Abstracts of free papers presented at the annual meeting of the Obstetric Anaesthetists' Association, Bournemouth, 23 & 24 May 2013

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O1 Risk factors for severe postpartum sepsis in the UK
CD Acosta, JJ Kurinczuk, DN Lucas*, M Knight
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Introduction: The incidence of maternal death caused by severe genital tract sepsis has nearly tripled over the last two decades in the UK and is now the leading cause of direct maternal death (1.3 per 100 000 maternities).1 The aim of this UK national study was to describe the sociodemographic and clinical risk factors associated with severe postpartum sepsis on a population basis, in order to inform future preventive strategies.

Methods: A population-based case-control study of severe maternal sepsis was undertaken from June 2011 to May 2012 using the UK Obstetric Surveillance System (UKOSS), which comprised all 221 hospitals with consultant-led maternity units in the UK. Cases were compared to controls using multivariable logistic regression. This analysis was restricted to cases of sepsis occurring postpartum, which formed the majority of cases reported.

Results: During the study period, 289 cases of severe postpartum sepsis were reported, representing an estimated incidence of severe postpartum sepsis of 3.8 cases per 10 000 maternities (95% CI=3.4-4.3). After adjustment for multiple sociodemographic and clinical variables, significant sociodemographic risk factors were: age≤25 years (adjusted odds ratio, aOR=1.51; 95% CI=1.07-2.12) and black or other minority ethnic group (aOR=1.61; 95% CI=1.20-2.16). The single significant clinical risk factor was mode of delivery. Compared to women who gave birth vaginally, women who had an operative vaginal delivery (aOR=3.23; 95% CI=1.85-5.61), prelabour caesarean (aOR=5.28; 95% CI=3.16-8.81) or caesarean after labour onset (aOR=9.47 95% CI=5.70-15.74) were all at significantly higher risk for postpartum sepsis. Primiparity, multiple-gestation and previous medical problems were identified as significant proximal risk factors in a model excluding mode of delivery. Premature rupture of membranes, >5 vaginal examinations, fetal blood sampling, fetal scalp electrode, labour induction and insertion of venflons, catheters or regional anaesthesia were not significant.

Discussion: The clear risk of severe postpartum sepsis associated with all modes of operative delivery has significant clinical implications for additional infection control measures and monitoring in obstetric anaesthetic practice. Additionally, the mechanisms of increased risk amongst younger and ethnic minority women need to be further explored. In the interim, clinicians should be aware of these increased risks and monitor women in these groups appropriately for early signs and symptoms of sepsis.

Reference

O2 Determination and quantification of the interaction of local anaesthetics and lipophilic opioids administered intrathecally for labour analgesia
WD Ngan Kee, KS Khaw, FF Ng, A Lee
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Introduction: Local anaesthetics and opioids are commonly given together during neuraxial labour analgesia with the expectation that the combination is advantageous. However, the nature of their pharmacodynamic interaction has not been fully determined. This study aimed to 1) describe the entire dose-response relation for combinations of intrathecal bupivacaine and fentanyl by determining the pharmacodynamic response surface, and 2) categorize the nature of the interaction (ie. intraadditivity vs additivity vs supraadditivity/synergism).

Methods: In a randomized double-blinded study, with IRB approval and patient consent, 300 labouring women received 1 of 30 different combinations of intrathecal bupivacaine and fentanyl using a combined spinal-epidural technique. Visual analogue pain scores were assessed for 30 min. The primary endpoint was the percentage decrease in pain score from baseline at 15 min. Dose-response data were first analyzed using nonlinear regression as previously described.1 Data were then pooled to derive a three-dimensional response surface plot.2 The interaction was categorized by constructing an isobologram using data for a 50% response at 15 min.

Results: A response-surface plot showing the pharmacodynamic interaction of intrathecal bupivacaine and fentanyl was constructed. Analysis of the isobologram revealed that the interaction is supraadditive/synergistic (Figure).

Discussion: This is the first study to fully describe the pharmacodynamic interaction of neuraxial local anaesthetic and opioid in humans. The demonstration of a supraadditive/synergistic interaction provides support for the combined administration of these drugs in routine clinical care.

References
O3 A prospective study to evaluate early Clauss fibrinogen and Fibt™ as predictors for major obstetric haemorrhage

GJ Lilley, DA Burkett-St.Lawrent, PW Collins, RE Collins
Dept of Anaesthesia, UHW, Cardiff, UK

Introduction: Fibrinogen has been shown to fall from a normal pregnancy range of 4-6 g/L early during postpartum haemorrhage (PPH) and is a more useful measure of haemostatic impairment than PT and aPTT. In a retrospective audit it was shown that the first Clauss fibrinogen measured after identifying a PPH predicted progression and the need for transfusion ≥4 units red blood cells (RBC) with a receiver operator characteristics (ROC) curve of 0.8.2 To establish whether a near-patient test (Fibt™ on the Rotem® Delta machine) had a similar utility for predicting the need for blood transfusion we undertook a prospective observational study.

Methods: After REC approval, 179 consecutive women were identified as having a PPH ≥1000 mL. Blood was taken for Clauss fibrinogen as part of a routine clotting screen and for Fibt™ (as a paired sample) as soon as PPH had been identified. All other aspects of management followed the local major PPH protocol. Total blood loss (gravimetric measurement), the number of units RBC transfused and other blood products were recorded. Statistical analysis was carried out using SPSS 20.

Results: From April to September 2012, PPH ≥1000 mL was identified in 179/3200 births (5.6/1000, progressing to ≥1500 mL in 84 patients and ≥2500 mL in 17 patients. 42 women received RBC transfusion with 10 receiving ≥4 units. Investigating patients who continued to bleed after 1500 mL, we performed ROC analysis to examine the utility of fibrinogen or Fibt™ maximum clot firmness (MCF) to predict progression to transfusion with any RBC, ≥4 units of RBC, or the need for invasive procedures (Bakri balloon etc). Area under the curve (AUC) and P values are shown.

AUC (p value)

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<th>Clotted RBC</th>
<th>Any RBC transfused</th>
<th>Any RBC transfusion</th>
<th>Invasive Procedures</th>
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<td>Fibrinogen</td>
<td>0.84 (p=0.01)</td>
<td>0.72 (p=0.003)</td>
<td>0.93 (p=0.01)</td>
</tr>
<tr>
<td>Fibt™</td>
<td>0.80 (p=0.01)</td>
<td>0.74 (p=0.001)</td>
<td>0.89 (p=0.01)</td>
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Fibt™ MCF <18 mm gives a positive predictive value of 89% (95% CI 67-98) and a negative predictive value of 84% (78-90) for the need for any RBC transfusion.

Discussion: In this prospective observational study, the first Clauss fibrinogen and Fibt™ taken after identifying a PPH predicted the need for any RBC and ≥4 units RBC transfusion. The fibrinogen and Fibt™ were similar in an MCF <18 mm predicted PPH progression and the need for invasive procedures. This study confirms the results of previous work that fibrinogen is a useful early marker of major PPH and that the near-patient test Fibt™, which can give results within minutes, is of similar value. It is unknown if early correction of fibrinogen in PPH will reduce the need for RBC transfusion and is the subject of a proposed interventional study.

ROTEM machine and regents provided by TEM International

References

O4 A pilot study to measure the insertion force of a Tuohy needle in a porcine spine

RA Isaacs, MYK Wee, VN Dubey*, N Vaughan*
Department of Anaesthesia, Poole Hospital NHS Foundation Trust, Poole, UK
*School of Design, Engineering and Computing, Bournemouth University, Bournemouth, UK

Introduction: There is a complex interplay of forces during an ‘in-vivo’ epidural needle insertion and without accurate measurement of these forces it is difficult to create realistic epidural simulators. Previous models have relied upon expert user opinion rather than numerical force data, thus making validity difficult to assess. This pilot study presents the results of insertion pressures as a Tuohy needle is advanced through the epidural space on a porcine cadaver. The primary aim was to test novel and innovative wireless pressure measuring and receiving equipment to facilitate a clinical trial in labouring parturients.

Methods: Approval for this study was granted by the Sponsor, PHFT and Bournemouth University. Ethics approval was not required. A saddle cut of a pig was obtained within 24 h of slaughter without being frozen. Insertions were performed by two experienced anaesthetists using a Portex 16-gauge Tuohy needle (Smiths Medical) at various intervertebral levels from T12-L5 using a midline approach. Pressure measurement required the use of a three-way tap, manometer tubing, a pressure transducer (Kimal plc) and a uniquely designed wireless transmitter and receiver. Custom-designed computer software processed the relayed data which were continuously monitored and could display a real-time pressure graph. Funding was obtained through both Bournemouth University and Poole Hospital NHS Foundation Trust.

Results: We performed a total of 17 epidural insertions at various levels to minimise confounding effects of multiple insertions at one level. Figure 1 displays a typical graph obtained, with the arrow indicating loss of resistance.

The maximum pressure peak ranged from 470–500 mmHg (62.7–66.7 kPa). This equates to a force of 11.8 N just before puncture of the ligamentum flavum.

Discussion: The results demonstrate that our pressure-measuring system is both accurate and responsive in the porcine model and correlates well with previous studies. Following this pilot study, an ‘in-vivo’ clinical study is now in progress, recruiting labouring parturients of varying body mass indices. Funding was secured through a grant from the NIAA. The data will ultimately be used to configure a haptic device for the purpose of creating a realistic force-feedback epidural simulator to assist training.

Reference
O5 Audit of maternal outcomes following introduction of an enhanced recovery in obstetric surgery (EROS) protocol for elective caesarean section

Anaesthesia, King’s College Hospital NHS Foundation Trust, London, UK, *Obstetrics & Gynaecology, King’s College Hospital NHS Foundation Trust, London, UK

Introduction: Enhanced recovery is well described in elective colorectal surgery. It has been accredited with improved outcomes and reduced inpatient stays.1,2 The principles of enhanced recovery have been extrapolated to other surgical specialties but not to the obstetric population.

Methods: An EROS protocol (Fig. 1) was devised for women undergoing elective caesarean section. The aim was to improve preoperative preparation, ensure early restoration of normal diet and return of bladder function, optimise postoperative comfort, encourage early mobilisation, improve patient satisfaction and minimise inpatient stay. The following were recorded for the first 50 women after introduction of the protocol: Timing of enteral nutrition, mobilisation and catheter removal postoperatively; re-catheterisation rate; duration of inpatient stay; and analgesia satisfaction scores.

Figure 1. Enhanced Recovery in Obstetric Surgery Protocol

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<td>Standardised analgesia</td>
<td>Follow-up by midwife day after discharge</td>
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<td>Reduced fasting times</td>
<td>Early enteral nutrition with cessation of IV fluids</td>
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<td></td>
<td>Early catheter removal</td>
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<td>Day zero mobilisation</td>
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<td></td>
<td>Opportunity to go home day one</td>
<td></td>
</tr>
</tbody>
</table>

Results: An audit of the previous 15 months elective caesarean sections (n=428) showed an average inpatient stay of 2.9 days with 28 women (6.5%) discharged on day one. After introduction of EROS the average inpatient stay reduced to 2.0 days with 22 women (44%) discharged on day one. Enteral nutrition was recommenced in recovery in 40 patients (80%). The catheter was removed before leaving recovery in 22 women (44%), with 3 requiring re-catheterisation. Day zero mobilisation occurred in 27 women (54%). Analgesia satisfaction scores (n=45) were rated as satisfactory or better by 44 women (98%) and unsatisfactory by one woman (2%).

Discussion: Through the implementation of the EROS protocol we have reduced the duration of inpatient stay. This improves patient flow and capacity on the post-natal ward and uses available resources more efficiently. By enabling women to return to normal function sooner their risk of morbidity is potentially reduced. Initial feedback from women has been very positive.

References

O6 Cardiac output response to a colloid preload for spinal anaesthesia for caesarean section in patients with treated severe preeclampsia

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Introduction: Fluid management during spinal anaesthesia (SA) for caesarean section (CS) in patients with severe preeclampsia (PE) is controversial. There is a significant risk of pulmonary oedema, therefore it would be of value to determine whether these patients are stroke volume (SV) responsive, in order to aid optimal fluid administration.

Methods: The SV response to a 300 mL colloid preload was studied in 42 patients with severe treated PE presenting for SA for CS for a maternal indication. Patients were placed in the left lateral position and a 16-gauge intravenous catheter and a 20-gauge radial arterial line were placed. Beat-by-beat baseline heart rate (HR), mean arterial pressure, SV and cardiac output (CO) were recorded using the LiDCO rapid pulse waveform analysis monitor (LiDCO, Cambridge, UK) for one minute before fluid administration. The colloid solution was then administered using a pressurized infusion bag, and the haemodynamic response measured during the one minute following the completion of the infusion.

Results: In response to fluid administration, mean cardiac index increased significantly, from 4.9 to 5.6 L/min/m² (P<0.01). This was due to an increase in both HR, from 81.3 to 86.3 beats/min (P=0.2) and SV, from 111.8 to 119.8 mL/beat (P=0.049). 14/42 (33.3%) and 23/42 (54.8%) patients exhibited a SV response >10% and >5%, respectively. In addition, a significant negative correlation was found between HR and SV changes in response to fluid loading (Fig. 1).

Figure 1: Negative correlation between SV and HR change following fluid administration (r = 0.6668, P <0.001).

Discussion: In patients with treated severe PE, colloid preloading resulted in a significant, variable increase in cardiac index, due both to an increase in SV and HR. An exaggerated HR response to fluid loading could indicate that further fluid administration is inappropriate.
O7 Effect of an anaesthesia information video on preoperative maternal anxiety and postoperative satisfaction in elective caesarean section. A randomised controlled trial

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Introduction: Video-based patient information supplementing clinician-supplied information has been shown to reduce anxiety and improve satisfaction in patients undergoing procedures.1 In Queensland, >90% of caesarean sections are performed under neuraxial anaesthesia.2 In this randomised controlled trial we aimed to assess the effect of using an information video on neuraxial anaesthesia in patients having elective caesarean section.

Methods: After ethics approval and written consent, women were randomised to: view the video and undergo usual care (Group V) or to undergo usual care (Group C). Eligible patients met these criteria: no previous elective caesarean section; age >18 years; able to complete a questionnaire and understand a video presented in English. The primary outcome measure was the Spielberger State-Trait Anxiety Inventory (STAI) score completed preoperatively. Secondary outcome measures included: duration of the anaesthetic interview (AI), the Maternal Satisfaction with Caesarean Section Score (MSCSS) completed postoperatively and patient satisfaction with the AI. A sample size of 50 in each group was determined, based on detecting an 8-point change in anxiety scores with 80% power and a significance level of 0.05. Patients were randomised by sequentially numbered, opaque, sealed envelopes. Care-givers and data-collectors were blinded to group assignment. A one-way ANOVA and Chi-squared tests were used in statistical analysis.

Results: 143 patients were randomised and 110 completed the protocol. Participants with missing data were not significantly different to those who completed the protocol based on the parameters we measured.

<table>
<thead>
<tr>
<th></th>
<th>Control n=58</th>
<th>Video n=52</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>32.5 ± 5.6</td>
<td>31.1 ± 5.0</td>
<td>0.20</td>
</tr>
<tr>
<td>Nulliparous (%)</td>
<td>29.3</td>
<td>28.8</td>
<td>0.96</td>
</tr>
<tr>
<td>Previous emergency CS(%)</td>
<td>55.2</td>
<td>59.6</td>
<td>0.64</td>
</tr>
<tr>
<td>Trait anxiety*</td>
<td>33.3 ± 7.8</td>
<td>31.6 ± 7.7</td>
<td>0.24</td>
</tr>
<tr>
<td>State anxiety*</td>
<td>41.2 ± 10.5</td>
<td>39.8 ± 10.8</td>
<td>0.49</td>
</tr>
<tr>
<td>MSCSS**</td>
<td>118.5 ± 19.4</td>
<td>122.7 ± 16.4</td>
<td>0.22</td>
</tr>
<tr>
<td>Satisfaction with information***</td>
<td>6.4 ± 0.9</td>
<td>6.8 ± 0.4</td>
<td>0.01</td>
</tr>
<tr>
<td>Duration of interview (min)</td>
<td>16.3 ± 5.3</td>
<td>15.1 ± 6.5</td>
<td>0.69</td>
</tr>
</tbody>
</table>

Data are mean ± standard deviation; *maximum possible score 80; **maximum possible score 154; ***score 1-7

Discussion: Using an anaesthesia information video does not increase preoperative anxiety or the duration of the preoperative AI. Satisfaction with the process of elective caesarean section remains high without the use of an information video.

References

O8 Intrathecal ropivacaine +/-opioid vs. bupivacaine +/-opioid for caesarean section: a meta-analysis

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Introduction: Conflicting outcomes have been reported after intrathecal administration of bupivacaine or ropivacaine over the time taken to obtain anaesthesia for caesarean section.1 This meta-analysis examines the time taken to reach surgical anaesthesia in the obstetric population, and the incidence of hypotension, epidural use, umbilical artery pH and recovery characteristics of the two local anaesthetics in prospective randomised controlled trials (RCTs).

Methods: The keywords ropivacaine, bupivacaine, intrathecal, spinal, subarachnoid, Caesarean and Cesarean were used to search Medline, EMBASE and Google Scholar to identify RCTs and published abstracts, using the Jadad Scale to assess the quality of the RCTs. RevMan statistical software® utilised inverse variance and a random effect model to calculate standardised mean difference (SMD), with 95% CI for continuous variables and odds ratio and the Mantel-Haenszel method for dichotomous variables. The primary outcome was time to surgical anaesthesia. Secondary outcomes were: time to complete motor block, incidence of hypotension, epidural use, duration of sensory block, and umbilical artery pH.

Results: Ten RCTs comprising 618 patients were included. Fentanyl, morphine and sufentanil were the commonest opioids used. The Jadad score ranged from 2-5. There was no significant difference in time taken to surgical anaesthesia with ropivacaine compared to bupivacaine (P=0.14). Time to complete motor block was significantly shorter with ropivacaine (P=0.008). There was no difference between the two groups with regard to the incidence of hypotension (P=0.12), duration of sensory block (P=0.16), epidural use (P=0.06) or umbilical artery pH (P=0.14).

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Studies /patients</th>
<th>SMD, IV, Random, OR, MH, 95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time taken to reach surgical anaesthesia</td>
<td>6/378</td>
<td>-0.2[-0.46, 0.06]</td>
<td>0.14</td>
</tr>
<tr>
<td>Time to complete motor block</td>
<td>4/236</td>
<td>-0.5[-0.8, -0.21]</td>
<td>0.008</td>
</tr>
<tr>
<td>Incidence of hypotension</td>
<td>6/371</td>
<td>1.45[0.90, 2.32]</td>
<td>0.12</td>
</tr>
<tr>
<td>Dose of epidural</td>
<td>7/385</td>
<td>0.5[0.02, 1.04]</td>
<td>0.06</td>
</tr>
<tr>
<td>Duration of sensory block</td>
<td>4/251</td>
<td>0.89[-0.35, 2.12]</td>
<td>0.16</td>
</tr>
<tr>
<td>Umbilical artery pH</td>
<td>4/218</td>
<td>-0.24[-0.55, 0.08]</td>
<td>0.14</td>
</tr>
</tbody>
</table>

Discussion: Intrathecal ropivacaine is a suitable alternative to bupivacaine for caesarean section. This meta-analysis suggests it has a similar onset of surgical anaesthesia with no increase in the incidence of hypotension or epidural use. As previously demonstrated,2 time to complete motor block is longer using ropivacaine, but duration of sensory block is similar with both drugs. There was no difference between the two groups in terms of the umbilical artery pH.

References
O9 Wireless telephony improves patient safety in a large maternity unit

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Introduction: Communication failures are implicated in everyday medical errors. Communication using the traditional paging system is a well-established method in our hospital but often force clinicians to leave the patient's bedside to respond to the caller, causing task disruption and delays. This, in addition to the large size and busy nature of our unit (6700 births/year), a superior method of communication was deemed necessary to minimise delays and improve efficiency. We present, in this service improvement, the introduction of a wireless communication system (Vocera®) and its impact on efficiency and patient outcomes.

Methods: A prospective audit of clinicians' response time to the pager (bleep) system was carried out. This was collected using timers attached to the delivery suite internal phones. This was repeated during a two-week trial period using a new communication system (Vocera®). When the results were compared, Vocera® appeared to be a better method of communication. Vocera® was introduced in June/July 2010 and required anaesthetists, obstetricians, operating department practitioners and midwife co-ordinator to carry a small, lightweight, wearable, hands free and voice-controlled wireless device. Results from annual audit of decision to delivery time (DDT) in category I caesarean section (CS) was used as an indicator of improved clinical outcomes.

Results: The mean response time using Vocera® (n=57) was 31 s with 100% call success rate, compared to 93 s and 83% using the standard pager system (n=120). In 2009 (before introducing Vocera®), the DDT was greater than 30 min for category 1 CS in 16% of cases. This has dropped to 8% in 2010 when Vocera was partially implemented and further dropped to 3% in 2011 after full implementation.

Discussion: This intervention has produced a considerable decrease in time needed to contact key staff members. Wireless technology allows instant communication and rapid location of clinicians in an emergency without the need to page and wait. Response times can be further reduced by using advanced call features (urgent and group calls). Test messaging can also be utilised to reduce task disruption from non-urgent calls. The DDT >30 min has significantly fallen since full implementation, indicating improved maternal and neonatal outcomes. The key to successful implementation, in addition to resources, was consultant leadership and staff engagement and training. The response to implementation has been very positive and is now considered an integral and essential part of the daily functioning of the unit. Vocera® has transformed communication between clinicians within our unit and also with those outside the hospital. We recommend the use of such technology in large and busy maternity or emergency units.

References
O11 Pregnant women's views on informed consent for research in labour

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Introduction: In a study published in 2012, patients sustaining a dural tap during insertion of a labour epidural were randomly assigned to one of two treatment groups, and only informed about the study and consent sought, after treatment. This is in breach of GMC guidance but was allowed by a multicentre REC in view of the difficulties obtaining consent before treatment of the dural tap. The ethical validity of this retrospective consent has been questioned but to our knowledge, the opinion of the patients themselves has not been sought. We sought women’s views as to the optimal timing for consent in this study.

Methods: With REC approval and written consent, 74 primiparous women in the 3rd trimester completed a structured, facilitated questionnaire. They were asked to rate the acceptability of the consent process occurring: in antenatal clinic; after the epidural was requested in labour; after the dural tap but before treatment; after the allocated treatment (as in the original study); or without consent at any stage. Results were analysed with the Friedman and Wilcoxon signed-rank tests, with P<0.05 indicating statistical significance.

Results: Mean (SD) age and gestation were 34.4 (4.5) and 34 (3.6). 7 (9%) had achieved A levels and the remaining 67 (91%) had completed either an undergraduate or postgraduate degree. Scores for acceptability of the five consent scenarios are shown in the figure. There was a statistically significant difference between all groups P<0.0005.

![Graph showing acceptability of consent process](image)

Discussion: Our data support the original study’s ethical conduct, though our results may not be applicable to other units, depending on their demographics. A subgroup of patients felt that retrospective consent was unacceptable; further work could look at identifying this group. As expected, antenatal consent was considered most acceptable but if not possible, other options can be justified. The wide range of responses mirrors that for disclosure of risk when sitting epidurals.

References

O12 Subdural empyema in pregnancy: a neurosurgical emergency

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Introduction: Subdural empyema is a rare but potentially fatal cause of headaches, most frequently seen as a complication of sinusitis. We present a case of a pregnant woman with headaches and malaise.

Case report: A 33-year-old woman (G3P2) of 25 weeks of gestation attended the emergency department with a 24-h history of headache, neck stiffness, malaise and coryzal symptoms. Medical history and pregnancy were unremarkable. She was alert and orientated, with neck stiffness, but no papilloedema or focal neurology. She was tachycardic and pyrexial with elevated CRP (206 mg/L) and serum lactate (7.1 mmol/L). Initial impression was of sepsis secondary to bacterial meningitis so fluid resuscitation and antibiotics were commenced. As there were concerns about radiation exposure in pregnancy a consultant radiologist and clinical infection team agreed that in the absence of clinical signs of raised intracranial pressure (ICP), they could perform a lumbar puncture (LP) without prior CT imaging. Rapid deterioration in conscious level along with left papillary dilatation preceded LP. Anaesthesia was induced and mechanical ventilation commenced. A CT head scan revealed a right parietal subdural collection consistent with empyema, global cerebral oedema and evidence of raised ICP. Intravenous mannitol was administered while she transferred to theatre for an emergency burr hole. Postoperatively her ICP remained high (initially >40 mmHg) requiring high-dose sedation, cooling and hypertonic saline. She was extubated on day 8 and transferred to the ward on day 12 with a residual 3rd cranial nerve palsy. Fetal observations remained normal throughout. Following discharge a fetal surveillance scan at 28 weeks confirmed normal development. She had an uneventful vaginal delivery at term.

Discussion: Morbidity and mortality in intracranial empyema relate directly to the delay in prompt diagnosis and neurosurgical intervention. There remains widespread misperception regarding risks involved with diagnostic radiology in pregnancy. In this case performing a lumbar puncture would not only have delayed diagnosis but my have had potentially serious consequences in a patient with raised ICP. Guidelines issued by the Health Protection Agency with the Royal College of Radiologists and College of Radiographers states that the radiation dose to a fetus likely to result from any diagnostic examination in current use should present no risk of fetal death, malformation, growth retardation or impaired mental development. Furthermore, fetal radiation exposure associated with a CT scab scan of the head is associated with a childhood cancer risk <1 in 1 000 000, compared to a natural background risk of 1 in 500.

References
P1 An evaluation of a programmed intermittent epidural bolus technique for labour analgesia

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Introduction: Programmed intermittent bolus (PIB) epidural analgesia compared to continuous epidural infusion for labour has been associated with reduced local anaesthetic (LA) consumption, reduced motor block and better patient satisfaction. We evaluated a PIB with PCEA regimen for labour analgesia, using a PCEA pump incorporating novel technology that delivers both PIB and PCEA boluses of low-dose epidural mixture (LDM) of 0.1% bupivacaine with fentanyl 2μg/mL.

Methods: The evaluation took place over a three-month period. Labour analgesia was initiated by epidural or combined spinal-epidural using LDM. A regimen consisting of 8 mL PIB with 45 min bolus interval and 5 mL PCEA, for breakthrough pain, with 20 min lockout period was then commenced. Pain and motor block were assessed throughout labour and patients were followed up after delivery. The primary outcome measure was LA consumption, while secondary outcomes included motor block, pain scores (0-10) and patient satisfaction. Parturients were considered to have a motor block if they had little or no leg movement. Patient satisfaction was considered adequate if it was reported as 'good', 'very good' or 'excellent'.

Results: Data from 86 patients were evaluated.

PIB with PCEA evaluation results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bupivacaine consumption (mg/h)</td>
<td>13.2 (3.26)</td>
</tr>
<tr>
<td>Motor block</td>
<td>40/68 [59%]</td>
</tr>
<tr>
<td>Time to motor block (min)</td>
<td>330 [233-375]</td>
</tr>
<tr>
<td>PCEA demands per hour</td>
<td>0.55 [0.13-1.18]</td>
</tr>
<tr>
<td>PCEA delivered per hour</td>
<td>0.30 [0.12-0.62]</td>
</tr>
<tr>
<td>Pain scores (0-10)</td>
<td>0 [0-1]</td>
</tr>
<tr>
<td>Spontaneous vaginal delivery</td>
<td>33/86 [38%]</td>
</tr>
<tr>
<td>Assisted vaginal delivery</td>
<td>30/86 [35%]</td>
</tr>
<tr>
<td>Patient satisfaction adequate</td>
<td>65/86 [96%]</td>
</tr>
</tbody>
</table>

Data are mean (SD), median [interquartile range] and number (%)

Discussion: Despite low pain scores and high patient satisfaction, total anaesthetic consumption was greater than expected, with a large proportion of patients experiencing a motor block. This could be attributed to the 0.1% bupivacaine in our LDM being at a higher concentration compared to other studies evaluating PIB analgesia for labour using 0.0625% bupivacaine. Further studies evaluating different PIB with PCEA dosing regimens are warranted.

References

P2 An evaluation of different ethyl chloride application methods for sensory block testing

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Introduction: The absence of perception of cold sensation is one of the modalities often tested to assess the effectiveness of neuraxial blockade. This may be tested with iced; however, for convenience many departments use ethyl chloride, the rapid evaporation of which leads to skin cooling. Ethyl chloride has been available for many years in a glass vial dispenser and has more recently become available as an aerosol (Fig. 1).

The purpose of this investigation was to examine the application rates from these devices in order to assess the likely environmental, cost and practical effects.

Methods: Two examples of each of the devices were tested. 10 second bursts were sprayed from each device at a 45 degree downward angle into a fume cupboard. A period of 2 min was allowed to elapse between each burst to prevent device cooling affecting output. The time to partial emptying (the time at which the spray became non continuous) and time to complete emptying was measured for each device.

Results: The glass vial has a volume of 50 mL at a cost of £16.08. The aerosol can has a volume of 100 mL at a cost of £9.29. When tested, the mean time (s) to partial emptying is 180 s for the glass vial and 30 s for the aerosol can. The mean time to fully empty is 200 s for the glass vial and 50 s for the aerosol can. The volume of ethyl chloride dispensed each second therefore is 0.25 mL for the glass vial and 2 mL for the aerosol; and cost per ml is 32 p and 9 p, respectively. When considering each 10 s spray, the cost per spray is therefore 80 p for the glass vial and 180 p for the aerosol.

Discussion: The devices were tested at a 45 degree downward angle in 10 s bursts as this approximately replicates the way in which the devices are used when testing sensory blockade. Glass vial dispensers gave a silent even spray until completely empty, whereas it was found that the aerosol canisters ceased to work continuously when partially empty and gave an audible hiss when used which could potentially alert patients to testing. The glass vial dispensers lasted 200 s whereas the aerosols completely emptied after 50 s, delivering 0.25 mL/s and 2.0 mL/s, respectively. The 8x fold higher output of the aerosol causes significantly more environmental pollution. Superficially the aerosol canisters seem to offer more economical application, being twice the volume for approximately half the price, however when cost per second of application is calculated glass vial dispensers proved to be the most economical. This investigation showed that when using ethyl chloride for sensory testing, glass vial dispensers are a silent, less polluting, and cheaper alternative to aerosol canisters.
P3 Enhanced recovery in obstetrics
B Das, R Vickers, V Machineni
Department of Anaesthetics, Queen’s Hospital, Burton-upon-Trent, UK

Introduction: Enhanced recovery (ER) is a bundle of ‘best evidence based practices’ delivered by a multi-professional team with the intention of helping patients recover faster after surgery. ER pathways are associated with better clinical outcomes, fewer complications and are cost-effective. While there is no research specifically looking at ER in obstetrics the same principles can be applied. We used the principles of ER in elective caesarean sections by planning and implementing a care pathway and subsequently audited the pathway to look at outcome measures- time to discharge and readmission rates.

Methods: The pathway involved identifying key steps in the patient’s journey (from obstetric decision for an elective caesarean through preoperative anaesthetic assessment to discharge from hospital), involving key people in each step and reinforcing expectations around early normalisation and discharge at every stage. We implemented the pathway in September 2012. All elective caesarean sections were performed under spinal anaesthesia with intrathecal bupivacaine and fentanyl and unless contraindicated, with rectal diclofenac and TAP blocks. A standardised postoperative analgesic regimen was prescribed and all intravenous fluids were stopped (unless clinically indicated) before transfer from recovery. On the wards patients were encouraged to eat and drink normally and reviewed after approximately 6 h to assess wearing off of the spinal anaesthetic. If the spinal had worn off, the urinary catheter was removed and the mother encouraged to mobilise. The following morning, the mother was reviewed by the obstetrician, anaesthetist and paediatrician to facilitate early discharge if appropriate. We compared time to discharge for patients pre- and post introduction of ER and also looked at readmission rates. Data were collected for elective sections in May 2012 (before ER) and October and December 2012 (post ER).

Results:

<table>
<thead>
<tr>
<th>Month</th>
<th>No of elective caesarean sections</th>
<th>% of women discharged within 24-36 h</th>
<th>Readmissions following discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2012 (pre ER)</td>
<td>39</td>
<td>10.2%</td>
<td>0</td>
</tr>
<tr>
<td>October 2012 (post ER)</td>
<td>23</td>
<td>43.4%</td>
<td>0</td>
</tr>
<tr>
<td>December 2012 (post ER)</td>
<td>21</td>
<td>76.2%</td>
<td>0</td>
</tr>
</tbody>
</table>

Discussion: We found an increase in the number of women being discharged the day following caesarean section since the introduction of ER. The improved results in December may be a reflection of increased confidence by staff in implementing the pathway. Our finding of no readmissions following early discharge suggests this is a safe practice.

References
1. Delivering ER: Helping patients to get better after surgery, Department of Health, March 2010
2. NHS Innovation, Health and Wealth, Accelerating Adoption and Diffusion in the NHS, October 2011

P4 General anaesthetic drug dosing for caesarean section in obese parturients
M Chandra, HC Reynolds, R Natesan
Anaesthesia, Airedale General Hospital, Keighley, UK

Introduction: Achieving optimal intubating conditions in obese parturients is essential given the increased incidence of airway complications in this challenging population. Drug dosage may require modification due to changes in key pharmacokinetic variables. The Society of Bariatric Anaesthesia (SOBA) recommends the use of total body weight (TBW) for suxamethonium and lean body weight (LBW) for thiopental in morbidly obese patients. We performed an audit in our hospital to ascertain whether appropriate doses of induction agents were administered to obese parturients requiring caesarean section (CS) under general anaesthesia (GA).

Methods: Parturients with a booking body mass index (BMI) of 35 kg/m² and above were identified using our electronic maternity database. The anaesthetic records of patients requiring GA for CS between the years 2005 and 2010 were reviewed retrospectively. The induction doses were compared against the recommended dosages (suxamethonium 1.0-1.5 mg/kg of TBW and thiopental 3-7 mg/kg of LBW). We also noted any airway complications.

Results: 31 completed anaesthetic records were identified. 8 (25.8%) patients were under dosed with suxamethonium (<1mg/kg), 21 (67.7%) patients were dosed appropriately (1-1.5 mg/kg) and 2 (6.4%) patients were overdosed (>1.5 mg/kg). With thiopental, no patients were under dosed (<3 mg/kg), 4 (12.9%) patients were appropriately dosed (3-7 mg/kg) and 27 (87.1%) patients were overdosed (>7 mg/kg). The only failed intubation was in the under dosed suxamethonium group.

Discussion: An appropriate dose of suxamethonium is vital to yield optimum intubating conditions. Our results suggest that suxamethonium is being regularly under dosed in this population, which may contribute and/or potentiate difficulties in airway management. It is common practice to use 1 ampoule (100 mg) of suxamethonium rather than a specific calculated dose. This may have contributed to the failed intubation in our under-dosed suxamethonium group. In order to improve compliance with the recommendations, we have devised a chart displaying pre-calculated doses of induction agents in the obstetric theatre. We aim to re-audit and assess the impact on the incidence of airway complications.

References
P5 Gravimetric measurement of blood loss during postpartum haemorrhage predicts fall in haemoglobin

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Introduction: Accurate measurement of blood loss during postpartum haemorrhage (PPH) is important so that early diagnosis is facilitated, appropriate interventions instigated and timely blood and blood products given. In PPH, blood loss is often estimated visually, but this method is associated with under and over estimation. 1,2 We introduced routine gravimetric measurement of blood loss (MBL) at all deliveries. To assess the accuracy of this technique we prospectively compared the fall in haemoglobin with MBL.

Methods: After local ethics approval, consecutive women in a 6-month period in 2012 who had a PPH > 1000 mL were recruited in all maternity areas. The volume of PPH was measured using a standard gravimetric technique of dry weight minus soiled weight of pads, sheets and swabs. This was added to blood collected in various receptacles and suction. The fall in haemoglobin (Hb) was defined as the pre-delivery Hb, minus the discharge Hb. Where a red cell transfusion had been given, 1 g/dL for each unit of red cells transfused was added to the fall in Hb to give a corrected fall in Hb. 3 Statistical analysis was performed with SPSS 20.

Results: 179/3200 (5.2%) had a PPH. The graph of MBL versus corrected fall in Hb is shown.

![Graph of corrected Hb drop compared to MBL](image)

The Pearson's correlation for a PPH >1500 mL was 0.789 which was similar in hours 0.694 and out of hours 0.846. Below 1500 mL there was no correlation.

Discussion: This study is the first to show that gravimetric measurement of blood loss is strongly associated with the fall in Hb during during PPH>1500 mL. There appear to be two distinct groups with no correlation during smaller bleeds which could be due to physiological compensation. We found the results similar for deliveries in different locations (consultant unit, midwifery unit and theatre) and out of hours demonstrating its feasibility. We suggest this technique should be routinely used in all maternity services to improve assessment of blood loss after delivery and during PPH.

References

P6 Non-luer spinal needles & syringe systems: clinical evaluation data from a large maternity hospital

I Ahmed, S S Solaidhanasekaran, M Purva, A Samaan
Anaesthesia, Hull Royal Infirmary, Hull, UK

Introduction: National Patient Safety Agency (NPSA) recommends that before their introduction into routine practice, currently available non-luer spinal needles, should first be clinically evaluated locally by users of these devices. We report clinical effectiveness data on six commercially available non-luer spinal needles.

Methods: Data collection: prospective on a standardised OAA developed proforma. Evaluation period: 1st April 2012 – 30th September 2012. Six commercially available needles were evaluated; Smith-Portex (SP), Becton-Dickinson (BD), Vygon (VG), B-Braun (BB), Pajunk (PJ), and Sarstedt, on patients undergoing caesarean section (CS). All needles were resourced free of charge from the respective suppliers. Evaluations were performed by anaesthetists with at least one year’s of experience in anaesthesia. Each non-luer needle and syringe system was evaluated separately for one month. Only 25-gauge and 90 mm non-luer needles were evaluated. All spinals were performed in sitting position in a standardised manner as per local protocol for neuraxial procedures.

Results: A total of 98 needles were evaluated; BD=19, SP=9, Vygon=32, BB=19, Pajunk=16, Sarstedt=3. All CS, except 9, were elective. 28 were performed by a consultant, 32 by core trainees and 38 by specialty trainees. Due to serious concerns raised, Sarstedt evaluation was discontinued after 3 procedures. With the BD, SP and PJ needles there was one failed spinal in each group.

Table: Equipment characteristics during needle evaluation

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>BD</th>
<th>SP</th>
<th>VG</th>
<th>BB</th>
<th>PJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good feel of dural puncture</td>
<td>74%</td>
<td>78%</td>
<td>100%</td>
<td>95%</td>
<td>69%</td>
</tr>
<tr>
<td>Trocar easy to remove</td>
<td>84%</td>
<td>78%</td>
<td>100%</td>
<td>100%</td>
<td>81%</td>
</tr>
<tr>
<td>Free aspiration</td>
<td>95%</td>
<td>66%</td>
<td>94%</td>
<td>100%</td>
<td>94%</td>
</tr>
<tr>
<td>Easy to see CSF in hub</td>
<td>95%</td>
<td>78%</td>
<td>100%</td>
<td>100%</td>
<td>94%</td>
</tr>
<tr>
<td>Leak of injectate</td>
<td>16%</td>
<td>11%</td>
<td>0%</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>Needle movement / bent</td>
<td>16%</td>
<td>22%</td>
<td>0%</td>
<td>22%</td>
<td>12%</td>
</tr>
<tr>
<td>No of attempts</td>
<td>1</td>
<td>57%</td>
<td>55%</td>
<td>69%</td>
<td>74%</td>
</tr>
<tr>
<td>&gt;2</td>
<td>31%</td>
<td>22%</td>
<td>19%</td>
<td>15%</td>
<td>25%</td>
</tr>
<tr>
<td>Satisfaction* (descriptive)</td>
<td>Same</td>
<td>74%</td>
<td>55%</td>
<td>63%</td>
<td>74%</td>
</tr>
<tr>
<td>Worse</td>
<td>26%</td>
<td>33%</td>
<td>9%</td>
<td>5%</td>
<td>44%</td>
</tr>
<tr>
<td>Better</td>
<td>0%</td>
<td>1%</td>
<td>22%</td>
<td>21%</td>
<td>0%</td>
</tr>
</tbody>
</table>

*Satisfaction compared with usual spinal needle and equipment

Discussion: Although, our sample size is much smaller, our results are comparable to those published by Kinsella et al; although, they did not evaluate Vygon, BD and B-Braun needles. Our data suggest that of the non-luer needles tested, Vygon is the least problematic.

References
P7 Programmed intermittent epidural bolus analgesia for labour: a comparison of two regimens

I Mavridou, T Husain, R Fernando, N El-Wahab, A Stewart, J Dick, M Columb*
Department of Anaesthesia, University College London Hospitals, London, UK, *Acute Intensive Care, University Hospital of South Manchester, Manchester, UK

Introduction: Manipulation of the programmed intermittent epidural bolus (PIB) time interval and injection volume can reduce local anaesthetic (LA) consumption without decreasing patient satisfaction. We adjusted the volume and PIB interval to evaluate the effect on LA consumption, using novel technology that delivers both PIB and patient controlled epidural analgesia (PCEA) boluses of low-dose epidural mixture (LDM), consisting of 0.1% bupivacaine with fentanyl 2 µg/ml at a high flow rate.

Methods: A regimen of 8 mL PIB with 45 min bolus interval and PCEA 5mL, for breakthrough pain, with 20 min lockout (PIB 8/45) was evaluated over a three-month period. The regimen was then revised to 5 mL PIB with 60 min bolus interval and 5 mL PCEA with 20 min lockout (PIB 5/60). This regimen was evaluated over two months. Pain and motor block were assessed throughout labour and patients were followed up after delivery. The primary outcome measure was LA consumption, while secondary outcomes included motor block, pain scores (0-10) and patient satisfaction. Patients were considered to have a motor block if they had little or no leg movement. Maternal satisfaction was considered adequate if it was reported as good, very good or excellent.

Results: Data were evaluated from 86 parturients using PIB 8/45 and 49 parturients using PIB 5/60.

<table>
<thead>
<tr>
<th>PIB 8/45</th>
<th>PIB 5/60</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bupivacaine (mg/h)</td>
<td>13.2 (3.26)</td>
<td>10.5 (3.86)</td>
</tr>
<tr>
<td>Motor Block (%)</td>
<td>40/68 (59%)</td>
<td>27/38 (71%)</td>
</tr>
<tr>
<td>Time to motor blk (min)</td>
<td>330 [233-375]</td>
<td>380 [293-634]</td>
</tr>
<tr>
<td>PCEA demands/h</td>
<td>0.55 [0.13-1.18]</td>
<td>1.27 [0.65-1.82]</td>
</tr>
<tr>
<td>PCEA delivered/h</td>
<td>0.30 [0.12-0.62]</td>
<td>0.67 [0.48-1.09]</td>
</tr>
<tr>
<td>Pain score (0-10)</td>
<td>0 [0-1]</td>
<td>0.4 [0.0-2.0]</td>
</tr>
<tr>
<td>Spontaneous delivery</td>
<td>33/86 (38%)</td>
<td>17/49 (35%)</td>
</tr>
<tr>
<td>Instrumental delivery</td>
<td>30/86 (35%)</td>
<td>21/49 (43%)</td>
</tr>
<tr>
<td>Satisfaction adequate</td>
<td>65/68 (96%)</td>
<td>36/39 (92%)</td>
</tr>
</tbody>
</table>

Data are mean (SD), median [interquartile range] and number (%).

Discussion: Our results show that the PIB 5/60 regimen significantly reduced total anaesthetic consumption but had no effect on motor block. Patient satisfaction remained the same in both groups, despite an increase in PCEA use. Our study suggests that further work is required to investigate other factors that may contribute to motor block, such as bupivacaine concentration in the LDM and epidural flow rate.

Reference

P8 The antenatal anaesthetic interview assists maternal decision making and does not increase anxiety in obese parturients

VA Eley, KJ Donovan*, E Walters, B Bjelland, D Eley†
Anaesthesia and Perioperative Medicine, Royal Brisbane and Womens' Hospital, Brisbane, Australia, *Wessex Deanery, Southampton University Hospital Trust, Southampton, UK, †School of Medicine, The University of Queensland, Brisbane, Australia

Introduction: High body mass index (BMI) parturients are recognised as high risk and antenatal anaesthetic assessment is recommended. The incidence of Class II obesity (BMI>35kg/m²) and Class III obesity (BMI>40kg/m²) in pregnancy is increasing and these individuals have reported negative experiences during their maternity care. Potential positive and negative effects of the antenatal interview have not been investigated. The aim of this prospective observational study was to determine if the antenatal anaesthetic interview (AI) affects decisional conflict or anxiety scores in obese women planning a vaginal delivery.

Methods: After ethics approval and written consent, women were recruited in the maternity anaesthetic clinic. Eligible patients had a BMI >35kg/m² and were planning a vaginal delivery. A sample size of 89 was derived from a prospective study and based on the the Decisional Conflict (DC) score as the primary outcome measure, to show an effect size of 0.3. Before the AI, participants completed a written DC questionnaire and Six-point Short Form of the Spielberger State-Trait Anxiety Inventory. Questions concerning risk perception were completed along with demographic data. The questionnaire, inventory and risk perception questions were repeated by telephone consultation two weeks later. The mode of delivery and use of epidural analgesia were recorded. Statistical analysis used Wilcoxon matched pairs test comparing before and after scores.

Results: After 38 patients were recruited (27 with complete data), interim analysis was performed. The mean age of the women was 30 years (SD 5.4), the mean BMI was 44.6 kg/m² (SD 7.4) and 16 women were nulliparous. All DC scores showed significant improvement after the interview (35.9 vs. 19.6, P=0.001) while the anxiety scores remained stable (10.8 vs. 9.7, P=0.33). Nulliparous women showed a greater reduction in DC scores than multiparous women (25.4 vs. 9.4 point reduction, P=0.028). Preferred method of labour analgesia showed little change before and after the interview. Eight participants reported dissatisfaction with the content and process of the interview.

Discussion: Interim results suggest the antenatal AI assists women in making a decision about labour analgesia and does not cause increased anxiety. Preference for epidural analgesia did not change. This information supports the current practice of referral of high BMI parturients for anaesthetic assessment.

References
2. Furber CM, McGowan L. A Qualitative Study of the experiences of women who are obese and pregnant in the UK. Midwifery 2011; 27: 437-44
P9 The King's experience: satisfaction without a background infusion
C Doyle, P Groves
Anaesthesia, King's College Hospital, London, UK

Introduction: Our institution changed from continuous epidural infusion (CEI) plus patient-controlled epidural analgesia (PCEA) regimen to PCEA bolus-only regimen in 2009. PCEA compared to CEI has shown increased maternal satisfaction and decreased motor block in some studies, whilst others found improved maternal analgesia with no increase in motor block with CEI.

Methods: We compared the outcome data collected routinely after anaesthetic interventions over a 12-month period before and after the change. In 2005, 0.1% bupivacaine plus fentanyl 2 µg/ml was infused at 8 mLh with a bolus of 8 mL and lockout of 30 min. In 2012, the same solution was used with 8 mL boluses and lockout of 20 min. In both, the maximum hourly dose was 24 mL. Mothers were asked to rate their pain relief during labour and vaginal delivery, their motor block and their overall satisfaction with the epidural service.

Results: In 2005, there were 4368 deliveries and 1000 epidurals (22.9%) of which we have data for 714. In 2012, there were 5136 deliveries, 1466 epidurals (28.5%) and we have data for 1078.

<table>
<thead>
<tr>
<th></th>
<th>2005 (n=714)</th>
<th>2012 (n=1078)</th>
<th>% change from 2005 - 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain relief during labour:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very effective</td>
<td>511 (72%)</td>
<td>856 (80%)</td>
<td>up 8%</td>
</tr>
<tr>
<td>Moderately effective or</td>
<td>203 (28%)</td>
<td>222 (20%)</td>
<td>down 8%</td>
</tr>
<tr>
<td>ineffective</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain relief during delivery:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comfortable</td>
<td>441 (62%)</td>
<td>675 (63%)</td>
<td>up 1%</td>
</tr>
<tr>
<td>Uncomfortable</td>
<td>103 (14%)</td>
<td>115 (11%)</td>
<td>down 3%</td>
</tr>
<tr>
<td>Motor block: None or minimal</td>
<td>379 (53%)</td>
<td>797 (74%)</td>
<td>up 21%</td>
</tr>
<tr>
<td>Moderate to marked</td>
<td>335 (47%)</td>
<td>281 (26%)</td>
<td>down 21%</td>
</tr>
<tr>
<td>Overall satisfaction:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>463 (65%)</td>
<td>814 (76%)</td>
<td>up 11%</td>
</tr>
<tr>
<td>Satisfactory or</td>
<td>251 (35%)</td>
<td>264 (24%)</td>
<td>down 11%</td>
</tr>
<tr>
<td>unsatisfactory</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion: In our busy obstetric unit, there has been a marked improvement in analgesia during labour and overall parturient satisfaction with a reduction in motor block since converting to the bolus-only PCEA regimen. During this time, the number of deliveries has increased by 17.6%, the epidural rate by 5.6% and the number of epidurals by 46.6%. The staffing and facilities have not changed over this time yet we have still managed to improve analgesia and satisfaction. Despite a 8% increase in women stating excellent pain relief during labour in 2012, there has been very little change in the proportion of women reporting a comfortable delivery. Our focus now is on investigating and addressing this.

References

P10 The Surety 'Safer' spinal needle is no less safer than the Luer lock counterpart.
D Rangarajan, JMD Noblet
Department of Anaesthetics, Royal London Hospital, London, UK

Introduction: The National Patient Safety Agency has mandated that "by 1st April 2012, healthcare organisations should have completed actions to ensure that all spinal bolus doses are performed using syringes...". The OAA recommends that this change should be postponed until the performance of such needles is formally assessed. Our maternity unit has however complied with the NPSA directive and we now use Pajunk non-luer ‘surety’ needles (25-gauge, 90 mm Sprotte), for all spinal anaesthesia. We wanted to determine if there was an increased rate of complications after the change to Surety needles.

Methods: In our hospital all maternity based anaesthetic work including complications, is logged on a database (File Maker Pro). We reviewed data from the 7-month period immediately before needle change and compared this data to data for a similar time period after Luer connecting needles were abandoned. Of the peri-procedural complications identified, we felt multiple attempts, incomplete blocks or failed spinals and conversion to general anaesthesia best reflected problems one could attribute to a new needle. The two tailed Chi squared test was used to determine the significance in any difference between the two populations. Yates correction was applied for determining significance of the differences of GA in the two groups, as the number of events was low.

Results: Complications in the two groups are displayed in the table. Other complications included shivering, nausea and vomiting and were not included in the analysis.

<table>
<thead>
<tr>
<th></th>
<th>Sept 11-Mar 12</th>
<th>April 12-Nov 12</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luer lock (n=283)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No complications</td>
<td>215</td>
<td>307</td>
<td>0.435</td>
</tr>
<tr>
<td>Incomplete or</td>
<td>9</td>
<td>6</td>
<td>0.153</td>
</tr>
<tr>
<td>failed block</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conversion to GA</td>
<td>3</td>
<td>1</td>
<td>0.404</td>
</tr>
<tr>
<td>Multiple attempts</td>
<td>33</td>
<td>39</td>
<td>0.484</td>
</tr>
</tbody>
</table>

Discussion: We found no significant increase in complications of spinal anaesthesia since changing to non-Luer connecting needles. This mirrors other reports evaluating safer needles. We understand that there are limitations to this analysis, namely the low number of complications and that there was a different cohort of anaesthetic trainees over this time period. Nevertheless we are encouraged that there has been no significant increase in complication rates. This bears out the feelings of all obstetric anaesthetists in our unit that these new needles are not inferior to their predecessors.

References
2. Sharpe P. NPSA: The Leicester experience to date. Pencil Point. Autumn 2012; No 33: 7


P11 A tertiary referral centre’s experience of changing the 4g loading dose of magnesium sulphate infusion time in accordance with NICE guidance

C Meier, L Marshall*, IJ Wrench
Anaesthetics, Sheffield Teaching Hospitals, Sheffield, UK,*Obstetrics, Sheffield Teaching Hospitals, Sheffield, UK

Introduction: Magnesium sulphate is well established in the treatment of pre eclampsia and eclampsia. In 2011 NICE published new guidance advising the 4g loading dose to be given over 5 min.1 Before this recommendation, our department gave the loading dose over 20 min. We updated our guidelines in accordance with NICE. Since the faster infusion time has been used, anecdotal evidence within the department suggests there have been more problems with adverse effects compared to when magnesium was administered over the slower infusion time. Adverse effects include flushing, nausea and vomiting, muscle weakness and respiratory depression. We conducted a service evaluation to gain further evidence of these problems.

Methods: An electronic survey was sent to anaesthetists, obstetricians and midwives. It asked them about their experience of administering a 4g loading dose of magnesium sulphate over the faster (5 min) and slower (20 min) infusion time. 69 surveys were returned.

Results: There was a statistically significant increase in the number of staff witnessing adverse effects of magnesium sulphate when a 4g loading dose is given over the new, faster infusion time of 5 min (P<0.003, Fisher's exact test). The most common adverse effect was feeling generally unwell (n=21/24), followed by feeling hot/flushed(n=9/24)

![Graph: Percentage of staff witnessing adverse effects of magnesium sulphate with the faster and slower infusion time](image)

Discussion: The recommendation from NICE that a 4g loading dose of magnesium sulphate should be given over 5 min is based on the protocol used in the Collaborative Eclampsia Trial.2 This survey identified that more adverse effects of magnesium sulphate are seen with a 5 min compared to 20 min infusion time. As a result we have now returned to giving the loading dose of magnesium sulphate over a slower infusion time.

References

P12 Amniotic fluid embolism and use of near-patient tests of coagulation

BN Thomas, GJ Lilley, DR Phillips, LJ De Lloyd
Department of Anaesthesia, University Hospital of Wales, Cardiff, UK

Introduction: Amniotic fluid embolism (AFE) is a rare but devastating obstetric emergency, with high mortality rates for both mother and fetus. We report a case of AFE and describe how use of near-patient testing guided management of the coagulation failure and massive postpartum haemorrhage that followed her initial presentation.

Case report: A previously fit 28-year-old multigravida was undergoing Syntocinon augmentation on the labour ward for meconium stained liquor. She sustained a sudden collapse to a Glasgow Coma Score 3, with profound hypoxia and tachycardia. Fetal bradycardia was also evident. Immediate resuscitation was initiated and she was quickly transferred to theatre for advanced resuscitation and caesarean section under general anaesthesia. A healthy baby was delivered 20 min after the initial collapse. At an estimated blood loss of 700 mL and before removal of the placenta, it was noted that there was no evidence of clot formation in the surgical field. A blood sample placed on the FIBTEM monitor in theatre shortly revealed severe fibrinogen deficiency (Fig. 1), later confirmed by laboratory tests as a fibrinogen concentration of 0.2g/L. The haemoglobin level on an arterial blood gas at this time was 11g/dL. Blood loss became torrential after removal of the placenta, with an eventual blood loss of 12.5 litres. Early recognition of coagulation failure allowed targeted therapeutic intervention to correct the coagulopathy.

![Graph: FIBTEM analysis showing lack of clot formation](image)

Discussion: Severe coagulopathy secondary to disseminated intravascular coagulation (DIC) is a characteristic feature of AFE. In this case, laboratory tests would have been of limited use due to inherent time delays, and we believe without guidance of near-patient testing, survival of the initial phase of DIC and haemorrhage would have been unlikely. Sadly, our patient died on the intensive care unit 3 days later from multiple cerebral emboli and consequent brainstem death. However, we believe this case illustrates the importance of availability of near-side testing of haemoglobin and coagulation on the labour ward to inform management of life-threatening obstetric emergencies.

Reference
P13 Anaesthesiological and obstetrical implications of stridorous laryngeal pathology in twin pregnancies

GL Schwarz, F Kristensen, M Hilland, J Kessler
Department of Anaesthesia and Surgical Services, Haukeland University Hospital, Bergen, Norway, 
*Department of Otolaryngology, Haukeland University Hospital, Bergen, Norway, †Department of Anaesthesia and Gynecology, Haukeland University Hospital, Bergen, Norway

Introduction: Laryngeal pathology is an uncommon cause of dyspnoea in pregnancy. However, subclinical lesions might become symptomatic due to mucosal engorgement, increased minute ventilation and oxygen consumption during pregnancy and delivery, leading to potentially life-threatening situations. Multidisciplinary approach is mandatory to tailor individual treatment plans, and to ensure favourable outcomes. We report two cases of twin pregnancies with similar clinical presentation, but different laryngeal diagnosis, resulting in different management.

Cases:

<table>
<thead>
<tr>
<th></th>
<th>Case 1</th>
<th>Case 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>36</td>
<td>30</td>
</tr>
<tr>
<td>BMI</td>
<td>29</td>
<td>32</td>
</tr>
<tr>
<td>Parity / Gest. age</td>
<td>1/37w</td>
<td>1/34w</td>
</tr>
<tr>
<td>Fetal presentation</td>
<td>Breech / cephalic</td>
<td>Breech / cephalic</td>
</tr>
<tr>
<td>Symptoms at admission</td>
<td>Stridor, dyspnoea at rest, rapid onset, increasing malaise</td>
<td>Stridor, dyspnoea at rest, otherwise well</td>
</tr>
<tr>
<td>Duration of symptoms</td>
<td>1-2 weeks</td>
<td>Several months</td>
</tr>
<tr>
<td>Fiberoptic laryngoscopy</td>
<td>Haemorrhagic</td>
<td>Subglottic stenosis</td>
</tr>
<tr>
<td>Anticipated difficulties</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Oxygenation in case of urgent general anaesthesia</td>
<td>Probably uncomplicated</td>
<td>Questionable</td>
</tr>
<tr>
<td>Airway management</td>
<td>Medical: steroids, antibiotics, saline inhalations</td>
<td>Awake surgical tracheostomy</td>
</tr>
<tr>
<td>Anaesthesia</td>
<td>Combined spinal-epidural anaesthesia</td>
<td>Combined spinal-epidural anaesthesia</td>
</tr>
<tr>
<td>Obstetrical management</td>
<td>Emergency caesarean section (Category 2)</td>
<td>Elective caesarean section 4 days after tracheostomy</td>
</tr>
<tr>
<td>Neonatal condition</td>
<td>Vigorous</td>
<td>Vigorous</td>
</tr>
<tr>
<td>Maternal outcome</td>
<td>Spontaneous recovery within few weeks</td>
<td>Laryngeal surgery two weeks postpartum</td>
</tr>
</tbody>
</table>

Discussion: Airway compromise during late pregnancy is extraordinary challenging for both the patient and the whole health care team. Only a few cases have been reported and there is no consensus about how to manage these situations. We found that a reliable plan B was essential in case of failed neuraxial anaesthesia or obstetrical complications. The two patients differed in the way that oxygenation was assumed possible by emergency intubation in patient 1 but not in patient 2 in whom oxygenation only could be guaranteed by securing her airway surgically before delivery.

P14 Arterial thrombus in pregnancy post explantation of ventricular assist device

AL Krepska, A Kumar, C Patient, M Belham, J A Pickett
Anesthesia, Addenbrooke's Hospital, Cambridge, UK, 
*Obstetrics, Addenbrooke's Hospital, Cambridge, UK, †Cardiology, Addenbrooke's Hospital, Cambridge, UK

Introduction: V entricular assist devices (VADs) are increasingly used in severe heart failure as a bridge to transplantation or destination therapy. In some cases there is sufficient unloading of the progress of heart failure to allow device explantation. We describe the complicated course of pregnancy in a patient with a previous VAD.

Case report: A 28-year-old multiparous woman was reviewed at the multidisciplinary cardiac clinic at 15 weeks of gestation with mild shortness of breath on exertion and palpitations. Twelve years previously she had a VAD implanted for heart failure following viral myocarditis. Her cardiac function subsequently improved sufficiently to allow VAD removal. She continued with standard heart failure medication until 2 months before her first pregnancy four years ago: delivery was by caesarean section for breech presentation without complication. At clinic review she was taking no cardiac medication. She had been a smoker until 6 months before pregnancy. Examination of the cardiovascular system was unremarkable apart from a soft pansystolic murmur. An echocardiogram showed multiple regional wall abnormalities and mild to moderate overall impairment of left ventricular function. She was commenced on oral bisoprolol and hydralazine. At 24 weeks she was struggling physically and psychologically. Repeat echocardiogram showed an ejection fraction of 35-40% and she was admitted. Furosemide and prophylactic anticoagulation were commenced. She self-discharged 5 days later due to difficult social issues. There was subjective improvement until 35 weeks when she again felt fatigued. Caesarean section was performed uneventfully at 36 weeks with combined spinal-epidural anaesthesia. An echocardiogram 4 days postpartum showed an ejection fraction of 50-55% with residual resting wall motion abnormality. She was discharged home on bisoprolol, ramipril and low molecular weight heparin for 7 days. Twelve days postpartum she developed a cold left foot. She was reviewed and discharged home from her local emergency department. However, later on the same day she had a routine cardiology review. She was referred back to the emergency department. A lower limb duplex scan revealed thrombus in the peroneal, posterior tibial and anterior tibial arteries. She was commenced on intravenous heparin and oral warfarin. Echocardiogram showed a large apical thrombus. She improved clinically over the next week and was discharged home on warfarin.

Discussion: This is the first case known to us of a parturient managed post VAD explantation with the development of complications. There may be similar patients in the future and appropriate management strategies are required. In view of our patient's left ventricular impairment, left ventricular scar tissue from previous VAD and procoagulant state we now believe it may have been prudent to have continued prophylactic anticoagulation postpartum for 6 weeks rather than 7 days.

Reference
1. Pepper JR. Update on mechanical circulatory support in heart failure. Heart 2012; 98: 663-9
P15 Seizures in pregnancy: eclampsia or something else?
A Kapoor, S Jackson*
Anaesthetics, Royal Victoria Infirmary, Newcastle, UK,*Obstetrics, Royal Victoria Infirmary, Newcastle, UK

Introduction: Seizures during pregnancy that are unrelated to preeclampsia should be distinguished from eclampsia. Usually the signs of severe preeclampsia precede and accompany eclampsia, facilitating the diagnosis. This case represents atypical seizure where differential diagnosis presented a unusual diagnosis.

Case report: A woman presented at 37 weeks of gestation with diarrhoea and vomiting. She had an atypical seizure after admission. She had no rash, photophobia or evidence of meningism. There was no past medical history of epilepsy or febrile convulsions but she had undergone a previous caesarean section for moderate preeclampsia in a twin pregnancy. She was treated with a magnesium infusion as there were 2+ of proteinuria despite having normal vital signs, blood results and urine PCR. She had another brief generalised seizure during caesarean section. The postoperative vital signs, CT scan of head, blood results, CT venogram and EEG were unremarkable. In the absence of any clear diagnosis, a urine sample was sent for toxicology which was positive for amphetamines including ecstasy.

Discussion: Eclampsia would appear to have been a reasonable working diagnosis to make in this case given the woman’s mode of presentation and previous history. Non-proteinuric preeclampsia is well described in the literature and delivery on this basis in the presence of a normal PCR was justified. A recent series from a tertiary centre in Australia sited four cases of non-proteinuric eclamptic seizures.1 In absence of any biochemical abnormalities with a second seizure, it was imperative to rule out other possible causes for her condition including meningitis, intracranial lesion, bleed, infarct or drug-related seizures. As this case shows, the clinical effects of amphetamines are significant and similar to the actions of cocaine, although their onset of action is slower and their duration is up to 10-12 h. One study at an emergency department in San Francisco has given the incidence of seizures secondary to amphetamine usage at 25%.2 The seizure pattern is distinct, with seizures that are generally brief and, in contrast to eclampsia, lack a chronic phase after the initial ictal event.3 Follow-up was essential for this woman, in order to advise her with regard to the risks of continued amphetamine use, including mood disorders and the possibility of myocardial infarction and stroke. Her general practitioner was also alerted, but no safeguarding issues were identified for her children following further investigation. This case illustrates the importance of excluding other potential causes for seizures. Drug-induced seizures in pregnancy are uncommon, but should be considered when eclampsia and epilepsy have been excluded.

References

P16 Spontaneous coronary artery dissection in the peripartum period
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Introduction: Spontaneous coronary artery disease (SCAD) is a rare but increasingly reported cause of myocardial infarction and sudden death in the peripartum period. We report a case of 3-vessel SCAD occurring in a postpartum patient.

Case report: A previously healthy 34-year-old multiparous woman presented to the maternity assessment unit (MAU) 12 days after an uneventful elective caesarean section with 2 episodes of central heavy chest discomfort, radiating down both arms and into the jaw. Similar episodes during the third trimester of pregnancy had been attributed to a panic attack by the general practitioner. Initially there were no ECG changes and the main concern was pulmonary embolism and anticoagulation was started as per local guidelines. The patient had continuing chest pain which was subsequently associated with ECG changes (8 h after MAU admission). Antiplatelet therapy was commenced and the patient was transferred to the coronary care unit. Blood troponin I was elevated at 22059 ng/L. Coronary angiography performed 18 h later revealed extensive dissection involving all major coronary arteries. In the presence of continuing chest pain and extensive lateral wall akinesia on echocardiography, emergency coronary artery bypass grafting was performed. The procedure was complicated, with bypass time of over 3 h and the patient needed six grafts. Six months after the episode, the patient is on maximal medical therapy and has impaired ventricular function. She has been referred for assessment to the cardiac transplant centre.

Discussion: This case highlights the need for increased awareness of SCAD in the peripartum period. In our case there was significant delay before correct diagnosis and treatment, which may have contributed to the subsequent severe myocardial dysfunction. Other factors delaying diagnosis were the patients young age, lack of cardiac risk factors and her postpartum status. In presenting this case, we hope to increase awareness of SCAD and the importance of early diagnosis and treatment in avoiding the devastating consequences.

Reference
P17 Uterine dehiscence following B-Lynch suture
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Introduction: A B-Lynch suture is a commonly used method for treating an atonic uterus preventing the need for hysterectomy following caesarean section. We describe a case where complications ensued 10 years post procedure in a subsequent pregnancy with devastating effect.

Case report: In 2002 a 22-year-old women at 29 weeks of gestation attended the emergency department as an unrestrained passenger involved in a road traffic collision. Significant abdominal injuries were sustained that led to haemodynamic compromise and fetal death. Following a massive transfusion an emergency caesarean section was performed. Due to uterine atony a B-Lynch suture was placed which successfully provided haemostasis and preserved the uterus. Subsequently a splenectomy and liver laceration repair were undertaken. In 2012, the same patient presented to hospital complaining of right sided abdominal pain at a gestation of 31 weeks. She had injected heroin earlier that morning which masked the severity of her pain leading to a presumptive diagnosis of appendicitis secondary to an elevated white cell count. Fetal heart rate was detected and the patient's observations were normal. After approximately 5 hours the patient rapidly deteriorated demonstrating signs of hypovolaemic shock. Due to the patients history of intravenous drug use, venous access was very difficult. The patient was transferred to recovery on labour ward so central venous access and resuscitation could take place. Before transfer the patient became profoundly hypotensive and bradycardic. The major haemorrhage protocol was initiated. A consultant radiologist noted extensive free fluid in the abdomen. The patient was immediately transferred to theatre for an emergency laparotomy. On exploration she was found to have complete dehiscence of the upper and posterior aspects of the uterus with the fetus free in the abdomen. The uterus was repaired and haemostasis was achieved and the patient was discharged from hospital a few days later.

Discussion: Throughout the pregnancy there was no evidence of uterine pathology and until this point the pregnancy had been uneventful. This case highlights the potential risk of B-Lynch sutures obtunding the blood supply to areas of the uterus potentially weakening the uterine wall endangering the life of mothers in subsequent pregnancies. The use of heroin before attending hospital may have masked her pain earlier in the progression of her pathology. Earlier detection may have resulted in a better outcome given fetal heart sounds were detected on admission. This case also highlights the difficulties associated with resuscitating intravenous drug users and difficulty obtaining venous access.

Reference

P18 An anaesthetic challenge: caesarean section for a patient with a facial arterio-venous malformation and polio
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Introduction: We present a patient with the challenging combination of an expanding facial arterio-venous malformation (AVM) and history of polio causing significant kyphoscoliosis and lower limb paralysis.

Case report: A 30-year-old Portuguese speaking nulliparous African woman presented to our institution antenatally with two significant co-morbidities. Firstly, a congenital facial AVM which expanded dramatically during pregnancy to protruberantly overlie the left frontal bone, nose, orbit and maxilla. Secondly, the patient had suffered from polio, causing bilateral lower limb paralysis and severe kyphoscoliosis. The patient was admitted at 29 weeks of gestation due to expansion and bleeding of the AVM (prompting concerns regarding sudden haemorrhage), anaemia, requiring transfusion, and increasing dyspnoea and tachycardia. She also developed hypertension requiring amiodipine. After multidisciplinary discussion, caesarean section was planned at 34 weeks because of maternal deterioration. Relative merits of neuraxial versus general anaesthesia were considered. Potential airway issues included difficulty with face mask fit (pre-oxygenation, bag- mask ventilation) and bleeding in the airway from the AVM due to trauma or hypertension at induction or extubation. Neuraxial anaesthesia presented significant technical challenges, unpredictable block spread, likely poor tolerance of high blockade, and possible emergency conversion to general anaesthesia. We proceeded with combined spinal-epidural (CSE) with invasive arterial monitoring. The CSE was inserted uneventfully and achieved an excellent block. However the patient was extremely anxious. Light sedation via propofol infusion provided anxiolysis and surgery was commenced uneventfully with an estimated blood loss of 700 mL. Five days post delivery she had an unprovoked bleed from the AVM requiring emergency intubation and embolisation. She has made a good recovery and is now home with her healthy baby.

Discussion: This case illustrates the challenges of rare conditions affecting both the airway and back. AVMs are prone to expansion during pregnancy although the course of this is unpredictable. Cautious surveillance is mandatory. Severe kyphoscoliosis poses undoubted technical challenges to the anaesthetist and may cause unpredictable distribution of local anaesthetic within the intrathecal space; but if there has been no surgical intervention then epidural blockade is likely to be reliable. CSE can be used as an effective technique for providing anaesthesia for caesarean section. The importance of multidisciplinary planning and preparation for these high-risk cases cannot be over emphasised.

References
**P19 Elective caesarean section in a patient with severe congenital glaucoma**

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**Introduction:** Glaucoma is usually related to raised pressure within the globe, leading to progressive destruction of the optic nerve. Glaucoma is the leading cause of blindness worldwide. 1 Intraocular pressure (IOP) may be raised acutely by dilatation of the pupil, hypoventilation and hypoxia, or by increasing venous pressure. This can occur with coughing, straining or vomiting. We present the anaesthetic management of a patient with severe glaucoma in whom an active labour may have caused complete visual loss.

**Case report:** A 35-year-old (G4P3) woman presented to our pre-assessment clinic with a history of severe glaucoma. Her visual acuity was poor with distinct vision of light and dark only, in a single functioning left eye. It had been recommended by her ophthalmology team that the stress of pregnancy would be of significant risk to her limited remaining vision, and therefore an elective caesarean section would be preferable. Neuraxial anaesthesia was preferred over general anaesthesia as the latter may cause raised IOP via laryngoscopy, inadvertent extra-ocular pressure, coughing on extubation or nausea and vomiting. Following insertion of a radial arterial line, we performed a combined spinal-epidural with 0.5% hyperbaric bupivacaine 2 mL with diamorphine 300 μg and started a phenylephrine infusion to maintain pre-operative blood pressure. Pheny lephrine was continued into recovery until the effects of the block had completely worn off. An episode of relative bradycardia was treated with glycopyrrolate as it has less effect on pupil size than atropine. 2 Attention was paid to other factors affecting IOP including 150 head up tilt to aid venous drainage, supplemental oxygen and avoidance of overzealous fluid administration and venous congestion. She was given prophylactic ondansetron and cyclizine, continuing into the postoperative period to minimise vomiting. The risks of postpartum haemorrhage were reduced by the administration of a Syntocinon infusion. On day 3 she was allowed home, having suffered no deterioration in vision.

**Discussion:** Goals of glaucoma management include maintenance of optic perfusion and avoidance of both venous congestion and raised IOP. Appropriate positioning and targeted fluid therapy helps to avoid venous congestion. No consensus exists on the management of severe glaucoma in labour. IOP typically falls in pregnancy however it has been shown that vomiting and straining may increase IOP by 30-40 mmHg. 3 In such a patient whose limited vision in a single eye is of such importance, elective caesarean section appears a logical choice. Our management shows that with meticulous planning and technique there can be a good outcome for both mother and baby.

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**P20 Normoglycaemic diabetic ketoacidosis in pregnancy**

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**Introduction:** We describe two unusual cases of normoglycaemic diabetic ketoacidosis (DKA) in pregnancy which were managed in a critical care unit of a district general hospital in June 2012.

**Case report:** The first case was a 26-year-old non-diabetic nulliparous woman of 31 weeks gestation, who was initially admitted under the medical team with pyelonephritis. Subsequently, the patient developed a lower respiratory tract infection. Her arterial blood gas demonstrated a severe compensated metabolic acidosis with normal lactate levels, a raised anion gap, a serum glucose of 4.5 mmol/L and normal renal function. She was subsequently admitted to the intensive care unit and within 24 h her acidosis worsened. Urinalysis was performed which demonstrated significant ketonuria however she remained normoglycaemic. The second case was a 32-year-old nulliparous woman of 23 weeks gestation with established gestational diabetics who was admitted to the labour ward HDU with suspected meningoccephalitis. An arterial blood gas demonstrated a moderate metabolic acidosis, normal lactate levels, a raised anion gap and a serum glucose of 6.6 mmol/L. Urinalysis revealed 2+ ketones. In both cases there was no history of significant starvation or vomiting and both patients appeared clinically euvoilaemic. Renal function was within normal limits and there was no elevation of chloride or lactate. Serum ketones were not recorded. Both patients were commenced on insulin/dextrose infusions, and blood glucose levels were maintained between 4 and 10 mmol/L. Case 1 was started on treatment four days after initial presentation; however, Case 2 was initiated on treatment only hours after admission because there was a higher index of suspicion for DKA despite normal blood sugars. In both cases there was rapid improvement in the metabolic acidosis.

**Discussion:** Normoglycaemic DKA is a rare complication of pregnancy. Metabolic changes that occur in pregnant women during the late stages of pregnancy can predispose to the development of DKA. 1 There is a decrease in insulin sensitivity due to the production of insulin antagonistic hormones, and insulin requirements increase throughout pregnancy due to the high glucose requirements of the placenta and fetus. It can present with normal blood glucose levels, which can lead to a delay in diagnosis. The onset of DKA can be more rapid in the pregnant patient with a more severe acidosis. 2 Early initiation of insulin therapy should not be withheld despite normal blood sugars. These patients should be managed in a critical care area and serum ketones should be monitored in all cases. 3

**References**

P21 Peripartum care of Jehovah's witness parturients: A five year review
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Introduction: Jehovah's witness (JW) mothers refuse to receive whole blood or major blood fractions based on interpretation of certain biblical passages. This refusal puts these mothers at a greatly increased risk of morbidity and mortality. We carried out a five-year review of the peripartum treatment of JW mothers delivered at a maternity unit with just fewer than 6000 deliveries per annum.

Methods: JW mothers who were delivered between January 2007 and November 2012 were identified and the clinical notes were obtained. Information was retrieved from the notes regarding demographic details, peripartum care, use of advanced directives and cell salvage availability. Data were audited against local hospital guidelines on the management of mothers who refuse blood transfusion. Approval for this audit was obtained from the hospital audit department.

Results: All 22 patients who were included survived to discharge. Ten patients had a caesarean section (CS) and 12 had a vaginal delivery (VD). Both groups were comparable with respect to age, parity and antenatal haemoglobin levels. All patients had signed an advanced directive specifying what blood products were acceptable to them and 21 patients agreed to the use of cell salvage if required. Cell salvage was set up in only six of the 10 caesarean deliveries (all during 'office hours') and 150 mL of autologous blood was returned to just one patient. Estimated blood loss among the CS group ranged from 350-800 mL and among the VD group ranged from 150 - 800 mL. Contrary to local guidelines, only eight patients (36%) had B12/folate/iron levels checked at any stage in pregnancy and a low iron level was treated antenatally in one out of three cases. A full blood count was checked after delivery in just seven CS patients (70%) and two VD patients (17%) however no haemoglobin level in either group was beneath the local transfusion threshold of 7 g/dL.

Discussion: The care of JW parturients in this unit over the past five years has fallen short of local guidelines. This includes a lack of 24-h cell salvage availability despite its acceptability to the vast majority of JW mothers delivered. The main barrier to its use has been a lack of trained staff 'out-of-hours'. This finding is reflective of the situation throughout the UK where only 39% of maternity units have 24 h access to cell salvage. We recommend that cell salvage be available to use in the peripartum care of every JW mother who consents to receive autologous salvaged blood. We have endeavoured to increase its availability in our unit by repeated targeted training of obstetric theatre staff and provision of on-call theatre technicians in an advisory role.

References

P22 Severe thrombocytopenia in pregnancy: preeclampsia on a background of deteriorating Fanconi anaemia
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Introduction: Fanconi anaemia (FA) is a rare autosomal recessive disorder characterised by primary bone marrow failure and pancytopenia. We describe the management of a parturient with FA complicated by preeclampsia.

Case report: A 23-year-old nulliparous woman with FA was admitted to hospital at 34\(^<\) weeks of gestation with worsening thrombocytopenia, anaemia and bleeding tendency (epistaxis, spontaneous bruising and bleeding gums). Despite no previous history of transfusion dependence, she had required recurrent blood transfusions in pregnancy and had developed multiple antibodies to platelets. During her admission, she was treated with intravenous immunoglobulin and steroids to reduce the HLA-antibody reaction to platelets. By 36\(^<\)2 weeks, her platelet count had fallen to 6\(\times\)10\(^9\)/L from 2\(\times\)10\(^9\)/L earlier in pregnancy with an unexplained fall in fibrinogen from 3.5 g/L to 1.6 g/L. With on-going haematology input, caesarean section at 36\(^<\)4 weeks was planned with confirmed donor availability of HLA-matched platelets. Due to her falling platelet count and peripheral oedema it was thought that her FA was complicated by preeclampsia although her blood pressure was normal. After transfusion of blood products and immunoglobulin on the night before her planned caesarean under general anaesthesia, she had an episode of pulmonary oedema. Immediately preoperatively, she was given platelets and fibrinogen concentrate but despite this she had a major postpartum haemorrhage of 3.2 L and eventually required a Bakri balloon, 6 units of packed red cells, 500 mL of cell-salvaged blood, 5 units of platelets and 8 g fibrinogen concentrate, guided by the haematologists who were present in theatre. Due to the risk of on-going haemorrhage, respiratory compromise and an intraoperative lactate of 5 mmol/L, the patient was transferred to the intensive care unit (ICU) for ventilation and on-going support. During transfer, the patient developed hypertension, resistant to sedative medication. Bolus labetalol, hydralazine and magnesium sulphate were commenced on arrival in ICU. Despite this treatment, she rapidly developed widespread twitching, clonus and hyperreflexia. Multiple repeated loading of magnesium, and a subsequent thiopentone infusion finally stabilised the patient. Urgent CT head was unremarkable. In the next 24 h, features of fulminant preeclampsia settled, her metabolic acidosis resolved and she was extubated with no neurological deficit. She required daily platelet transfusions until day 7 post delivery, and was discharged home on day 10. Her platelet count returned to her pre-pregnancy value of 32\(\times\)10\(^9\)/L by day 25 and she was well.

Discussion: FA and preeclampsia are both complex systemic disorders affecting coagulation. A case series of pregnant patients with FA suggested that they may have an increased incidence of preeclampsia. In our case the combination of the two diseases led to severe thrombocytopenia, coagulopathy and haemorrhage, requiring multidisciplinary management to achieve a successful outcome.

Reference
P23 Sickle cell crisis, varicella zoster infection and preeclampsia: clinical conflict during emergency caesarean section

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Introduction: Women in labour often have acute pathology, but presenting with three life-threatening conditions simultaneously is extremely rare. Furthermore, treatment of one condition does not usually adversely affect the others. We present an unusual case where a patient's medical conditions meant that neither a neuraxial or general anaesthetic (GA) was ideal, resulting in a conflict of anaesthetic management.

Case report: A 27-year-old woman was admitted with sickle cell chest crisis (SCC) at 31 weeks of gestation. She was started on acyclovir for suspected varicella pneumonia after developing a chickenpox rash. Within 48 h she had raised blood pressure (BP) and urate levels consistent with preeclampsia, although no treatment was started. Soon after, a pathological CTG trace meant she needed an immediate caesarean section. On arrival in theatre her BP was 200/120, oxygen saturation 93% on air and haemoglobin (Hb) 6.7 g/dL. After careful consideration a single-shot spinal was given, avoiding the vessels and using meticulous aseptic technique. This helped reduce the BP, which was kept stable with a phenylephrine infusion. Fluids including blood and platelets were given cautiously, after inserting arterial and central lines, so as not to precipitate pulmonary oedema, and supplemental oxygen given to reduce the risk of sickling. The patient remained stable throughout the procedure and although she required CPAP and exchange transfusion on the high dependency unit she went on to make a full recovery.

Discussion: If a patient presented for emergency caesarean section with either SCC, preeclampsia or varicella infection, the ideal anaesthetic technique would differ greatly. Preeclampsia is best treated with fluid restriction and a neuraxial anaesthetic, whereas varicella infection usually needs a GA and liberal intravenous fluids. In contrast the technique of choice for SCC would be neuraxial and to keep the patient well hydrated. The presence of all three in our patient meant that there was no ideal technique, leading to an anaesthetic dilemma. Traditional teaching says neuraxial blocks should be avoided in systemic infection, but in this case the possibility of CVA and eclamptic seizure as well as chest crisis and varicella pneumonia meant the risks of GA were high. Gambling and Douglas recommend neuraxial anaesthesia in a parturient with acute varicella because of the high risk of varicella pneumonia, and case reports of spinal in varicella infection do exist. However this can introduce varicella in to the cerebrospinal space, a rare but potentially catastrophic event. After considerable reflection a neuraxial technique was chosen, partly because the patient was already receiving acyclovir. It proved highly successful, helping to control the BP, avoid the risks of GA and maintain an awake patient to act as the best cerebral function monitor. The patient showed no signs of abnormal neurology postoperatively and remains well six months later.

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P24 The super morbidly obese parturient: what is the way forward?

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Introduction: Super-obese patients with a body mass index (BMI) >50 kg/m² are becoming a common occurrence. In pregnancy these patients present significant challenges to the multidisciplinary team (MDT) looking after them. They are at high risk for a suboptimal outcome.1

Case report: We present a case of a 27-year-old nulliparous woman with a singleton pregnancy who had a BMI close to delivery of 84 kg/m². She weighed 229 kg and was 1.65 m tall. She was diagnosed with an intrauterine death at 37 weeks of gestation. After failed induction it was decided to deliver her by caesarean section. Her past medical history included four episodes of deep vein thrombosis and two occasions of pulmonary embolism. She also suffered from attention deficit hyperactivity disorder, asthma and hypothyroidism. She had a mildly positive anti-cardiolipin antibody titre and a normal glucose tolerance test. Her blood pressure was normal and significant cardiorespiratory pathology was excluded. She had a potential difficult airway with a Mallampati score of 3. Several MDT meetings were held during the course of her pregnancy and tertiary regional and national experts were consulted over her management. It was agreed to deliver her vaginally and if that failed, then a planned elective caesarean section would be performed. An emergency procedure was to be avoided. The anaesthetic team comprised of 3 consultant anaesthetists (2 obstetric) and 1 trainee registrar. A difficult airway trolley and a glide-scope video laryngoscope was available. A right internal jugular central venous catheter and right radial arterial line were inserted before performing a combined spinal-epidural (CSE) anaesthetic. With full aseptic precautions and the patient sitting, a 120-mm 16-gauge Tuohy needle was used to locate the epidural space at the L3-L4 interspace using loss of resistance to saline. The space was easily located at 10 cm on first attempt and a needle-through-needle spinal performed with a 27-gauge needle using 0.5% hyperbaric levobupivacaine 2.2 mL and diamorphine 300 µg. An epidural catheter was inserted and 5 cm left in the space. The patient was placed supine in a crucifix position on an Oxford pillow and arm supports. She had a rapid onset block to T4 level bilaterally. A phenylephrine infusion was used to support her blood pressure. The total time from commencing the CSE to end of surgery was 51 min. Surgery was uneventful but post-operative outcome was complicated by wound sepsis which later resolved.

Discussion: We have no bariatrics service in our institution and there were challenges at all levels in allocating appropriately skilled staff and sourcing equipment for the ward, intensive care and theatres. Help from industry, multiple medical and ancillary disciplines was sought to facilitate a safe delivery. Setting up an ad hoc high-risk bariatric maternity service for a single patient episode is not cost effective. Consultant obstetric anaesthetists should be part of the MDT at time of booking. We suggest that the super obese parturients should be looked after in an obstetric centre with an established bariatric service.

Reference
P25 Use of the Air-Q Intubating Laryngeal Airway for blind tracheal intubation in a parturient with predicted difficult airway management

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Introduction: We describe the blind use of the Air-Q Intubating Laryngeal Airway (ILA) to secure the airway of a woman with airway trauma following eclamptic seizures at the University College Hospital, Ibadan, Nigeria.

Case report: A 24-year-old woman presented at 35 weeks gestation with a history of five eclamptic seizures during which she had severely bitten her tongue. On arrival her blood pressure was 190/120 mmHg. Glasgow Coma Scale 11/15 and she had a grossly swollen and bleeding tongue obstructing her oropharynx. She was loaded with magnesium sulphate and antihypertensive therapy was initiated. She remained hypertensive, had a further two seizures, and a decision to deliver via caesarean section was made. Airway assessment suggested direct laryngoscopy would be extremely difficult and there was no access to fibreoptic equipment. Neuraxial anaesthesia was contraindicated. She was pre-oxygenated and induced with propofol 100 mg and suxamethonium 50 mg. An Air-Q ILA (Size 4.5) was inserted via which it was possible to ventilate effectively. A 6.5 mm tracheal tube was blindly passed down the Air-Q with auscultation confirming positioning. Surgery proceeded successfully in the delivery of a live baby. Postoperatively she was intubated for 24 h until the airway swelling receded.

Discussion: The placement of a supraglottic airway device (SAD) in the management of the difficult airway and as a conduit for tracheal intubation is an established technique. The Air-Q is a new disposable SAD for use as a primary airway or as an aid for intubation in difficult airways. It is specifically designed to overcome the limitations of the intubating laryngeal mask airway (ILMA) which requires the use of an expensive special tracheal tube. It is able to accommodate standard tracheal tubes of a wider internal diameter and reduced length. Although recommended that tracheal intubation through these devices be performed with fibreoptic or optical stylet visualisation, these are not frequently available in resource-poor settings where intubation is often performed blindly. Our case demonstrates that the Air-Q ILA can be a valuable device in the management of the difficult obstetric airway. Although studies have demonstrated the ILMA to be a superior conduit for blind tracheal intubation, in resource-poor environments where expertise and expensive equipment are not available the Air-Q may be a more practical SAD. We could find no other reports of the use of the Air-Q ILA in the difficult airway management of a parturient.

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P26 A case of peripartum cardiomyopathy associated with severe preeclampsia

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Introduction: Preeclampsia (PET) is a commonly seen obstetric pathology that can be associated with peripartum cardiomyopathy (PPCM). We describe a patient with PET and presumed chest sepsis, who deteriorated acutely post caesarean section. Further investigation revealed PPCM with cardiac failure.

Case report: A 23-year-old nulliparous woman presented at 37 weeks, with a 4-day history of feeling unwell and short of breath, with a dry cough and wheeze. She had signs and symptoms of severe PET and a respiratory rate of 28 breaths/min. She was started on the severe PET protocol and intravenous antibiotics. A chest x-ray (CXR) was requested and labour was induced. Apart from not tolerating a magnesium infusion due to hot flushes, she remained stable overnight and had an epidural was sited. In the morning, a pathological cardiotocography trace mandated an uneventful emergency caesarean under epidural anaesthesia. Transient postoperative hypotension responded to a modest fluid challenge. Six hours post caesarean she became acutely short of breath with tachypnoea, hypoxia and hypertension. With involvement from microbiology and intensive care (ITU), the impression was that of chest sepsis. She was given oxygen and nebulisers. A CXR was then performed, which showed florid pulmonary oedema. Intravenous furosemide was given and an urgent echocardiogram requested. Before this was performed, she deteriorated rapidly, requiring intubation, ventilation and transfer to ITU. Echocardiography showed poor leaflet ventricular function. Fractional shortening (FS), derived from the equation FS=100 x (LVEDD-LVESD/LVEDD), was 15% (normal 30–42%) and a diagnosis of PPCM was made. Cardiac function was supported with a dobutamine infusion, and she was started on angiotensin-converting-enzyme inhibitors. She was extubated 2 days later and made an excellent recovery, with near normal cardiac function.

Discussion: PPCM, although relatively rare, is a severe life-threatening condition of unknown aetiology. Symptoms and signs can present in a similar manner to other more common pathologies such as PET, sepsis, pulmonary emboli or asthma. In addition, PET is a recognised risk factor for PPCM. This case highlights the need to consider an early CXR and echocardiography in patients with PET to enable prompt diagnosis of an associated PPCM.

Reference
P27 Anaesthetic management in a parturient with uncorrected Tetralogy of Fallot

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Introduction: Cardiac disease is the UK’s leading cause of indirect maternal mortality. Although Tetralogy of Fallot (TOF) is the commonest cyanotic congenital heart defect, presentation in pregnancy without surgical correction is rare. We report a case of a parturient, with uncorrected TOF, who required anaesthesia for caesarean section.

Case report: A 29-year-old G1P0 parturient from Cameroon, presented to our institution at 30 weeks of gestation. Past medical history included a childhood heart murmur and life long history of poor exercise tolerance and dizzy spells. A pansystolic murmur and clubbing were noted on examination. Blood pressure and jugular venous pressure were 90/50 mmHg and 5 cm, respectively and oxygen saturations were 89% on air. Cyanosis was not evident due to skin colour. Echocardiography revealed TOF with 50% aorta override, a large ventricular septal defect (bidirectional shunting) and pulmonary stenosis. She was subsequently referred for specialist multidisciplinary management. The patient remained stable until 34 weeks when she developed chest pain on exertion and a marked reduction in exercise tolerance. In view of her cardiac decompensation, she was admitted for optimisation and early caesarean delivery. During her admission she became increasingly short of breath, even at rest. Treatment included oxygen (PaO$_2$ on air 8.7kPa), diuresis, thromboprophylaxis and steroids (for fetal lung maturation). Following multidisciplinary discussion, a decision for caesarean delivery was made at 36 weeks gestation. Fetal ultrasound and growth were normal. Invasive monitoring (via arterial and central venous cannulae) was established before theatre and oxygen administered via face mask. Adequate anaesthesia was established with a combined spinal-epidural, using a low-dose spinal (0.5% hyperbaric bupivacaine 0.7 mL with fentanyl 15 µg) with a slow sequential epidural top-up. A phenylephrine infusion (100 µg/mL at 20-40 mL/h) was used to maintain afterload and normotension. The patient remained cardiovascularly stable throughout surgery with the use of minimal additional metaraminol boluses. A slow infusion of Syntocinon and rectal misoprostol were used to promote uterine tone. Estimated blood loss was 600 mL and the baby was delivered in good condition. Analgesia was achieved with epidural opioids, paracetamol and diclofenac. The patient was discharged home on Day 4 and is currently waiting for corrective surgery.

Discussion: Uncorrected TOF in pregnancy is rare with a high risk of maternal mortality. Evidence for best practice is sparse due to limited publications. Key issues surrounding the management of such cases include a thorough understanding of anatomical defects, physiological adaption and events and drugs that can worsen right-to-left shunt, in addition to careful multidisciplinary planning. Our aim was to deliver adequate surgical anaesthesia whilst avoiding a reduction in afterload, or increase in heart rate or contractility. The use of therapeutic vasoconstriction was paramount to prevent worsening cyanosis.

P28 Anaesthetic management of caesarean section in a woman with hemophagocytic lymphohistiocytosis

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Introduction: We describe the management of caesarean section in a woman with reactive hemophagocytic lymphohistiocytosis (HLH).

Case report: A 35-year-old multiparous woman at 24 weeks of gestation was transferred to a regional liver unit with liver failure, coagulopathy, cytopenia, hepatosplenomegaly, hypertriglyceridermia and hyperferritinemia. She was normotensive, with no proteinuria. At 9 weeks gestation she presented with fever, weight loss and cervical lymphadenopathy, diagnosed from a lymph node biopsy as Kikuchi Fujimoto Disease (KFD). Her liver function deteriorated rapidly and she was admitted to the Intensive Care Unit (ICU) with acute liver failure. Following transfer, liver biopsy and bone marrow histology demonstrated histiocyte phagocytosis confirming the diagnosis of HLH. A multispecialty review concluded that liver transplantation would not be of benefit, as the disease would affect the transplanted liver, and that termination of pregnancy would aid the mother's survival. Caesarean section was undertaken 2 days post transfer by combined obstetric, neonatal and hepatobiliary teams. Anaesthesia was maintained with oxygen, isoflurane and atracurium in the left lateral tilt position. Standard invasive and non-invasive monitoring was used in addition to cerebral oxygen saturation monitoring. A live baby was delivered. A 2 litre haemorrhage was managed with blood products, calcium and tranexamic acid. Thromboelastograph analysis guided therapy. Uterine atony was managed with oxytocin, ergometrine and carboprost. Postoperatively chemotherapy and immunotherapy were commenced. She was extubated on day 10 post surgery and discharged from ICU on day 29. The baby survived and remains on the special care baby unit.

Discussion: HLH is a rare disorder characterised by cytokine dysfunction and uncontrolled hemophagocytosis of normal hematopoietic cells. Reactive HLH is associated with a mortality of up to 59%, usually from multigorgan failure, and is rarely reported in pregnancy. Features include prolonged fever, hepatosplenomegaly, liver dysfunction, cytopenia, hypertriglyceridermia, and hyperferritinemia. Reactive HLH may be precipitated by a variety of factors, including viral, bacterial and parasitic infections, malignancy and pregnancy. The precipitating cause in this case is thought to be KFD, a rare, usually benign, self-limiting lymphadenitis which is associated with HLH in pregnancy. HLH shares similarities to HELLP syndrome (Haemolysis, Elevated Liver enzymes and Low Platelets). Differentiating HLH from HELLP syndrome and other pregnancy related liver disorders was essential and required multi-specialty input. Caesarean delivery required the coordination of specialist teams and their equipment from other centres. Near patient thromboelastography was essential in managing coagulopathy and haemorrhage.

References
P29 Combined spinal-epidural anaesthesia for caesarean section in a patient with familial neurocardiogenic syncope
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Introduction: Neurocardiogenic syncope is a common clinical condition characterised by sudden transient episodes of loss of consciousness followed by spontaneous complete recovery. We describe the peripartum management of a patient with familial neurocardiogenic syncope.

Case report: A 29-year-old nulliparous woman with familial neurocardiogenic syncope was referred to the obstetric anaesthetic department in her third trimester of pregnancy. At age 5, she had her first syncopal episode and subsequently suffered at least 2 episodes a year. These mainly occurred at night, with symptoms of nausea and hot sweats proceeding to syncope and associated with teeth clenching, hand spasm, and cyanosis. There were no precipitating factors, and her brother and father reported similar episodes. She underwent extensive investigations: echocardiogram, cardiac magnetic resonance imaging, electrophysiology, electroencephalogram and ventricular tachycardia stimulation study, all of which were normal. A Reveal device captured 3 episodes of gradual slowing of atrial and ventricular rate, culminating in asystole for 8-19 s and correlating with syncope. A tilt table test induced 20 s of asystole with similar preceding symptoms. Conservative management advice was given: increased salt intake, good hydration and avoiding prolonged sitting or standing. A pacemaker was discussed but rejected due to lack of evidence. The syncopal episodes became more frequent during pregnancy and a multidisciplinary team approach discussed treatment options. With uncertain efficacy of pharmacological therapy and potential fetal risks, conservative management was continued. It was felt controlled delivery would be optimal, and so caesarean section was scheduled for 39 weeks gestation with a combined spinal-epidural (CSE) anaesthetic. In the obstetric theatre standard monitoring was applied, a 16-gauge cannula was inserted and Hartmann’s solution 500 mL commenced. CSE anaesthesia was performed in the sitting position using intrathecal 0.5% hyperbaric bupivacaine 1.8 mL with diamorphine 300 µg. She was placed supine with left lateral tilt and underwent an uncomplicated caesarean section. Her blood pressure dropped periodically, but was maintained with intermittent doses of phenylephrine 20 µg. There were no episodes of bradycardia <60 beats/min. She was transferred to the high-dependency unit for further monitoring and remained well before being discharged on the second postoperative day.

Discussion: Neurocardiogenic syncope is defined as a syndrome in which triggering a neural reflex results in a self-limited episode of systemic hypotension characterised by bradycardia and peripheral vasodilation. No case reports describe using combined spinal-epidural anaesthesia for the management of the parturient with neurocardiogenic syncope. This anaesthetic allowed us to reduce the spinal anaesthetic dose, while ensuring the ability to titrate epidural anaesthesia as required. This patients peripartum care required careful planning and management by the multidisciplinary team and if faced with this problem again we would adopt a similar approach.

References
3. Baghizada L, Krings T, Carvalho J C A. Regional anaesthesia in Marfan syndrome, not all dural ectasias are the same: a report of two cases. Can J Anaesth 2012;59:1052-7

P30 Combined spinal-epidural analgesia for labour in a patient with Marfan’s syndrome and dural ectasia
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Introduction: We present the peripartum management of a patient with Marfan’s syndrome, aortic root dilatation and dural ectasia who underwent an uncomplicated vaginal delivery using a combined spinal-epidural (CSE) technique.

Case report: A 32-year-old (G2P1) Chinese woman was referred at 29 weeks of gestation for anaesthetic consultation. She had a history of Marfan’s syndrome with a known 4 cm aortic root dilatation. CT angiogram of her aorta detected a dural ectasia of the lower lumbar and sacral spine, although she was asymptomatic. On account of this incidental finding, she was refused a labour epidural during her first pregnancy, and had a painful traumatic vaginal delivery despite Entonox and intramuscular pethidine. She expressed fears of labouring without adequate analgesia, and would have opted for an elective caesarean section if additional labour analgesia was contraindicated. MRI confirmed significant dural ectasia at L3-4, with a reduced but adequate epidural space. After discussion, she agreed to a labour epidural, with intravenous PCA fentanyl as the backup option. Serial transthoracic echocardiograms showed stable aortic dilatation. She was maintained on metoprolol and planned for vaginal delivery. She was admitted in spontaneous labour at 38 weeks. A CSE was performed after reconfirming consent. A sensory block to T8 was achieved only after 25 min with intrathecal ropivacaine 3.75 mg and further titrated boluses of epidural lidocaine 75 mg and ropivacaine 13 mg with fentanyl 13 µg. Analgesia was maintained with continuous epidural infusion of ropivacaine 0.16% with fentanyl 1.6 µg/mL at 10 mL/h. Throughout labour, she had good pain relief with a Bromage score of 3 and was haemodynamically stable. The infant was delivered (Apgar scores of 9 and 9 at 1 and 5 min, respectively) via vacuum-assisted delivery to shorten the second stage. She was discharged 3 days later without complications and repeat echocardiogram 5 weeks post delivery was unchanged.

Discussion: Dural ectasia has been attributed to be the cause of inadequate spinal anaesthesia in parturients undergoing caesarean section.1 This likely resulted in larger doses and a longer time to achieve adequate analgesia for our patient. Due to increased theoretical risk of dural puncture and CSF leak, neuraxial anaesthesia was thought to be contraindicated if there was dural ectasia at the level of epidural insertion.2 Successful CSE for caesarean section has recently been reported in patients with lumbar dural ectasia.3 In our patient, adequate epidural space was seen on the MRI at L3-4 to allow for catheter insertion. The use of a CSE technique provided effective labour analgesia with haemodynamic stability, and should be considered in parturients with Marfan’s syndrome and co-existing dural ectasia.

References
3. Baghizada L, Krings T, Carvalho J C A. Regional anaesthesia in Marfan syndrome, not all dural ectasias are the same: a report of two cases. Can J Anaesth 2012;59:1052-7
P31 Hereditary haemorrhagic telangiectasia complicating pregnancy
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Introduction: Hereditary haemorrhagic telangiectasia (HHT), or Osler-Weber-Rendu disease is an autosomal dominant disorder affecting 1 in 5-8000 individuals. Arteriovenous malformation can occur in these patients which are usually silent manifestation of the condition. Pulmonary arteriovenous malformation (PAVM) can occur up to 48% of cases, hepatic up to 30% and cerebral up to 10% of cases. The alteration in cardiac physiology which occurs with pregnancy increases the risk of AVM rupture and haemorrhage. We report a case of life threatening haemorrhage from the rupture of PAVM in a pregnant woman with known HHT.

Case report: A 35-year-old nulliparous woman was admitted at 26 weeks of gestation following a collapse at home. She woke with severe abdominal and chest pain. The pregnancy had been uneventful apart from 2 episodes of epistaxis. On arrival she was in shock with haemoglobin of 6 g/dL and severely acidicotic. Portable abdominal ultrasound scan (USS) was performed to rule out abruptio showed an absent fetal heart beat. After initial resuscitation, a laparotomy was performed to rule out intra abdominal bleeding which was negative. Hysterotomy ruled out intrauterine bleeding. Postoperative chest X ray showed a ‘white out’ of the left lung. USS confirmed haemothorax. A chest drain was inserted which drained 2.5 L of blood. She developed haemoptysis 2 days later resulting in re-accumulation of haemothorax. CT chest revealed the PAVM which was successfully coiled 2 days later.

Discussion: Pregnancy in women with HHT should be managed as high risk and women should be advised about small but potentially serious complications. Ideally the patient should be screened for PAVM pre-pregnancy. However, the management of asymptomatic PAVM during pregnancy is unclear, due to the risks associated with treatment balanced against the low risk of complications. Shovlin et al feel that for this reason the screening and treatment of PAVM in asymptomatic pregnancy is unjustified. Knowledge of the condition and pre-planning in the event of an emergency can improve outcome and would have expedited focused management for PAVM in this case.

References

P32 Intrapartum anaesthetic management of Oculodentodigital Dysplasia
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Introduction: Oculodentodigital dysplasia (ODDD) is a rare genetic condition, most commonly inherited in an autosomal dominant manner. Features include a dysmorphic nose, microcephaly, mandibular overgrowth, cleft palate, neurological abnormalities and syndactyly.1 We describe the management of a patient with this condition during labour and delivery.

Case report: A 27-year-old nulliparous woman with ODDD presented in spontaneous labour at term and requested an epidural for pain relief. Review of her medical records revealed a history of ODDD, as well as multiple previous surgeries including bimaxillary osteotomy and rhinoplasty. Anaesthesia records revealed previous failed fibreoptic nasal intubation followed by successful blind nasal intubation. Laryngoscopy before facial surgery was recorded as a Cormack-Lehane grade 2 view. Examination revealed a Mallampati score of 2 with significantly limited lower jaw protrusion; however, neck extension was good. She was noted to have dental abnormalities, as well as a dysmorphic skull and facial bones. A literature review revealed the condition was associated with neurological pathology including white matter abnormalities, ataxia and deafness. A consultant neurologist advised that due to the abnormal shape of the skull, there was a possibility that the brain may not sit normally within the cranial cavity. They advised under normal circumstances they would recommend imaging before any procedure involving dural puncture due to the possibility of tonsillar descent and coning. We were advised that epidural anaesthesia would likely not be contraindicated, providing a dural puncture did not occur. Following assessment of risks and benefits, an epidural was sited successfully to minimise the requirement for a general anaesthetic and potential airway difficulties. A category 3 caesarean section under epidural top-up was carried out uneventfully later in the day for failure to progress.

Discussion: The anaesthetic management of extremely rare conditions can be challenging, especially during the time pressured period of intrapartum care. It is vital these patients are assessed by an anaesthetist during their antenatal period. This allows sufficient time for plans to be made for optimal management in discussion with relevant specialists and the patient. The features of ODDD can demonstrate relative contraindications to both general and neuraxial anaesthesia. In such cases, specialist input is required and difficult management decisions may need to be made in the presence of a sparse evidence base.

Reference
1. Orphanet 2010 http://www.orpha.net/consor/cgi-bin/OC_Exp.php?lng=EN&Expert=2710
P33 Ornithine transcarbamylase deficiency: the importance of multidisciplinary peripartum care

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Introduction: Ornithine transcarbamylase deficiency (OTCD) is a rare urea cycle enzyme deficiency which may be associated with life threatening hyperammonaemia. Early clinical signs of hyperammonaemia include drowsiness, vomiting and behavioural changes. Progression to acute coma in pregnancy has been reported. We describe the management of a primiparous woman with OTCD.

Case report: A 26-year-old nulliparous woman with OTCD was referred for an anaesthetic assessment. She had been diagnosed in infancy and received regular follow-up. Her serum ammonia levels during pregnancy were controlled with oral citrulline and sodium phenylbutyrate. At 35 weeks gestation she was reviewed jointly by a consultant anaesthetist and a senior physician from adult metabolic medicine. A comprehensive management plan for labour, delivery and the postpartum period was formulated and widely distributed to relevant personnel and the parturient. Our institution had in place an emergency protocol for the management of adults with hyperammonaemia - liaison with pharmacy ensured that all intravenous medications required to lower serum ammonia (sodium phenylbutyrate, sodium benzoate and arginine) were stocked on our delivery unit. The parturient was admitted at 41 weeks gestation in spontaneous labour. Intravenous infusions of 10% dextrose and Hartmann’s solution were commenced. An arterial cannula was sited for frequent monitoring of serum ammonia, bicarbonate, glucose and electrolytes. Early epidural analgesia was provided. She continued with her usual oral medications. The adult metabolic medicine team were informed of her admission and their contact details were correctly documented on the multidisciplinary plan. She later required a forceps delivery for prolonged second stage of labour with epidural anaesthesia. Her ammonia levels were mildly elevated but remained stable throughout labour and delivery. Her postpartum period was complicated by perineal wound infection treated with antibiotics. Normalising serum ammonia allowed discharge on day 7.

Discussion: Ornithine transcarbamylase is a mitochondrial enzyme required for the synthesis of citrulline which is in turn necessary for the removal of serum ammonia. In OTCD high catabolic states such as trauma, sepsis, surgery and pregnancy may trigger hyperammonaemia, permanent neurological damage and even death. Affected parturients require monitoring and detailed multidisciplinary planning. Neuraxial analgesia reduces catabolic stress and is considered beneficial. Caloric supplementation with 10% dextrose also reduces protein breakdown. Continuation or introduction of ammonia lowering treatment needs to be considered. A guideline for emergency management of hyperammonaemia must be readily available. Hyperammonaemia is most likely postpartum and serum ammonia concentrations should be closely monitored during this period.

References

P34 A case of recurrent recurrent laryngeal nerve palsy: Ornter's syndrome in pregnancy

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Introduction: Ornter's syndrome, or cardiovocal syndrome, refers to a left recurrent laryngeal nerve (LRLN) palsy resulting from cardiovascular compression. We report a case of a parturient with undiagnosed mitral stenosis who became symptomatic during two pregnancies.

Case report: A 40-year-old G2P1 woman was referred to the anaesthetic antenatal clinic at 30 weeks of gestation for vocal hoarseness during her second trimester. She described similar symptoms during her first pregnancy 9 years previously in the Philippines. She had been referred to an ENT specialist who diagnosed idiopathic left-sided vocal cord palsy. At term, she had proceeded to have an emergency caesarean section, under spinal anaesthesia, for fetal distress. This was converted to general anaesthesia midway through the operation due to her development of dyspnoea. No further information was available. Five weeks after delivery her voice had returned to normal. During her second pregnancy she experienced palpitations with dyspnoea and a reduction in exercise tolerance. The hoarseness was again attributed to an idiopathic cause without further investigation. At 37 weeks she went into spontaneous labour receiving epidural analgesia. A healthy male infant was delivered by forceps in the delivery room complicated by postpartum haemorrhage. Over the following 8 h she received intravenous crystalloid 6.5 L and 2 units of packed red cells. 12 h postpartum she developed acute dyspnoea with her voice reduced to a whisper. She was treated with furosemide for pulmonary oedema secondary to fluid overload with initial improvement. She then deteriorated with the onset of fast atrial fibrillation, hypotension and pyrexia (38.2°C). She was transferred to the obstetric HDU and empirically treated for pulmonary embolism (PE) and sepsis. CT pulmonary angiography showed bilateral pulmonary oedema, a dilated left atrium and pulmonary arteries, with no evidence of PE. Echocardiography revealed severe mitral stenosis, with a grossly dilated left atrium and severe pulmonary hypertension. Cardiology review concluded that the patient’s LRLN palsy had been due to cardiovascular compression. Her condition rapidly improved after treatment with metoprolol and furosemide. She made a good recovery and has been referred for mitral valvotomy.

Discussion: Ornter's syndrome was first described in 1897. Previously it was thought the dilated left atrium directly compressed the LRLN but more recent authors have concluded that cardiovascular compression of the LRLN is caused by enlargement of pulmonary arteries or the thoracic aorta. This case describes decompenation of mitral stenosis due to both physiological changes of pregnancy and high volume fluid resuscitation. Cardiac disease is the leading cause of maternal death in the UK. Clinicians should remain alert to the rarer presentations of cardiac disease in pregnancy.

References
P35 Anaesthetic techniques for labour and delivery after liver transplantation: a case series

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Introduction: The population of women surviving and regaining fertility after successful liver transplantation is increasing and has a largely favourable outcomes for mother, fetus and graft. Up to 2012, there have been 115 pregnancies in 81 liver transplant recipients from our institution, with 81 live births. The caesarean section rate was 45.7% (UK mean 21.5%).1 43.2% had normal vaginal deliveries (NVD) and 11.1% had instrumental deliveries (ID). We sought to investigate the indications for the higher CS rate and the trends in anaesthetic techniques in these women.

Methods: The study was approved by our Clinical Effectiveness Department (Audit Approval 1257). 18 patients delivered outside the UK or delivery details were not available. Details of 36 delivery hospitals for 63 patients were available and the lead obstetric anaesthetists were contacted via email.

Results: Responses were received for 17 deliveries (30%). Nine women (52.9%) had a CS, four (23.5%) had a NVD and four (23.5%) had an ID. 75% of the IDs and 25% of the NVDs had an epidural.

Table: Indications and anaesthesia for the caesarean sections

<table>
<thead>
<tr>
<th>Urgency of CS</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indication for CS</td>
<td>cord prolapse, fetal distress with preeclampsia</td>
<td>fetal distress x 3, failure to progress (FTP)</td>
<td>maternal request, unstable lie, previous CS</td>
<td></td>
</tr>
<tr>
<td>Neuraxial Anaesthesia</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>General Anaesthesia</td>
<td>2</td>
<td>1 (maternal request)</td>
<td>1 (platelets 83x10^9/l)</td>
<td></td>
</tr>
</tbody>
</table>

Discussion: This is only a small group but the reason for the higher rate of CS for fetal distress remains unclear and could be influenced by the higher rate of pre-existing maternal comorbidities, prematurity and preeclampsia. Compared to national audit data, the rate of CS for fetal distress was 44% vs 22%; for FTP 11% vs 20%; for previous CS 11% vs 14%; and for maternal request 11% vs 7%.1 In this series, Royal College of Anaesthetists standards for neuraxial anaesthesia rates for CS were not met for elective CS (67% vs standard of 95%) or emergency CS (50% vs 85%).2 Only one woman in this cohort had a coagulation abnormality and therefore we should aim to increase the rate of neuraxial anaesthesia for these patients.

References
2. Royal College of Anaesthetists: Raising the Standard: a compendium of audit recipes. Section 8:8 2012.

P36 Head and neck cancer in pregnancy

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Introduction: Head and neck cancer in pregnancy raises a variety of challenges that require careful multi-disciplinary management. We describe the case of a nulliparous woman with a tongue base tumour and hypermobility syndrome (JHS).

Case report: A 19-year-old nulliparous woman with a tongue base T-lymphoblastic lymphoma, JHS (Ehlers Danlos spectrum) and a history of local anaesthetic (LA) insensitivity was referred for an anaesthetic review in her 3rd trimester. The lymphoma was localised only to the oropharynx and oncological management had been conservative as it was believed to behave in a 'benign' manner. She was never subjected to chemotherapy but did require debulking surgery for airway obstruction. Previously for tongue biopsy she had an inhalational induction with spontaneous ventilation through a LMA, followed by neuromuscular paralysis with a difficulty intubation (grade IV laryngoscopy view). For her two debulking surgeries, she had nasal fibreoptic intubation (FI) under general anaesthesia (GA) and awake respectively. Both FI were technically difficult. She continued to have stridor symptoms but the pregnancy was otherwise uneventful. In view of her JHS, she had an echocardiogram which was normal. Both her mother and grandmother had postpartum haemorrhage but her own coagulation investigations were normal. She had an elective caesarean section (CS) for anaesthetic indications.

Discussion: The incidence of head and neck cancer in younger females is rising1 and scenarios like this may become increasingly common. This case presents a number of anaesthetic dilemmas. In view of her age and despite her JHS, the most likely obstetric outcome would be a normal labour and vaginal delivery. LA insensitivity is a recognised feature of JHS but the implication for neuraxial anaesthesia is uncertain. A GA would be required if neuraxial anaesthesia for an emergency operative delivery failed. However, the risk of failed intubation under GA would be high for this patient and any delay in finding the equipment and skilled help could be detrimental to both mother and fetus. An elective CS would be another option. The anaesthesia options for a CS would include a neuraxial technique or a GA with awake FI. If a neuraxial technique was used and subsequently failed intraoperatively, it would be very challenging to perform an awake FI on a distressed patient. However, an elective CS in a young woman may lead to further CS and anaesthesia in subsequent pregnancies. A consensus opinion of the consultant obstetric anaesthetists was sought. The opinion was for an elective CS under GA to which both the obstetricians and patient agreed. The awake FI again proved to be technically challenging due to vocal cord oedema. An ENT surgeon was on standby but no assistance was required. The CS was uneventful and she was discharged home after two days. Our approach may be criticised for being overly cautious and may have created implications for future pregnancies and deliveries. However, we believe we avoided the potential for a ‘can’t intubate, can’t ventilate’ scenario thereby ensuring the safety of both mother and baby.

Reference
P37 Evaluation of efficacy of sequential compression device for prevention of hypotension after spinal anaesthesia in caesarean section

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Introduction: Subarachnoid block is the preferred anaesthetic technique for elective caesarean section due to it being convenient, cheap, reliable with a rapid onset. Hypotension being a frequent but disturbing side effect despite the use of standard preventive measures such as prehydration and left uterine displacement. The aim of this study was to evaluate the efficacy of sequential compression device for preventing hypotension after spinal anaesthesia for caesarean section. The hypothesis being that this would recruit pooled venous blood from the lower limbs, maintain the central blood volume and thus decrease the incidence of hypotension. We calculated the amount of vasopressor required in both the groups and assessed side effects of the sequential compression device.

Methods: Eighty parturients scheduled for elective caesarean section under spinal anaesthesia were recruited and randomly assigned to use of either a mechanical pump (Group A) or control (Group B). A standardized protocol for hydration and anaesthesia was followed. Hypotension was defined as a decrease in systolic blood pressure by $\geq 20\%$ from baseline, treated with 6-mg boluses of intravenous ephedrine. The incidence of hypotension was taken as the primary outcome. Median ephedrine requirement was taken as a measure of the severity of hypotension.

Results: Hypotension occurred in 6 of 40 (22.5%) patients in Group A compared to 22 of 40 (55%) in Group B ($P = 0.001$). The median [range] ephedrine dose was greater in Group B (13 [0–22] mg) compared to Group A (0 [0–12] mg) ($P < 0.001$). There was no difference between groups in the time to onset of hypotension.

Discussion: The sequential compression device that has been used in the intensive care units can be used in the operation theatres to reduce the incidence and severity of hypotension after spinal anaesthesia for caesarean section.

References

P38 Intraosseous access in the peripartum patient: is your needle long enough?

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Introduction: Use of the intraosseous (IO) route for managing obstetric haemorrhage and resuscitation in the emergency setting is recognised where intravenous access is difficult to establish. Successful IO insertion depends on sufficient needle length to reach the bone marrow. We question whether our standard 25 mm needle (EZ-IO®, Vygo®), with a safe deployment distance from skin to bone surface of $\leq 20$ mm, is adequate in cases of maternal obesity and oedema with increasing tissue depth. The optimal site for IO insertion has not been defined in parturients.

Methods: This was an observational study in the pre-assessment clinic with written consent. Data used was approved by the local Caldicott Guardian. Ultrasound measurements were taken (using a Sonosite 180 Plus with a 5–10 MHz linear array probe) from skin to bone surface at four standardised sites: proximal tibia, distal tibia, humerus and sternum. Additional data included booking BMI and presence of pre-eclampsia.

Results: 26 women were recruited. Median [range] gestation was 34 [29–38] weeks. There were no cases of preeclampsia. There was a general trend of increasing booking BMI and depth of tissues. 69% (n=18) of measurements at the humeral site were $>20$ mm.

Table: Percentage with skin-bone distance of $>20$ mm

<table>
<thead>
<tr>
<th>Booking BMI kg/m²</th>
<th>alth</th>
<th>Tibia (proximal)</th>
<th>Tibia (distal)</th>
<th>Sternum</th>
</tr>
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<tbody>
<tr>
<td>20 - 24.9</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>25 - 29.9</td>
<td>1 (20)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>30 - 34.9</td>
<td>3 (60)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (20)</td>
</tr>
<tr>
<td>35 - 39.9</td>
<td>2 (40)</td>
<td>1 (20)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>40+</td>
<td>9 (100)</td>
<td>4 (44)</td>
<td>3 (33)</td>
<td>4 (44)</td>
</tr>
<tr>
<td>Total</td>
<td>18 (69)</td>
<td>6 (23)</td>
<td>3 (12)</td>
<td>5 (19)</td>
</tr>
</tbody>
</table>

Discussion: In 88% (n=15) of patients with a BMI $<40$ kg/m² the 25mm EZ-IO® needle is sufficient to reach the bone marrow at both proximal and distal tibial sites. At a BMI $>40$ kg/m² the median depth was lower at the distal compared to proximal tibia (16.4 mm vs. 19.7 mm). With increased tissue depth at the humeral site IO placement may be more difficult in patients with a BMI $>25$ kg/m². The sternum site could be considered but this is would require use of a different licensed system (e.g. FAST1®, PyngMedical®).

Reference
P39 Intraosseous vascular access in obstetric emergencies: an OAA approved national survey

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Introduction: Intraosseous (IO) vascular access is established in adult and paediatric resuscitation as a temporary bridge to definitive vascular access when initial attempts at intravenous access are failing. The Association of Anaesthetists of Great Britain and Ireland (AAGBI) have recommended consideration of IO access when dealing with massive haemorrhage. Its successful use has also been described in resuscitation of the obstetric patient. Ready availability of IO equipment could provide another option for the obstetric anaesthetist.

Methods: Following OAA approval, all OAA members were invited to complete an online questionnaire beginning in April 2012 (survey number 128). Questions explored the role of IO vascular access in obstetric emergencies, experience of its usage and availability of IO equipment on UK labour wards.

Results: The response rate was 49% (921 completed replies). 46% had previously encountered suboptimal maternal resuscitation due to delays in obtaining intravenous access and 81% would consider IO access in life-threatening obstetric emergency after failed peripheral venous access. 90% had received previous training in IO usage and 28.6% had already used an IO needle in a clinical emergency (21.5% paediatric, 6.8% adult non-obstetric and 0.27% obstetric). The first line choices of anatomical location for sited an IO needle in an obstetric patient were proximal tibia (82%), proximal humerus (16%), distal tibia (1%) and other sites (1%). However, local availability of IO equipment was variable (Table). Where IO equipment was available, this was a manual needle in 26% and a powered/drill device in 74%.

<table>
<thead>
<tr>
<th>Availability of IO Equipment</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Within obstetric unit</td>
<td>17%</td>
</tr>
<tr>
<td>From nearby hospital department</td>
<td>20%</td>
</tr>
<tr>
<td>Not readily available</td>
<td>34%</td>
</tr>
<tr>
<td>Don't know</td>
<td>29%</td>
</tr>
</tbody>
</table>

Discussion: The majority of responders are trained in the use of IO vascular access and would consider its use in obstetric emergencies although immediate availability is limited. IO access equipment is relatively inexpensive and likely will be used rarely. Its main role is when urgent access is required but cannot be obtained quickly enough through other means. Advantages are that it is rapid and reliable with high first pass success rates facilitating early resuscitation and buying time before definitive vascular access. IO availability may be invaluable in units with large patient groups at risk of difficult vascular access e.g. morbidly obese or intravenous drug using patients. Further training, experience and availability of IO equipment in labour wards is needed together with recognition in local protocols and drills. IO access provides another option for the anaesthetist in the most difficult of situations.

References

P40 Intraosseous vascular access skill acquisition in labour ward staff: results of a training programme

R Junkin, K Litchfield
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Introduction: Obstetric emergencies can be unpredictable and fast paced with time-critical responses needed to prevent morbidity. Resuscitation and delivery could be delayed when faced with difficult or impossible peripheral venous cannulation (PVC). After PVC attempts fail, intraosseous (IO) access is one alternative which may provide significant time savings and has been recommended in national guidelines. We examine IO access training and skill acquisition amongst our labour ward staff.

Methods: Labour ward staff were recruited and trained to use the battery-powered EZ-IO® intraosseous vascular access device. Training consisted of an oral presentation followed by demonstration of the device on a proximal humerus manikin. After a period of familiarisation, staff were then timed performing the procedure on the manikin whilst assessed against a checklist. They then filled in a questionnaire regarding its potential usage in obstetric emergencies.

Results: We recruited 66 novice staff (28 obstetric anaesthetists, 11 obstetricians and 27 midwives). The first pass success rate was 63/66 (95.5%). The mean time taken to achieve successful access was 48.0 s. Anaesthetists (mean: 46.2 s) were the fastest group to achieve success although this was not statistically significant when compared using the two sample t-test with the obstetricians (46.9 s, P=0.88) and midwives (50.5 s, P=0.29) (Fig. 1). 73.4% of PVC trained staff felt the device was easier to insert than a PVC. 100% of staff would consider IO usage in the future.

Figure: Boxplot of IO success times in labour ward staff groups

Discussion: IO access training with the EZ-IO® device amongst labour ward staff appears to demonstrate rapid skill acquisition in simulated practice with high first pass success rates in novice users. Difficult vascular access often falls to the expertise of the labour ward anaesthetist but it appears this particular skill is also similarly reproduced by other staff groups reflecting the technique’s ease of learning. Further experience is needed in real life emergencies but IO vascular access may be considered in trained labour ward staff as a second line when rapid access is required in life-threatening obstetric emergencies and initial alternate measures are failing.

References
P41 Is 12 cm the magic number to shorten regional anaesthesia catheters after disconnection?

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Introduction: Neuraxial catheter infections are rare but have serious consequences. Direct catheter spread of skin flora is the most common cause. Catheter connector disconnection and contamination is not uncommon. Shortening of the contaminated portion is often the only option due to anticoagulation. To determine the optimal length to shorten the catheter after disconnection we conducted an in vitro study using seven different materials of catheter (including silver-coated) and Proteus mirabilis as the test organism.

Methods: Four catheters of each variety were prepared of which two were filled with 0.25% bupivacaine. Each of the 28 test catheters were exposed to a 0.5 McFarland broth of P. mirabilis (10³ orgs/mL) or a 1:1000 dilution of the broth (10⁴ orgs/mL - which is similar to clinical conditions). They were then dipped 2-3 mm at the patient end of the catheter for 2 s. All were then incubated in a horizontal position for 24 h in a 35°C air incubator to let the organisms migrate, and then cut in to 2 cm lengths (total of 140 pieces). Each section was incubated for 24 h at 35°C in 8 mL trypticase soy broth. Turbid broths plus two adjacent clear broths were mixed by inversion and a 1 µL loop of broth (88 samples) were inoculated on to a blood agar plates and incubated for 24 h in a 35°C air incubator.

Results: The maximum migration of test organisms in 24 h was 2 cm for 10⁴ orgs/mL and 6 cm for 10⁷ orgs/mL. The presence of bupivacaine marginally reduced bacterial migration, except in one catheter where it was more. The presence of silver in the catheter made no difference.

Discussion: In the event of catheter disconnection within 24 h, it might be appropriate to clean the outside of the catheter and cut at least 12 cm (double the worst case scenario from our study) for supine patients. This applies irrespective of the type of catheter material tested or coating with silver.

References

P42 Pre-printed labels improve documentation of neuraxial anaesthesia risks for obstetric procedures in a tertiary obstetric unit: a closed audit loop.

S Aluri, M Braganza, M Woolnough
Anaesthetics, Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield, UK

Introduction: Litigation related to regional anaesthesia was the largest sub-category within anaesthesia-related claims handled by the National Health Service Litigation Authority between 1995 to 2007. Within this sub-category, 51% of claims involved obstetric neuraxial anaesthesia, at a total cost of £5,342,000. Good documentation of the risks of obstetric neuraxial anaesthesia could help reduce litigation costs. We conducted a re-audit looking at changes in pre-operative risk documentation in a tertiary obstetric unit following the introduction of a standardised, pre-printed neuraxial anaesthesia risk label, based on OAA guidelines.

Methods: This project was registered with the Trust Clinical Effectiveness Unit as an audit. Data were collected retrospectively from a random selection of theatre cases (elective and emergency) under neuraxial anaesthesia over a four-month period. Preoperative risk documentation was deemed adequate when all of the following had been recorded: sensations experienced during procedure, failure and conversion to general anaesthesia (GA), significant hypotension, post-dural puncture headache (PDPH) and nerve damage (all present on the pre-printed label).

Results: Audit data were collected from 104 cases and compared to the results of a previous audit. Adequate documentation was present in 92% of anaesthetic charts with a pre-printed label and 42% of charts without a pre-printed label. Further comparison between elective and emergency cases, showed that the presence of a pre-printed label improved the adequacy of documentation from 20% to 82% in emergency cases and from 57% to 97% for elective cases.

Figure: Pre-operative documentation of risks of regional anaesthesia on the anaesthetic chart.

Discussion: Anaesthetic chart documentation may be the only evidence available to the anaesthetist to defend litigation claims. We have shown that good pre-operative documentation of the risks of neuraxial anaesthesia, especially in emergency cases, can be greatly improved by the introduction of a simple pre-printed risk label on to the anaesthetic chart.

References
2. OAA suggested datasets for Obstetrics. http://www.oaaanaes.ac.uk/content.asp?ContentID=22
P43 Simulated evaluation of non-Luer devices in neuraxial anaesthesia

A K Bhalla, C Chevannes, H McNamara, T Wauchope, A Ssenoga
Anaesthetics, Liverpool Women’s Hospital, Liverpool, UK

Introduction: The Department of Health aims to eliminate the use of devices with a Luer connector firstly from single-shot neuraxial procedures (April 2012) and subsequently from all neuraxial and regional anaesthesia procedures (April 2013). It has been stated that "...once achieved, non-Luer connectors for neuraxial procedures will create one more barrier to wrong route errors."; "...there remains a lack of independent evaluation (of non-Luer connectors) which is urgently needed to enable clinicians to judge the absolute and relative performance of different connectors"; and "...a structured evaluation of all five current connectors is urgently needed." The aim of our study was to evaluate all five current connectors in a comparative clinical evaluation.

Methods: We obtained samples of all five types of non-Luer spinal connectors available (Correct inject, Hall Lock, Neurax, Surety and BD Univa). We carried out clinical simulations on anatomically realistic Blue Phantom models. Anaesthetists were asked to perform a simulated spinal anaesthetic with all the different devices and then given structured questionnaires to assess their experience. The questionnaires were designed based on the OAA/SALG evaluation form. The equipment was scored on a 5 point Likert-type scale on: ease of removing / inserting trocar; free aspiration; ease of CSF visualisation; ease of connection; and leak. This was to collect information regarding the needles themselves, the ease and safety of using the different connectors, and an overall comparison against the assessors’ currently used Luer device. Attempts were made by all participants to cross-connect different non-Luer and Luer systems.

Results: Anaesthetists of different grades were recruited into this study and in total 180 evaluations were made. There were no issues with cross-connectivity.

<table>
<thead>
<tr>
<th></th>
<th>Hall Lock</th>
<th>Pajunk (Surety)</th>
<th>Transmed (Surety)</th>
<th>Neurax</th>
<th>Correct BD Univa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy trocar removal/insertion</td>
<td>2.0</td>
<td>4.0</td>
<td>3.5</td>
<td>3.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Free aspiration</td>
<td>2.0</td>
<td>3.5</td>
<td>4.0</td>
<td>3.0</td>
<td>4.0</td>
</tr>
<tr>
<td>CSF visualisation</td>
<td>2.5</td>
<td>3.0</td>
<td>4.0</td>
<td>3.5</td>
<td>4.0</td>
</tr>
<tr>
<td>Ease of connection</td>
<td>1.5</td>
<td>3.5</td>
<td>3.5</td>
<td>3.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Leak</td>
<td>3.0</td>
<td>4.0</td>
<td>4.0</td>
<td>3.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>1.5</td>
<td>3.5</td>
<td>3.5</td>
<td>2.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Comparison</td>
<td>worse</td>
<td>same</td>
<td>same</td>
<td>worse</td>
<td>same</td>
</tr>
</tbody>
</table>

Discussion: The authors would like to emphasise that these are preliminary results from an on-going study. Once completed this will be a comprehensive, independent evaluation of all five non-Luer connectors available.

Reference

P44 Transthoracic impedancemetric cardiology in the third trimester of pregnancy: indexed systemic resistances measure appears discriminant on preeclampsia early diagnosis

S Leroy, E Tith, N Didi, A Addes*, A Songy, C Agüilella, B Dureuil*
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Introduction In the third trimester of pregnancy, discovering pregnancy induced hypertension (PIH) is frequently the first sign of preeclampsia. Proteinuria or neurological signs often present at a later stage, although regular review and antihypertensive therapy may increase pregnancy duration. No test is sufficiently predictive of preeclampsia at an early stage. In a previous study, we reported that measuring cardiac index (CI) or indexed systemic vascular resistances (ISVR) with transthoracic impedancemetric cardiology (TCI) could be a discriminant, non-invasive and easily reproducible way to diagnose preeclampsia before the appearance of proteinuria. In this second study we aimed to assess the discriminant power of ISVR to diagnose preeclampsia in women with PIH diagnosed in the third trimester.

Methods: We conducted a prospective observational cohort study over 3 months in a specialist obstetric hospital. After informed consent, we included every pregnant woman in the third trimester, with two systolic blood pressures (SBP) <140 mmHg without proteinuria or other signs of preeclampsia. Patients where excluded if they were already treated or known to have chronic hypertension. Each patient underwent a TCI measurement (Physioflow®. Manatec) in a strict prone position, and was followed-up weekly until the appearance of preeclampsia. We included healthy volunteer pregnant women without hypertension as controls (CON group). We measured SBP, CI, and ISVR. During follow-up patients were divided into 3 groups CON, PIH, and preeclampsia (PRE) according to clinical condition, until two weeks postpartum.

Results: We included 65 patients. 29 in the CON group, 6 in the PIH, and 30 in the PRE group. The mean gestational age was 34.5 weeks.

<table>
<thead>
<tr>
<th></th>
<th>CON</th>
<th>PIH</th>
<th>PRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP(mmHg)</td>
<td>115 (10)</td>
<td>134 (16)</td>
<td>147 (16)</td>
</tr>
<tr>
<td>ISVR(dynes.s/cm²/m²)</td>
<td>2577 (1682)</td>
<td>2563 (867)</td>
<td>3700 (1607)*</td>
</tr>
</tbody>
</table>

Data are mean (SD). *P<0.05

Area under curve of the ROC curve was best (AUC= 0.775, P<0.001) in the 2500 dynes.s/cm²/m², determined as best prognostic level.

Discussion: TCI ISVR measurement is operator independent, with no specialised skills needed, and could offer a non-invasive way to accurately predict preeclampsia in PIH disorders. It could help with establish when early follow-up and antihypertensive therapy is required. However, our study is limited by the cohort size and further studies are needed.

Reference
P45 Treatment of disseminated intravascular coagulopathy using near patient testing of coagulation (ROTEM) and fibrinogen concentrate

HM McNamara, A Bhalla, C Chevannes, L Bricker*, PM Barclay, S Malliah
Department of Anaesthesia, Liverpool Women's Hospital, Liverpool, UK. *Obstetric Directorate, Liverpool Women's Hospital, Liverpool, UK

Introduction: Disseminated intravascular coagulopathy (DIC) may occur as a consequence of intraterine death (IUD), especially in association with placental abruption.1 It is a challenging condition to treat, as it may progress rapidly. The use of near-patient testing of coagulation, combined with the ability to rapidly administer fibrinogen concentrate allows treatment to keep pace with an evolving clinical situation. Our department has developed a ROTEM pathway as part of our massive haemorrhage guideline. This guides treatment with blood products including fibrinogen concentrate, on the basis of ROTEM results and the clinical situation. We present an example of the use of this pathway to correct severe DIC, thus preventing potential catastrophic haemorrhage.

Case report: A 30-year-old G3P2 woman presented at 17 weeks of gestation with abdominal pain and vaginal bleeding. There was minimal overt blood loss but ultrasound demonstrated placental abruption associated with IUD and significant retroplacental haemorrhage. Her heart rate was 102 beats/min, blood pressure 142/66 mmHg. Initial results showed very deranged ROTEM values, with the FibTEM trace appearing as a flat line, with no clot formation. This correlated with laboratory results, available later. As labour progressed, the uterus expanded to the xiphisternum, alongside a falling haemoglobin (Hb) due to presumed concealed haemorrhage. Massive haemorrhage was anticipated once uterine tamponade was released following delivery. The table shows the course of treatment and correction of coagulopathy, guided by the ROTEM pathway (*normal values). Delivery 2 h later occurred with minimal blood loss. The placenta was retained, and was manually removed in theatre under general anaesthesia. There was minimal fresh blood loss and the patient was stable throughout.

<table>
<thead>
<tr>
<th>Time</th>
<th>Hb</th>
<th>Plats</th>
<th>PT</th>
<th>aPTT</th>
<th>Fib</th>
<th>EXTEM*</th>
<th>EXTEM*</th>
<th>FIBTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>04:15</td>
<td>9.4</td>
<td>183</td>
<td>12.6</td>
<td>31.3</td>
<td>0.81</td>
<td>177</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>05:45</td>
<td>8.3</td>
<td>90</td>
<td>11.7</td>
<td>34.3</td>
<td>1.47</td>
<td>59</td>
<td>24</td>
<td>3</td>
</tr>
<tr>
<td>09:30</td>
<td>8.5</td>
<td>127</td>
<td>11.4</td>
<td>31.5</td>
<td>2.27</td>
<td>43</td>
<td>30</td>
<td>9</td>
</tr>
</tbody>
</table>

Discussion: DIC can be severe and progressive, especially when associated with abortion and IUD. Until delivery the coagulopathic stimulus remains, but delivery itself presents a significant haemostatic challenge. In this unusual case presenting at 17 weeks, use of the ROTEM pathway and fibrinogen concentrate provided contemporaneous monitoring and correction of coagulopathy. This occurred before delivery, thereby avoiding potential uncontrolled haemorrhage.

Reference

P46 Improving data capture on obstetric anaesthesia procedures and complications - role of coding

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Introduction: Accurate data collection of obstetric anaesthesia procedures and complications is essential for clinical governance purposes. Traditionally our hospital has used a paper-based data collection system for obstetric anaesthesia procedures and complications. In 2011 we attempted to improve data capture on our paper based system by introducing a system for coding all obstetric anaesthesia procedures and complications, which was based on the National Obstetric Anaesthetic Database (NOAD) dataset.1 We then assessed the impact of our new coding system on improving data capture.

Methods: We assessed the capture of data for the calendar year 2010, before introducing a coding system; and for the calendar year 2012, after the coding system had been introduced. In 2010, procedures and complications were handwritten in a data collection book, and a code allocated retrospectively; whereas in 2012 a code corresponding to the NOAD dataset was recorded contemporaneously. The procedure codes incorporated all procedures undertaken by anaesthetists, and the complication codes incorporated all complications resulting from those procedures. It also identified those procedures with no complications. Examples of codes used would be P1 for epidural for labour, P4 for spinal anaesthesia for caesarean section and C0 for no complications. Results then were entered into a spreadsheet and were analysed with Microsoft® Office Excel.

Results: There were 114 procedures (10.4%) which were not recorded or not clearly identifiable in 2010 compared with 16 procedures (1.3%) in 2012. The presence or absence of complications was recorded in 12 (1.1%) cases in 2010 compared with 949 (75.4%) of cases in 2012. In 2010 the absence of complications was not recorded. The number of complications recorded in 2010 was 12, compared with 115 in 2012.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total number of procedures</th>
<th>Procedure code incomplete n (%)</th>
<th>Complication code incomplete n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>1094</td>
<td>114 (10.4%)</td>
<td>1082 (98.9%)</td>
</tr>
<tr>
<td>2012</td>
<td>1258</td>
<td>16 (1.3%)</td>
<td>309 (24.6%)</td>
</tr>
</tbody>
</table>

Discussion: This audit cycle demonstrates that using codes for recording procedures and complications is easily achievable at the time of the intervention, and improves data capture. Manual retrospective coding is also very time consuming and the time needed to collate and analyse the year’s audit data was dramatically improved by the new system. It also allows more accurate and timely completion of annual NOAD returns. It is likely that the increased number of complications recorded is a result of better documentation rather than a bone fide increase. We would recommend our NOAD dataset based coding system for hospitals using paper based data collection of obstetric anaesthesia procedures and complications.

Reference
P47 Securing and management of epidural catheters in UK maternity units: an OAA approved survey.
S J Napier, H Swales
Shackleton Department of Anaesthesia, University Hospitals Southampton, Southampton, UK

Introduction: Catheter migration or disconnection can result in failure of epidural analgesia. An audit in our unit showed this occurred in 7% of epidurals sited but this reduced following introduction of guidelines detailing securing method. The OAA information card for mothers states that 1 in 8 of epidurals will not work well enough for labour and another form of pain relief may be needed.1 It does not suggest an acceptable resite rate. Resting an epidural exposes women to risks of a second neuraxial block and delays in receiving analgesia. Catheter disconnections at the filter can risk infection and epidural abscesses.2 We elected to survey UK units to establish epidural fixation methods and actions in epidural disconnections.

Methods: An OAA approved electronic survey was sent to UK lead obstetric anaesthetists asking how epidurals were secured and the management of epidural disconnections.

Results: Of 206 invited, 149 responses were received (72% response rate). Only 17% of units have guidelines on securing epidurals, 38% have guidelines on how to manage an epidural disconnection and just 6% were aware of their unit’s disconnection or fall out rate. 47% use a catheter locking device to secure the catheter, and the remainder use a variety of sterile dressings, the most popular being a transparent dressing and a tape window around this. 35% of units use Opsite spray at the insertion site. Many commented on fewer disconnections since the introduction of the new yellow Portex connector. The length of catheter left in the space increased with BMI with the majority of units leaving 5 cm in the space once BMI >35 kg/m². Some commented that length would depend on the depth of space found. 39% of anaesthetists secure the catheter with the woman in an “unflexed position”. In cases of disconnection, 24% of units would resite all catheters whilst 11% would clean catheter and cut off a portion. The majority of units have no fixed policy but management depends on whether the disconnection was witnessed, duration of disconnection and the stage of labour.

Discussion: Every effort should be made to reduce the need for epidural resites due to disconnections or catheter migration. Few units have guidelines or indeed even monitor this. Methods for securing catheters vary widely however the majority are using devices designed to secure the catheter to the skin. Anchoring the catheter to the skin, especially in obese women however, can potentially increase the amount of movement of the catheter in the epidural space and therefore increase catheter migration. Catheters should ideally be taped in an unflexed position. Opsite is used in a third of units despite the manufacturers’ advice that it can corrode plastic. Few units have guidelines on what to do in the event of a disconnection and there appears to be no national consensus.

References

P48 A national survey exploring choice of antibiotic prophylaxis for caesarean section: what impact have the NICE guidelines had?
KL Gough, U Misra*, PN Robinson, DN Lucas
Anaesthetics, Northwick Park Hospital, Harrow, UK, *Anaesthetics, Sunderland Royal Hospital, Sunderland, UK

Introduction: The 2011 NICE guidelines for caesarean section1 recommend a move away from the widespread use of co-amoxiclav prophylaxis at caesarean delivery. The guidelines support the findings from a Cochrane review that both ampicillin and first generation cephalosporins have similar efficacy in reducing postoperative endometritis.2 Despite these recommendations, the choice of antibiotic for caesarean section remains controversial.

Methods: We conducted an OAA approved, national survey, sent electronically to 208 UK lead obstetric anaesthetists. Questions examined awareness of the updated NICE guideline and impact of the guideline on choice of antibiotic for caesarean section.

Results: 148 responses were received (72.2% response rate). The majority of respondents were aware of the updated recommendations for antibiotic choice (93.4%). In 78% of units antibiotics are given before skin incision. The most popular regimens are: co-amoxiclav 46.7%, cefuroxime and metronidazole 20.7%, cefuroxime alone 30%. 52% of units have changed the antibiotic choice since publication of the guideline with a further 23% planning to make changes. In units where there are no plans to change to the choice of antibiotic the following reasons were given:

<table>
<thead>
<tr>
<th>Reason for not planning to change</th>
<th>Percentage of units (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preference for antibiotics administration post cord clamping</td>
<td>18.2</td>
</tr>
<tr>
<td>Less experience giving other antibiotics</td>
<td>2.6</td>
</tr>
<tr>
<td>Insufficient evidence to make a change</td>
<td>23.4</td>
</tr>
<tr>
<td>Already using a cephalosporin or ampicillin</td>
<td>16.9</td>
</tr>
<tr>
<td>Concerns about maternal anaphylaxis pre-delivery</td>
<td>14.3</td>
</tr>
<tr>
<td>Concerns about potential delay to emergency sections when preparing antibiotics</td>
<td>7.8</td>
</tr>
<tr>
<td>Other</td>
<td>16.8</td>
</tr>
</tbody>
</table>

Discussion: Despite widespread awareness of the 2011 guidelines, the recommendations have not been universally adopted, for diverse reasons. Previous work has concentrated on the timing of prophylaxis, but choice of antibiotic has been less explored. These two aspects are difficult to untangle as it is due to the changed recommendation for pre-incision administration of antibiotics that the largely familiar use of co-amoxiclav has come under scrutiny.3 If NICE guidance is not followed without valid justification trusts may be liable to financial penalties.

References
P49 A service evaluation study to establish the usefulness of combined spinal epidural anaesthesia for women having repeat (>2) caesarean sections

E V E Plunkett, S Jagannathan, R Gowni, K Hasan
Anaesthetic, Birmingham Women’s Hospital, Birmingham, UK

Introduction: Combined spinal-epidural (CSE) anaesthesia is a useful technique in obstetric anaesthesia. Its main advantage is the combination of the rapid onset of a high quality block with the option to extend anaesthesia or analgesia for prolonged surgery, postoperative analgesia or on going labour analgesia. However, its use is also associated with a higher incidence of complications. Patients having multiple repeat caesarean sections may be perceived to benefit from this technique in anticipation of surgery taking longer or being more complicated. We sought to investigate our unit’s experience of managing this subgroup of patients.

Methods: An initial study reviewed all cases having their third or greater caesarean section in a 12-month period (April 2007 - March 2008). This involved reviewing hospital notes, noting the mode of anaesthesia, duration of surgery and any complications. Having presented the results of this study to the department, a follow-up study of 6 months of cases (October 2010 - March 2011) was performed to establish whether any change in practice had occurred.

Results: In the initial study there were 131 cases identified. 4 were then excluded due to missing information. 17/127 (13%) of caesarean sections were performed under CSE, but in only 1/17 cases was the epidural catheter used and this was for postoperative analgesia. In 4/17 cases intravenous opioid analgesia was required intraoperatively and in 7/17 cases there were difficulties associated with insertion. The average duration of surgery in patients having a CSE was only 5 min longer than the average for all cases. In the repeat study 75 cases were identified. Only 4/75 (5%) of cases were performed under CSE. The epidural component was used in 50% of these and in 1 of the 4 there were complications on insertion (paraesthesia). On reviewing the cases, the indications for CSE were felt to be more robust. The average duration of surgery was 55 min for cases under CSE anaesthesia, 46 min for cases under spinal anaesthesia and 60 min for cases under general anaesthesia. There was no significant difference in duration of surgery with increasing number of previous caesarean sections.

Discussion: The initial study suggested that, in our unit, administration of CSE anaesthesia for patients having multiple repeat caesarean sections in anticipation of prolonged surgery is not beneficial and should only be used for other reasons. Following presentation of these results to the department, the repeat study results suggest that practice has changed and although CSE anaesthesia continues to be used, the indications are stronger. As an additional point, the mean duration of surgery does not appear to change considerably with increasing numbers of previous caesarean sections.

Reference

P50 Complications of cell-salvaged blood re-infusion in the obstetric patient

R Vedantham, M Mushambi
Department of Anaesthesia, Leicester Royal Infirmary, Leicester, UK

Introduction: NICE has issued guidance on the use of intraoperative cell salvage in obstetrics.1 Its safety and efficacy has been supported by studies and case reports.2 There is a theoretical risk of amniotic fluid embolism which may be minimised by the use of leukocyte depletion filters. However, recent case reports have identified these filters as a possible cause of hypotension during salvaged blood re-infusion.3 Delivery of a Rh-positive fetus by a Rh-negative mother carries the risk of maternal alloimmunisation, which may be exacerbated by the use of cell salvage. We surveyed current practice and complications of cell-salvaged blood re-infusion in the obstetric patient.

Methods: After OAA approval, an e-mail questionnaire was sent to 206 lead obstetric anaesthetists in April 2012. Questions included practice of cell-salvaged blood re-infusion and the use of leukocyte depletion filters.

Results: We received 159 responses (77%). 46 participants were excluded due to the non-availability of cell salvage in their units. In total 113 (55%) completed the survey and were analysed. All units had access to cell salvage during daytime while 65% had access out-of-hours. 85% of respondents had used cell salvage in the previous 6 months. In the previous year, 26% had collected blood but had not re-infused, 42% had re-infused 1-2 times, 20% 3-4 times and 12% >4 times. When asked about the decision to re-infuse, 73% (82) respondents routinely re-infused all patients if sufficient blood was processed, even when bleeding was under control and patients were clinically stable with a haemoglobin (Hb) ≥8 g/dL, while 26% (29) used a re-infusion trigger as they were concerned about potential complications of re-infusion. 37% of these used a median blood loss >1.5 (±1) litres and 63% used a median Hb <8 (±1) g/dL as the trigger. 89% of respondents routinely used leukocyte depletion filters and the majority of those who did not, were concerned about the hypotensive reaction. 14% experienced significant maternal hypotension during cell-salvaged blood re-infusion. 50% of these abandoned re-infusion, 12% stopped and then resumed and 38% removed the leukocyte depletion filter. Only 34% respondents routinely check for alloimmunisation following the re-infusion of cell-salvaged blood in a Rh-negative mother.

Discussion: The re-infusion of cell salvaged blood is not without risks, but 73% of respondents would re-infuse cell salvaged blood even when it was not clinically indicated. The majority of units do not test for alloimmunisation. It is recommended that Rh-negative mothers should be tested since it has been demonstrated that the use of a leukocyte depletion filter does not prevent fetal red blood cell contamination during re-infusion of cell-salvaged blood.4

References
P51 Decision making following failed intubation at caesarean section: a national OAA survey

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Department of Anaesthesia, Royal Devon and Exeter Hospital, Exeter, UK, *Department of Anaesthesia, Chelsea and Westminster Hospital, London, UK, †Department of Anaesthesia, Royal Lancaster Infirmary, Lancaster, UK

Introduction: Failed tracheal intubation is more common in obstetric general anaesthesia. Failed intubation drills are well established but little attention has been paid to how key decisions are made when intubation fails but ventilation by an alternative means is possible during emergency caesarean section for fetal distress. What influences the decision to wake the mother or maintain anaesthesia to enable delivery is largely unknown.

Methods: Following approval from the Surveys Subcommittee of the Obstetric Anaesthetists’ Association (OAA), all OAA UK members were invited to complete an electronic survey (no.125). A scenario was presented of a category-1 caesarean section under general anaesthesia for severe fetal bradycardia in which intubation fails but ventilation is possible. Questions were posed on subsequent management and free text invited to describe reasons why decisions were made. An inductive approach to data analysis was performed to develop general categories of answers. Extracts from individual answers were further categorised to describe how respondents explained particular decisions.

Results: There were 927/1803 completed questionnaires (51%) and 23 partially completed, totalling 950 (53%); results are presented reflecting responses for each question. 679/949 (73%) were consultants, 577/936 (62%) had never experienced an obstetric failed intubation but 460/947 (49%) had managed one as part of simulation-based training. In response to the scenario presented, 503/945 (53%) would maintain anaesthesia to enable delivery and 442/945 (47%) would wake the woman before delivery. Prominent themes are shown in the Table.

Table: Prominent themes in forming decisions

<table>
<thead>
<tr>
<th>Reasons for waking</th>
<th>Reasons for continuing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived duty of care;</td>
<td>Peer pressure from other team members;</td>
</tr>
<tr>
<td>Fear of litigation;</td>
<td>Faith in own and others’ abilities;</td>
</tr>
<tr>
<td>Protocol adherence of some sort;</td>
<td>Belief this would be the wish of the mother</td>
</tr>
<tr>
<td>Fear of criticism by peers</td>
<td></td>
</tr>
</tbody>
</table>

Discussion: Anaesthetists were divided in the decisions they would make when faced with this scenario and justified their choices primarily on personal evaluation of the situation rather than protocol or guidelines. Decision making following failed intubation is complex but we have identified prominent themes and known behaviours. Greater understanding of these may aid planning and decision making when faced with similar situations.

References

P52 Impact of dose finding studies on anaesthetic prescribing practice of oxytocin in the United Kingdom.

R West, SJ West*, R Simons, A McGlennan

Introduction: Oxytocin use has been associated with maternal death, litigation claims and adverse effects. Renewed interest in the safe use of oxytocin has implied that a much lower loading dose is as effective, with a far lower complication rate. We report the current national use of oxytocin following caesarean section (CS).

Methods: An Obstetric Anaesthetists Association (OAA) approved national survey was sent to all UK lead obstetric anaesthetists in July 2012. Questions were posed on oxytocin use in elective and emergency CS, initial dose and method of administration, second dose, infusion dose and serious complications from oxytocin administration.

Results: The completed response rate was 72.9% (150/206). The number of obstetric units that used less than 5 IU oxytocin for the initial dose was 8 (5.3%) for non-labouring CS and 7 (4.6%) for labouring CS. A neat bolus was given by 23 (15.3%), bolus diluted in 5 mL by 44 (29.3%), slow intravenous or infusion by 80 (53.3%) and 3 (2%) used carbetocin instead. None gave more than 5 IU oxytocin. Subsequent doses were given as the initial dose by 134 (89.3%), reduced dose by 13 (8.7%), increased dose by 1 (0.7%), but not more than 5 IU. Oxytocin infusions were routinely used by 35 (23.3%) and by 77 (51.3%) only when requested by obstetrician. Most used 7.5–10 IU/h (128, 85.3%) over 4 h. The majority (123, 82%) used a volumetric pump, 20 (13.3%) used a syringe driver and 7 (4.7%) diluted the oxytocin in a bag of fluid and allowed it to run freely. Complications including asystole and bronchospasm were reported by 14 (9.3%).

Discussion: This survey represents the first evidence that UK anaesthetists are using less than 5 IU oxytocin. Additionally, in the UK we are no longer using 10 IU oxytocin that had previously reported to be standard practice for up to 14% of anaesthetists. Surprisingly, nearly half did not administer the initial dose as slow intravenous and a small percentage administered oxytocin infusion as diluted 500 mL free running drip. It is interesting that serious adverse events, including asystole, were reported in healthy parturients using the generally recommended oxytocin dose of 5 IU. Avoidance of repeated bolus used probably shows awareness of oxytocin receptor desensitization. This survey gives an account of the variability in practice across the UK and a measure of the serious adverse events surrounding the use of oxytocin. These findings further support the need to standardize our practice. A reasonable approach could be to have a national evidence-based protocol or consensus from large organizations to improve quality of care and patient safety following oxytocin administration in CS.

References
P53 Maternal positioning during caesarean section: wedge or tilt?
AJ Shonfeld, E Mullins*, S Malhotra
Department of Anaesthesia, Imperial College Healthcare Trust, London, UK, *Department of Obstetrics, Imperial College Healthcare Trust, London, UK

Introduction: Aortocaval compression can adversely affect maternal organ perfusion including flow to the uterus. It has been shown that anaesthetists are inaccurate at estimating the degree of tilt on an operating table. If the wedged position has an equally good haemodynamic profile should it be the standard position for operative procedures rather than table tilt as the wedge position guarantees a set amount of tilt?

Methods: Following ethical approval 40 ASA I and II women with singleton pregnancies who presented at term for routine antenatal midwifery clinics were recruited and positioned sequentially in a randomised order, supine with 15 degrees left tilt (tilt), supine with wedge (wedge) and left lateral (lateral). Maternal haemodynamics were assessed with a supraprosternal Doppler device and non-invasive blood pressure monitoring.

Results: Cardiac output was not significantly different between the three groups. Systolic and diastolic blood pressure and heart rate were significantly lower in the lateral position.

<table>
<thead>
<tr>
<th>Lateral</th>
<th>Tilt</th>
<th>Wedge</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTC</td>
<td>411.72</td>
<td>396.85</td>
</tr>
<tr>
<td>CIE</td>
<td>2.65</td>
<td>2.7</td>
</tr>
<tr>
<td>Systolic BP</td>
<td>116.25</td>
<td>119.75</td>
</tr>
<tr>
<td>Diastolic BP</td>
<td>68.73</td>
<td>74</td>
</tr>
<tr>
<td>Heart Rate</td>
<td>76.8</td>
<td>79.86</td>
</tr>
</tbody>
</table>

FTC: corrected flow time (milliseconds); CIE estimated cardiac index (L/min/m²)

Discussion: Maternal positioning has the potential to influence haemodynamics and have subsequent consequences for fetal outcome. We found no significant difference in cardiac output between the three positions, however, the lower blood pressure and heart rate in lateral position perhaps indicate a lower resistance cardiovascular system and re-enforce the importance of a lateral maternal position during uterine fetal resuscitation. As wedge and tilt positions were equally good for maternal cardiac output perhaps we should adopt wedge as the gold standard position for caesarean section as then we know a set degree of uterine displacement will be applied.

References

P54 Simulator-based assessment of an airway checklist in obstetric anaesthesia
MD Wittenberg, AJ Wickham, RJ Daly, DJA Vaughan, DN Lucas
Department of Anaesthesia, Northwick Park Hospital, London, UK

Introduction: The fourth National Audit Project recommended that a simple airway checklist can quickly identify potential problems. Concerns have been raised that using a checklist in the obstetric setting may cause delay to general anaesthesia (GA). We designed an airway checklist for use before obstetric GA, and used high fidelity simulation to examine its impact on procedural time and efficacy.

Methods: Following Caldicott Guardian approval and written informed consent, nine anaesthetists and nine anaesthetic assistants conducted two different simulated scenarios that required the administration of a GA. The first scenario was conducted without the use of the checklist and the second with the checklist used during pre-oxygenation. A high-fidelity 3G Laerdal SimMan was used in a simulated obstetric theatre setting. Times from decision for GA, and from start of pre-oxygenation, to successful tracheal intubation were recorded. Data were compared using the paired t-test.

Results: The difference in mean ±SD time taken from decision for GA to intubation when not using the checklist (N-GA) and using the checklist (C-GA) was not statistically significant between the groups (4.95±2.9 4 min vs 4.76±1.41 min; P=0.87). Equally, there was no significant difference in mean time from start of pre-oxygenation to intubation between the groups (3.98±0.85 min vs 3.29±1.05 min; P=0.3) as shown in the Figure.

Figure: Times from decision for GA and start of pre-oxygenation to intubation when using (C-GA) and not using (N-GA) the checklist.

Discussion: We found that using an airway checklist for obstetric GA in a simulator setting did not cause significant delay. Furthermore, participants felt that using the checklist reduced error and anxiety in this setting. We now intend to introduce the checklist to routine practice to evaluate its impact in a clinical setting.

Reference
P55 Acute neuropathic pain following caesarean section

M Mackenzie, M Cox*, V Terzidou*, D Phukan
John Hammond Department of Anaesthesia, East Surrey Hospital, Redhill, UK, *Magill Department of Anaesthesia, Chelsea and Westminster Hospital, London, UK

Introduction: Acute neuropathic pain (ANP) after caesarean section (CS) is a recent concept, but early identification and treatment may reduce progression to a chronic pain state. Breastfeeding may have implications on the treatment choice and there are few data on which to base decisions.

Methods: An OAA approved survey (No 127) was sent to 207 lead obstetric anaesthetists, with questions on awareness, incidence and departmental treatment policy for ANP with any variation used for breastfeeding. With audit committee approval, we also prospectively surveyed 198 women following CS with questions modified from the S-LANNS pain score and Paindetect pain questionnaire, for any ANP features.

Results: The OAA response rate was 68%. 22% were unaware of the concept of ANP. 62% did not know how many cases were seen in their departments and 23% said that they had none. 13% had <5 cases/year. 3% routinely questioned postoperative patients for the presence of neuropathic symptoms.

First line intervention(s)  Responses (193)
Referral to chronic pain service  58 (30%)
Amitriptyline 26 (13%)
Gabapentine 23 (12%)
Tramadol 16 (8%)
Pregabalin 6 (3%)
Nerve block 3 (2%)
Ketamine 2 (1%)
Don't know 54 (28%)

For breastfeeding, 17% would not change from first line intervention, 36% would refer to chronic pain specialists and 44% did not know. One respondent would avoid pregabalin, and only 1 respondent would advise to stop breastfeeding if using pregabalin or gabapentin. Data collected from 198 women on postoperative day 1, a 75% inclusion rate. One (0.5%) woman had many features suggestive of ANP giving an estimated population incidence of 10/1000 (95%CI 0 - 30). Isolated burning pain was seen in 4 (2.0%) and burning with numbness was seen in 2 (1.0%).

Discussion: The reported incidence of ANP following CS was small but may be under-reported since only 3% of units routinely look for symptoms and a fifth of respondents were not aware of the possibility. Considering our data could suggest an incidence as high as 30/1000, awareness was limited and there was no consensus on treatment options. Many would refer to chronic pain clinics, particularly if breast feeding. Should we be seeking ANP more proactively?

References

P56 Back Pain: A Cautionary Tale

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Introduction: We present a case of epidural abscess following straightforward epidural placement for labour analgesia in a healthy primigravida.

Case report: A 37-year-old woman underwent induction of labour at 36+2 weeks for a monochorionic diamniotic twin pregnancy. She had been commenced on aspirin 75mg daily at 12 weeks of gestation as per NICE guidelines. Once in established labour she requested an epidural, which was inserted uneventfully under strict aseptic conditions at L2-3 and provided effective analgesia for labour and instrumental delivery. The catheter was in situ for 15 h and the block regressed once analgesia was discontinued. She was asymptomatic on postnatal review. Forty-eight hours after delivery the patient developed back pain and redness at the epidural site. She was apyrexial with no neurological findings and had a normal leucocyte count. A diagnosis of superficial site infection was made and oral flucloxacillin was commenced. The following day her symptoms and signs were improving and the patient was discharged home on antibiotics with appropriate advice. She re-presented 2 days later with severe radicular back pain shooting into her neck and down her legs, pus discharging from the epidural site, neutrophilia, and raised CRP. There was no neurological deficit. After neurologist review and discussion with a radiologist it was agreed that MRI was warranted but could be delayed to the following morning. Antibiotic therapy was amended to intravenous flucloxacillin and vancomycin. MRI the following morning revealed an extradural mass at L2-3 reported as ‘consistent with an infected haematoma’. Neurosurgical review recommended conservative treatment with close neurological monitoring, serial inflammatory markers and repeated MRI scans to monitor progress. Cefotaxime was added as advised by microbiology. Staphylococcus Aureus was identified as the causative organism. Follow-up MRI 4 weeks post delivery showed complete resolution of the extradural mass.

Discussion: Epidural abscess is a rare complication of CNB with an incidence of 2.1 per 100 000 and is strongly associated with significant morbidity and mortality. Interestingly this patient was on aspirin which may have contributed to development of an epidural haematoma, although MRI cannot differentiate between blood or pus, so this remains uncertain. Presentation of epidural abscess rarely follows the classical triad of fever, back pain and neurological deficit. Shooting radicular pain appears to be typical whilst neurological deficit is a late sign associated with poor prognosis. Consequently we believe that MRI should be performed without delay in any patient in whom epidural abscess is suspected. In certain carefully selected patients conservative management can achieve a good outcome.

References
PS7 Postnatal codeine prescription: a survey of UK practice
N Thangarajan, P Mackie*, G Dickinson†, J Bain
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*Anaesthetics, University Hospital Southampton NHS
Foundation Trust, Southampton, UK, †Anaesthetics, Royal
Hampshire County Hospital, Winchester, UK

Introduction: Codeine is a commonly prescribed opioid for
acute pain following caesarean section. Its use in different
forms in UK, such as codeine phosphate, co-dyramol, co-
codamol, dihydrocodeine, is widespread. We were prompted
to carry out this survey in light of recent evidence of adverse
reactions, including one neonatal death, in breastfed infants
whose mothers were prescribed codeine phosphate,1,2,3 and
new guidelines issued by NICE and the FDA. The aim of this
survey is to establish the prevalence of codeine use in UK
obstetric units, the circumstances in which it is used and what
information the mother is given about its use.

Methods: Following approval from the Obstetric
Anaesthetists’ Association, an electronic mailing survey was
sent to all UK lead obstetric anaesthetists with specific
instructions as to answer the survey questions as per their
protocol rather than their own opinion.

Results: We had a response rate of 79%. 69% of units
prescribe codeine to breastfeeding mothers. Only 36% of the
units have guidance on prescription of codeine for postnatal
analgesia. Codeine is not prescribed by 22% of units and
factors that influence codeine prescription include constipation, concerns with baby, increased side effects, allergy, not in guidelines and not a good analgesic. Codeine
has been prescribed in 14% of units for specific groups like
post caesarean section, post perineal tear and post
instrumental delivery. Codeine was prescribed regularly in 33%
of the units and as required in 67%. 64% were prescribed by
anaesthetists and 14% by obstetricians. Prescription doses
varied between 30 mg (43%) and 60 mg (57%). 35% of the units
discharge women with codeine and only 24% give information
about its use. Out those, 68% gave verbal advice and 24% used
leaflets. Key messages given to patients include
constipation and sleepy baby.

Discussion: Are we taking into account the genetic factors
and the physiological alterations in pregnancy in relation to
opioid metabolism and response? The use of codeine in
breastfeeding mothers should be at the lowest effective dose
and for the shortest duration as per NICE recommendations.
There is a need for continued vigilance when patients are
prescribed codeine. Practice has changed significantly
following the case report. Some units have stopped
prescribing codeine whereas others prescribe it as required.

References
depression in breastfed infants following maternal codeine use.
Paediatric Drugs 2008;10:399-404
2. Koren G, Cairns J, Chitayat G Leeder SJ. Pharmacogenetics of
morphine poisoning in a breastfed neonate of a codeine prescribed
mother. Lancet 2006;368:704
opioid toxicity following maternal use of codeine during

PS8 Efficacy of transversus abdominis plane block as part of
multimodal analgesia for management of pain following
caesarean delivery: an institutional experience
W D H Lakshman, K Gardner, V Annam
Anaesthetics, Colchester Hospital University NHS
Foundation Trust, Colchester, UK

Introduction: The transversus abdominis plane (TAP) block as
part of multimodal analgesia for postoperative pain relief
following caesarean delivery (CD) has shown to be effective
when performed in combination with intrathecal fentanyl,1 but
not with morphine.2 There are no randomised controlled trials,
of TAP blocks in combination with intrathecal diamorphine, a
drug widely used in the UK. An audit conducted in our unit in
2008 showed only 12.5% of women had a pain score in the first
24 h of <3 (VAS 0-10) against a national best practice standard
of >90%.3 This figure improved to 45% in 2009 with addition of
TAP blocks to a multimodal analgesic regimen that included
paracetamol, NSAIDS and opioids. We then introduced a staff
and patient education programme on postoperative pain
management along with self administration of oral analgesia
(SAM). We re-audited our practice in 2010.

Methods: After obtaining hospital audit committee approval,
we collected data prospectively from women having a CD over
a 6-week period. We collected patient demographic details,
category of caesarean section, anaesthetic technique and the
amount and type of postoperative rescue analgesia administered by midwives. We also collected the worst pain
scores on movement (VAS 0-10) and PONV scores for the first
3 postoperative days or until discharge, which ever was earlier.
We also obtained data on postoperative length of hospital
stay from the hospital records.

Results: There were 60 women who had a CD during this time,
53% elective and 47% non-elective (46 spinal, 8 epidural and 6
general anaesthesia). 90% of women who had a spinal
anaesthetic with intrathecal diamorphine also had TAP blocks.
No TAP blocks were performed on women who had an
epidural top-up. All women were entered into the SAM
programme. A total of 40% did not require any rescue
analgesia. The median total oral morphine used in the first 24 h
was 10 mg [IQR 0-20]. The median worst pain score in the first
24 h was 0 [IQR 0-3]; this had been 4 in 2009 and 6 in 2008.
90% of women had a worst pain score of <3 (12.5% in 2008 (no
TAP blocks and no SAM), 45% in 2009 (TAP blocks but no
SAM). The median length of stay was 2 days [IQR 1-2]; it was
also 2 in 2008 and 2009 [IQR 2-3].

Discussion: The quality of postoperative pain relief following
CD has improved significantly in our unit following the
addition of TAP blocks to a multimodal analgesic regimen.
Further improvements have been achieved with the
introduction of SAM, patient education and staff training.

References
1. McDonnell JG, Curley G, Carney J et al. The analgesic efficacy of
transversus abdominis plane block after caesarean delivery. Anesth
Analg 2008; 106: 186-92
2. Abdalla FW, Halpern SH, Magarido CB. Transversus abdominis
plane block for postoperative analgesia after caesarean delivery
performed under spinal anaesthesia? A systematic review and meta-
for continuous quality improvement in anaesthesia. Royal College
P59 Incidence of pelvic girdle pain in Peterborough Hospital
M Morosan, R Kare, R Abulamad, M Weisz
Anaesthesia, Peterborough and Stamford Hospitals NHS Trust, Peterborough, UK

Introduction: We conducted a prospective survey to establish the incidence of pelvic girdle pain (PGP) in our population, in order to better stratify its severity and to facilitate an early referral to the anaesthetic clinic.

Methods: After gaining clinical governance approval from our hospital, we prospectively collected data from the obstetric antenatal clinic. We devised a questionnaire based on a validated pelvic girdle pain collection tool, looking at a 20-item activity scale and 5-item pain related scale (permission for usage being granted by original researchers).1 Between March and July 2012 we collected 502 completed questionnaires. 20 were excluded from the final analysis, due to difficulty in data interpretation. Demographic data were collected on: age, smoking and working status. Further data were collected on gestational age, parity, history of inflammatory or chronic pain conditions, presence of PGP in previous pregnancies and time frame for improvement, onset in current pregnancy and treatment received.

Results: In the 482 analysed questionnaires, we found an incidence of 9.5% severe and 26.1% moderate PGP. In 19 patients affected in a previous pregnancy it took between 6 months to 2 years to notice an improvement in their symptoms. The majority of patients informed the midwives and GPs about symptoms and few received treatment or physiotherapy referral despite an increased severity. As a result, we started a new PGP pathway in our hospital. Patients with mild and moderate disease will be brought to exercise classes, while severely affected patients will attend anaesthetic antenatal clinic and receive physiotherapy.

Discussion: Pregnancy associated PGP is a source of disability and distress to the mothers and their families. These patients are more likely to require an anaesthetic intervention for delivery. There are few evidence-based interventions related to this condition.2 Recent animal studies report a protective effect of oxytocin at spinal level in the development of postpartum chronic pain.3

References

P60 Patient survey regarding enhanced recovery interventions for elective caesarean sections at a tertiary obstetric unit.
S Aluri, R Bhosale, C R Anderson, I Wrench
Anaesthetics, Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield, UK

Introduction: In our unit the median length of stay following elective caesarean section is two days (60% of patients). We are planning to adopt the principles of enhanced recovery programmes1 to allow some patients to be discharged the day following surgery (currently 2.5% of patients). To support this initiative we distributed a questionnaire to patients, based on these interventions to know their views and to assist with pathway design.

Methods: This project was registered with the Trust Clinical Effectiveness Unit as a service evaluation. In total 58 patients who had undergone elective caesarean section were seen on the first or second post-operative day and asked to complete a questionnaire.

Results: The proportion of patients who would like to have gone home at least a day earlier was 46%. In terms of discharge medication, 59% of patients felt that regular paracetamol and diclofenac with or without codeine would be sufficient with the remainder preferring something stronger such as morphine.

Figure: Patient responses in percentage to the questionnaire.

Discussion: A significant minority of patients would like earlier discharge following elective caesarean section. As a group they also welcome preoperative high calorie drinks and early skin-to-skin contact in theatre. There are concerns about getting out of bed at 8 h and in terms of warming, many patients do not perceive this as a problem at all despite evidence from our own unit that many are cold postoperatively. Our data suggest that interventions for enhanced recovery following elective caesarean section will be welcomed by patients. We also believe that they will result in significantly more being discharged the day following surgery.

Reference
P61 The state of post caesarean section pain management services in tertiary hospitals in Nigeria in 2012


Anaesthetics, Conquest Hospital, Hastings, UK,
*Anaesthesia, Coordinator, The IMPRACSE Team, Nigeria,
†Obstetrics and Gynaecology, Coordinator, The IMPRACSE Team, Nigeria

Introduction: In September 2011 the League of Obstetric Anaesthetists of Nigeria (LOAN) was inaugurated. This was a significant milestone in the evolution of obstetric anaesthesia as a subspecialty in the country. In a bid to improve the standard of obstetric anaesthesia services LOAN has embarked on the IMPRACSE (IMproved Pain Relief After Caesarean Section) project. This multicentre obstetric anaesthesia project aims to develop a blueprint for improving post caesarean section (CS) pain management in a way that is practical and sustainable in an economically challenged environment. We found no previous report on similar multicentre obstetric anaesthesia research in Africa. This survey was necessary to obtain baseline data.

Methods: An electronic questionnaire was sent to tertiary hospitals having an identified consultant with a subspecialty interest in obstetric anaesthesia. We received responses from all five hospitals. Two hospitals are located in Lagos and one each in Benin, Port Harcourt and Zaria. We sought information on the number of caesarean sections for 2009 - 2011, drugs and techniques available for post CS analgesia and who wrote the analgesic prescription.

Results: In 4/5 hospitals (80%) the obstetrician was solely responsible for the post CS analgesic prescription. Only in one hospital was the anaesthetist jointly involved. There was no preservative free morphine or dexamorphine in any hospital. However, intrathecal fentanyl was used in three (60%) hospitals. In one hospital there was no opioid available for intrathecal use. Pentazocine was the commonest drug used for post CS analgesia but prescription practice varied widely.

<table>
<thead>
<tr>
<th>Drugs used for post CS analgesia (1st 48 h)</th>
<th>Hosp 1</th>
<th>Hosp 2</th>
<th>Hosp 3</th>
<th>Hosp 4</th>
<th>Hosp 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paracetamol</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Diclofenac</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Tramadol</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Codeine</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Pentazocine</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Pethidine</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
</table>

Discussion: This survey highlights the need to standardise post CS pain management in Nigeria. Poorly managed post CS pain is now a recognised risk factor for chronic post surgical pain. The Royal College of Anaesthetists guideline recommends that 100% of women should be prescribed regular non steroidal antiinflammatory drugs unless contraindicated. On this score alone two hospitals had 0% compliance. Yet paracetamol and diclofenac are available and affordable even in resource poor countries. In 2013 the IMPRACSE team plans to audit post CS outcomes. This will include pain scores and actual analgesia received.

References

P62 Wound infection is significantly associated with chronic pain after caesarean section

YM Nawaz, L Parks, PF Bell

Anaesthesia, Craighavon Area Hospital, Portadown, UK

Introduction: Chronic pain after caesarean section (CS) is a debilitating condition which affects a mother’s ability to care for herself and her new baby. The prevalence of this condition is estimated to be between 6-18%. We report a study of chronic pain after CS in a maternity unit with approximately 4000 deliveries/year and a CS rate >35%.

Methods: Following Regional Ethical and Trust Governance approval, a postal patient questionnaire was sent to 300 consecutive women who had a CS between August and October 2011. Data were collected on patient demographics, past medical history, peripartum care, duration of postoperative pain and characteristics of chronic pain. The primary aim was to identify the prevalence of chronic pain lasting >two months after CS and until the time of survey in the study cohort with calculated 95% confidence intervals (CI). The secondary aim was to identify the factors which were significantly associated with this condition.

Results: Six patients were excluded due to wrong address details. 124/294 potential participants returned a completed questionnaire and consent form giving a 42% response rate. Postoperative pain lasting >two months was present in 29% (95%CI: 21.8 to 37.6%) and lasting for a mean of 363 days was present in 22.6% (95%CI: 16.1 to 30.7%) of respondents. The overall wound infection rate was found to be 22% and the most common sites of pain persisting until the time of survey were the wound (57%) and back (43%). Several factors were significantly associated with chronic postoperative pain.

Table: Factors associated with chronic pain (CP) after CS

<table>
<thead>
<tr>
<th>Associated Factor</th>
<th>CP (n=36)</th>
<th>No CP (n=88)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past history of chronic pain</td>
<td>7 (20%)</td>
<td>3 (3%)</td>
<td>0.003</td>
</tr>
<tr>
<td>General anaesthesia</td>
<td>4 (11%)</td>
<td>2 (2%)</td>
<td>0.008</td>
</tr>
<tr>
<td>Severe acute post-operative pain</td>
<td>18 (50%)</td>
<td>15 (7%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Wound infection</td>
<td>15 (42%)</td>
<td>11 (12.5%)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Data are number (%); P values (Mann Whitney U test)

Discussion: Chronic pain after CS in this study was more prevalent than published evidence suggests. The possible reasons for this include a false elevation due to a low response rate, a high wound infection rate and differences in anaesthetic technique between this and other published studies. It is known that a past history of chronic pain and acute severe postoperative pain can predispose to chronic postoperative pain. However, this study has found the first reported significant association between caesarean wound infection and persistent postoperative pain. Evidence shows that antibiotic prophylaxis given pre-incision instead of post umbilical cord clamping reduces the prevalence of wound infection following CS. Therefore, we suggest that introducing such a policy could reduce the risk of developing chronic pain after caesarean delivery.

References
P63 Aortocaval compression in obese pregnant mothers - an MRI study
K Saravanakumar, M Hendrie, P Daniellian*, F Smith†
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Introduction: Aortocaval compression is common in late pregnancy. Obese pregnant mothers are at risk of significant aortocaval compression from both gravid uterus and obesity-induced increase in intra-abdominal pressure. In this pilot study, we estimated the cross-sectional area of the inferior vena cava (IVC) and aorta in obese pregnant mothers in different reverse Trendelenburg positions.

Methods: After ethical approval and consent, 6 ASA I/II women with a singleton pregnancy and booking BMI of 30-35 kg/m² underwent magnetic resonance imaging (MRI) in 6 different positions - right lateral, left lateral, supine with 15° wedge, additional reverse Trendelenburg position of 5°, 10° and 15° sequentially. Repeated measures ANOVA was used to estimate association.

Results: Less than 50% of mothers who expressed an interest for scanning participated. Inter-individual variability was noted. The IVC was consistently larger in left lateral compared to right lateral position: the left lateral position was considered as baseline value for analysis. IVC compression when supine with 15° wedge varied from 8-94% (1st quartile 18.48; 2nd quartile 68.25; 3rd quartile 87.49). Aortic compression varied from 0-24% (1st quartile 2.9; 2nd quartile 6.5; 3rd quartile 19.4). Additional 15° reverse Trendelenburg relieved compression in both vessels. Improvement in IVC varied from 0-35% (1st quartile 0.22; 2nd quartile 4.75; 3rd quartile 11.54) while aorta varied from 0-25% (1st quartile 1.05; 2nd quartile 7.26; 3rd quartile 11.27). The difference was statistically significant with one observer (P=0.006) while not with second observer (P=0.209).

Discussion: This is the first study evaluating cross-sectional area of aorta and IVC in obese pregnant women. Left lateral position is found to be the ideal position for minimising aortocaval compression. Additional reverse Trendelenburg to the existing practice of left lateral tilt improved aortocaval compression. The clinical implications of this improvement is unknown.

References
2. De Keulenaer BL, De Waele JJ, Powell B et al. What is normal intra-abdominal pressure and how is it affected by positioning, body mass and positive end-expiratory pressure? Intensive Care Med 2009;35:969-76

P64 Compliance with the 'prevention of surgical site infection' bundle during caesarean section
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Introduction: As part of the recent ‘Patient Safety First’ campaign, a care bundle comprising four evidence based interventions was recommended to reduce the incidence of surgical site infections (SSI). We audited compliance with the bundle in elective and emergency caesarean sections.

Methods: During August to October 2011, a series of 50 patients undergoing emergency and elective caesarean sections were prospectively audited. The audit criteria from the preventing SSI care bundle were: Timeliness of prophylactic antibiotics (within 60 min before incision), maintenance of normoglycaemia in diabetic patients (blood sugar 5-10 mmol/L), normothermia (temperature in recovery >36°C) and appropriate hair removal (electric clippers rather than razor blades). The following interventions were then made: Acquisition of forced air and intravenous fluid warmers for the theatres and recovery in maternity (previously unavailable), all anaesthetic machines and recovery permanently stocked with tympanic thermometers, supplies of appropriate antibiotics kept on the anaesthetic machine, operating theatre staff education. A further 50 patients were then audited in August to October 2012 to close the loop.

Results: The baseline 2011 group demonstrated a compliance with timely antibiotics of 82% of patients, normothermia in 78%, appropriate hair removal in 60% and the single diabetic patient in the sample had appropriate blood sugar control. Full compliance to all criteria within the care bundle was achieved in 40% of patients. The 2012 re-audit showed significant improvement with antibiotic compliance of 100%, and normothermia in 94% of patients. Median temperature of patients in recovery increased in 2012 from 36.2°C to 36.7°C. Of the four patients with diabetes in the second group, two had appropriate blood sugar levels. Appropriate hair removal in 2012 was achieved in 56% and overall compliance to all four domains of the bundle in 2012 was 50%. However, when hair removal was removed from the analysis, full compliance with the remaining domains rose from 62% in 2011 to 90% in 2012.

Discussion: Reducing patient harm by minimising surgical site infection is important and the response to the interventions has been encouraging, particularly with improvements in temperature and timeliness of antibiotics. The number of diabetic patients in the sample (just five across both years) is so small it is hard to draw meaningful conclusions between the two sample groups. Compliance with appropriate hair removal remains a challenge with no improvement during the second audit cycle. Where hair removal was necessary in theatre, electric clippers were used. Patients who failed this aspect of the bundle did so because they were shaving themselves with razors before coming into hospital. This issue must therefore be addressed with patient education at some stage during the antenatal period.

Reference
P65 Evaluation of methods for producing lateral tilt for cardiopulmonary resuscitation in pregnancy

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Introduction: Current guidelines stress the importance of avoiding aortocaval compression during cardiopulmonary resuscitation (CPR) in pregnancy and suggest the use of left lateral tilt to achieve this. Several methods for producing lateral tilt have been described, though the optimal method is unknown. We compared four of these methods on a manikin.

Methods: After REC approval and written consent, 20 BLS-trained staff each performed 2 min of continuous chest compressions on a ResusAnne® manikin (Laerdal, Kent), placed on the floor and tilted to the left, using each of: a folded pillow ('soft' wedge); a pre-formed 55x51x20 cm foam ('firm') wedge (Anetic Aid, W. Yorkshire); a custom-made wooden ('hard') wedge (55x51x20 cm); and a kneeling assistant ('human' wedge). All wedges initially produced 15-30° baseline tilt. We measured tilt angle with IntegrasoftHN software (www.tiltmeterapp.com) on an Apple iPhone®3GS (Apple Inc, USA) taped to the manikin's abdomen, and depth and rate of chest compressions using Laerdal PC SkillReporting software running on a computer connected to the manikin. Participants rated each wedge for stability (1 = very poor; 5 = very good). Data were compared with repeated measures ANOVA or Friedman test; P<0.05 indicated statistical significance.

Results: The firm and hard wedges were the most stable and reliable, and the soft wedge the least, at maintaining tilt (Table). Most participants said that discomfort would prevent them from continuing as the human wedge for more than one cycle.

Table: Values are mean (SD) or median (IQR)[range].

<table>
<thead>
<tr>
<th>Tilt angle: °</th>
<th>Soft (n=15)</th>
<th>Firm (n=15)</th>
<th>Hard (n=15)</th>
<th>Human (n=16)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compression</td>
<td>50 (48-52)</td>
<td>51 (49-55)</td>
<td>51 (48-52)</td>
<td>49 (47-52)</td>
<td>P=0.036</td>
</tr>
<tr>
<td>depth: mm</td>
<td>[38-61]</td>
<td>[43-59]</td>
<td>[38-62]</td>
<td>[34-64]</td>
<td></td>
</tr>
<tr>
<td>Compressions</td>
<td>58 (42-78)</td>
<td>72 (49-89)</td>
<td>66 (31-78)</td>
<td>44 (27-81)</td>
<td>P=0.02</td>
</tr>
<tr>
<td>Stability</td>
<td>2 (1-4)</td>
<td>3 (1-3)</td>
<td>5 (4-6)</td>
<td>5 (4-6)</td>
<td>P&lt;0.01</td>
</tr>
</tbody>
</table>

P<0.01 for all comparisons except Firm vs. Hard (NS). P=NS for all comparisons except Firm vs. Human (P=0.009) and Hard vs. Human (P=0.02); P=NS for all comparisons except Firm vs. Human (P=0.03). Hard vs. Human (P=0.016) and Soft vs. Human (P=0.047); P<0.01 for all comparisons except Soft vs. Human (NS).

Discussion: Most UK units would use pillows and/or the human wedge to produce lateral tilt during CPR. Our data suggest that preformed wedges should be used in preference as they are more reliable while facilitating more effective chest compressions.

References

P66 Fibtem® use in the haematological resuscitation of a massive postpartum haemorrhage

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Introduction: Fibrinogen is an independent marker for severity of postpartum haemorrhage (PPH). We describe a catastrophic PPH leading to a hypovolaemic arrest with immediate and targeted resuscitation guided by near-patient Fibtem® analysis.

Case report: A 32 year old healthy woman presented for induction of labour at 42 weeks gestation. Once in established labour, she had an effective epidural sited. Due to slow progression of labour and the development of a suspicious cardiotocograph, the patient was transferred to theatre for a trial of forceps. Her epidural was topped up appropriately, a forceps delivery was unsuccessful and a caesarean section delivered a healthy baby. Following delivery of the placenta there was rapid blood loss with refractory uterine atony. Within 20 min of the placenta being delivered, the patient was in hypovolaemic arrest requiring aggressive intravenous fluid and sympathomimetic drug administration. We were able to maintain her airway avoiding a general anaesthetic and within 3 min the patient was resuscitated to a responsive state. The oncall haemato logically consultant present in theatre utilised the real-time Fibtem® analysis to guide the management of this devastating coagulopathy (standard laboratory tests lagged at least 20 min behind each Fibtem® result). Consecutive Fibtems® with associated blood results are attached below:

Haemostasis was achieved following a co-ordinated multidisciplinary approach using standard surgical and medical therapies and aggressive, balanced haematological resuscitation. The patient was transferred to the obstetric high dependency unit alert, orientated, comfortable and holding her baby within 3 h of her hypovolaemic arrest. She had a relatively uncomplicated recovery and was discharged at 5 days post caesarean section.

Discussion: PPH is a common occurrence for a tertiary referral delivery suite, however hypovolaemic arrests are not. During our team debrief several points were highlighted. The multidisciplinary approach allowed for effective rapid targeted correction of the patient’s coagulopathy owed in part to the nature of Fibtem® analysis. The ability to avoid a general anaesthetic and associated cardiovascular instability also allowed assessment of consciousness for direct cerebral perfusion monitoring and a hypotensive resuscitation.

Reference
P67 'It's all in the eyes': postnatal sepsis and Behcets disease.
SF Bell, N Tailor, R Collis
Department of Anaesthesia, University Hospital of Wales, Cardiff, UK

Introduction: We present a case of postnatal sepsis complicated by Behcets disease presenting with sight-threatening peripheral ulcerative keratitis.

Case report: A 36-year-old woman presented to the delivery suite in labour at term. Her obstetric history consisted of a previous spontaneous vaginal delivery and emergency caesarean section at 30 weeks (following trauma). Past medical history included hypothyroidism and arthritis. She did not take any regular medications. An emergency caesarean section was performed for failure to progress. Blood loss was 725 mL. The patient initially required blood transfusion, fluids and antibiotics but steadily improved and was discharged after four days. The patient was readmitted two days later due to wound dehiscence following suture removal. She was tachycardic with a neutrophilia and raised CRP. Re-opening of her caesarean incision revealed pus in the rectus sheath and along the uterine incision. Intravenous tazosin and gentamycin were commenced empirically. The patient was persistently unwell, initially with a postoperative ileus followed by development of watery green diarrhoea, increasing abdominal pain, nausea and vomiting, worsening oedema and persistent haemorserous ooze from the incision. Her antibiotics were changed to meropenem, metronidazole and vancomycin. CT confirmed the presence of an ileus but no additional collection. Five days after readmission the patient developed severe painful, red eyes. The ophthalmology team made the rare diagnosis of sight-threatening peripheral keratitis. After discussion regarding the challenge of commencing a septic patient on steroids to save her sight, the patient was commenced on high dose methylprednisolone. After a further 7 days in-patient treatment with antibiotics, steroids and nutritional supplementation the patient improved and was discharged home. Inpatient rheumatology review identified features suggestive of Behcets disease (recurrent oral and genital tract ulceration and seronegative articular disease) which had previously not been diagnosed.

Discussion: Behcets disease is a systemic vasculitis characterised by oral and genital ulceration, ocular inflammation, arthritis and gastrointestinal involvement. The influence of pregnancy on the disease is variable with 20% of women experiencing a deterioration in their symptoms. Peripheral ulcerative keratitis is a rare sight threatening feature of Behcets and early ophthalmology opinion is crucial. Immunocompromise (due to sepsis and pregnancy) may have exacerbated the patient’s Behcets which caused continuing deterioration despite antibiotic and surgical treatment. The difficult decision to commence high-dose steroids in a septic patient required extensive multidisciplinary consultation, but counter intuitively the patient only started to recover once this treatment had been instituted.

References

P68 Neuraxial morphine and intrathecal catheter placement as prophylaxis against post dural puncture headaches: 4 year retrospective review in a large maternity unit
JP Williams, A Roberts, S Slinn, R Banaz, S Morris
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Introduction: Epidural morphine has been recently shown to reduce the incidence of post dural puncture headache (PDPH) and the requirement for epidural blood patch (EBP) following accidental dural puncture (ADP). Consequently, the practice in our unit has included the optional use of neuraxial morphine in addition to the placement of intrathecal (IT) catheters as a prophylactic measure against PDPH. Following ADP, women received 4 mg of epidural morphine if the catheter was reinserted at a different level or 100-200 µg of morphine if the catheter was placed intrathecally. This review aims to evaluate the impact of neuraxial morphine and IT catheters on the development of PDPH and the need for EBP over a 4-year period.

Methods: A retrospective review of all cases of ADP and PDPH associated with epidural analgesia between August 2007 and August 2011 was performed. In each case, the use of IT catheter, administration of neuraxial morphine, the presence of PDPH and the requirement of EBP were recorded. Excel and SPSS were used in the data analysis.

Results: During the above period, we identified 100 ADP. Due to difficulty obtaining the notes, 57 patients were included in this review. Following ADP, IT catheters (n=34) were placed when possible and left in between 6 and 24 hours. In the remaining (n=23), the dural tap was either unrecognised or the operator chose to reinsert the epidural catheter at a different level. Neuraxial morphine was administered if the patient had a caesarean section or as prophylaxis against PDPH. The table below shows the incidence of PDPH and the need for EBP with different management plans following ADP.

<table>
<thead>
<tr>
<th>Management following ADP</th>
<th>PDPH</th>
<th>EBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT catheter with/without morphine (n=34)</td>
<td>20 (59%)</td>
<td>11 (32%)</td>
</tr>
<tr>
<td>IT catheter with morphine (n=25)</td>
<td>14 (56%)</td>
<td>9 (36%)</td>
</tr>
<tr>
<td>IT catheter without morphine (n=9)</td>
<td>6 (67%)</td>
<td>2 (22%)</td>
</tr>
<tr>
<td>Epi catheter with/without morphine (n=23)</td>
<td>20 (87%)</td>
<td>16 (70%)</td>
</tr>
<tr>
<td>Epidural catheter with morphine (n=8)</td>
<td>6 (75%)</td>
<td>4 (50%)</td>
</tr>
<tr>
<td>Epidural catheter without morphine (n=15)</td>
<td>14 (93%)</td>
<td>12 (80%)</td>
</tr>
</tbody>
</table>

Discussion: Our data clearly show that insertion of an IT catheter following ADP significantly reduced both the incidence of PDPH (P=0.047) and the need for EBP (P=0.013). When carrying out logistic regression analysis, it appears that placing the epidural catheter intrathecally had a significant effect on reducing PDPH. Adding morphine did not have further effect. Epidural morphine may reduce PDPH and EBP but this needs further investigation. Caution should be used when interpreting these results due to the small sample size and lack of randomisation. We do recommend the insertion of the epidural catheter intrathecally following ADP as this appears to be the most effective measure for the prevention of PDPH. Large multicentre randomised controlled trails are needed to further evaluate the role of IT catheters.

Reference
P69 PDPh and posterior reversible encephalopathy syndrome (PRES): misdiagnosis or co-presentation
S Hameed, H Doherty, I Ahmed, IF Russell
Anaesthesia, Hull Royal Infirmary, Hull, UK

Introduction: PRES, a rare neurological condition associated with a variety of underlying conditions, including preeclampsia, is characterised by headache, visual disturbances (blurring, homonymous hemianopia, cortical blindness etc.), altered consciousness, seizures and characteristic neuroimaging abnormalities.1 Headache associated with PRES may be indistinguishable from PDPh and could delay diagnosis.2 We report a case of PRES, initially diagnosed as PDPh, reinforcing the diagnostic challenges of postpartum headache.

Case report: A 19-year-old nulliparous woman with a past medical history of occasional migraines, had an uneventful pregnancy, requested epidural analgesia in labour. An uneventful epidural provided effective pain relief for 5 h, and then became ineffective. It was resited, again uneventfully. Subsequently she underwent caesarean section, with epidural top-up for failure to progress. She was discharged home 2 days later with no complications. 2 days after discharge she presented with severe postural frontal-headache and photophobia. Diagnosis of PDPh was made. She declined an epidural blood patch (EBP), opting for conservative management. This had no effect and the next day she accepted an EBP. Unfortunately, she developed diarrhoea and EBP was delayed pending resolution of diarrhoea. 3 days later she was prepared for the EBP. Just before 1% lidocaine skin infiltration she complained of blindness and developed focal seizures, involving the facial muscles lasting 3 min. The EBP was abandoned. Although she had never shown features of preeclampsia, we initially managed her seizures as eclamptic with magnesium sulphate infusion. She was referred for urgent neurological review and an MRI brain scan. The latter showed abnormalities consistent with PRES. Oral phentoin was prescribed for 2 weeks. Her blindness resolved within 3 h of onset. The headache slowly abated and she was discharged 3 days later. At 2 weeks she made full recovery with no residual headache or neurological sequelae.

Discussion: If a patient has received an epidural and develops headache post-delivery, PDPh tops the differential diagnosis list.1 Diagnosis of PDPh is clinical, based on classical symptoms; postural bilateral fronto-occipital headache, neck stiffness, nausea, vomiting, auditory & visual disturbances. PRES, on the other hand, is rare, and is strongly associated with preeclampsia.3 Our case was unique for two reasons; i) there were no features of preeclampsia; and ii) initial presentation was typical of PDPh. There was a 5-day delay between onset of headache and development of seizures and cortical blindness, pathognomonic of PRES. Was our case an atypical presentation of PRES, misdiagnosed initially as PDPh, or did delayed treatment of PDPh triggered PRES?2 Would an EBP have prevented or aggravated PRES? The literature is unable to answer these questions.

References

P70 Pressure sores in labouring women: a national OAA approved survey
L Armstrong, K Stevenson, R Hignett
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Introduction: In mid-2010 we became aware of reports of labouring women suffering pressure sores at our tertiary referral maternity unit. Labouring women are generally perceived to be at low-risk of pressure sores. However, there are sporadic case reports of women in labour who have suffered pressure sores.1 The incidence of women in labour developing pressure sores in the UK is unknown. We therefore wished to conduct a national survey to determine the incidence and risk factors for the development of pressure sores in labouring women in the UK.

Methods: We conducted an OAA approved survey for 2 months from mid-October 2012. All UK lead obstetric anaesthetists were invited to complete the survey. We asked questions relating to incidence, risk factors, and local measures in place which may prevent pressure sore development.

Results: Surveys were received from 156 (76%) lead obstetric anaesthetists. 28% (44) have been aware of pressure sores in labouring women in the previous five years. The reported incidence of pressure sores is:

<table>
<thead>
<tr>
<th>Pressure Sore Category</th>
<th>Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 pressure sores in previous 5 years</td>
<td>31 (70%)</td>
</tr>
<tr>
<td>6-10 pressure sores in previous 5 years</td>
<td>6 (14%)</td>
</tr>
<tr>
<td>11-20 pressure sores in previous 5 years</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Number not known</td>
<td>6 (14%)</td>
</tr>
</tbody>
</table>

20% (9) have resulted in litigation. Risk factors for pressure sore development included: obesity 13, epidural analgesia 13, prolonged labour 7, immobility 7, co-morbidities 5. Routine preventative measures in place include: low-dose mobile epidural regimen 88 (57%), pressure area assessment 64 (42%), frequent position change 102 (67%), pressure relieving mattresses 16 (10%), and removal of wet pads/bedding after epidural insertion 36 (31%).

Discussion: Our results show that over a quarter of maternity units have been aware of women suffering pressure sores in labour in the preceding five years. The frequency for most units was low, but in 16% between 6-20 pressure sores were reported in each centre. Risk factors in case reports are multifactorial,2 and include external factors (midwifery care, mattress), extrinsic (patient position, shear forces, wet skin, skin disinfectants) and intrinsic (high/low BMI, immobility, epidural analgesia, co-morbidities). Significant risk factors in our survey concur with those in case reports. For new mothers, pressure sore development is a distressing complication. In addition one in five cases reported in this survey has resulted in litigation. Simple measures which may prevent pressure sores should be routinely used and include: ongoing risk assessment, removal of wet bedding/pads, avoidance of shear forces, and frequent patient position change.

References
**P71 Successful treatment of maternal meningitis complicated by sagittal sinus and internal jugular venous thrombosis**

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Department of Anaesthetics and Critical Care, Worcester Royal Hospital, Worcester, UK

**Introduction:** Pregnancy and the postpartum period are associated with an increased risk of thromboembolic diseases and cerebrovascular complications. We report a case of cerebral venous sinus thrombosis (CVST) as a complication of sinusitis.

**Case report:** A 23-year-old woman presented at 37 weeks of gestation drowsy, photophbic, and febrile. An urgent computerised tomography (CT) head scan was organised, a lumbar puncture performed and empirical antibiotics commenced. Review of the CT head identified no abnormalities; however, in light of the deteriorating neurological condition of the patient, a magnetic resonance (MR) head was performed. This showed occlusion of the left internal jugular vein and left sigmoid venous sinus, there was no sign of venous sinus thrombosis. Review of the MR scan identified extensive sinusitis which appeared to be the only source of the patient’s meningitis. Emergency caesarean section was performed using remifentanil at induction. After delivery of a live baby, sinus washout was performed by otolaryngologists. Five days post commencement, heparin infusion was stopped and warfarin commenced. The woman suffered no neurological sequelae, and a subsequent MRV head on outpatient follow up showed re-canalisation of the major vessels which had previously been occluded. A thrombophilia screen at six weeks post-partum was negative.

**Discussion:** Imaging such as CT and MRI are the primary imaging modalities used in the diagnosis of CVST. A CT head scan can show venous infarcts or haemorrhages, though the most sensitive examination technique and imaging modality of choice is MRI in combination with MRV. CVST management includes the treatment of the underlying condition, the reduction of intracranial pressure, avoidance of extension of the thrombus, and prevention of remote seizures. Anticoagulation therapy with low molecular weight heparin is the treatment of choice, followed by oral warfarinisation. This case highlights the importance of considering an intracranial thrombotic event as a differential diagnosis in woman presenting with a seizure or headache who would otherwise be considered as low risk for such an event.

**References**
P73 A survey of the understanding and management of fetal distress among staff who care for pregnant women
A Mehta, L Wee, S Gajree*, J Modder*, S Subair*
*Anaesthetics, University College Hospital, London, UK.
Introduction: The 2009 CMACE perinatal mortality report identified 24 neonatal deaths related to intrapartum asphyxia.1 Guidelines published by The Royal College of Obstetricians and Gynaecologists recommend that all those involved in the care of a woman and her baby should undertake training in cardiotocography (CTG).2 Recommendations for anaesthetists dealing with intrauterine resuscitation have been published.3 We conducted a survey of maternity staff to evaluate their understanding and management of presumed fetal distress.

Methods: A survey was designed based on the above recommendations.2,3 Questionnaire surveys were administered to anaesthetists, obstetricians and midwives working in the maternity unit of University College London Hospital over a 3-week period. NICE guidelines were used to decide if the answers were correct to CTG interpretation while anaesthetic recommendations were used for resuscitation.3

Results: We surveyed 48 anaesthetists, 20 midwives, 19 obstetricians. Normal and abnormal CTGs were identified correctly by 68% of anaesthetists and 100% of obstetricians and midwives. The table shows the correct responses expressed as a percentage of the total responses.

<table>
<thead>
<tr>
<th></th>
<th>Anaesthetists</th>
<th>Midwives</th>
<th>Obstetricians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fetal pH - normal range</td>
<td>60%</td>
<td>65%</td>
<td>100%</td>
</tr>
<tr>
<td>Fetal pH requiring Cat 1 CS</td>
<td>85%</td>
<td>90%</td>
<td>94%</td>
</tr>
<tr>
<td>CTG - non-reassuring features</td>
<td>12%</td>
<td>17%</td>
<td>26%</td>
</tr>
<tr>
<td>CTG - reassuring</td>
<td>25%</td>
<td>85%</td>
<td>100%</td>
</tr>
<tr>
<td>CTG - pathological</td>
<td>31%</td>
<td>25%</td>
<td>47%</td>
</tr>
<tr>
<td>Steps for pathological CTG</td>
<td>45%</td>
<td>80%</td>
<td>94%</td>
</tr>
<tr>
<td>Intrauterine fetal resuscitation</td>
<td>93%</td>
<td>75%</td>
<td>94%</td>
</tr>
</tbody>
</table>

There was no correlation between seniority of the respondents and the correct answers given.

Discussion: Our survey shows anaesthetists were unfamiliar with CTG interpretation and the steps to be taken in response to a pathological CTG; unsurprising as anaesthetists do not usually receive this training. However, they answered correctly on intrauterine resuscitation, most likely because most of the required actions are similar to maternal resuscitation. Obstetricians and midwives showed uncertainty in CTG interpretation with regard to non-reassuring features and pathological CTGs. This highlights that confusion may arise among maternity health care professionals due to use of terminology. Of note, midwives were unsure of the normal fetal pH range. We suggest that midwives and obstetricians should update themselves in the terminology used by current NICE guidelines to classify CTGs. We propose anaesthetists receive training in intrapartum fetal monitoring to allow them to contribute more effectively when dealing with fetal distress.

References

P74 Epidural analgesia during labour is associated with low Apgar but not with neonatal encephalopathy
S Tornell, C Ekeus*, U Högberg†, S Håkansson§
*Dep of Surgical and Perioperative Sciences, Umeå University, Umeå, Sweden. †Dep of Women’s and Childrens Health, Karolinska Institutet, Stockholm, Sweden. §Dep of Women’s and Childrens Health, Uppsala University, Uppsala, Sweden.

Introduction: Maternal intrapartum fever is associated with neonatal sequelea. Previous studies have shown an increased maternal temperature after receiving labour epidural but this has been questioned. The aim of this study was to investigate if there is an association between use of epidural analgesia and adverse neonatal outcome and also the association of reported fever during labour and adverse neonatal outcome.

Methods: The study was approved by the local ethical committee and the design was a prospective register study from The Swedish Birth Register and the National Patient Register. Including all nulliparous with singelton pregnancies at term in Sweden from 1999 to 2008. Exclusion criteria were women with diabetes, hypertension, gestational related complications like preeclampsia, eclampsia, abruptio placenta, gestational diabetes, gestational hypertension or ante-or intrapartum stillbirth. A total of 294 369 pregnancies were included in the study. Outcomes were Apgar < 5 at 5 min and diagnosis of neonatal encephalopathy ICD-10 code P90 and/or P91(convulsions or neonatal cerebral ischemia). Adjustments were made for following parameters: calendar year of birth, maternal age, height, BMI, uterine dystocia, instrumental delivery, chorioamnionitis, other infections during delivery, small for gestational age, large for gestational age and sex.

Results: Using crude data showed that both epidural analgesia and maternal fever were associated with Apgar <7 at 5 min and neonatal encephalopathy. After adjustment for the parameters listed above, the use of epidural analgesia was associated with a slightly increased risk of low Apgar score, but not with adverse neonatal outcome. On the other hand maternal fever was associated with both low Apgar and neonatal encephalopathy.

Table: Apgar <7, 5 min and Neonatal encephalopathy

<table>
<thead>
<tr>
<th></th>
<th>Apgar &lt; 7, 5 min</th>
<th>Neonatal encephalopathy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidural analgesia 1</td>
<td>1.33(1.20-1.47)</td>
<td>1.10(0.92-1.32)</td>
</tr>
<tr>
<td>Maternal fever</td>
<td>2.17(1.55-3.04)</td>
<td>2.51(1.47-4.31)</td>
</tr>
</tbody>
</table>

1Adjusted for maternal fever. Data are adjusted odds ratio (95% CI)

Discussion: The findings in this study implicates the importance of using routines for correct temperature measurements and adequate treatment of maternal fever, which overrides the discussion of adverse outcome due to labour epidural analgesia. The results could be biased by other factors not adjusted for in this study.

References
P75 Estimation of risk of preterm delivery following non-obstetric surgery during pregnancy
A Rivers, P Aylin*, S Brett†, S Kumar, V Sodhi
Anaesthesis, Queen Charlotte’s and Chelsea Hospital, London, UK, *Dr Foster Unit, Imperial College London, London, UK, †Intensive Care Medicine, Imperial College Healthcare NHS Trust, London, UK

Introduction: Approximately 1-2% of mothers require non-obstetric surgery during pregnancy. Obstetricians and anaesthetists may counsel these women preoperatively regarding the subsequent risk to the pregnancy. There is some evidence that there is an increased risk of preterm delivery under these circumstances, 1 but this is based on historical data and may not reflect current outcomes. We performed a preliminary analysis on an English national dataset to estimate the risk of preterm delivery in women undergoing non-obstetric surgery during pregnancy.

Methods: Anonymised English national hospital data, originally generated for costing purposes and held at the Dr Foster’s Unit, were used to quantify the number of women who gave birth during the financial year 2008/2009. Gestation at delivery was established for each individual and used to identify preterm deliveries (<37/40 gestation) and to calculate the date of conception. Patients who underwent non-obstetric surgery which was likely to have required general anaesthesia (e.g. appendicectomy, laparoscopic surgery) between 12 weeks gestation and the week of delivery were identified.

Results: Patients with incomplete data (29%) were excluded. 437,254 patients were included, of whom 8673 (2%) had an operation during pregnancy which required general anaesthesia. There were 1040 preterm deliveries in this group (12%) compared with 33,321 preterm deliveries in the control group (8%).

<table>
<thead>
<tr>
<th>Group</th>
<th>Preterm</th>
<th>Term</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery</td>
<td>1040 (12%)</td>
<td>7633 (88%)</td>
<td>8673</td>
</tr>
<tr>
<td>No surgery</td>
<td>33,321 (8%)</td>
<td>395260 (92%)</td>
<td>428,581</td>
</tr>
<tr>
<td>Total</td>
<td>34,361</td>
<td>40,2893</td>
<td>43,7254</td>
</tr>
</tbody>
</table>

The relative risk of preterm delivery in women who required non-obstetric surgery under general anaesthesia during pregnancy was 1.54 (95% CI 1.46-1.63). A Chi-squared test proved this to be statistically significant (P<0.0001).

Discussion: This preliminary data analysis suggests that surgery during pregnancy significantly increases the risk of preterm delivery. Further analysis of this and other large datasets could identify the factors contributing to this increase. We are currently applying for funding to be able to perform a more detailed analysis of the data available. We hope that these data will provide a robust evidence-base for clinicians in the future to counsel women regarding the statistical risk of preterm labour, miscarriage and stillbirth following non-obstetric surgery, under general anaesthesia during pregnancy.

Reference

P76 Evaluation of ultrasound in parturients with a body mass index > 35 kg/m2
E Clitheroe, A Ssenoga, C Chevannes, H McNamara, A Bhatta
The Tom Bryson Department of Anaesthesia, Liverpool Women’s Hospital, Liverpool, UK

Introduction: The increased prevalence of maternal obesity in the UK raises concerns for performing neuraxial blockade for caesarean section. 1 We aimed to establish the effect on timing of onset of spinal anaesthesia using ultrasound compared to standard anatomical technique in the parturient with a body mass index (BMI) >35 kg/m2.

Methods: A service evaluation approved by the hospital audit committee was undertaken. Patients with a BMI >35 kg/m2 at booking presenting for elective caesarean section under spinal anaesthesia were assessed for timing of onset of cerebrospinal fluid (CSF) flow. Initiation of timing using a computerised anaesthetic record system began with back palpation in the anatomical technique and picking up the probe in an aseptic ultrasound technique.

Results: Total of 42 patients (20 anatomical, 22 ultrasound) were assessed. There were no instances of technical failure. Mean BMI in the anatomical group was 39.3 kg/m2 (35-48) with 8 patients having a BMI >40 kg/m2. Mean BMI in the ultrasound group was 41.4 kg/m2 (35-51) with 12 patients having a BMI >40 kg/m2. Timing of onset of CSF flow ranged from 4-16 min in the anatomical group and 1-15 min in the ultrasound group.

Table: Time to CSF flow

<table>
<thead>
<tr>
<th>Group</th>
<th>Anatomical</th>
<th>Ultrasound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>5.5 min [4-16] (n=20)</td>
<td>6.8 min [1-15] (n=22)</td>
</tr>
<tr>
<td>BMI 35-39</td>
<td>4.3 min [4-5] (n=12)</td>
<td>7.7 min [4-15] (n=11)</td>
</tr>
<tr>
<td>BMI &gt;40</td>
<td>7.2 min [4-16] (n=8)</td>
<td>5.9 min [1-9] (n=11)</td>
</tr>
<tr>
<td>Anaesthetist: CT2</td>
<td>10.5 min [5-16] (n=2)</td>
<td>8.0 min [4-15] (n=9)</td>
</tr>
<tr>
<td>Anaesthetist: ST3-7</td>
<td>4.3 min [4-5] (n=14)</td>
<td>7.0 min [4-9] (n=8)</td>
</tr>
<tr>
<td>Anaesthetist: Consultant</td>
<td>4.5 min [4-5] (n=4)</td>
<td>4.4 min [1-7] (n=5)</td>
</tr>
</tbody>
</table>

Data are mean [range]

Discussion: Use of ultrasound increased the timing to onset of CSF flow, although the difference was only 1.3 min on average. This may relate to an increased average BMI in the ultrasound group, selection bias for use of ultrasound or training bias in developing competency with use of ultrasound for spinal anaesthesia. No difference between techniques was demonstrated with a consultants undertaking the procedure. In patients with a BMI >40 kg/m2 there was a reduction in timing when using ultrasound imaging and previous studies have suggested the technical difficulty of neuraxial blockade is reduced with ultrasound imaging. 2,3 Our service evaluation demonstrates that use of ultrasound does not significantly increase spinal procedural time and may have real benefit in establishing spinal anaesthesia in patients with a BMI >40 kg/m2.

References
P77 Evolving anaesthesia for evolving surgical advances: Ex Utero Intrapartum Treatment (EXIT) procedure and remifentanil

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Introduction: Developments in surgical techniques, fetal medicine, medical imaging and patient expectations have ensured EXIT procedures are becoming more prevalent around the world. Anaesthetic techniques have also evolved. With patient consent, we describe a case and our own experiences.

Case report: A 21-year-old primigravida presented at 29 weeks of gestation with a 2-week history of reduced fetal movements. Ultrasound showed a large cystic hydramnios and polyhydramnios. After admission for premature labour, tocolysis with nifedipine was instituted with success. MRI revealed no extension into the intracranial cavity of the fetal tumour. Within a week of admission a plan for delivery had been drawn up, involving obstetricians, paediatric ENT surgeons, a neonatal team, obstetric and paediatric anaesthetists and theatre staff. Subsequent weekly MRI scans revealed the tumour was growing but the trachea area remained clear. At 34 weeks, an EXIT procedure was undertaken with a tracheostomy performed under utero placental support. As predicted oral intubation was not possible. A general anaesthetic was performed for the entire procedure. Preoperatively antacid prophylaxis was given and the parturient positioned with left lateral uterine displacement. Pre-oxygenation and induction using total intravenous anaesthesia (TIVA) with propofol 1% (Marsh Model) and remifentanil was performed, intubation followed without complication. During the EXIT procedure, uterine relaxation and fetal anaesthesia/analgesia was provided. Sevoflurane was administered to a maximum MAC of 1.8. The fetus was given intramuscular vecuronium. With the tracheostomy secured, the fetus was delivered and umbilical vessels were cannulated for further drug administration. Once the cord was clamped, an intravenous oxytocin bolus was administered and an infusion commenced.

Discussion: EXIT procedures can be performed with neuraxial or general anaesthesia. Remifentanil has a significant place in both, secondary to its extensive placental transfer. Previous cases have reported the need for uterine tocolytic agents such as nitroglycerin, magnesium and terbutaline, these require the concurrent use of vasopressor to offset their effects and maintain perfusion of maternal vital organs. Maintenance of placental blood flow within a compromised maternal circulation aims to prevent placental abrupton. We describe a simpler method of anaesthesia, analgesia and tocolysis that was efficient, safe and in combination gave the necessary physiological conditions required.

References

P78 HIV positive pregnancies: a review of obstetric and anaesthetic management

D Khare, N Hussain, S Bellam, S Quasim
Anaesthetics, University Hospitals of Coventry and Warwickshire, Coventry, UK

Introduction: Outside of the national capital, University Hospital Coventry and Warwickshire (UHCW) has one of the largest number of HIV positive pregnant women presenting for delivery. These are managed according to our protocols that are based on the British HIV association (BHIVA) guidelines of 2008. We discuss our experience, in view of the current guidelines, in these patients who delivered in the year 2011 at UHCW.

Methods: All women who delivered at our centre in the year 2011 were reviewed. Pregnancies with HIV were identified by ‘HIV Link’ Nurse. Case notes were used for retrospective audit and data collection.

Results: 33 pregnancies with HIV were identified, who had their expected dates of delivery (EDD) in the year 2011. 25 case notes were retrieved and analysed. 21/25 (84%) patients were from sub-Saharan Africa. Mean age at EDD was 32 years. Median gestation at delivery was 39 weeks. 3/25 (12%) patients were diagnosed with HIV during their current pregnancy. All patients were commenced on anti-retroviral therapy according to trust protocol which was continued throughout the pregnancy. Viral load (VL) at 6-12 weeks was high in newly diagnosed and untreated women. VL at 36 weeks was <40 in 17/25 (68%). Women with VL >40 copies/mL were started on Zidovudine infusion 2 hours before delivery of the baby. Modes of delivery were based on VL, as per the hospital’s guidelines. Elective caesarean section (CS) was planned for 9/25 (36%) and NVD for 14/25 (56%). One patient went abroad at 28 weeks and delivered there. One pregnancy was terminated at 22 weeks because of foetal anomaly incompatible with life. All parturients had spinal anaesthesia for CS. One needed conversion to general anaesthesia. Labour analgesia was requested by 2/25 mothers. 23 deliveries resulted in 24 live births (one was twin pregnancy). Vertical transmission was checked for by using HIV DNA PCR test at 9 weeks. This was found negative in 23 live births. One baby’s details could not be retrieved. Complications during pregnancy due to HIV were minimal. One patient had a vulval abcess. The same patient was also diagnosed with anaemia at 24 weeks. 1/25 (4%) patients had proteinuria which did not require treatment. One mother had amniocentesis at 20 weeks and received Nevirapine prophylaxis as her VL was 260 copies/mL. Her pregnancy and delivery proceeded uneventfully.

Discussion: HIV during pregnancy is a complex problem with implications on the health of the mother and the baby. Early recognition and diagnosis can allow for timely intervention and result in good outcomes. Standardised guidelines have an important role in their management. At UHCW, these protocols have resulted in low VL at term. They have also enabled us to plan the modes of delivery and have reduced the risk of complications.
P79 Just how anxious are primiparous parturients before induction of labour? A prospective study.

J Erskine, J Dolan, S Young
Anaesthetics, Princess Royal Maternity Unit, Glasgow, UK

Introduction: Recognition of the relationship between increased maternal anxiety and adverse physiological and psychological effects has led to growing interest in the identification and targeted treatment of at risk patients. Current literature focuses on anxiety levels in patients before caesarean section.\(^1\)\(^2\) Patients scheduled for induction may have additional anxiety regarding labour and may, therefore, have comparatively higher anxiety levels.

Methods: The study was approved by the West of Scotland Research Ethics Committee. We elected to study primiparous patients to eliminate any confounding effect of previous experience. Patients were recruited on admission, the night before induction. In a sample of convenience, each patient completed the Beck Anxiety Inventory (BAI).\(^3\) Questions relating to cognitive thoughts were extracted: 'fear of the worst happening', 'terrified', 'nervous', 'fear of losing control', 'fear of dying', 'scared'. Anxiety scores were allocated to each cognitive thought: 0=none, 1=mild, 2=moderate, 3=severe.\(^3\)

Results: 385 patients participated in the study and completed the BAI. The mean age of the participants was 27.6 years [SD 6.27]. Table 1 shows the distribution of cognitive thoughts. 24 patients (6.2\%) could be defined as severely anxious, with a cumulative score >12. One patient scored the maximum of 18.

Table: Distribution of cognitive thoughts

<table>
<thead>
<tr>
<th>Score</th>
<th>Worst happening</th>
<th>Terrified</th>
<th>Nervous</th>
<th>Lose Control</th>
<th>Dying</th>
<th>Scared</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>98</td>
<td>186</td>
<td>29</td>
<td>273</td>
<td>313</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>(25.5)</td>
<td>(48.2)</td>
<td>(7.5)</td>
<td>(70.7)</td>
<td>(81.3)</td>
<td>(16.4)</td>
</tr>
<tr>
<td>1</td>
<td>132</td>
<td>97</td>
<td>170</td>
<td>66</td>
<td>42</td>
<td>165</td>
</tr>
<tr>
<td></td>
<td>(34.3)</td>
<td>(25.1)</td>
<td>(44.2)</td>
<td>(17.1)</td>
<td>(10.9)</td>
<td>(42.9)</td>
</tr>
<tr>
<td>2</td>
<td>96</td>
<td>72</td>
<td>145</td>
<td>36</td>
<td>24</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td>(24.9)</td>
<td>(18.7)</td>
<td>(37.7)</td>
<td>(9.3)</td>
<td>(6.2)</td>
<td>(27.3)</td>
</tr>
<tr>
<td>3</td>
<td>59</td>
<td>31</td>
<td>41</td>
<td>11</td>
<td>6</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>(15.3)</td>
<td>(8.0)</td>
<td>(10.6)</td>
<td>(2.8)</td>
<td>(1.6)</td>
<td>(13.5)</td>
</tr>
</tbody>
</table>

Data are number (%)

Discussion: The data show that cognitive thoughts of anxiety are extremely common in this patient group. Targeting individuals identified by the BAI as being moderately to severely anxious could lead to both increased maternal satisfaction and lower anxiety levels in these patients. This could be achieved by tailored education and information provision, including the introduction of coping mechanisms and other cognitive therapies. We are considering the development of such a service within our unit.

References

P80 Lessons learnt from a maternal arrest following intrauterine death

TB Daunby, P Gill, L Hole
Anaesthetics, Southampton University Hospital, Southampton, UK

Introduction: We present a successful resuscitation of a parturient undergoing induction following intrauterine death. We analyse human and clinical factors leading up to the arrest and during the resuscitation, then present the changes in our practice as a department as a result of this process.

Case report: A 34-year-old woman was undergoing an induction using a mifepristone / misoprostol regime following a 34 week intrauterine death. She has a history of mild asthma. Following a short period of dyspnoea and anxiety, she collapsed. The anaesthetic and obstetric team were rapidly in attendance where a PEA rhythm was identified and resuscitation guidelines were followed. She was intubated and perimortem caesarean section was performed followed by return of spontaneous cardiac output. Following this she was stabilised and transferred to ICU. She required high inotropic and vasopressor support and intravenous salbutamol, ketamine and theophylline to overcome severe bronchospasm. After 4 days these symptoms began to abate and she was discharged to the ward and subsequently home after two weeks. Investigative findings suggested peripartum dilated cardiomyopathy complicated by severe bronchospasm and pulmonary oedema. Investigations also refuted differentials of anaphylaxis, myocardial infarction, sepsis and pulmonary embolism and results were not suggestive of anamniotic fluid embolism.

Discussion: Through the analysis of the human and clinical factors leading to the cardiorespiratory arrest, we found a more "hands-off" approach to parturients being managed with intrauterine death. This was present throughout their care from nursing in a dedicated room with minimal lighting, minimal intervention from staff (the woman had not had any observations in the 4 h leading up to her arrest, and this was deemed usual) to no requirement for intravenous access. This approach may also have influenced the lack of working suction in the room as equipment may have been less thoroughly checked. Misconceptions addressed during the analysis included staff’s perception that perimortem caesarean section was not necessary with intrauterine death and that mifepristone and misoprostol may have contributed to the bronchospasm. The resuscitation team worked very effectively which was thought to be helped by recent multidisciplinary training. This case highlighted to our department that labour following intrauterine death should be treated as high risk unless otherwise decided. We hope this case and analysis highlights to other departments the need for vigilance and warns against the default "hands-off" approach to parturients with intrauterine death that we had adopted.

References
2. Royal College of Obstetricians and Gynaecologists Green Top Guideline No 55. Late intrauterine fetal death and stillbirth. London: RCOG; 2010
**P81 A survey of labour analgesia services in Nigerian tertiary hospitals in 2012**

J A Ezike-Ejiofor, E Ogbobi-Nwosu*, S Fyneface-Ogan*, CC Makwe†, C O Imarengiaye*, A O Lawal*

Anaesthetics, Conquest Hospital, Hastings, UK,
*Anaesthesia, Coordinator, The IMPRACASE Project, Nigeria,
†Obstetrics & Gynaecology, Coordinator, The IMPRACASE Project, Nigeria

**Introduction:** In a modern obstetric unit worthy of the 21st century every woman should have the right to pain relief. Unfortunately parturients in developing countries are often denied analgesia due to multiple factors including maternal ignorance, provider reluctance,1 and institutional hindrance. Nigeria, the most populous country in Africa, is comprised of 36 states; each has at least one federally funded tertiary hospital. This survey was carried out by the IMPRACASE (IMProved Pain Relief After CaeSarean sEction) team, a multicentre obstetric anaesthesia project. It aims to develop a blueprint for improving post caesarean section (CS) pain management in a way that is practical and sustainable in an economically challenged environment.2 Apart from CS outcomes the IMPRACASE team is also collating data on aspects of obstetric anaesthesia services in dire need of improvement.

**Methods:** We contacted a resident or consultant working in federal tertiary hospitals by telephone or electronic questionnaire. We sought information on the drugs and techniques available for labour analgesia in their units.

**Results:** We established contact with tertiary hospitals in 21/36 states (58.3%). Entonox was not available in any tertiary hospital in Nigeria. Intermittent intramuscular opioid was the commonest labour analgesic technique with pentozone being the most readily available choice. Morphine was not used for labour analgesia in any hospital. Only one hospital (0.03%) had naloxone on its labour ward. Three hospitals (0.08%) had a labour epidural service although the utilisation rate was low.

**Table:** Utilisation rate of the labour epidural service

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Hosp 1</th>
<th>Hosp 2</th>
<th>Hosp 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal deliveries/year</td>
<td>1000</td>
<td>1800</td>
<td>3800</td>
</tr>
<tr>
<td>Labour epidurals/year (optimistic projection)</td>
<td>60</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>% utilisation</td>
<td>6%</td>
<td>6.7%</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

**Discussion:** In developing countries there are a lack of resources and political will to drive improvement. The greater obstacle is often the belief by even health care providers that improvement is synonymous with expensive equipment and highly specialised skills. The effect is that simple things that could be done are ignored. The unavailability of naloxone is a real problem. In low resource countries, obstetricians will not prescribe opioids to a parturient at cervical dilatation of >6 cm in the absence of naloxone. It can therefore be safely assumed that even available opioids are grossly under utilised. This is perhaps a simpler issue to resolve in the interim. The real challenge will be establishing a 24-h labour epidural service. For this a programme of sustained maternal and healthcare provider education will be required.

**References**


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**P82 Piloting the CARE revalidation tool in obstetric anaesthesia**

S Munshi, E McGrady, S Young

Anaesthetics, Glasgow Royal Infirmary, Glasgow, UK

**Introduction:** The consultation and relational empathy (CARE) measure is a consultation process measure that has been developed by the Departments of General Practice at Glasgow and Edinburgh University. It is based on a broad definition of empathy in context of a therapeutic relationship within the consultation. The wording reflects a desire to produce a holistic, patient-centred measure that is meaningful to patients irrespective of their social class, and has been developed and applied in over 3000 general practice consultations in areas of high and low deprivation in the west of Scotland. The care measure has 10 questions clear and easy to complete patient-completed questionnaire. It measures empathy in the context of the therapeutic relationship during a one-on-one consultation between a clinician and a patient. It is now the recommended tool for gathering patient feedback for hospital doctors undertaking revalidation in Scotland.1,2,3

**Methods:** A survey was conducted for 50 post elective caesarean section patients about the anaesthetist performing the neuraxial procedure. The person collecting the information was not involved in any procedure, minimum dialogue was permitted at the time of handing out the questionnaire, the information was collected on the postnatal wards after the anaesthetic had worn off. The parameters used to measure were “making you feel at ease”, “letting you tell your story”, “really listening”, “being interested in you as a whole person”, “fully understanding your concerns”, “showing care and compassion”, “being positive”, “explaining things clearly”, “fully understanding your concerns”, “making a plan of action with you”. The responses are on a 4-point scale from failed to excellent.1,2 Descriptive statistics were used at the end for results.

**Results:** There was no patient score in the failed and poor category for any parameter. The maximum scores were seen in the excellent category where 88% of patients thought that the anaesthetist made them feel at ease, was positive explained, things clearly, and showed care and compassion. The lowest scores were in the adequate category, with 12% of patients scoring at least one question at this level.

**Discussion:** The CARE system is designed for GPs, but is being used for hospital doctors in Scotland. This initial pilot suggests it is easy to use for the assessment of obstetric anaesthetists, and captures a high degree of satisfaction with our performance. Further studies are needed to see if it can reliably detect problem areas.

**References**

P83 A case report of a patient with uncommon neurological symptoms following a dural puncture

W D H Lakshman, V Annam, K Gardner
Anaesthetic Department, Colchester General Hospital, Colchester, UK

Introduction: Neurological sequelae are well documented following dural puncture, these include headache, subdural haematoma, infection, spinal haematoma and cranial nerve palsies. We present the case of a patient who developed a headache, consistent with a post dural puncture headache, and unilateral arm paraesthesia, following a labour epidural.

Case report: A 21-year-old nulliparous woman had a lumbar epidural sited for labour at her request. Two attempts at siting the epidural were made at two different sites. During the second attempt, unable to pass the catheter, the anaesthetist rotated the needle 180 degrees after which he was able to feed it without any problems. A dural puncture was not noted at the time of insertion. 30 h after the insertion, the woman woke with a headache and tingling in her left forearm. She was readmitted to the ward 60 h post-delivery complaining of a constant postural frontal headache, photophobia, altered sensation in her left arm and shooting pains in her lower back radiating to her shoulder blades. Simple analgesia was unhelpful. On examination she was sweaty but apyrexial. She was orientated and talking. Her cranial nerves were intact and neurology in her legs was normal. She had normal power, tone and reflexes throughout her arms but her left arm had decreased sensation (to pinprick and light touch) over the C6, C7 and T1 dermatomes. C8 seemed unaffected. Bloods tests revealed an Hb of 8.8 g/dL and a WBC of 11.8 x 10⁹/L. An urgent MRI of her cervical, thoracic and lumbar spine showed two small foci of low signal intensity at L4/5 and L3/4 which were suspicious of breaches through the dura at both sites. Otherwise the MRI was normal. A blood patch was performed, injecting 23 mL of autologous blood. There was resolution of her headache, backache and paraesthesia within 12 h. She was discharged home and had no further problems or recurrence of her symptoms.

Discussion: A headache is the most common symptom of a CSF leak caused by a breach in the dura, be it spontaneous or iatrogenic. Upper limb paraesthesia is an unusual but recognised symptom of spontaneous intracranial hypotension. In the literature, we could find no reports of another case presenting like ours following a dural puncture, although there is one case report of a patient with bilateral arm pain.2 The theory postulated in the cases of spontaneous intracranial hypotension, is that a decrease in CSF volume leads to stretching of the cervical nerve roots causing radicular arm pain or arm paraesthesia.1 In all documented cases, these symptoms were completely alleviated by treatment with a blood patch, thus allowing the CSF pressure to return to normal. This is the first reported case of unilateral upper limb paraesthesia following a dural puncture that probably caused a decreased volume of CSF and subsequently traction on the nerve roots.

References

P84 A picture tells a thousand words but a video tells even more: the use of a training video to reduce the risk of neuraxial chlorhexidine contamination

JPW Collins, GNB Jackson, KJ Bird
Anaesthetic Department, Royal Berkshire Hospital NHS Foundation Trust, Reading, UK

Introduction: Accidental chlorhexidine contamination of the neuraxis during spinal or epidural anaesthesia is a rare but potentially devastating complication which has recently featured prominently in the anaesthetic literature.1 We developed and evaluated a novel method for providing anaesthetists with information designed to reduce the potential for harm.

Methods: An electronic questionnaire was distributed to all 71 anaesthetists in our department. After being asked if they were aware of a recent editorial outlining the risks of chlorhexidine contamination and whether they had taken steps to prevent it, they were directed to watch a 90-second video produced by the authors2 demonstrating a double-gloving method for reducing this risk. Finally they were asked questions about the impact of this method of information delivery.

Results: Thirty-nine responses were received (55% response rate). 44% were trainees.

<table>
<thead>
<tr>
<th>Question (n=39)</th>
<th>Yes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you seen the recent editorial about chlorhexidine contamination?</td>
<td>18 (46)</td>
</tr>
<tr>
<td>Has the editorial changed your practice?</td>
<td>12 (31)</td>
</tr>
<tr>
<td>Have you contaminated your gloves or equipment tray when performing neuraxial block in the last 12 months?</td>
<td>25 (64)</td>
</tr>
<tr>
<td>Do you think the double-gloving method shown would be effective in reducing the risk?</td>
<td>34 (87)</td>
</tr>
<tr>
<td>Do you think the double-gloving method shown would increase the time taken to perform the block?</td>
<td>4 (10)</td>
</tr>
<tr>
<td>Do you think videos like this are an effective way to demonstrate patient-safety techniques?</td>
<td>38 (97)</td>
</tr>
<tr>
<td>Will this video make you change your practice?</td>
<td>27 (69)</td>
</tr>
</tbody>
</table>

Discussion: Though almost half of the anaesthetists surveyed had read a recent publication about the risk of neuraxial chlorhexidine contamination, and nearly two-thirds had previously contaminated their equipment, the majority had not changed their practice. A short video demonstrating a technique designed to reduce the risk was almost universally well received and would lead to more changes in practice than a published editorial. We intend to use further training videos to instruct our novice obstetric anaesthetists in neuraxial techniques, and would encourage other departments to do likewise. If similarly successful, a nationally coordinated training video resource could be established.

References
P85 A study of a programmed intermittent bolus and patient-controlled epidural regimen for labour analgesia

T Husain, J Mavridou, R Fernando, N El-Wahab, A Stewart, J Dick, M Columb*
Department of Anaesthesia, University College Hospitals NHS Foundation Trust, London, UK, *Acute Intensive Care, University Hospital of South Manchester, Manchester, UK

Introduction: The use of automatic/programmed intermittent bolus (PIB) regimens for labour analgesia has been associated with reduced local anaesthetic (LA) consumption and increased maternal satisfaction, when compared to continuous epidural infusions with or without patient-controlled epidural analgesia (PCEA).1 Additionally, extending the PIB interval and increasing bolus volume, using 0.0625% bupivacaine, has been shown to further decrease LA use without decreasing maternal comfort or satisfaction.2 We aimed to evaluate a PIB and PCEA regimen, using a low-dose epidural mixture (LDM) of 0.1% bupivacaine with 2 μg/mL fentanyl, utilising a pump capable of delivering boluses at a high flow rate.

Methods: Labour analgesia was initiated by epidural or combined spinal-epidural using LDM. A regimen consisting of 5 mL PIB with 60 min bolus interval and 5 mL PCEA, for breakthrough pain, with a 20 min absolute lockout was then commenced. Pain and motor block were assessed throughout labour, and patients were followed up after delivery. The primary outcome measure was LA consumption, while secondary outcomes included motor block, pain scores (0-10) and patient satisfaction. Patients were considered to have a motor block if they had little or no leg movement. Maternal satisfaction was considered adequate if it was reported as ‘good’, ‘very good’ or ‘excellent’.

Results: Data were evaluated from 49 patients.

PIB and PCEA evaluation results

<table>
<thead>
<tr>
<th>Bupivacaine usage (mg/h)</th>
<th>10.5 (3.86)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor block (min)</td>
<td>27/38 (71%)</td>
</tr>
<tr>
<td>PCEA demands per hour</td>
<td>1.27 [0.65 - 1.82]</td>
</tr>
<tr>
<td>PCEA delivered per hour</td>
<td>0.67 [0.48 - 1.09]</td>
</tr>
<tr>
<td>Pain score (0-10)</td>
<td>0.4 [0.0 - 2.0]</td>
</tr>
<tr>
<td>Spontaneous vaginal delivery</td>
<td>17/49 (35%)</td>
</tr>
<tr>
<td>Assisted vaginal delivery</td>
<td>21/49 (43%)</td>
</tr>
<tr>
<td>Patient satisfaction adequate</td>
<td>36/39 (92%)</td>
</tr>
</tbody>
</table>

Data are mean (SD), median [interquartile range] and number (%).

Discussion: Our study revealed that the PIB and PCEA regimen provided high patient satisfaction and low pain scores. Of note, the incidence of motor block was high, despite the mean LA consumption being similar to that described in previous work.2 Further studies are required to elucidate the effect of bolus and time interval manipulation and of flow rate on LDM-based PIB regimens.

References


P86 Introduction of patient controlled epidural analgesia: an audit of maternal satisfaction

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Introduction: Current evidence supports the use of low-dose local anaesthetic solution with the addition of an opioid for epidural analgesia in labour.1 Evidence has also steered practice away from continuous infusions and towards intermittent bolus regimens.2 Drug boluses can be administered either by midwife led top-up (MLTU) or patient controlled epidural analgesia pump (PCEA). Our current practice is to use MLTU; however, we felt that PCEA offers a number of potential advantages, including a reduction in midwifery workload and increased patient satisfaction.

Methods: This audit compared parturients receiving MLTU with those receiving PCEA. All patients were followed up on the day following delivery and their pain scores and levels of satisfaction documented. The views of the midwife and anaesthetist relating to the mode of drug delivery were noted.

Results: Data were collected for 50 PCEA and 52 MLTU patients. 60% of the PCEA patients reported complete pain relief vs. 19% of the MLTU group. The proportion of patients reporting at least partial pain relief was 88% for PCEA vs 64% for MLTU. None of the PCEA patients reported zero pain relief, compared with 17% of MLTU patients.

Table: Maternal satisfaction with labour analgesia

<table>
<thead>
<tr>
<th></th>
<th>PCEA (%)</th>
<th>MLTU (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>80</td>
<td>62</td>
</tr>
<tr>
<td>Moderately satisfied</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>Not at all satisfied</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Not recorded</td>
<td>9</td>
<td>14</td>
</tr>
</tbody>
</table>

Staff feedback was very positive, with 88% of midwives and 100% of anaesthetists either moderately or very satisfied with the technique. 85% of midwives thought their workload had decreased with PCEA, whilst 60% of anaesthetists thought their workload had increased. The main problems identified from the anaesthetists’ feedback related to technical issues with the PCEA pumps and giving sets.

Discussion: Patients had a very good experience of PCEA; all those for whom a response was documented were either moderately or very satisfied with the system. Along with high maternal satisfaction, pain scores were much improved in the PCEA group compared with MLTU. The vast majority of those who used the PCEA system would recommend it to a friend during labour. The optimum mode of delivery for epidural drugs on a given labour ward is that which works best in practice on that specific labour ward, taking into account the views and experience of both staff and patients. On our labour ward, we have demonstrated that PCEA is feasible and facilitates superior satisfaction rates. As a result of this audit we plan to permanently introduce a PCEA service.

References

P87 Anaesthetic protocol for manual removal of placenta
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*Anaesthetic Department, St James University Hospital, Leeds, UK

Introduction: There is limited evidence to decide the best neuraxial anaesthetic regimen for manual removal of placenta (MROP). Early studies recommend a block height to T10. More recent studies suggest the need for a block height to T6 to cold to ensure maternal comfort. We carried out an audit in our institution looking at the introduction of an anaesthetic protocol to outcomes and patient experience for women undergoing MROP.

Methods: The audit was registered with our clinical audit department. Ethical approval was not required. We carried out a retrospective audit before and after the introduction of an anaesthetic protocol. Our protocol advocated the use of neuraxial anaesthesia unless contraindicated. For spinal anaesthesia we recommended hyperbaric bupivacaine 0.5% with diamorphine 300 μg adequate to achieve a block height to T6 to light touch for all patients. For those with an epidural in situ, this could be topped up using ropivacaine 0.75% with diamorphine 3 mg to a block height to T6. We audited details of the anaesthetic technique and the postoperative course and interviewed the women postoperatively to ascertain pain scores and patient satisfaction.

Results: Initial results revealed there was no standardised anaesthetic regimen in use and a high incidence of intraoperative discomfort contributed to poor patient satisfaction. Practice was audited for six months after implementation of the protocol.

Table: Results before and after introduction of the protocol

<table>
<thead>
<tr>
<th></th>
<th>Before protocol</th>
<th>After protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intraoperative</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patients receiving 0.5% hyperbaric bupivacaine 2.6–3 mL</td>
<td>59%</td>
<td>82%</td>
</tr>
<tr>
<td>Patients receiving diamorphine</td>
<td>14%</td>
<td>100%</td>
</tr>
<tr>
<td>Patients achieving a block &gt;T6</td>
<td>45%</td>
<td>84%</td>
</tr>
<tr>
<td>Patients reporting intraoperative pain satisfaction</td>
<td>12%</td>
<td>0%</td>
</tr>
<tr>
<td>Excellent intraoperative patient satisfaction</td>
<td>85%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Postoperative</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time to mobilisation &lt;12h</td>
<td>81%</td>
<td>92%</td>
</tr>
<tr>
<td>Removal of urinary catheter within 24h (re-catheterisation)</td>
<td>85% (0)</td>
<td>92% (0)</td>
</tr>
<tr>
<td>Excellent postoperative satisfaction</td>
<td>38%</td>
<td>96%</td>
</tr>
<tr>
<td>Time to discharge</td>
<td>92%</td>
<td>92%</td>
</tr>
</tbody>
</table>

Discussion: The introduction of the anaesthetic protocol has seen an improvement in our intraoperative pain scores, a greater level of patient satisfaction with no deleterious effects of the postoperative course.

References

P88 Headache after combined spinal-epidural blocks: a 10-year review
S Griffiths, R Russell
Department of Anaesthesia, John Radcliffe Hospital, Oxford, UK

Introduction: Meta-analysis has estimated 1.5% incidence of accidental dural puncture (ADP) during epidural insertion, with 52% developing a post-dural puncture headache (PDPH). PDPH with 27-gauge pencil-point needles is reported to be 1.7%. PDPH rates following combined spinal-epidural (CSE) are reported to be similar to those after epidural. Over the last 10 years, the number of CSEs performed in our unit for both caesarean section (CS) and labour analgesia has risen by >30%. We investigated whether this affected our headache and epidural blood patch (EBP) rate.

Methods: With Trust Caldicott Guardian approval we obtained numbers of neuraxial techniques performed from 1/1/2000 to 1/1/2010 from our computerised database. Notes of women with suspected or definite ADP, PDPH or EBP were analysed. Heads following single-shot spinal anaesthesia were also examined. During the study period, our unit used 16-gauge epidural needles, 25-gauge Whitacre-point needles for single-shot spinals and 27-gauge Whitacre-point needles for CSEs.

Results: Over the 10-year period, 19859 epidurals, 4290 spinals and 8294 CSEs were performed. 134 women developed a PDPH. The headache rate after CSE (0.2%) was significantly lower than that after epidural (0.5%) (P < 0.0025). There were no differences between CSE and spinal or epidural and spinal. Significantly fewer EPBs were performed after CSE 19 (0.2%) than epidural 77 (0.3%) (P < 0.05).

Table: Neuraxial Techniques and PDPH

<table>
<thead>
<tr>
<th>Year</th>
<th>Epidural PDPH n (%)</th>
<th>Spinal PDPH n (%)</th>
<th>CSE PDPH n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>4 (0.2)</td>
<td>388 (0)</td>
<td>738 (2.0)</td>
</tr>
<tr>
<td>2001</td>
<td>10 (0.5)</td>
<td>388 (3.0)</td>
<td>684 (0)</td>
</tr>
<tr>
<td>2002</td>
<td>2 (0.1)</td>
<td>358 (0)</td>
<td>738 (3.0)</td>
</tr>
<tr>
<td>2003</td>
<td>7 (0.4)</td>
<td>396 (0)</td>
<td>762 (1.0)</td>
</tr>
<tr>
<td>2004</td>
<td>8 (0.4)</td>
<td>393 (2.0)</td>
<td>836 (1.0)</td>
</tr>
<tr>
<td>2005</td>
<td>18 (0.9)</td>
<td>420 (2.0)</td>
<td>884 (2.0)</td>
</tr>
<tr>
<td>2006</td>
<td>11 (0.5)</td>
<td>487 (3.0)</td>
<td>976 (2.0)</td>
</tr>
<tr>
<td>2007</td>
<td>7 (0.4)</td>
<td>415 (0)</td>
<td>815 (3.0)</td>
</tr>
<tr>
<td>2008</td>
<td>15 (0.7)</td>
<td>464 (3.0)</td>
<td>828 (1.0)</td>
</tr>
<tr>
<td>2009</td>
<td>17 (0.9)</td>
<td>581 (3.0)</td>
<td>1033 (4.0)</td>
</tr>
<tr>
<td>Total</td>
<td>99 (0.5)</td>
<td>4290 (16.0)</td>
<td>8294 (19.2)</td>
</tr>
</tbody>
</table>

Discussion: Despite using both 16- and 27-gauge needles, the incidence of PDPH was significantly lower after CSE than epidural. This may result from subsequent epidural drug and fluid administration and the use of spinal opioids, both of which have been suggested to reduce the PDPH rate. The predominant use of CSEs for elective CS may have reduced the incidence of ADP and PDPH. The retrospective nature of the study could have contributed to the apparently low PDPH rates. Prospective studies should examine whether headaches are less common and severe after CSEs than after epidurals.

References
P89 Time to complete neurological recovery following regional anaesthesia for obstetric procedures - a service evaluation

R Pothireddy, S Aluri, I Wrench
Anaesthetics, Royal Hallamshire Hospital, Sheffield, UK

Introduction: Although patients receive pre-delivery information about neuraxial anaesthesia, there is little about the block duration, which is a common question. We conducted a service evaluation looking at the time taken for complete recovery of both motor and sensory block following spinal and epidural top-up anaesthesia for obstetric procedures, to provide more accurate information to patients. By this we also wished to help guide staff about when to remove urinary catheters and mobilise patients.

Methods: This project was registered with the Trust Clinical Effectiveness Unit as a service evaluation. Eighty two patients who received either spinal (n=50) or epidural top-up (n=32) anaesthesia were followed up between 4 and 12 h following their operation. Motor block was measured using Bromage scale and the level of sensory block was assessed using light touch. Patients were asked when they thought that their block had worn off. Also we conducted a survey of anaesthetists asking what they think is the time taken for complete recovery. Hyperbaric bupivacaine 2.0-2.6 mL was used for spinal and 0.5% plain bupivacaine 15-20 mL for epidural top-up. About 75% of patients in both groups had diamorphine added to the local anaesthetic according to standard practice.

Results: Following spinal anaesthesia, time for complete recovery ranged from 4 - 9 h and following epidural from 4 - 8 h. According to patients the time taken for complete recovery following spinal ranged from 3-12 h with median of 7.5 h and for epidurals ranged from 2.5-13h with median of 6 h. In some cases there was residual block on examination despite patients thinking the block was completely worn off. The time for catheter removal and mobilisation was much longer than the time for blocks to wear off.

Table: Median (range) recovery times

<table>
<thead>
<tr>
<th>Recovery Type</th>
<th>Time for complete recovery on examination (h)</th>
<th>Time patients felt normal sensation (h)</th>
<th>Time catheter out (h)</th>
<th>Time first out of bed (h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinal</td>
<td>4-9</td>
<td>7.5(3-12)</td>
<td>17(7-23)</td>
<td>17(7-24)</td>
</tr>
<tr>
<td>Epidural</td>
<td>4-8</td>
<td>6(2.5-13)</td>
<td>12(4-22)</td>
<td>13(6-22)</td>
</tr>
</tbody>
</table>

Discussion: Recovery from spinal and epidural anaesthesia takes a similar length of time. There is residual block up to between 8 and 9 h following neuraxial anaesthesia for obstetric procedures. Patients’ perception of block duration sometimes differs from reality. Anaesthetists views on the length of time that it takes for neuraxial anaesthesia to wear off was similar to our findings. It may be possible to mobilise patients and remove urinary catheters earlier than is the current practice.

References
1. Your anaesthetic for caesarean section - OAA patient information leaflet. www.oaa-anaes.ac.uk/content.asp?ContentID=11

P90 Trends in obstetric anaesthesia training in the west of Scotland

R Junkin, K Lake, EM McGrady
Department of Anaesthesia, Glasgow Royal Infirmary, Glasgow, UK

Introduction: Procedural success and complication rates in obstetric anaesthesia have been demonstrated to improve with practice. Trainees achieve competence at different rates and variability exists in the amount of obstetric anaesthesia experience to which they are exposed during training. We wanted to quantify extent of obstetric anaesthesia procedural experience in our region as an index of training.

Methods: We examined the final cumulative logbooks of year-5 SpRs completing training in 2010 (mixed pre-2007 and 2007 curriculum) and the respective final logbooks of ST7 trainees finishing in 2012 (2007 curriculum). We recorded all obstetric procedural experience for these two cohorts: number of labour epidurals and caesarean sections (CS) performed under spinal, epidural, combined spinal-epidural (CSE) and general anaesthesia (GA).

Results: We examined 31 SpR5 and 35 ST7 logbooks (Figure). On examination of SpRs and ST7s in 2010 and 2012 respectively, the number of labour epidurals per trainee were 96% of the CS were performed under epidural. The procedure means were compared using the two sample t-test except for the CSE group where data were positively skewed and the Mann-Whitney U test was used to compare the medians. P-values for each procedure are displayed. There were highly statistically significant differences in logbook numbers between the two cohorts with the more recent ST7 group having higher numbers across the board.

Discussion: External pressures are present in medical training with reduction in trainee hours often highlighted. In our region, closure and amalgamation of obstetric services has resulted in fewer but busier labour wards. Local reduction in trainee numbers together with changes in curricula appear to have increased our trainee experience in obstetric anaesthesia. However, the gap between individuals is also widening with some still demonstrating low numbers. This may reflect individual specialist interests but we must ensure adequate preparation of all trainees for future roles. This study highlights the importance of monitoring experience gained within deaneries and in the future 2010 curriculum trainees.

References
2. Naik VN, Devito I, Halpern SH. Cusum analysis is a useful tool to assess resident proficiency at insertion of labour epidurals. Can J Anaesth 2003; 50: 694-8

Figure: Boxplot of obstetric anaesthesia procedures for SpR5s finishing in 2010 (light grey) and ST7s in 2012 (dark grey). The procedure means were compared using the two sample t-test except for the CSE group where data were positively skewed and the Mann-Whitney U test was used to compare the medians. P-values for each procedure are displayed. There were highly statistically significant differences in logbook numbers between the two cohorts with the more recent ST7 group having higher numbers across the board.

Discussion: External pressures are present in medical training with reduction in trainee hours often highlighted. In our region, closure and amalgamation of obstetric services has resulted in fewer but busier labour wards. Local reduction in trainee numbers together with changes in curricula appear to have increased our trainee experience in obstetric anaesthesia. However, the gap between individuals is also widening with some still demonstrating low numbers. This may reflect individual specialist interests but we must ensure adequate preparation of all trainees for future roles. This study highlights the importance of monitoring experience gained within deaneries and in the future 2010 curriculum trainees.

References
2. Naik VN, Devito I, Halpern SH. Cusum analysis is a useful tool to assess resident proficiency at insertion of labour epidurals. Can J Anaesth 2003; 50: 694-8
P91 Maternal satisfaction with intrapartum epidural analgesia in Corniche Hospital, UAE

ZA Kotrya, KM El Qesny, N Al Hammadi
Dep of Anaesthesia, Corniche Hospital, Abu Dhabi, United Arab Emirates

Introduction: 24 h on-site epidural service was introduced in our facility 4 years ago. Despite previous socio-cultural and religious barriers, the rate of epidural analgesia in our hospital has now reached the rates of other developed countries. Our objective was to determine the maternal satisfaction with the use of intrapartum epidural analgesia.

Methods: 130 patients who had epidural analgesia during Jan-Feb 2012 were given a semi-structured questionnaire regarding their experience of intrapartum pain management. The questionnaire was given on postnatal wards and collected after being completed between 24-48 h after delivery.

Results: A total of 123 returned questionnaires were analysed. The rate of epidural analgesia use was 41.1% (n=51) among Emirati, 31% (n=38) other Arab origin and 27.6% (n=34) among expatriate women with 62% (n=77) of the parturients requesting epidural analgesia after working hours. Nearly two thirds of the mothers 64.6% (n=79) stated, that they anticipated the pain during childbirth to be severe or unbearable. One third 35.8% (n=44) had no analgesia before requesting an epidural, the remaining patients had Enlonox 52% (n=64) or pethidine 14.6% (n=18) with 3 patients having used both methods before epidural insertion. The main reason for requesting an epidural was pain 76% (n=94), followed by relief of stress and fatigue 18.6% (n=23). The intensity of pain after having epidural is shown in the figure.

Figure. The percentage of pain scored during 1st and 2nd stage of delivery.

The time from 1st epidural bolus until delivery varied from <30 min in 4 patients to >12 h in 13 patients. Two epidurals had to be re-inserted and one-third of the patients 25.2% (n=31) needed at least one top up. Overall 82.9% (n=102) of the mothers would consider epidural analgesia for their next delivery with 6.5% (n=8) undecided and 10.6% (n=13) would consider other methods.

Discussion: Almost 70% of our parturients experienced no or minimal pain while having an epidural analgesia. However, despite a dedicated on-call anaesthetist, extensive education during antenatal classes and infusion of epidural mixture (rate mL/h), >11% of our mothers still reported severe or unbearable pain during their labour. The ideal time for satisfaction assessment is unknown and alters all the time. However, continuous education of both doctors and midwives on the delivery ward can play an important role in improving the results.

P92 Survey of obstetric knowledge, experience and CPD among consultant anaesthetists on a general rota

A Pathmanathan, N Patel, R Bell, M Columb
Department of Anaesthesia, University College London Hospitals, London, UK

Introduction: Revalidation requires licensed doctors in the UK to demonstrate that they are up to date and fit to practice. Our delivery suite has >6000 deliveries/year and anaesthetic cover out-of-hours is provided by the general ‘on-call’ consultant. Our aim was to explore anaesthetic consultants’ knowledge, experience and confidence in providing obstetric anaesthesia.

Methods: Consultant anaesthetists on the general rota were approached over a 2-week period in December 2012 and asked to complete a questionnaire testing familiarity with our delivery suite, knowledge of obstetric anaesthesia (incorporating relevant elements of the RCOA CPD Matrix Level 2), previous obstetric CPD in the last 5 years and preferred method for CPD in the future. Consultants had no prior warning and were overseen individually during the process. Knowledge and familiarity were scored. Confidence to cover the delivery suite at short notice was self scored.

Results: We surveyed 44 out of a possible 47 consultant anaesthetists, grouped according to the type of cover they provided for obstetrics: Regular obstetric sessions (RO) (2 excluded as conducting survey); Occasional obstetric sessions (OO); General on call (G); Duty consultant (D) who coordinates daytime cover for all anaesthetic services and may attend emergencies but does not participate in general on call.

<table>
<thead>
<tr>
<th>Consultant group (n=44)</th>
<th>Knowledge+ (max score 61)</th>
<th>Familiarity+ (max score 17)</th>
<th>Confidence+ (0-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RO (n=7)</td>
<td>52 [50.5, 56.5]</td>
<td>15 [15, 16]</td>
<td>10 [10, 10]</td>
</tr>
<tr>
<td>OO (n=7)</td>
<td>48 [46, 50.5]</td>
<td>11 [9.5, 12.5]</td>
<td>8 [6.5, 10]</td>
</tr>
<tr>
<td>D (n=12)</td>
<td>44 [39.8, 47.3]</td>
<td>9 [7.8, 11]</td>
<td>2 [0.8, 5]</td>
</tr>
</tbody>
</table>

Data are median [IQR]. *P<0.001 (ANOVA).

There was a significant difference in knowledge, familiarity and confidence scores between groups with a linear trend to better scores as consultant groups provide more cover for obstetrics RO>OO>G>D (Cuzick’s trend P<0.001). There was a positive correlation between knowledge and familiarity scores (P<0.001); both correlated with confidence to cover obstetrics (r=0.5, P<0.01). 32/44 (72.7%) had attended at least one type of obstetric update in the last 5 years. Excluding group RO/G, only 8/37 (21.6%) had done a supervised session with an obstetric colleague however this did not result in significantly better scores. 19/37 (51.3%) ranked this as their 1st choice for future obstetric CPD. A comprehensive lecture and masterclass were ranked 2nd and 3rd.

Discussion: Our survey demonstrated a beneficial effect of spending more time on the delivery suite. In line with the OAA/AAGBI recommendations, 2 we need to increase uptake of supervised sessions for those with on-call commitments and extend this to those with occasional sessions. Ideally these should be structured which in conjunction with update lectures incorporating the CPD matrix may enhance patient care and help meet revalidation requirements.

References
1. Royal College of Anaesthetists. www.rcoa.ac.uk/CPD
2. Guidelines for Obstetric Anaesthetic Services 2005. OAA/AAGBI