Abstracts of free papers presented at the annual meeting of the Obstetric Anaesthetists' Association, Edinburgh, 26 & 27 May 2011

(\textit{The presenter is underlined})

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O1 The effect of neck warming on shivering during labour with epidural analgesia

TA Tanqueray, M Mackenzie, SM Yentis, PJ Steer,*

Introduction: The reason why women develop fever during labour when epidural analgesia (EA) is used remains speculative. Our hypothesis is that it represents an imbalance between heat production and loss, though there may also be an inflammatory component. Use of EA in labour is often associated with maternal shivering, and we have observed that attempts to lower maternal temperature with wet sheets, fans, etc. often result in increased shivering, limiting their use. We postulated that active warming of the mother’s neck during EA might allow mothers to tolerate passive cooling, perhaps by indirect warming of the hypothalamus.

Method: After REC approval and written consent, 71 healthy women > 36 weeks of gestation with EA in labour were randomly assigned to either: (1) standard management (cooling with wet towels if they developed a fever); or (2) use of a neck warmer set (Fig.1) at 40°C from the initiation of EA (as previously described) plus use of standard cooling if a fever developed. Oral temperature was recorded 4-hourly. Statistical analysis was performed using SPSS v. 17, with P<0.05 indicating statistical significance.

Results: Maximum maternal temperature was correlated with the duration of EA in the control group (r²=0.215; P=0.005) but not in the neck warmer group (r²=0.076; P=0.11). Shivering occurred 50% less often in the neck warmer group (6/35, 17%) than in the control group (14/34, 41%; p=0.036). In women who shivered, mean (SD) duration of shivering was shorter in the neck warmer group (1.8 (1.2) vs 2.4 (2.4) h), although this difference was not statistically significant (P=0.37).

Discussion: This preliminary study suggests that use of a neck warmer may have beneficial effects when used in association with EA in labour, by abolishing the relationship of pyrexia with the duration of analgesia, and simultaneously reducing women’s shivering tendency. Larger studies are needed to confirm these preliminary results.

References

O2 Testing the block for caesarean section - leaving touch out in the cold

MA Walters, M Van de Velde
Department of Anaesthesia, University Hospitals Leuven, Leuven, Belgium

Introduction: Spinal anaesthesia block height is assessed using sensory modalities touch and cold. To prevent intraoperative discomfort during caesarean section a block to touch to dermatome T6 is recommended. In our department caesarean section is routinely performed using low-dose combined spinal epidural (CSE) anaesthesia. We have observed that patients may have no sensory block to touch and yet have pain-free surgery. We performed a prospective review of low-dose CSEs to establish if a block to touch is still required when using this technique.

Methods: After ethical approval trainees performed 100 low-dose CSEs. 1.5 ml 0.5% hyperbaric bupivacaine and 0.5 ml sufentanil were combined and of this mixture 0.1 ml per 10 cm patient height was administered intrathecally in the sitting position. After CSE completion the patient was moved into steep Trendelenburg with left lateral tilt. A co-load of 500 ml colloid with 200 µg phenylephrine was given. The block was tested with a gauze swab soaked in ether and the patient asked where they first felt touch and cold. Corresponding levels were recorded on a dermatomal map. A block to cold up to minimum T3 was considered necessary to commence surgery. Epidural saline volume expansion was used as required. Discomfort and pain scores were noted.

Results: The mean (SD) dose of bupivacaine was 6.27 (±0.27) mg. 69% of patients had no detectable block to touch.

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<th>Cold block &lt;T6 (n=84)</th>
<th>Cold block &lt;T3 (n=16)</th>
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<tr>
<td>Pain before delivery (%)</td>
<td>0</td>
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<tr>
<td>Pain before delivery (%)</td>
<td>9 (NS)</td>
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<th>Touch block &lt;T6 (n=27)</th>
<th>Touch block &lt;T6 (n=92)</th>
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<tbody>
<tr>
<td>Pain before delivery (%)</td>
<td>0</td>
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For patients with pain, surgery was stopped and the epidural topped up effectively in all cases. No patient required general anaesthesia. The next day 77% of patients rated their anaesthesia as excellent, 17% good and 2% satisfactory.

Discussion: The absence of a block to touch when using low-dose CSE did not significantly increase the incidence of intraoperative pain. A block to cold ≥T3 is a more reliable indicator of satisfactory anaesthesia with low-dose CSE techniques and the incidence of pain in this group is comparable to studies in which larger or conventional doses of bupivacaine are used. We conclude that aiming for a block to touch up to T6 with larger doses of bupivacaine may be unnecessary and predispose the patient to haemodynamic instability and increased nausea and vomiting.

References
1. Russell IF. At caesarean section under regional anaesthesia, it is essential to test sensory block to light touch before allowing surgery to start. Int J Obstet Anesth 2006;15:294-300.
O3 Can phenylephrine infusions cause reactive hypertension during elective caesarean section?

A Stewart, R Fernando, S McDonald, R Hignett, T Jones, M Colombr
Anaesthesia, University College Hospital, London, UK

Introduction: Phenylephrine is well recognised as the vasopressor of choice for treating maternal spinal hypotension. There have been concerns about it increasing maternal systolic blood pressure (SBP) to supra-normal levels. A recent study demonstrated a significantly greater incidence of maternal hypertension in their higher phenylephrine concentration groups. We used 3 infusion concentrations of phenylephrine to prevent spinal hypotension during elective caesarean section (CS) and found a dose-dependent reduction in maternal cardiac output (CO). We now present secondary outcome data, investigating if phenylephrine infusions cause reactive hypertension when used to treat maternal hypotension during elective CS under spinal anaesthesia (SA).

Methods: In this randomised double-blind study, 75 elective CS patients were allocated to receive a 25 µg/min, 50 µg/min or 100 µg/min infusion of phenylephrine. This infusion was titrated to maintain maternal SBP at baseline, from the time of SA until delivery, such that the infusion was on if the SBP was below the baseline SBP (bSBP), and off once the SBP was above the bSBP. SBP was recorded every minute from time of SA until delivery. Reactive hypertension was defined as a read of ≥120% bSBP.

Results: There was no significant difference in the highest SBP recorded from SA until delivery between the groups. The number of minutes the SBP was recorded as above the bSBP increased with higher concentrations of phenylephrine, demonstrating a significant linear trend between the groups (P<0.05). However, there was no difference in the number of patients with reactive hypertension, or number of minutes the SBP was ≥120% bSBP between the groups (Table).

<table>
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<th>Phenylephrine Infusion (µg/min)</th>
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<th>(n=25)</th>
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<tr>
<td>bSBP (mmHg)</td>
<td>122.2±12.7</td>
<td>120.4±11.7</td>
<td>123.9±13.8</td>
</tr>
<tr>
<td>Highest SBP</td>
<td>139.8±14.3</td>
<td>139.0±9.9</td>
<td>145.8±12.2</td>
</tr>
<tr>
<td>Highest SBP (bSBP)</td>
<td>114</td>
<td>115</td>
<td>118</td>
</tr>
<tr>
<td>No. of min SBP ≥120% bSBP</td>
<td>10.2±5.9*</td>
<td>11.6±8.8*</td>
<td>16.2±8.8*</td>
</tr>
<tr>
<td>No. of patients SBP ≥120% bSBP</td>
<td>6</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>No. of min SBP ≥120% bSBP</td>
<td>0.48±1.0</td>
<td>1.04±2.4</td>
<td>1.68±3.0</td>
</tr>
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Data are mean±SD. *P<0.05 (linear trend between groups)

Discussion: We did not demonstrate that high concentration infusions of phenylephrine are associated with reactive hypertension in the mother. Unlike the earlier study, which terminated the phenylephrine infusion only once the SBP was at 120% baseline, our protocol stopped the phenylephrine infusion once the maternal SBP was above bSBP. This would suggest that by careful titration of the phenylephrine infusion to the baseline SBP, we can reduce the incidence of maternal hypertension.

Reference

O4 Timing of prophylactic antibiotics at caesarean section: a national survey of current practice and opinion

M Poole, M Rucklidge, E Hartsilver, T Kay,* Anaesthetic Department, Royal Devon and Exeter Hospital, Exeter, UK, *Child and Women's Health, Royal Devon and Exeter Hospital, Exeter, UK

Introduction: Maternal morbidity from infectious complications post caesarean section is high. The use of prophylactic antibiotics in surgical practice is established, with evidence demonstrating the greatest benefit from pre-incision administration. At caesarean section, due to concerns for the neonate, antibiotics are commonly administered post cord clamping. However, recent evidence suggests that pre-incision antibiotics at caesarean section pose no harm to the neonate.

Methods: Background information and a postal survey were sent to 220 UK lead obstetric anaesthetists in May 2010. Questions were posed on the current practice for antibiotic prophylaxis at caesarean section, reasons for post-cord clamping administration and if units would favour a change to pre-incision administration of antibiotics.

Results: The response rate was 60% (133 replies). 100% of units gave antibiotics for elective cases and 99% of units for emergencies. Currently, prophylactic antibiotics are administered post cord clamping by 6 units (5%), and post cord clamping by 127 units (95%).

<table>
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<th>Reasons for administering prophylactic antibiotics after cord clamping</th>
<th>Number of Units</th>
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<tr>
<td>Traditional</td>
<td>72 (54%)</td>
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<tr>
<td>Insufficient evidence to give before cord clamping</td>
<td>40 (30%)</td>
</tr>
<tr>
<td>May impair culture of causative organisms in the event of neonatal sepsis</td>
<td>32 (24%)</td>
</tr>
<tr>
<td>To reduce likelihood of antibacterial resistance in the neonate</td>
<td>26 (20%)</td>
</tr>
<tr>
<td>Anaphylaxis</td>
<td>17 (13%)</td>
</tr>
<tr>
<td>Don't Know</td>
<td>8 (62%)</td>
</tr>
<tr>
<td>Other</td>
<td>16 (12%)</td>
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Of 127 units giving antibiotics late: 53 units (42%) favoured changing practice to administration before skin incision, 45 units (35%) were undecided and 28 units (22%) did not support a move to pre-incision antibiotic administration. One unit did not complete the question.

Discussion: Despite 95% of units currently giving antibiotics post cord clamping, 77% of units were either in favour or undecided on whether practice should change to pre-incision administration. Should the more recent evidence of maternal benefit without neonatal harm be sufficient to change practice? A national debate on the issues surrounding early antibiotic administration at caesarean section would be helpful to form a consensus opinion on current best practice.

References
O5 Caesarean section surgical site infection surveillance
KO Enohumah, S Corcoran,* J Loughrey
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Introduction: Surgical site infection (SSI) is the second most common infection following a caesarean section (CS) within a group of patients who are generally considered to be young, fit and well. In keeping with best international practice and to improve patient care, we piloted a programme to monitor SSI following CS delivery to establish baseline infection rates and identify associated risk factors for SSI.

Methods: After Ethics committee approval the SSI surveillance form for CS was designed for both inpatients and post-discharge patients. The surveillance form was filled out in theatre by the attending anaesthetist and obstetrician during CS. All patients were reviewed daily postoperatively for evidence of infection. Patients were followed up for 30 days by telephone. Infections, based on CDC SSI definitions, were confirmed by either the attending GP or on admission to the hospital. Patients’ charts were also reviewed for dates and details of SSI.

Results: All women undergoing CS from May to August 2010 in our hospital were prospectively studied. During the 4-month study period 765 women had a CS delivery representing 27% of all deliveries at the hospital with 710 (92.8%) women successfully followed up for 30 days. 114 women met the CDC SSI definition (Table) giving a SSI incidence rate of 16%. 103 (90%) cases were diagnosed post discharge. In 321 cases wound closure was achieved by staples, however, in multivariate analysis the highest risk of infection was associated with the use of absorbable sutures (23%) compared with staples (13%) and nonabsorbable sutures (7%). The incidence of SSI was also higher in obese (26%) compared with healthy (15%) women. A neuraxial technique was used in 649 cases and there was no significant statistical difference between the type of anaesthesia (neuraxial vs general) and operation type (elective vs emergency).

<table>
<thead>
<tr>
<th>SSI type</th>
<th>No. SSI</th>
<th>Incidence rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial incisional</td>
<td>98</td>
<td>14</td>
</tr>
<tr>
<td>Deep incisional</td>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>Organ/space infections</td>
<td>15</td>
<td>2</td>
</tr>
</tbody>
</table>

Discussion: Over 90% of our patients were followed up for 30 days with 90% of infections diagnosed after discharged from the hospital. This highlights the need for post discharge surveillance if we want a more accurate assessment of infections rates in this group of patients. The finding that the use of non-absorbable sutures was associated with lower infection rate than absorbable sutures should inform ongoing practice in line with NICE guideline on SSI.

References
2. Surgical site infection: prevention and treatment of surgical site infection. NICE guideline, draft for consultation, April 2006, London

O6 A bigger needle for a big problem?
R Treadgold, S Hussain, S Morris, D Nicholson, R Collis
Anaesthetist Department, University Hospital Wales, Cardiff, UK

Introduction: Prophylactic uterotonics should be routinely offered to all women in the third stage of labour as they can reduce the risk of postpartum haemorrhage (PPH) by about 60%. The policy in our unit is to administer an intramuscular injection of a uterotonent into the vastus lateralis muscle on the anterolateral thigh using a 21-gauge 40-mm needle. Given the association between obesity and increased risk of PPH, we questioned whether a 40-mm needle was of sufficient length to penetrate to at least 5 mm depth into the muscle in pregnant women approaching term.

Methods: This was a prospective longitudinal study with ethical approval. Measurements of height, weight, muscle depth (measured by ultrasound) and thigh circumference were obtained from women of 36-42 weeks gestation attending for antenatal care with consent. Labouring women, non-English speakers, those under 16 years of age and those with lower limb pathology were excluded. The booking BMI was also recorded.

Results: 40 women were recruited. There was a general trend of greater thigh circumference and deeper vastus lateralis muscle with higher BMI. The association was stronger for actual BMI rather than booking BMI. 20% of women (8/40) had muscle depth of at least 35 mm, where a standard needle would be unlikely to penetrate to a depth of 5 mm.

<table>
<thead>
<tr>
<th>Actual BMI</th>
<th>Average muscle depth (mm)</th>
<th>Average thigh circumference (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>20-24.9</td>
<td>18.5 [8.5-24.5]</td>
<td>55.0 [45-60.5]</td>
</tr>
<tr>
<td>25-29.9</td>
<td>20.7 [10-27.5]</td>
<td>55.0 [53-59]</td>
</tr>
<tr>
<td>30-34.9</td>
<td>25.6 [13.5-42]</td>
<td>61.0 [55.5-65.5]</td>
</tr>
<tr>
<td>35-39.9</td>
<td>32.6 [13-45.5]</td>
<td>67.0 [59.25-74.5]</td>
</tr>
<tr>
<td>&gt;40</td>
<td>49 [42-61]</td>
<td>76.1 [67.75-87]</td>
</tr>
</tbody>
</table>

Discussion: The CMACE report focussed on women with BMI>35, and it is this group of women who are more likely to have inadequate muscle penetration via a 40 mm needle. Such a muscle depth impacts not only on the bioavailability of uterotonics, but also analgesics and anti-emetics. Further data analysis will focus on rates of PPH and uterotonic usage to investigate an association with muscle depth. Perhaps the time has come to rethink a one-technique-fits-all approach and consider alternative methods, modes or routes of administration of uterotonic drugs.

References
1. Prevention and management of postpartum haemorrhage. RCOG Green top Guidline No 52. May 2009
O7 Systematic review of intrathecal magnesium alone or with local anaesthetics and opioids for obstetric analgesia

AP Morrison, A Banerjee, C Mackie, C Grassman, JM Hunter
Anaesthesia, Royal Liverpool University Hospital, Liverpool, UK

Introduction: An effective adjunct to local anaesthesia without adverse effects remains elusive. This meta-analysis explores the effect of adding intrathecal magnesium (Mg) to the duration of spinal analgesia in obstetric patients.

Methods: RCTs on Medline and EMBASE with no restrictions were sought using the following keywords/text words: human, intrathecal, magnesium. Bibliographies of relevant reviews and RCTs were searched. The Jadad Scale1 assessed the quality of the manuscripts, all scored between 3 and 5. RevMan statistical software2 utilised inverse variance and random effect to calculate standardized mean difference (SMD) with 95% confidence intervals (CI) for continuous variables. The primary outcome was time from intrathecal injection to first analgesic request (duration of analgesia). Secondary outcomes were: onset and time to maximal sensory block; duration of sensory block; onset of motor block; and time to motor recovery.

Results: The search yielded 5 studies of 377 patients receiving local anaesthetics +/- opioids +/- Mg published from 2002-10. The addition of Mg had no effect on time to first request for analgesia in obstetric patients. Mg significantly delayed onset of sensory and motor block. There was no significant effect on duration or time to motor recovery (Table).

Discussion: Intrathecal Mg has no effect on duration of spinal analgesia in obstetric patients and delays onset of sensory and motor block. In contrast to general and orthopaedic surgery,2 intrathecal Mg appears not to confer analgesic benefit in obstetrics.

Table: Summary of outcome measures

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Number of studies /participants</th>
<th>SMD and 95%CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of analgesia (min)</td>
<td>5/377</td>
<td>-0.42 (-1.49, 0.65)</td>
<td>0.44</td>
</tr>
<tr>
<td>Onset of sensory block (min)</td>
<td>2/187</td>
<td>0.53 (0.27, 0.78)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Time to maximal sensory block (min)</td>
<td>2/150</td>
<td>0.52 (-0.09, 1.13)</td>
<td>0.09</td>
</tr>
<tr>
<td>Duration of sensory block (min)</td>
<td>3/247</td>
<td>-0.11 (-1.05, 0.84)</td>
<td>0.82</td>
</tr>
<tr>
<td>Onset of motor block (min)</td>
<td>2/150</td>
<td>0.49 (0.20, 0.79)</td>
<td>0.001</td>
</tr>
<tr>
<td>Time to complete motor recovery (min)</td>
<td>3/247</td>
<td>0.18 (-0.56, 0.92)</td>
<td>0.63</td>
</tr>
</tbody>
</table>

References

O8 The effects of Head Elevated Ramped Position during combined spinal epidural anaesthesia for elective caesarean delivery

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Introduction: Elevating the torso in a head elevated ramped position (HERP) during caesarean delivery (CD) has benefits for the mother including improved comfort and breathing characteristics (oxygenation, increased FRC), reduced reflux symptoms and better airway position -if unexpected intubation is needed. Multiple factors affect the level of anaesthetic block for CD. The effect of HERP on level of spinal anaesthesia has never been reported. We hypothesised that positioning a parturient in HERP for an elective CD using an elevation pillow would not significantly increase the time for a T4 block (primary outcome). Secondary outcomes were: maternal comfort, airway position, maximum height block, anaesthesia duration.

Methods: Following IRB approval and informed consent 60 women undergoing elective CD were randomised to one of three groups: A. Head Elevated Ramped Position (HERP) B. HERP- Horizontal (HERP-H) & C. Control – Horizontal with pillow under head. Patients at risk of high block were excluded. Following standard CSE anaesthesia in the sitting position subjects were placed supine with left uterine displacement and in groups HERP and HERP-H elevation pillow was inserted. For group HERP-H the back of the operating table was lowered so the subject’s back was horizontal (H) until adequate block and then bed levelled to same position as group (HERP). Data collected included, time to T4 with ice, block height at 30 and 120 min, need for epidural supplementation, maternal comfort (3 point Likert scale) and airway position assessment (relationship of external auditory meatus (EAM) to sternal notch).

Results: ANOVA showed HERP significantly delayed time to T4 compared to control (P=0.045). HERP: mean- 681s [range 344-1298s], Control: m=491s [range 183-720s], HERP-H: m=598, [range 317-1183s]. Subjects found the elevated position significantly more comfortable than control (P=0.001). EAM was at the level or higher than the sternal notch in 100% of HERP subjects compared to 20% in control position. 4 patients were excluded (2 failed attempts at CSE; 2 failed spinal-epidural used). All had block >T8 at 120min.

Discussion: HERP after CSE significantly delays onset of block, but this was not clinically relevant (3min). HERP provides a significantly more comfortable position and the woman is in an ideal position for intubation should conversion to GA be needed. We would recommend elevating the torso once block is established so that women have the advantages of the position without potential delay.
O9 Do epidurals lead to perineal trauma? A three year review

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Introduction: Epidural analgesia during labour has been regarded as a risk factor for perineal trauma.1 However, this association has not been shown to be predictive and is probably due to the presence of multiple confounding factors, such as fetal malposition, fetal macrosomia and assisted vaginal delivery.2 We postulated that epidurals may actually be protective against perineal trauma by reducing the uncontrolled urge to push at the moment of delivery.

Methods: We retrospectively reviewed data for all deliveries in a tertiary obstetric unit in the North of England between Jan 2008 and Dec 2010. We collated data on all vaginal deliveries and compared the incidences of spontaneous versus assisted delivery and epidural versus non-epidural analgesia with 3rd and 4th degree perineal injuries.

Results: There were 10553 spontaneous and 2922 assisted vaginal deliveries over this time. Within the spontaneous cohort, the incidence of 3rd or 4th degree tears was significantly lower in the epidural group (1.9%) compared to those without an epidural (2.7%, \( P<0.05 \)). In the assisted delivery group there were more women receiving epidurals for labour than not (1746 vs 1176); however, the rates of 3rd or 4th degree tears were again significantly lower in those using an epidural (4.6%) than those without (6.9%, \( P<0.05 \)). The overall risk of sustaining a 3rd or 4th degree perineal tear in all women using an epidural before vaginal delivery was 3.1% compared with 3.2% in those with no epidural.

Discussion: Despite the increased rate of assisted vaginal delivery amongst the epidural population, the overall rates of 3rd or 4th degree tears remained comparable between the groups. This is because the increased risk due to assisted delivery is offset by an overall lower rate of trauma seen in both spontaneous and assisted epidural groups, compared to the corresponding non-epidural groups. Previous studies have demonstrated an increased risk of severe perineal trauma with epidural analgesia, secondary to the increased assisted delivery rate.3 However, within our institution, the presence of an epidural appears to be associated with a decreased risk of perineal trauma.

References

O10 Anaesthesia for caesarean section of very preterm infants

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Introduction: Spinal anaesthesia (SA) for caesarean section (CS) has been associated with potentially harmful neonatal effects when compared to epidural and general anaesthesia (GA).1 Most data are from studies of elective CS in term infants. Little is known of the effect on outcome in premature infants; a recent retrospective study suggested an association between increased neonatal mortality and SA when compared to GA.2

Methods: Following ethics committee approval, case notes of women who underwent CS at <33 weeks of gestation between 2004-2008 in our unit were reviewed. Data on maternal and fetal morbidity, anaesthetic technique and neonatal outcome were collected. SA and GA were compared using a multivariate regression model to control for maternal and fetal factors that could influence outcome.

Results: 238 CS were identified of which 186 case notes were available. There were 37 twin deliveries giving a total of 223 infants. SA was used in 146 cases, GA in 40 and epidural in 4 (excluded from further analysis). There were no significant differences in maternal age, gestational age or birth weight between SA and GA. Use of GA was more likely where maternal complications (e.g. APH, eclampsia, chorioamnionitis) were present.

Table: Univariate analysis of outcome by anaesthetic technique.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Spinal</th>
<th>GA</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apgar 1 min</td>
<td>8 [2-10]</td>
<td>7 [1-10]</td>
<td>0.029</td>
</tr>
<tr>
<td>Apgar 5 min</td>
<td>10 [2-10]</td>
<td>9 [4-10]</td>
<td>0.020</td>
</tr>
<tr>
<td>Umbilical vein pH</td>
<td>7.30 (0.08)</td>
<td>7.30 (0.14)</td>
<td>0.135</td>
</tr>
<tr>
<td>Umbilical vein base excess</td>
<td>-4.0 (3.6)</td>
<td>-5.0 (5.3)</td>
<td>0.174</td>
</tr>
<tr>
<td>Umbilical artery pH</td>
<td>7.30 (0.1)</td>
<td>7.20 (0.1)</td>
<td>0.25</td>
</tr>
<tr>
<td>Umbilical artery base excess</td>
<td>-4.4 (4.1)</td>
<td>-5.0 (5.6)</td>
<td>0.489</td>
</tr>
<tr>
<td>Length of stay on SCBU (days)</td>
<td>39.2 (39.0)</td>
<td>43.2 (29.0)</td>
<td>0.518</td>
</tr>
</tbody>
</table>

Regression analysis controlling for maternal and fetal factors revealed 1 min Apgar score was less in the GA group compared to the SA group (0.992, \( P=0.018 \)); 5 min Apgar score was 0.85 less in the GA group (\( P=0.004 \)). Venous pH was lower in the GA group by 0.045 (\( P=0.03 \)). Length of stay in SCBU was increased in the GA group by 9.3 days compared to the SA group (\( P=0.032 \)).

Discussion: GA was predictably associated with lower Apgar scores. Unlike previous work, we did not observe a harmful association between SA and neonatal outcome. We found length of stay to be increased by >7 days where GA was used and that GA was used more often where maternal complications were present. Further investigation is required to determine the nature of this association between GA and fetal morbidity.

References
O11 Is seeing really believing in obstetric haemorrhage? A multidisciplinary training exercise

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Introduction: The Confidential Enquiry into Maternal and Child Health reports that haemorrhage remains a leading cause of maternal morbidity and mortality. \(^1\) Visual estimation of blood loss by obstetric teams has been shown to be inaccurate by up to 50% at large volumes.\(^2\) Various educational strategies, including visual aids, have attempted to improve estimation accuracy. We attempted to validate a photographic visual aid proposed by a previous study,\(^3\) using high fidelity simulation within the multidisciplinary team.

Methods: 88 healthcare professionals with a wide range of experience on labour ward were recruited. 7 OSCE stations were constructed using known volumes of simulated blood and expired blood from the transfusion service to replicate everyday clinical haemorrhage scenarios. Each participant was asked to estimate the visible blood loss for each station on a pre-printed questionnaire. They were then given a pre-printed photographic aid showing haemorrhage scenarios with blood volumes displayed. They were then asked to record a second estimate. All data were entered onto Microsoft Excel and statistically analysed using Prism.

Results: 34% of initial estimates were within 20% of the correct value. When using the visual aid, 36% of estimates were within 20% of the correct value. The results for each station were then examined by profession. A Wilcoxon signed rank test was used to compare the median errors pre- and post-intervention with the visual aid. The pairings were assessed with a Spearman rank correlation coefficient. Statistically significant results were seen in just 6 of 36 groups; 4 of these were for the same station, estimating the blood volume in a soaked sanitary towel.

Discussion: Improving visual estimation of blood loss is extremely difficult. Successful strategies are often time consuming and labour intensive and achieve only limited success. We hoped that introducing a visual aid onto labour ward might improve accuracy without the need for a concomitant teaching programme. This was not the case. The aid improved accuracy at some stations. We intend to repeat the study after a training programme in haemorrhage estimation, using the visual aid in conjunction with other estimation strategies.

References

O12 SAFE Handover: An audit of the efficacy of a structured handover tool

JDW Bailes, A Dharmadasa, DN Lucas, K Rao, PN Robinson
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Introduction: A national survey of obstetric anaesthetic handovers showed that 94% were purely verbal and several critical incidents were reported as a result of inadequate handovers. We recently introduced a simple handover tool to improve the quality of anaesthetic handovers on our labour ward; the “SAFE” proforma lists sick patients, those at risk of intervention or haemorrhage, follow-ups and patients with Epidurals. We audited of the quality of handovers on labour ward before and after the introduction of this tool.

Methods: The audit and the SAFE proforma were discussed with the trust’s Caldicott Guardian. In the first part of the audit the handover was conducted as usual for our unit (purely verbal in most cases). The anaesthetic registrar receiving handover recorded anonymously the time taken and the number of patients handed over. The same registrar then reviewed the labour ward patient board and also joined obstetric handovers to ascertain the actual number of patients who met the SAFE criteria for handover. This process was then repeated after the introduction of the SAFE proforma.

Results: The SAFE handover tool increased the average duration of handover from two to six minutes and increased the proportion of patients handed over from 49% to 79%.

<table>
<thead>
<tr>
<th></th>
<th>Before SAFE proforma</th>
<th>After SAFE proforma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handled Actual over number</td>
<td>Missed over number</td>
<td>Handled Actual over number</td>
</tr>
<tr>
<td>Sick 7</td>
<td>33 (79%)</td>
<td>31 46 (33%)</td>
</tr>
<tr>
<td>At Risk 6</td>
<td>23 (74%)</td>
<td>7 22 (22%)</td>
</tr>
<tr>
<td>Follow-ups 9</td>
<td>13 (50%)</td>
<td>16 1 (6%)</td>
</tr>
<tr>
<td>Epidurals 29</td>
<td>36 (19%)</td>
<td>26 2 (8%)</td>
</tr>
<tr>
<td>Total 51</td>
<td>105 (51%)</td>
<td>77 97 (21%)</td>
</tr>
</tbody>
</table>

Discussion: Use of SAFE has increased the quality of obstetric anaesthetic handovers and thus enhanced patient safety. There was an increase in the proportion of patients handed over in all groups, except the epidural group. The importance of handovers has been recognised by the Clinical Negligence Scheme for Trusts Standards 2010/11, which suggests that maternity units “have documentation to ensure effective handover that is implemented and monitored.” Our audit suggests that this tool would help units meet this requirement. We recommend that SAFE be used as an aide-memoire, rather than a formal record.

References
O13 A comparison of disconnection strengths of epidural catheter connectors

JB Springett, N Peters, S Yentis
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Introduction: We have noticed multiple instances of epidural catheter disconnections from the epidural catheter connector. Although management of this has been suggested in the literature, the ease of disconnection has not been studied. We compared different manufacturers' epidural catheter connectors for their ease of disconnection.

Methods: We contacted the 6 major suppliers of epidural sets in the UK for samples of their epidural connectors. We tested 5 samples from each manufacturer under the same room temperature conditions. All were tested to the British Standard (BS)2 Each filter was attached to a drip stand and then the connector and epidural catheter attached. The screw-fit connectors were tightened to manufacturers specifications. At a length of 20 cm along the catheter, a rubber footed mosquito clamp was attached. From this a weight of 500g (5N) was attached and allowed to act for 2min (BS test, a lack of detachment indicating a ‘pass’). After the 2min had elapsed we then added extra weight as fluid from an i.v. giving set hung from 2m (equivalent to 5g/s of fluid). The weight at which disconnection occurred, time taken, and length of stretch of catheter were all recorded.

Results: All connectors from all companies passed the BS test except one clip connector made by Braun*.

Table 1: Mean (SD) disconnection force (N) and time (s) for different epidural connectors (n=5). s= screw-fit; c=clip

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Force &gt;BS 5N</th>
<th>Time</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polymedic (s)</td>
<td>16.5 (0.44)</td>
<td>393 (4.0)</td>
<td>1 catheter snapped</td>
</tr>
<tr>
<td>Portex (s)</td>
<td>12.0 (2.6)</td>
<td>352 (8.0)</td>
<td>5 disconnected</td>
</tr>
<tr>
<td>Pajunk (c)</td>
<td>10.4 (2.54)</td>
<td>282 (30.0)</td>
<td>5 disconnected</td>
</tr>
<tr>
<td>Portex new (c)</td>
<td>9.3 (0.59)</td>
<td>184 (9.0)</td>
<td>5 disconnected</td>
</tr>
<tr>
<td>BD Perisafe (s)</td>
<td>7.5 (1.5)</td>
<td>241 (26.5)</td>
<td>5 disconnected</td>
</tr>
<tr>
<td>Vygon (s)</td>
<td>2.1 (1.2)</td>
<td>155 (22.0)</td>
<td>5 disconnected</td>
</tr>
<tr>
<td>Braun (c)</td>
<td>1.7 (1.3)</td>
<td>151 (20.0)</td>
<td>5 disconnected, 1 failed BS test*</td>
</tr>
</tbody>
</table>

Discussion: Although all manufacturers' connectors passed the BS test, there was a marked difference in strength beyond this standard. The most common reason for disconnection from screw-fit connectors is inadequate tightening at time of placement (personal correspondence with manufacturer). The newer connectors would seem to eliminate that possibility, although our study suggests that there is no consistent difference between screw-fit and clip connectors in terms of the maximal force that can be applied to the catheters before disconnection occurs.

References

O14 Does position in the passive second stage of labour affect birth outcome in nulliparous women using epidural analgesia

A Theron, R Baraz, D Thorp-Jones, J Sanders, R Collis
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Introduction: Epidural analgesia is associated with a prolonged second stage and an increase in the rate of instrumental delivery. Allowing passive descent of the fetus may be beneficial. The use of different maternal positions during the passive stage has not been established, although one paper suggests the lateral position may be beneficial. The aim of this study was to assess if the lateral or sitting position in the passive second stage influences mode of delivery in women using a low-dose epidural.

Methods: Following LREC approval, term nulliparous women with a single fetus were recruited. Informed written consent was obtained after an epidural was sited and analgesia established. Computer randomisation allocated women to the lateral or sitting position for the passive second stage (usually 1h). Other standardised labour protocols were followed. The primary outcome was mode of delivery. We calculated that 300 women were needed for a difference in intervention of 16%, with β=0.8 and α=0.05. Secondary outcomes included maternal acceptability, CTG abnormalities and neonatal outcome.

Results: The National Institute for Health Research (NIHR) announced a similar multi-centre study,3 when we had recruited 120 patients: n=39 allocated to sitting and n=38 to the lateral position. We present this as a pilot study focusing on what we have learned.

<table>
<thead>
<tr>
<th>Mode of delivery</th>
<th>Sitting</th>
<th>Lateral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal vaginal delivery</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>Ventouse</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Non rotational forceps</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Rotational forceps</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

Demographic characteristics were similar. There were no differences in the primary or secondary outcomes. The biggest difficulty was the large patient drop out after consent n=43 and that 5 patients in the lateral group spent <30 min in the designated position, compared with zero in the sitting group due to maternal discomfort.

Discussion: Despite a previous study showing that the lateral position may be beneficial,2 midwives recommended the sitting position making recruitment difficult. Our study did not show any trend towards improved outcome in the lateral position. Independently from our study the NIHR has set up a multi-centre study aiming to recruit 3000 patients.3 We feel it is important that midwives take ownership of the study to facilitate recruitment.

References
O15 Low-dose CSE for caesarean section: Training and quality of anaesthesia

MA Walters, K Poulis, J Van Acker, C Lebrun, M Van de Velde
Department of Anaesthesia, University Hospitals Leuven, Leuven, Belgium

Introduction: Low-dose combined spinal-epidural (CSE) reduces the incidence of maternal hypotension compared to conventional dose CSE or spinal anaesthesia. This has been demonstrated in clinical trials with experienced operators. Concern about increased intraoperative discomfort may limit this technique from more widespread use. We performed a case series of low-dose CSEs for caesarean section in our daily practice and analysed whether anesthetist training affected the outcomes of haemodynamic stability and pain during surgery.

Methods: After ethical approval data were prospectively collected from 100 patients receiving low-dose CSE for elective and emergency caesarean sections. CSE technique was guided by local protocol. Pain and discomfort scores were recorded regularly during surgery. Non-invasive blood pressure was measured at 2-min intervals until delivery and compared to preoperative baseline. Anaesthetists were divided into 2 cohorts for analysis. Group IT (Intensive Training): operators with an interest in obstetric anaesthesia and whom had received intensive training in low-dose CSE techniques. Group ST (Standard Training): operators with conventional knowledge and awareness of local protocol but no additional training.

Results: Group IT performed 39 procedures and group ST 61. Mean (SD) dose of bupivacaine was 6.3 mg (±0.3) in both groups. Patients with pain during surgery and/or hypotension were significantly increased in group ST compared to group IT. Local protocol was followed incorrectly in 26% of cases in the ST group.

<table>
<thead>
<tr>
<th></th>
<th>iT Group</th>
<th>ST Group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain before delivery</td>
<td>0</td>
<td>11</td>
<td>0.028</td>
</tr>
<tr>
<td>Pain after delivery</td>
<td>5</td>
<td>23</td>
<td>0.018</td>
</tr>
<tr>
<td>Total pain during surgery</td>
<td>5</td>
<td>30</td>
<td>0.003</td>
</tr>
<tr>
<td>Hypotension &gt;10%</td>
<td>59</td>
<td>77</td>
<td>0.034</td>
</tr>
<tr>
<td>Hypotension &gt;20%</td>
<td>26</td>
<td>41</td>
<td>NS</td>
</tr>
<tr>
<td>Protocol not followed</td>
<td>8</td>
<td>26</td>
<td>0.021</td>
</tr>
</tbody>
</table>

Data are %. Pain = any discomfort requiring treatment

Discussion: Low-dose CSE is the preferred anaesthesia for caesarean section at our institution. Outcomes depend on operator experience, training in using the technique and adherence to local protocol. To reduce the incidence of intraoperative pain and maintain haemodynamic stability it is necessary to provide further intensive training to operators who have not previously benefited from this. We intend to do this and continue to audit outcome.

References

O16 The utility of CUSUM scoring in the assessment of trainees in a teaching hospital

H Murgatroyd, NL Scott, MJ deMartino, M Purva,†
Department of Anaesthesia, Leeds Teaching Hospitals NHS Trust, Leeds, UK; †Department of Anaesthesia, Hull Royal Infirmary, Hull, UK; †Medical student, Hull and York Medical School, Hull, UK

Introduction: Cumulative sum (CUSUM) scoring has been used previously in anaesthetic training and audit. With each procedure the score falls with success and rises with failure. A practitioner may be identified as having a success rate that differs from an acceptable standard. With this study, we aimed to show the utility of CUSUM scoring in a busy teaching hospital obstetric unit in detecting the failing epiduralist.

Methods: CUSUM charts were created for 10 doctors who performed more than 20 epidurals during a four-month period. The charts were designed to signal failure rates that were significantly higher than the 20% average failure rate found at the Hull Royal Infirmary. An additional modification of this technique was made; a ‘warning curve’ chart in which the score could not fall below zero and should therefore give an early indication of poor performance.

Results: The modification to the CUSUM technique made it easy to show graphically periods of poor performance. The ‘warning curve’ plot indicated a success rate significantly different from average by an ST4 doctor after 17 procedures. At this point, it would be possible to examine his data, discover the reason for his difficulties and direct additional training.

Discussion: Modifications to the conventional CUSUM technique taken together with other established methods of assessment can aid the identification of trainees having difficulty with practical procedures, and examination of the underlying data may reveal the reasons for procedural failure. This study constitutes preliminary data from an on-going, multi-centre study to determine the utility of contemporary CUSUM charting in obstetric anaesthesia training and revalidation.

References
O17 The incidence and outcomes of uterine rupture in the United Kingdom
K Fitzpatrick, JJ Kurinczuk, Z Alfrević, P Spark, P Brocklehurst, M Knight
NPEU, University of Oxford, Oxford, UK, *Division of Perinatal and Reproductive Medicine, University of Liverpool, Liverpool, UK

Introduction: True uterine rupture is a complication of pregnancy associated with severe maternal and fetal morbidity and mortality. In the developed world it most commonly occurs in women who have previously delivered by caesarean section. Several studies and recent reports of the increased risk of morbidity, particularly due to uterine rupture, are thought to have contributed to a marked decrease in the number of women attempting vaginal birth after caesarean section. Two recent systematic reviews have identified deficiencies with existing studies estimating incidence and outcomes. The aims of this study, therefore, were to estimate the incidence of uterine rupture in the UK and describe the outcomes for mother and baby.

Methods: A national population-based case-control study was undertaken using the UK Obstetric Surveillance System, carried out in all 223 hospitals with consultant-led maternity units in the UK. The participants comprised 159 women diagnosed with uterine rupture between 1st April 2009 and 30th April 2010 and 448 control women who did not have a uterine rupture in this period and who had delivered by caesarean section in any previous pregnancy.

Results: The estimated incidence of uterine rupture was 1.9 per 10,000 maternities (95% CI 1.6-2.2) overall; 10.9 (95% CI 9.1-12.8) and 0.3 (95% CI 0.2-0.4) per 10,000 maternities in women with and without a previous caesarean delivery respectively; and 20.5 (95% CI 19.4-21.6) and 2.9 (95% CI 1.8-4.5) per 10,000 maternities in women with a previous caesarean delivery planning a vaginal or an elective caesarean delivery respectively, in their current pregnancy. Fifteen (9%) women had a hysterectomy following uterine rupture, 10 (6%) had one or more other organs damaged at rupture or removed during surgery and 69 (43%) had other or additional morbidity following their uterine rupture, including 62 (39%) who received a blood transfusion. Fifty (31%) of the women were admitted to ITU/HDU and two women died (case fatality 1.3%, 95% CI 0.2-4.5%). Excluding stillbirths occurring prior to uterine rupture, there were 9 stillbirths and 10 early neonatal deaths among 146 infants (perinatal mortality rate 130 per 1000, 95% CI 80-196).

Discussion: Although uterine rupture is associated with significant maternal and perinatal mortality and morbidity, even amongst women with a previous caesarean section, it is a rare occurrence at 1 in every 1,000 women. For women with a previous caesarean section, the decision regarding mode of delivery in subsequent pregnancies needs to carefully consider both the risks and benefits associated with the different options.

References

O18 Blood patches may cause significant scarring in the epidural space: two case reports
C Collier
Anaesthesia, Prince of Wales Private Hospital, Sydney, Australia

Introduction: Epidural blood patches are widely used in the treatment of post dural puncture headache (PDPH) and it is commonly accepted that the mass of injected blood will be resorbed quickly, and leave only minimal scarring in the epidural space. However, two recent cases investigated with epidural contrast injection, have suggested that permanent scarring may occur, and distort epidural anatomy, producing an obstructive barrier in the epidural space, but also allowing the possibility of an extensive block.

Methods: The 2 patients formed part of our long-running series of epidurogram studies, following ethics committee approval. Both had suffered an accidental dural puncture at their first caesarean section, 15 and 24 months previously, followed by epidural blood patch injection for PDPH. Their initial blocks for repeat surgery were both clearly inadequate, despite extra local anaesthetic dosing, with the first being unilateral and low (T12), and the second just too low (T11). The epidural catheters were re-sited in an adjacent interspace, with the subsequent block in one patient becoming satisfactory, whilst the other developed a total subdural block, with apnoea and unconsciousness after 50 min. The following day, with informed consent, contrast (Iopamidol, Isovue 300, 6-10 mL) was injected down the epidural catheter and radiographic screening undertaken.

Results: The spread of contrast was severely restricted in both patients, with a lack of vertical spread, and contrast being confined mostly to the posterior epidural space. In the second patient, the spread of bilateral subdural contrast up to T6, was also detected. The radiographic appearances were those of obstruction to contrast flow within the epidural space, as commonly seen in the presence of a transverse septum, or post-surgical adhesions. In our two patients, whose previous blocks had worked well, it is suggested that the cause of the obstruction was scarring following the blood patching, which also distorted the epidural anatomy and allowed easier access to the subdural space.

Discussion: Although the vast majority of epidural blood patches appear to be without any long-term hazards, a few may result in significant scarring in the epidural space, with distortion of the meningeal anatomy and the possibility of failed blocks, or occasionally unexpectedly extensive blocks.

References
O19 The incidence of epidural analgesia for caesarean section negatively correlates with caesarean section rates in Canada  
SH Halpern, M Silva  
Division of Obstetrical Anaesthesia, Sunnybrook Health Sciences Centre, Toronto, Canada  
Introduction: Whether or not epidural analgesia (EA) causes an increase in caesarean section (CS) rates is still controversial. The Canadian Institute for Health Information (CIHI) maintains a database of health outcomes in Canada. We queried that database to determine whether provincial EA rates correlated with CS rates.  
Methods: CIHI is an independent, not-for-profit corporation funded by federal, provincial and territorial governments that provides accurate and comparable information on Canada’s health system. We searched the CIHI database to obtain the information about rates of CS, assisted deliveries and labour EA rates by province in Canada during 2008 to 2009. The primary outcome was the correlation between EA and primary CS rates. The correlation between EA and all CS, assisted vaginal delivery, and total operative delivery (vaginal and CS) were secondary outcomes. A P value of 0.05 was considered statistically significant.  
Results: We found a negative correlation (R= -0.465) between EA rate and the primary CS rate (Fig 1). The correlations between EA and total CS/assisted vaginal delivery/total operative delivery were -0.356/0.094/-0.20 respectively. None of the correlations were statistically significant.  
Discussion: If EA caused an increased CS rate, there should be a positive correlation between these variables. A negative correlation is strong evidence against this thesis. Using administrative data from CIHI, we demonstrated a negative correlation between the incidence of labour EA and CS rates. Taken with other evidence, EA should not be considered a causative risk factor for CS.

![Scatterplot of Epidural Rates vs Primary Cesarean Section Rates](image)

Reference  

O20 The use of a novel pulsatile cerebrospinal fluid model to assess pressure manometry and fluid sampling through spinal needles: support for the use of a 22-gauge spinal needle with a tapered 27-gauge pencil-point tip.  
Y Ginosar, Y Ginosar,*, Jordana Lovett,† Y Smith,‡ T Ben-Hur,‡ EM Davidson  
Anesthesiology, Hadassah Hebrew University Medical Center, Jerusalem, Israel, *, High School Summer Project, Jerusalem, Israel, †Neurology, Hadassah Hebrew University Medical Center, Jerusalem, Israel  
Introduction: Despite increased incidence of PDPH, 22-gauge needles are routinely used for lumbar puncture because of shorter cerebrospinal fluid (CSF) pressure equilibration times and CSF sampling times. We used a novel pulsatile CSF model to assess these variables for different spinal needles and compared them with a tapered spinal needle with a 22-gauge shaft and a 27-gauge tip (22/27G).  
Methods: A fluid bag was inflated to create a pulsatile fluid reservoir with a pressure of 25/15 cmH₂O. We tested 18G, 20G, 22G, 24G, 25G, 26G, 27G and 22/27G spinal needles, which were inserted into the sampling port. CSF pressure was measured every 2 s for 120 s by manometry. Saline 0.9% and mannitol 20% were tested separately. The time to produce a 1ml CSF sample was measured in triplicate.  
Results: CSF pressure equilibration time (s) was 40.7 ± 6.4, 108.7 ± 6.1 and 51.3 ± 4.6 for the 22G, 27G and 22/27G needles. 22G vs 27G and 22/27G vs 27G (P<0.001); 22G vs 22/27G not significant (1-way ANOVA with Bonferroni). CSF sampling time (s) was 40.3 ± 3.1, 225.3 ± 10.0, and 63.0 ± 5.2 for the 22G, 27G and 22/27G needles. 22G vs 27G and 22/27G vs 27G p<0.0001; 22G vs 22/27G (NS) (1-way ANOVA with Bonferroni). Saline was different from mannitol for both measurements and all needles (P<0.0001) (1-way ANOVA).  
Discussion: A 22/27G tapered spinal needle has similar flow properties to the 22G needle but the 27G tip avoids the unacceptably high incidence of PDPH.

![Graph showing CSF pressure equilibration and sampling times](image)

Reference  
P1 A cost assessment of cell salvage in obstetrics
S Waldron, S Chadwick, A Parkes, P Kirk
Department of Anaesthesia, North Manchester General Hospital, Manchester, UK

Introduction: The use of cell salvage in obstetrics has been endorsed by NICE, but cost implications remain a barrier to its routine use in some centres. To assess the cost effectiveness of collecting blood for cell salvage during all caesarean sections undertaken from 8am-5pm at our institution.

Methods: 100 consecutive patients who had undergone elective or emergency caesarean section between the hours of 8am-5pm were identified using the obstetric theatre logbook. Using the Trust transfusion database, patients who required an allogeneic blood transfusion intra- or postoperatively were identified and the number of units transfused recorded. We use the Fresenius CATS cell salvage machine. The cost of collecting blood with the potential for cell salvage was analysed using a ’tiered’ approach; only the collecting reservoir, heparinised saline and suction are prepared routinely. The processing disposables are only opened if >800ml of blood is collected. A cost calculation for the preparation of the ’tiered’ approach for the 100 patients audited was performed. This was compared to the cost of allogeneic blood required for the same cohort. The additional cost of processing salvaged blood for patients who suffered haemorrhage was considered. Staffing costs were not included as no additional staff would be required to administer cell salvaged blood within normal working hours at our institution.

Cost of ’tiered approach’ set up= £31.80
Cost of processing pack if >800ml collected= £104.00
Cost of one unit of allogeneic blood= £124.52

Results: 8 patients required allogeneic transfusion. A total of 50 units of allogeneic blood were transfused.
Cost of 50 units of packed cells = £6,226
Cost of ’tiered’ approach for 100 patients = £3,180
Cost of processing salvaged blood in 8 patients = £832
Potential cost saving= 6,226- (3,180+832)= £2,214

Discussion: The potential cost saving for the routine use of ’tiered’ cell salvage for caesarean section is significant and could be considered for future use. However, potential difficulties include the collection of post-operative transvaginal losses. We would advocate a further study with a larger patient cohort before recommending the routine use of cell salvage in obstetrics.

Reference

P2 Does the use of cell salvage in Rhesus D antigen negative women cause alloimmunisation?
A Sange, V Skelton
Anaesthesia and Critical Care, King’s College Hospital, London, UK

Introduction: Endorsement of the use of cell salvage by national bodies has established its use in obstetrics to reduce allogenic blood transfusion. The safety of cell salvage in obstetric haemorrhage has been supported by retrospective studies, case reports and one controlled trial that assessed the use of cell salvage in elective and emergency caesarean sections. 115% of the population are Rhesus D (RhD) antigen negative. In the delivery of a Rh positive fetus to a RhD negative mother, there is a risk of maternal alloimmunisation, which may be exacerbated by the use of cell salvage.

Methods: We identified all women for whom the cell saver had been used from our obstetric cell salvage database between 2008-09. Their case notes were reviewed to establish the indication for caesarean section, Rhesus status of the mother and the baby, estimated blood loss, cell-salvaged blood transfused, Kleihauer-Betke test results and amount of anti-D immunoglobulin administered.

Results: Cell salvage was used for 40 caesarean sections. 35 mothers were RhD positive and 5 RhD negative. 3 of the 5 RhD negative mothers had RhD positive babies. Only one of the 3 RhD negative mothers with RhD positive babies received cell-salvaged blood transfusion (volume transfused 196ml). The postpartum Kleihauer-Betke test was negative in all 3 mothers with RhD positive babies. All the RhD negative patients received prophylactic anti-D immunoglobulin according to the standard hospital protocol for the management of RhD negative mothers. There was no evidence of alloimmunisation in any of the patients. They did not require any further doses of anti-D immunoglobulin.

Discussion: Fetal red blood cells may contaminate cell salvaged blood during caesarean section. Reinfusion of the salvaged blood of a RhD negative mother with a RhD positive baby could cause alloimmunisation. A recent exploratory study shows that the use of a leucopellet filter will not prevent fetal red cells contamination during transfusion of salvaged blood. The number of RhD negative women in our cohort is in line with the national population incidence. In this small group, RhD negative women showed no sign of alloimmunisation after receiving a standard dose of 500IU of prophylactic anti-D immunoglobulin post partum. Although reassuring, we will continue to monitor this group of women closely.

References
P3 Comparison of closed-loop feedback computer-controlled and manual-controlled phenylephrine infusions during spinal anaesthesia for caesarean section

WD Ngan Kee, KS Khaw, YH Tan, FF Ng
Department of Anaesthesia and Intensive Care, The Chinese University of Hong Kong, Shatin, Hong Kong

Introduction: Manual-controlled infusion (MCI) of phenylephrine (PHE) is effective for maintaining blood pressure (BP) during spinal anaesthesia for caesarean section. Recently, we developed a closed-loop feedback computer-controlled infusion (CCI) system which has the advantage of automation and enables the use of complex algorithms that are difficult or cumbersome to use with manual infusions. The aim of this study was to compare BP control with CCI vs MCI.

Methods: With ethics approval and patient consent, we randomized 222 ASA I–II patients having elective caesarean section to have systolic blood pressure (SBP) maintained with PHE (100 μg/ml) using CCI or MCI. Average baseline systolic BP (SBP) was measured during a rest period. Spinal anaesthesia using bupivacaine-fentanyl was induced in the right lateral position then crystalloid cohydration and PHE 60 ml/h were started. After 1 min until delivery, PHE was titrated according to SBP measured Q1min. In the CCI group a variable rate algorithm was used: rate (ml/h) = (10 - error%) * 3, where error% = (measured SBP - baseline SBP)/baseline SBP *100%. Maximum rate limited to 60 ml/h. In the MCI group, a simple on-off algorithm was used: SBP ≤ baseline: 60 ml/h or SBP > baseline: infusion off. BP control was assessed by evaluating percentage deviation of SBP from baseline using performance error (PE) calculations. 1 Bias (median PE), values vary systematically above or below baseline inaccuracy (median absolute PE), average magnitude of differences from baseline) and wobble (intrasubject variability) were calculated. Data were compared using t-tests. P < 0.05 was considered significant.

Results: 212 patients completed the study. Performance error calculations are shown in the table. Bias was similar between groups but inaccuracy and wobble were smaller in the CCI vs the MCI group. The incidences of hypotension (10.1 vs 8.7%) and nausea/vomiting (2.8 vs 3.9%), total PHE dose, Apgar scores and umbilical arterial pH were similar between the CCI vs MCI groups.

<table>
<thead>
<tr>
<th></th>
<th>CCI group</th>
<th>MCI group</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bias (%)</td>
<td>2.34±3.34</td>
<td>2.07±3.66</td>
<td>0.58</td>
</tr>
<tr>
<td>Inaccuracy (%)</td>
<td>4.83±2.01</td>
<td>5.55±2.59</td>
<td>0.03</td>
</tr>
<tr>
<td>Wobble (%)</td>
<td>3.87±1.82</td>
<td>4.77±2.44</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

Discussion: CCI provided tighter and automated control of SBP compared with MCI. This was not associated with any differences in clinical outcome.

Reference


P4 A follow up audit after a change in practice: parturients' desire for information about rare complications of regional anaesthesia

JE Angrave, KE Cullis, PAS Moore
The Selwyn Crawford Department of Anaesthetics, Birmingham Women’s Hospital, Birmingham, UK

Introduction: In 2008 the GMC published new guidance on consent. This stated that the information given to a patient about risks associated with a medical procedure will depend on the severity and likelihood of the risk and what the patient wants to know.1 It is important to share common complications of a procedure but if a patient does not want to know rare risks it may not be appropriate to impose this information on them. An initial departmental audit showed that a majority of obstetric patients (73/100) did not wish to receive risk information about rare complications of regional anaesthesia. The consent procedure was subsequently changed. Patients are informed of common complications (>1:1000) and then asked if they wish to receive information about rare complications (1:10,000). Complication rates are quoted according to the OAA Epidural Information Card.2 The decision is documented on the anaesthetic chart. We performed a prospective audit to review this change of practice. Our aim was to ensure it remained appropriate to give patients the choice.

Methods: All anaesthetic charts over a 2-month period were reviewed. 515 patients received either an epidural, spinal or CSE. If a patient received more than one intervention, only the consent process for the first procedure was analysed.

Results: 415 patients (81%) were given the option of receiving rare risk information. Of the 100 patients not given the option, 59 anaesthetic charts indicated that the anaesthetist had chosen to inform the patient of rare risks whilst 40 patients were neither informed nor given the choice. One patient refused any risk information. Of the 415 patients given the option, 84% did not wish to receive information about rare complications associated with regional anaesthesia. When analysed by urgency, 79% of elective patients did not wish to receive rare risk information compared with 86% of emergency patients. Of the emergency cases, 5% of those undergoing non-delivery procedures wanted rare risk information compared with 15% undergoing delivery procedures.

Discussion: This audit involving much larger numbers, confirms the finding from the previous audit that the majority of obstetric patients do not wish to know the rare complications of regional anaesthesia. This supports our change in practice. In light of our results and the GMC guidance, we believe it is acceptable practice to offer patients the option of not receiving information about the rare risks of regional anaesthesia if that is their desire.

References

P5 Epidural and intrathecal opioid administration - An OAA approved survey of current practice

A J Brewer, R Leighton
Department of Anaesthesia, University Hospitals of Leicester, Leicester, UK

Introduction: The choice of neuraxial opioid used during caesarean section remains controversial; however, it has been shown that their use leads to reduced intraoperative discomfort.

Methods: After OAA approval (Survey number 100) an email questionnaire was sent to 218 lead obstetric anaesthetists in September 2010. Questions were posed on intrathecal and epidural opioid usage and use of oral and intramuscular opioid usage post neuraxial opioid usage.

Results: Of the 218 invited participants 169 responded (77.5%) with 6 responses rejected.

Table: Spinal opioid usage for caesarean section

<table>
<thead>
<tr>
<th>Opioid</th>
<th>Number of Responses</th>
<th>Mean dose used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diamorphine</td>
<td>136 (67.7%)</td>
<td>313.4 µg (250-500 µg)</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>49 (24.4%)</td>
<td>21.8 µg (10-75 µg)</td>
</tr>
<tr>
<td>Morphine</td>
<td>12 (6%)</td>
<td>141.6 µg (100-300 µg)</td>
</tr>
<tr>
<td>Morphine and fentanyl</td>
<td>4 (2%)</td>
<td>morphine 100 µg with fentanyl 15 µg</td>
</tr>
</tbody>
</table>

Epidural opioids in labour were used in all departments. Low-dose mix was used with 2 µg/ml fentanyl in 98.1% of cases, with 2 respondents using 4 µg/ml and 1 using 1 µg/ml. Other responders used alfentanil 0.0015% with bupivacaine 0.1% or diamorphine 2.5 mg in 10ml normal saline. At caesarean section, elective and emergency, 95.0% of respondents used either diamorphine (mean 2.93 mg; range 1-5 mg) or fentanyl (mean 85.3 µg; range 40-100 µg) the remaining using morphine. Following neuraxial opioids oral or intramuscular opioids were used by 136 (82.9%) responders, with 8.8% of those having limitations on the usage of opioids. The commonest route of administration was oral (70%), with the most commonly administered drug being morphine or codeine.

Discussion: There is differing clinical practice in neuraxial opioid usage at caesarean section, with the dose used being the most variable. Also following neuraxial opioid usage there is wide variations in practice of administering further opioids, however most departments do give opioids with no limitation on timing if the patient is in pain.

References
3. Cowan CM, Kendall JB, Barclay PM et al. Comparison of intrathecal fentanyl and diamorphine in addition to bupivacaine for caesarean section under spinal anaesthesia Br J Anaesth 2002;89:452-8

P6 How good are we at placing epidurals? Initial results from the Cusum project

N L Scott, E J Lewis, H Murgatroyd, * M Purva, †

Introduction: Cusum analysis has been used to assess anaesthetist’s competency in epidural procedures but previous studies have used different procedural failure rates in the algorithm leading to confusion when analysing performance. To date there are no studies showing the actual failure rates and we aimed to identify the true failure rates for epidural procedures at one hospital to better inform subsequent Cusum analysis.

Methods: A definition of epidural failure was reached by consensus among consultants. Presence of any of the following factors resulted in an epidural being deemed a failure: inadequate pain relief by 45 min of placement, dural puncture, retiting, abandonment, mother dissatisfied at follow up visit. The database used to collect information on anaesthetic procedures was modified to allow all relevant datasets to be collected. Operator’s details were anonymised.

Results: 576 epidurals placed between September and December 2010 were analysed. An overall failure rate of 18.9% emerged for the unit. The actual failure rate for CT2, ST3 and ST4 trainee were found to be 20, 21 and 16% respectively. CT2 performed only 19% of epidurals but contributed to 31% of those resisted or abandoned. ST3 performed only 23% but contributed to 60% of dural punctures. Reasons for epidurals classed as failure are shown below. Although only 14% of epidurals were placed in lateral position, their failure rate of 20.3% was similar to that of 18.3% for sitting position (P=0.7). However, 50% of those classed as failed lateral epidurals were due to them being abandoned in contrast to only 14% of those classed as failed sitting epidurals (P<0.1).

Reasons for epidural failure

<table>
<thead>
<tr>
<th>Reason</th>
<th>Patient%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abandoned</td>
<td>13</td>
</tr>
<tr>
<td>Resited by another anaesthetist</td>
<td>16</td>
</tr>
<tr>
<td>Dural puncture</td>
<td>3</td>
</tr>
<tr>
<td>Inadequate analgesia by 45 min</td>
<td>29</td>
</tr>
<tr>
<td>Patient dissatisfied</td>
<td>3</td>
</tr>
<tr>
<td>Multiple reasons (7 dural punctures included)</td>
<td>36</td>
</tr>
</tbody>
</table>

Discussion: The true failure rate as identified in our project is far higher than noted in previous studies. Our definition of failure may be more stringent than others. However, the presence of learning curve issues in junior doctors performance warrant perhaps increased use of ultrasound assistance for epidural placement to improve our epidural service. A lack of expertise in lateral epidurals has highlighted the need for targeted training in this area. We believe our pragmatic definition of failed epidural insertion may be useful in future studies of this topic.

Reference
P7 Loss of resistance technique for obstetric epidurals: is it related to the incidence of accidental dural puncture?

C. Todd, N Hollister, S Ball, D Thorp-Jones, J Coghill
Department of Anaesthesia, Derfford Hospital, Plymouth, UK; *Centre for Health and Environmental Statistics, University of Plymouth, Plymouth, UK

Introduction: The use of lumbar epidural analgesia in obstetrics is common and like many practical procedures in anaesthesia each person has their own particular preferences for insertion technique. Accidental dural puncture (ADP) has a quoted incidence of 0.19% to 3.6% of all obstetric lumbar epidurals.1 We set out to determine if techniques for loss of resistance (LOR), namely air v saline had any influence on the rate of ADP. It has been previously postulated that LOR with saline is a safer technique.1,2

Methods: We performed a retrospective analysis of our local obstetric anaesthetic database, containing 18,385 obstetric epidurals performed over a 15-year period. In our hospital a data sheet is completed for each epidural inserted, stating amongst other things the LOR technique used. ADP was defined as clear evidence of CSF in the needle or catheter, spinal anaesthesia following a test dose or symptomatic ADP headache detected during follow up. Data were reviewed to determine the incidence of ADP in relation to loss of resistance technique used during insertion.

Results: Of 18,385 lumbar epidurals performed a total of 129 ADPs were detected, giving an overall incidence of 0.70%. LOR technique was categorised into using air, saline or not stated. Air was the medium used for the loss of resistance for 866 epidurals, 9 of which had recognised ADP (1.04%). Saline was the medium of choice for 9,528 epidurals, 64 of which had recognised ADP (0.67%). A further 7,991 epidural data sheet did not state which medium was used, 56 of these had recognised ADPs (0.70%). The relative risk of ADP with air vs saline is therefore 1.55 (95% CI 0.77 to 3.10, P=0.218).

<table>
<thead>
<tr>
<th>LOR technique using this technique</th>
<th>Total epidural numbers</th>
<th>Epiduals with no Epidural with ADP</th>
<th>ADP</th>
</tr>
</thead>
<tbody>
<tr>
<td>air</td>
<td>866</td>
<td>857</td>
<td>9</td>
</tr>
<tr>
<td>saline</td>
<td>9528</td>
<td>9464</td>
<td>64</td>
</tr>
<tr>
<td>not stated</td>
<td>7991</td>
<td>7935</td>
<td>56</td>
</tr>
</tbody>
</table>

Discussion: Results from our review give some indication of an increased risk of ADP with air as opposed to saline. The relative risk of ADP with air compared to saline was 1.55, although this result was not statistically significant. Despite this and the fact 7,991 data sheets were incomplete we believe complete data on over 10,000 epidurals showing a relative risk of ADP of 1.55 when air is used as the LOR technique adds weight to the argument of the benefits of saline over air as the LOR technique of choice.

References

P8 National survey on epidural needle size used in obstetric practice

P. Gautama, M Mushambi, S Francis
Anaesthetics, University Hospitals of Leicester NHS Trust, Leicester, UK

Introduction: Dural puncture with a 16G Tuohy needle can result in severe post dural puncture headache (PDPH) in up to 88% of cases.1 The incidence of severe PDPH is significantly higher following accidental dural puncture (ADP) with 16G needles compared with 17G or 18G needles.1 Recent evidence showed that the incidence of ADP was marginally lower with 18G needles (0.5%) compared with 16G (0.6%) needles and the incidence of severe PDPH was 64% with 18G needles compared with 88% with the 16G needles.2 The epidural blood patch rate was lower (48% vs 67%) and the success of the blood patch was higher (83% vs 70%) in the 18G compared with 16G needles. With this evidence in mind, we decided to survey units in the UK to see how many adopted the use of smaller gauge needles in order to reduce morbidity following ADP.

Methods: A postal questionnaire was sent to lead obstetric anaesthetic consultants in the UK. The questions included size of Tuohy needles used in the unit, the ADP rate, number of epidural blood patches (EBP) per month and number of patients needing more than one EBP per month.

Results: A total of 236 questionnaires were sent and we had 130 responses (55%). 71% of the hospitals that replied were DGHs and 28% were teaching hospitals. The majority of units (77.7%) had an epidural rate between 10-30%. 98 units (75%) used 16G needles, 16 units (12%) used 18G and 16 units (12%) used both 18G and 16G needles. Of the 32 units that used 18G needles, 27 (84%) units had been using them for more than 5 years and the remaining for less than 5 years. Of the 32 that used 18G for epidurals, 12 did not use them for combined spinal epidurals as they considered them too small.

<table>
<thead>
<tr>
<th>18G (%)</th>
<th>16G (%)</th>
<th>16G (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADP (%)</td>
<td>rate</td>
<td>&lt;1</td>
</tr>
<tr>
<td></td>
<td>2-3</td>
<td>25</td>
</tr>
<tr>
<td>EBP in a month</td>
<td>≥</td>
<td>94</td>
</tr>
<tr>
<td>Pt needing &gt;1 EBP (per month)</td>
<td>0</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>≥2</td>
<td>13</td>
</tr>
</tbody>
</table>

Discussion: Despite evidence, the majority of units are still using 16G needles. 25% of the hospitals who were not using 18G needles had considered changing. The common reasons for not changing were fear about an increase in accidental dural tap rates because of a learning curve and the different trainees rotating in the region, concern about a difference in needle size between obstetric and non obstetric areas, difference in opinion with colleagues and reluctance to change from a familiar technique.

References
2. Sadashivaiah J, McLure H. 18G Tuohy needle can reduce the incidence of severe postdural puncture headache. Anaesthesia 2009; 64: 1379-80
P9 Whose depth is it anyway? A study to examine accuracy of epidural depth assessment
K Kondov, FE Webster, P Sharpe, R Leighton
Department of Anaesthesia, University Hospitals of Leicester, Leicester, UK

Introduction: Anaesthetists routinely document the depth of epidural space following epidural insertion with a varying degree of accuracy. Accurate measurement of the depth of epidural needle is important where ultrasound has been used to guide epidural insertion or where further procedures are performed.

Method: We developed a novel model with six 16-gauge 8cm Tuohy needles (Portex) to allow us to assess the accuracy of measurement of depth of insertion. 50 anaesthetists of differing grades (ST3 and above) were asked to measure the depth of each needle as they would do in their routine practice. The measured depths were compared with actual depth as measured by a ruler.

Results: The actual depth ranged between 2.9 and 5.3cm. As demonstrated in the graph below, there were wide variations in assessed depth. The standard deviations of the measurements ranged between 0.43 and 0.66cm. The consultants measurements tended to show less variation. Overall the coefficient of variation for the measurements was 10.6% and the precision of measurement was 21%.

Discussion: Using this simple model we were able to demonstrate a significant variation in accuracy of epidural depth assessment. This may have implications for the subsequent management of epidurals once inserted and any future epidural placement. Caution should be exercised when referring to epidural depth as documented by other clinicians.

Reference

P10 A national survey of the presence and utilization of thromboelastography and thromboelastometry across UK obstetric units
AV Pillai, W Scott
Department of Anaesthesia, Royal Derby Hospital, Derby, UK

Introduction: Thromboelastography and thromboelastometry are forms of near patient coagulation test that enable quick interpretation of changes in coagulation status. There is established evidence for their role in liver transplantation and growing evidence of roles in other settings including obstetrics. This survey aims to assess the extent of the use of the thromboelastogram (TEG®) and the thromboelastometer (ROTEM®) across obstetric units in the UK.

Methods: After OAA approval an online questionnaire was circulated to 219 lead obstetric anaesthetists from the OAA database in March 2010. Questions were posed on the presence, uses and usefulness of TEG/ROTEM.

Results: The final response rate was 69%. 3% of obstetric units had dedicated TEG and 9% had shared use of TEG/ROTEM nearby. No units had dedicated ROTEM. 64% of units with access to TEG/ROTEM used the equipment less than once a month. 84% of units with access to TEG/ROTEM found it at least moderately useful. The equipment was used in a number of clinical situations but most frequently in major haemorrhage (26% of units with access to TEG/ROTEM). The results of TEG/ROTEM were used to determine timing of operative delivery and suitability for neuroaxial blockade but most commonly to guide the administration of blood products (42% of units with access to TEG/ROTEM). 60% of units without access to TEG/ROTEM would consider its purchase. Cost was a major reason not to consider TEG/ROTEM. There were also concerns regarding the training of staff and the infrequency of use of the equipment.

Discussion: Only a minority of obstetric units across the UK had access to TEG/ROTEM. Most units with TEG/ROTEM used the resource infrequently but felt it was at least moderately useful particularly to guide the administration of blood products in major haemorrhage. Perhaps the true value of this equipment is in units with high numbers of deliveries and many high-risk pregnancies. It also seems that it is a resource that can be shared across different departments to meet the cost implications. In these situations it is important to have adequate training and clear guidance on the interpretation of results.

References
P11 Reference ranges for thromboelastography and traditional coagulation tests in term parturients

B Macafee, K Ashpole, MCox, F Matthey, L Acton, SM Yentis
Department of Anaesthesia, Chelsea and Westminster Hospital, London, UK

Introduction: Thromboelastography (TEG®) evaluates ‘quality’ of clot during coagulation of blood. Before uptake of such methods as ‘near-patient testing’ tools, establishing reference ranges for the local population is recommended. Our main aim was to establish ‘normal’ ranges for TEG in women having elective caesarean section (CS) in our unit but with (surprisingly) few data published on standard coagulation test reference ranges in late pregnancy, we also wished to derive reference ranges for those tests.

Methods: After REC approval and written consent, we studied 30 women (ASA 1-2, 16-45 years) presenting for elective CS with an uncomplicated singleton pregnancy >38 weeks. Blood samples were taken preoperatively, on arrival in the recovery room, and in a subset of 19 women, 4 h after subcutaneous enoxaparin 40 mg (given 3-4 h after surgery). The first sample had standard laboratory coagulation tests, full blood count (FBC) and TEG analysis; the second coagulation tests and TEG analysis; the third had TEG analysis alone.

Results: TEG ranges are shown in the Table. Full blood count and standard coagulation reference ranges were within 98% of the local non-pregnant ranges (data not shown).

Table: TEG reference ranges (2.5-97.5 percentiles)

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Pre-op</th>
<th>Post-op</th>
<th>Post-exon*</th>
</tr>
</thead>
<tbody>
<tr>
<td>R (min)</td>
<td>2.3-8.6</td>
<td>3.5-7.5</td>
<td>4.3-10.5</td>
</tr>
<tr>
<td>K (min)</td>
<td>1.2-4</td>
<td>1.1-1.8</td>
<td>1-2.6</td>
</tr>
<tr>
<td>MA (min)</td>
<td>68.9-83.2</td>
<td>72-83.1</td>
<td>68.81.1</td>
</tr>
<tr>
<td>Angle degree (°)</td>
<td>60.7-75.6</td>
<td>65.0-75.3</td>
<td>57.6-75.2</td>
</tr>
<tr>
<td>Ly 30 (%)</td>
<td>0-7.8</td>
<td>0-2.5</td>
<td>0-3.1</td>
</tr>
<tr>
<td>CI</td>
<td>-1.5-4</td>
<td>0.6-5.0</td>
<td>-2.2-4.3</td>
</tr>
</tbody>
</table>

Post-op=before enoxaparin. Post-op exon=after enoxaparin

*uncorrected for heparin effect i.e kaolin cuvette

Discussion: In pregnancy, increased coagulability co-exists with increased fibrinolysis. The TEG provides a rapid evaluation of all phases of coagulation to clot retraction/stability and fibrinolysis. Study provides reference ranges for different clinical settings. Further, we have confirmed that the use of standard coagulation test reference ranges in obstetrics is justified.

References

P12 Descriptive study to determine rotational thromboelastometry (ROTEM®) values during labour and to assess the relationship between FIBTEM and Clauss fibrinogen

K S King, S Setty, K Thompson, A P McGlennan
Department of Anaesthesia, Royal Free Hospital, London, UK

Introduction: ROTEM® is a point of care testing device that provides specific coagulation pathway assessment in a short time. The use of ROTEM is well established in liver and cardiac surgery but not in the obstetric setting. Studies report ROTEM values in pregnancy and immediately post-partum but none during active labour, when the haemostatic system is initiated. Our primary aim was to establish a range of normal values for ROTEM in labour. Our secondary aim was to assess the relationship between FIBTEM, a component of ROTEM and Clauss fibrinogen.

Methods: Following ethical approval our prospective descriptive study was commenced. Healthy labouring women at term were recruited at the point of requiring routine blood tests or venous access. Women with established liver or haematological disease and those with pre-eclampsia or taking coagulation altering drugs were excluded. On the blood sample we performed ROTEM analysis (EXTEM, INTEM and FIBTEM) and laboratory analysis for fibrinogen, using the Clauss method.

Results: At the time of submission we have enrolled 30 women. The results are tabulated below:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>CT (secs)</th>
<th>CFT (secs)</th>
<th>MCF (mm)</th>
<th>CA15 (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXTEM</td>
<td>52</td>
<td>65</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>(48-55)</td>
<td>(59-71)</td>
<td>(72-76)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTEM</td>
<td>151</td>
<td>53</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>(134-159)</td>
<td>(49-59)</td>
<td>(71-76)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIBTEM</td>
<td></td>
<td></td>
<td></td>
<td>23</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(20.3-27)</td>
</tr>
</tbody>
</table>

ROTEM values are median [inter-quartile range]. CT=clotting time; CFT=clot formation time; MCF=maximum clot formation; CA15=clot amplitude at 15 min.

The median value [inter-quartile range] for Clauss fibrinogen was 4.8 [4.4-5.2]. The correlation coefficient between FIBTEM (CA15) and Clauss fibrinogen was 0.32.

Discussion: This is the first time a range of normal ROTEM values for labouring women has been described. The advantage of ROTEM over standard clotting studies is that it provides results within a few minutes. It can quickly detect an abnormality in haemostasis during obstetric haemorrhage, guide specific blood product administration and monitor the ongoing treatment.

References
P13 Point of care thromboelastography during massive obstetric haemorrhage in a maternity hospital.

CM Nix, R Blinder, T Tan, MF Carey

Department of Perioperative Medicine, Coombe Women & Infants University Hospital, Dublin 8, Ireland

Introduction: Thromboelastography (TEG) has been used perioperatively to monitor haemostasis in liver transplantation and cardiac surgery. This observational study describes the use of point of care TEG to guide management during massive obstetric haemorrhage (MOH) in a maternity hospital.

Methods: We retrospectively analysed data from patients with MOH, defined as a peri-partum estimated blood loss of more than 2.5 litres, for whom point of care TEG was used to guide transfusion of blood products in 2009. Standard laboratory coagulation tests were also performed. We compared the time taken to obtain a coagulation test result between point of care TEG and standard laboratory coagulation tests (SLT). We also compared the agreement between TEG and SLT for abnormal coagulation.

Results: In 2009, 25 patients met our criteria of MOH who were managed with point of care TEG. The median (IQR) number of units of blood products transfused as follows: 6 (5-7) units red blood cells; 6 (2-3) units fresh frozen plasma; 0 (1-2) unit of platelets; 2 (1-3) units of fibrinogen. There was a significant difference of 12.8 min between the time taken to obtain a point of care TEG result with the time taken to obtain SLT. All abnormal TEG results agreed with SLT results, but only 50% of abnormal SLT results agreed with TEG results.

Discussion: Point of care TEG is a useful tool in guiding transfusion therapy during MOH. Coagulation results were available sooner compared to SLT. 50% of abnormal SLT results had normal TEG results. This was probably due to SLT giving only a partial assessment of haemostasis compared to TEG which gives a "global" and real-time assessment of haemostasis.

Reference

P14 ROTEM® thromboelastometry identifies blood product requirements during major obstetric haemorrhage

S Bolton, M Harkness, S Thompson

Simpson’s Centre for Reproductive Health, Royal Infirmary of Edinburgh, Edinburgh, UK

Introduction: Major obstetric haemorrhage (MOH) is a significant cause of maternal morbidity and mortality. Despite a lack of published evidence, thromboelastometry has been recommended for monitoring coagulation in obstetric patients with MOH.

Methods: All patients with MOH requiring standard laboratory tests (SLT) for suspected coagulopathy were included and a paired ROTEM sample was taken. Indications for blood product transfusion and antifibrinolytic agents were determined by reference to the British Committee for Standards in Haematology and the ROTEM Expert Meeting Working Group algorithm. The sensitivity and specificity of the ROTEM algorithm for the requirement for FFP or platelet transfusion was calculated. Spearman’s rank correlation coefficient and ROC curve analysis were applied to identify the ROTEM variables that most accurately guided therapy.

Results: 66 women met inclusion criteria, all with a blood loss >1.5 litres. 93 paired blood samples were analysed by SLT and ROTEM thromboelastometry. 21 pairs of blood samples from nine patients demonstrated coagulopathy requiring treatment. The ROTEM algorithm demonstrated excellent sensitivity (0.88) and specificity (0.96) for the presence of coagulopathy requiring treatment. Sensitivity and specificity for FFP transfusion were 0.76 and 0.96 respectively but for platelet transfusion sensitivity was poor (0.37) with a specificity of 0.97. Correlation between FIBTEM MCF and fibrinogen levels was strongest (r=0.79, 95% CI 0.65-0.88, P<0.05). The EXTEM A10 variable from the ROTEM was found to most strongly correlate with platelet count (r=0.59, 95% CI 0.37-0.74, P<0.05). ROC curve analysis for platelet count <75x10^9 indicated an EXTEM A10 cut-off of 39mm. The inclusion of this into the algorithm increased the sensitivity for platelet therapy to 0.79. In two patients the ROTEM identified hyperfibrinolysis that could not be detected by SLT.

Discussion: Our findings suggest that a ROTEM algorithm specific to MOH provides rapid and accurate information for guiding blood product and antifibrinolytic therapy.

References
P15 Hyperfibrinolysis not observed in obstetric haemorrhage when evaluated with thrombelastography

CP Brennan, P Barclay, S Malliah
The Tom Bryan Department of Anaesthesia, Liverpool Women’s NHS Foundation Trust, Liverpool, UK

Introduction: Antifibrinolytic drugs have been suggested to be of use in the prevention and treatment of obstetric haemorrhage. Tranexamic acid is shown to be of benefit in acute trauma 1 and a Cochrane review of its use was favourable but limited, 2 whilst the RCOG do not recommend its use. 3 With unclear evidence it would seem prudent to utilise a test for hyperfibrinolysis prior to using an antifibrinolytic, however current laboratory tests are difficult to use in the acute clinical setting. Thrombelastography has been suggested as a useful diagnostic tool 4 as it can provide both rapid detection and re-assessment in real time. Our unit is currently assessing the TEG thrombelastograph. A loan machine was provided free of charge by Haemalogics, all other costs (disposables etc) were incurred by Liverpool Womens Hospital, and Haemalogics had no involvement in the development of this abstract. Thrombelastography has been used in multiple instances of obstetric haemorrhage and this audit aims to evaluate those results to assess for the presence of hyperfibrinolysis complicating obstetric haemorrhage.

Method: Obstetric unit TEG results recorded over a three month period were reviewed if tagged with bleeding (or other bleeding diagnosis). The fibrinolysis marker LY30 was included unless it was not finalised or the trace had been disrupted by artefact. 20 results from 14 patients were included and LY30 results assessed.

Results: None of the results showed evidence of hyperfibrinolysis, all LY30 results were less than the 8% given as normal by the manufacturer. Mean LY30 was 1.17% (95% CI. +/- 0.74)

Discussion: Thrombelastography is proving useful in our long-term evaluation within our busy tertiary referral obstetric unit. The cases included involved some patients with a demonstrated coagulopathy, and included abruptio, placenta previa and uterine atony. Hysterectomy was required in two patients. We do not use antifibrinolytic drugs as routine although some units do. Given the lack of clear guidance it seems reasonable to use a test of fibrinolysis before using blind treatment. In this audit of our results no hyperfibrinolysis was shown in any case which goes against blanket use in postpartum haemorrhage.

References

P16 The use of thromboelastography (TEG) to determine the effect of obesity and pregnancy on coagulability. A prospective observational study

S Sharma, H Boyce, J Ng, S Ijoma, A Moretti, G Stocks
Department of Anaesthesia, Queen Charlotte’s and Chelsea Hospital, London, UK

Introduction: Thromboembolism remains the leading cause of direct death for mothers in the United Kingdom and in the last CAMCE report at least half the women who died from thromboembolic disease were obese. TEG has detected changes indicative of hypercoagulability in both pregnant and obese populations but the combined effect of pregnancy and obesity on coagulation has not been investigated. The aim of our study was to assess and compare the effect of pregnancy and body mass index (BMI) on TEG parameters and laboratory tests of coagulation. Our hypothesis was that increasing BMI will further increase the hypercoagulable changes of pregnancy detected by TEG.

Methods: Following ethics committee approval and written informed consent, 96 participants were recruited to one of four groups: non-pregnant lean (NPL), pregnant lean (PL), non-pregnant obese (NPO), pregnant obese (PO). All participants were female and aged 18-55 years. Pregnant participants were >35 weeks gestation. Lean participants had a BMI<25 kg/m², and obese participants had a BMI >35 kg/m². For TEG analysis whole blood samples were activated with kaolin and analysed with a computerised Thromboelastograph Haemostasis Analyser 5000 and the coagulation index (CI) was recorded. Samples also underwent laboratory analysis for platelet count, activated partial thromboplastin time (APTT), pro-thrombin time (PT), and fibrinogen levels. Data were analysed using Students test and ANOVA with Bonferroni correction for multiple comparisons. Results are presented as mean, (SD) with P<0.05 defined as significant.

Results: There were no significant differences between patient characteristics, APTT and PT. The CI (-3 to +3) was significantly greater in the obese groups (indicating more coagulability) compared to the lean groups (P<0.0001), with no difference observed between pregnant and non-pregnant groups when controlled for BMI. As expected, platelet counts were significantly lower in the pregnant groups compared with the non-pregnant groups (P<0.001). Fibrinogen levels were significantly higher in both the pregnant and obese groups (P<0.0001).

<table>
<thead>
<tr>
<th></th>
<th>NPL n=24</th>
<th>PL n=24</th>
<th>NPO n=24</th>
<th>PO n=24</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI kg/m²</td>
<td>22 (2)</td>
<td>21 (2)</td>
<td>47 (7)</td>
<td>40 (4)</td>
</tr>
<tr>
<td>CI</td>
<td>-4.5 (3.2)</td>
<td>-4.3 (4.4)</td>
<td>2.6 (1.7)</td>
<td>2.5 (1.9)</td>
</tr>
<tr>
<td>Platelets x 10⁹/L</td>
<td>252 (59)</td>
<td>197 (49)</td>
<td>288 (58)</td>
<td>238 (59)</td>
</tr>
<tr>
<td>Fibrinogen (g/L)</td>
<td>2.7 (0.5)</td>
<td>4.6 (0.5)</td>
<td>4.2 (0.7)</td>
<td>5.1 (0.9)</td>
</tr>
</tbody>
</table>

Discussion: As demonstrated by TEG, obesity is a more significant factor for determining hypercoagulability with pregnancy having no additional coagulation effect in either very lean or obese people.

Reference
P17 Invasive arterial blood pressure (IABP) monitoring in patients with severe pre-eclampsia undergoing caesarean section - a national survey

RA Stoeter, CMA Booth, H Buckley, S Maguire, S Wheatly
Department of Anaesthesia, University Hospital of South Manchester, Manchester, UK

Introduction: In the 2007 CEMACH report, 110 deaths were attributed to intracranial haemorrhage resulting from uncontrolled hypertension in women with preeclamptic toxaemia (PET). Emphasis was placed on the importance of accurate blood pressure measurement and treatment of systolic hypertension. It recommended that, in severe PET cases requiring intubation at caesarean section, anaesthetists "should anticipate an additional rise in blood pressure" and "be given as much time as possible to prevent the pressor effects of intubation". IABP monitoring provides the necessary real-time information required for accurate titration of anti-hypertensive agents.

Methods: This national postal survey, after OAA approval (survey number 85), was sent to all UK. OAA consultant members. The aim was to ascertain current practice regarding IABP monitoring in those with severe PET requiring caesarean section, including rationale for non-use. Severe PET was defined as that which required intravenous anti-hypertensive infusions.

Results: 479 consultants replied, representing a return rate of 45%. 158 (34%) respondents reported routine use of IABP monitoring in severe PET patients requiring caesarean section. Of the reasons given for not using IABP monitoring, 175 (43%) considered it unnecessary, 128 (32%) cited lack of appropriately trained staff and 84 (21%) stated lack of level 2 facilities or equipment.

Discussion: The CEMACH report highlighted suboptimal treatment of hypertension in PET as a serious failing. Subsequently, the role of IABP measurement needs careful consideration. Severe PET carries significant morbidity and mortality, requiring level 2 care with IABP monitoring available. Since joint AAGBI/OAA guidelines specify that "staff appropriately trained for high dependency care should be available 24 hours per day", it is concerning that 32% cited lack of trained staff as a reason for not instigating IABP monitoring. Unreliability of automated non-invasive blood pressure devices and the need for timely, optimal titration of intravenous antihypertensive agents during high risk times, such as tracheal intubation, suggest that continuous, real-time IABP monitoring is essential. Recommendation of IABP monitoring as standard in severe PET parturients would negate time delays, and risk of inaccurate non-invasive readings, should subsequent caesarean section ensue.

References

P18 Hemodynamic parameters in preeclampsia measured by transthoracic impedancemetric cardiology in the third trimester of pregnancy: an observational pilot study

S Leroy, A Addes,* N Didi, B Lacroix, B Dureuil,*
Anesthesiology, Le Belvedere General Hospital, Mont Saint Aignan, France, *Anesthesiology, University Hospital Charles Nicolle, Rouen, France

Introduction: In preeclampsia, symptoms and signs often present late in the disease’s history, and the challenge is early diagnosis, resulting in therapy, and consequently lower morbidity and mortality. No test is sensitive or specific enough to diagnose preeclampsia before clinical signs appear. Transthoracic impedancemetric cardiology (TIC) is a non-invasive technique measuring systolic ejection volume (SEV), and calculating cardiac output (CO) and indexed systemic vascular resistance (ISVR), which could be interesting in the early detection of abnormal hemodynamics in preeclampsia. The purpose of our study was to describe the variation of hemodynamic variables in preeclampsia during the third trimester of pregnancy using TIC in prone (P), left lateral (LL) and right lateral (RL) positions, compared with non preeclamptic pregnant women, and non pregnant women.

Methods: We conducted a prospective observational case-control study. We included healthy pregnant volunteers (EUT group) and those with isolated pregnancy related hypertension (PE group) in the third trimester between 32-36 weeks. We compared these patients, with 10 non pregnant women (TEM group). For each woman we measured by TIC (Physioflow®, Manatec), systolic blood pressure, diastolic and mean blood pressure, CO, cardiac index (CI), ISVR. Measurements were taken during 15 min in strict P, then repeated during 15 min in LL and finally 15 min in RL. We calculated the difference between each position sequence for every parameter. After measures, patients were followed until 15 days postpartum.

Results: We included 10 patients per group. The median gestation was 40 weeks in the EUT group and 36±6 in the PE group. The principal hemodynamic variables between groups are described in the Table. One patient in the EUT group had a negative CI difference between P and lateral (RL and LL) positions versus 7 of 10 in the PE group. (P<0.05)

<table>
<thead>
<tr>
<th>parameter</th>
<th>position</th>
<th>EUT</th>
<th>TEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI</td>
<td>3,5[2,7-4,5]</td>
<td>3,1[1,6-3,6]</td>
<td>3,3[2,8-4]</td>
</tr>
<tr>
<td>ISVR-P</td>
<td>3,4[2,6-4,4]</td>
<td>*2,4[1,8-3,3]</td>
<td>2,9[2,5-3,3]</td>
</tr>
</tbody>
</table>

Median [range] * P<0.05

Discussion: In our study, variation of CI, measured with TIC, during changes of position between prone to right or left position measured at 35 weeks seems to have a high prognostic power for an evolution toward preeclampsia. Our study is limited by our cohort’s size. Further studies are needed to conclude discriminative power of the TIC in the diagnosis of preeclampsia.
P19 Peripartum cardiomyopathy in a preeclamptic patient: a diagnostic conundrum.

P Rudra, S Sagadai
Anaesthetics, James Paget University Hospital, Great Yarmouth, UK

Introduction: Gestational hypertension or preeclampsia is a risk factor for developing peripartum cardiomyopathy (PPCM). The clinical features of fulminating heart failure secondary to preeclampsia and PPCM overlap and can pose a diagnostic dilemma. Here we would like to describe a case of acute onset heart failure due to peripartum cardiomyopathy, in a severely preeclamptic patient, and would like to emphasise the role of echocardiography in differentiating the aetiology.

Case Report: A 17-year-old primigravida was admitted to hospital at 38 weeks, with signs and symptoms of severe preeclampsia and decision was made to induce labour with prostaglandin E2. However, within a short time, the patient developed signs of acute heart failure, with type 1 respiratory failure and profound metabolic acidosis. She was transferred to the operating theatre for emergency caesarean section under general anaesthesia, and haemodynamic improvement was noted only after delivery of the baby. Echocardiography performed at the end of the surgery, on the operating table, showed systolic dysfunction of the left ventricle, with low ejection fraction (<35%) and moderate pericardial effusion. Chest x-ray showed pulmonary venous congestion with florid pulmonary oedema.

She was transferred to the intensive care unit intubated and ventilated. The diagnosis of PPCM was made and the patient was started on glyceryl trinitrate infusion and furosemide. Her clinical condition improved rapidly and she was extubated the next day. Further follow up at 4 months showed return of normal ventricular function.

Discussion: PPCM is a form of dilated cardiomyopathy in which the aetiology remains largely unknown and is likely to be multifactorial. Anaphylaxis, preeclampsia and PPCM predispose to noncardiogenic pulmonary oedema and it can be extremely difficult to differentiate between them. In our case, anaphylaxis to prostaglandins was excluded by serum tryptase levels, and subsequent skin testing. Left ventricular systolic dysfunction with depressed ejection fraction demonstrated by echocardiography enabled us to diagnose PPCM as the cause of acute heart failure and exclude noncardiogenic pulmonary oedema due to severe preeclampsia as well as other causes. Increased awareness of PPCM, a high index of suspicion, and prompt assessment by bedside echocardiography is the key to early detection as we have demonstrated in this case. This should be followed by aggressive management to prevent any major adverse event.

References

P20 Loey's Dietz Syndrome: general vs regional anaesthesia for caesarean delivery

N Hooker, R Bell
Department of Anaesthesia, University College London Hospitals, London, UK

Introduction: Loey's Dietz Syndrome (LDS) is a recently described connective tissue disorder associated with a high incidence of vascular dissection and uterine rupture in pregnancy. Anaesthetic management must therefore ensure haemodynamic stability but may be complicated by skeletal and other abnormalities. We report a patient with LDS who underwent two caesarean sections, one under general and one under neuraxial anaesthesia.

Case Report: The woman initially presented to the high-risk antenatal clinic with a connective tissue disorder of unspecified diagnosis. She had multiple skeletal abnormalities including kyphoscoliosis, dural ectasia, a high arched palate and micrognathia. Cervical spinal fusion had been performed 6 years earlier for craniocervical instability. She also had asthma and gave a history of easy bruising. Monthly echocardiograms during pregnancy showed stable aortic dimensions; however, she was booked for caesarean section (CS) at 34 weeks to reduce the risk of aortic dissection. In view of her spinal abnormalities, potential bleeding tendency and anticipated difficult intubation general anaesthesia with awake fibreoptic intubation was planned. On the day of surgery this was converted to asleep fibroptic intubation due to extreme patient anxiety. This proved to be difficult complicated by difficult ventilation. She remained haemodynamically stable but experienced a brief episode of oxygen desaturation to 88%. Blood pressure was controlled with remifentanil, glyceryl trinitrate and clonidine. Postoperative recovery was uneventful. By her second pregnancy a diagnosis of LDS had been established; in view of the previous difficulties regional anaesthesia for CS was reconsidered. Haematology testing revealed no haemostatic deficit. Lumbar MRI confirmed dural ectasia but with an intact posterior epidural space. A CSE was attempted but no CSF obtained from the spinal needle. A single shot spinal anaesthetic was successful and 2.3 ml plain bupivacaine 0.5% with 25 μg fentanyl achieved a T4 block to cold.

Discussion: LDS shares features of Marfan and vascular Ehlers-Danlos (EDS) syndromes. Anaesthetic management for CS has not previously been reported in the literature. Facial malformations can make airway management challenging. Contrary to EDS, LDS does not cause postoperative bleeding and neuraxial anaesthesia may not be contraindicated. Dural ectasia has been implicated in failed spinal blocks although there have been several reports of successful spinal anaesthesia in Marfan patients, in whom dural ectasia is very common. We tried to avoid pooling of drug in the dural ectatic sac by using plain instead of hyperbaric bupivacaine. Detailed imaging of the patient spine is helpful in planning the anaesthetic.

References
P21 Management of phaeochromocytoma in pregnancy: a case series
A Sabharwal, C Williamson,* V Sodhi
Anaesthesia, Queen Charlotte’s and Chelsea Hospital, London, UK, *Obstetric Medicine, Imperial College, London, UK
Introduction: The incidence of phaeochromocytoma in pregnancy is 1 in 50000. In the past 30 years the incidence of maternal and fetal mortality has fallen due to improvements in antenatal care and a multidisciplinary (MDT) approach.
Cases Histories: Three women were referred with a confirmed biochemical and radiological diagnosis of phaeochromocytoma within 5 years. Patient 1 was referred at 17/40 with symptoms of palpitations, sweating and headaches. She had a history of essential hypertension and Type 2 diabetes. Her adrenal tumour was noted on ultrasound scanning (USS) in pregnancy and a computed tomography scan estimated it to be 12 cm in diameter. Patient 2 was referred following an incidental finding on USS of a right adrenal mass at 20/40. She was normotensive on no medical therapy and asymptomatic. Patient 3 was referred at 38/40 with poorly controlled hypertension despite treatment since 24/40. All 3 women were alpha-blocked using oral and/or intravenous (iv) phenoxybenzamine (PBZ) until a postural drop in systolic blood pressure of 30 mmHg was achieved. Oral hydration was encouraged to avoid precipitous hypotension. Beta-blockade with propranolol was introduced once alpha-blockade was established. All 3 women were delivered by elective CS; Patient 1 at 34/40 under general anaesthesia (GA) due to tumour size, (the baby required ventilatory support for 8 h post-delivery but recovered well); Patients 2 & 3 using regional anaesthesia (RA) at term. All were admitted to the intensive care unit (ICU) pre-delivery for invasive monitoring and optimisation of fluid balance. All received 4g magnesium sulphate (MgSO4) iv over 20 minutes prior to GA or RA followed by 1g/h iv intraoperatively. They were monitored on ICU overnight post-CS and discharged home 4-5 days later on oral therapy. Tumour removal was performed under GA 6-8 weeks postpartum in all cases; Patient 1 had an open adenectomy due to tumour size, Patients 2 & 3 had uneventful laparoscopic procedures. All 3 patients were admitted to ICU pre- and postoperatively. Patient 1 required blood transfusion (8 units) during open adenectomy. There were no long-term adverse outcomes for any mother or baby.
Discussion: Our MDT protocol for the management of phaeochromocytoma in pregnancy includes the use of PBZ for alpha-blockade and MgSO4 perioperatively as well as a 2 stage surgical approach. In the future we hope the ante- and postpartum care of these women will be possible on the high dependency unit on delivery suite, avoiding a strain on ICU resources and improving the birth experience for the mother.
Reference

P22 Aortic dissection in pregnancy and managing cardiopulmonary bypass after caesarean section
CL Johnston, F Schroeder, R Wendler
Anaesthetic Dept, St George’s Healthcare Trust, London, UK
Introduction: We report a case of type I acute aortic dissection (AAD) in pregnancy in a previously well multiparous woman. We discuss the prevention of post partum haemorrhage (PPH) on cardiopulmonary bypass (CPB) in this challenging group of patients.
Case report: A 34-year-old previously well multiparous woman presented at 39 weeks of gestation with vomiting and chest, back and upper abdominal pain. Blood pressure was normal at antenatal checks, and all observations were normal on admission including CTG, ECG and CXR. She was admitted and treated for a presumed gastrointestinal upset. After several hours’ observation she became tachycardic, hypoxaeamic and hypertensive. She had also developed a significant metabolic acidosis and a fetal tachycardia. She was taken for immediate caesarean section under general anaesthesia. Large amounts of pulmonary oedema observed laryngoscopy on induction and ventilation was difficult, requiring high pressures and 100% oxygen. Her tachycardia normalised with fluids and her blood pressure was stable throughout surgery. A live infant was delivered in flaccid condition and the patient was taken to intensive care postoperatively. A bedside echocardiogram was performed, which showed aortic regurgitation with a dissection flap. She was taken for immediate aortic root replacement under CPB with moderate hypothermia (24°C). PPH was prevented with continuous Syntocinon infusion, with close liaison between obstetric and cardiac teams. She received tranexamic acid, 7 U fresh frozen plasma, 2 U platelets and 2 U of cryoprecipitate intraoperatively. INR and APTT were within normal limits postoperatively. There was no significant bleeding from the uterine bed. After a short period of haemofiltration and ventilation, she made a full recovery. She was completely neurologically intact and her daughter was able to visit her on day 4. She was discharged from hospital 22 days after first presenting.
Discussion: Treatment of AAD requires teamwork between cardiac and obstetric teams for a successful outcome. Caesarean delivery followed by surgical replacement/repair is advocated at this gestation, but CPB soon after caesarean section carries a significant risk of PPH. A literature search at the time of surgery did not reveal any recommended strategies to avoid this potentially fatal complication. Our own strategy of avoiding extreme hypothermia and continuing a Syntocinon infusion resulted in no further bleeding from the contracted uterus. We use the limited available literature to discuss the strategies to prevent PPH whilst on CPB.
References
**P23 The provision of high dependency care within delivery suite**

SC Waldron, A Waite, A Bewlay  
**Department of Anaesthesia, Royal Preston Hospital, Lancashire, UK**

**Introduction:** Difficulties with the provision of high dependency care (HDU) within delivery suite have been highlighted by CMACE1 and the Safer Childbirth report. These issues have been discussed in the literature.3 We aimed to assess the quality of HDU care within delivery suite at our institution. Observation chart documentation was used as a marker for quality of care. We audited our service against our Trust’s monitoring standards. The Trust allows a 10% failure rate for observation chart documentation.

**Methods:** A retrospective case note review was performed. HDU patients from Jan-July 2009 were identified using the Trust obstetric database. Observation charts were compared to Trust monitoring guidelines (specific to diagnosis) in 4 categories: vital signs, modified obstetric early warning score (MOEWS), hourly urine output and calculation of fluid balance.

**Results:** 21 patients received HDU care for preeclampsia (PET) and six for severe haemorrhage. Vital signs were documented adequately in 47% of PET patients and 50% of haemorrhage patients. MOEWS was documented adequately in 33% of PET patients and 33% of haemorrhage patients. Hourly urine output was documented in 47% of PET patients and 50% of haemorrhage patients. Fluid balance calculations were correct in 9% of PET patients and 34% of haemorrhage patients. Eight patients required HDU care but did not receive it, as defined by the failure to document observations on a HDU chart.

**Discussion:** Documentation of observations were below Trust standards. Fluid balance calculations were highlighted as a particular issue. Poor design of the HDU observation chart and inadequate staff training were implicated as causative factors. Eight patients failed to receive HDU care that was clinically indicated. Lack of guidelines outlining indications for HDU care on delivery suite was identified as a contributing factor. Regular multi-disciplinary staff training now targets the documentation issues highlighted by this audit. The HDU chart has been reformatted and guidelines outlining indications for obstetric HDU care have been written by the audit authors.

**References**


**P24 Introduction of a standardised admission and discharge proforma in an obstetric high dependency unit**

K O’Connor, R Kearns, K Litchfield  
**Princess Royal Maternity Unit, Glasgow Royal Infirmary, Glasgow, UK**

**Introduction:** Inconsistent and poorly structured content in admission and discharge notes can lead to adverse clinical incidents.1 Structured medical records improve health care professional performance, patient outcome and quality of information available for audit and research.2 A structured obstetric specific admission and discharge proforma was introduced to our obstetric high dependency unit (HDU) with the aim of improving patient safety. The admission sheet documents basic demographics, diagnosis, mode of delivery and specific monitoring requirements. The discharge section includes a tick-box systems review, investigation summary and ongoing treatment plan. We audited the impact of the proforma on the adequacy of information documented in HDU notes.

**Methods:** Case notes of mothers admitted to HDU prior to proforma introduction were retrospectively reviewed for recording of information requested on the new standardised medical record. A program of education emphasising practical use and importance of completion accompanied the introduction of the proforma. A prospective case note review of mothers was then completed using solely the admission and discharge proforma for information collection.

**Results:** 20 case notes were reviewed prior to introduction and 10 case notes after. The results are summarised below:

<table>
<thead>
<tr>
<th></th>
<th>Pre proforma information documented (%)</th>
<th>Post proforma information documented (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission</td>
<td>45</td>
<td>73</td>
</tr>
<tr>
<td>Demographics</td>
<td>29</td>
<td>94</td>
</tr>
<tr>
<td>Admission checks</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>65</td>
<td>100</td>
</tr>
<tr>
<td>Mode of delivery</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>Monitoring</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discharge</td>
<td>11</td>
<td>100</td>
</tr>
<tr>
<td>Systems review</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ward instructions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Discussion:** Prior to the introduction of the proforma, documentation of the basic information relating to the admission and safe discharge of obstetric HDU patients was unsatisfactory. Documentation of specific monitoring requirements was particularly poor and discharge information was universally inadequate. The proforma successfully improved the quantity and standardised the structure of information collected. Future audit should evaluate the proforma’s effect on patient safety by assessing the impact on clinical incidents and effectiveness of communication between health care professionals.

**References**

P25 Obstetric intensive care admissions: a 12 year review in a tertiary intensive care centre
C Turkington, B Mullan, M Molloy,*
Regional Intensive Care Unit, Royal Victoria Hospital, Belfast, UK, *Royal Jubilee Maternity Hospital, Royal Victoria Hospital, Belfast, UK
Introduction: A retrospective review was carried out of obstetric admissions to our intensive care unit from July 1998, the date data contribution Intensive Care National Audit and Research Centre (ICNARC) commenced.
Methods: We retrospectively reviewed the data on obstetric admissions over the 12 year period from July 1998 to our unit. We reviewed the following: reason for admission, age, APACHE II score, level of care, number of ventilator days and renal replacement days, length of stay and outcome.
Results: During the review period 72 obstetric patients were admitted to our unit, almost all from the largest maternity hospital in the region in the same Trust. The reasons for admission were mainly direct obstetric causes, most frequently peripartum haemorrhage, but also preeclampsia, eclampsia and HELLP syndrome. Pneumonia and /or ARDS was the most common non-obstetric cause for admission. The mean age was 31 years [range 15–47]. The mean APACHE II score was 12.8. One patient admitted with H1N1v had an APACHE II score greater than 30. There were 79 days of level 3 critical care and 30 days of level 2 care. 42 patients were not defined as level 2 or 3 care. 109 ventilator days were required for over half the patients. 34 patients did not require ventilation. Only one day of renal replacement therapy was required. The mean length of stay was 2.4 days [range 2.4–48]. All patients survived.
Discussion: The mean APACHE II scores from our data are consistent with those on obstetric patients in the recent ICNARC report. However, our mean length of stay was longer (2.4 vs. 1.25 days) due to one obstetric patient who was in our unit for 48 days. ICNARC reported the incidence of obstetric patients requiring admission to critical care was 260 per 100,000 pregnancies. There were approximately 55,500 pregnancies during the 12 year review in the regional maternity hospital. The incidence of obstetric patients requiring critical care in our unit may be lower than that reported by ICNARC due to the provision of level 1 and 2 critical care on labour ward when midwife staffing and skill mix has allowed. Investment in staffing, training and equipment for a permanent high dependency care facility on the labour ward would be desirable. 2

References
1. Female admissions (aged 16–50 years) to adult, general critical care units in England, Wales and Northern Ireland, reported as “currently pregnant” or “recently pregnant “.
   www.rcoua.ac.uk/icnarc_obs_report.pdf

P26 Review of admissions of obstetric patients to intensive care over a three year period
P Gauthama, D Ncomanzi, R Leighton
Anaesthetics, University Hospitals of Leicester NHS Trust, Leicester, UK
Introduction: Obstetric admissions to the intensive care unit (ICU) are useful quality-assurance indicators. One indicator of pronounced maternal morbidity is transfer to an ICU. With low maternal mortality in the developed world, morbidity is often a better index in auditing maternal delivery services. We aimed to characterise the frequency, causes, and outcomes of obstetric admissions to the ICU over a 3-year period in our Trust.
Methods: We analysed the obstetric admission to ICU from January 2007 to December 2009 in both the hospitals in our Trust. The two hospitals together see about 11,000 deliveries in a year. The obstetric anaesthesia database (Euroking) and the ICU database were searched and cross referenced. Data collected included maternal age, diagnosis, number of ventilator days and outcomes in the ICU.
Results: 69 patients were admitted to ICU over the 3-year period representing 0.65% of all deliveries. The mean age was 28 years. The average length of stay in ICU was 4.3 days. 52% needed ventilation as part of their management. The mean ventilated days was 1.58. There was no deaths in the 69 admitted.

Table: Reasons for ICU admission

<table>
<thead>
<tr>
<th>Reason</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postpartum Haemorrhage</td>
<td>30</td>
<td>43.5%</td>
</tr>
<tr>
<td>Sepsis</td>
<td>8</td>
<td>11.6%</td>
</tr>
<tr>
<td>Preeclampsia/Eclampsia</td>
<td>6</td>
<td>8.7%</td>
</tr>
<tr>
<td>Cardiac Causes</td>
<td>6</td>
<td>8.7%</td>
</tr>
<tr>
<td>Antepartum Haemorrhage</td>
<td>4</td>
<td>5.8%</td>
</tr>
<tr>
<td>High/Total Spinal</td>
<td>2</td>
<td>2.9%</td>
</tr>
<tr>
<td>Uterine Rupture</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>Anaphylaxis</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>Others</td>
<td>11</td>
<td>15.9%</td>
</tr>
</tbody>
</table>

Discussion: The frequency of obstetric ICU admissions at our hospitals averaged 6.5 per 1000 deliveries. This has significantly increased from 2.9 per 1000 deliveries from a similar review performed for 2005-2007 in our Trust. Our ICU admission rates are much higher than other published studies. 1 Despite the increase in ICU admissions there has not been any mortality in the admitted patients. Haemorrhage and sepsis were the commonest causes of ICU admissions. During the 2006 – 2008 triennium, sepsis was the leading cause of direct maternal deaths, accounting for 26 direct deaths and a further 3 deaths classified as ‘Late Direct’. 2

References
2. Saving Mothers’ Lives 2006-08: Briefing on genital tract sepsis. CMACE Emergent Theme Briefing
P27 Maternal admissions to critical care - a 10 year review

FJ Anderson, JA Joss
Department of Anaesthesia and Intensive Care, Ninewells Hospital, Dundee, UK

Introduction: There are many reasons for maternal admission to a critical care facility both before and after delivery. A previous review of national data showed an admission rate of 0.7% of total ICU admissions for direct obstetric admissions and 0.2% for coincidental obstetric admissions. We reviewed maternal admissions to ICU in our hospital for a 10-year period to identify the number of obstetric admissions, reasons for admission, obtain demographic information and maternal and fetal outcomes.

Methods: Retrospective analysis of demographic, diagnostic, treatment and severity data. The Ward Watcher® database was used to identify all female admissions between the ages of 12 and 55 during the 10-year period from 1st January 2001 until 31st December 2010. The admitting specialty and unit diagnosis were used to identify all those whose admission was directly related to pregnancy. All other admission summaries were reviewed to identify those who were pregnant or within 42 days of termination of pregnancy at the time of admission but required critical care for a condition unrelated to their pregnancy.

Results: 63 patients were identified as being pregnant or recently pregnant at the time of admission to ICU. Ages ranged from 17 to 46 years with a median age of 31. Direct obstetric conditions accounted for 30 admissions (0.78% of total ICU admissions) with coincidental conditions accounting for the remaining 33 (0.85% of total ICU admissions). The three commonest primary reasons for admission were haemorrhage (20), acute respiratory failure (16) and sepsis (9). 4 patients died during their ICU admission, 1 was from a direct obstetric condition.

Discussion: The proportion of direct and coincidental admissions varies between our sample and the nationally collected data, the reason for this is unclear. Previous work by ICNARC1 and Hazelgrove2 have demonstrated the difficulty in searching large databases to obtain information about the critically ill obstetric patient. With maternal mortality being such a rare event it is important that we examine other data sets to determine the incidence and spectrum of maternal critical illness.

References

P28 Massive haemorrhage in placenta praevia during caesarean section is not related to the grade of placenta

SD Singaravelu, S Mallaiah, P Barclay
Anaesthetics, Liverpool Women’s Hospital, Liverpool, UK

Introduction: Haemorrhage is a major cause of maternal mortality. Placenta praevia remains the leading cause of major obstetric haemorrhage. Higher grade of placenta praevia is widely believed to be associated with massive haemorrhage.1

Methods: We performed a retrospective audit of blood loss in patients with placenta praevia who underwent caesarean section between 2002 to 2008. We collected the following data associated with risk of bleeding: age, parity, position of placenta, grade of placenta and previous caesarean section.

Results: 143 patients were identified during the audit of whom 27 (19%) had massive blood loss (>1500ml) in the operating theatre. Factors significantly associated with increased risk of massive haemorrhage were anterior position of the placenta (odds ratio 2.8, 95% confidence interval 1.2-6.8; P=0.019) and previous cesarean section (odds ratio 2.5, 95% CI 1.3 to 4.9: P=0.013). The grade of placenta praevia was not significantly associated with excessive risk of massive haemorrhage (P=0.146).

Table: Grade of placenta praevia and massive haemorrhage

<table>
<thead>
<tr>
<th>Grade of placenta</th>
<th>Blood loss &gt;1500ml</th>
<th>Blood loss ≤1500ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 (38%)</td>
<td>8 (62%)</td>
</tr>
<tr>
<td>2</td>
<td>4 (10%)</td>
<td>35 (90%)</td>
</tr>
<tr>
<td>3</td>
<td>2 (15%)</td>
<td>11 (85%)</td>
</tr>
<tr>
<td>4</td>
<td>1 (19%)</td>
<td>62 (81%)</td>
</tr>
</tbody>
</table>

Discussion: Decision making regarding the risk of bleeding during caesarean section for placenta previa should not be based upon the grade of placenta as patients with lower grades are similar risk of massive haemorrhage to those with higher grades. Anterior position and history of previous caesarean section were significantly associated with massive haemorrhage.

Reference
P29 Accidental dural puncture - 12 months in a large obstetric unit

SP Copie, Y Wagnerr
National Women's Health, Auckland City Hospital, Auckland, New Zealand

Introduction: Accidental dural puncture is quoted as a risk of less than 1% when undergoing neuraxial anaesthesia/analgesia. This ongoing audit of accidental dural puncture is currently in its 3rd year. It aims to ensure current local rate is in line with international standards and also to highlight possible problems associated with technique, training and workload in a busy obstetric department.1,2

Methods: The population audited was elective and emergency obstetric patients in which neuraxial blockade had been performed. Over a period of 12 months between 01/4/09-31/3/10 all recognised accidental dural punctures and diagnosed post dural puncture headaches were followed up. Information was collected concerning epidural/spinal insertion, needle used, timing and urgency of the epidural/spinal as well as daily follow-up by the pain service in the treatment of the subsequent headache. Data were collated and compared to international standards and previous years audits.

Results: Over the audited 12 months there were 7782 births in our unit and 4653 neuraxial blocks, a regional rate of 59.8%. 24 of these 4653 suffered either a recognised dural puncture or a diagnosed post dural puncture headache at a rate of 0.5%. Of these 24, 20 developed a post dural puncture headache. 50% of these dural punctures occurred during normal working hours with no increase in proportion during the night shift. As in previous years consultants were appropriately represented with 38% of the total dural punctures in line with the proportion of total epidurals/spinals performed by them. Six (25%) accidental dural punctures occurred during elective caesarean section, the preferred technique of the department being combined spinal-epidural with an 18-gauge Tuohy needle kit. 10 dural punctures occurred following a single attempt and the median BMI for the women involved was 31.8. Only 3 women developed a dural puncture headache within 24 h of intervention with 8 out of 20 not becoming evident until after 48 h. Conservative treatment commenced in all cases with only 10 out of 20 requiring epidural blood patch.

Discussion: Local dural puncture rates are in line with international standards. There is no increase in occurrence out of hours and it is not necessarily operator dependent and/or associated with multiple/difficult insertions in our unit. Conservative management of oral analgesics, and the consideration of gabapentin in those non-breast feeding women, is a valid first line therapy for post dural puncture headache within the first 48 h prior to epidural blood patch.

References
1. RCOA compendium of audit recipes Obstetric Services (8) 2006

P30 Can't a consultant do my epidural? Is the grade of anaesthetist related to the incidence of accidental dural puncture?

C. Todd, N Hoddler, S Ball, D Thorp-Jones, J Coghill
Department of Anaesthesia, Derriford Hospital, Plymouth, UK. *Centre for Health and Environmental Statistics, University of Plymouth, Plymouth, UK

Introduction: Accidental dural puncture (ADP) has a quoted incidence of 0.19% to 3.6% of all obstetric lumbar epidurals and is associated with significant maternal morbidity.1 We wanted to determine if there was an association between the grade of anaesthetist performing the epidural and the incidence of ADP.

Methods: We performed a retrospective analysis of our local obstetric anaesthetic database, containing 18,385 obstetric epidurals performed over a fifteen year period. In our hospital a data sheet is completed for each epidural inserted, which includes the name of the anaesthetist performing the procedure. Each anaesthetist is identifiable on the database by a unique number code which also classifies them into one of several seniority grades. The grades are summarised in the table. ADP was defined as clear evidence of CSF in the needle or catheter, spinal anaesthesia following a test dose or symptomatic ADP headache detected during follow up. Data were reviewed to determine the incidence of ADP in relation to the grade of anaesthetist.

Results: Of 18,385 lumbar epidurals performed a total of 129 ADPs were detected, giving an overall incidence of 0.7%. The percentages of epidurals that resulted in ADP are summarised below. We found no evidence of an association between grade of anaesthetist and occurrence of ADP (P=0.338 using Fisher’s exact test).

<table>
<thead>
<tr>
<th>Grade</th>
<th>Number of EPs</th>
<th>Number of ADPs</th>
<th>% ADP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultant</td>
<td>804</td>
<td>3</td>
<td>0.37%</td>
</tr>
<tr>
<td>NCCG</td>
<td>792</td>
<td>2</td>
<td>0.25%</td>
</tr>
<tr>
<td>Registrar (post FRCA)</td>
<td>496</td>
<td>5</td>
<td>1.01%</td>
</tr>
<tr>
<td>Registrar (pre FRCA)</td>
<td>6099</td>
<td>43</td>
<td>0.71%</td>
</tr>
<tr>
<td>SHO</td>
<td>10091</td>
<td>76</td>
<td>0.75%</td>
</tr>
<tr>
<td>Not stated</td>
<td>103</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Discussion: There is some evidence that the ADP rate is inversely related to the number of epidurals performed, especially for the first 50 procedures,2 however a large review3 found that the rate of ADP was not related to the grade of anaesthetist. We have found no evidence of a relationship between the grade of anaesthetist and the incidence of ADP. We believe this to be a significant finding as more senior grades often believe themselves to have a significantly lower incidence of dural taps.

References
P31 Simulation training in obstetric anaesthesia - a national survey of its availability and usefulness

J Paul A Amarasekara,* B Kurian, S Dinesh,* Y Chikermane.*
Anaesthetics, Sandwell and West Birmingham Hospitals NHS Trust, Birmingham, UK. *Anaesthetics, Heart of England NHS Foundation Trust, Birmingham, UK

Introduction: Simulation training could potentially be a valuable teaching tool, in the management of obstetric emergencies. The survey looked at how simulation based training has been adapted, nationally, into the obstetric anaesthesia module, and also, the views of the obstetric anaesthetists on its usefulness.

Methods: After OAA approval (survey number 101), using the new online survey tool, a questionnaire was sent to 1214 consultant obstetric anaesthetists in August 2010. Questions covered the duration of obstetric anaesthesia modules, accessibility of simulation based training, the appropriateness and funding of such training.

Results: The response rate was 44% (535 replies). The vast majority (89%) believe that simulator based training should be integrated into the obstetric anaesthesia module. Nearly all (95%) feel that this should be funded by the deaneries. Currently, such training is mandatory in just a few units (10% of responders). Only 38% of the responders said that their units provided simulator based training. 58% said that their units ran multidisciplinary drills, in obstetric emergencies, with varied trainee involvement. Nearly half (49%) said that the minimum period of supervised training, prior to going on-call, was 3 months. Many said that this period was much shorter, being more competency based rather than time based.

Discussion: With the current EWTD time constrains, more emphasis is being placed on the achievement of the initial competencies set out by the RCoA, rather than a time based training module. All agree that this is limiting the exposure of trainees to obstetric emergencies, even on large units. Most units are looking into using simulation training to fill this gap, but, both time and financial burdens are delaying progress. While most agree that simulation training is necessary, many feel that it need not be using high fidelity (expensive) equipment. The value of multidisciplinary training has been highlighted by many. The survey shows that there is an overwhelming support, among consultant OAA members, for the integration of some form of simulation training into the obstetric anaesthesia module. The OAA should coordinate with the RCoA to see whether there is a need to make simulation training mandatory, and if so, to aim to provide simulation training facilities in each deanery.

Reference

P32 Anaesthesia for morbidly obese parturients: How big a problem is it?

M Shanmugam, R Natesan, P Kochhar
Department of Anaesthesia, St. Mary’s Hospital, Manchester, UK

Introduction: High maternal BMI is associated with increased incidence of operative interventions during delivery and increased incidence of perioperative complications. 1,2 In the setting of a high-risk tertiary maternity centre, we attempted to quantify the anaesthetic issues during delivery in morbidly obese women.

Methods: Following approval from our clinical audit department, we obtained data from our central anaesthetic database system looking at all morbidly obese pregnant women (BMI>40) who needed operative intervention over a 3-year period (2007 - 2010). We collected data regarding baseline demographics, nature of intervention, degree of urgency, anaesthetic modality and difficulty achieving neuraxial blockade along with subsequent management.

Results: Of the 332 morbidly obese parturients who delivered in the time period studied, 124 (37%) needed anaesthesia for operative intervention. The majority (56%) had single-shot spinal anaesthesia with a success rate of 85%, followed by epidural top-up (21%) with a success rate of 80%, followed by combined spinal-epidural (13%) with a success rate of 81%. GA was the primary technique in 7% of patients and as secondary rescue technique in 4% of this population. The number of attempts taken to successfully place a neuraxial block was taken as a surrogate marker for difficulty (Table).

<table>
<thead>
<tr>
<th>Number of attempts</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>&gt;3</td>
<td>0</td>
</tr>
<tr>
<td>no data</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>69</td>
</tr>
</tbody>
</table>

The mean (SD) number of attempts required to place a successful block was 1.9 (0.9) for CSE & 1.6 (0.6) for spinal. We recently started using ultrasound to guide placement of neuraxial blockade in our unit. Subgroup analysis in this group shows that the use of ultrasound improves the success rate of achieving neuraxial block at first attempt from 32% to 50%.

Discussion: From our study, there does not appear to be a significant difference in the ease of achieving neuraxial block with either CSE or spinal. The need for general anaesthesia as a primary or rescue technique in this population is no different from the generic maternal population that we care for. Routine use and training in ultrasound for placement of neuraxial blockade is likely to be of significant advantage in negating potential difficulties & subsequent complications.

References
P33 Audit of maternal body mass index during pregnancy
AO Packham, A Darbar, E Hart
Department of Anaesthesia, University Hospitals of Leicester NHS Trust, Leicester, UK
Introduction: Guidelines from NICE1, CEMACE and the RCOG2 recommend that all women should have their height and weight measured and documented at the start of pregnancy and their BMI calculated. Treatment guidelines such as thromboprophylaxis after caesarean section3 are based on these values. We assessed whether height, weight and BMI information recorded at the start of pregnancy is adequate to guide treatment at delivery.
Methods: Parturients presenting for induction of labour or elective caesarean section were invited to participate. The height, weight and BMI recorded at the booking visit were noted and the woman was asked how these values were obtained. They were then weighed and measured by the audit team. Change in weight was assessed for those women who booked at <15 weeks gestation, were seen by the audit team at 38+ weeks gestation and had a singleton pregnancy.
Results: 86 women were audited. All 86 had a height and weight documented at their booking visit but 21 (24%) reported that they were not weighed by their midwife and 51 (60%) reported that their height was not measured. 68 women met the criteria for their change in weight to be analysed. Median weight gain was 12.9kg [IQR 8.4-17.8kg] and median increase in BMI was 4.9kg.m-2. 20 women (29%) were obese at booking and 31 women (46%) exceeded the weight gain for their BMI recommended by the American Institute of Medicine.4

<table>
<thead>
<tr>
<th>Booking BMI</th>
<th>Ideal Weight Gain(kg)</th>
<th>Weight Gain(kg)</th>
<th>25th Centile</th>
<th>Median</th>
<th>75th Centile</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18.5 (n=2)</td>
<td>12.5-18.0</td>
<td>8.0</td>
<td>9.1</td>
<td>12.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.5-24.9 (n=29)</td>
<td>11.5-16.0</td>
<td>3.5</td>
<td>11.0</td>
<td>14.0</td>
<td>19.5</td>
<td>32.0</td>
</tr>
<tr>
<td>25.0-29.9 (n=17)</td>
<td>7.0-11.5</td>
<td>3.5</td>
<td>8.5</td>
<td>10.9</td>
<td>19.0</td>
<td>27.0</td>
</tr>
<tr>
<td>≥30.0 (n=20)</td>
<td>5.0-9.0</td>
<td>7.5</td>
<td>5.5</td>
<td>11.5</td>
<td>16.2</td>
<td>39.4</td>
</tr>
</tbody>
</table>

Discussion: Midwives are recording self-reported estimates of height and weight in a significant proportion of patients despite guidelines to the contrary. There is great variability in weight gain during pregnancy with nearly half of women exceeding the recommended weight gain. Consideration should be given to calculating BMI close to delivery as a more accurate basis for treatment and drug therapy.

References

P34 High body mass index and outcomes in the parturient
S Eason, U Misra
Department of Anaesthesia, Sunderland Royal Infirmary, Sunderland, UK
Introduction: The risks of obesity in pregnancy for mother and fetus have been highlighted in CEMACH, CEMACE1 undertook a national project on maternal obesity and presented its findings and key recommendations. Specific recommendations include antenatal anaesthetic review of all patients with a BMI>40 and consideration regarding timing of epidural analgesia. This study aims to compare outcome in women with a BMI>40 and BMI<40 in our unit to help us counsel these women appropriately in clinic.
Methods: Case notes of 145 women attending the high-risk anaesthetic antenatal clinic with elevated BMI (>40) were reviewed over a 2-year period. Note review identified patient demographics, comorbidities, use of epidural analgesia and mode of delivery. Data were analysed using two tailed Fishers exact test with Prism graph pad statistical software.
Results: The age range was 19-40 y with a BMI range of 40-65 kg/m2, 97% were of white British ethnic origin. Antenatal complications of gestational diabetes and pregnancy induced hypertension were seen in 20%. General anaesthesia (GA) was used for caesarean section (CS) on 6 occasions; 3/6 (50%) failed spinal; 1/6 (17%) failed epidural top up; and 2/6 (33%) sepsis and fetal bradycardia. 6% of babies were admitted to the special care baby unit.

<table>
<thead>
<tr>
<th>BMI&lt;40</th>
<th>BMI&gt;40</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidual</td>
<td>38/145 (26%)</td>
<td>20/36/6904 (29%)</td>
</tr>
<tr>
<td>Primi epid</td>
<td>21/56 (37%)</td>
<td></td>
</tr>
<tr>
<td>CS emergency</td>
<td>38/145 (26%)</td>
<td>12/40/2604 (18%)</td>
</tr>
<tr>
<td>elective</td>
<td>2/145 (1%)</td>
<td>53/6904 (8%)</td>
</tr>
<tr>
<td>primi CS</td>
<td>29/56 (51.7%)</td>
<td>38/1/399 (28%)</td>
</tr>
<tr>
<td>GA CS</td>
<td>6/40 (15%)</td>
<td>8/2/399 (6%)</td>
</tr>
<tr>
<td>failed spinal</td>
<td>3/6 (50%)</td>
<td></td>
</tr>
<tr>
<td>failed epidural</td>
<td>1/6 (17%)</td>
<td></td>
</tr>
<tr>
<td>primary GA</td>
<td>2/6 (33%)</td>
<td></td>
</tr>
<tr>
<td>Forceps</td>
<td>10/145 (7%)</td>
<td>10/58/6904 (17%)</td>
</tr>
<tr>
<td>Primi forceps</td>
<td>8/56 (14%)</td>
<td></td>
</tr>
</tbody>
</table>

Discussion: Antenatal assessment including dietary counselling, monitoring comorbidities, preparation for labour analgesia are key features in the management of these high-risk mothers. Our data highlight the increased incidence of operative deliveries in the primiparous (51.7%) mothers with BMI≥40. Lack of resources and increasing prevalence of morbid obesity might make anaesthetic assessment of all mothers with a BMI≥40 difficult. The GA rate for CS is higher in the morbidly obese group primarily due to failure to site the regional block in time. Therefore, it is important to counsel these women antenatally as epidurals may lower risks associated with delivery especially the primiparous parturient with BMI≥40 who seem to have a significantly increased incidence of delivery by CS.

Reference
P35 Obesity in pregnancy: anaesthetic interventions and delivery outcomes

CL Baxendale, EJ Walker
Department of Anaesthesia, Heart of England NHS Foundation Trust, Birmingham, UK

Introduction: Obesity affects 16-19% of pregnant women and is associated with an increased risk of adverse fetal and maternal outcomes. Anaesthesia-related complications secondary to difficulties in securing the airway, venous access and providing regional analgesia and anaesthesia are more likely, especially in patients with class III obesity (BMI ≥40). The recent CMACE/RCOG guideline recommends that all patients with class III obesity should have an antenatal consultation with an obstetric anaesthetist and that an experienced anaesthetist should be available during labour and delivery.1 We examined anaesthetic interventions for and delivery outcomes of obese patients referred to our obstetric anaesthetic clinic.

Methods: Data were collected retrospectively from all clinic referrals for class III obesity from April 2008 to September 2010. Complete records were examined for analysis of comorbidities, anticipated anaesthetic difficulties, epidural uptake, need for caesarean section (CS) and outcomes of induction and attempted vaginal birth after caesarean section (VBAC).

Results: Complete records were available for 83/137 referrals. Common comorbidities were hypertension (30%), gestational diabetes (19%) and asthma (17%). 6 patients were anticipated to have difficult airways and backs. 28 patients (34%) achieved a vaginal delivery, 32 (39%) required an emergency CS and 23 (28%) elective CS. Overall, 61 patients (73%) required anaesthetic interventions. 13 (22%) of 60 labourers received an epidural. Of the 47 without, 24 required CS (51%) and 8 patients within this subgroup required GA. 10/13 planned VBACs resulted in CS. 72% of elective CS and 34% of emergency CS were attended by a consultant anaesthetist and consultant obstetrician.

<table>
<thead>
<tr>
<th>Onset of labour</th>
<th>Anesthetic Intervention</th>
<th>Emergency CS</th>
<th>General Anaesthetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prinup spontaneous (n=15)</td>
<td>12</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>induced (n=12)</td>
<td>10</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>elective CS (n=3)</td>
<td>3</td>
<td>n/a</td>
<td>0</td>
</tr>
<tr>
<td>Multip spontaneous (n=21)</td>
<td>9</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>induced (n=12)</td>
<td>7</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>elective CS (n=20)</td>
<td>20</td>
<td>n/a</td>
<td>5</td>
</tr>
</tbody>
</table>

Discussion: These results show that class III obesity in pregnancy carries a high likelihood of obstetric and anaesthetic intervention. Higher risk sub-groups are primigravid patients having induction of labour and patients where VBAC is attempted. The low epidural uptake rate is of concern given the likelihood of emergency CS. Consultant-delivered care for all these patients may increase epidural uptake and decrease the incidence and potential risks of GA.

Reference

P36 Introduction of a midwife led anaesthetic obesity clinic

A Theron, S Harries, R Collis
Department of Anaesthesia, University Hospital of Wales, Cardiff, UK

Introduction: The Confidential Enquiries recommended that obese women should be seen by an anaesthetist prior to labour.1 From the recent CMACE report, 2.3% of our women (highest in UK) have a BMI ≥ 40.2 This equates to 140 patients out of 6200 deliveries/year. Obese women require additional obstetric input to ensure optimal care. Our hospital has therefore developed a midwife-led obesity clinic to provide dietary advice, reweighing and appropriate investigations. Anaesthetists have developed a multi-professional pathway allowing midwives to identify women at highest anaesthetic risk, ensuring that these women are seen by an anaesthetist. The ultimate aim is to reduce overall anaesthetic clinic attendances for those women considered not to be at high anaesthetic risk.

Methods: An audit to identify the impact of obesity on the anaesthetic clinic was undertaken. After approval from the data protection officer, the information department provided clinic lists for the first 6 months of 2010. Electronic clinic letters were reviewed and where no electronic letter was found, maternity notes were requested. Concurrently, a comprehensive anaesthetic assessment proforma has been developed, which has been incorporated into the obstetric obesity documentation.

Results: In 6 months, 243 women saw a consultant anaesthetist in clinic. The largest group n = 68 (28%) were seen for a raised BMI. Of these patients, 18% had a BMI < 40, 50% had a BMI 40-44.9 and 32% had a BMI ≥ 45.

Discussion: The number of obese women seen in the obstetric anaesthetic clinic and the number estimated from the CMACE report roughly equate implying that referring women with a BMI > 40 was occurring. The majority however had a booking BMI < 45 and experience has shown that many of these women have airways where the probability of an intubation difficulty is low and spinous processes are easily palpated. Seeing these women in a consultant anaesthetic clinic has major resource implications. We have therefore trained midwifery practitioners who are managing and screening all women with a BMI > 40, because of potential obstetric complications, to perform an anaesthetic assessment against a standard proforma. All women with a recalculated BMI > 45 at 32 weeks are automatically referred, but those with a recalculated BMI of 40 - 45 are referred only if potential problems are identified. This is a new service development and the impact has not been evaluated. A comprehensive audit will be undertaken in 2011, which will review the numbers of women attending the anaesthetic clinic and safety issues.

References
P37 Knowledge of the potential obstetric and anaesthetic risks in pregnancy due to raised body mass index

MEK Pearce, HV Hopwood
Anaesthesia, Musgrove Park Hospital, Taunton, UK

Introduction: The Centre for Maternal and Child Enquiries (CMACE) and the Royal College of Anaesthetists (RCoA) published guidelines on the management of obesity in pregnancy (March 2010) in recognition that obesity is one of the most commonly occurring risk factors for complications in obstetric practice. Over 10 years to 2004, obesity has increased from 9.9 to 16.0% in women in early pregnancy. Pregnant women with a body mass index (BMI) ≥30 at booking at our hospital were surveyed about potential risks.

Methods: We devised a questionnaire which was approved by the local hospital research committee and was handed out to those who had a BMI ≥30 at booking in antenatal clinic. It consisted of basic demographics, nine tick-box questions and some free text at the end for other comments.

Results: 101 women were surveyed over a six week period and all questionnaires completed. Ages ranged between 15 and 45 and BMI ranged from 30.0 to 57.7. 47.5% received no information about obesity and pregnancy and of those that did receive information this mainly came from midwives. 31.6% did not want to think about their weight during pregnancy and 5.9% wanted information pre-pregnancy. 7.9% wanted a regular support group during pregnancy and 24.8% wanted support post-delivery. 61.4% had lifestyle advice. Amongst those surveyed, there was a variety of awareness of problems during pregnancy, labour and post-delivery. 50.5% had considered having an epidural and 25.7% would opt for an epidural to try and avoid a general anaesthetic. 13.9% would like to see an anaesthetist antenatally and 43.6% were unsure.

Discussion: The questionnaire showed that only 52.5% of obese pregnant women were informed of the potential risks to them and their unborn baby and this is well below the ideal standard of 100%. All obese women (BMI ≥30) need to be given clear information and this highlights several points. There is a need to improve obstetric and anaesthetic information given locally; we need to update local guidelines in view of recent national guidance; we need to check that information has been given and this could be assisted by placing a reminder sticker in the patient notes when their raised BMI has been identified.

References

P38 The ease of performing spinal anaesthesia with ultrasound guidance in obese women with poor quality back surface landmarks undergoing elective caesarean delivery

S Mac Colgáin, F Memon, T Tan
Anaesthesia, Coombe Women and Infants University Hospital, Dublin, Ireland

Introduction: Obese pregnant women with poor quality back landmarks, or impalpable spinous processes present a considerable challenge to the anaesthetist relying on palpation techniques to identify the interspinous space. This results in a high number of failed attempts at lumbar puncture, long procedural times and distress to patients. We performed a prospective observational study on using ultrasound guidance to facilitate spinal blockade in obese patients with poor quality back surface landmarks and impalpable spinous processes.

Methods: After ethical approval, obese pregnant women with poor quality back landmarks presenting for elective caesarean section undergoing spinal anaesthesia were recruited for the study. Ultrasound scanning of the lumbar spine was performed to identify needle puncture site before spinal blockade. Spinal blockade was performed using the pre-marked site. The time taken to perform spinal anaesthesia and the number of attempts (needle advancements) were recorded.

Results: 20 women with a mean body mass index of 37±3 kg/m² were recruited. The mean (SD) time taken to scan the lumbar spine and mark the pre-puncture site was 114 (±63) s. The mean time from local anaesthetic infiltration to identification of cerebrospinal fluid was 70 (±5) s. The mean total time taken to perform spinal blockade was 185 (±96) s. The median [IQR] number of attempts (needle advancements) was 1 [1-2.5]. The median number of skin punctures was 1 [1-1]. Only 1 space was attempted for all patients. 15 patients were very satisfied, and 5 were satisfied. None of the patients were dissatisfied.

Discussion: Ultrasound scanning of the lumbar spine can facilitate performance of spinal anaesthesia in obese women with poor quality back landmarks, or impalpable spinous processes.
P39 Remifentanil PCA for labour analgesia: friend or foe
JC Bonner, W McClamont
Department of Anaesthesia and Critical Care, Ninewells Hospital, Dundee, UK

Introduction: Remifentanil patient controlled analgesia (PCA) is a popular choice for labour analgesia in some centres. We describe a case where its use was associated with a respiratory arrest on our labour suite.

Case Report: A 17-year-old primiparous woman underwent induction of labour for intratrurine death at 26 weeks gestation. She was previously fit and healthy with a BMI of 27. She received misoprostol and mifepristone for induction of labour and later requested remifentanil PCA after a trial of paracetamol and Entonox. Shortly after replacement of her remifentanil bag, which she had been using for several hours previously with no complications, her midwife re-entered her room after a brief absence to find the patient blue and unresponsive. The midwife called for help and medical and senior midwifery staff responded.

The patient was placed in a left lateral position, jaw thrust applied to open her airway and her lungs were ventilated with high flow oxygen via bag valve mask for approximately 30-40 s. At this time she regained consciousness and localised to the jaw thrust. The PCA was discontinued and the patient recovered fully within a further 5 min; delivery occurred 10 min later. The PCA equipment was checked by a consultant anaesthetist not involved in the patient’s care. The pump was checked by medical physics technicians and confirmed that it delivered the programmed dose with the lockout time specified (40μg bolus/2 min lockout). Prior to the collapse the pump had delivered 7 ml (40μg/ml) over the preceding 20 min which was consistent with her previous use prior to the bag change. The correct prescription was confirmed with reference to the chart, label and controlled drug cupboard stock. Patient observations 5 min before the event were noted to be satisfactory.

Discussion: Remifentanil PCA for labour pain is well established in many centres and for some it provides satisfactory analgesia for labour pain.1 It must not be forgotten, however, that side effects such as respiratory depression and bradycardia are possible with this mode of analgesia and in some cases can lead to a life threatening situation. In this case it is not clear that remifentanil was the main factor in this critical incident. Why after hours of satisfactory continued use did this incident take place? We propose that other factors that may have contributed to this situation include dehydration (the patient had vomited several times during labour), exhaustion, increased pain stimulation in second stage with possible bradycardia, and an upright position contributing to orthostatic hypotension (the patient was found unresponsive sitting up in bed). We propose that continuous monitoring with defined alarm limits and constant midwifery presence be mandatory for any patient using a remifentanil PCA and that patients receive adequate fluid/electrolyte replacement throughout labour.

Reference

P40 The launch of remifentanil-PCA in labour in Switzerland combined with webbased continuous quality control
A A Melber, D Reinhardt, AS Bansi
Institute of Anaesthesia, Salem Hospital Berne, Berne, Switzerland

Introduction: Due to its profile of action the strong opioid remifentanil qualifies as an ideal analgesic drug during labour. Applied as patient controlled analgesia (PCA) this method offers optimal safety and comfort for the parturient and child. Although frequently used in other countries, its routine use has not yet been established in Switzerland.

Methods: Initiated from Salem Hospital in Berne, a website was created to implement this method in Switzerland. This website contains a concise direction for professionals and a questionnaire, collecting a database for each application. This database comprises the course, the complications for mother and child as well as the satisfaction of all parties.

Results: After a pilot project with 40 parturients this method was implemented for routine use in labour in our hospital. Until now, more than 600 women (~40% of all births in our hospital) delivered with the support of a remifentanil-PCA. Pain scores, side effects of mother and child and satisfaction of mother and midwife were analysed. 95% of parturients and midwives would choose this method again or recommend it for child birth.

Discussion: Despite reassuring results large numbers are often needed to detect rare complications or side effects. With the registration of every application of all participating hospitals via this website (www.soscsurvey.de/silvia) the datapool grows continuously in a short time. This allows constant adjustment of the procedure as well a quick feedback in case of adverse effects. The routine use of remifentanil-PCA in labour is a safe method with excellent acceptance of parturients, midwives, obstetricians and anaesthesiologists. With the help of the webbased data collection we offer a quick nationwide launch and regular audits which provide excellent quality management and safety.

References
P41 Usage of remifentanil patient controlled analgesia in labour in the UK.

KM Howie, S Millar
Anaesthetics, Royal Alexandra Hospital, Paisley, UK

Introduction: Remifentanil PCA is an increasingly accepted option for obstetric analgesia since its use in thrombocytopenic parturients was described in 1998. Its pharmacokinetics are favourable and studies suggest it to be safe, efficacious and acceptable to women in labour. Concerns have been raised, however, that potential side effects may limit use. We wanted to survey nationally the experience with and current provision of remifentanil PCA.

Methods: After OAA approval an on-line survey was distributed to 215 lead obstetric anaesthetists in the UK. 156 (72.56%) replied.

Results: 36% offered remifentanil PCA in labour. Of those that did not 50% were planning to, and if not this was due to concerns over safety (apnoea), a low epidural rate and difficulties monitoring patients. The majority used it only when an epidural was contra-indicated (62%). Nearly a quarter (23%) offered it on request, and discussed this during labour (42.5%) or at an anaesthetic clinic (45%). Information booklets are provided by 53.8% of departments. 75% used a standard bolus, 40μg in 51% of these. Some units used a varied dose titrated to response or by weight, 70% employed a lockout of 2 min. The majority used a Graseby Omnilute pump (51.8%), 18% a McKinley Bodyguard. Some Graseby users expressed a wish to change to a faster delivery system. Unsurprisingly, 95% of pumps were set up by anaesthetists and training was most common in this group, 42% having received some form. 40% also gave training and education to midwives. This was usually on an informal basis (53%), though some included it in competency based training (10.1%). 35.6% of departments had difficulty obtaining equipment, and 11% had suffered a critical incident, respiratory depression being most common (55.5%). None of these resulted in permanent harm and all were due to incorrect preparation or inadequate monitoring outside of local protocol. Satisfaction was high, 73% having a satisfaction score of 6 or more on a scale of 0-10. Suggestions for improvement included more widespread availability, improved resources and more experience with the technique. A faster delivery time and improvements in education were also mentioned.

Discussion: Remifentanil PCA is used with high levels of satisfaction in over a third of labour suites in the UK. This is a substantial increase from 17% of units in a survey from 2007. A 40μg, 2min lockout and Graseby pump is most common, though a McKinley pump was preferable if available. Critical incidents are rare but potentially life threatening. Improvements in monitoring, safe preparation, further resources and education could improve the service.

References
P43 Effect of reducing fasting times for fluids before elective caesarean section

TA Tanqueray, M Mackenzie, SM Yentis
Anaesthetics, Chelsea & Westminster Hospital, London, UK

Introduction: Patients undergoing elective caesarean section (CS) may have to wait many hours for surgery if the emergency workload is heavy. In our unit, the fasting policy was nil-by-mouth from midnight, and we previously found that many women were dehydrated at surgery after long fasting periods for fluids. We audited the effects of changing the fasting guidelines on fasting times, thirst scores and urine osmolality.

Methods: We surveyed 50 healthy mothers undergoing elective CS in the 3 months before, and 50 in the 3 months after, a guideline change (allowing food until midnight and water until 6am on the day of surgery, actively encouraging mothers to take a glass of water at 6am). Women with systemic disease or taking drugs affecting renal function were excluded. The REC chair deemed REC approval unnecessary but all 100 women gave written informed consent. We recorded women's thirst on a 100-mm VAS at 8am and at surgery, and the time/content of their last meal/drink. A urine sample obtained at catheterisation in theatre was analysed for osmolality. Parametric/non-parametric tests were used as appropriate, with P<0.05 indicating significance.

Results: The women’s age, height, weight, BMI, parity and CS indication were similar. At 8am on the day of surgery, median (IQR [range]) fasting time fell from 9.8 (8.8-10.8 [0.4-12.8])h to 2.5 (2.0-5.4 [0.5-10.8])h for fluids (P<0.0001; Fig), while mean (SD) fasting time for solids was 11.44 (1.46)h pre- and 11.0 (1.32)h post-change. Thirst scores fell from 6.1 (4.4-8.3 [0.8-10.0]) to 5.2 (3.2-7.4 [0.7-9.7]) at admission and from 7.5 (4.9-9.1 [0.8-10.0]) to 6.9 (4.5-8.3 [0.7-9.9]) at surgery (NS). Mean (SD) urine osmolality was 591 (179) and 527 (197) mOsm/kg pre- and post-change (NS).

Fig. Hours since last drink, pre- (light grey) and post-change (dark grey). Single patients along x-axis.

Discussion: After changing the fasting guidelines for elective CS, we found shorter fluid fasting times though this did not translate to significantly lower thirst scores or urine osmolalities. This could be due to altered physiology in pregnancy or the stress response in anticipation of surgery or even parenthood!

Reference

P44 How ‘natural’ are your caesarean sections? – A national survey.

JC Walker, H Swales, P Mackie
Department of Anaesthesia, Princess Anne Hospital, Southampton, UK

Introduction: The ‘natural’ caesarean technique was developed at Queen Charlotte’s Hospital, and aimed to mimic the experience of vaginal birth. The main principles are: (i) parents to watch the birth of their child as active participants and the partner to cut the umbilical cord (ii) slow delivery with physiological auto-resuscitation (iii) the baby to be transferred directly onto the mother's chest for early skin-to-skin contact.

The aim of our survey was to investigate national awareness and practice.

Methods: After OAA approval (survey 107), an online survey questionnaire was sent to 214 UK lead obstetric anaesthetists in November 2010. Questions included awareness of the technique, who was requesting it, and whether it was offered. The questionnaire explored the benefits and problems in practising the technique. We asked if elements of the full technique were routinely offered, those which lead anaesthetists would consider offering and any other measures offered to improve the experience for the mother and partner in theatre.

Results: The response rate was 75% (160 replies). 46% of responders were aware of the ‘natural’ caesarean technique but the procedure had only been requested in 12% of units (19 units). 70% of requests had come from patiutients. Only 4 units (2.5%) currently offer the full ‘natural’ caesarean section, but 55% of responders already offer some features described. No responders had registered the procedure as a new technique in their hospital.

Table: Elements of the “natural” section offered. n=160

<table>
<thead>
<tr>
<th>Elements offered</th>
<th>routine</th>
<th>consider</th>
<th>neither</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECG on mothers back</td>
<td>14%</td>
<td>46%</td>
<td>40%</td>
</tr>
<tr>
<td>Partner present whilst regional established</td>
<td>63%</td>
<td>22%</td>
<td>15%</td>
</tr>
<tr>
<td>Drapes lowered at delivery</td>
<td>46%</td>
<td>34%</td>
<td>20%</td>
</tr>
<tr>
<td>Delivery direct to mothers chest</td>
<td>16%</td>
<td>44%</td>
<td>40%</td>
</tr>
<tr>
<td>Partner to cut umbilical cord</td>
<td>32%</td>
<td>37%</td>
<td>31%</td>
</tr>
<tr>
<td>Dimmed theatre lights</td>
<td>2%</td>
<td>32%</td>
<td>66%</td>
</tr>
</tbody>
</table>

Free comments showed some to be sceptical of the technique and use of the term ‘natural’. No serious incidents were reported but several units reported neonatal concerns after skin to skin contact, fathers feinting and concerns over sterility.

Discussion: The ‘natural’ caesarean technique has been publicised nationally and there are requests for this technique in UK centres. Whilst it has been commented on that the technique has yet to be fully evaluated in regard to safety and outcome data, it is clear that obstetric anaesthetists are now working towards many of the anaesthetic goals in the ‘natural’ caesarean section whilst mindful of the risks and limitations.

Reference
P45 Anaesthetic times for caesarean section: an observational study of spinal anaesthesia

B Macafee, P Reid, B Norman, SM Yentis
Department of Anaesthesia, Chelsea and Westminster Hospital, London, UK. *Department of Anaesthesia, North Hampshire & Basingstoke Hospital, Hampshire, UK

Introduction: Several studies have examined decision-to-delivery times for caesarean section in relation to the 30-minute rule. Two important time factors are transfer of a mother to theatre and anaesthesia, but there has been little published analysis of procedural times required to provide anaesthesia. In an observational study we analysed the total procedural time for spinal anaesthesia, and that of its component parts.

Methods: We observed obstetric anaesthetists (ST3 and above) and timed their management of caesarean section (all categories) under spinal anaesthesia. An observer timed nine anaesthetic sub-component tasks (IV cannulation, positioning, adding drugs to the pack, donning mask/gown/gloves, preparing spinal drugs and kit, antiseptic spray, palpating the back and local anaesthetic injection, spinal needle insertion, obtaining CSF and subarachnoid injection), from when both the patient and the anaesthetist had entered the operating theatre to when the mother was ready for surgery.

Results: 80 spinals were observed, of which 41 were carried out by consultants. 16 cases had 2 anaesthetists present. 65 were elective (category-4) and 6 were category-2/3. Times are shown in the Table.

Table: Times for sub-components of spinal anaesthesia.

<table>
<thead>
<tr>
<th>Task</th>
<th>Median [Range]</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV cannulation</td>
<td>67 [10-243]s</td>
</tr>
<tr>
<td>Positioning for spinal</td>
<td>17 [5-519]s</td>
</tr>
<tr>
<td>Adding drugs to pack</td>
<td>12 [2-237]s</td>
</tr>
<tr>
<td>Scrubbing/mask/gown/gloves</td>
<td>136[39-305]s</td>
</tr>
<tr>
<td>Preparing spinal drugs/kit</td>
<td>158 [22-311]s</td>
</tr>
<tr>
<td>Antiseptic spray</td>
<td>6 [3-14]s</td>
</tr>
<tr>
<td>Palpating back/LA injection</td>
<td>54.5 [5-143]s</td>
</tr>
<tr>
<td>Spinal needle insertion to CSF</td>
<td>35.5 [8-495]s</td>
</tr>
<tr>
<td>Obtaining CSF/Subarachnoid inj</td>
<td>26 [2-76]s</td>
</tr>
<tr>
<td>Total</td>
<td>790 [350-1780]s</td>
</tr>
</tbody>
</table>

Data are median [range]

Discussion: The appropriate choice of anaesthetic for urgent caesarean section is still debated. This study provides detailed information of average procedural times for spinal anaesthesia, based on the timings of sub-component tasks. When speed is of the essence, certain tasks, such as cannulation and positioning of the patient, could be delegated to other theatre staff. The ‘no-touch’ technique as described in rapid sequence spinal anaesthesia could also be employed. Whether these times could be reduced in extreme emergencies remains to be seen.

References
P47 How obstetric anaesthetists test the quality of regional anaesthetic block before caesarean section: a national survey

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Introduction: This is a follow-up survey, to the original conducted in 2004 to ascertain how UK obstetric anaesthetists tested the adequacy of regional block as well as the standard of documentation, discussion of risks and frequency of postpartum follow up. Methods: An online survey was sent via email to all OAA consultant grade members. Data relating to the method of testing adequacy of anaesthetic block, discussion of risks, documentation and postpartum follow up were sought.

Results: 1219 emails were sent with 549 replies, giving a response rate of 45%. Cold remained the modality of choice during testing (36%) but this was often in combination with testing other modalities. The chart below details the frequency (%) with which the other modalities were tested. 99.5% of respondents stated they documented evidence of testing the block before surgery. T4 was the commonest upper level when testing with cold (76%) and pin prick (25%), whereas T5 was preferred when testing with light touch (37%). The lower level of the block was tested by 62% of respondents, with S2 the most popular lower level (42%). 96% of respondents routinely warn patients of discomfort intraoperatively, with 92% warning of the possible risk of conversion to general anaesthesia. 49% reported they did not actually quote a figure whereas those who did, the risk of conversion ranged from 0.2 to 25%. About 90% stated they performed routine postpartum follow up, with 87% specifically asking about the quality of analgesia during caesarean section.

Discussion: The original survey showed that the majority of anaesthetists used cold as their primary modality of testing regional anaesthesia. The repeat survey revalidates this data. Testing cold is largely in combination with other modalities. Light touch is a more sensitive predictor of intraoperative discomfort but the percentage of anaesthetists testing this modality has not changed from the previous survey. It is evident that pre-assessment, risk discussion, documentation and postpartum follow up is carried out to a reasonable standard.

Reference

P48 Category 1 caesarean sections: an audit of decision to delivery interval and fetal outcome

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Introduction: The classification of urgency of caesarean section (CS) based on clinical definitions was introduced in 2000; it proved to be the most applicable & consistent between different clinicians. 30-minute decision to delivery interval (DDI) is an arbitrary time that has come from a ‘pragmatic’ approach. Many audits have shown that the 30-minute DDI given for category 1 CS is difficult to achieve, and that there may be no relation between fetal outcome and this classification. Our aims were to assess what fraction of category 1 CS achieved a DDI of 30 min, which is an RCOA audit proposed standard for best practice, and to determine if DDI had an impact on fetal outcomes.

Methods: All category-1 CS were identified over a 6-month period. The following information was gathered retrospectively: indication, anaesthetic, time of decision, transfer time, time anaesthetic ready, time of delivery and neonatal pH & Apgar scores.

Results: In total there were 79 category-1 CS. The majority (81%) of category-1 CS were performed for fetal distress; 42% were performed within 30 min. Neonatal pH and initial Apgar scores were worse in babies born with a DDI up to 15 mins, but there was no deterioration in either of these parameters in those with a DDI exceeding 30 min.

<table>
<thead>
<tr>
<th>DDI (min)</th>
<th>≤5</th>
<th>6-15</th>
<th>16-30</th>
<th>31-45</th>
<th>46-60</th>
<th>&gt;60</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH (mean)</td>
<td>7.08</td>
<td>7.24</td>
<td>7.21</td>
<td>7.23</td>
<td>7.19</td>
<td></td>
</tr>
<tr>
<td>1 min Apgar (mean)</td>
<td>6.8</td>
<td>7.8</td>
<td>8.1</td>
<td>6.4</td>
<td>8.0</td>
<td></td>
</tr>
</tbody>
</table>

DDIs were given for those with DDI ≤5 min compared with DDI of >30 min (10 vs 7). Prolonged transfer times and anaesthesia times were the reasons for delay in the majority of cases with DDI >60 min.

Discussion: The 30-minute standard for category-1 CS was not achieved for more than half of the cases on our unit. The lower neonatal pH and Apgar scores seen when DDI ≤5 min, suggests that the most compromised fetuses were selected for the fastest delivery. There was no difference in the pH or initial Apgar scores between the cases that were delayed beyond 30 min and those that were not. The RCOG ‘Sentinel’ CS audit suggested that delivery for many category-1 CS was not achieved in 30 min. In those cases with DDI of ≤75 min, there was no increased risk of compromise, and DDI ≤30 min did not always result in good neonatal outcome. Detection of fetal distress, its extent, accurate categorisation and identification of true emergency cases will result in better and more appropriate DDIs. Reduction in transfer times and anaesthetic times, improved communication and the use of drills to facilitate this are recommendations from this audit.

References
P49 Decision to delivery interval in emergency caesarean section: a prospective observational study

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Introduction: The Lucas classification is commonly used to categorise urgency of caesarean section. A target decision-to-delivery (DDI) of 30 min for urgent cases is often quoted but lacks an evidence base; it is often unachievable in practice where the DDI should always be the shortest safely achievable time. We report a prospective observational study of category 1 & 2 caesarean sections in our hospital (approx. 8,500 deliveries/year) during a 3-month period in 2010. We examined individual factors in the DDI (transfer to theatre, anaesthetic and surgical times), type of anaesthetic administered and fetal outcome.

Methods: Data were collected at the time of caesarean section and within 72 h of delivery from medical notes. Emergency paging identified either category 1 or 2. All times were taken from the hospital paging recall system and theatre clocks which were synchronised. Transfer time was defined as that from emergency call to arrival in theatre, anaesthetic time from arrival to skin incision, and surgical time from incision to delivery.

Results: There were 44 (41%) category 1 and 61 (58%) category 2 caesarean sections in the study period. Almost half (49%) of the category 1 cases were "stepped down" by the obstetrician on arrival to theatre (category 1 to 2/3); 18% of category 2 cases were stepped down (category 2 to 3). Time data are summarised in the table (mean ± SD [range]):

<table>
<thead>
<tr>
<th>Lucas Class</th>
<th>DDI (min)</th>
<th>Transfer time (min)</th>
<th>Anaesthetic time (min)</th>
<th>Surgical time (min)</th>
<th>Anaesthetic %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GA</td>
<td>Spinal</td>
<td>Epidural</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>16.5±4.3</td>
<td>5±2.2</td>
<td>8.2±3</td>
<td>3.4±1.6</td>
<td>7(29) 2(8) 15(63)</td>
</tr>
<tr>
<td>[9-24]</td>
<td>[3-14]</td>
<td>[1-8]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 to 2</td>
<td>24.7±9.9</td>
<td>7.8±5.6</td>
<td>12.9±6.6</td>
<td>4.5±2.6</td>
<td>4(20) 8(40) 8(40)</td>
</tr>
<tr>
<td>[12-51]</td>
<td>[5-26]</td>
<td>[1-11]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>29.6±9.3</td>
<td>9.3±4.5</td>
<td>15±7.6</td>
<td>5.1±2.2</td>
<td>4(8) 13(26) 33(66)</td>
</tr>
<tr>
<td>[14-66]</td>
<td>[3-23]</td>
<td>[5-50]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 to 3</td>
<td>40.5±11.5</td>
<td>12.3±4.7</td>
<td>22.4±10.1</td>
<td>5.8±2.7</td>
<td>1(9) 5(45) 5(45)</td>
</tr>
<tr>
<td>[24-55]</td>
<td>[7-22]</td>
<td>[11-35]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DDI was shorter for more urgent cases with anaesthetic times consistently the biggest contributor. More general anaesthetics (GA) were conducted in category 1 calls (P=0.032), but epidural top-up was an effective technique and quicker than de novo spinal. Apgar scores were similar.

Discussion: Short DDIs can be achieved with reductions in each contributor (transfer, anaesthetic and surgical times) for the most urgent cases. Anaesthetic time is the longest but epidural top-ups provide rapid anaesthesia for urgent section. We had a lower GA rate than previously reported. Re-establishing urgency in theatre may reduce the GA rate.

References

P50 Anaesthetic times for grade-1 caesarean section – a simulation study

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Introduction: The available anaesthetic techniques for grade-1 caesarean section (CS) (immediate threat to life of woman or fetus) are general or spinal anaesthesia de novo, or epidural top-up. Using high fidelity simulation, we examined the preparation and procedural time for each of these anaesthetic options.

Methods: After REC approval and written consent, 20 anaesthetists with competency in obstetric anaesthesia were recruited. Trained personnel acted as the ODP and parturient. Each anaesthetist read a scripted scenario for a grade-1 CS requiring general, spinal or epidural top-up anaesthesia. Each then simulated performing the three anaesthetic techniques, in a randomised order. Theatre set-up and drug/equipment availability were comparable to a labour ward theatre. Part-task trainers were used alongside the 'mother' for specific tasks: a manikin arm if an intravenous (i.v.) cannula was not already sited; a part-task full-body manikin for tracheal intubation; and a lumbar puncture trainer for intrathecal injection. Intravenous drugs were given into an i.v. line. Epidural top-ups were with our standard 'fast-mix' preparation, given into a standard epidural catheter placed beside the 'mother'. All procedures were videoed and films analysed retrospectively for sub-component times. Timings started when the anaesthetist entered the room. Data were compared using the Friedmann statistic, with statistical significance taken as P<0.05.

Results: 7 consultants and 13 trainees were observed. Overall times are shown in the table (data on sub-component times not shown).

Table 1. Median [range] times for preparation and procedure (from touching the 'patient') for each anaesthetic technique.

<table>
<thead>
<tr>
<th></th>
<th>General</th>
<th>Spinal</th>
<th>Epid</th>
<th>Top-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparations (s)</td>
<td>53.5 [28-84]</td>
<td>254.5 [147-390]</td>
<td>102.5 [45-258]</td>
<td></td>
</tr>
<tr>
<td>Procedure (s)</td>
<td>115 [69-219]</td>
<td>60.5 [25-159]</td>
<td>68.5 [36-190]</td>
<td></td>
</tr>
<tr>
<td>Total time (s)</td>
<td>191.5 [107-264]</td>
<td>312 [177-549]</td>
<td>168.5 [88-321]</td>
<td></td>
</tr>
</tbody>
</table>

Discussion: We found marked differences in preparation and procedural times for the three techniques. However, our times exclude the time taken for onset of regional block, which must be added when considering the relative merits of the three techniques. Further analysis of the sub-component times is required to identify if more than one task (especially preparation) can be done concurrently.

References
P51 Analgesia and thromboprophylaxis post caesarean section: completing the audit cycle following introduction of a patient information card

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Introduction: During routine anaesthetic follow-up post caesarean section, we noted that patients were not consistently receiving their regular co-dydramol, diclofenac and enoxaparin, as prescribed, especially at night. We audited current practice using information from electronic prescribing records. We then introduced a patient information card to try and improve administration rates.

Methods: We collected data from 47 patients post caesarean section. We reviewed the e-prescribing records to ascertain whether analgesia and thromboprophylaxis had been both prescribed and administered. Then we introduced a pictorial patient information card (Fig). We encouraged patients to ask for any medication that was omitted. We then re-audited administration rates in 26 patients and performed a patient satisfaction questionnaire.

![Patient information card](image-url)

Fig: Patient information card

Results: 1 in 5 patients did not receive their co-dydramol on the first post-operative night. There was a further fall in administration in the evening and at night on subsequent post-operative days. 1 in 4 patients did not receive their diclofenac on the first post-operative night. Following the introduction of the patient information card, overall administration rates of co-dydramol improved from 74% to 88% and diclofenac improved from 83% to 91%. The administration rate of enoxaparin was 83% (day 3) to 89% (day 1) and did not improve with the introduction of the information card. 80% of women and their partners read the information card and gave positive feedback.

Discussion: We were surprised to discover that patients were not reliably receiving medication following caesarean section. The introduction of patient information cards appears to be acceptable and warrants further investigation. It is postulated that enoxaparin administration did not improve as patients are less likely to request an injection. By empowering patients with information cards, it may be possible to prevent excess morbidity and mortality post caesarean section.

P52 Assessing venous thromboembolism risk - compliance with CEMACH recommendations and CQUIN target

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Introduction: Venous thromboembolism (VTE) was the most common cause of direct death in the last Confidential Enquiry into Maternal and Child Health (CEMACH). Substandard care was identified as a cause, including inadequate VTE risk assessment with failure to prescribe appropriate thromboprophylaxis. The Commissioning for Quality and Innovation (CQUIN) payment framework set a target of 90% for VTE risk assessment in inpatients. We audited practice in our obstetric unit against this target.

Methods: The drug chart in our hospital includes a box on the front which the clinical team completes and signs to demonstrate that VTE risk assessment has been performed, with prescription of thromboprophylaxis as appropriate. In Nov-Dec 2010, patients undergoing a surgical procedure in our obstetric unit had their drug charts and notes examined by a single anaesthetist who was not involved in the care of the patients. Completion of VTE assessment and thromboprophylaxis prescription was recorded, as well as urgency of the case and time of surgery. This anaesthetist then made an independent judgement on whether the assessment and prescription had been carried out correctly based on guidelines issued by the Royal College of Obstetricians and Gynaecologists (RCOG).

Results: VTE assessment was completed in 71 out of 75 cases (95%). The breakdown is shown in the table.

<table>
<thead>
<tr>
<th>Surgical procedure</th>
<th>Risk assessment correct</th>
<th>Prescription correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective caesarean section (n=38)</td>
<td>37/38 (97%)</td>
<td>37/38 (97%)</td>
</tr>
<tr>
<td>Emergency caesarean section (n=20)</td>
<td>14/20 (70%)</td>
<td>16/20 (80%)</td>
</tr>
<tr>
<td>Others (n=17)</td>
<td>17/17 (100%)</td>
<td>17/17 (100%)</td>
</tr>
</tbody>
</table>

The overall correct risk assessment rate was 91% (68/75) and correct prescription 93% (70/75). In 8 cases, one or the other parameter was incorrect; the majority in the emergency caesarean section group with 6 of these cases occurring out of hours.

Discussion: Our rate of VTE risk assessment of 95% achieves the target set by CQUIN. We demonstrated some incorrect risk assessments and thromboprophylaxis prescription which is not measured by our clinical process. Our audit highlights the potential for mistakes with emergency cases occurring out of hours. Training on this issue may help reduce mistakes and, potentially, the rates of VTE in pregnancy.

References
3. Reducing the risk of thrombosis and embolism during pregnancy and the puerperium. RCOG Green-top guidelines No. 37 Nov 2009
P53 Pulmonary embolism: reducing the risk with inferior vena cava filters

J A Khan, M Molloy
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Introduction: Retrievable inferior vena cava filters (IVCF) have been recommended for use in pregnancy prior to delivery where anticoagulation therapy will be interrupted.1 We describe the diagnosis, anticoagulation therapy and implementation of IVCF of a series of women with VTE in pregnancy in our department.

Case Series: Five parturients were diagnosed with VTE during the later stages of pregnancy in 2010. Three presented with chest pain and shortness of breath, two with acute onset groin pain. Risk factors included previous VTE in pregnancy in one patient and smoking in another. One patient was diagnosed with antiphospholipid syndrome after pregnancy. No obvious risk factors were found in two patients. Management of these patients required a multispecialty approach. Doppler ultrasound was used to diagnose VTE initially and if negative, a ventilation perfusion scan was performed.2 Therapeutic anticoagulation with low molecular weight heparin (LMWH) was initiated on diagnosis of VTE. One patient was on antenatal therapeutic LMWH on presentation which was changed to unfractionated heparin infusion. Prior to delivery, retrievable IVCF was placed in the suprarenal part of the inferior vena cava (IVC) by interventional radiologists. This was successful in four patients. In one patient, placement was not possible as the diameter of the IVC was too wide (>35 mm) for the use of a retrievable IVC filter (max width 30 mm). Placement of a permanent filter was not advised due to potential long-term complications. LMWH and unfractionated heparin were stopped 24 h and 6 h respectively before planned delivery. All patients had caesarean section, four patients under general anaesthetic and one under spinal anaesthesia. Caesarean section was carried out in cardiac theatre for the patient without an IVCF in situ. Transoesophageal echocardiography was used intraoperatively with cardiothoracic team on stand-by. Anticoagulation therapy was recommenced 6 h after caesarean section. Filter retrieval was successful in three out of the four patients. The filter could not be retrieved in one patient as it was displaced and the hook embedded in the IVC wall. This patient was commenced on lifelong therapeutic anticoagulation. One patient had delayed postpartum haemorrhage and despite correction of anticoagulation, underwent hysterectomy due to uncontrollable bleeding.

Discussion: Antenatal assessment of risks for VTE and referral to haematology for management of anticoagulation treatment is essential. Insertion of IVCF, timely interruption of anticoagulation therapy and delivery requires a multispecialty approach. IVCF offer protection against pulmonary embolism, but are not without complications.1

References

P54 Audit of inadvertent perioperative hypothermia in the obstetric theatre

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Introduction: Perioperative hypothermia is defined as a core temperature ≤ 36°C and is a common consequence of anaesthesia.1 This may lead to increased blood loss and the need for transfusion, increased rate of wound infections, morbid cardiac events, pressure sores and increased hospital stay. NICE guidelines2 recommend that: all patients have their temperature recorded in the hour prior to theatre, then every 30 minutes until the end of procedure; all intravenous fluids in excess of 500 ml must be warmed; and all patients with hypothermia must be actively warmed.

Methods: In the first audit cycle we collected data over a 2-week period for 55 consecutive patients undergoing procedures in theatre. We looked at the following parameters: perioperative temperature measurement, duration of procedure and administration of fluids, intraoperative blood loss and perioperative warming measures. After educating staff and introducing local recommendations, we re-audited our practice for a further 2 weeks (52 patients) 4 months later.

Results:

<table>
<thead>
<tr>
<th></th>
<th>First Cycle</th>
<th>Second Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of patients</td>
<td>55</td>
<td>52</td>
</tr>
<tr>
<td>Pre-operatively:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of temperatures measured</td>
<td>54/55</td>
<td>46/52</td>
</tr>
<tr>
<td>No. of patients hypothermic</td>
<td>3/55</td>
<td>3/52</td>
</tr>
<tr>
<td>Intra-operatively:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of temperatures measured</td>
<td>1/55</td>
<td>24/52</td>
</tr>
<tr>
<td>No. of patients hypothermic</td>
<td>1/1</td>
<td>2/24</td>
</tr>
<tr>
<td>Average time in theatre</td>
<td>62 min</td>
<td>60 min</td>
</tr>
<tr>
<td>Average amount fluid given</td>
<td>1371 ml</td>
<td>1086 ml</td>
</tr>
<tr>
<td>Average blood loss</td>
<td>568 ml</td>
<td>534 ml</td>
</tr>
<tr>
<td>No. of patients receiving warmed fluids</td>
<td>2/55</td>
<td>15/52</td>
</tr>
<tr>
<td>Post-operatively:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of temperatures measured</td>
<td>51/55</td>
<td>48/52</td>
</tr>
<tr>
<td>No. of patients hypothermic</td>
<td>9/55</td>
<td>6/52</td>
</tr>
</tbody>
</table>

Discussion: In the first audit cycle, our perioperative temperature management was not in accordance with current recommendations. After introducing local guidelines, intraoperative temperature monitoring and active patient warming showed a modest improvement. Perioperative temperature management is an integral part of our perioperative care, and provision of this care in the maternity theatre should be no exception. Our new guidelines will need further robust promotion and additional audit is necessary to reinforce this aspect of care in the maternity theatre.

References
2. National Collaborating Centre for Nursing and Supportive Care commissioned by National Institute for Health and Clinical Excellence 2008,
P55 NICE and warm: completing the audit cycle
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Introduction: Hypothermia negatively impacts on patient outcome.1–3 The 2008 NICE guidelines defines perioperative hypothermia as a "core temperature <36°C at any time from one hour before the start of anaesthesia to 24 hours after entering recovery." Recommendations include 100% patients for non-urgent surgery have a core temperature >36°C preoperatively, 100% patients admitted to recovery have a core temperature >36°C, 100% patients should not be discharged from recovery until core temperature >36°C and 100% operations be performed with an ambient air temperature >21°C. The authors’ initial audit (May–June 2010) showed that the core temperature of 30% of patients undergoing caesarean section (CS) dropped below 36°C by the end of surgery. Of these, half left recovery still below 36°C. No warming methods were employed. After the mandatory introduction of Ranger® fluid warmers, the temperature of women undergoing CS was re-audited.

Methods: From August–October 2010, fifty patients undergoing CS (categories 2–4) under all types of anaesthesia had their temperatures measured using a tympanic thermometer. Time points: arrival in theatre, 30 min from knife-to-skin, conclusion of surgery and discharge from recovery. Ambient theatre temperature, duration of procedure and amount of fluid given was also documented.

Results: Twelve out of fifty patients (24%) were hypothermic (<36°C) upon entering theatre (cf. one patient in the previous audit). Forty-one patients (82%) admitted to recovery had a core temperature >36°C compared to thirty-four (68%) from the initial audit, showing the benefit of using the Ranger® warmer. The average length of CS was 54 min (range 30–100). The average temperature change without the Ranger® warmer was -0.48°C and with warming was -0.06°C, the difference being 0.42°C.

Discussion: Use of the Ranger® warmer maintains a steadier core temperature. There has been an increase of 7 patients (14%) leaving theatre with a temperature >36°C when compared to the previous audit. This could have been greater if patients were kept warm prior to theatre. Perhaps this reflects the re-audit being performed during cooler autumn months. Consideration must be given to postponing surgery until the core temperature is 36°C (difficult in obstetrics) and limiting patient exposure. We are now considering forced air warmers; this has to be a multi-disciplinary approach.

References

P56 Temperature measurement at the forehead as acceptable alternative to tympanic measurement in obstetric patients
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Introduction: The NICE guidelines on the prevention of inadvertent perioperative hypothermia1 do not include pregnant patients. We compared temperature measurements using a continuous cutaneous device at 3 sites (forehead, shoulder and carotid) against the widely used intermittent tympanic thermometer.

Methods: Research ethics committee approval was sought but deemed not necessary. Intraoperative temperature was measured in 32 obstetric patients for different procedures. Cutaneous temperature was measured using the Crystalone™ Moving Line® strip and tympanic temperature using an infrared thermometer. Temperature at the forehead was taken for all patients, 19 patients were also assessed for temperature at the shoulder and 12 for temperature at the carotid to identify the best site for cutaneous measurement. Tympanic and cutaneous temperature was taken 3 times for each patient in 5-min intervals. The Bland-Altman plot was used to compare measurements in each patient.

Results: There was no statistical difference (p=0.81) between the tympanic measurement and cutaneous measurement at the forehead.

The mean difference between measurements was 0.19°C (CI 0.080-0.31). However, measurements at the shoulder and carotid were statistically different (P<0.0001) from the tympanic measurements (mean difference -0.46 and 0.33 respectively).

Discussion: Obstetric patients are prone to inadvertent hypothermia during operative procedures, owing to intravenous fluid administration, exposure of body cavities and blood loss. It is usually quite difficult to measure temperature continuously in a patient under regional anaesthesia. We showed that measuring temperature at the forehead using a cutaneous device is an acceptable alternative to tympanic measurement.

Reference
P57 Obstetric “wake up and proceed” survey

D Hurford, C Laxton
Dept of Anaesthesia, Southmead Hospital, Bristol, UK

Introduction: Management often cited for failed intubation at emergency category 1 caesarean section for fetal distress is “I would wake the patient up and perform a spinal anaesthetic”. Whilst undoubtedly safe, we question how one would practically proceed in achieving this.

Methods: 30 obstetric anaesthetists in the Severn region (25 consultants; 5 advanced trainees) were e-mailed a failed intubation scenario and asked which of five responses they would follow to manage our hypothetical patient.

Scenario: A 31-year-old patient was brought to the obstetric theatre as a category 1 caesarean section for persistent fetal bradycardia (60-80bpm) despite intra-uterine resuscitation. You have decided to wake up the patient from a failed intubation situation and proceed to a regional anaesthetic. How would you approach this?

1 Patient, with LMA in situ, moved into left lateral position. Whilst patient waking you perform a spinal.

2 Patient, with LMA in situ, moved into right lateral position. Whilst patient waking you perform a spinal.

3 Wait for LMA to be out with the patient conscious (responding to commands), then proceed to re-positioning and performing a spinal.

4 Wait until patient is fully awake before proceeding to perform a spinal.

5 Other alternative (please specify)

Results: There was a 77% response rate (80% consultants & 60% advanced trainees). The majority (66%) chose option 3 whereas 26% would have continued to proceed with a supraglottic airway device (SAD). One responder felt unable to give a definitive answer based upon the information alone (4%) and one chose option 1 (4%).

Discussion: The majority consensus was for waiting until the patient was conscious before proceeding. A number of variables that might have altered a chosen method included: fetal heart rate changes, patient co-operation & obstetric opinion. Many highlighted it was essential to consider all the options and continually re-evaluate. Reasons given for waiting until LMA was out included: patient movement, leaving the airway, distraction during placing spinal anaesthetic. A key aspect of obstetric anaesthetic training is the “ability to anticipate, recognise and manage” a difficult airway and with 1:250-1:300 failed intubation rates it is essential that all have appropriate training.1,2 Part of this continues past "I would wake the patient up". Historically the focus is upon the airway component of obstetric failed intubation, little attention is paid to teaching the safe progression from airway to neuraxial block in these situations. With this survey’s findings maybe it is time to incorporate such decision-making into the classically taught obstetrics failed intubation.

References


P58 Obstetric airway management - a national survey of equipment and training

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Introduction: Obstetric airway management causes anxiety to anaesthetists of all grades. An array of devices are available to assist the anaesthetist, with evidence that videolaryngoscopy facilitates management of the obstetric airway.1 We aimed to establish which devices are kept in obstetric theatre, what training is offered in their use and how frequently they are utilised.

Methods: After OAA approval (survey number 102) an email questionnaire was sent to 215 lead obstetric anaesthetists in September 2010.

Results: The response rate was 72% (158 replies).

Table: Airway devices present in obstetric theatres (OT) and main theatres (MT)

<table>
<thead>
<tr>
<th>Device</th>
<th>OT (%)</th>
<th>MT (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibreoptic scope</td>
<td>21%</td>
<td>97%</td>
</tr>
<tr>
<td>Any videolaryngoscope</td>
<td>42%</td>
<td>63%</td>
</tr>
<tr>
<td>Any cricothyroid puncture kit</td>
<td>95%</td>
<td>99%</td>
</tr>
<tr>
<td>High pressure jet ventilate</td>
<td>58%</td>
<td>98%</td>
</tr>
<tr>
<td>Intubating LMA</td>
<td>70%</td>
<td>92%</td>
</tr>
</tbody>
</table>

Where a videolaryngoscope was kept in obstetric theatre, 75% had an Airtraq, 12% a Glidescope, 5% an Ambu Pentax, 5% a McGrath and 3% a Storz C-MAC. Of the 150 units (95% of respondents) who stock ready made cricothyroid puncture kits, 74% keep a large bore cannula such as a QuickTrach, 50% a surgical cricothyroidotomy kit such as a Crikid and 27% a 13G jet ventilation cannula device such as a Ravussin; 69 institutions (44%) having 2 or more different kits. 26 of 155 lead clinicians reported using these devices in an obstetric patient in the last 12 months, but never on more than 5 occasions. 50% of these reports involved videolaryngoscopy and 29% the use of a fibreoptic scope. The provision of formal training in the use of these devices (when kept anywhere in the hospital) was variable with 51% offering it in the use of the fibreoptic scope, 31% for videolaryngoscopy, 52% in cricothyroid puncture and 38% in the use of videolaryngoscopy.

Discussion: There is an ever expanding choice of devices currently available which purport to improve airway management, and this is reflected in the diverse range of airway adjuncts available on labour wards in the UK. For many of these devices there has been little or no evaluation in the general or obstetric populations. When advanced airway equipment is available, training should ideally be formalised to ensure it is used safely, appropriately and to its full potential. Our survey suggests that training is lacking in an area where familiarity with equipment is vital. A further concern is the cost implications of storing devices which have a limited shelf life, as our survey shows that these devices are used so infrequently.

Reference

P59 Assessment of application of cricoid pressure in an obstetric unit using a modified 50-ml syringe.

M Bhardwaj, K Williams, K Ramaswamy, M Popat
Nuffield Department of Anaesthetics, John Radcliffe Hospital, Oxford, UK

Introduction: 2011 marks the 50th anniversary of the description of cricoid pressure (CP) by Sellick. Application of an appropriate force at correct anatomical site and direction for appropriate duration is crucial during rapid sequence induction. The Difficult Airway Society recommends a force of 30N, but the magnitude of the applied force is one of the most difficult factors to judge. Excessive force may obscure the view at laryngoscopy while suboptimal force may be insufficient to protect from regurgitation and aspiration. Various commercial bench training tools are available for training on application of cricoid pressure. We describe a novel modified 50-ml syringe to train anaesthetic nurses to apply optimum CP.

Methods: A graduated 50-ml syringe was modified by mounting a Plaster of Paris cast to mimic thyroid and cricoid cartilages. Three coloured strips were placed along the barrel to guide optimum, sub optimum and excessive force. Volume displacement of air while applying CP on cricoid cartilage was calculated and converted to force using a neonatal weighing machine. A force of 28-35N was used as the target range of CP in this study. 15 anaesthetic nurses were randomly recruited and consented for participation in the study. The recruits completed a questionnaire assessing their theoretical knowledge of CP prior to blinding to assess the amount of force applied and sustained for 1 minute using the modified syringe. All were reassessed after a practice session on the modified syringe. Volume displacement during application of CP was recorded by an independent observer.

Results: All anaesthetic nurses were aware of correct anatomical site, timing of application and release of CP. 13 knew the correct force to apply while 5 were unaware of the direction of force used in CP. Before practice, 4 (26.6%) applied the force in target range. 4 (26.6%) applied excessive force (>40N) and remaining 7 (46.6%) suboptimal force (<20N). These 7 could only sustain a force of 20N for 1 minute. After practice, 13 (86.6%) applied a sustained force in target range for 1 minute and remaining 2 (13.3%) applied the force above the target range and were unable to sustain it.

Discussion: Modified 50-ml syringe could be a cost effective, robust and reproducible training tool to learn the amount of force required for CP.

References

P60 Incidence of postoperative morbidity following general anaesthesia for caesarean section

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Introduction: Limited data exist regarding the incidence of chest infection and other less serious morbidity following general anaesthesia for caesarean section (CS). The Obstetric Anaesthetists' Association (OAA) leaflet providing information for mothers regarding anaesthesia for CS quotes the incidence of chest infection as 20%, sore throat as 20% and nausea and vomiting as 10%. All patients who underwent general anaesthesia for CS in our institution in 2010 were followed up daily until hospital discharge. Where this was not possible, patient notes were reviewed. Criteria for the diagnosis of postoperative chest infection were based on those published by the American Thoracic Society. Chest infection was diagnosed if the patient developed at least two of three defined clinical features (fever, leukocytosis or leukopenia, and productive cough) together with a new radiographic lung infiltrate. Patients were also asked if sore throat or nausea and vomiting were present.

Results: Of the 1654 women who underwent CS in 2010, 95 received general anaesthesia. Tracheal intubation was performed in all cases. Patients were followed up for a median of 3 days (range 2-4). One patient (1.1%: 95% confidence interval (CI) <0.001 - 6.3%) fulfilled criteria for diagnosis of chest infection while in hospital. Forty-two patients (44.2%: 95% CI 34.6 - 54.2%) complained of sore throat postoperatively, self limiting in all cases and lasting a median of 1 day. Eight patients (8.4%; 95% CI 4.1 -16.0%) reported postoperative nausea and vomiting.

Discussion: We found that the incidence of postoperative chest infection was substantially lower than that quoted to mothers in the OAA information booklet. Sore throat was common but usually mild and short lived. Nausea and vomiting were infrequent. It may be necessary for the OAA to review information issued to mothers based on these data. Further studies are required to accurately estimate the incidence of postoperative chest infection after general anaesthesia for caesarean section.

References
P61 Postoperative analgesia after caesarean section: comparison of patient controlled analgesia with continuous infusion of pethidine

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Introduction: In order to improve conventional postoperative pain management after caesarean section, which in our hospital setting is continuous narcotic infusion, we compared it with patient controlled analgesia (PCA).

Method: We compared PCA and continuous infusion using pethidine after elective caesarean section in 121 patients, in a randomized study. Written informed consent was taken from all patients. All patients were enrolled in the study after an uneventful caesarean section under spinal anaesthesia using 10 mg bupivacaine and 25 µg fentanyl. 61 patients in Group P received PCA with 0.15 mg/kg bolus pethidine with 10-min lock out. 60 patients in group C received continuous pethidine infusion at a rate of 0.15 mg/kg/h. Following randomization all patients were started their postoperative pain regimen 120 min after spinal anaesthesia and all received an initial bolus of 0.5 mg/kg pethidine before starting PCA or continuous infusion. All patients received 1g paracetamol three times a day and a 100 mg diclofenac suppository twice a day during the study period.

Results: The verbal pain score, need for rescue analgesia, incidence of nausea and vomiting was significantly lower (P <0.001) in PCA group as compared to continuous infusion group at 6, 12 and 24 h. 98% of the patients were satisfied with pain management and wanted the same form of analgesia for future surgeries in the PCA group as compared to 70% (P <0.001) in Group C.

Discussion: PCA devices are now widely used in clinical practice, and are among the most recommended techniques for the control of moderate to severe postoperative pain in the postoperative setting. It enables patient’s participant in pain relief and usually results in improved analgesia. In our study we observed better pain control, less need for rescue analgesia for breakthrough pain, less incidence of nausea and vomiting and greater patient satisfaction. However these devices are expensive and material costs per patients are usually higher compared with conventional analgesia. Since in our part of the world we do not have preservative free narcotic to use by intrathecal route, we can improve postoperative pain management by using PCA instead of continuous narcotic infusion in patients undergoing caesarean section.

References
P63 Pain on day 2 after elective caesarean section - is it really a problem? Postoperative analgesic requirements after spinal anaesthesia with intrathecal opioid

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Department of Anaesthesia, Nottingham University Hospitals NHS Trust, Nottingham, UK

Introduction: Adequate postoperative analgesia is important for women who have undergone caesarean section (CS) in order to allow early mobilisation and to facilitate caring for the baby. It has been suggested that analgesia in the second 24 hours post-CS might be inadequate, and that extended-release epidural morphine might confer appreciable benefit.

Methods: This prospective audit of all women undergoing category 3 or 4 LSCS under spinal anaesthesia with intrathecal opioids was conducted from November 2009 until January 2010 (77 cases; 6 cases excluded). 64 women received intrathecal diamorphine (dose range 250-400 μg); 7 women received intrathecal preservative-free morphine (dose 100 μg). Our clinical practice was compared with RCoA audit standards: that the worst pain score should not exceed 3 on a VAS of 0-10 in over 90% of women, 100% of women should be prescribed paracetamol and NSAIDs unless contraindicated, and over 90% of women should be satisfied with pain management.

Results: 100% of women were administered paracetamol and 99% were administered NSAIDs. By the end of the second day, 56% of women had been discharged home.

Fig: percentage of women with VAS score not exceeding 3 at 24 and 48 h post CS.

Discussion: The audit standard for paracetamol and NSAID prescription was met, although women’s pain commonly exceeded VAS score 3. Over half of women were discharged home by 48 h. The contribution of pain to delaying discharge beyond 48 h is unknown. We found no evidence upon which to change practice and embrace extended-release epidural morphine. A further evaluation of pain at discharge is warranted.

References

P64 Persistent pain after caesarean section: a survey of incidence and adequate management

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Introduction: Persistent pain is a well recognised complication after various types of surgery. A survey of pain clinics reported the incidence at 20%. Few studies have assessed the incidence of pain after caesarean section and literature search failed to provide comprehensive data on the incidence in UK. The aim of the survey was to study the incidence of chronic pain after caesarean section at our hospital.

Methods: After ethics approval, all patients (n=149) who had caesarean section during a 3-month period at the hospital were included in the study. A consent form along with the questionnaire and a prestamped envelope was mailed to all the patients. Patients were asked about the duration of postoperative scar pain. If they were still having pain, its frequency and its impact on quality of life was assessed. Questions were also asked about previous operations, pain problems elsewhere, treatment sought and medications taken.

Results: A total of 86 (57%) females were interviewed. The mean follow up time was between 6-8 months. Postoperative abdominal scar pain was present in 11(12%) of patients after 3 months of the surgery and 7(8%) patients had pain at the time of the interview. The pain was present on a daily basis in 1 patient and in 6 (6.9%) patients with days interval. The pain was associated with numbness in 5 (5.8%) patients and itching of scar area was present in 1 patient. No patients attended the chronic pain clinic.

Discussion: The survey demonstrated the incidence of persistent pain in 12% of population which is the same as observed in a recent study. The incidence of daily moderate to severe pain was seen in only 1.1% of patients which is less than 9.8%, observed by Sng et al. Overall moderate to severe pain was seen in 4.65% of population, higher in comparison to 0.6% as observed by Kainu et al. The observation period was short and we cannot exclude that pain will eventually resolve in some patients. Overall this study highlighted the significant problem of persistent pain and its inadequate management. Its important to systematically enquire about pain in postnatal and GP visits, so that a treatment plan can be commenced.

References
P65 Changes in placental and fetal organ perfusion during chronic maternal hypoxia in mice: assessment by BOLD MRI during brief hypercapnic and hypoxic challenge.

Y Ginosar, N Corchia, U Elchalal, R Abramovich.

Introduction: Reduced maternal uteroplacental blood flow (UPBF) leads to chronic intrauterine fetal asphyxia. Doppler ultrasound may assess uterine, umbilical and fetal vessels, but is unable to assess these simultaneously or to perform rapid repeat assessments for dynamic studies. We previously developed a blood oxygen level dependent functional MRI (BOLD-fMRI) method utilizing hypercapnia (5% CO₂) and hypoxia (95% O₂) for monitoring dynamic changes in hepatic perfusion without contrast administration. In this study we describe the use of BOLD-fMRI with acute hypercapnic challenge to assess changes in UPBF and fetal organ perfusion and to assess whether these responses are affected by chronic maternal hypoxia, as a model of intrauterine fetal asphyxia.

Methods: Between days E13-17.5, pregnant female ICR mice were either exposed to chronic hypoxia (12% O₂) by placing them in a hypoxic chamber or kept under normoxic conditions; n=6 mice/group. On E17.5, all mice were anesthetized with pentobarbital and scanned in a 4.7-T Bruker Biospec spectrometer. Changes in placental and fetal perfusion were analyzed from T₂*-weighted GE images (TR/TE=147/10 ms) acquired during breathing of air (4 min), air-carbon dioxide (5% CO₂) (4 min), and carbogen (95% O₂, 5% CO₂) (4 min). Different regions of interest (placenta, fetal heart, fetal liver and fetal brain) were identified on True-FISP images using IDL software. Percentage change in signal intensity induced by hypercapnia (ΔSO₂) and hypoxia (ΔSO₂) was calculated and presented by color maps and time curves.

Results: BOLD-fMRI provided simultaneous assessments of perfusion of placenta and fetal organs (brain, heart, liver) in pregnant mice. We observed that acute maternal hypercapnia caused reproducible and reversible reductions in placental perfusion, fetal hepatic perfusion and fetal cardiac perfusion. Fetal cerebral perfusion, however, was unchanged; suggestive of the described phenomenon of fetal “brain sparing”. The acute hypercapnia challenge using BOLD-fMRI was able to distinguish between chronic intrauterine asphyxia (induced by maternal hypoxia) and normal controls, with lower % change in UPBF and less fetal brain sparing.

Discussion: Further preclinical and clinical investigation is required to assess whether these observations may herald the use of this non-invasive diagnostic tool to determine if the severity of chronic intrauterine fetal asphyxia justifies interventional delivery.

References

P66 Spontaneous low pressure headache - a normal MRI scan does not exclude the diagnosis.

R Goyal, IJ Wrench

Department of Anaesthesia, Sheffield Teaching Hospitals Trust, Sheffield, UK

Introduction: In our unit we provide a service for management of patients with spontaneous low pressure headache (SLPH) where a spinal fluid leak occurs naturally. In common with post dural puncture headache, SLPH has a typical MRI appearance.

We now report a service evaluation of this patient group with particular regard to the role of MRI in diagnosis and management.

Methods: Patients were identified by reference to our database. Information was accessed from patient notes, the radiology database and the electronic records of clinical letters.

Results: We saw 22 patients over a 12 year period of whom all had an MRI scan. These patients received a total of 41 blood patches with a median per patient of 2, [range 1-5]. There were 15 patients with MRI scans demonstrating features of SLPH. Ten of these had long term benefit from blood patching. 1 did not and 4 were lost to follow-up. A possible site for leakage of CSF was found by MRI or MRI myelography in 8 cases. There were 7 patients with normal MRI scans despite typical symptoms of SLPH. Of these 4 had long term benefit, 2 did not and 1 was lost to follow-up. A possible site for the epidural leak was found by MRI or MRI myelography in 2 cases.

Figure: Percentage successfully treated by blood patch in relation to MRI appearances.

Discussion: Despite a normal MRI, patients with a typical history of SLPH will usually benefit from blood patching. MRI myelography will often identify a potential site of leakage of CSF to guide the placement of the epidural blood.

Reference
P67 CEMACH two years on  
SL Williams, S Catling  
Anaesthetics, Singleton Hospital, Swansea, UK  
Introduction: The Confidential Enquiry into Maternal and Child Health (CEMACH) Saving Mothers’ Lives 2003-2005 published its findings in 2007.1 Within this highly regarded longstanding review, key issues to be addressed within obstetric practice are highlighted and changes recommended. The authors of the report state themselves that ‘they consider their recommendations to lead to action’  
Methods: After OAA approval (survey number 98) a postal questionnaire was sent to 220 Lead Obstetric Anaesthetists in January 2010. Questions were posed asking directly if the changes recommended had been implemented and we attempted to identify any difficulties that may have hindered their implementation. Specifically, we targeted the management of the obese obstetric patient, the use of modified early obstetric warning score (MEOWS) and the provision and monitoring of resuscitation training.  
Results: The response rate was 62% (136 replies). 125 of 136 units (92%) are currently using MEOWS, 122 units (89%) have guidelines for the management of the obese obstetric patient and 81 units (59%) had guidance for the management of sepsis. 90 units (66%) have a designated anaesthetist at all times, but out of hours 12 units (8%) provide direct consultant supervision of obese obstetric women, with 54 units (40%) providing this cover 9-5pm. The commonest reasons given were ‘not considering it clinically necessary’ (51%), ‘lack of manpower’ (19%) or a combination of both (10%). 108 units (79%) have implemented yearly resuscitation updates, but no coherent or transparent means of auditing its uptake were consistently reported. Feedback of difficult or interesting cases to fellow anaesthetists occurred in 29 units (21%), the remainder of responses reporting ad hoc occasional feedback system. The manner in which the feedback was provided again was inconsistent.  
Discussion: Identifying poor uptake and implementation of national recommendations, in this case the CEMACH report, allows an opportunity to identify reasons, barriers and potential solutions to improve its uptake. Even just the prompt of a survey can highlight an area for clinical improvement, as was evidenced in this survey. Not adhering to nationally published recommendations can leave an NHS trust vulnerable to litigation. Perhaps the publication of the recent Centre for Maternal and Child Enquiries (CMACE)2 report recommending that obese pregnant women should be managed directly by anaesthetists of grade ST6 or above, will be welcomed by obstetric units and be a more obtainable standard.  
References  

P68 Audit of fetal intrauterine resuscitation prior to caesarean section for fetal distress  
NJ Boniface, S Wallace, WB Maxwell  
Department of Anaesthesia, Great Western Hospital, Swindon, UK  
Introduction: Fetal intrauterine resuscitation describes a bundle of therapies to improve umbilical blood flow and oxygen delivery to the placenta in situations where the fetus is showing evidence of compromise.1 There are currently no discrete fetal intrauterine resuscitation guidelines in our Trust; however, elements of fetal intrauterine resuscitation appear in the algorithms for the management of late decelerations, fetal bradycardia and uterine hypertonus with fetal distress.  
Methods: A retrospective audit looking at the case notes of all patients recorded in the birth register as having undergone emergency caesarean section for fetal distress over a three-month period (June–Sept. 2010). Documentation in the written record of labour, the operation note, the anaesthetic chart and the drug and fluid chart was compared to the intrauterine resuscitation guidelines of a neighbouring teaching hospital.  
Results: 66 caesarean sections for fetal distress were performed during the audit period. One set of notes could not be obtained. 13 out the 65 patients had a general anaesthetic. 4 of these patients had no reason other than fetal distress for having a GA.  
Table: Use of intrauterine resuscitation techniques

<table>
<thead>
<tr>
<th>Cat. 1 (24)</th>
<th>Cat. 2 (38)</th>
<th>Cat. 3 (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in position</td>
<td>4 (16%)</td>
<td>10 (26%)</td>
</tr>
<tr>
<td>Oxygen</td>
<td>5 (21%)</td>
<td>9 (24%)</td>
</tr>
<tr>
<td>Tocolysis</td>
<td>0 (0%)</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>IV fluid bolus</td>
<td>3 (13%)</td>
<td>5 (13%)</td>
</tr>
</tbody>
</table>

In 23 cases oxytocin infusion was in progress. In 52% of cases it was documented that this was switched off pending operation.  
Discussion: Basic intrauterine resuscitative measures are sparsely applied in our unit. The reasons for this are likely to be multi-factorial: lack of a formal policy, low profile of the issue amongst the multidisciplinary team, access to tocolytic drugs and poor documentation are all likely to play a part. The rate of GA in this sample is 20%. This compares poorly with a neighbouring unit’s rate of 13% for the same group,2 although the overall unit rate of GA for non-elective caesareans is compliant with the RCoA audit standard. Introduction of an intrauterine resuscitation guideline, a campaign of multidisciplinary education and publicity and documentation tools are planned in order to improve our performance before a repeat audit to complete the audit cycle.

References  
P69 Awareness of anaesthetic procedures within the obstetric team

R Campbell, V Salota, H Sauer
Anaesthetic Department, South London Healthcare Trust, London, UK

Introduction: Within obstetrics excellent multidisciplinary care is necessary to ensure an adequate outcome for both mother and baby. An understanding and consideration of essential obstetrics and anaesthetics by both sides of the drape is crucial to enhance patient care and team working. Therefore, we decided to survey the understanding of anaesthetic techniques by our obstetric colleagues in order to identify areas for improvement.

Methods: A questionnaire was devised based on RCOA guidelines and given to trainees and midwives working on the labour ward within our district general hospital. They were asked to complete the questionnaire immediately and under supervision. Results were analysed using Excel spreadsheets.

Results: 40 questionnaires were completed in total; 15 obstetric trainees and 25 midwives. When asked what was the acceptable time from calling the anaesthetist for an epidural to attending the mother, 15 (60%) midwives and 5 (33%) trainees answered 15 minutes, 8 (32%) midwives and 6 (40%) trainees thought 30 minutes. Regarding regional techniques 16 (64%) midwives and 13 (86%) trainees knew that spinals involved injection directly into the CSF. 9 (36%) midwives and 9 (60%) trainees thought GA required the most skill, 3 (12%) midwives and 4 (27%) trainees thought epidural and 3 (12%) midwives and 5 (33%) trainees CSE. With regards which method would provide the most rapid anaesthesia 7 (28%) midwives and 7 (46.6%) trainees answered GA, 7 (28%) midwives and 3 (20%) trainees spinal and 4 (16%) midwives thought epidural top up. With respect to dermatomes, 2 (8%) midwives and 5 (33%) trainees identified the umbilicus as T10, 3 (12%) midwives and 9 (60%) trainees the xiphisternum as T7, 8 (32%) midwives and 7 (46.6%) the nipple as T4, 4 (16%) midwives and 5 (33%) trainees agreed the level for labour analgesia was T10 and 5 (20%) midwives and 5 (33%) trainees thought the level of an epidural causing concern would be T6.

Discussion: The level of awareness of anaesthetic techniques amongst the obstetric team is poor and the profound underestimation of the time acceptable for attendance of an anaesthetist to a parturient may be a source of both friction and pressure on labour ward. A better understanding of the difficulties and complications involved with varying anaesthetic techniques is paramount to patient safety and further education is required regarding anatomy and dermatomes. As a result of this survey we aim to institute a reciprocal educational programme between obstetric and anaesthetic departments to improve understanding on both sides in an attempt to improve both the working environment and patient safety.

References

P70 Are boys more trouble than girls? An investigation into the significance of fetal gender on caesarean section category and epidural requests in labour.

JC Barker, J Coghill
Anaesthesia, Theatres and Pain Management, Plymouth Hospitals NHS Trust, Plymouth, UK

Introduction: A commonly heard labour ward comment is that ‘boys are more trouble than girls’. We sought to determine whether male babies were more likely to result in any category of caesarean section than females and whether mothers of male babies were more likely to request epidurals in labour that those carrying girls.

Methods: A review of our obstetric anaesthetic database was conducted. Hospital data on the total number of male and female babies born in the region each year was obtained. We looked at the likelihood of boys being born by any type of caesarean section with respect to girls. Singleton data over 2 years for category 2, 3, and 4 sections, and 5 years for category 1 sections were analysed. A year of data were analysed to determine if the epidural (PCEA) rate was higher for mothers of male babies. Chi squared tests were performed on the results to determine their significance.

Results:

<table>
<thead>
<tr>
<th>Category</th>
<th>Total deliveries</th>
<th>Total events by category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total males by category</td>
<td>Total females by category</td>
</tr>
<tr>
<td>Cat 1</td>
<td>22453</td>
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<td>Cat 3</td>
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<td>Cat 4</td>
<td>9574</td>
<td>644</td>
</tr>
<tr>
<td>PCEA</td>
<td>4809</td>
<td>1068</td>
</tr>
</tbody>
</table>

Discussion: Boys are significantly more likely to be delivered by category 2 caesarean section than girls but not by categories 1, 3 or 4. Mothers carrying male babies are significantly more likely to request epidurals in labour than those carrying females. As male babies have averagely larger head circumferences than girls, a resultant lengthy, augmented labour could explain the increased epidural rate in mothers of male babies. Events such as cord prolapse or placental abruption are often not gender-related and could account for the lack of significant difference in category 1 sections. In category 3 and 4 sections, mothers are often in very early labour or not labouring. Premature boys fare less well than girls of the same gestation. If male babies are physiologically less robust, an inability to withstand the stresses of labour could account for an increase in category 2 sections but not 3 or 4.

References
P71 Demographic and obstetric outcomes of elderly parturients at a London teaching hospital: 20 years of data

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Introduction: Pregnancy beyond age 40 constitutes a higher risk for both the mother and baby. 1 We investigated the demographics and associated complications of elderly parturients delivering at our unit over the last 20 years.

Methods: Our hospital database was searched to retrieve maternity data on all women delivering in our unit between January 1990 and December 2010. We performed a retrospective cohort study to compare labour outcomes between the <40 and ≥40 year old groups.

Results: 107159 women delivered in the study period, 6261 (5.8%) were ≥40 years old and 100898 (94.2%) were under 40.

Fig: Demographic of elderly parturients (≥40 years old) over the last 20 years. National data from the Office for National Statistics2 (ONS) plotted for comparison.

A larger proportion of the elderly group required regional analgesia for labour (61% vs 54%), regardless of whether they were nulliparous (70% vs 63%) or multiparous (54% vs 43%). The elderly group had a higher rate of caesarean section (46% vs 26%), both category 1-3 (19% vs 15%) and category 4 (28% vs 12%). The elderly group also had twice the amount of major (blood loss >1000ml) postpartum haemorrhages (3.6% vs 1.7%) and thromboembolic events (0.2% vs 0.09%), as well as a higher proportion of antenatal cardiac disease (0.34% vs 0.24%) and diabetes (0.65% vs 0.48%).

Discussion: Over the last 20 years our institution has consistently provided maternity care to a cohort of women that has doubled the national percentage of elderly parturients. This may be related to the particular demographic of the local population we serve, in which women might be delaying marriage and childbirth to pursue careers. As our data and previously published work has shown,1 the more elderly parturient is at a higher risk. These women are likely to require more anaesthetic input and services must be planned accordingly.

References

P72 Does IVF pregnancy affect the load of work of anaesthetist in labour ward?

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Introduction: Pregnancies resulting from in vitro fertilisation (IVF) are associated with a higher incidence of perinatal complications than those spontaneously conceived. This increased risk can be attributed to increased maternal age, the pathological basis of the infertility and the high incidence of multiple pregnancies.1,2 The IVF unit in our hospital is one of the busiest in London and a large number of patients deliver in our labour ward. Anecdotally these patients require more anaesthetic input. We conducted this audit to establish if this cohort of patients did have specific impact on the anaesthetic workload.

Methods: Using the delivery suite database, all primigravidae delivering one month in 2010 were reviewed. IVF cases were compared with non-IVF with respect to age, body mass index, (BMI), number of fetuses, antenatal anaesthetic input, mode of delivery, use of regional anaesthesia and other anaesthetic input, and whether HDU care was required and neonatal outcome.

Results: Four of the 149 cases were IVF pregnancies (2.7%) The mean age of the IVF patients was 41 years (range 39-44 years), compared with those naturally conceiving whose average age was 30 years (range 17-42 years). Both groups had the same mean BMI (24). There were no multiple pregnancies.

Table: Anaesthetic perinatal involvement

<table>
<thead>
<tr>
<th>IVF</th>
<th>Non IVF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any input by anaesthetist</td>
<td>100%</td>
</tr>
<tr>
<td>Antenatal anaesthetic referral</td>
<td>25%</td>
</tr>
<tr>
<td>Spontaneous vaginal delivery</td>
<td>0%</td>
</tr>
<tr>
<td>Elective Caesarean section</td>
<td>75%</td>
</tr>
<tr>
<td>Induction of Labour</td>
<td>25%</td>
</tr>
<tr>
<td>Regional block for labour/delivery</td>
<td>100%</td>
</tr>
<tr>
<td>High dependency unit admission</td>
<td>25%</td>
</tr>
</tbody>
</table>

Discussion: We appreciate the small number of IVF pregnancies identified in this review. However these preliminary results do suggest that IVF pregnancies increase the anaesthetic workload prenatally, during delivery and postnatally. We intend to conduct a larger review to confirm our findings. This information may be of importance in establishing the anaesthetic cover likely to be required in units with high proportion of IVF pregnancies.

References
P73 Drug-using parturients in a tertiary referral centre

JL Robertson, EM McGrady, S Young
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Introduction: Drug abusers (DA) are high risk but there is a paucity of relevant data in the anaesthetic literature. We aimed to investigate the demographics and labour ward needs of these patients and to compare it with data from the same unit 12 years previously.

Methods: Our computerized database (PROTOS) was accessed for all patients who delivered in the first 6 months of 2009. Data were obtained on drug and alcohol use, smoking, deprivation category (Scottish Neighbourhood statistics, with a 1-6505 decreasing deprivation score), use of labour analgesia and feeding intention. Data from 1997 were collected (before computerization) by accessing case notes of DA patients over 1 year. Results were analysed using GraphPad Instat.

Results: 2949 patients delivered in the 6 months (67 drug abusers and 2882 non-drug abusers). SIMD rank median score was significantly higher in the non-drug abuser (NDA) group (P<0.0001). 11.9% of DA and 0.3% NDA consumed alcohol during pregnancy (P<0.0001). There was also a strongly significant difference (P<0.0001) in smoking rates in pregnancy: 79% of DA and 15.4% of NDA. For both groups, mean parity was 1 and percentage of primiparous patients and duration of labour were similar. Polydrug use was common (61%) in DA. The most commonly used drugs were diamorphine (29 patients), cannabis (26) and cocaine (20). Modes of delivery are shown in the table.

<table>
<thead>
<tr>
<th>Mode of delivery</th>
<th>Drug users n(%)</th>
<th>Non-drug users n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVD</td>
<td>37 (55.2)</td>
<td>1627 (56.5)</td>
</tr>
<tr>
<td>Instrumental</td>
<td>9 (13.4)</td>
<td>387 (13.4)</td>
</tr>
<tr>
<td>C1 C/Section</td>
<td>6 (8.9)</td>
<td>102 (3.5)</td>
</tr>
<tr>
<td>C2 C/Section</td>
<td>7 (10.4)</td>
<td>251 (8.7)</td>
</tr>
<tr>
<td>C3 C/Section</td>
<td>4 (5.9)</td>
<td>182 (6.3)</td>
</tr>
<tr>
<td>C4 C/Section</td>
<td>4 (5.9)</td>
<td>333 (11.6)</td>
</tr>
</tbody>
</table>

Use of Entonox, diamorphine and epidurals were similar in both groups. The 1997 cohort had 71 DA patients. Again, polydrug use was common but the drugs used were diamorphine (49 patients), methadone (48) and diazepam (19). Epidural rates were similar in both groups.

Discussion: DA live in more deprived areas with higher rates of alcohol and smoking use. The number of DA has doubled since 1997 and while diamorphine remains the most common drug abuse, cocaine use is now apparent. Delivery by Category 1 (C1) caesarean section was higher in DA group (P=0.03) and higher in the NDA group for C4 sections. DA are a potentially challenging group of patients. In particular, higher C1 rate has safety implications for the patient, baby and healthcare staff.

Reference

P74 Pregnancy outcome in sickle cell disease patients: a London hospital case series

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Introduction: A combined obstetric and haematology clinic has been in operation at KCH since 2000 to look after pregnant patients with sickle cell disease (SCD). These patients have specific care needs and at are increased risk of poor outcome.

Methods: This retrospective study looked at pregnancy outcomes and anaesthetic care in SCD patients from 2000-2009.

Results: We found records of 127 pregnancies. Data were available for 93 pregnancies and 82 neonates. Of 93 pregnancies, 41 (44%) were HbSS genotype, while 52 (56%) were HbSC. The mean [range] gestational age at booking was 16 [10-30] weeks. The mean number of antenatal visits made to the combined clinic was 10.2 [2-17]. The lowest haemoglobin tolerated without transfusion was 4.9g/dL. Blood transfusions were given at much lower triggers than usual (5.8 [4.9-6.9]). There was one maternal death in pregnancy. Of the 82 neonates, 16 (19%) required level 2 care post partum, no deaths were recorded. The mean gestational age at delivery was 37.8 [30.1-43.1] weeks. 16% of babies were born before 36 weeks. 85 of the 93 pregnancies had crisis data recorded. 57 (67%) had significant crises pre-pregnancy, 51% of patients with a past history of crisis developed crisis episodes during the pregnancy.

28 randomly selected pregnancies were studied in detail and studied the incidence of sickling crises. 5 patients (18%) developed 3 or more crises during their pregnancy indicating severe disease. Most (63%) presented after 28 weeks of pregnancy. One patient required an exchange transfusion post partum for severe chest crisis which was not improving with allogeneic transfusions. 75% of episodes had signs of bony crisis while 37% had chest syndrome. About 60% patients had chronic pain issues, which were managed with simple oral analgesics. Pain during crises was managed mainly with oral analgesics, while only a minority of patients required patient controlled analgesia (4%). In the majority the labour pain was managed with oral analgesics and Entonox with only 28% requesting an epidural.

Discussion: A multidisciplinary approach and early interventions could positively influence the good outcome in pregnancy in SCD patients.

References
P75 Regression modeling of fetal hydrogen ion concentration at elective caesarean section
P K B C Raju, M Fernandes, J Bonner, W McClymont, S Munishankarappa, J Nanson, N Purdie, G A Mcleod
Anaesthetics, Ninewells Hospital, Dundee, UK

Introduction: Umbilical pH is the current gold standard for fetal wellbeing at delivery. However, measurement is rarely standardised and may be delayed, leading to a drift upwards in pH over time. In our hospital we have standardised our sampling protocol (see below). The aim of this prospective audit was to assess the frequency of measurement of umbilical pH in elective patients and a random sample of emergency patients undergoing caesarean section (CS) under spinal anaesthesia. In addition we wished to analyse our dataset to determine which factors may be independent predictors of low umbilical pH.

Methods: After obtaining Caldicott guardian permission from NHS Tayside, data were prospectively collected on 484 patients undergoing CS between Jan-Dec 2009. Our data included patient characteristics, obstetric history and past medical history. Anaesthesia was administered according to an agreed protocol. Operative data included fluid preload (ml), phenylephrine (µg), glycopyrrolate (mg), ephedrine (mg), patient position for spinal, dose of local anaesthetic, intrathecal opioid, spinal-delivery time and incision-delivery time. Umbilical blood gas analysis was also standardised. The protocol was: (i) umbilical cord double clamped within 5 min of delivery; (ii) arterial and venous samples taken from the double clamped area of cord within 15 min of delivery; (iii) blood analysed within 5 min of sampling.

Statistical analysis used NCSS, Utah & http://vassarfaculty.vassar.edu/lowry/

Results: Of the 486 patients, 405 underwent elective and 81 emergency CS. There was no difference in patient characteristics or fluids pre-delivery. Vasopressor use and the time weighted area under the curve (AUC) of pulse, systolic and diastolic pressures was similar between groups. Within the elective patients, pH, pH, Appar 1 & 5 min was obtained in 341 (84%), 310 (77%), 388 (96%) and 387 (96%) patients respectively. For emergency patients, data were obtained for pH, pH, Appar 1 & 5 min in 74 (94%), 68 (86%), 79 (100%) & 79 (100%) patients. Umbilical vein and artery blood gases & Appar scores at 1 min were reduced in the emergency patients. For example, elective mean (SD) umbilical vein pH was 7.32 (0.06) whereas emergency mean (SD) umbilical vein pH was 7.29 (0.08), P<0.01. Logistic regression modeling of umbilical vein pH showed two independent predictors of pH<7.25: Emergency surgery (OR 4.40, 95% CI 1.85-11.1, P<0.001); and phenylephrine (OR 4.32, 95% CI: 1.36-13.8, P=0.01). Discrimination or the predictive ability of the model using a ROC curve was 0.72.

Discussion: We have shown that 84% of elective caesarean patients and 94% of emergency patients had at least one blood gas analysis measured according to our new protocol. Predictors of pH<7.25 were emergency surgery and use of phenylephrine.

Reference

P76 Very late booking parturients: characteristics, outcomes and anaesthetic involvement
A Dharmadasa, DN Lucas, S Hiles, D Vaughan, PN Robinson
Department of Anaesthetics, Northwick Park Hospital, London, UK

Introduction: Current recommendations in the UK are that antenatal care (ANC) be initiated within the first 12 weeks of pregnancy.1 Women who book for ANC after this time (‘late bookers’) are consistently cited as high risk; late booking being associated with poor maternal and/or neonatal outcomes.2 There is little information about the characteristics of this group of pregnant women or the anaesthetic care they receive. We conducted a retrospective, case-note audit to analyse the characteristics, outcomes and anaesthetic interventions in these women. We were particularly interested in those women who book very late in pregnancy.

Methods: We used the computerised audit system (Cicconia Medical Information System) to identify women who booked at greater than 30 weeks gestation during the twelve month period July 2009 to July 2010. Of the 402 women identified we were able to locate and carry out case note review of 126 women. Patient data was anonymised and statistical analysis was performed using the chi-squared test.

Results: The 126 parturients fell into three broad groups: 1) no previous ANC; 2) transfer of ANC from abroad; and 3) transfer of ANC from another maternity unit within the UK. The medical problems at booking and medical problems that developed after booking were similar between the three groups. The rates of spontaneous labour and vaginal delivery were similar between the three group and comparable to the overall rates in our unit. However, the emergency caesarean section rate was significantly higher in patients with no ANC (27%, P<0.0001) compared with patients who had transferred their ANC from abroad (12%) or from another UK maternity unit (13%) and also the overall rate in our unit. The rates for all types of anaesthetic intervention were similar in all groups and not significantly different to the regional anaesthesia rates for labour and delivery and general anaesthetic rates in our unit.

Discussion: Our results indicate that very late bookers who transferred their ANC from abroad or from another UK hospital may not be at greater risk of poor outcomes but those who received no ANC are at greater risk of requiring emergency caesarean section. Our results suggest that very late bookers (≥ 30 weeks gestation) are not a homogenous group and should not necessarily be treated as such. A detailed prospective analysis is needed to distinguish sub-groups of late booking pregnant women and help focus antenatal risk assessment and care.

References
P77 What time is it in maternity? - completing the audit cycle
AL Hool, R Stoeter, H Eason, S Reddy
Department of Anaesthesia, Lancashire Teaching Hospitals, Preston, UK

Introduction: Accurate timekeeping is important in all medical disciplines but is vital in obstetrics1 where time is used as a marker of quality of care e.g. ‘decision to delivery time interval’.2 Timings are often reviewed closely when critical incidents are analysed and can have a huge significance in medicolegal cases. There are numerous clocks in our maternity unit, all of which may be used as reference to document these key times. Different clocks may be used by different personnel to record the same event leading to conflicting documentation. An audit of the accuracy of the clocks on the maternity unit was undertaken in June 2009 and then re-audited in December 2010.

Methods: The time on an iPhone mobile phone was confirmed to be correct by comparing with an internet world clock site. This was then compared to the time showing on each of the clocks and monitors in the maternity unit. The difference was recorded as a snapshot in +/- minutes. Seconds were not noted as they are not used in documentation and monitors do not have seconds.

Results: The total number of clocks and monitors audited were 19: 12 delivery rooms, 3 in maternity theatre, 2 in switchboard, 1 pager and 1 office clock. Accuracy in June 2009 was 21% (4/19, range -6 to +4 minutes) compared with 47% (9/19, range -5 to +1 minutes) in December 2010. Only 1 clock in December 2010 was greater than 2 minutes inaccurate compared with 5 in June 2009.

<table>
<thead>
<tr>
<th>Accuracy (+/- minutes)</th>
<th>June 2009 (number of clocks)</th>
<th>December 2010 (number of clocks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;=2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>+2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>+1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>0 (accurate)</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>-1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>-2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>&gt;-2</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

Discussion: After the initial audit the purchase of radiocontrolled clocks was recommended, which would be an easy and relatively cheap method to reduce the medicolegal risk inherent in inaccurate medical documentation. This did not initially materialise, and although there has been some improvement in clock accuracy a potential 6 minute inaccuracy could still have occurred in this ‘snapshot’ when a sequence of clocks is used. The clocks have now been ordered following these audits and risk assessment by the obstetricians.

References

P78 Nausea and vomiting after intrathecal diamorphine: closing the audit loop
SJ Hill, GR Lyons, R Wilson, H Mcleod, E Mcdonnell
Obstetric Anaesthesia, Leeds Teaching Hospitals NHS Trust, Leeds, UK

Introduction: Intrathecal diamorphine 400 lg is used to improve perioperative analgesia during caesarean section, but is associated with a 56% incidence of postoperative nausea or vomiting.1 We aimed to measure the incidence of nausea and vomiting due to intrathecal diamorphine following the introduction of prophylactic cyclizine.

Methods: During 8 months in 2009, 68 women planned for elective caesarean section under combined spinal-epidural anaesthesia were audited. They all received 400 lg of intrathecal diamorphine and a 50mg prophylactic dose of cyclizine after delivery. During the first 24 perioperative hours they were questioned about incidence of nausea, vomiting, and requests for additional anti-emetics. Incidence of side effects of cyclizine administration and intraoperative intravenous opioid requirements were also noted.

Results: 10 (15.2%) patients experienced nausea of whom 7 (10.6%) also experienced vomiting in the first 24 hours. 42 (63.6%) patients had a heart rate of greater than 100 beats/min, and 7 (10.6%) greater than 130 beats/min. 1 (1.5%) patient had atrial ectopics. No patient reported any antimuscarinic side effects. 3 (5%) patients required intraoperative supplementation with alentanil.

Discussion: The reported incidence of nausea and vomiting associated with caesarean section varies between 20-70%, with use of intrathecal opioids accounting for the higher incidence. The introduction of cyclizine prophylaxis has reduced rates of both nausea and vomiting by 41%. Although the number needed to treat for cyclizine is approximately 5 the incidence and significance of side effects attributable to cyclizine is minor. The routine addition of a cheap, safe prophylactic antiemetic has dramatically improved our patients’ experience.

Reference
P79 A prospective survey of anaesthetic practice for laser ablation in twin-twin transfusion syndrome

TM Dav-Thompson, E McDonald, Y Poonawala
Department of Anaesthesia, Birmingham Women's Hospital, Birmingham, UK

Introduction: Twin-twin transfusion syndrome (TTTS) is a complication of monochorionic twin pregnancies characterised by intertwin blood exchange from donor to recipient fetus via placental vascular anastomoses. Optimal treatment, fetoscopic laser coagulation (FLC) involves insertion of a fetoscope into the amniotic cavity of the recipient fetus, fluid instillation and lasering of selected aberrant vessels. A retrospective survey of our anaesthetic practice identified a need for prospective reassessment of the management of intraoperative complications associated with anaesthesia for this procedure.

Methods: Anaesthetic practice for a prospective cohort of patients undergoing FLC for TTTS was studied at our centre from July 2009 to December 2010 using a standardised questionnaire. Data collected included primary anaesthetic technique, incidence of maternal movement and prophylactic or therapeutic use of supplemental analgesia, vasopressors and antiemetics.

Results: Data were collected for 48 FLC procedures (46 under spinal anaesthesia, 2 local anaesthetic). Mean gestation was 19 weeks [range 16-26]. Mean spinal anaesthetic dose was 12.2mg heavy bupivacaine with 57% of patients receiving additional spinal fentanyl (mean dose 17.9µg). Median [range] block height to cold was T4 [T7-T1], in all cases this was above level of fetoscope insertion. Mean [range] duration of surgery was 43 min [20-75]. Intraoperative maternal movement not associated with the complications in the following table occurred in 2 cases and was treated with sedation.

Table: Interventions for intraoperative complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>Intervention</th>
<th>Frequency (mean dose)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotension</td>
<td>Prophylaxis</td>
<td>42 patients (phenylephrine 1500µg)</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
<td>13 patients (phenylephrine 330µg)</td>
</tr>
<tr>
<td></td>
<td>Treatment of associated nausea and vomiting</td>
<td>5 patients (epidrine 12.6mg)</td>
</tr>
<tr>
<td>Nausea and vomiting</td>
<td>Prophylactic antiemetic</td>
<td>6 patients</td>
</tr>
<tr>
<td></td>
<td>Therapeutic antiemetic</td>
<td>3 patients</td>
</tr>
<tr>
<td>Pain</td>
<td>LA wound infiltration</td>
<td>2 patients</td>
</tr>
<tr>
<td></td>
<td>LA wound infiltration plus intravenous fentanyl</td>
<td>1 patient</td>
</tr>
</tbody>
</table>

Discussion: Surgical requirements for this intricate procedure preclude intraoperative maternal movement. Factors such as nausea and vomiting or pain despite adequate spinal block are significant complications. Recognition and preemptive treatment of these factors can improve surgical conditions.

Reference

P80 A survey of obstetric anaesthesia and analgesia in the Czech Republic in 2009

A Parízek, J Blaha, P Noskova
Department of Obstetrics and Gynecology, Charles University, Prague, Czech Republic

Introduction: In 2009, there were 116,500 deliveries and 118,348 babies born in the Czech Republic (The Office of National Statistics of the Czech Republic). The aim of our work was to analyse the usage and trends of various obstetric anaesthetic and analgesic methods. We have performed the same survey in 1993, 1994, 1996, 1998 and 2002.

Methods: In 2010, we sent a questionnaire to the heads of all maternity units and respective anaesthesia providers in the Czech Republic (98 units in total). We asked about the methods of obstetric anaesthesia and analgesia used for each type of delivery.

Results: From 98 maternity units, 56 (57%) heads of obstetric departments and 36 (37%) heads of anaesthesia departments returned questionnaires. In total, we obtained a survey of methods for 78% (91,000) of births in the Czech Republic in 2009. According to respondents, 21.8% (19,838) of pregnancies ended with caesarean section, and 2.6% (2,366) with forceps/vacuum extraction. For caesarean section, 59.9% (11,882) used a neuraxial anaesthetic method. Of these, spinal anaesthesia was used in 69.9% (8,305), epidural anaesthesia in 29.9% (3,553), and combined spinal-epidural anaesthesia in 0.2% (24) of cases. For spontaneous births, 32.1% (29,211) of women gave birth without analgesia, 30.1% (27,391) used some non-pharmacologic method, and 17.8% (16,198) were given pethidine. Epidural analgesia was used in 14.9% (13,559) of vaginal births. Epidural analgesia in the Czech Republic is offered in 91% (89) of maternity units, and 90% (88) offer 24-hour service giving epidural analgesia for spontaneous births. In 83% (81) of maternity units, epidural analgesia for spontaneous births is fully covered by health insurance.

Discussion: Before 1990, caesarean sections in the Czech Republic were almost exclusively performed under general anaesthesia. Systemic analgesia with pethidine was the main analgesic method used for spontaneous deliveries during this period. The development of obstetric analgesia, and of regional analgesic methods in particular, has been supported by a system of interdisciplinary postgraduate programmes for obstetricians, anaesthetists and midwives.

Acknowledgement: The authors would like to thank Dolenska Sylva, MD for her help with the preparation of the questionnaire.

Reference