Abstracts of free papers presented to the Obstetric Anaesthetists' Association annual meeting in Edinburgh, UK on 3–4 May, 2001

Oral Presentations
O01–O12 210–215

Posters with Discussion
PD01–PD18 216–224

Poster Presentations
P01–P50 225–249

(Poster number 41 is not published in this journal, by the author's request)
Comparison of true 15° table tilt vs. full lateral position after induction of spinal anaesthesia for caesarean section

SGO Rees, JA Thurlow, IC Gardner, MJL Scrutton, SM Kinsella
St Michael's Hospital, Bristol, UK.

Introduction: Following spinal injection in the right lateral position for caesarean section, the supine position with left tilt is more convenient than the full left lateral position but may be associated with aortocaval compression. This study assessed the difference between these two positions.

Methods: 60 subjects were randomised to either a measured left 15° table tilt (n=31) or left lateral (n=29) position for 15 min after spinal bupivacaine injection for caesarean section. Ephedrine was administered according to a strict protocol. Maternal arm and leg blood pressure, heart rate, ephedrine dose, symptoms and block height, fetal heart rate, umbilical cord gases and Apgar scores were recorded.

Results: One subject was withdrawn from each group. There were no significant differences between groups in maternal heart rate, arm systolic arterial pressure (SAP), ephedrine dose, fetal heart rate or cord gases. Mean (SD) maximum percentage decrease in leg SAP was greater in the tilt group 34.6 (11.1) % vs. 24.6 (10.4) % [P<0.001]. Median block height was one segment more cephalad in the tilt group at 5, 10 and 15 min [P<0.05]. Apgar scores were lower and maternal symptoms more frequent in the tilt group but these differences did not reach statistical significance.

Conclusion: Following induction of spinal anaesthesia the left 15° table tilt position is associated with aortic compression and potential fetal compromise. Women should spend the minimum time feasible in this position before caesarean section, especially in the presence of fetal hypoxia.

Reference:

Epidural catheters that fall out in labour; is back pressure to blame?

CB Collier MD, MRCP, FRCA, FANZCA
Dept. of Anaesthesia, Royal Hospital for Women, Sydney, Australia

Introduction: The dislodgement of catheters out of the epidural space during the course of labour is an uncommon (1-3% incidence) but frustrating complication, which has usually been attributed to poor catheter fixation techniques, excessive patient movement or accidental traction on the catheter. However, a study of failed epidurals using epidurography has suggested that raised pressure in the epidural space may be a more common factor in the ejection of catheters.

Methods: An attempt has been made to investigate every patient, over the last 8 years, who suffered a failed block following dislodgement of an initially satisfactory multihole catheter and then had a second catheter inserted in an adjacent interspace. Following ethics committee approval, these patients were invited to undergo epidural contrast injection (Iohexol 10-13 ml) through both catheters with radiographic screening, on the first postpartum day.

Results: A total of 16 patients were investigated. In 15 of these, the epidurogram showed a markedly reduced pattern of contrast distribution. In 14 cases, a dorsal midline septum, or its lateral extensions, appeared partially to divide the epidural space, whilst in the other, extensive adhesions were present. In all patients, extravasation of contrast was detected from the epidural space, around the outside of the catheter, with leakage back into the erector spinae muscles and in some cases, escape through the skin puncture site.

Conclusions: No problems arose from the simultaneous presence of two catheters in the epidural space. The displacement of catheters out of the epidural space was usually associated with some structural anomaly that restricted the flow of epidural solutions. It is suggested that in the course of epidural bolus injections or continuous infusions, the greatly decreased capacity of the epidural space in these subjects leads to an excessive build-up in the space, with some retrograde flow of epidural solutions. Collection of extravasated fluid under the skin dressings may loosen whatever fixation device is in use and encourage catheter migration out of the epidural space.

Reference
O03. Epidural analgesia and funic acid-base balance: a meta-analysis

Felicity Reynolds, *Siv Sharma, Paul T Seed
St Thomas' Hospital London UK, *University of Texas, Dallas, USA

Introduction: Meta-Analysis of randomised trials confirms that epidural analgesia increases maternal hypotension and pyrexia, second stage duration and instrumental delivery, all of which may adversely affect the baby. Umbilical artery pH, reflecting both respiratory (dependent on maternal respiration) and metabolic components, is often used as a marker of the intrauterine environment although base excess (BE) is a better index of metabolic acidosis, and of importance to the newborn to compensate for respiratory difficulty.

Method: The literature was searched for studies (both randomised and not) comparing epidural with systemic opioid labour analgesia, in which umbilical cord blood was sampled at birth. If full acid-base data were not reported, we obtained unpublished figures for umbilical artery pH and BE. Random effect meta-analysis was conducted for randomised studies only and for all studies. Data were corrected for one published study, and results for long and short labours combined for another.

Results: 8 randomised and 4 non-randomised studies were identified for which mean and standard deviations (10 studies) or full data (2 largest studies) were obtained for pH. BE data were obtained for 4 randomised and 4 non-randomised studies - see table. There was no evidence of publication bias (Egger's test).

<table>
<thead>
<tr>
<th>Table. Differences (epidural – control)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
</tr>
<tr>
<td>pH random</td>
</tr>
<tr>
<td>pH all</td>
</tr>
<tr>
<td>BE random</td>
</tr>
<tr>
<td>BE all</td>
</tr>
</tbody>
</table>

Conclusion: Epidural analgesia has a favourable effect on funic pH and base excess. Including data from non-randomised studies does not materially affect this conclusion. This suggests that the known reductions in maternal stress and sympathetic tone that occur with epidural analgesia do indeed improve the intrauterine environment, despite the theoretical potential adverse effects.

References

O04. Obstetric outcome of teenage pregnancies in Cardiff

S E Harries, R Collis
Department of Anaesthetics, University Hospital of Wales, Cardiff

Introduction Teenage pregnancy often has a below average outcome in terms of higher rates of pre-term delivery, intrauterine death and low birth weight infants. Studies on adolescent mothers, however, also indicate that a spontaneous vaginal delivery is more likely and less obstetric intervention is required. This retrospective review examined data on teenage pregnancies in Cardiff from 1990-1998.

Method Using data from the Cardiff Births Survey, 2373 primiparous teenage pregnancies were studied over a 9-year period. Mode of delivery, use of regional analgesia for labour and choice of anaesthesia for emergency caesarean section were compared in age groups 14-15, 16-17 and 18-19 years. These data were then compared to a group of primiparous mothers aged 25-26 yr. All spontaneous and induced labours without medical or severe obstetric conditions were included.

Results The rate of spontaneous vaginal delivery decreased whilst the rate of interventional delivery increased with maternal age. Using the χ² test, this was highly significant (P value <0.001).

<table>
<thead>
<tr>
<th>Table: Mode of delivery in each age group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yr)</td>
</tr>
<tr>
<td>SVD</td>
</tr>
<tr>
<td>Instrum. del</td>
</tr>
<tr>
<td>Em. CS</td>
</tr>
</tbody>
</table>

Teenage groups had a mean epidural rate of 32.5%, compared with 59% in the 25-26 age group. Teenage mothers with labour epidurals showed a trend for increased instrumental delivery. However, this did not reach statistical significance. 3-6% of teenage mothers had instrumental deliveries without regional anaesthesia. Over 50% of teenage mothers had general anaesthesia for emergency caesarean section, despite working epidurals for labour in 26% of mothers. 8% of mothers aged 25-26 years had general anaesthesia for emergency caesarean section, of whom 5% had working epidural catheters in-situ.

Discussion. Even during teenage years, increasing maternal age is a predictor of a less favourable obstetric outcome. The least intervention for delivery occurred in the 14-15 age group. The high rate of general anaesthesia for caesarean section in teenagers, despite the presence of a functioning epidural catheter in some mothers, suggests an educational problem, which anaesthetists should consider.

References
O5. Platelet function in preeclampsia: platelet function analyser (PFA-100) vs thromboelastograph (TEG)

J R Davies, R Fernando, S Hallworth
Dept of Anaesthesia, Royal Free Hospital, London

Introduction: The PFA-100 is a new benchtop platelet function analyser which, by aspirating citrated blood through a 150-μm aperture in a collagen membrane, measures the speed of formation of a platelet plug in vitro, expressed as Closure Time (CT) in seconds. The device could rival existing tests, including the TEG, as an assessment of primary haemostasis before regional anaesthesia when platelet dysfunction is suspected. The aim of this study was to compare the performance of the PFA-100 and TEG in measuring platelet function in preeclamptic and healthy pregnant women.

Methods: Following ethics committee approval and informed consent, whole blood samples were taken from 80 healthy term women and 41 preeclamptics (sub-divided into mild and severe according to established criteria). Apart from routine obstetric screening tests, blood was collected in 105-mmol/litre, 3.2% buffered sodium citrate syringes for PFA-100 analysis. CT was measured after transfer of a 800-μl citrated blood sample into a PFA-100 test cartridge containing epinephrine as a platelet activator. Simultaneously, the maximum amplitude (MA) was measured with a TEG 3000 using 360 μl 1% celite-activated whole blood. Additional laboratory tests included fibrinogen and von Willebrand Factor (vWF) measurement. Statistical analysis included ANOVA and linear trend (P<0.05).

Results:

<table>
<thead>
<tr>
<th></th>
<th>Control n=80</th>
<th>Mild n=20</th>
<th>Severe n=21</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT (s)</td>
<td>103.2 (16.9)</td>
<td>112.6 (20.4)</td>
<td>139.2 (43.2)**</td>
</tr>
<tr>
<td>Platelets</td>
<td>265.3 (89.1)</td>
<td>230.8 (76.9)</td>
<td>187.8 (69.4)*</td>
</tr>
<tr>
<td>MA (mm)</td>
<td>73.8 (4.3)</td>
<td>73.1 (4.7)</td>
<td>72.2 (5.6)</td>
</tr>
</tbody>
</table>

There were no significant differences in patient characteristics, Hb, Hct, fibrinogen and vWF. CT increased significantly with severity of preeclampsia whereas MA did not differ between groups. In patients with platelet counts <100 (n = 5), CT was grossly elevated (mean = 239 s) whereas MA (mean = 61 mm) was just below our pregnancy 95% reference range (64-83 mm) for celite activated whole blood.

Conclusion: Impairment of primary haemostatic function with increasing severity of preeclampsia was revealed by the PFA-100 but not the TEG. The PFA may prove a more sensitive method of determining platelet dysfunction in preeclampsia with consequent implications for the safety of regional anaesthesia.

Reference


O6. Maternal anti-factor Xa activity following subcutaneous heparin after caesarean section

CA Stirrup, M Cox, DN Lucas, LJ Acton, C Costello, SM Yentis.
Chelsea & Westminster Hospital, London, UK.

Introduction: Venous thromboembolism is a leading cause of maternal mortality. While heparin requirements increase during pregnancy, little is known about the puerperium. We found that 49/50 maternity units used standard prophylactic doses of s.c. heparin after elective caesarean section in 1999, and that 5000 U is inadequate. We investigated 7500 U and 10 000 U s.c. heparin for their anti-Xa activity after caesarean section.

Methods: Our previous study involved hourly blood samples in 8 women after 5000 U heparin. After Ethics Committee approval and informed consent, a further 5 women were given 7500 U and anti-Xa activity was measured using a single-stage assay (Coamatic Chromogenics) at 3 h when peak activity occurs. Ten women were given 10 000 U and anti-Xa activity was measured hourly for 6 h.

Results: No patient receiving 7500 U and only two patients receiving 10 000 U achieved anti-Xa activity above 0.1 U/ml at any time, and in these two it was short-lived. Anti-Xa activity at 3 h suggested the lower end of a dose-response curve dose (Figure).

Conclusion: Even 10 000 U s.c. heparin is inadequate for achieving prophylactic anti-Xa activity. However, since anti-Xa activity may not correlate with efficacy, we are reluctant to increase the dose further based solely on anti-Xa. Given that enoxaparin 20-40 mg (within the non-pregnant range) may produce adequate anti-Xa activity, we suggest abandoning s.c. unfractionated heparin after caesarean section and using enoxaparin instead.

This study was supported by the Special Trustees of Chelsea & Westminster. DNL was supported by an OAA Fellowship.

References

O07. Postural stability following regional analgesia for labour
J Davies, R Fernando, S Verma, P Found, A McLeod
Dept of Anaesthesia, Royal Free Hospital, London, UK

Introduction: The safety of mobilisation following low dose regional analgesia for labour remains controversial. Previous studies have demonstrated preserved balance despite clinically-elicited sensory deficits. The new Balance Master 6.1 (NeuroCom Inc) posturography system allows for a computerised assessment of balance during different aspects of ambulation. Using posturography we studied the ability to perform basic manoeuvres following combined spinal epidural (CSE) labour analgesia, compared with pregnant (PC) and nonpregnant (NPC) controls.

Methods: Following ethics committee approval and informed consent, we performed an observational study of 150 women in three groups of 50. The CSE group received spinal analgesia (bupivacaine 2.5 mg + fentanyl 5 µg). A further epidural top-up of 10ml of bupivacaine 0.1% + fentanyl 0.0002% was given for inadequate spinal analgesia. CSE and PC (awaiting elective caesarean section) were compared to age-matched NPC. Posturography tests included sit-to-stand (STS), walking test (WT), step-and-quick-turn (SQT) and step-up-and-over (SUO: 20 cm high obstacle). Data were analysed using ANOVA and t-test.

Results: NPC mean weight and PC mean height were significantly less than the other groups.

<table>
<thead>
<tr>
<th></th>
<th>NPC (n=50)</th>
<th>PC (n=50)</th>
<th>CSE (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STS Rising index (%)</td>
<td>21.9 (6.6)</td>
<td>13.3 (6.4)</td>
<td>11.3 (5.1)*</td>
</tr>
<tr>
<td>WT Step length (cm)</td>
<td>47.4 (8.2)</td>
<td>41.9 (7.6)</td>
<td>40.4 (8.3)*</td>
</tr>
<tr>
<td>WT Speed (cm/s)</td>
<td>63.6 (13.1)</td>
<td>56.5 (15.0)</td>
<td>55.6 (12.3)**</td>
</tr>
<tr>
<td>SUO Lift up (%)</td>
<td>42.3 (8.3)</td>
<td>32.4 (6.3)</td>
<td>30.4 (7.8)*</td>
</tr>
<tr>
<td>SUO Movement time (s)</td>
<td>1.4 (0.2)</td>
<td>1.8 (0.4)</td>
<td>1.9 (0.6)*</td>
</tr>
<tr>
<td>SUO Impact index (%)</td>
<td>42.8 (14.1)</td>
<td>29.3 (10.7)</td>
<td>30.5 (8.3)*</td>
</tr>
</tbody>
</table>

*Rising index' and 'Lift up' measure force exerted during rising; 'Impact index' measures centre of gravity control on descent.

Pregnant women (PC, CSE), regardless of regional analgesia, had significantly reduced postural stability compared to NPC. In contrast to spinal analgesia alone, women within the CSE group receiving additional epidural top-ups (n=17/50) had significantly impaired STS sway, SUO lift up and SUO movement time.

Conclusion: Being pregnant at term significantly affects postural stability; low dose spinal analgesia does not impair function further. Following initial spinal analgesia for labour, subsequent epidural top-ups may potentially have a negative impact on postural control.

References:

O08. 15° lateral tilt for caesarean section: do we practise what they preach?
S Jones, SM Kinsella, F Donald
Departments of Anaesthesia, Southmead Hospital and St. Michael's Hospital, Bristol

Introduction: Crawford suggested that 15° lateral tilt should be used to reduce aortocaval compression at caesarean section. Morgan, however, noted that "estimating the angle [of lateral table tilt] by eye is grossly inaccurate, the true angle being much smaller than the estimated angle." The aims of the study were to determine the routine practice of anaesthetists in our institution, to examine their ability to estimate left lateral tilt and their awareness of the recommendations in the literature.

Methods: Anaesthetists were observed at elective caesarean section. After spinal insertion they were asked to position the patient with appropriate tilt, and then estimate the degree of tilt that they had used. The actual position was measured using a protractor with a suspended weight. The anaesthetist was also questioned on knowledge of published recommendations.

Results: 16 anaesthetists were assessed. None used more than 15° tilt and 12/16 used 11° or less, whereas 14/16 estimated that they had used 15° or more (figure). All but two overestimated the actual tilt they had used, although two others overestimated by only one degree. None underestimated tilt. Only four were unaware of the 15° recommendation, all being SHOs in their second year of anaesthetic training.

Conclusion: The degree of tilt used was usually substantially less than 15°, despite awareness of Crawford's recommendation. Most anaesthetists overestimated the amount of tilt that they had used. We believe that inadequate left lateral tilt should always be considered if maternal cardiovascular compromise occurs during caesarean section.

References:
O09. Time to abandon ethyl chloride and pin-prick?
Loss of differentiation of sensory modalities during onset of spinal anaesthesia using bupivacaine and diamorphine for elective caesarean section.
J Edgar, VA Clark
Simpson Memorial Maternity Pavilion, Lauriston Place, Edinburgh EH3 9YW

Introduction: Using heavy bupivacaine alone for spinal caesarean section, differentiation of sensory modalities to cold, pin prick and touch has been demonstrated. We investigated whether this differentiation is maintained or eradicated when opioid is added to spinals for caesarean section, a common practice in some units.

Methods: In a prospective observational study, 21 women, providing 63 observations, were studied using a standardised spinal technique of 2.7 ml of hyperbaric bupivacaine 0.5% and diamorphine 0.3 mg. Cold (ethyl chloride), pain (pin prick) and touch (cotton wool) were used to assess height of block 10, 30, 60, 90 and 120 min after spinal anaesthesia.

Results: All patients achieved a block above T5 to all modalities. No patient had intraoperative pain. There was no difference in the highest unblocked segment for the 3 modalities at 10 and 30 rain. Touch was significantly lower than pain and cold 60, 90 and 120 min after spinal anaesthesia.

Discussion: It is controversial which modality to choose to test block adequacy. Ethyl chloride is used in several units in the UK. It is expensive, environmentally unfriendly and explosive. Pin prick is unpleasant and may frighten the patient. Cotton wool is cheap, readily available and non-threatening. Anaesthesia to all modalities including touch to T5 at 10 min was associated with pain-free caesarean section.

Conclusion: This study demonstrates that touch using cotton wool is a reliable method for testing block height 10 and 30 min after spinal anaesthesia. Is it not therefore time to abandon ethyl chloride and pinprick as testing techniques for spinal anaesthesia?

References

O10. Intrathecal opioid anaesthesia for caesarean section and postoperative morphine consumption.
CM Cowan, PM Barclay, JB Kendall, RG Wilkes
Liverpool Women's Hospital, Crown Street, Liverpool.

Introduction: Use of intrathecal opioid for caesarean section under spinal anaesthesia can influence postoperative analgesic requirements.1

Methods: 75 patients for elective caesarean section under spinal were randomised to receive 2.75 ml heavy bupivacaine with one of three intrathecal adjuvants; saline 0.9%, fentanyl 20 μg and diamorphine 300 μg. PCA analgesic consumption was recorded for 24 h postoperatively. Data were analysed using ANOVA, with Bonferroni post-hoc test for multiple comparisons.

Results: Patients who received fentanyl or diamorphine required less analgesic than those in the control group until 4 h postoperatively. Thereafter, only those who received diamorphine continued to consume less, those who had fentanyl exhibited a degree of catch-up with their analgesic requirements. Data are shown in Fig 1.

![Figure 1. PCA morphine consumption according to intrathecal adjuvant group. (mean & 95% C.I.)](image)

Conclusion: Intrathecal opioids exert an agent-dependent effect on analgesic requirements after caesarean section. In this regard, diamorphine significantly reduces requirements for at least 24 h, whereas fentanyl has little effect beyond 4 h, when compared to a control group.

References:
O11. Anaesthesia for emergency caesarean section in women already receiving epidural analgesia.

P Cole, M Dresner, J Stockwell, J Freeman.
Obstetric Anaesthesia, Leeds General Infirmary, UK.

Introduction: Spinal anaesthesia is the technique of choice for elective caesarean for most UK anaesthetists for reasons of speed and efficacy. However, the same anaesthetists are likely to use their less favoured choice of epidural anaesthesia for emergency cases when an epidural catheter has been previously sited for analgesia. Of five patient complaints about pain during caesarean section over 3 years in our unit, all received topped-up epidural anaesthesia. With this experience in mind, is epidural anaesthesia effective and safe enough for emergency caesarean section compared to spinal anaesthesia?

Methods: The last 100 emergency sections performed under epidural anaesthesia in our unit were compared with the last 100 spinals for patient satisfaction scores, intravenous/inhalational drug supplementation, and conversion to another form of anaesthesia. Also, the total dose of local anaesthetic used was compared to the toxic dose for a 100-kg woman. Regimens for epidural and spinal anaesthesia were standardised, with all patients receiving diamorphine either 3 mg epidurally or 300 μg intrathecally. Data was retrieved from anaesthetic charts and our audit database.

Results: There was no difference in satisfaction scores between the groups, with over 90% judging their anaesthesia as "excellent". There was a greater use of supplements in the epidural group (P<0.001).

Table. The need for supplementation

<table>
<thead>
<tr>
<th>Supplementation</th>
<th>Epidural</th>
<th>Spinal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midazolam</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Alfentanil</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Entonox</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Alfentanil + Entonox</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Conversion to GA or spinal</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

Thirty patients in the epidural group received a theoretically toxic dose of local anaesthetic.

Conclusion: Patient satisfaction with epidural anaesthesia is high, but at the expense of using theoretically toxic doses of local anaesthetic in 30% of women, intravenous or inhalation supplementation in 17%, and abandoning the epidural in 5%. Spinal anaesthesia would therefore seem to be a safer and more reliable choice for emergency caesarean section. Before concluding that spinal anaesthesia should be used in preference to topping up existing epidurals, data on the risks of unexpected high blocks, spinal failure due to confusing epidural fluid as CSF, and the incidence of neural damage must be considered.

O12. Vascular responses in pregnancy and pre-eclampsia

C Beck, M Katovich, P Langevin
Departments of Anesthesiology and Pharmacodynamics, University of Florida, Gainesville, FL, USA

Introduction: Pre-eclampsia is a disease of unknown etiology, that remains a leading cause of fetal and maternal morbidity and mortality. During normal pregnancy, peripheral vascular resistance decreases. This allows the blood pressure to remain normal in the face of a rise in cardiac output. We have previously shown that vascular tone is reduced during pregnancy because of intrinsic changes in the vascular smooth muscle. We now present data demonstrating that changes in vascular tone are modulated by factor(s) circulating in the plasma.

Methods: Renal arteries from New Zealand White female (NZWF) rabbits were rubbed (endothelium removed), mounted on tension transducers and incubated in plasma from pregnant and non-pregnant NZWF or humans. After at least two hours incubation, pressor dose response curves were determined.

Results: Renal arteries harvested from non-pregnant animals hyporespond to pressors after they have been incubated in plasma from pregnant animals (figure). Vessels from pregnant animals demonstrate decreased tone. Preliminary data in humans are similar.

![Figure: Vascular reactivity in plasma.](image)

Conclusion: Factors circulating in plasma of pregnant animals decrease pressor response analogous to the reduction in pressor response seen in pregnant humans. This depressed response is demonstrable in rubbed vessels, indicating that vascular tone is mediated at the level of the smooth muscle rather than through the endothelium. The absence of such factors could contribute to pre-eclampsia.

References:
PD01. Thrombocytopenia in pregnancy: platelet function analyser (PFA-100) vs thromboelastograph (TEG)
J R Davies, R Fernando, S Hallworth
Dept of Anaesthesia, Royal Free Hospital, London

Introduction: The PFA-100 is a new benchtop platelet function analyser which, by aspirating citrated blood through a 150μm aperture in a collagen membrane, measures the speed of formation of a platelet plug in vitro, expressed as Closure Time (CT) in seconds. The device could rival existing tests, including the TEG, as an assessment of primary haemostasis prior to regional anaesthesia when platelet dysfunction is suspected. The aim of this study was to compare the performance of the PFA-100 and TEG in assessing platelet function within a variety of pregnancy disorders associated with thrombocytopenia (platelet count <150 x 10^9/L).

Methods: Following ethics committee approval and informed consent, whole blood samples were taken from 12 gestational thrombocytopenics (GTP), 2 immune thrombocytopenics (ITP), 9 thrombocytopenic preclampsics (PET) and 2 HELLP syndrome patients. All thrombocytopenic patients were further subdivided into 2 groups with platelet counts above ('TP>80') and below 80 x 10^9/L ('TP<80'). 80 healthy term women acted as controls. CT was measured after transfer of a 800 μl 3.2% citrated blood sample into a PFA-100 test cartridge containing epinephrine as a platelet activator. Simultaneously, the maximum amplitude (MA) was measured with a TEG 3000 using 360μl 1% celite cartridge containing epinephrine as a platelet activator. Data are mean (SD) * ANOVA, P<0.0001; 1 linear trend, P<0.0001

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocols exist</td>
<td>23 (86%)</td>
<td>2 (7%)</td>
<td>4 (14%)</td>
</tr>
<tr>
<td>Midwives can give all top-ups</td>
<td>17 (59%)</td>
<td>5 (17%)*</td>
<td>0</td>
</tr>
<tr>
<td>Aspiration before top-ups</td>
<td>7 (24%)</td>
<td>17 (59%)</td>
<td>3 (10%)</td>
</tr>
<tr>
<td>Anaesthetist called</td>
<td>8 (28%)</td>
<td>21 (72%)†</td>
<td>0</td>
</tr>
</tbody>
</table>

Discussion: It is debatable which is more worrying: that 7% of units do not have protocols for epidural analgesia or that 14% of trainees covering labour ward did not know whether protocols existed. Midwives' inability to give top-ups is still a problem in some units, limiting anaesthetists' freedom to prescribe certain epidural regimens. A substantial proportion of units allow midwives to give epidural solutions without aspiration first, often without calling an anaesthetist. Furthermore, in three units (10%), an instrumental delivery may be performed in the absence of an anaesthetist and with a midwife who is unable to top-up the epidural (in one unit, without an epidural protocol either). Maternity units (and obstetric anaesthetists in particular) apparently continue to leave themselves exposed to criticism or worse. It is unclear from our survey whether this reflects a lack of interest, lack of resources, or lack of awareness.

References:
PD03. Latex allergy in pregnancy: quality and availability of information on the Internet

OD Odejinmi and SM Yentis
Magill Department of Anaesthesia, Chelsea and Westminster Hospital, London, UK.

Introduction: Latex allergy is increasing and there is a need for greater awareness. We were interested in assessing information available on the Internet regarding this problem since increasing numbers of patients use this medium.

Methods: The Internet was searched using five search engines (Excite, AltaVista, Lycos, Google and Yahoo) for a combination of the terms “latex”, “allergy” and “pregnancy”, and the first 50 sites were visited. Each was scored 0-3 for relevance to obstetrics, accuracy of content, credibility of the website and inclusiveness of information (mention of gloves, urinary catheters, vaginal examination and anaesthetic equipment).

Results: Sites (out of the first 50 identified) scoring ≥ 2 for each category are shown below. Only two websites within each search engine scored ≥ 2 across all areas studied.

<table>
<thead>
<tr>
<th>Search Engine</th>
<th>Relevance</th>
<th>Accuracy</th>
<th>Credibility</th>
<th>Inclusiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excite</td>
<td>1 (2)</td>
<td>2 (4)</td>
<td>5 (10)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Alta Vista</td>
<td>5 (10)</td>
<td>5 (10)</td>
<td>3 (6)</td>
<td>6 (12)</td>
</tr>
<tr>
<td>Lycos</td>
<td>3 (6)</td>
<td>3 (6)</td>
<td>3 (6)</td>
<td>3 (6)</td>
</tr>
<tr>
<td>Google</td>
<td>5 (10)</td>
<td>10 (20)</td>
<td>3 (6)</td>
<td>5 (10)</td>
</tr>
<tr>
<td>Yahoo</td>
<td>1310</td>
<td>10 (20)</td>
<td>7 (14)</td>
<td>5 (10)</td>
</tr>
</tbody>
</table>

*n* = total number of “hits”

Conclusion: Although many sites are identifiable, most offer poor quality or unreliable information. With increasing use of the Internet by patients there is a need for better information and also from a respected and credible organisation. We suggest that the OAA is well-suited to this task given the imminent development of the OAA website and the specialist nature of the organisation, and we are preparing a proposal for such information.

References

PD04. Influence of position on the spread of local anesthetics in the epidural space during obstetric analgesia.

Department of Anesthesia and Reanimation, St. Elisabeth Hospital, Turnhout, Belgium; *Department of Anesthesiology, University Hospitals, Leuven, Belgium.

Introduction: The maternal position during and after epidural injection of local anesthetics is often assumed to be only of minor importance. In this study we looked for differences in sensory block between parturients in the left lateral position (LLP) and in the right lateral position (RLP).

Methods: After approval from the hospital ethics committee and informed consent, 66 women requesting epidural analgesia for labor were enrolled. Parturients received 0.125% bupivacaine 10 ml with epinephrine 12.5 µg and sufentanil 7.5 lxg, either in the LLP or in the RLP. After 20 min parturients in the RLP turned to the LLP; a second investigator, blinded for the initial position, measured the sensory block to pinprick at 20 and 30 min. Before the parturients received a top-up, the sensory block was measured again (“next”, see table). Student’s t-test and ANOVA were used to analyze the data; a P value of <0.05 was considered significant.

Results: Within each group there were more dermatomes blocked on the dependent than on the non-dependent side, with statistical significance at 20 and 30 min (P <0.05 for the RLP, P <0.001 for the LLP group). The number of blocked dermatomes on the left side at 30 min was significantly higher in the LLP group than in the RLP group (P <0.006, see table); the difference between the groups in the number of blocked dermatomes on the right side however did not reach statistical significance.

| Table: Mean number of blocked dermatomes at 3 moments in time in the two groups, RLP vs. LLP. |
|----------------------------------|-----------------|-----------------|-----------------|
|                                  | Left side       | Right side      |                 |
|                                  | 20 min | 30 min | next | 20 min | 30 min | next |
| RLP                              | 6.2    | 7.6    | 4.2  | 7.3    | 8.9    | 4.6  |
| LLP                              | 7.9    | 10.3   | 4.8  | 5.7    | 8.0    | 3.8  |

* = P <0.006

Conclusion: The results of this study confirm that the spread of local anesthetics in the epidural space is favored towards the dependent side. The absence of a statistically significant difference in the sensory block on the right side between the two groups might be due to the fact that patients in the RLP were turned on their left sides for the measurement of the sensory block. This would imply that the sensory block is not fixed 20 minutes after epidural injection.

Reference:
PD05. Evaluation of time variables following dural tap before epidural blood patch.
B A Crooks, J Morrison, E McGrady
Department of Anaesthesia, Glasgow Royal Infirmary University NHS Trust, Glasgow, Scotland.

Introduction: Epidural blood patching (EBP) is the recognised 'gold standard' treatment for post dural puncture headache (PDPH). No current guidelines on the optimum timing for this procedure exist. There has been a move toward earlier EBP due to heightened awareness, improved surveillance, earlier discharge, humanitarian, and medico-legal issues. Our institution perceived an increase in recent repeat EBP. This study was designed to assess the timing of EBP and also to determine the 'success' of the procedure on this basis.

Methods: Ethics committee approval was obtained for a retrospective cohort analysis of patients, following dural tap, receiving EBP in Glasgow Royal Maternity Hospital between 1994-1999 inclusive. Audit record data and communications diaries identified 138 patients. Casenotes were recalled and information extracted. Records of population statistics (age, weight, parity and gestation), specific data on dural tap recognition, onset of PDPH and EBP; assessment of success by means of resolution of symptoms and lack of further intervention were all collected.

Results: 12 000 regional blocks were carried out during the 6-year study period. Dural taps were recorded in 138 (1.15%), of which 77 (0.6%) had PDPH, and 42 (0.35%) received EBP. Population statistics (age, weight, parity and gestation) were comparable in all 6 years. Average time to onset of PDPH from dural tap was 31.3 h for epidural (18 gauge) and 35 h for spinal (24 gauge). Average time from dural tap to first EBP was 69.9 h for epidurals and 67 h for spinals. Analysis showed an increase of repeat EBP in the later years, from 1 to 2, up to 6 per year. Those requiring a second EBP averaged 42 h from dural tap to first EBP whilst those requiring only one averaged 74 h. Standard error of the difference between means giving a P value of <0.001.

Conclusions: This study found a statistically significant difference in the timing from dural tap to first EBP between those requiring one EBP and those requiring a second. Factors influencing the time scale to EBP need to be assessed. Certainly this study casts some doubt over the perceived benefits of earlier EBP.

References:
1. Reynolds F. Dural puncture and headache. BMJ 1993;306:874-6

PD06. Incidence of failure of upper limb automated blood pressure measurement during Caesarean Section
M Hamad, R Freeman, I Wrench
Department of Anaesthesia, Central Sheffield University Hospitals, Sheffield, South Yorkshire, U.K.

Introduction: During lower segment caesarean section automated blood pressure devices sometimes fail to measure one or more components of blood pressure when the cuff is applied to the dominant upper limb. We have studied the incidences and types of these failures among patients who had caesarean section under different anaesthetic techniques.

Method: We studied 106 patients who had elective and emergency caesarean section over a period of 12 weeks. 60 had spinal blocks, 36 had epidural blocks, and 10 had general anaesthesia. The non-invasive blood pressure was measured by an automated Datex monitor. The cuff was applied to the dominant upper limb. The systolic (SBP), diastolic (DBP), and mean (MBP) blood pressures were recorded minute-by-minute on a Laptop computer connected to the measuring device by a serial port cable, using a software developed on Visual Basic 6.

Results: In 34 out of 60 patients (56.6%) who had spinal blocks, the device failed to measure blood pressure on 137 occasions (total). The device failed to measure SBP on 33, DBP on 44, and all components on 60 occasions. In 24 out of 36 patients (66.6%) who had epidural blocks, the device failed to measure the blood pressure on 102 occasions (total). The device failed to measure SBP on 21, DBP on 39, and all the components on 42 occasions. In 1 out of 10 patients who had general anaesthesia, the device failed to measure the SBP on one occasion only.

Discussion: We have found automated blood pressure measurements to fail frequently during caesarean section under regional anaesthesia. This failure might be related to shivering or to movements during the operation. Even when the device failed to measure one component of blood pressure, other components were unreliable and differed from adjacent readings. Such failure of blood pressure measurement may be problematic when rapid changes of blood pressure occur, for example at the onset of regional anaesthesia. We feel that during caesarean section an automated blood pressure measurement using a cuff applied to the non-dominant upper limb or to the lower limb may carry less incidence of failure. We have a study in progress to prove or disapprove this hypothesis.

References
**PD07. Gastric emptying following elective caesarean section**

S Patel, G Roberts, P Barclay  
Department of Anaesthesia, Liverpool Women's Hospital, Crown Street, Liverpool.

**Introduction:** At present, women are routinely fasted for up to 24 hours following elective caesarean section. This practice is justified on the basis of altered gastrointestinal function in the early postoperative period, although there is little evidence to support this and early feeding has been shown to be safe in several recent studies. Our study aimed to investigate the physiological changes that occur in gastric emptying following elective caesarean section under spinal anaesthesia.

**Methods:** After ethics committee approval and informed consent, 10 patients undergoing elective caesarean section under spinal anaesthesia were recruited. A 1.5-g dose of paracetamol was given at the end of surgery and blood levels measured over a 2-h period to determine gastric emptying. This was then repeated on the third postoperative day to establish a baseline value for each patient.

**Results:** The mean time to peak paracetamol concentration (Tmax) was 81 min (SD 42.0) on day 0. This was significantly longer than Tmax on day 3, 24 minutes (SD 14.5), P<0.0021. The maximum paracetamol concentration (Cmax) and area under the curve (AUC) were also significantly reduced on day 0 than day 3.

**Figure 1:** Tmax on day 0 and day 3

**Conclusion:** Gastric emptying was found to be significantly delayed in the immediate postoperative period, as evidenced by a delay in delivery of paracetamol to its site of absorption in the duodenum. This would suggest that a period of starvation may be required until gastric emptying has returned to normal but further work is required in this area.

**References:**

**PD08. A national survey of acid aspiration prophylaxis before caesarean section**

R Taylor, L Sherman, F Donald  
Department of Anaesthesia, Southmead Hospital, North Bristol NHS Trust, Bristol

**Introduction:** Acid aspiration or Mendelson's syndrome is known to have contributed to maternal mortality following caesarean section. A national survey in 1992-3 showed that ranitidine and sodium citrate were the agents of choice for acid aspiration prophylaxis before elective and emergency caesarean sections. The authors also looked at previous surveys and commented that since 1984 the use of magnesium trisilicate had been abandoned. Our survey was designed to see whether practice had changed further since 1993.

**Methods:** Postal questionnaires were sent to the 255 obstetric units on the database of the Obstetric Anaesthetists Association. Lead consultants were asked to supply details of acid aspiration prophylaxis used in their unit.

**Results:** 176 completed questionnaires (69%) were returned to us and analysed. They showed that practice has not changed greatly since the 1992-3 survey (figure below including results from 1984 and 1988). Ranitidine and sodium citrate are still the agents of choice although 40% of units are adding metoclopramide compared with 29% in 1992-3. Only 1% of units are using proton pump inhibitors and magnesium trisilicate is not being used at all.

**Conclusions:** Choice of prophylaxis for acid aspiration has changed little since 1992-3. Proton pump inhibitors are not much used, despite their popularity in other areas of medicine. This suggests that obstetric anaesthetists consider ranitidine and sodium citrate to be safe and effective acid aspiration prophylaxis before caesarean section.

**References:**
PD09. An audit of patient controlled epidural analgesia during labour
IC Shaw I Wrench
Department of Anaesthesia, Jessop Hospital for Women, Sheffield, S10 2TP.

Introduction: We have compared the effectiveness of a Patient Controlled Epidural Analgesia (PCEA) system with the results of a Combined Spinal-Epidural (CSE) technique that we have previously presented.

Methods: A standard epidural was sited. After an initial test dose, a bolus of fentanyl 50 μg was administered. The PCEA pump (Alaris IVAC P5000) was set up using a solution of 0.1% bupivacaine with fentanyl 2 μg/ml. A background infusion of 7 ml/h was supplemented by a bolus of 5 ml available every 20 min. Pain score, blood pressure, volume of infusion, sensory level and motor block were recorded hourly. A 10-ml rescue bolus of 0.25% bupivacaine was available if required. One hundred patients were audited.

Results: We found that the PCEA protocol gave parturients excellent analgesia with over 90% reporting either no pain or mild pain throughout their labour (fig 1). Compared with CSE a similar proportion required a rescue bolus (32% vs. 35%) however a smaller number required conversion to a standard epidural protocol (4% vs. 43%).

Fig 1. Pain scores

In an anonymous questionnaire the midwives reported the PCEA significantly reduced their workload. Review of the patients' notes showed a reduction in the frequency that the anaesthetist was contacted because of poor pain control (21% vs. 37%).

Conclusion: Having audited the success of the PCEA compared to the CSE, the department has elected to continue with the PCEA due its high patient satisfaction, the low pain scores recorded, the low conversion rate to standard epidural protocol and the reduction in workload for both the medical and midwifery staff.

References:

PD10. Haemodynamic changes caused by oxytocin during caesarean section under spinal anaesthesia.
A.J. Pinder, C. Calow, J. O'Riordan, M. Dresner, R. Johnson,
Obstetric Anaesthesia, Leeds General Infirmary, UK.

Introduction: The haemodynamic effects of oxytocin have been studied in women undergoing termination of pregnancy, but not during caesarean section under spinal anaesthesia. Marked but short-lived hypotension and tachycardia are well tolerated by healthy parturients, but women with cardiac disease may be at risk. As more such patients are presenting for caesarean section, we felt it appropriate to gain more knowledge of the haemodynamic profile of oxytocin.

Methods: Following ethics committee approval and informed written consent, 34 healthy parturients scheduled to undergo elective caesarean section were randomised to receive 5 or 10 units of oxytocin upon clamping of the umbilical cord. All patients received the same spinal anaesthetic and surgical technique. ECG, pulse oximetry, non-invasive blood pressure and cardiac output (bioimpedence cardiography) were monitored at baseline before oxytocin administration and at 30-s intervals for 5 min thereafter. Statistical analysis was with Student's T-Test.

Results: Clinically and statistically significant increases in cardiac output occurred after both doses of oxytocin. Similarly, both groups showed 50% increases in heart rate. Changes in blood pressure were minimal. Haemodynamics returned to baseline by 2 min in each group.

Conclusion: Oxytocin does not greatly affect blood pressure in healthy women by virtue of marked compensatory increases in heart rate and cardiac output. Parturients with cardiovascular disease may not be able to mount such responses, with the consequent risk of haemodynamic collapse. We conclude that bolus doses of oxytocin should not be given to patients with fixed cardiac output.

Reference
PD11. Antenatal anaesthetic clinics prevent an increase in maternal anxiety

K D Rooney, S J Young, F Bryden, E McGrady
The Royal Maternity Hospital of Glasgow

Introduction: Our unit currently admits patients for elective caesarean section on the day of surgery. Absence of the preoperative visit on the night before theatre results in the loss of an opportunity to reduce anxiety. A pilot study in our unit had shown these women to be anxious and poorly rested. The aim of this study was to assess the effectiveness of antenatal clinic counselling, by anaesthetists and midwives, as anxiety-reducing strategies.

Methods: After local ethics committee approval and patient informed consent, we performed a single blind randomised controlled trial, allocating 60 patients at their last antenatal visit to one of two groups. Group 1 received a standard preoperative explanation by midwives. Group 2 received a standard preoperative assessment, all by the same anaesthetist. Patients were then given a questionnaire, asking basic demographic details, questions on restedness, sleep pattern and a Spielberger state-trait anxiety inventory (form Y2). Patients were asked to complete these questionnaires at the clinic and on the day of operation. The setting was a tertiary referral hospital obstetric unit. Mann-Whitney U test was used to calculate significance for non-parametric data, and two sample T-test for normally distributed data.

Results: There were no significant differences in basic demographic details between the two groups.

<table>
<thead>
<tr>
<th>Clinic anxiety score</th>
<th>Operation anxiety score</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 40.5</td>
<td>47</td>
<td>0.0133</td>
</tr>
<tr>
<td>Group 2 43</td>
<td>47</td>
<td>0.0928</td>
</tr>
<tr>
<td>P value 0.5761</td>
<td>0.1384</td>
<td></td>
</tr>
</tbody>
</table>

In addition, group 1 had a significantly reduced rested score (5) preoperatively compared to (6) in the clinic (P=0.0474), while the fall in score of group 2 was not significant (P=0.6587).

Conclusion: Women undergoing elective caesarean section are very anxious. In our study, the anaesthetic clinic prevented a significant rise in anxiety on the day of theatre, and prevented a significant fall in self-reported restedness. Anxiety and disturbed sleep are multifactorial, anaesthetic clinics by providing an opportunity for information and discussion, have a role to play in anxiolysis.

References:


J A Kenningham, F M Dodd
Department of Anaesthesia, Wythenshawe Hospital, Manchester, M23 9LT

Introduction: The survival of patients with cystic fibrosis has increased from less than 1 year in 1940 to over 30 years at present, and it is now not uncommon for such patients to become pregnant. The potential for critical maternal respiratory problems, intrauterine growth retardation (IUGR), and premature labour has been examined in two studies. We examined the 12 pregnancies in our regional unit over the past 7 years in relation to the risk factors identified by these authors, hoping to isolate criteria to alert the physician to those with cystic fibrosis who are likely to have problems.

Method: A retrospective study of the case notes relating to these pregnancies, looking particularly at pre-pregnancy FEV₁, pre-pregnancy weight, and weight gain during pregnancy.

Results: All the patients were delivered prematurely by caesarean section due to deteriorating lung function (with or without IUGR) between 26 and 38 weeks. The single important factor leading to early delivery was pre-pregnancy FEV₁ < 60% of that predicted for height and age. Seven babies were admitted to SCBU, of these 3 were ventilated. Uneventful anaesthesia was provided by meticulous epidural or combined spinal epidural techniques, and the epidurals were used for analgesia for 24 - 48 hours post partum. Care was provided in a high dependency facility on labour ward (or ICU for respiratory failure) and was multidisciplinary. All patients had uneventful recoveries and were discharged home within 7 days. Subsequently, 1 patient died from respiratory failure 9 months later, 1 has received and another is awaiting a lung transplant.

Conclusion: Our series shows that with a multidisciplinary approach it is possible for these patients to do well. Operative delivery was well tolerated because, unlike any other abdominal surgery in these patients, the delivery of the baby results in an immediate improvement in respiratory function towards the pre-pregnancy level. Our data supports the view that those patients with an FEV₁ <60% of predicted are more likely to deliver small, pre-term babies which require admission to SCBU.

References:
PD13. Patient-controlled epidural analgesia (PCEA) in labor. A comparison of bupivacaine 0.125% and ropivacaine 0.2%
S Evron, T Ezri, O Sadan, M Glezerman.
Department of Anesthesia and Obstetrics and Gynecology, Wolfson Medical Center, Holon, Israel.

Introduction: The aim of this study was to evaluate the effects of low dose bupivacaine 0.125% and ropivacaine 0.2% without opioid using PCEA on labor pain, motor blockade, mode of delivery and fetal outcome.

Methods: After institutional ethical approval and written informed consent, we enrolled 332 healthy parturients requesting epidural analgesia in a prospective, randomized study. They were at 37 weeks' gestation with spontaneous onset of labor and cervical dilation 3-4 cm. Following lumbar epidural catheter placement and a lidocaine test dose of 60 mg, they received by PCEA (IVAC P5000 Model PCAM) either bupivacaine 0.125% or ropivacaine 0.2% at a basal infusion rate of 5 ml/h with patient-controlled boluses of 5 ml available every 20 min with 30 ml/h limit.

Results: The results obtained are shown in Table 1. No intergroup differences were observed in demographic data, labor and delivery characteristics or fetal outcome. Epidural analgesia was equally effective in the two groups and in both stages of labor, as categorized by VAS. However, dose requirement was significantly lower in the bupivacaine group (P=0.001). Motor blockage of the lower limbs was significantly less with ropivacaine than with bupivacaine.

Conclusion: Bupivacaine 0.125% and ropivacaine 0.2% without opioid were shown to be equally effective and safe by PCEA in labor and delivery. Although the doses of ropivacaine required were relatively higher, motor blockade of lower limbs was significantly less pronounced and less disturbing in labor. Therefore, ropivacaine would seem to be preferable because of its known lower toxicity.

Table 1. Characteristics of regional anesthesia

<table>
<thead>
<tr>
<th>Bupivacaine</th>
<th>Ropivacaine</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=106</td>
<td>n=172</td>
</tr>
<tr>
<td>Dose (mg/h)</td>
<td>17.7 ± 13.7</td>
</tr>
<tr>
<td>VAS 1st Stage</td>
<td>10.3 ± 5.9</td>
</tr>
<tr>
<td>VAS 2nd Stage</td>
<td>11.1 ± 5.6</td>
</tr>
<tr>
<td>Bromage Score 1st Stage (% of patients) *</td>
<td>Score - 0</td>
</tr>
<tr>
<td></td>
<td>Score - 1</td>
</tr>
<tr>
<td></td>
<td>Score - 2</td>
</tr>
<tr>
<td>Bromage Score 2nd Stage *</td>
<td>Score - 0</td>
</tr>
<tr>
<td></td>
<td>Score - 1</td>
</tr>
<tr>
<td></td>
<td>Score - 2</td>
</tr>
</tbody>
</table>

* P<0.001

References:
1. Owen M, D'Angelo R, Gerancher JC et al. 0.125% Ropivacaine is similar to 0.125% bupivacaine for labor analgesia using patient controlled epidural infusion. Anesth Analg 1998; 86: 527-531.

PD14. Survey of UK trainees' experience of obstetric anaesthesia
T Meek, V Bythell
Royal Victoria Infirmary, Newcastle upon Tyne, UK

In October 2000 we sent a questionnaire to all SpRs in two UK schools of anaesthesia (Northern and Imperial Schools) asking for specific data regarding trainees' obstetric anaesthesia experience. To date 59 questionnaires have been returned out of a total of 205 sent (28.8%). Data obtained so far are presented in the table below.

Results:

Table 1. Number of cases conducted [Median (range)]

<table>
<thead>
<tr>
<th>Supervised GA CS</th>
<th>Unsupervised GA CS</th>
<th>CSE for labour analgesia</th>
<th>Epidural for labour analgesia</th>
<th>Epidural for CS</th>
<th>Spinal / CSE for elective CS</th>
<th>Spinal / CSE for emergency CS</th>
</tr>
</thead>
<tbody>
<tr>
<td>All SpRs (n=59)</td>
<td></td>
<td>8 (0 - 400)</td>
<td>16 (0 - 2100)</td>
<td>2.5 (0 - 200)</td>
<td>161 (20 - 500)</td>
<td>35 (3 - 262)</td>
</tr>
<tr>
<td>SpR 4/5s (n=18)</td>
<td></td>
<td>10 (0 - 30)</td>
<td>20 (8 - 200)</td>
<td>3 (0 - 200)</td>
<td>180 (62 - 400)</td>
<td>34 (17 - 200)</td>
</tr>
</tbody>
</table>

CS = caesarean section

Table 2. Major problems and the number of trainees (%) with no experience of them.

<table>
<thead>
<tr>
<th>All SpRs (n=59)</th>
<th>SpR 4/5s (n=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major haemorrhage</td>
<td>2 (3.4)</td>
</tr>
<tr>
<td>Failed intubation</td>
<td>37 (62.7)</td>
</tr>
<tr>
<td>Eclampsia</td>
<td>13 (22.0)</td>
</tr>
<tr>
<td>Pre-eclampsia requiring caesarean section</td>
<td>3 (5.1)</td>
</tr>
</tbody>
</table>

In addition 43 failed intubations were reported out of a total of 4801 general anaesthetics for caesarean section. This incidence (0.89%) is higher than that generally reported from UK obstetric units.

Conclusions: We are now sending out repeat questionnaires in order to improve the response rate. Nevertheless, we feel that the above data support the widely-held view that the experience of current trainees in some areas of obstetric practice (particularly general anaesthesia) gives cause for concern. We suggest that there is a need to explore ways of maximising training opportunities in obstetric general anaesthesia.

Acknowledgement:
We wish to thank Organon-Teknika for providing respondents to the survey with a pocket anaesthesia reference text.
PD15. Efficacy of obstetric regional blocks in women with previous spinal surgery

S Comara, R Russell
Nuffield Dept of Anaesthetics, Oxford Radcliffe NHS Trust, Oxford, UK

Introduction: Previous spinal surgery may add to the complications of regional analgesia and anaesthesia, such as increased difficulty siting a block, increased risk of accidental dural puncture, and increased failure rate due to impaired spread of local anaesthetics. Some have even suggested that regional blocks are contraindicated in such women.

Methods: Five years’ experience of regional blocks for labour and delivery in women who had undergone spinal surgery were reviewed. Information on the nature of surgery, anaesthetic plan, type and efficacy of analgesia and anaesthesia, and labour outcome were recorded.

Results: The notes of 46 women relating to 58 deliveries were traced. 28 had had lumbar discectomy (most commonly at L4/5 or L5/S1), 13 scoliosis surgery, 4 spinal fusion (3 spondylolisthesis repair, 1 vertebral fracture stabilisation at L4/S1) and 1 spina bifida repair. In only 4 women were regional blocks considered contraindicated – 3 with extensive scoliosis surgery; one with spina bifida refused. Regional block was considered a possibility for the remaining 42 women. Of the 58 deliveries there were 40 labours. 22 regional blocks were sited for analgesia (15/22 discectomy; 6/15 scoliosis surgery; 1/3 fusion). Effective analgesia was achieved in 12 (80%) with discectomy, 5 with scoliosis surgery (83%) and the 1 fusion. Of the 40 labours, delivery was spontaneous in 26, there were 7 instrumental deliveries and 7 emergency caesarean sections. There were a further 18 non-urgent caesarean sections (13 discectomy; 2 scoliosis surgery; 3 fusion). Regional anaesthesia (spinal or CSE) was used in 16 and general anaesthesia in 2. Of the 16 regional blocks, 2 (1 discectomy; 1 scoliosis surgery) were inadequate and required conversion to general anaesthesia. One woman with scoliosis surgery had a difficult intubation. There were no documented accidental dural punctures.

Discussion: 68% of women with previous discectomy requested regional analgesia in labour with most producing effective pain relief. Those with scoliosis surgery were less likely to request regional blocks (40%), although, where used, they were equally effective. When spinal block was used for operative delivery, anaesthesia was adequate in 88%. Regional blocks may be considered for labour and delivery in women who have undergone spinal surgery.

Reference

PD16. Audit of waiting times for epidural analgesia for women in labour

S Francis, P Squire, C Barbrook, T M Bourne
Department of Anaesthesia, Leicester Royal Infirmary, University Hospitals of Leicester, UK.

Introduction: Our hospital operates an ‘epidural on demand’ service for women in labour. This audit was carried out to ascertain whether national standards were being achieved. This was to be tested by comparing waiting times for epidurals for women in labour against standards set by appropriate regulatory bodies. The standards are

A. ‘The time from informing the anaesthetist of the mother’s request until attending the women should ideally not exceed 30 minutes and, in any case, not exceed 60 minutes, other than in exceptional circumstances.’
B. ‘>80% of women with severe pain or in the second stage should be seen by the anaesthetist within 30 minutes of being called.’

Method: We audited prospectively all epidurals sited in labour over a six-week period. Data were collected by anaesthetists on forms that were read by an optical marker reader.

Results: During this period 207 epidurals were sited in labour. Of these, 165 were audited and the remainder had data missing. Out of 165 women audited, 139 (84%) were seen within the ideal 30 minutes. 157 (95%) were seen within 60 minute (target 100%). 36 out of 165 requested epidural analgesia in the second stage of labour. Of these, 29 (81%) were seen within 30 minutes (target >80%). 46 out of 165 that requested epidural analgesia were in severe pain. Of these 37 (80%) were seen within 30 minutes (target >80%).

Conclusions: Only one out of three standards were achieved. The other two results were very close to the standard. Multiple reasons were identified as causing the delay but none were repetitive enough for intervention.

References
PD17. Defining an aspiration test for identifying accidental intrathecal placement of epidural catheters

OD Odejinmi, SM Yentis
Magill Dept. of Anaesthesia, Chelsea and Westminster Hospital, London, UK.

Introduction: Aspiration is sensitive for detecting accidental intravenous placement of an epidural catheter, whilst most work on intrathecal misplacement has involved test doses. Although cerebrospinal fluid has been aspirated in cases of intrathecal misplacement, no study has defined the method of aspiration. Our aim was to define a reproducible aspiration test.

Methods: To simulate intrathecal misplacement, we placed the distal 4 cm of a blunt-ended multi-orifice Portex® 18-gauge epidural catheter horizontally into a 1-litre bag of Hartmann's solution containing glucose 500 mg and albumin 300mg, 10 cm below the meniscus. A vertical (nozzle-down) 5-ml syringe (B-D) was attached to the catheter and aspirated to the 2, 3, 4 or 5 ml mark in random order. The time to aspirate 1 ml of solution was recorded using three different catheters and four syringes, with and without an epidural catheter attached. Data were analysed using Mann-Whitney rank-sum test or Kruskal-Wallis test using Bonferroni's correction, with P < 0.05 taken as denoting statistical significance.

Results: Aspiration time was affected by the mark used (P = 0.004; Figure) and presence of a filter (P < 0.0001), but not by syringe or catheter. All aspiration times were ≤7.4 s and the maximum difference was under 1 s.

Discussion: Since aspiration was possible in ≤7.4 s in all cases, we suggest our "nozzle-down 5-ml syringe aspiration test" to the 3-ml mark for 10 s, with or without a filter. Inability to aspirate 1 ml during this time would indicate a negative test. We are currently validating the test in human subjects for its sensitivity and specificity.

References:

PD18. The vanishing art of obstetric general anaesthesia in the UK: implications for overseas trainees.

OO Nafiu, EO Elegebe,
Norfolk and Norwich Hospital NHS Trust, Norwich, UK

Introduction: Regional has largely replaced general anaesthesia for caesarean section in most UK obstetric units, a trend that is causing some concern. There are about 500 trainees from various countries training in the UK, who would be expected to return home as fully trained anaesthetists. These UK-trained anaesthetists may have difficulty providing safe obstetric general anaesthesia when they return home. We examine the training experience in obstetric anaesthesia between the UK and Ghana, a West African country.

Methods: We analysed the logbooks on obstetric anaesthesia kept by an overseas trainee (OON) while working in two centres. The overseas logbook was compiled at the Korle Bu Teaching Hospital (KBTH), Accra, Ghana, a tertiary institution with an annual delivery rate of about 18 000 and a caesarean section rate of 22%. The UK logbook was compiled while working at West Suffolk Hospital (WSH), a 600-bed district general hospital with an annual delivery rate of 2800 and a caesarean section rate of 16%.

Results: 512 obstetric cases were recorded in the logbook from the KBTH. There were 446 caesarean section, 275 (62%) emergencies and 171 (38%) elective. 239 obstetric cases were recorded in the logbook from the WSH, mostly epidurals in labour. There were 114 caesarean sections, 72 (63%) emergencies and 42 (36%) elective cases. Procedures performed in the two centres are shown:

Discussion: General anaesthesia is more popular for caesarean section and other obstetric procedures in Ghana, due to the local belief that "operations are normally performed on sleeping patients". Trainees returning to senior anaesthetic posts in their countries may therefore have difficulty adapting to local practice. It is inappropriate for centres in the UK to modify anaesthetic practice to suit the needs of overseas trainees, but it may be imperative for the Royal College to inform sponsors of overseas trainees about this disparity in practice.

References
P01. Level of spinal needle insertion lower after OAA annual meeting in Winchester 2000

CD Newsom,
Department of Anaesthesia, Walsall Manor Hospital, Walsall, West Midlands

Introduction: At the Winchester 2000 OAA Annual Meeting, Prof F Reynolds presented a report of five cases of spinal cord damage following insertion of a spinal needle at L2-3.1 Because in 10% of adults the conus extends below L1/2 and anaesthetists may be up to 2 spaces higher than assumed, she recommended that "a spinal needle should not be inserted above L3". This advice was given to the anaesthetic department at the next audit meeting. In November, an editorial indicated that in 42% of cases the conus may extend below LI/2 and the error may be up to 4 spaces.2

Methods: The labour ward database was examined using SQL and the levels of insertion of all spinals performed on labour ward during 2000 were reviewed (4 months before and 7 months after the May audit meeting).

Results: 496 spinals were recorded in the database but 126 were excluded as data on the space used was not available. Data for the month of May was excluded from statistical analysis as part fell before and part after the audit meeting. The levels of insertion Jan to Apr were 0(0%), 31(36%), 55(63%), 1(1%), and Jun to Dec 1(1%), 48(19%), 193(78%), 5(2%) at L1/2, L2/3, L3/4, & L4/5 respectively. (P =0.02, ~2)

Figure: Percentage of spinals at each level during 2000.

Conclusion: The percentage of spinals performed at L2/3 (or higher) in Walsall fell from 36% to 20% as a direct result of Professor Reynolds' paper presented at Winchester in May 2000. The OAA Annual Meeting is an effective method of bringing about a change in obstetric anaesthetic practice.

References:

P02. Glycopyrronium for prevention of hypotension following CSE for elective caesarean section

M Rucklidge, J Durbridge, PK Barnes, SM Yentis
Magill Department of Anaesthesia, Chelsea & Westminster Hospital, London, UK.

Introduction: Previous studies found glycopyrronium reduced,1 increased2 or had no effect on maternal hypotension or ephedrine requirements following spinal anaesthesia for caesarean section. Since in these studies the subjects had a wide range of resting heart rates (HR), we studied those only with resting HR <80/min.

Methods: After ethical approval and written informed consent, healthy women presenting for elective caesarean section with a resting HR <80/min were randomised to receive glycopyrronium 2 µg/kg or saline after 12 ml/kg crystalloid, and before spinal anaesthesia with 2.6 ml heavy bupivacaine 0.5% + fentanyl 15 µg in the sitting position using a CSE technique. Those receiving saline were given ephedrine 6 mg on dural puncture and those receiving glycopyrronium were given saline, in a double-blind fashion. Women were laid supine with left-lateral tilt and further ephedrine 3 mg and fluid 200 ml given if BP fell ≥20% from baseline. Syntocinon 5 U was given slowly i.v. on delivery. A sequential analysis technique was used with α 0.05 and β 0.8, and a 50% reduction in ephedrine requirements as the primary outcome.

Results: The study was stopped after the 1st analysis of 20 patients. Baseline values and outcomes for glycopyrronium (G) or ephedrine (E) are shown below:

<table>
<thead>
<tr>
<th></th>
<th>G</th>
<th>E</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline HR (/min)*</td>
<td>83 (9)</td>
<td>72 (13)</td>
<td>0.56</td>
</tr>
<tr>
<td>Baseline MAP (mmHg)*</td>
<td>89 (10)</td>
<td>82 (11)</td>
<td>0.17</td>
</tr>
<tr>
<td>Max. HR (/min)*</td>
<td>103 (19)</td>
<td>101 (12)</td>
<td>0.47</td>
</tr>
<tr>
<td>Min. MAP (mmHg)*</td>
<td>54 (12)</td>
<td>56 (6)</td>
<td>0.79</td>
</tr>
<tr>
<td>Vol. crystalloid (ml)*</td>
<td>1878 (547)</td>
<td>1778 (353)</td>
<td>0.65</td>
</tr>
<tr>
<td>Ephedrine (mg)**</td>
<td>9 (0-48)</td>
<td>6 (0-33)</td>
<td>0.44</td>
</tr>
<tr>
<td>Nausea/vomiting (n)</td>
<td>5</td>
<td>5</td>
<td>0.5</td>
</tr>
<tr>
<td>Dry mouth (n)</td>
<td>4</td>
<td>4</td>
<td>0.5</td>
</tr>
</tbody>
</table>

*mean (SD); **median (range)

Conclusion: Even targeting patients with relatively low resting HR, we did not find any advantage in giving glycopyrronium before CSE for caesarean section.

References:
P03. A cardiologicaly dynamic investigation of the use of lateral tilt during spinal anaesthesia.

A Pinder¹, J Bamber ², M Dresner ¹
1. Leeds General Infirmary
2. Addenbrooks Hospital, Cambridge

Introduction: An informal survey revealed that most UK obstetric anaesthetists recommend 15° of left lateral tilt for preventing aortocaval compression. Results of an earlier study of term pregnant women did not support this traditional assertion, showing 2.5° to be adequate.¹ We have now repeated this study in pregnant women under spinal anaesthesia, where aortocaval compression would be expected to be more significant and the degree of tilt more critical.

Method: With local ethics committee approval, 25 women scheduled for elective caesarean section were recruited to the study. Maternal cardiac output was measured by bioimpedance cardiography (Bomed NCCOM3-R7 monitor) before and after the establishment of spinal anaesthesia, in each of three tilt position (2.5, 5 and 12.5°) in random order. The null hypothesis was that changing the magnitude of lateral tilt had no significant effect on maternal cardiac output before or after spinal anaesthesia. Statistical analysis was by a repeated measures model (SPSS v 9.0). The power of the study was 0.8 to detect a 20% difference in cardiac output at 0.05 significance level.

Results: Changing the magnitude of lateral tilt did not result in any significant differences in maternal cardiac output before or after spinal anaesthesia.

Conclusion: This study adds to our earlier work in providing no support for the assertion that 15° of left lateral tilt is necessary to prevent aortocaval compression in term pregnant women, before or during spinal anaesthesia. Whilst the accuracy of bioimpedence cardiography in pregnancy can be debated, it is a fact that most operating tables and wedges are incapable of producing a 15° tilt.

Reference:

P04. Hypotension during spinal anaesthesia for caesarean section

E Lapins
Department of Anaesthesia, Stradin's Clinical University Hospital, Riga, Latvia

Introduction: Maternal hypotension during spinal anaesthesia for caesarean section is a common problem.¹ Non-labouring patients who undergo elective caesarean section have an increased incidence of hypotension compared to those who undergo a period of labour.² This clinical observation was evaluated in prospective study.

Methods: After ethics committee approval and informed consent, 36 ASA I/II patients (23 non-labouring and 13 labouring) undergoing caesarean section were recruited. Hyperbaric bupivacaine 12.5 mg and fentanyl 10 µg were injected intrathecally in the sitting position after a 20-ml/kg fluid preload and 12.5 mg ephedrine infusion. T4 sensory block was assessed by lack of cold sensation. Hypotension (SAP <90 mmHg or <70% of baseline) was treated with 5-mg ephedrine boluses. The incidence of hypotension and ephedrine requirement were calculated. Results were expressed as mean ± SD and confidence intervals were calculated.

Results: There was no difference in demographic parameters between the two groups. No hypotension was reported in the labouring group, while there was an incidence of 43.4% (95% confidence interval 23 to 63%) in the non-labouring group. Ephedrine requirement was 24 ± 11.5 mg.

Conclusion: In this prospective study the incidence of hypotension was 43.4% among non-labouring patients but labouring patients had no hypotension, probably because pain stimulated the autonomic nervous system, which could stabilise the blood pressure during labour including spinal anaesthesia. These results should be interpreted cautiously because the numbers of patients is small in both groups and this hypothesis should be evaluated in further investigations.

References:
P05. An audit of the incidence of nausea and vomiting during elective spinal caesarean sections.
JD Crowson, J Elton
Department of Anaesthesia, Walsgrave Hospital, Coventry, West Midlands, UK

Introduction: Nausea and vomiting during spinal anaesthesia for an abdominal operation are distressing to the patient and make the surgical procedure more difficult to perform. The aim of this audit was to assess the incidence of nausea and vomiting (N+V) occurring during elective caesarean section under spinal anaesthesia. The anaesthetic technique recommended by the department was used, and the results compared against an agreed standard.

Methods: Eighty-eight patients were studied over a 5-month period. From a literature search, it was agreed that an acceptable standard of intraoperative N+V is 15%. The question we asked was, do we achieve this? The standard anaesthetic technique was as follows:-

- Ranitidine and sodium citrate pre-med. 14- or 16-gauge cannula. Metoclopramide 10 mg i.v. before the block.
- Sitting position, heavy bupivacaine 15 mg fentanyl, 25 µg 24-gauge atraumatic needle at L2/3 or L3/4.
- Ephedrine infusion (60 mg in 1000 ml Hartmann’s)
- Check BP every 1 min for first 10 min, then every 2 min until stable, thereafter 5 min.
- Supplemental oxygen via open face mask
- If hypotension occurs increase infusion +/- ephedrine bolus 3-6 mg. If symptoms of N+V correct any hypotension first, then if still a problem give ondansetron 4 mg i.v.

The occurrence of any N+V was recorded from the time of initiation of the block to discharge from recovery. Other factors recorded were adequacy of sensory block, any hypotension for greater than 2 min, exteriorisation of the uterus and fluid fasting times.

Results: Nine audit forms were discarded due to the use of a non-standard technique, leaving a sample size of 79 cases. An adequate sensory block was achieved in 98.7% of cases, and hypotension of >30% for 2 min occurred in 6.3% of cases. Four patients complained of persistent nausea only, and one patient had an episode of vomiting, giving an overall incidence of nausea and vomiting of 6.3%. Of the four patients who had nausea, one had evidence of hypotension and in two the uterus was exteriorised. All the symptomatic patients had their symptoms relieved with the restoration of normotension and/or the administration of ondansetron.

Conclusion: We found that, with the use of the above technique, the incidence of nausea and vomiting was much lower than is generally reported. Also, the technique proved to be effective and no adverse effects were identified. There were no cases of intractable nausea or vomiting. Fluid fasting times and uterine exteriorisation did not seem to have a significant effect. Perhaps this was because a good block (>T5) was obtained in all but one case and hypotension was avoided.

P06. Anaesthetic classification of caesarean section: relationship with fetal outcome.
DN Lucas, M Hasan, B Loughnan, PN Robinson.
Northwick Park Hospital, Harrow, Middlesex UK

Introduction: The classification of urgency of caesarean section has recently been revised in an attempt to improve communication between anaesthetists and obstetricians for non-elective caesarean sections. Our aim was to examine the relationship of the new classification with fetal outcome as determined by the Apgar score.

Methods: Caesarean section data and Apgar scores (at one and five minutes) were analysed retrospectively. The urgency of caesarean section was classified into four groups using the revised method, i.e. (1) Emergency - immediate threat to life of mother or fetus; (2) Urgent - maternal or fetal compromise which is not immediately life-threatening; (3) Scheduled - needing early delivery but no maternal or fetal compromise; (4) Elective - at a time to suit the woman and maternity team. Data were analysed using the Kruskal Wallis test, P < 0.05 denoting significance.

Results: Data from 464 consecutive caesarean sections over a six month period were analysed and are shown in table 1. There was no significant difference in one and five minute Apgar scores between the four groups.

Table 1 Median Apgar scores at 1 and 5 minutes for the four caesarean section groups

<table>
<thead>
<tr>
<th>Grade of urgency of caesarean section</th>
<th>No of patients</th>
<th>1-min Apgar (median)</th>
<th>5-min Apgar (median)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>27</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>166</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>123</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>148</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

Conclusion: This study does not show a correlation between Apgar scoring and relative urgency of caesarean section. However Apgar scoring, although widely used, is not a sensitive method of assessing fetal outcome. Cord blood gas analysis or neurobehavioural scoring may show a better correlation with the new classification. This retrospective study does show that life threatening or “true” emergency caesarean sections are relatively uncommon and account for only about five percent of all caesarean sections. By pinpointing this group the new classification should allow for better communication between health care professionals working in the delivery suite.

References:
P07. Choice of anaesthetic technique for caesarean section in women with placenta praevia

A Martin, S Rutter, C Grange, R Russell
Nuffield Department of Anaesthetics, Oxford Radcliffe Hospitals NHS Trust, Oxford, UK

Introduction: Haemorrhage associated with placenta praevia remains a significant cause of maternal mortality. Choice of anaesthetic technique for caesarean section in women with placenta praevia remains controversial, with regional anaesthesia being revisited as an acceptable technique. The aim of our study was to assess choice and outcome of anaesthetic technique for placenta praevia in our unit.

Methods: We analysed factors affecting the primary choice of anaesthetic technique in 64 consecutive cases of caesarean section for placenta praevia. Duration of surgery, blood loss, conversion to general anaesthesia, caesarean hysterectomy and/or blood transfusion were recorded.

Results: The four main indications for primary GA were: moderate/severe antepartum haemorrhage (n=5), obstetrician's and/or anaesthetist's preference (n=3), mother's preference (n=2), and fetal distress (n=1). Of these 11 women one required blood transfusion and none needed caesarean hysterectomy. Median duration of surgery was 43 min (range 26-51) and median blood loss was 750 ml (range 500-3000ml).

<table>
<thead>
<tr>
<th>Technique</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary general anaesthesia</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>Primary regional anaesthesia</td>
<td>53*</td>
<td>83</td>
</tr>
<tr>
<td>CSE</td>
<td>38</td>
<td>59</td>
</tr>
<tr>
<td>Spinal</td>
<td>9</td>
<td>14</td>
</tr>
<tr>
<td>Epidural</td>
<td>6</td>
<td>10</td>
</tr>
</tbody>
</table>

*3 cases of RA were converted to GA (5.7%)

In two of the three women in whom RA was converted to GA, hysterectomy was performed. In one of these cases GA was, in retrospect, unnecessary as bleeding was rapidly controlled. In all three cases of conversion RA was chosen in accordance with maternal preference and GA was induced after the delivery. Median duration of surgery in women who received RA was 38 min (range 24-152 min); median blood loss was 750 ml (range 300-5000ml)

Conclusion: Our results indicate the safety of RA in women with placenta praevia undergoing caesarean section. However, thorough preoperative assessment is vital. Preparation for prompt management of obstetric haemorrhage, senior staff involvement and explanation of need for conversion to GA are of paramount importance.

Reference:

P08. A cohort study of the subjective experience of a caesarean section under regional anaesthesia.

JF Down,* S Gowrie-Mohan†
*Centre for Anaesthesia, UCL, London and †Department of Anaesthesia, Lister Hospital, Stevenage, UK.

Introduction: In modern obstetric anaesthetic practice most caesarean sections performed under regional anaesthesia are pain-free but not sensation-free. We recognise this and warn patients they will feel something, but what best describes the sensation? Is the experience pleasant and would most women happily repeat it? This study attempted to answer these questions.

Method: We undertook a prospective, cohort study of all patients undergoing caesarean section under regional anaesthesia. Demographics, obstetric history and anaesthetic details were recorded. Patients were asked both open and closed questions about their experience and whether they would choose general or regional anaesthesia for any future caesarean section.

Results: We studied 106 consecutive patients undergoing caesarean sections (52 emergency and 54 elective) under regional anaesthesia (65 spinal, 26 epidural and 15 combined spinal/epidural). In total 6 patients described significant pain at some stage during the procedure but all of these said they would choose regional next time. Responses to closed questions are summarised in the figure. Open questioning revealed minimal additional information.

Figure: Responses to closed questions.
A: I felt as if someone was washing up in my abdomen.
B: I felt as if something was being taken out of my pocket.
C: I felt nothing at all.
D: I felt pulling and pushing.
E: It felt as if my insides were being pulled out.
F: I felt pain or discomfort.
G: None of the above.

In addition only 6% of patients found the experience unpleasant and 95% would choose regional anaesthesia in the future.

Conclusion: We conclude that most of our patients did feel sensations during the procedure and the phrase that most commonly described these was “pulling and pushing.” We also found that the majority of patients in our group found the experience of caesarean section under regional pleasant and would choose it again.
P09. Forewater amniotomy in theatre: is there a case for prophylactic regional anaesthesia?

NL Purdie and EM McGrady
Glasgow Royal Maternity Hospital, Rottenrow, Glasgow, UK.

Introduction: Forewater amniotomy is performed in theatre when the perceived risks of cord prolapse are high. Cord prolapse is an obstetric emergency that almost invariably requires abdominal delivery under general anaesthesia. Many anaesthetists administer prophylactic regional anaesthesia for this procedure. With this technique, should cord prolapse occur, surgery can begin immediately and the hazards of general anaesthesia are avoided. We were interested to review anaesthetic intervention associated with forewater amniotomy and the period of labour that followed, should urgent delivery not be required.

Methods: We conducted a 2-year retrospective review of case notes of women undergoing forewater amniotomy in theatre. The use of prophylactic regional anaesthesia and the incidence of cord prolapse were determined. In uneventful cases the duration of labour, uptake of regional analgesia and delivery outcome were recorded.

Results: Between 01/01/1999 and 31/12/2000, 24 women underwent forewater amniotomy in theatre. 62.5% of procedures were carried out during normal working hours and 45.8% had a consultant anaesthetist in attendance. Five received regional anaesthesia specifically for the procedure (3 CSE, 2 epidural). There were no cases of cord prolapse. The median (IQR) duration of labour following amniotomy was 323 (151.25 to 453.5) minutes. During labour six women requested epidural analgesia. Two women required spinal anaesthesia for caesarean delivery. Delivery outcome is shown in the table:

<table>
<thead>
<tr>
<th></th>
<th>Maternal elective before delivery</th>
<th>Fetal distress before delivery</th>
<th>All delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal FiO2</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>0.3 - 0.5</td>
<td>121 (33.0)</td>
<td>54 (14.8)</td>
<td>339 (91.8)</td>
</tr>
<tr>
<td>0.5</td>
<td>239 (65.3)</td>
<td>245 (66.9)</td>
<td>23 (6.3)</td>
</tr>
<tr>
<td>0.5 - 0.7</td>
<td>2 (0.5)</td>
<td>5 (1.4)</td>
<td>0</td>
</tr>
<tr>
<td>1.0</td>
<td>2 (0.5)</td>
<td>40 (10.9)</td>
<td>1 (0.3)</td>
</tr>
</tbody>
</table>

Conclusion: In our hospital, the incidence of cord prolapse complicating forewater amniotomy in theatre is rare. In addition, the uptake of regional analgesia during labour is no greater in this sub-population than that seen in comparable mixed parity groups. While general anaesthesia is to be avoided wherever possible in obstetric practice, this must be balanced against the potential morbidity associated with the use of prophylactic regional blockade.

P10. Maternal inspired oxygen fraction for caesarean section under general anaesthesia

Jane A Thurlow, S Michael Kinsella
Anaesthetic Department, St Michael's Hospital, Bristol.

Introduction: Standard textbook teaching recommends a maternal inspired oxygen fraction (FiO2) of 0.5 – 0.7 before delivery during elective caesarean section under general anaesthesia, with the aim of reducing fetal hypoxia. While acceptable neonatal oxygenation has been reported with a maternal FiO2 of 0.33, some recommend a maternal FiO2 of 1.0 when there is fetal compromise, in order to maximize oxygen transfer. We surveyed obstetric anaesthetists to gain an understanding of working practice in the UK.

Method: A questionnaire was distributed to 1000 members of the Obstetric Anaesthetists' Association regarding the maternal inspired oxygen concentration used during either elective caesarean section or caesarean section when there is fetal distress.

Results: 366 completed questionnaires were returned.

<table>
<thead>
<tr>
<th>Maternal SlO2 used at caesarean section</th>
<th>Maternal elective before delivery</th>
<th>Fetal distress before delivery</th>
<th>All delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal FiO2</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>0.3 - 0.5</td>
<td>121 (33.0)</td>
<td>54 (14.8)</td>
<td>339 (91.8)</td>
</tr>
<tr>
<td>0.5</td>
<td>239 (65.3)</td>
<td>245 (66.9)</td>
<td>23 (6.3)</td>
</tr>
<tr>
<td>0.5 - 0.7</td>
<td>2 (0.5)</td>
<td>5 (1.4)</td>
<td>0</td>
</tr>
<tr>
<td>1.0</td>
<td>2 (0.5)</td>
<td>40 (10.9)</td>
<td>1 (0.3)</td>
</tr>
</tbody>
</table>

The most frequent reasons for using a particular FiO2 were: to increase oxygen supply to the fetus, 'learnt practice', adequate maternal oxygenation, use of nitrous oxide and published evidence. Anaesthetists who use an FiO2 of 0.5 during elective caesarean section tend not to increase this when fetal distress is present.

Conclusion: The majority of anaesthetists continue to use a higher FiO2 before delivery than afterwards at elective caesarean section, despite the evidence that 0.33 may be adequate. A trend towards use of a higher FiO2 with associated fetal distress probably reflects the understanding that increasing maternal FiO2 increases oxygen transfer to the fetus.

References
P11. Effect of epidural morphine 1.0mg and 1.5mg on postoperative pain, pruritus and nausea: Comparison of cesarean section and abdominal gynecological surgery

Y Namba,* M Furuhashi**
*Department of Anesthesiology, HokkaidoEsashi Hospital, Esashi. **Second Department of Internal Medicine, Sapporo Medical University School of Medicine, Sapporo, Japan

Introduction: Epidural morphine provides excellent relief of postoperative pain but is associated with complications such as pruritus, nausea, respiratory depression and urinary retention.1 We compared the effect of two different doses of epidural morphine on postoperative pain relief, pruritus and nausea after cesarean section and after abdominal gynecological surgery.

Methods: All surgery was performed under epidural anesthesia. Fifty-three cesarean section (C/S) patients and sixty-five abdominal gynecological surgery (GY) patients were randomly allocated into one of four groups receiving either 1.0 or 1.5 mg of morphine epidurally before the end of surgery.

- C/S 1.0: epidural morphine 1.0 mg (n=28)
- C/S 1.5: epidural morphine 1.5 mg (n=25)
- GY 1.0: epidural morphine 1.0 mg (n=42)
- GY 1.5: epidural morphine 1.5 mg (n=23)

The patients evaluated their own symptoms (Pain and pruritus: 1= none or little; 2= tolerable; 3= intolerable; nausea: 1= none; 2= present). The Mann-Whitney test was used for statistical analysis.

Results: Results (n and %) are shown in the table below.

<table>
<thead>
<tr>
<th>Score</th>
<th>C/S 1.0</th>
<th>C/S 1.5</th>
<th>GY 1.0</th>
<th>GY 1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>17.8</td>
<td>10.2</td>
<td>13.1</td>
<td>15.5</td>
</tr>
<tr>
<td>2</td>
<td>53.6</td>
<td>48.4</td>
<td>48.4</td>
<td>48.4</td>
</tr>
<tr>
<td>3</td>
<td>28.6</td>
<td>44.8</td>
<td>44.8</td>
<td>44.8</td>
</tr>
</tbody>
</table>

* C/S 1.0 vs. C/S 1.5 (P= 0.0448); ** GY 1.0 vs. GY 1.5 (P= 0.0044); † GY 1.0 vs. GY 1.5 (P= 0.0312).

Conclusion: Increasing the dose of epidural morphine from 1 mg to 1.5 mg decreased postoperative pain in both C/S and GY groups but also increased pruritus in both C/S and GY groups in the incidence and severity of pain, pruritus and nausea.

P12. Are patient controlled analgesia systems needed after caesarean section?- an audit.

Hannah King, Siobhan Leith
Department of Anaesthesia, Arrowe Park Hospital, Wirral, UK

Introduction: We decided that patients undergoing caesarean section should have their postoperative pain audited in order to answer several questions, including whether patient controlled analgesia (PCA) is needed after caesarean section.

Methods: All patients undergoing caesarean section in a three-month period from 1/5/00 to 31/7/00 were included. The PCA system used was the Baxter wristwatch, a disposable patient controlled device which delivers a bolus of morphine 1 mg in 0.5 ml with a fixed lockout of 6 min. In addition to the PCA all patients were prescribed the departmental analgesia regime of paracetamol 1 g q.d.s. and piroxicam (Feldene melt) 20 mg o.d. following a first dose of piroxicam 40 mg unless contraindicated. The standard PCA form was reviewed and patient data were also collected from the theatre logbook and departmental computer records.

Results: In the three months audited a total of 135 patients underwent caesarean section and the PCA assessment charts of 120 (89%) of these cases were reviewed. Pain was assessed using a verbal rating scale (VRS 0-10) and mild pain was defined as a VRS score 0-3, moderate pain as a VRS score 4-6 and severe pain as VRS score 7-10.1 Analysing the median pain scores at rest for all patients showed that 80.7% had mild pain and no patients had severe pain at rest. Of the patients who had caesarean section performed under spinal 84% had mild pain at rest compared to 76% of general anaesthesia patients and 75% of epidural patients. The pain scores on movement 12 h postoperatively were also analysed and this showed that 58.4% of all patients had moderate pain and 32.7% had severe pain. Again the severity of pain varied with anaesthetic technique in that 52.6% of patients having general and 23.7% having spinal anaesthesia had severe pain. We compared these two groups for mild and moderate pain versus severe pain using Fisher's exact test which gives P=0.0277, which is statistically significant.

Conclusion: This audit has shown that the mean duration of PCA use was 45.5 h, the mean total dose of morphine was 64 mg and with the above analgesia regime, 32.7% of patients had severe pain on movement 12 h postoperatively. Therefore the use of PCA is justified because of the dose of morphine consumed and the inherent problems with intramuscular narcotics.

References:
P13. Comparison of diclofenac analgesic efficacy given by either intravenous/oral or rectal route to relieve pain after childbirth
Dimitri Verheeke, Fabienne Roelants, Patricia Lavandhomme.
Department of Anaesthesiology, Université Catholique de Louvain, St Luc Hospital, 1200 Brussels, Belgium

Introduction: Postpartum pain (perineal pain and uterine contractions) has an important impact on immediate quality of life. Few studies relate to analgesics to treat pain after vaginal delivery or compare two different routes of administration of the same drug at the same dose. The aim of this study was to evaluate the efficacy of diclofenac given orally by suppository to relieve perineal and uterine contraction pain after vaginal delivery.

Methods: All parturients (n=70) received epidural labour analgesia (ropivacaine, sufentanil). Immediately after vaginal delivery, group R (n=36) received rectal diclofenac 100 mg, repeated every 12 h as needed. Group IV/PO (n=34), received intravenous diclofenac 100 mg followed after 12 h by oral diclofenac 50 mg as needed (max 3 doses). Oral paracetamol was available for all patients on request. Scores of epidural analgesic efficacy (0: no sensation; 1: light perception; 2: no analgesia), perineal injury (1: episiotomy; 2: tear; 3: intact), instrumentation (0: none; 1: forceps) and baby weight were recorded. Pain scores (VAS: 0-10) for perineal pain and uterine contractions were assessed at 12, 24, 48, 72 h and day 4 after delivery. Statistical analysis used Student’s t test and χ². P ≤0.05 was considered significant.

Results: There were no significant difference between groups in patients parameters, perineal sensitivity, baby weight or perineal injury. Perineal VAS at 12 h was 1.8 ± 1.9 in group R and 3.2 ± 2.6 in group IV/PO (P = 0.03). Fewer women (5/36) needed oral paracetamol in group R than in group IV/PO (11/34) at 12 h (P = 0.09). VAS for uterine contractions, global diclofenac and paracetamol consumption were similar between groups.

Conclusion: Rectal diclofenac was more effective to relieve perineal pain (significantly lower VAS and less rectal drug absorption, promoting a localised anti-inflammatory and analgesic effect.

References:

P14. The addition of clonidine to fentanyl and bupivacaine for combined spinal-epidural analgesia in labour
M Paech, S Banks, S Yeo, T Pavy, C Orlikowski, L Gurrin
Department of Anaesthesia, King Edward Memorial Hospital for Women, Perth, Western Australia

Introduction: Subarachnoid fentanyl and bupivacaine administered for combined spinal-epidural (CSE) analgesia during labour produce profound analgesia lasting 90-120 min. The addition of subarachnoid clonidine in doses of 50-200 µg increases the duration of spinal analgesia, but results in more hypotension and sedation. This double-blind study was designed to assess whether the duration of CSE analgesia was increased by clonidine in doses of less than 50 µg.

Methods: After Ethics Committee approval and informed consent, 112 parturients in active labour were randomised (stratified for parity) to receive, as part of a CSE technique, subarachnoid fentanyl 20 µg and bupivacaine 1 mg with 0 (group C0), 15 (group C15), 30 (group C30) or 45 (group C45) µg of clonidine. The primary endpoint was duration of analgesia, with secondary outcomes the incidence of hypotension, the level of sedation and maternal satisfaction.

Results: Data from 101 parturients of mixed parity were analysed. There were no significant demographic differences between groups, with median cervical dilatation at entry 3 or 4 cm. Twenty two mainly multiparous parturients delivered before activation of epidural analgesia. The quality of analgesia was excellent, with median scores of zero in all groups until 60 min. There were no differences in sedation, motor block, cephalad sensory level, itch, nausea or shivering scores or in maternal satisfaction. Clonidine did not significantly increase the duration of analgesia, although there were trends to increased duration of analgesia with higher clonidine doses, reaching significance for multipara in C45 & C30 compared with C0 & C15 (estimated mean increase 31 minutes, P <0.01). Clonidine lowered blood pressure for 90 minutes, but did not significantly increase hypotension or ephedrine use except in multipara in C30 and C45 (P <0.04).

Conclusion: The effect of clonidine 15-45 µg on the duration of spinal analgesia was not significant. Clonidine conferred no clinical benefit and, as used in this study, is not recommended.

References:
P15. Analysis of dermatomal spread of equipotent epidural analgesia in 76 labouring women receiving either plain local anaesthetic solutions or local anaesthetic and fentanyl.

PS Smith, A Robinson, R Wilson, H Gorton, G Lyons
Department of Anaesthesia, St. James's Hospital, Leeds

Introduction: The addition of adrenaline to local anaesthetic may increase the speed of onset and the duration of the blockade. 1 The addition of fentanyl to local anaesthetic solutions for the first stage of labour increases the speed of onset and the duration of the blockade. 2 We investigated whether the addition of fentanyl increased the segmental spread of sensory block, and if so, whether the spread was predominantly in a cephalad or caudal direction.

Methods Data were collected from two randomised, double blind, sequential allocation studies, which determined the minimum local anaesthetic concentration (MLAC) of levobupivacaine alone, 3 or with fentanyl 2 or 3 μg/ml. 4 Women received either plain solutions (SR-bupivacaine or levobupivacaine) or levobupivacaine plus fentanyl, and were analysed as two equianalgesic groups. Only women with effective epidural analgesia (visual analogue score ≤10 at 30 min) were included. The upper and lower levels of sensory block to pin prick were recorded bilaterally. The number of dermatomes of sensory spread was calculated in both a cephalad and caudal direction. The data were analysed using a two tailed Student t test.

Results Forty three women receiving plain local anaesthetic solutions and 33 receiving local anaesthetic plus fentanyl were included. The addition of fentanyl to levobupivacaine solutions significantly reduced the MLAC of levobupivacaine from 0.091% (plain) to 0.048% (with 2 μg/ml fentanyl) and 0.051% (with fentanyl 3 μg/ml). 5 Despite this reduction, the mean sensory segmental spread was increased bilaterally from 6.4 to 7.8 dermatomes by the addition of fentanyl (P <0.015). The spread was significant in a cephalad direction (P <0.017), but not caudally (P <0.64).

Conclusion The addition of fentanyl to equianalgesic epidural local anaesthetic solutions increases the segmental spread of sensory analgesia by one dermatome, the upper level benefiting significantly more than the lower level.

References

P16. Low dose epidural infusions without crystalloid preload and fetal distress.

A Lansbury, E Warren, G Lyons
Obstetric Anaesthesia, St James’s University Hospital, Leeds, U.K

Background and Goals: Efficacy of fluid preload as prophylaxis against hypotension caused by regional blockade has been questioned. 1 A pilot study concluded that further study would be unlikely to show beneficial effect from crystalloid preload. 2 As a result we ceased to use a crystalloid preload during routine epidural pain relief in labour. This study assessed the outcome of this change on hypotension and fetal distress.

Methods: Some 300 women were recruited to this prospective observational study. A standard protocol for the establishment of epidural pain relief was followed. Intravenous access was obtained but an infusion was not attached. Epidural blockade was established with 20 ml of a mixture of 0.06/0.08/0.1% w/v bupivacaine with 0.02 mg/ml alfentanil, followed by a continuous infusion of the mixture at 12 ml/h. Data concerning hypotension, fetal distress, requirement for i.v. infusion, and method of delivery were collected.

Results: All epidural infusions were effective. Of the 302 women in the study 131 women (43%) required no i.v. infusion. All these were normal deliveries. 171 women (57%) required an i.v. infusion during the per-delivery period. Of these 88 went on to normal delivery, 21 to forceps and 62 to caesarean section.

Table. Reason for i.v. infusion

<table>
<thead>
<tr>
<th>Number of Women</th>
<th>Obstetric indications</th>
<th>Hypotension</th>
<th>Fetal distress</th>
</tr>
</thead>
<tbody>
<tr>
<td>89</td>
<td>64</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

10 patients experienced hypotension associated with fetal distress and of these 6 went on to have caesarean section. The remaining 8 patients did not experience any recorded hypotension of and 3 went on to caesarean section.

Conclusion: Fetal distress occurred in 18 women (6%) at some time after epidural insertion. 10 women (3.3%) experienced associated hypotension. The question of whether an intravenous infusion influences the incidence fetal distress after epidural pain relief is raised. A power analysis using our data suggests that 600 women would be needed in a randomised controlled trial to resolve this issue, with power of 0.9 and significance of 0.05%. This would be a feasible study to undertake.

References
P17. Maternal satisfaction with the speed of onset of labour epidural analgesia – is there indication for increasing the usage of the combined spinal-epidural technique?

R Chapman, A Elsayed, K McKinlay, T Robinson, S Young.
Department of Anaesthesia, Royal Maternity Hospital, Glasgow

Introduction: Combined spinal-epidural analgesia (CSE) has been used for labour, one advantages of the technique being a more rapid onset of analgesic effect than with an epidural. In order to assess whether there is a need to increase the usage of CSEs in labour an audit of maternal satisfaction with onset of analgesia with the current epidural technique was conducted.

Method: Data were collected over a 3-month period from 72 patients who had epidural analgesia during labour. Patients were interviewed following delivery in the postnatal wards. Maternal satisfaction with onset of analgesia was assessed using 2 questions. Firstly, patients were asked if they experienced pain relief within 30 min of the epidural being sited and secondly if they had been satisfied with this time. The routine obstetric anaesthetic audit forms were used to record these data. This enabled collection of other relevant data including the level of satisfaction with analgesia during the 1st and 2nd stages of labour.

Results: In 60 patients the onset of analgesia was within 30 min and 55 patients were satisfied with the onset time. All 12 patients who did not experience analgesia within 30 min were dissatisfied with onset time. Of the 17 patients who were dissatisfied with their onset time, nine assessed the quality of analgesia during the first and second stages of labour as either “mediocre” or “poor”.

Conclusion: Most patients in the study had analgesia within 30 min of the epidural being sited and only a small proportion of this group were dissatisfied with this time. Some of the dissatisfied patients may have had poorly functioning epidurals since they had “poor” or “mediocre” analgesia. The audit demonstrates that epidural analgesia provides satisfactory onset time of analgesia in most patients, although further studies would be useful to help identify the subgroup of patients who might benefit from using the combined spinal-epidural technique.

Reference:

P18. A survey of risk factors at the time of epidural insertion that may predict instrumental or caesarean delivery

P Peyrasse, R E Collis and W. W. Mapleson
University Hospital of Wales, Cardiff, UK.

Introduction: Epidural analgesia is associated with a higher risk of instrumental or caesarean delivery than if no epidural is used. This may be because mothers already at risk of operative delivery are requesting this form of analgesia for labour.

Methods: We collected data at the time of epidural insertion in 200 mothers requesting epidural analgesia for labour, where delivery was not imminent. Data on maternal age, parity, induced labour, known large or small baby, prolonged rupture of membranes, prolonged latent phase of labour, oxytocin already started or to be started immediately after epidural insertion, pregnancy-induced hypertension, early diagnosis of occipito-posterior position and cervical dilatation <5cm was recorded. Statistical analysis was carried out using analysis of variance.

Results: There was no significant dependence on any of the above factors, which could be identified at the time of epidural insertion to predict surgical intervention except maternal age (P<0.01) and parity (P<0.001). Fig. 1 shows this graphically with the fitted risk of caesarean delivery, forceps or caesarean or any (caesarean, forceps or ventouse) plotted against age for primiparous and multiparous mothers. There is a clear relationship between maternal age and operative delivery from 15 to 45 years. This is seen most strikingly for mothers in their first labour but age is also relevant as a risk factor for the older multiparous mother.

Conclusion: Maternal age is understood to be a risk factor for operative delivery. These data shows this to be true from teenage years onwards. Induced labour and Syntocinon are known to be associated with increased epidural uptake and increased intervention but we found age and parity to be more important in predicting outcome.

References
P19. Dural taps: when is the greatest risk?
PJ Youngs, J Coghill
Dept of Anaesthesia, Derriford Hospital, Plymouth

Introduction: The incidence of inadvertent dural puncture (IDP) varies with technique, experience and frequency of performing epidurals in obstetric patients. There is concern that inexperienced SHOs have more dural taps in the middle of the night. The hypothesis that time of day affected the IDP rate was tested.

Methods: The audit database of obstetric anaesthesia covering the last 5 years was reviewed. The time of insertion, grade of anaesthetist and any complication of the epidural were analysed. Complications had been identified at epidural insertion and at post partum anaesthetic follow up.

Results: There were 32 cases of IDP in 8071 epidurals (overall rate 0.40%).

<table>
<thead>
<tr>
<th></th>
<th>Day 8:00-17:59</th>
<th>Evening 18:00-23:59</th>
<th>Night 00:00-7:59</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total epidurals</td>
<td>3799</td>
<td>1795</td>
<td>2477</td>
</tr>
<tr>
<td>IDPs n</td>
<td>16</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Epidurals by SHO</td>
<td>42.6%</td>
<td>45.7%</td>
<td>43.9%</td>
</tr>
<tr>
<td>IDPs by SHOs</td>
<td>63%</td>
<td>33%</td>
<td>80%</td>
</tr>
</tbody>
</table>

The time of day does not significantly influence the overall incidence of IDP. SHOs had significantly more dural taps during the daytime and after midnight than predicted from the number of epidurals performed by that group (P= 0.02, $\chi^2$ test). The SHO IDP rate increased from evening through to night, despite the same SHO providing the epidural service; this rise was not seen with other staff.

Discussion: These results support the hypothesis that SHOs have more dural taps at night. The rate is below the 1% target set in audit guidance from the Royal College of Anaesthetists, but the decreased performance of SHOs within their on-call period is of concern. The higher rate of IDP by SHOs during the daytime may reflect the fact that those new to obstetric anaesthesia insert labour epidurals during the day. A longer period of daytime supervised obstetric anaesthesia (currently 4 weeks) may be required in order that those starting on-call duties have greater experience.

Reference:

P20. Analgesic management of intrauterine fetal demise (revisited)
A Con, I McGovern, R Sashidharan
Department of Anaesthesia, The Royal London Hospital, UK

Introduction: The incidence of intrauterine death ranges from 5-7 cases per 1000 births in the UK. It is commonly managed by induction of labour within four weeks of diagnosis. Analgesic management of these cases has received little attention. With lack of guidelines or accepted standards, analgesia, in these situations, is provided on an ad-hoc basis. An audit conducted in our hospital confirmed this observation. Guidelines were therefore set up which included early counselling and provision of patient controlled intravenous or epidural analgesia.

Methods: We retrospectively reviewed the notes and drug charts of cases of confirmed intrauterine death in our unit before (1997) and after setting up the guidelines (1999). We included fetal demise from any aetiology at a gestation of >20 weeks. Cases in which the diagnosis of fetal demise was not made before delivery were excluded from the analysis. Analgesic methods used were audited. Data were analysed using Student's t and $\chi^2$ tests. P <0.05 was considered significant.

Results: There were 36 confirmed cases of intrauterine death in 1997 (group A) and 33 in the more recent study period (group B). Groups were similar in maternal age, gestational age and parity.

Table. Types of analgesia

<table>
<thead>
<tr>
<th>Group</th>
<th>Number (%)</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None / oral</td>
<td>7 (19)</td>
<td>4 (12)</td>
</tr>
<tr>
<td>PCA</td>
<td>14 (39)*</td>
<td>20 (61)*</td>
</tr>
<tr>
<td>Epidural</td>
<td>2 (6)</td>
<td>3 (9)</td>
</tr>
<tr>
<td>Total</td>
<td>36 (100)</td>
<td>33 (100)</td>
</tr>
</tbody>
</table>

*P < 0.05

Discussion: In both groups the majority of patients required at least one form of analgesia. The use of PCA increased dramatically following the introduction of guidelines suggesting this. Of the 4 patients who received no, or only oral, analgesia in the more recent group, one had refused the offer of PCA and one had delivered before it was possible to site an epidural. All the epidurals in the latter group were patient controlled. The introduction of guidelines for the analgesic management of intrauterine death have increased the usage of PCA in our hospital.

References:
1. CESDI Annual Reports 1995-1998; Dept of Health
P21. Fall in ICU admissions for pre-eclampsia accompanies introduction of regional protocol.
D J Tuffnell D Jankowicz and G Lyons* (on behalf of Yorkshire Obstetric Critical Care Group) Bradford Royal Infirmary, Bradford, West Yorkshire *St James University Hospital, Leeds.

Introduction: The adoption of a single regional protocol for pre-eclampsia by all sixteen of the maternity units in the Yorkshire region, accompanied by the appointment of an audit midwife, has allowed monitoring of both compliance and standards of critical care in the Region’s maternity units. The aim of this study was to seek evidence of improving standards between 1998 and 2000.

Methods: This mainly prospective observational study was conducted between 1998 and 2000 in 16 maternity units in Yorkshire. Data were collected from each unit by means of a standard proforma, and these were collated centrally by the Regional Audit Midwife. Compliance with the protocol management of hypertension and intravenous fluid maintenance were compared between 1998 and 2000. The annual requirement for intensive care admission from adoption of the protocol in 1998, up to 2000, was assessed using Fisher’s exact test.

Results: Between 1998 and 2000 around 120,000 women delivered in Yorkshire approximately 40,000 each year. The number of pre-eclamptic women managed according to the protocol was 195 in 1998, 237 in 1999 and 180 by December 2000. In 1998, 86 did not adhere to the fluid management protocol, and in 2000 the number was 58. The number of cases where both antenatal and postnatal fluid management was not followed has dropped from 24 in 1998 to 10 in 2000. The percentage of ICU admissions fell from 11.2% in 1998 to 6.3% in 1999 and is at present 3.8% for 2000 (P <0.01) (data still outstanding).

Conclusion: The introduction of a regional protocol for the management of pre-eclampsia across the Yorkshire region has been accompanied by improved compliance in treatment of hypertension and fluid restriction. Complications of pre-eclampsia necessitating ICU admission have also declined (P <0.01). A relationship between cause and effect has not been established.

P22. Spinal is safer than general anaesthesia for caesarean sections in eclamptic patients
M Razzaque, K.Rahaman, R Sashidharan
Departments of Anaesthesia Dhaka Medical College Hospital, Bangladesh & The Royal London Hospital, UK.

Introduction: Complications of general anaesthesia for caesarean section remain the leading cause of anaesthetic related maternal mortality. Despite this, most experts consider general anaesthesia as a safer option in severe pre-eclampsia and eclampsia. Dhaka Medical College Hospital is a tertiary referral teaching hospital in Bangladesh. In this institution, despite the perceived increased morbidity and mortality, spinal is the technique of choice for caesarean section in eclamptic women.

Method: The audit data for eclamptic patients having caesarean sections between January 1st and December 31st 1998 was reviewed.

Results: Total obstetric admissions in 1998 = 11206

<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total with eclampsia</td>
<td>818</td>
<td>7.29%</td>
</tr>
<tr>
<td>Antepartum eclampsia</td>
<td>689</td>
<td></td>
</tr>
<tr>
<td>Eclampsics having CS</td>
<td>525/689</td>
<td>76.2%</td>
</tr>
<tr>
<td>Spinals for CS</td>
<td>470/525</td>
<td>89.5%</td>
</tr>
<tr>
<td>General anaesthesia for CS</td>
<td>55/525</td>
<td>10.5%</td>
</tr>
<tr>
<td>Deaths after eclampsia</td>
<td>72/818</td>
<td>8.8%</td>
</tr>
<tr>
<td>Deaths after CS</td>
<td>22/818</td>
<td>2.6%</td>
</tr>
<tr>
<td>Deaths after spinals</td>
<td>14/470</td>
<td>2.9%</td>
</tr>
<tr>
<td>Deaths after general anaesthesia</td>
<td>8/55</td>
<td>14.5%</td>
</tr>
</tbody>
</table>

The audit data show that the eclamptic patients having caesarean section under spinals have a lower mortality then those who have general anaesthesia. No case of epidural haematoma has been reported in these women having spinals.

Conclusion: We conclude that the audit data from Dhaka Medical College Hospital show that the eclamptic patients having caesarean section under spinal block have a lower morbidity and mortality then those who have general anaesthesia.

References:
P23. Use of coagulation screens in pregnancy-induced hypertension
J A Beynon, E Morris, S Young
Department of Anaesthesia, Glasgow Royal Infirmary, Glasgow, UK.

Introduction: Prothrombin time and activated partial thromboplastin time are not usually prolonged in pregnancy-induced hypertension unless associated with thrombocytopenia. In our hospital, guidelines have been established to determine when a coagulation screen is indicated before undertaking regional anaesthesia. These guidelines have been introduced to help the anaesthetist to evaluate whether regional anaesthesia can safely be undertaken in the presence of pregnancy-induced hypertension. They state that a coagulation screen should be performed when the platelet count is less than $150 \times 10^9/L$ or in worsening pregnancy-induced hypertension. We observed that coagulation screens were being performed outside the indications stated by the guidelines. The purpose of this study was to identify how many times this occurred over a prospective period.

Methods: The study was conducted over a one-month period, with the data collected using the study box incorporated into the audit sheets already in use for the continuous departmental obstetric anaesthesia and analgesia audit.

Results: A total of 19 patients were identified. Fifteen epidurals insertions, one combined spinal-epidural and 4 spinal anaesthetics were performed (one patient had received both epidural and spinal anaesthesia). Coagulation screens were performed in 16 of the 19 patients; of these, the platelet count had been greater than $150 \times 10^9/L$ in 13 cases. In three cases the platelet count was less than $150 \times 10^9/L$. In three of the 19 patients the platelet count was greater than $150 \times 10^9/L$ and no coagulation test was performed.

Conclusion: 81.25% of the coagulation screens performed were unnecessary while 18.75% were justified. In 15.8% of patients recruited, coagulation screens were omitted appropriately. Possible reasons identified to explain why coagulation screens were performed outside the guidelines were: reduced patient distress due to one venepuncture being performed instead of 2, reduction of time spent by the medical staff in performing one venepuncture instead of 2 and prevention of the delay in obtaining a result when a coagulation screen is sent off separately. The main disadvantage of performing coagulation screens indiscriminately in pregnancy-induced hypertension is one of unnecessary cost. We have estimated that adherence to the guidelines as described may produce an annual saving of approximately £1500 to £4000 based on the findings of this study.

References:

P24. Thrombotic thrombocytopenic purpura and pre-eclampsia in pregnancy - anaesthetic implications.
RJ Chilvers, JA Pickett.
Department of Anaesthesia, Addenbrooke's NHS Trust, Cambridge, UK

Introduction: Thrombotic thrombocytopenic purpura (TTP) is a rare but potentially fatal disease characterised by thrombocytopenia, microangiopathic haemolytic anaemia, fever, neurological and renal dysfunction. In pregnancy, clinical presentation is similar to the HELLP syndrome but differentiation is important - management of TTP includes continuation of the pregnancy and plasma exchange. Pre-eclampsia may, however, be superimposed on TTP.

Case Report: A 23-year-old primigravida was referred at 21 weeks' gestation with a diagnosis of TTP and pre-eclampsia. The initial platelet count was 7×10^9/L and serum lactate dehydrogenase (LDH) levels were 3203 U/L. Daily plasma exchange improved the platelet count to 150×10^9/L and LDH levels fell to 492 U/L. Adjuvant therapy for TTP consisted of aspirin, steroids and enoxaparine. Hypertension was controlled with labetalol. At 27 weeks' gestation delivery was considered necessary due to poor fetal growth and worsening pre-eclampsia. Despite concerns about a possibly difficult tracheal intubation, regional anaesthesia was avoided because of a platelet count of 55×10^9/L. General anaesthesia was administered uneventfully and a live baby was delivered. Plasma exchange continued for 5 days post partum.

Discussion: Antenatal assessment and multidisciplinary care are vital for the parturient with TTP and pre-eclampsia. Anaesthetic implications of pre-eclampsia are well known - the presence of TTP adds further problems. Severe thrombocytopenia may preclude regional anaesthesia and intramuscular injections. Intravenous opioid analgesia can be offered for vaginal delivery. Operative delivery may require general anaesthesia. Mucosal bleeding can occur and the sympathetic responses to intubation and extubation should be obviated to reduce the risk of intracranial haemorrhage. Intra-operative bleeding requires the administration of packed red cells and fresh frozen plasma. Platelet transfusion may worsen TTP and is only recommended for life-threatening circumstances. Renal compromise is common and meticulous fluid management is essential but thrombotic complications are possible with central venous cannulation. Steroid use may necessitate intraoperative cover and can also be associated with sepsis. Bleeding, neurological dysfunction and renal dysfunction are recognised postoperative complications and high dependency care is advisable.

References:
DK Thomas, CM Wright, JA Durbridge.
Magill Dept of Anaesthesia, Chelsea & Westminster Hospital, London, UK.

Introduction: Following several anecdotal reports of skin reactions on removal of epidural dressings, we conducted a survey to determine the nature and frequency of reactions, and whether any particular dressing was implicated.

Methods: Data were collected prospectively from 182 parturients who received epidural an in labour or before caesarean section. All subjects received a standard Tegaderm® dressing over the insertion site, together with one of the following adhesive dressings to secure the epidural: Sleek®, Micropore®, Mefix® or Medipore®. Anaesthetists were instructed not to change their routine practice. All patients were reviewed on the routine post-partum follow-up ward round, to determine incidence of pruritus, evidence of skin reactions, and the skin contact time of the dressing. Statistical analysis included Mann-Whitney and Fishers exact test.

Results: In total, 21 out of 182 subjects (11.5%) developed skin reactions. The average contact time for subjects with skin reactions was 9 h (range 2-22 h) and for subjects with no skin reactions was 6 h (range 1-27.5 h) which was not significantly different. There was no significant difference in the incidence of skin reactions in each group except the Micropore® group, of which numbers were too small to reveal any true difference. The results are summarised in the table below:

<table>
<thead>
<tr>
<th>Type of dressing</th>
<th>Total cases</th>
<th>Skin reactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleek®</td>
<td>65</td>
<td>9 (13.8%)</td>
</tr>
<tr>
<td>Micropore®</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Mefix®</td>
<td>54</td>
<td>7 (13.0%)</td>
</tr>
<tr>
<td>Medipore®</td>
<td>50</td>
<td>5 (10%)</td>
</tr>
</tbody>
</table>

Conclusion: Our study shows that there is no significant difference between epidural dressings with respect to skin reactions or efficacy, as judged by displacement of catheters. In addition, the incidence of skin reactions bears no relationship to the contact time of the dressing with the skin.

Dressing manufacturers suggest that mechanical injuries may be the biggest single cause of tape reactions, instigated by stretching or pulling tape too tightly. The type of dressing or adhesive is less important than the technique of application.

P26. Discomfort during removal of adhesive epidural dressings
DK Thomas, J Mukherjee, SM Yentis
Magill Department of Anaesthesia, Chelsea & Westminster Hospital, London, UK.

Introduction: There are several different adhesive dressings available for use when securing epidural catheters in labouring women. Although fixation of the catheter at the site of insertion should involve a sterile dressing, most techniques also involve strips of sticking plaster over the top and up the patient's back. Since no study has investigated this aspect of epidural dressings, the choice of plaster depends on personal preference of the anaesthetist, midwife or ODA. We found that a common concern among staff and patients is the discomfort experienced when removing large amounts of adhesive dressings. We therefore performed a study to determine whether one type of adhesive dressing was more uncomfortable to remove than another.

Methods: After ethical approval and informed consent, four 2-inch × 6-inch strips of different adhesive dressings (Sleek®, Micropore®, Mefix® and Medipore®) were simultaneously applied to the backs of 20 healthy female volunteers who were not allergic to sticking plaster. The strips were applied randomly to four standardised sites on the lower back, and the subjects were blind to the position of each different dressing. After 30 min, the dressings were removed one at a time in random order by a single operator using the same technique for each dressing. Subjects recorded their discomfort for the removal of each dressing using a 10-cm visual analogue scale (0 = no discomfort; 10 = the worst discomfort imaginable). Scores were analysed using Friedman's statistic with a value for P of 0.05 denoting statistical significance. Purchase costs for the different dressings were obtained from the hospital supplies department.

Results: Discomfort visual analogue scores (VAS) and costs for each type of dressing are shown below.

<table>
<thead>
<tr>
<th>Type of dressing</th>
<th>VAS</th>
<th>Cost (per m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAS</td>
<td>Sleek</td>
<td>Micropore</td>
</tr>
<tr>
<td>Median</td>
<td>3.2*</td>
<td>1.2</td>
</tr>
<tr>
<td>Interquartile</td>
<td>2.0-5.0</td>
<td>0.6-2.7</td>
</tr>
<tr>
<td>Range</td>
<td>0.1-8.2</td>
<td>0.1-6.0</td>
</tr>
<tr>
<td>Price (per m)</td>
<td>£0.50</td>
<td>£0.06</td>
</tr>
</tbody>
</table>

*P = 0.01 compared to other dressings

Conclusion: Sleek is more uncomfortable to remove than other dressings and also more expensive. Until an advantage can be demonstrated for Sleek over others, we suggest that one of the other three dressings tested should be used. This is irrespective of how the epidural catheter itself is actually fixed to the skin at the insertion site.
A survey of consent for epidural analgesia during labour amongst anaesthetists

A Stronach, S Leith
Wirral Hospital, Upton, Merseyside.

Introduction: A labouring woman offers a unique situation in which to obtain consent. The aim of this survey was to evaluate the current practice of obtaining consent before insertion of epidurals for analgesia during labour.

Methods: A postal survey by questionnaire was conducted amongst consultant obstetric anaesthetists and trainees in North West (Mersey) Region and North Wales.

Results: There was an overall response rate of 72% (48% consultants, 38% trainees and 14% staff grades). 95% of respondents obtained consent before insertion of an epidural of which 86% obtained verbal consent. Most anaesthetists warned patients of complications. The proportions who would mention different complications are shown in the table below:

<table>
<thead>
<tr>
<th>Complication</th>
<th>Consultant</th>
<th>Trainee</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>85%</td>
<td>100%</td>
<td>75%</td>
</tr>
<tr>
<td>Patchy block</td>
<td>56%</td>
<td>94%</td>
<td>83%</td>
</tr>
<tr>
<td>Backache</td>
<td>34%</td>
<td>58%</td>
<td>50%</td>
</tr>
<tr>
<td>Neurological</td>
<td>27%</td>
<td>45%</td>
<td>33%</td>
</tr>
<tr>
<td>Injury</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure</td>
<td>66%</td>
<td>88%</td>
<td>75%</td>
</tr>
<tr>
<td>Hypotension</td>
<td>37%</td>
<td>73%</td>
<td>67%</td>
</tr>
</tbody>
</table>

Other complications, rarely mentioned, were nausea and vomiting, increased incidence of instrumental delivery, urine retention and pruritus. 75% of respondents made some documentation in the notes, 25% made none. 76% of consultants claimed that patients have ready access to written information antenatally and 54% said they routinely attended parentcraft lectures at their hospital.

Discussion: The majority of respondents obtained consent, which was verbal in most cases and included warnings of the risks of headache, patchy block and failure. Fewer consultants than trainees warned the patients of backache and most of those who did dismissed epidurals as a cause. Contrary to OAA guidelines, 25% of respondents made no documentation in the patient's notes. In addition only 76% of consultant obstetric anaesthetists reported that patients receive written information antenatally and only 54% were involved in the parentcraft classes. In an increasingly litigious environment, is the information we provide to our patients in the antenatal and intrapartum period adequate and should this information be documented?

References:
1. OAA. Guidelines for Obstetric Anaesthesia Services. 1998; 13-14
P29. Assessment of pre-caesarean section clinics: How much do women want to know and what do they remember?

K Barkshire, J Burry, R Russell
Nuffield Dept of Anaesthetics, Oxford Radcliffe NHS Trust, Oxford, OX3 9DU, UK.

Introduction: Women receiving epidural analgesia in labour have reasonable recall of risks and benefits discussed before the block is sited. When booked for elective caesarean section women often come into hospital on the evening before surgery allowing little time for consultation by anaesthetic staff. A pre-caesarean section clinic has been established with women attending seven days before surgery is scheduled. Procedures are explained and informed consent taken by both anaesthetic and obstetric staff. Relevant blood and radiological investigations are checked or carried out. The efficiency of anaesthetic input to the clinic was evaluated by assessing the recall of the risk of anaesthesia.

Methods: Women attending the clinic were asked to complete a questionnaire. Before consultation, anxiety scores were measured on 100-mm VAS. The anaesthetic procedure was then discussed and complications listed. The anxiety score was repeated. For each side effect women were asked to score (100-mm VAS) how important this information was to them. On admission one week later a further anxiety score was taken and women were asked what side effects they could recall.

Results: In this ongoing study 59 questionnaires have been completed. Anxiety scores fell after anaesthetic discussion (39.0 (sd 27.4) vs 32.6 (sd 24.3); P<0.05) but increased by the morning of surgery (47.5 (sd 24.8) P<0.05). No woman stated that she would rather not have known about any complications. VAS of importance of side effects was greatest for nerve damage. On the day of surgery over 50% remembered more than 3 complications. More women remembered about nerve damage than intra-operative pain.

Table: Women's recall of side effects

<table>
<thead>
<tr>
<th>Potential Complication</th>
<th>% recalling complication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>86%</td>
</tr>
<tr>
<td>Back tenderness</td>
<td>46%</td>
</tr>
<tr>
<td>Hypotension</td>
<td>32%</td>
</tr>
<tr>
<td>Incomplete anaesthesia</td>
<td>24%</td>
</tr>
<tr>
<td>Nerve damage</td>
<td>34%</td>
</tr>
</tbody>
</table>

Discussion: Discussion of anaesthetic technique in the assessment clinic reduces maternal anxiety, although this rises just before surgery. A majority of women remembered most of the potential anaesthetic side effects. Recall of information is better than that previously quoted for labour analgesia

References

P30. Women's knowledge, education and usage of analgesia for labour in a District Maternity Unit.
M Nyabadza1 and M Y K Wee2
1SHO and 2Consultant, Poole General Hospital

Introduction: Antenatal information for women is an important aspect of maternity care. It is increasingly seen as an aid to the process of consent. There is recent emphasis on the woman as the central focus and the importance of obtaining her opinion. Antenatal education involving the maternity team and using specific teaching media and leaflets on pain relief have not previously been validated.

Aims and Methods: 1) To assess the sources of information and knowledge of pain relief and 2) To see if there is any association between level of knowledge, choice of analgesia, actual analgesia used and degree of apprehension about labour pain. Questionnaires were distributed to 200 mothers within 48 h of delivery. They assessed the women's knowledge and attitudes towards various methods of pain relief in labour and 'degree of worry' regarding labour pain. The questionnaire also determined the antenatal choices of pain relief and the actual pain relief used.

Results: The most important sources of information were the midwives (42.7%), friends and family (31.3%), magazines/TV (28.9%) and hospital leaflets (18.3%). Knowledge of epidurals, Entonox and pethidine was reassuringly high (93.9%, 93.9% and 89.8% respectively). However only 47.4% of women were prepared to use epidurals, 78.2% Entonox and only 24.8% would be prepared to use pethidine (see fig. 1). The personnel who had the most influence on analgesia choice during labour were the midwives (40.3%), family members (19.7%) and anaesthetists (10%). Interestingly, 48.8% of parturients who had attended the pain relief talk by anaesthetists were not very concerned about coping with labour pain as opposed to 34.4% of other parturients. 43.5% of parturients who were quite worried about coping with labour pain had not attended the talks as opposed to 28.2% of those who had.

Figure 1: Knowledge, opinions and usage of pain relief methods

Conclusions: The level of knowledge of the most common methods of analgesia used locally is reassuringly high. Midwives and family/friends continue to play a central role in patient information. The use of patient-friendly media: videos and hospital leaflets is helpful. Anaesthetists should continue their involvement with antenatal talks using all forms of information media and participate in midwifery teaching.

References:
B A Crooks, D Smith.
Department of Anaesthesia, Glasgow Royal Infirmary NHS Trust, Glasgow, Scotland

Introduction: Malignant vasovagal syncope (MVVS) is caused by abnormal autonomic reflex activity of neurocardiogenic origins. It has been postulated that increased responsivity of the central serotonergic system leads to sympathetic withdrawal and participates in its pathogenesis. Cardiovascular reflex mechanisms involved fall into three recognised subtypes 1) cardioinhibitory 2) vasodepressor and 3) mixed. Symptoms of dizziness, abnormal temperature perception, sweating and syncope can occur without any provocation. Tilt testing can provoke the symptoms, and is used for diagnosis. Therapy consists of a β-blocker +/- fludrocortisone +/- ‘tilt training’.

Case Report: A 21-year-old primiparous patient with a twin pregnancy presented at 36 weeks' gestation with mild pre-eclampsia and fetal compromise. MVVS had been diagnosed by tilt-testing some 4 years previously, when atenolol 12.5mg and fludrocortisone 100 µg daily were prescribed. The patient was advised at 8 weeks' gestation to stop the β-blocker. Continuation of fludrocortisone was recommended, but it was discontinued in the first trimester. The pregnancy was uncomplicated, apart from mild postural dizziness.

Management: Urgent delivery and out-of-hours presentation meant a management plan was required rapidly. Little published information was available. The patient received fluid preload with 1 L of Hartmann’s solution and was given glycopyrolate 200 µg i.v. Standard non-invasive monitoring was instigated. Oxygen at 4 L/min was given by Hudson face mask. Spinal anaesthesia was performed with the patient in the left lateral position using 0.5% heavy bupivacaine 2.5ml with 10 µg of fentanyl. Adequate regional block was achieved and surgery performed uneventfully. She received routine postoperative analgesia, fluids and monitoring.

Comment: Outcome was favourable in this case. The MVVS was of the vasodepressor type and it would have been safer, in retrospect, to have used invasive monitoring. Antenatal assessment is essential. Avoid relative dehydration, hypovolaemia, and vagal stimulation. Restart β-blocker with fludrocortisone if syncopal episodes occur during pregnancy.

Reference:
1 Kenny RA. Newcastle protocols. Heart 2000; 83: 564-569.

P32. Delivery by caesarean section of a patient with peripartum cardiomyopathy in the A&E department
D Uzeirbegovic
Anaesthetic Department, Guy’s & St. Thomas’ NHS Hospital Trust, London, UK

Introduction: Peripartum cardiomyopathy (PPCM) is a rare congestive cardiomyopathy affecting women in their reproductive years. It is defined as the onset of acute heart failure without demonstrable cause in the last trimester of pregnancy or within the first 6 months after delivery. The consequences of the disease are potentially devastating to these young, otherwise healthy women. Early diagnosis and initiation of treatment are essential to optimise pregnancy outcome. However, the principal issue in the treatment of PPCM is the timing and management of delivery. Importance of clinicians’ awareness of the condition and a team approach to its resolution cannot be over-emphasised.

Case report: A 42-year-old, morbidly obese patient of African origin presented at 37 weeks' gestation to our A&E department. She was in acute heart failure complicated with pulmonary oedema and consequent respiratory failure. She arrested following endotracheal intubation, was successfully resuscitated and had an emergency caesarean section. A live baby boy was delivered in good condition. Postpartum haemorrhage and subsequent total abdominal hysterectomy complicated the postoperative course. The patient was treated on the ICU for the following two weeks. Three weeks after the admission she and her baby were discharged home.

Discussion: The successful management of this patient with peripartum cardiomyopathy depended on a team approach, including the management of intubation, cardiac arrest, anaesthesia for caesarean section and for total abdominal hysterectomy.

References

CD Oliver and W Harrop-Griffiths
Department of Anaesthesia, St. Mary's Hospital, London, UK.

Case report: A 37-year-old primiparous migraine-sufferer with no history of epilepsy underwent an uneventful pregnancy, labour with epidural analgesia and vaginal delivery. Post dural puncture headache (PDPH) occurred the following day and was treated with simple analgesics, bed rest, intravenous fluids and oral sumatriptan 100 mg, to good initial effect. Headache recurring over the next five days was treated with further sumatriptan, compound analgesics and two doses of intramuscular Synacthen 1 mg. Her neurological status and blood pressure were normal to this point. On day 6 she suffered two grand mal seizures, with an arterial pressure of 170/100 mmHg which remained elevated for several hours after the convulsions. A computerised tomography scan of her head showed two low attenuation areas suggestive of cerebral infarction. Subsequent lumbar puncture, temperature, blood urea and electrolytes were normal. She made an uneventful recovery, with no neurological deficit.

Discussion: No features of pre-eclampsia or other risk factors for seizures were present and postpartum seizures due to PDPH alone seem to be a rarity. PDPH is presumed to be due to cerebrovascular dilatation but treatment with caffeine, a cerebral vasculature vasoconstrictor can cause fitting. Sumatriptan is also a cerebral vasoconstrictor predominantly of pathologically dilated arterial vessels, but regional responses may differ in a dose-dependent manner. Pre-eclamptic women have a reduced intravascular volume and cerebral vasoconstriction. Sub clinical preeclampsia can occur postpartum where peripheral hypertension may not be a feature. Post-partum eclamptic seizures associated with cerebral vasospasm respond to nimodipine, a potent inhibitor of the tonic phase of contraction induced in the basilar artery by 5HT, the very receptor on which sumatriptan exerts its effects. Therefore it may be unwise to prescribe cerebral vasoconstrictors (or unevaluated and poorly understood treatments like Synaethen) for PDPH, when some patients may be suffering from regional or global vasoconstriction as is seen in sub-clinical preeclampsia. Further investigation of PDPH and the cerebral circulation in pregnancy is warranted.

References:

P34. Labour analgesia and pseudoxanthoma elasticum

P. Sice, P. Youngs, P. Harvey.
Department of Anaesthesia, Derriford Hospital, Plymouth, Devon.

Introduction: Pseudoxanthoma elasticum (PXE) is a rare disorder of elastic and collagen tissue, with autosomal dominant or recessive inheritance. It produces loose, thickened folds of skin on the neck and flexural areas. Ocular angiod streaks may lead to retinal scarring, haemorrhage and blindness. Abnormal deposition of calcium can occur in elastic fibres, the arterial system and cardiac muscle. Loss of elasticity of the larynx led to difficult intubation. Arterial calcification can produce intermittent claudication, coronary artery disease and hypertension. Gastrointestinal haemorrhage is common due to poor healing of mucosal abrasions. The prevalence and severity of these various complications differ between the 4 patterns of inheritance and currently there are no reports in the literature of the use of regional analgesia techniques in PXE.

Case Report: A 30-year-old primigravida with PXE in spontaneous labour requested epidural analgesia. PXE was diagnosed aged 7 years by the characteristic skin changes and she was thought to have a mild autosomal recessive form. She had retinal streaks and an antenatal ECG and echocardiogram were normal. The pregnancy was uneventful. The risks and benefits of epidural analgesia in PXE were discussed with her. Lumbar epidural analgesia was established with 0.1% bupivacaine 15 ml with fentanyl 2 μg/ml and continued as an infusion, to allow early detection of neurological signs indicating a developing epidural haematoma. Four hours later there was spontaneous vaginal delivery of a live male infant and she proceeded to complete recovery.

Discussion: PXE has several implications for anaesthesia with airway and cardiovascular difficulties and a theoretical potential for blood vessel fragility, increasing the risk of spinal canal haematoma if regional techniques are used. Other options include Entonox and intravenous opioids. However in an obstetric emergency, epidural analgesia can be extended, thereby avoiding the potentially increased risks of general anaesthesia in PXE.

References:
P35. A national survey of obstetric epidural test doses. II: labour
IC Gardner and SM Kinsella.
St Michael's Hospital, Bristol, BS2 8EG, UK.

Introduction: Epidurals for labour analgesia are evolving, with the use of lower doses of local anaesthetics. A traditional test dose may contain a higher dose of local anaesthetic than the total dose used to establish analgesia with a dilute solution.

Methods: Anaesthetists' practice for test doses when starting epidural analgesia in labour was explored as part of a larger questionnaire (see previous Abstract).

Results: There were 328 responses. 37 (11%) gave a single dose for completion of analgesia but did not consider it a test dose. 50 (15%) gave a single dose for completion of analgesia, which was described as a test dose. The remaining 241 (74%) gave two doses for completion of analgesia, a test dose followed by the same solution (111) or a different solution (130).

Overall 267 (81%) used bupivacaine for the initial bolus (first dose/test dose), of which 114 gave dilute bupivacaine (concentration <0.25%) and 146 gave concentrated bupivacaine (≥0.25%). 57 (17%) used lignocaine (Table).

<table>
<thead>
<tr>
<th>B (mg)</th>
<th>&lt;7</th>
<th>7-10</th>
<th>11-15</th>
<th>&gt;15</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%)</td>
<td>8 (3%)</td>
<td>75 (28%)</td>
<td>149 (56%)</td>
<td>32 (12%)</td>
<td>264</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L (mg)</th>
<th>&lt; 30</th>
<th>30-40</th>
<th>41-60</th>
<th>&gt;60</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%)</td>
<td>4 (7%)</td>
<td>12 (22%)</td>
<td>28 (51%)</td>
<td>11 (20%)</td>
<td>55</td>
</tr>
</tbody>
</table>

Table. Number of respondents using differing doses of local anaesthetic in the initial bolus (B = bupivacaine; L = lignocaine)

The maximum dose of bupivacaine given as an initial bolus dose was 37.5mg and of lignocaine 100mg.

Conclusion: The use of dilute solutions for test doses and initiation of analgesia has increased three fold since 1996-97. Of concern is that doses of local anaesthetic sufficient to cause total spinal block are being given as initial doses.

Acknowledgement: To the OAA for approving this survey.

References

P36. A national survey of obstetric epidural test doses. I: to top up for caesarean section
IC Gardner and SM Kinsella.
St Michael's Hospital, Bristol, BS2 8EG, UK.

Introduction: The necessity for epidural test doses as well as their constitution has been questioned. Details of current practice in the UK, especially for management of emergency caesarean section, are lacking.

Methods: 500 members of the Obstetric Anaesthetists' Association were asked to complete a questionnaire regarding their use of epidural test doses, including extension of block for emergency caesarean section.

Results: There were 328 responses (66%). When topping up an epidural for caesarean section 207 (63%) gave no test dose (total dose as bolus) and 118 (36%) gave a formal test dose (table). For bupivacaine test doses the minimum dose used was 5 mg and the maximum 50 mg. For lidocaine the minimum dose was 30 mg and the maximum 200 mg.

<table>
<thead>
<tr>
<th>B (mg)</th>
<th>≤10</th>
<th>11-15</th>
<th>16-20</th>
<th>&gt;20</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%)</td>
<td>6 (11%)</td>
<td>29 (56%)</td>
<td>4 (8%)</td>
<td>13 (25%)</td>
<td>52</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L (mg)</th>
<th>≤40</th>
<th>41-60</th>
<th>61-80</th>
<th>&gt;80</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%)</td>
<td>7 (16%)</td>
<td>20 (44%)</td>
<td>6 (13%)</td>
<td>12 (27%)</td>
<td>45</td>
</tr>
</tbody>
</table>

Overall the most frequently used local anaesthetic for caesarean section was 0.5% bupivacaine (51%) followed by 2% lignocaine (26%) and 0.5% bupivacaine 2% lignocaine 50/50 mix (13%). Adrenaline was frequently used by those giving 2% lignocaine, less often with the mix and rarely with bupivacaine. Of those using a test dose, 111 continued to top up with the same solution and the remaining 7 used a different solution.

Conclusion: When anaesthesia is required for emergency caesarean section the majority of those surveyed do not use a formal test dose. We suggest that this may be because correct placement of the catheter is assumed as it is 'tested' semi-continuously during provision of analgesia for labour.

Acknowledgement: To the OAA for approving this survey.

References
P37. UK Registry of high-risk obstetric anaesthesia - haematology: a preliminary report

MY Latoo, C McGovern
Royal Free Hospital, London, UK.

Introduction: Haematological conditions increase the risk of morbidity during pregnancy. This national database aims to collate contributions from OAA members with a view to increasing our knowledge of these conditions and to improving the service provided to these women.

Methods: A standard form is available from OAA or Dr AJ England (see acknowledgements), for completion by anyone who cares for a pregnant woman with one of these conditions. Anonymous data are transferred to a computer program, written in 'Microsoft Access', and can be made available to anyone wanting to review them. Patient conditions are characterised into five groups: Hypercoaguable, hypocoaguable, platelet disorders, haemoglobinopathies and 'others'. Information about pre-pregnant history, antenatal care, delivery, including methods of analgesia, and the postnatal course of mother and infant are collected. Specific questions about history of previous miscarriage, antenatal plans, mode of delivery, blood loss and intensive care admission are also requested as these may be more common in these groups of women.

Results: The database was initiated in January 2000 and at the time of writing contained information on 15 women.

Haemoglobinopathies. This group contained 7 women. Four had sickle cell disease, with two suffering temporary morbidity and one requiring intensive care. Three had Beta thalassaemia. One died in intensive care after delivery, the others had uncomplicated deliveries.

Hypercoaguable disorders. There were 5 women in this group, of whom 1 suffered temporary morbidity, but the other 4 had uncomplicated deliveries.

Platelet disorders. There were 3 women in this group, 2 suffered temporary morbidity and the other delivered without complications.

No other patients were recorded.

Discussion: Women with haematological conditions are predisposed to greater morbidity during pregnancy. This database will allow anaesthetists to share their knowledge and experience and may lead to a better understanding of the problems encountered in these women. The database is in its infancy, but is continually being updated and improved and is starting to collate useful information from patients. It is anticipated that in the future it will provide part of the foundations for better anaesthetic care.

Acknowledgements
The NOAD - Haematology is co-ordinated by Dr AJ England, at the Royal Free Hospital, Pond Street, London, NW3 2QG. e-mail adrian.england@r fh.nthames.nhs.uk. If you require further information about the data stored, or would like to contribute to the database please contact him directly.

P38. An audit of the immediate management of maternal cardiac arrest.

VL Tucker, H Swales
Southampton University Hospitals NHS Trust, Southampton, UK.

Introduction: Maternal cardiac arrest occurs in approximately 1 in 30,000 term pregnancies. In standard resuscitation training little is said about resuscitation of the pregnant woman. We looked at levels of knowledge regarding maternal cardiac arrest to determine whether more specific education was required.

Methods: 5 people from 8 groups of doctors and midwives were randomly selected and asked about management of maternal cardiac arrest. One point was scored for mentioning each of the following:

- Call for help
- Check airway / give oxygen
- Begin CPR
- Perform CPR in lateral wedged position
- Deliver baby by caesarean section if CPR unsuccessful after 5 minutes

The standard set was that 100% should score 5/5.

Results: No-one scored 5 initially and only 6 people scored 5 after some education. The education given to the groups varied. It included posters, OSCE practice, tutorials and resuscitation demonstrations.

Table. Average scores for each group before and after education.

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour ward midwives</td>
<td>2.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Antenatal clinic midwives</td>
<td>2.6</td>
<td>4.0</td>
</tr>
<tr>
<td>Obstetric SHOs</td>
<td>3.0</td>
<td>3.4</td>
</tr>
<tr>
<td>Obstetric SpRs</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Anaesthetic SHOs</td>
<td>3.2</td>
<td>4.0</td>
</tr>
<tr>
<td>Anaesthetic SpRs</td>
<td>3.2</td>
<td>4.0</td>
</tr>
<tr>
<td>A &amp; E doctors</td>
<td>3.4</td>
<td>3.6</td>
</tr>
<tr>
<td>GPs</td>
<td>3.2</td>
<td></td>
</tr>
</tbody>
</table>

Conclusions: Initial results were disappointing. Of particular concern was the failure to adopt the wedged position during CPR. The greatest improvement was seen amongst the midwives for whom a compulsory annual update has been instigated.

We have highlighted a shortfall in resuscitation training. It is essential that hospital staff responsible for perinatal care undergo regular training in the specifics of maternal resuscitation.

Reference:
P39. An audit cycle of anaesthetic chart documentation for elective and emergency caesarean Sections performed under regional anaesthesia

AM Dick, H Swales
Princess Anne Hospital, Southampton

Introduction: The Obstetric Anaesthetists Association has recommended a minimum record of procedure for regional anaesthesia. With the increase in medico-legal activity in Obstetric anaesthesia in recent years, it is essential to record discussions held with the patient. Pain experienced under regional anaesthesia could be considered grounds for compensation if a sufficient level of block is not demonstrated. We initially performed a retrospective audit of charts to examine documentation. We then introduced new anaesthetic charts and re-audited the records kept.

Method: A retrospective audit was carried out of 30 elective and 30 emergency sets of notes of women undergoing caesarean section using a regional technique. The records were examined for evidence of preoperative explanation (including side effects of the regional technique), the anaesthetic technique used and documentation of the adequacy of the block. We then altered our existing anaesthetic charts to include prompts for documentation and re-audited a further 30 elective and 30 emergency records.

Results:
a) Preoperative documentation: The initial audit showed that in all highlighted areas elective caesarean records had better documentation than emergency caesarean records. Following the introduction of the new chart, 97% of all charts contained a record of the discussion of risks of regional anaesthesia. This compared to a maximum of 73% in elective records in the initial audit.
b) Block evaluation: 43% of records in the retrospective audit mentioned both an upper and lower limit of the block. This improved to 63% in the later audit.
c) Timings: Only 27% of all the initial records stated any timing of block or delivery of the baby. This improved to 85% following use of the new chart.

Conclusion: Altering the anaesthetic records to include prompts greatly improved documentation of the regional anaesthetic technique, particularly in emergency cases.

References:
1) OAA website. http://www.oaa-anaes.ac.uk

P40. How was it for you? An analysis of 18 000 obstetric epidurals.

M Anthoniz, JE Duggan
Wansbeck General Hospital, Northumberland

Introduction & methods: We report on 18 983 obstetric epidurals performed in six units using the Wansbeck Epidural Audit System (WEAS).1 One unit partially implemented the system and did not record delivery data. 16 204 records contained delivery data.

Results: Delivery data and follow up data was recorded in 94% and 87% of records respectively. CSE accounted for only 10%, and of the 1712 CSEs recorded a single unit with a CSE rate of 29% contributed 1646.

Table: Data collected from individual units

<table>
<thead>
<tr>
<th>Data collected from individual units</th>
<th>SVD %</th>
<th>44</th>
<th>55</th>
<th>62</th>
<th>53</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrumental %</td>
<td>33</td>
<td>26</td>
<td>21</td>
<td>27</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>CS %</td>
<td>23</td>
<td>18</td>
<td>16</td>
<td>19</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>MA ex+sat %</td>
<td>92</td>
<td>92</td>
<td>88</td>
<td>86</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>PA ex+sat %</td>
<td>93</td>
<td>95</td>
<td>92</td>
<td>89</td>
<td>93</td>
<td></td>
</tr>
<tr>
<td>AL ex+sat %</td>
<td>94</td>
<td>95</td>
<td>92</td>
<td>89</td>
<td>93</td>
<td></td>
</tr>
<tr>
<td>PD pf+c%</td>
<td>84</td>
<td>81</td>
<td>67</td>
<td>74</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>AR &lt;30min %</td>
<td>98</td>
<td>96</td>
<td>93</td>
<td>96</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>ADP %</td>
<td>0.8</td>
<td>0.9</td>
<td>1.1</td>
<td>0.56</td>
<td>0.55</td>
<td>0.29</td>
</tr>
<tr>
<td>PDPH %</td>
<td>0.6</td>
<td>0.7</td>
<td>1.0</td>
<td>0.8</td>
<td>1.0</td>
<td></td>
</tr>
</tbody>
</table>

SVD: spontaneous vertex delivery; CS: caesarean; MA ex+sat: midwife assessment excellent or satisfactory; PA ex+sat: patient assessment excellent or satisfactory; AL ex+sat: analgesia in labour excellent or satisfactory; PD pf+c: delivery pain free or comfortable; AR<30 min: anaesthetic response time request to attendance <30 min; ADP: accidental dural puncture; PDPH post dural puncture headache.

Grade of anaesthetist performing the technique was: trainees 76%; consultant 11%; other 13%. An early complication occurred in 22.6% of records, the most common being (rate/1000); difficult insertion 90, bloody tap 53; missed segment or unilateral 13.2. One case of total spinal was recorded. A late complication occurred in 15% of records, the most common being (rate/1000): backache 83; headache 7.1; urinary retention 5.9; dissatisfaction 5.4; neurological deficit 4.5.

Discussion: Service delivery in each unit was of a high standard. Analgesia for delivery could be improved. Trainees appear to run the epidural service of this country and service without feedback cannot be considered as training. The WEAS collects audit data as part of the clinical process and fulfils this training function. Standardising data collection and sharing data also enable individual units to compare performance, and a large pool of data allows the occurrence of rare complications to be monitored.

References
P42. Trauma in pregnancy: do local features make a difference?
CE Restrepo, OL Giraldó*, WA Palacio*,
GA Rodríguez*, N Socha*, N Fernández*.
Dept. of Anaesthesia, HUSVP* & Clinica Las Americas.
Medellin, Colombia.

Introduction: Trauma is a leading cause of non-obstetric death, primarily from placental abruption. Only 5% of the patients survived the first trimester (43.9%). The trauma mechanism and the localization of the injury are shown in the table:

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>n (%)</th>
<th>Localization</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violence</td>
<td>25 (61)</td>
<td>Joints</td>
<td>15 (37)</td>
</tr>
<tr>
<td>Road Traffic</td>
<td>11 (27)</td>
<td>Abdominal</td>
<td>14 (34)</td>
</tr>
<tr>
<td>Poisoning</td>
<td>2 (4.9)</td>
<td>Head injury</td>
<td>10 (24)</td>
</tr>
<tr>
<td>Snake-bite</td>
<td>2 (4.9)</td>
<td>Thorax</td>
<td>10 (24)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (2.4)</td>
<td>Uterine</td>
<td>6 (15)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ocular</td>
<td>3 (7.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spinal cord</td>
<td>2 (4.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vascular</td>
<td>2 (4.9)</td>
</tr>
</tbody>
</table>

Among the violent injuries 56% were victims of knife wounds, 36% gunshot wounds, 4% hammer-like wounds and domestic violence 4%. Twenty-seven patients underwent surgical exploration, exploratory laparotomy (44%) being the most common procedure. There were 5 cesarean sections in this survey (18.5%: 3 for maternal indications and 2 fetal indications). There was one maternal death due severe head injury and 9 fetal deaths mainly from placental abruption. Only 5% of the patients received prophylaxis against premature labor. Nobody was premedicated for acid aspiration. General anesthesia with inhalation agents was used in 85%.

Conclusions: Pregnant women in our city cannot escape violent trauma, which explains the difference between our series and another countries. This register will help us to create a National Pregnancy Trauma Database in order to improve the care of this catastrophic event.

References:

P43. Labor epidural analgesia guidelines.
B Harrison, C Burkle, G Kamath, G Vasdev
Department of Anesthesiology, Mayo Clinic, Rochester, MN, USA.

Introduction: Although labor epidural analgesia (LEA) is effective, complications occur. Societies issue guidelines to maintain safety and efficacy of LEA. Grilli et al. analyzed 431 published guidelines per predefined criteria (1. description of stake holders, 2. search information, 3. grading of recommendations) and found only 22 met all three criteria. We analyzed LEA guidelines to see if they fulfill Grilli’s criteria.

Methods: Guidelines relevant to LEA were obtained via the Internet from the American Society of Anesthesiologists (ASA), The Association Of Anaesthetists of Great Britain and Ireland (AAGBI), and the Australian and New Zealand College of Anaesthetists (ANZCA). Four authors then reviewed each of the guidelines per Grilli’s criteria and analyzed the guidelines' recommendations for LEA personnel.

Results: Only the ANZCA’s Guidelines for the Conduct of Major Regional Analgesia in Obstetrics had a specific guideline for LEA, while the ASA contained LEA guidelines in Guidelines for Regional Anaesthesia in Obstetrics and the AAGBI contained LEA guidelines in Guidelines for Obstetric Anaesthesia Services. Both the ASA and ANZCA failed to meet all three of Grilli’s criteria while the AAGBI described the stake holders and gave details of the source of information, but did not state its search strategy and failed to grade the recommendations. Only the AAGBI specified an anesthesiologist be involved and immediately available, while the ASA specified a physician under the direction of a physician and be readily available while the ANZCA specified a doctor with appropriate training and experience and also be readily available.

Conclusion: Guidelines help establish a standard of medical care and as a result are used as evidence in medical malpractice cases. A study demonstrated that guidelines implicated medical malpractice 2:1. Our analyses of LEA guidelines show that they do not meet Grilli’s criteria and analysis of one aspect, i.e. personnel, reveals lack of conformity implying that no evidence-based guideline is in operation. Guidelines are important but in the area of LEA they need to be multidisciplinary, well searched, documented, and evidence graded to be acceptable and credible; otherwise, they are in danger of being guideless.

References:
P44. Simulation of obstetric anaesthetic emergencies: an analysis of ward based scenarios.

A Gaunt, S Kirby, A Holdcroft.
Department of Anaesthesia and Intensive Care, Hammersmith Hospital, London W12 OHS.

Introduction: The Confidential Enquiries into Maternal Deaths in the UK (1994-96) reminded obstetric units to organise “fire drills” to simulate massive obstetric haemorrhage. The drills would serve to familiarise staff with protocols and test their robustness. We present an analysis of resuscitation simulations highlighting the need to rehearse management of critical incidents and demonstrating common pitfalls of protocol design.

Methods: An organising team (Anaesthetist, Obstetrician and Resuscitation Officer) established the goals of the scenario e.g. arrival of blood. All potential participants were informed by circular that a simulation would occur within a month. If staff were busy or a potentially difficult pregnancy / labour was in progress, then the simulation was rescheduled. Following completion of the scenario, staff were debriefed and written recommendations drafted and circulated widely.

Results and discussion: Six-monthly scenarios simulating major haemorrhage (n = 2), major haemorrhage plus cardiac arrest (n = 5) and cardiac arrest (n = 1) were analysed. Initially the first 4 scenarios highlighted lack of familiarity with protocols. Failure of communication occurred frequently, e.g. 7 out of 8 scenarios identified paging difficulties, and inappropriate call-out delayed management in 2 cases. Failure to attend can constitute substandard care and it is recommended that consultant staff be included in group calls. Staff roles within the emergency team had to be accurately defined, such as the surgical role of the obstetrician and the link between blood transfusion and porters. Lack of essential equipment outside delivery suite, e.g. transportable oxygen delivery system and caesarean section pack, delayed resuscitation on 2 occasions.

Conclusion: Each scenario generated major protocol changes relating to equipment, staff roles, organisation and communication. Where staff rotate on a regular basis, haemorrhage and resuscitation drills (emphasising the special nature of cardiac arrest in pregnancy) may need to occur more often than every six months. Protocol validity can best be established by regular “fire drills”.

References

P45. Discretion is still the better part of valor: Obstetric Anaesthesia in the electronic era

M Mackenzie, G Vasdev, G Kamath, R Mackenzie
Claremont Graduate University, Claremont, CA and Anesthesia Dept., Mayo Clinic, Rochester, MN, USA

Introduction: Electronic medical records (EMRs) can improve the quality and efficiency of health care, research and management. The use of EMRs is particularly attractive to obstetric anaesthesia as access to antenatal information is integral to our practice. However, parturient information confidentiality (PIC) and high cost has limited the spread of this technology. The aim of our study was to identify potential sources of PIC breaches.

Methods: Using MEDLINE, WESTLAW, medical industry literature and newspaper archive, potential sources of PIC breaches were identified. These were then compared to the safeguards issued by the European Union directive on the protection of personal data (1995) and the recently passed US department of health and human services rules on the privacy of individually identifiable health information (2000).

Results: PIC can be breached by 3 mechanisms: authorized (Au), unintentional (U) and unauthorized (UA). Authorized personnel can pass the health details to a third party for personal gain. U breaches occur when Au personnel pass the information to a bona fide second party, who in turn use this information for gain. U access occurs when a “hacker” breaks into a system and steals the data. There are few reports of these occurrences and this may be because they are undetectable. U access can also occur when an Au person leaves the data accessible for others. Both the EU and US rules protect against U, but they assume that collection and disclosure are the norm. A privacy-protection rule should only be permitted in certain specified circumstances with well-defined, clear guidelines for disclosure. Ownership of health information is another issue that is not adequately addressed and hence does not protect our patients.

Conclusion: Iron clad safe guards against egregious breaches in patient confidentiality have yet to be devised and universally implemented. Furthermore, the legislative process in most developed countries is only now wrestling with ways of preventing intentional dissemination of sensitive information to third parties for fiscal gain. While there are compelling reasons to leap enthusiastically into the brave new world of record keeping and transfer, until these issues have been addressed and the systems proven to be water tight discretion should remain the better part of valor.

References:
P47. The influence of antenatal physiotherapy for backache on delivery.
Royal Free Hospital, London, UK.

Introduction: Tewari et al. found increases in ventouse delivery, emergency caesarean section and epidural rates amongst women with prenatal backache who discussed pain relief in labour with an anaesthetist during pregnancy. The incidence and intensity of back pain during pregnancy can be reduced by physiotherapy in the antenatal period. We performed a retrospective review of outcome for women who received outpatient physiotherapy during pregnancy in the same hospital as Tewari et al., to determine if similar patterns were found for delivery in these women.

Methods: Mode of delivery and the use of regional analgesia were reviewed for women identified from physiotherapy outpatient records over a period of twelve months and compared with that of all other women who delivered at the same time. The data were analysed using Z test with Yates correction.

Results: Records identified 103 women in the physiotherapy group. They were significantly more likely to receive regional analgesia for delivery (72% vs 59.8%, P >0.05), had higher ventouse delivery and elective caesarean section rates, but an emergency caesarean section rate only half that of controls.

<table>
<thead>
<tr>
<th>Seen by physio</th>
<th>Control</th>
<th>P value</th>
<th>Tewari et al.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>103</td>
<td>3210</td>
<td>50/4694</td>
</tr>
<tr>
<td>SVD</td>
<td>28%</td>
<td>40.2%</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>without RA</td>
<td></td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>SVD with RA</td>
<td>28%</td>
<td>26.4%</td>
<td>NS</td>
</tr>
<tr>
<td>Forceps</td>
<td>1%</td>
<td>2.2%</td>
<td>NS</td>
</tr>
<tr>
<td>Ventouse</td>
<td>16%</td>
<td>5.1%</td>
<td>&gt;0.0001</td>
</tr>
<tr>
<td>el LSCS</td>
<td>21%</td>
<td>10.8%</td>
<td>&gt;0.01</td>
</tr>
<tr>
<td>em LSCS</td>
<td>7%</td>
<td>15.3%</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

Conclusions: This audit, in common with that of Tewari et al., found a higher use of regional analgesia for delivery in women with backache, suggesting that factors other than the anaesthetist and the physiotherapist underlie the greater use of regional blockade in these women. The high ventouse rate, similar to that found by Tewari et al., indicates that neither the physiotherapist nor the anaesthetist are important in its aetiology. This study does suggest that physiotherapy during the antenatal period may reduce emergency caesarean section rates.

Acknowledgments: The authors wish to express their gratitude to the physiotherapy department for their assistance with this audit.

References:

P46. Intravenous cannulae for obstetric hemorrhage.
C Burkle, B Harrison, R MacKenzie, M Warner, G Vasdev.
Department of Anesthesiology, Mayo Clinic, Rochester, MN, USA.

Introduction: For obstetric hemorrhage (OH) one large bore intravenous (i.v.) cannula is recommended. As uterine blood flow is >700 ml/min at term, in severe OH, high infused flow rates are needed. We developed a model of fluid administration, using roller pumps to deliver constant flows, in order to determine i.v. catheter size and arrangement for fluid infusion in severe OH.

Methods: A Rapid Infusion System™ (Haemonetics, Braintree, MA) roller pump was filled with 3L of 0.9% saline. Distal to the systems pressure transducer, 1 In of i.v. tubing ending in a bifurcation was attached. This allowed i.v. cannulae (18g, 16g, 14g) either single or in parallel (X2) to be tested. Flow rates of 250, 500, 1000 ml/min were set for each of the three i.v. cannulae, single and parallel. At supply pressures >300-mmHg constant flow rate was terminated. When this occurred a maximum flow rate corresponding to a supply pressure of 300 mmHg was measured for the affected i.v. cannulae. For each flow rate and i.v. size (single and parallel), pressure was measured for 5 runs.

Results: Figure 1 depicts the results of the mean pressure (n=5) versus the constant flow rates ml/min.

The relationship of flow to pressure is not linear, indicating turbulent flow. Flow was better through parallel than through single cannulae; smaller gauge, larger radius had higher flows. Only 14g single cannulae or 16g and 14g in parallel can achieve flow rates of >500 ml/min. Smaller single 18g i.v. catheters are able to maintain flow rates of 100 ml/min.

Conclusion: Turbulent flow is proportional to the radius and to the square root of pressure. It is generally under-appreciated that two cannulae in parallel will have decreased resistance for the same flow. For severe OH a single 14G i.v. cannula or 16G i.v. cannulae in parallel is necessary to cope with the high-infused volume.

References:
P48. Epidural anaesthesia and dermoid implantation tumours.

EW Moore, CM Cowan.
Liverpool Women's Hospital, Crown Street, Liverpool.

Introduction: Iatrogenic intraspinal epidermoid tumours secondary to neuraxial blockade are well documented.1

Methods: 500 members of the Obstetric Anaesthetists' Association were asked to complete a postal questionnaire examining experience of the clinician and instrument used to breach the epidermis.

Results: The skin piercing technique employed by the respondents was subclassified according to clinician experience. These data are expressed as those methods comprising a blunt (Tuohy needle) or sharp (blade or needle) skin puncture. Using the largest (5-15 year) experience group as the reference category, logistic regression suggests that more senior anaesthetists are more likely to pierce the skin with a sharp instrument, whilst junior anaesthetists favour blunt skin puncture.

Table 1. Practitioner likelihood of sharp skin incision when compared to the 5-15 year group (n=192).

<table>
<thead>
<tr>
<th>Experience (years)</th>
<th>Odds Ratio</th>
<th>95% C.I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 (n=32)</td>
<td>0.65</td>
<td>0.28 3.53</td>
</tr>
<tr>
<td>15+ (n=166)</td>
<td>2.31</td>
<td>1.51 3.55</td>
</tr>
</tbody>
</table>

Conclusion: Dermoid implantation tumours of the central nervous system after percutaneous needle puncture have been reported. Transmission of a dermoid fragment is more likely when employing needles that are hollow, blunt, of large diameter and have poorly fitting stylets.2-5 Introducing the Tuohy via an incision made with a blade is less likely to transmit epidermal tissue. Comparing practice with experience shows that more experienced practitioners are more likely to use a blade to breach epidermal tissue than their less experienced colleagues. Case reports of this complication before 19702 may have coloured the practice of these experienced anaesthetists: this lesson needs to be heeded by the next generation of obstetric anaesthetists.

References

P49. The introduction of micropore filters for epidural catheters

AG McKenzie
Simpson Memorial Maternity Pavilion, Edinburgh, U.K

Through the years 1961-64 several anaesthetists pointed out the need for a scrub-up before each epidural top-up, in order to maintain sterility. Some designed various forms of mechanical apparatus with reservoirs of local anaesthetic, which enabled an anaesthetist to avoid touching the syringe or epidural catheter. However, such apparatus presented other potential complications.

At this time bacteriological membrane filters (made of polymers) had been available for 40 years, but were expensive. Then developments in the plastics industry, coupled with increased demand for the filters in microbiology, led to mass production at relatively low cost.

The first recorded use of a micropore membrane filter in intermittent epidural analgesia was at the Obstetric Unit of the Queen Elizabeth Hospital in Adelaide, Australia. There James M Saunders inoculated 50-ml bottles of prilocaine with various bacterial cultures, passed the proven contaminated local anaesthetic through a Millipore filter and cultured the resulting fluid. Finding that he was unable to grow any organisms over a large number of tests, he felt happy to introduce the filters to prevent possible contamination of the epidural space.

Saunders presented this experience in 1964 at an Astra meeting in Santos, preceding the 3rd World Congress of Anaesthesiologists in São Paulo, Brasil. His paper attracted the attention of D Bruce Scott, who, on returning to Edinburgh, UK, attached 0.2-µm size Millipore filters to epidural catheters.2 John Desmond was probably the first to apply the technique in North America in 1972.3 J Selwyn Crawford (Birmingham, UK) further recommended these filters in 1975 to prevent introduction of particles of glass and other foreign material into the epidural space.4 A number of American authors disputed the need for micropore filters in continuous epidural analgesia. Nevertheless the filters underwent further development for use with epidural catheters and now form a standard component of mass produced epidural kits used world wide.

References
P50. The evolution of the epidural needle: was it Tuohy's or Huber's design?

J Martini, G Vasdev, B Harrison, D Martin, R MacKenzie
Dept. of Anesthesia, Mayo Clinic, Rochester, MN, USA.

Introduction: Central neuro-axial blockade was first used in 1900, when cocaine was injected intrathecally. Despite an increase in regional techniques at that time, obstetric regional analgesia did not spread until major improvements in technique, needle-design, and safety were established. The aim of our study was to document the development of the epidural needle.

Methods: Using institutional archives and cross-reference with the Wood-Library Museum (Chicago, IL), the chronological events in the evolution of epidural anesthesia were sought.

Results: In 1940, Lemmon described an indwelling malleable needle which, while providing extended anesthesia, imposed additional risks. At the same time Hingson used a malleable needle for caudal anesthesia in labor. In 1944, he described lumbar epidural blockade with the malleable needle. He cited experimenting with a ureteral catheter, but later abandoned the practice due to technical difficulty of catheter insertion through a Love-Barker needle. In 1944, Edward Tuohy, a US Army Medical Corps captain, described the first use of an indwelling silk ureteral catheter. Tuohy suggested the possibility of the cephalad migration of the catheter tip, he suggested bending the catheter before placement. It was not until the following year that he described the use of a 15-gauge needle with a Huber tip, a curved tip with a lateral orifice. In 1946, Ralph Huber, a dentist from Seattle, applied for a patent for a "transversely curved wall-end portion" needle. It was Tuohy, however, who suggested the possibility of using the lateral orifice to direct the catheter. In addition, the original Huber tip had secondary levels, which made it much sharper compared to the single, primary level of the modern needle.

Conclusion: Tuohy claimed no originality for the design and described it as a "needle with a Huber point." However, it seems that any epidural needle with a Huber tip has now become known as a "Tuohy needle" without any claim by Tuohy himself.

References: