SURVEY OF THE CURRENT MANAGEMENT OF DURAL TAPS OCCURRING DURING THE SITING OF EPIDURALS FOR PAIN RELIEF IN LABOUR

T. Sajjad, T. D. R. Ryan
Liverpool Maternity Hospital, Liverpool, UK

A postal survey of all the maternity units in the United Kingdom was conducted to gain information regarding the current practice of the management of dural taps occurring during the siting of epidurals for pain relief in labour and to see if any changes in the management have resulted from articles recently published in medical and anaesthetic literature.1-3

Of the 272 questionnaires sent, 233 were returned, representing a reply rate of 86%; 15 of the units didn’t have an epidural service so they were excluded from the final analysis.

Of the units replying to the questionnaire, 58% had a written protocol for the management of dural taps. Ninety-nine percent of the units resited the epidural after a tap, of these 14% occasionally inserted an intrathecal catheter for pain relief while a further 1% routinely inserted a catheter into the subarachnoid space. In 72% of the units the anaesthetist gave the top-up; of these 61% modified the epidural dose of the local anaesthetic in some way. In 46% of the units the patients were allowed to push after a dural tap. After delivery 30% of the units mobilised the patients as soon as possible, while 70% advised bedrest varying from 6-48 h.

As prophylaxis to avoid post dural puncture headache 9% of the units were in favour of an early prophylactic blood patch, while 19%, for prophylaxis, only relied on asking the patients to drink as much fluid as possible. As an additional prophylaxis 6% of the units used epidural opioids.

Before performing a blood patch 44% of the units routinely took blood for culture and sensitivity, whereas in 8% of the units a white cell count was routinely done before performing a blood patch. Only in 8% of the units was blood taken for culture and sensitivity, and a white cell count performed at the same time. In the presence of post dural tap headache 7% performed the patch as soon as possible, 35% of the units performed the patch within 24 h, while 27% performed within 48 h. After a patch, 11% said they discharge the patients the same day, 73% discharge the patient the next day, while 2 of the units carried out the procedure as a daycase.

Asked if they had a patient who needed a blood patch more than once, 23% of the units had a patient who received a blood patch twice.

Asked about the time intervals considered appropriate for a repeat blood patch, 60% considered 24-h interval appropriate, 24% considered 48-h appropriate while 6% said they wouldn’t consider or recommend it.

Asked if a colloid other than blood has been used in the recent past, 3 of the units had used dextran. The respondents were asked to mark a visual analogue scale as follows.

Happy to perform a blood patch                                           Unhappy to perform a blood patch
0                                        100

The scores were as follows ($n=210$): 0 = 28; 1-10 = 49; 11-20 = 51; 21-30 = 23; 31-40 = 8; 41-50 = 10; 51-60 = 9; 61-70 = 11; 71-80 = 7; 81-90 = 5; 91-99 = 2; 100 = 3.

References
OBSTETRIC FLYING SQUADS REVISITED
J. Muir, J. Goddard, D. Brighouse, D. Sutton
Shackleton Department of Anaesthesia, Southampton University Hospitals NHS Trust, Southampton, UK

The activities of obstetric flying squads have been reviewed at intervals since their inception in 1933, at a time when 30% of deliveries were at home. Since that time, with improved antenatal care, an increasing consultant based obstetric service, and a home delivery rate of less than 1%, the number of flying squad call-outs has decreased. At the same time, there has been a move towards dedicated anaesthetic cover for labour ward. Rationalisation of manpower led us to conduct both local and national surveys.

Method
A retrospective audit was undertaken to review the previous 16 years' activity of the obstetric flying squad in Southampton. A nationwide survey by postal questionnaire was conducted to study national trends in the usage of obstetric flying squads.

Results
The Southampton audit showed a decline in the annual number of calls from 30 to 6, 75% of those being to patients' homes, and 78% for problems associated with haemorrhage. The administration of general anaesthesia on flying squad trips has stopped. Of the 23 general anaesthetics given, only 2 were in the last 9 years. Only one was administered in the patient's home, the remaining 22 in GP unit equipped theatres.

The response rate of the national survey was 67% (180 out of 267 questionnaires returned). 128 units (71%) had an obstetric flying squad. In agreement with our own audit, most units are moving away from a multidisciplinary flying squad towards a resuscitation and retrieval service with transfer to hospital. Most units no longer provide an anaesthetist on such trips, due to loss of cover at the base hospital, and since provision of anaesthesia outside the hospital is so infrequent (6 nationally in the previous year).

Conclusion
As a result of these combined studies, the anaesthetic presence on the obstetric flying squad service in Southampton has been withdrawn. However, several questions must be considered. With the proposed increase in home deliveries as a result of the Select Committee report, will the trend of declining flying squad requests be reversed? If so, who will provide the emergency cover, and who will fund it?

References

CRICOID PRESSURE: TEACHING THE RECOMMENDED RANGE
B. Carter, T. Van Decar, N. Herman, K. Knape
Department of Anesthesiology, University of Texas Health Science Center, San Antonio, Texas, USA

Introduction
The application of cricoid pressure was first described by Sellick. This technique is known to be effective in preventing passive regurgitation when applied correctly as part of a rapid sequence induction in patients who are considered at risk. A recommended pressure is 10–20 Newtons (N) with the patient awake, increasing to 30–40 N with the onset of unconsciousness. The training of anesthesia personnel in the proper application of cricoid pressure is considered less than acceptable. This study was proposed to determine if, with further education and practice, anesthesia faculty/residents and assistants could be taught to apply a recommended cricoid pressure.

Methods
The force of cricoid pressure was measured using a life-size laryngotracheal model placed on a tared Air-Shields Vickers infant scale. Fifty-three participants did measurements. The groups were divided into anesthesia faculty, anesthesia residents (CA1, CA2, CA3) and nursing personnel. Preinstructional values were obtained by having the participant place the Sellick maneuver on the cricoid region of the model and recording the resultant pressure in kilograms first as if the 'patient' were awake and then anesthetized. The kg values obtained were converted to N using the conversion factor 1 kg = 9.8 N. Participants were then instructed as to the proper pressure to be given and were asked to attempt to apply this force (postinstructional values). The participant was then allowed to view the scale while
applying 20 N/awake and 30–40 N/anesthetized and allowed to practice this until they felt confident they could replicate the recommended pressure. Postpractice values were then obtained with the participants blinded once again to the scale. Follow-up values were obtained 3 months after the initial study. The participants were again blinded to the scale, reminded of the recommended cricoid pressure, and asked once again to attempt to apply this force.

Results

The Figure illustrates the differences for each group of participants between pre-instructional dominant hand (DH) asleep, post-practice DH asleep, and follow-up DH values. All groups exhibited significant improvement (by paired t-test) after practice with the exception of the CA-3 group in which participant numbers were small.

Discussion

We conclude that application of the recommended range of cricoid pressure is not only a learned technique which can be quickly and effectively taught to anesthesia personnel, but is a technique which is also retained.

CRICOID PRESSURE (IN NEWTONS)

![Cricoid Pressure Graph]

References


FAILED INTUBATION DRILL: A REVIEW OF ITS USE IN OBSTETRIC PRACTICE

G. Bonney, G. Lyons
Department of Anaesthesia, St James' University Hospital, Leeds, UK

Following the publication of an audit of failed intubation in 1985, we introduced changes in practice, and increased the scope of the enquiry. A protocol for managing difficult intubation (Cormack 3) involving use of the gum elastic bougie, was taught to all trainees. Recent analysis of the data collected provides some further points to debate, and encourages us to make some firm recommendations regarding the composition of failed intubation drills.

Between 1978 and 1992, the failed intubation drill was used 19 times, always for caesarean section. The incidence of failed intubation for caesarean section remains unchanged at 1:287, despite an heightened awareness of the problem in this unit, and the introduction of a protocol for difficult intubation.

Key points to consider are that 13 out of the 19 patients had been intubated either before or after the incident on record. This implies that anatomical factors may frequently be of lesser importance in failure to intubate, and that influences peculiar to the obstetric environment are implicated. In particular, the application of pressure to the cricoid deserves special scrutiny.

Our review also finds that Afro-caribbean and Asian women account for more than 50% of failure to intubate, while making up only 8% of our obstetric population, and having the same caesarean delivery rate as other racial groups.

We argue that a failed intubation should be defined as such when intubation cannot be accomplished on a single dose of suxamethonium, that inexpert application of cricoid pressure is a potential cause of failure to intubate, and that when difficulty is experienced, cricoid pressure should be momentarily released before failure is accepted and the drill implemented.
AMBULATION IN LABOUR WITH AN EPIDURAL: THE EFFECT ON ANALGESIC REQUIREMENTS, OUTCOME OF LABOUR AND MATERNAL SATISFACTION

R. Collis, S. Harding, L. Davies, C. Moore, M. Baxandall, B. Morgan
Queen Charlotte's Hospital, London, UK

Introduction
Using a combined spinal epidural (CSE), needle through needle, with low dose bupivacaine and fentanyl it is possible for more than 90% of women in labour to get out of bed and walk about safely. The effect that ambulation has on labour without epidural analgesia has been evaluated and has generally shown a reduction in analgesia required, shorter labour and improvement in the number of vaginal deliveries. In a preliminary study we have assessed similar parameters in women with epidurals.

Methods
Consenting nulliparous women with a CSE were randomly allocated to either staying in bed for the rest of their labour or spending as much time as possible out of bed. Those women who got out of bed were asked to sit in a rocking chair, stand by the bed or walk about. Continuous monitoring of the fetal heart rate was possible if the mother sat or stood close to the monitor. They all received a spinal injection of bupivacaine 2.5 mg and fentanyl 2.5 µg followed by epidural top-ups of 10 mg of bupivacaine in 10 ml with 2 µg/ml of fentanyl.

Results
There were 105 women recruited into the study, 53 were randomly assigned to staying in bed including 17 induced labours, and 52 to ambulation including 18 induced labours. The results are given in Tables 1, 2 and 3.

Conclusion
The small sample size results in no statistically significant differences. There are, however, interesting trends between the 2 groups. Fentanyl and bupivacaine usage was the same but more women in the ambulatory group were satisfied with their pain relief. There was also a trend towards shorter labour, more spontaneous vaginal deliveries and fewer rotational instrumental deliveries. The study is continuing and further data will be presented.

References

Table 1. Demographic and block data

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Weight (kg)</th>
<th>Cervical dilatation (cm)</th>
<th>Mean block time (min)</th>
<th>Bupivacaine (mg/h)</th>
<th>Fentanyl (µg/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambulatory</td>
<td>30.3 SD 4.2</td>
<td>78.2 SD 8.7</td>
<td>3.38 SD 1.4</td>
<td>396 SD 217</td>
<td>7.6 SD 3.5</td>
</tr>
<tr>
<td>Bed</td>
<td>29.4 SD 5</td>
<td>75 SD 10.5</td>
<td>3.1 SD 1.6</td>
<td>448 SD 193</td>
<td>8.2 SD 2.8</td>
</tr>
</tbody>
</table>

Table 2. Outcome of labour

<table>
<thead>
<tr>
<th>Spont vaginal delivery no (%)</th>
<th>Lift out instrumental</th>
<th>Rotational instrumental</th>
<th>Emerg LSCS</th>
<th>Wt of baby (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambulatory</td>
<td>34 (65.4%)</td>
<td>11 (21%)</td>
<td>0</td>
<td>7 (13.5%)</td>
</tr>
<tr>
<td>Bed</td>
<td>31 (58%)</td>
<td>13 (24.5%)</td>
<td>3 (5.7%)</td>
<td>6 (11.3%)</td>
</tr>
<tr>
<td>3514SD433</td>
<td>3472SD499</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Post partum follow-up

<table>
<thead>
<tr>
<th>Happy with epidural</th>
<th>Happy with analgesia</th>
<th>Satisfied with mobility</th>
<th>Able to move about easily</th>
<th>Generalised backache</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambulatory</td>
<td>52 (100%)</td>
<td>46 (88%)</td>
<td>44 (84.6%)</td>
<td>0</td>
</tr>
<tr>
<td>Bed</td>
<td>50 (94%)</td>
<td>47 (88.7%)</td>
<td>40 (75.9%)</td>
<td>31 (58.5%)</td>
</tr>
</tbody>
</table>
CONTINUOUS EPIDURAL INFUSION OF ALFENTANIL OR DIAMORPHINE WITH BUPIVACAINE IN LABOUR - A DOSE FINDING STUDY

D. A. Hill, G. J. McCarthy, I. M. Bali  
Department of Anaesthetics, Waveney Hospital, Ballymena, N. Ireland, UK

Introduction

Continuous epidural infusions have become popular for providing analgesia in labour. In an effort to reduce the frequent top-ups when the infusion rate is too low, or excessive motor blockade, hypotension and systemic toxicity when the infusion rate is too high, the addition of opioids to a dilute bupivacaine infusion has been suggested. The search for the ideal opioid has been extensive. Morphine was soon found to be unique in its capacity to produce more side-effects than analgesia. The lipophilic opioids are promising with segmental uptake into the cord and thus a low potential for respiratory depression.

The purpose of this study was to determine the minimum effective analgesic dose of the two lipophilic opioids alfentanil and diamorphine when infused with 0.125% bupivacaine for epidural analgesia in labour.

Methods

Following Queen's University Research Ethical Committee approval, written informed consent was obtained from 120 healthy parturients. Epidural analgesia was induced with 0.375% bupivacaine and the patients were randomly assigned to receive a continuous infusion of 0.125% bupivacaine at 8 ml/h containing one of the following - alfentanil at either 133, 266 or 400 µg/h or diamorphine at either 133, 266, 400 or 533 µg/h. The control group received 0.125% bupivacaine alone.

Quality of analgesia and maternal side-effects were recorded hourly, neonatal effects were assessed following delivery. Statistical analysis was performed using nonparametric and parametric analysis of variance (ANOVA) with Tukey honest significant difference test as appropriate.

Results

Analgesia assessed by visual analogue scores and the top-up interval were significantly better for the highest 2 doses of each opioid (P < 0.05). The optimal dose with the minimum of systemic side-effects was 266 µg/h of alfentanil and 400 µg/h of diamorphine. These doses were equianalgesic. Perineal analgesia was significantly better with any dose of either opioid compared to control (P < 0.05).

The incidence of nausea and pruritus tend to increase as the dose of each respective opioid increased, however this only reached significance (P < 0.05) with the largest dose of diamorphine.

Maternal respiratory rate showed no significant depression with any of the opioid doses used in this study.

Neonatal Apgar scores or Amiel-Tison neurological and adaptive capacity scores demonstrated no significant neonatal depression with the doses of opioid used in this study.

In conclusion this study has described the epidural doses of these lipophilic opioids when infused with 0.125% bupivacaine for epidural analgesia in labour. The maternal and neonatal effects demonstrate the safety of these epidural opioids.

References


THE EFFECT OF EPIDURAL ANALGESIA DURING LABOR ON THE IMMUNE SYSTEM: MATERNAL BLOOD INTERLEUKIN-6 LEVELS

R. De Jongh*, M. Puylaert*, W. Ombelet†, H. Vandeput‡, R. Heylen*, E. Bosmans‡, R. Berghmans‡, H. Suzuki§  
Departments of *Anaesthesiology and †Gynecology, Sint Jansziekenhuis, Genk, Belgium, ‡Eurogenetics, Tessenderlo, Belgium, §Tosoh, Tokyo, Japan

Recent studies suggest that cytokines can participate in the pathophysiology of normal and abnormal pregnancy and parturition. Interleukin-6 (IL-6), an early and integral responder in the cascade of host mediators after injury, exerts multiple biological activities which comprise induction of fever, modulation of the synthesis of acute-phase proteins by the liver, activation of B and T lymphocytes and stimulation of hemopoietic progenitor and stem cells. Epidural analgesia (intermittently 10 ml of bupivacaine 0.125% with epinephrine and 1 µg/ml sufent-
tanyl) was given on the patients demand (group epi; n = 20). Patients having no pain relief or pentazocine 30 mg IM formed the control group (group cont; n = 30). Venous blood was obtained: (1) after hospital admission, (2) just after parturition, (3) ± 12 h post partum and (4) 24 h post partum.

The white cell count increased after parturition with a significant difference between the groups 12 h post partum. IL-6 increased post partum and returned to normal after 24 h. In the group epi compared to the group cont, IL-6 levels were 300% (P < 0.001) and 50% (P < 0.05) higher after parturition and 17 h post partum respectively (Fig.). Postpartal IL-6 levels were correlated with duration of labor and duration of oxytocin administration. Explanation for these findings remains speculative: (1) Bias (no randomisation, higher oxytocin administration in group epi), (2) hormonal effects of epidural analgesia (adrenergic, steroid and estrogen hormones), (3) altered uteroplacental blood flow and amniotic fluid infusion, (4) altered uterine contractions or cervical ripening.

References

Poster presentations

EPIDURAL BUPIVACAINE INFUSIONS VERSUS INTERMITTENT TOP-UPS: EFFECTS ON ANALGESIA AND MODE OF DELIVERY IN 1947 PRIMIPARAE

Epidural infusions of low concentrations of local anaesthetic are increasingly being used to provide analgesia during labour. The advantages over intermittent top-ups are easier administration providing stable continuous pain relief with reduced motor blockade, less systemic toxicity and a reduced incidence of hypotensive episodes. Over a 3-year period we studied 1947 primiparous women, with a singleton pregnancy, gestational age at delivery of 36-42 weeks, whose first and second stages of labour were managed actively. After 3 ml of 2% lignocaine was followed by 10 ml of 0.25% bupivacaine. The women were then allocated to receive an infusion of 0.125% bupivacaine at 10 ml/h or intermittent doses of 0.25% bupivacaine 10 ml, the allocation being determined by the availability of infusion pumps. All mothers were visited on the following day and pain relief during labour and delivery scored.

Epidural infusions were given to 1144 (59%) women whilst 803 (41%) received intermittent boluses. There was no significant difference in the spontaneous vaginal delivery rate in the infusion group 536 (47%) compared with the top-up group 409 (51%) and the caesarean rate was the same in both groups (18%), 202 in the infusion group versus 145 in the top-up group. The instrumental delivery rate was similar in the infusion group 387 (34%) and to the top-up group 238 (30%) (P > 0.05). However the rotational forceps rate in the infusion group 87 (8%) was significantly higher than in the top-up group 23 (2%).
On questioning the women as to the pain relief during labour, 970 (85%) of the infusion group rated it as good compared to 642 (80%) of the top-up group, the difference being significant (P=0.006). The mothers' overall assessment of the epidural was scored as excellent in 748 (65%) receiving an infusion compared to only 440 (55%) of the top-up group, the difference is significant at the P<0.0001 level.

In conclusion, mothers receiving an epidural infusion of local anaesthetic had better analgesia and were more satisfied but were more likely to have a rotational forceps delivery.

HAEMODYNAMIC AND METABOLIC EFFECTS OF FENTANYL IN MOTHER AND BABY DURING ELECTIVE CAESAREAN SECTION UNDER GENERAL ANAESTHESIA

A. Chan, M. Henley, F. Carli

Department of Anaesthesia and Section of Medical Statistics Northwick Park Hospital, Harrow, Middlesex, UK

Introduction

Animal studies show that placental perfusion is reduced by increased maternal stress. Although complete abolition of the hormonal and cardiovascular response to major surgery requires large doses of opioids (e.g. fentanyl 50 µg kg⁻¹) it has been shown that the response to laryngoscopy, tracheal intubation and lesser degrees of surgical stress may be obtunded with considerably lower doses.¹,² The aims of this study were to determine whether fentanyl, in a moderate dose, given at induction of anaesthesia for caesarean section attenuates the stress response in the mother without deleterious effects on the baby.

Method

Nineteen ASA 1 patients were studied. Patients were randomly allocated to receive either 5 µg kg⁻¹ of fentanyl (n=12) at induction of anaesthesia or an equivalent volume of saline (n=7). General anaesthesia consisted of thiopentone and suxamethonium, vecuronium, nitrous oxide, oxygen and enflurane. Heart rate and blood pressure were recorded at 4 time periods: pre-induction, umbilical cord clamping, the end of surgery and one hour after surgery.

Venous blood samples were taken at the same intervals for measurement of cortisol, glucose, free fatty acids and lactate. Umbilical venous samples were taken from the babies at birth for measurement of metabolites and arterial blood was taken for acid base status.

Results

There was a similar change in maternal metabolic variables during surgery in both groups. However, the heart rate was significantly lower in the fentanyl group (P=0.034). Three out of 12 of the babies in the fentanyl group were significantly depressed (APGAR score <7) at 1 min, but there was no difference with the control group at 5 min. No late respiratory depression or abnormality in acid base status was observed.

Conclusion

Fentanyl given at induction for elective caesarean section attenuates the maternal haemodynamic changes associated with surgery, but does not modify the metabolic response. The impact of the transitory depression on the baby at birth needs to be further investigated and weighed against the benefit of the haemodynamic stability achieved in the mother.

References


THE RELATIONSHIP BETWEEN SENSORY, MOTOR AND SYMPATHETIC CHARACTERISTICS OF A REGIONAL BLOCK FOR CAESAREAN SECTION AND PAIN FELT BY THE MOTHER

R. E. Collis, S. Harding, M. L. Baxandall, B. M. Morgan

Queen Charlotte's Hospital, London, UK

Introduction

Regional rather than general anaesthesia for both elective and emergency caesarean section (LSCS) is now accepted as safer for the mother and has become the anaesthetic of choice in many units. Mothers however are generally unpremeditated and anxious that they may experience pain during the procedure. The relationship between the motor, sensory and
sympathetic characteristics of the block and pain and pressure felt by the mother is examined.

Methods

200 consecutive emergency and elective LSCS were studied. Where an epidural was in situ for labour the block was extended or a combined spinal epidural or spinal alone was used for both emergency and elective procedures. Epidural and intrathecal fentanyl were widely used. Within 2 min of the start of surgery the block was assessed bilaterally in 3 ways: a sensory level at the top and bottom of the block was found using ethyl chloride spray, motor power was assessed by the ability to straight leg raise against gravity and warm dry feet were taken to indicate sympathetic blockade. The mother was asked when the peritoneum was opened, on delivery of the baby, closure of the peritoneum and the following day whether she felt pain or pressure and to score it as none, mild, moderate or severe. The block was considered to be inadequate if there was not bilateral sympathetic blockade, if the mother was able to straight leg raise either leg against gravity or if the sensory level did not include the sacral roots and was below T4 on either side. Suboptimal anaesthesia was recorded if the mother complained of any pain, however mild, or pressure which was uncomfortable and persisted throughout the operation.

Results

There were 86 elective LSCS and 114 emergency LSCS. 17 women (19.8%) had suboptimal blocks at the start of their elective LSCS and 43 women (37.7%) had suboptimal blocks at the start of their emergency LSCS (Table). Pain or persistent discomfort was felt by 56 women (28%). 7 women (3.5%) experienced moderate pain on 5 occasions. This was due to inadequate blockade before commencing the surgery and on 2 occasions an optimal block wore off towards the end of surgery. One woman had severe pain when surgery was commenced where the block was defective in all 3 ways, the only one in the study, and the other complaint of severe pain occurred when a working block wore off. No regional blocks had to be converted to a general anaesthetic after the start of surgery and all women were happy with their experience of LSCS. There was a highly significant correlation between suboptimal block and pain during surgery ($X^2 = 20.6$).

Conclusion

The incidence of pain, the severity of pain and the degree of pain and discomfort which may be acceptable during LSCS under regional blockade has not been well defined. A sensory level above T6 and a degree of motor blockade has been thought to be necessary to provide a painless LSCS under regional blockade. We have shown that a regional block that is below T4 and does not provide bilateral sympathetic and profound motor blockade is likely to result in pain during a LSCS. A block that is thought to be optimal can still result in mild pain or discomfort and a means of extending a block towards the end of surgery is important.

References


DOUBLE-BLIND, RANDOMIZED COMPARISON OF A SINGLE DOSE OF CARBETOCIN VS 8 HOURS OXYTOCIN INFUSION AFTER CESAREAN DELIVERY: SAFETY DATA

A Canadian multi-center trial

D. Gambling*, J. Dansereau†, M. Schulz‡, G. L. A. Horbay§, W. Wassenaar§

*University of Texas Southwestern Medical Center at Dallas, USA, †Grace Hospital, Vancouver, University of British Columbia, Canada, ‡SciAn Services Inc., §Ferring Inc., Toronto, Canada

Introduction

Oxytocin is used to contract the uterus during cesarean delivery. It is often infused over several hours because its half-life is only 4-10 min. Carbetocin is a new, long-acting synthetic analogue of oxytocin with a half-life of 40 min. In a prior study of carbetocin during cesarean delivery effective uterine contraction was obtained following i.v. injection of 100 μg doses. The aim of this study is to compare the efficacy of a single i.v. dose of carbetocin with an 8 h infusion of oxytocin. It was designed to detect the odds of an
incidence rate of 'need for further oxytocin treatment' is 3 times higher or lower between the 2 treatment groups.

Methods

After obtaining IRB approval from each of the 7 centers, women undergoing elective cesarean delivery under regional anesthesia were randomly assigned to one of 2 groups following informed consent.

Group A (oxytocin) patients received 51U of oxytocin as an i.v. bolus immediately after delivery of the neonate followed by an infusion of 20 IU/litre oxytocin in lactated Ringer's solution at 125 ml/h.

Group B (carbetocin) patients received 100 µg carbetocin as an i.v. bolus immediately after delivery of the neonate followed by an infusion of 1 litre lactated Ringer's solution at 125 ml/h.

Uterine tone assessments (boggy or firm) were made by the obstetrician every min following delivery for 5 min, then every 5 min for 25 min and again at the end of the procedure.

Patients were assessed for abdominal pain, back pain, headache, nausea, feeling of warmth, and metallic taste. They were observed for flushing, sweating, tremors, vomiting and hemodynamic stability. Need for further oxytocin treatment, for the following 48 h, was documented as were postoperative uterine tone, fundal position, p.v. blood loss and vital signs.

Multistage sequential statistical analysis of the primary study objective, i.e. the need for further treatment, is being performed continuously using the double Triangular Test.

Results

400 patients have been studied to date and the stopping rule established by the double Triangular Test has not been applied. Safety analysis has been performed on the first 200 subjects and no differences were found between groups A and B in terms of intraoperative BP, HR or presence of adverse reactions (Fig.).

Discussion

A single i.v. dose of carbetocin was similar to an 8 h infusion of oxytocin in terms of maternal vital signs and was not associated with any untoward effects. The advantages of a single dose of carbetocin compared to an oxytocin infusion include ease, simplicity, avoidance of IV fluid loads and errors in their administration.

References


Fig.—Carbetocin in c-section: interim safety analysis symptoms and signs (operating room period)
CARDIOVASCULAR STABILITY DURING EPIDURAL INJECTION OF LOCAL ANAESTHETIC

J. Goddard, D. Brighouse
Shackleton Department of Anaesthesia, Southampton University Hospitals NHS Trust, Southampton, UK

Introduction

A recent study documented a transient bradycardia associated with injection of autologous blood into the epidural space in the management of post dural puncture headache. It was postulated that the cause of this was either a transient rise in intracranial pressure, or the effects of free radical formation. In an attempt to exclude any effect of posture, or a rise in intracranial pressure, the study was repeated using the same injected volume of local anaesthetic in patients undergoing elective caesarian section under epidural anaesthesia.

Method

Ten women presenting for elective caesarian section under epidural anaesthesia were studied. Each mother acted as her own control to exclude a postural mechanism for the previously observed bradycardia. Four hours preoperatively, cardiovascular parameters were recorded in the sitting and left lateral positions. Induction of epidural anaesthesia followed the protocol of Andrews et al. The epidural space was identified with the patient in the sitting position, and 15 ml 0.5% plain bupivacaine was injected over 45 s. After threading the epidural catheter, the patient was placed in the left lateral position for 5 min. Throughout this time, heart rate and blood pressure were continuously recorded using the Finapres (Ohmeda) non-invasive blood pressure monitor. Thereafter, further local anaesthetic was given to achieve surgical anaesthesia.

Results

There was a small but statistically significant decrease in heart rate associated with the change in posture from sitting to left lateral position in some pregnant patients at term. (23.83 [SD 3.04] beats per 15 s to 22.33 [SD 2.71] P<0.001, ANOVA).

The injection of 15 ml 0.5% plain bupivacaine into the epidural space was not associated with significant bradycardia (Fig.) (24.75 [SD 2.77] beats per 15 s to 24.92 [SD 2.94] P>0.1, ANOVA).

Conclusion

We have identified a potential contributory factor to the transient bradycardia observed by Andrews et al, but are unable to confirm or refute their proposed aetiological mechanisms.

Reference


Fig.—Heart beats per 15 s. Mean values. Vertical bars represent standard deviation.
THE INCIDENCE OF POST DURAL PUNCTURE HEADACHE AFTER SPINAL ANAESTHESIA FOR CAESAREAN SECTION WITH A PENCILPOINT NEEDLE WHITACRE 25 GAUGE

R. Helsted, B. D. Pedersen
Department of Anaesthetics, County Hospital of Næstved, Denmark

Introduction
Spinal anaesthesia (SA) is known to provide a more profound and reliable blockade compared with that of epidural anaesthesia. It is also unfortunately associated with a high incidence of post dural puncture headache (PDPH), especially in young pregnant patients.1

In the last few years studies concerning the use of pencilpoint needles for SA in young patients have shown a lower and more acceptable incidence of PDPH in obstetric as well as in ordinary and orthopaedic surgery.2-5

We consider severe PDPH most unpleasant to a mother taking care of her baby. Therefore to ensure quality control we recorded the incidence of this side-effect in women, to whom we offered SA for caesarean section (Cs). We used a Whitacre pencilpoint needle 25 gauge, VYGON.

The use of collected data for this publication was approved by the local Ethics Committee.

Methods
Sixty-six healthy women (age: 18–38, average 26 years, height: 150–185 cm, weight 55–119 kg) were included; all undergoing Cs: 64 elective and 2 emergency cases. They were preloaded with 1–1.5 litre of saline 0.9%. With the subject in the left lateral or sitting position, the needle was introduced into the subarachnoid space through an extradural introducer at the level of L 2/3. Bupivacaine isobaric 0.5%, 2–3.6, average 2.5 ml, was injected intrathecally. Immediately after, the subject received 10–15 mg ephedrine i.v. and was turned to the left semilateral position. Hypotension <90 mmHg systolic was treated by additional bolus doses of ephedrine, and further saline infusion (max 3 litre). After surgery the patient was given a questionnaire regarding appearance of headache and potential inconvenience. Mobilisation was allowed as soon as possible.

Results
In 3 subjects the SA was inefficient, and they required general anaesthesia. In the rest SA was successful, and PDPH occurred in only 2 cases, an incidence of 3%. One was slight and responded to bedrest and analgesics. In the other case the headache occurred 5 days after surgery, and was so severe that treatment with extradural bloodpatch twice was necessary. Slight headache of other origin occurred in 8 patients – 12%. In other studies concerning Cs and SA, investigators have found incidences of PDPH varying from 0–23%.3 5 The patient acceptability was 98%.

Except for the subject with severe PDPH none preferred general anaesthesia for a potential next Cs. One patient never answered the questionnaire.

Conclusion
We found that SA for Cs can be accomplished successfully by use of the pencilpoint Whitacre needle 25 gauge, reducing PDPH to an incidence of 3%. The patient acceptability was 98%, and all anaesthetists considered the needle easy and pleasant to use.

References

THE EFFECT OF EPIDURAL ANALGESIA DURING LABOR ON THE IMMUNE SYSTEM: NEONATAL BLOOD INTERLEUKIN-6 LEVELS

*Departments of Anesthesiology and Gynecology, Sint Jansziekenhuis, Genk, Belgium, †Eurogenetics, Tessenderlo, Belgium, ‡Tosoh, Tokyo, Japan

Birth is a stressful event for the child. A lot of physiological changes happen during the early extraterine period to make an independent existence possible. In these processes, cytokines might play an important role.

Interleukin-6 (IL-6) is a pleiotropic cytokine, which plays an important role in host defences to stress and infection.1 2 Together with IL-3, granulocyte-macrophage colony-stimulating factor (GM-CSF) and erythropoietin, IL-6 belongs to the
class of factors that control granulomonopoiesis and erythropoiesis. In fetal life, IL-6 induces the active cycling and expansion of haematopoietic progenitor cells, granulocytes and monocytes. Here GM-CSF seems to play a minor role. After birth, abnormalities of plasma cytokines including IL-6 may contribute to increased susceptibility to infection in neonates. Measurement of cytokine levels may be useful to predict neonatal course and outcome and to reflect perinatal stress.

We investigated whether epidural analgesia given to the mother in the peripartal period influenced the plasma IL-6 level of the child.

Method

Cord blood samples were obtained from 51 neonates with gestational ages between 37 and 41 weeks at the time of delivery. None of the children nor their mothers showed infectious complications. All mothers had vaginal deliveries. Epidural analgesia (intermittent bupivacaine 0.125% with epinephrine and 1 µg/ml sufentanil) was administered on patient's request to 20 patients. The second group of mothers (n = 31) received no pain relief or an intramuscular injection of 30 mg pentazocine. The protocol was approved by the local ethics committee.

Cord blood samples were taken in pyrogen-free dry test tubes. Serum and blood cells were separated at 4°C (5 min, 1000 G) and kept frozen at -20°C. IL-6 was determined with ELISA method.

Statistical significance was tested by unpaired t-test and stepwise regression analysis.

Results

No significant difference could be found between the neonates concerning their body weight, sex versus body weight ratio or placental weight (Table).

Serum cytokines and type of delivery:

In neonatal blood, no significant difference between the 2 types of analgesia was found during delivery, epidural: mean ± SEM 45.55 ± 26.89 pg/ml and controls: 18.25 ± 3.83 pg/ml (P=0.11) although a 300% raise of IL-6 could be seen in the maternal blood after delivery.

Table 1. Characteristics of the neonates

<table>
<thead>
<tr>
<th></th>
<th>No epidural</th>
<th>Epidural</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>31</td>
<td>20</td>
</tr>
<tr>
<td>Weight (mean)</td>
<td>3333 g</td>
<td>3346 g</td>
</tr>
<tr>
<td>Sex/Weight</td>
<td>F 3107 g</td>
<td>F 3158 g</td>
</tr>
<tr>
<td></td>
<td>M 3298 g</td>
<td>M 3338 g</td>
</tr>
<tr>
<td>Placental weight</td>
<td>F 620 g</td>
<td>F 745 g</td>
</tr>
<tr>
<td></td>
<td>M 625 g</td>
<td>M 651 g</td>
</tr>
<tr>
<td>Induction</td>
<td>7</td>
<td>11</td>
</tr>
</tbody>
</table>

Serum cytokines in neonate/mother:

Maternal IL-6 on admission and after delivery accounted for 43% of the variance in neonatal IL-6 level.

The IL-6 concentration in amniotic fluid had no predictive value for the IL-6 of the neonates tested on stepwise regression analysis.

Conclusion

Although not significant, we see a rise in the IL-6 in neonates. In the maternal group, the rise was 300%. Our findings suggest there is a partial barrier for IL-6 through the placenta. Since all our pregnancies were at term, we may conclude from several studies that the children were all able to produce IL-6 on their own. In amniotic fluid, maternal and fetal macrophages are found during infection, which both can be responsible for the rise in IL-6 during infection. No statistical correlation could be found between the amniotic and neonatal IL-6. Since we had 51 normal non-infectious pregnancies, we assume that the IL-6 found in the amniotic fluid is mainly maternally produced due to labour, although further investigation is necessary.

The type of epidural analgesia that we provided to the mothers does not alter uteroplacental or fetal circulation. So the difference in IL-6 we see between maternal and neonatal blood is unlikely to be due to impaired blood flow.

After this study we may say that the type of analgesia given to the mother does not alter the outcome of the child. Possibly the IL-6 of the mother on admission to the hospital could be of a predictive value for the child's IL-6 and possibly thereby his outcome.

References


**EFFICACY OF IV-PCA KETOROLAC TROMETHAMINE FOR ANALGESIA POST CESAREAN SECTION**

J. H. Skerman, H. D. Sanusi
Department of Anesthesiology, School of Medicine in Shreveport LSU, Shreveport, Louisiana, USA

**Introduction**

A study was designed to investigate the efficacy of IV-PCA ketorolac tromethamine (kt) in providing analgesia with the least amount of side-effects in the obstetric population post cesarean section. Kt is a new nonsteroidal anti-inflammatory drug which is an attractive alternative to spinal or epidural narcotics, spinal or epidural local anesthetics, or parenteral narcotics in view of its lack of side effects. Kt has not yet been approved for use intravenously in the United States. It has to date only been approved for oral and intramuscular administration.

**Methods**

The study was approved by the Institutional Review Board and all subjects gave informed written consent. In Phase 1 of the study, 30 term parturients undergoing cesarean section with epidural, subarachnoid or general anesthesia were selected. After delivery of the infant, each patient received a 30 mg loading dose of kt i.v. No intraoperative or postoperative narcotics were administered. IV-PCA kt was initiated at a dose of 1 mg, with a delay of 12 min, and a basal rate of 5 mg/h. Visual analogue scale (VAS) for pain and sedation along with plasma levels of kt were measured at 1, 6, 12, 18 and 24 h after IV-PCA was initiated. Side-effects such as nausea, skin rash, pruritus, or respiratory depression were evaluated at these same time intervals and treated if necessary. The total cumulative dose of kt as well as doses of additional analgesics required for breakthrough pain were recorded. Data were analysed using Repeated-measure ANOVA and Spearman Correlation Analysis.

**Results**

Since only 30 patients have been studied thus far in this initial study, there is great difficulty in statistically comparing the level of pain relief obtained from kt with their corresponding plasma levels at various time periods. Of the patients studied, respiratory depression (rate < 12), nausea and skin rash were not reported. The only reported incidence of pruritus occurred following an intramuscular morphine injection for breakthrough pain. Sedation was only at statistically significant levels at time 0 or immediately following the surgery. In the very few posts partum patients who were able to provide breast milk at 24 and 28 h post-initiation of the IV-PCA kt, the levels of kt in the breast milk were undetectable or negligible. Excessive bleeding did not occur in any patient who received kt IV-PCA for the 24 h postoperative period.

**Discussion**

Although our initial study showed that the majority of the patients required no other analgesics for treatment of their pain, it is difficult to demonstrate statistically with our small sample size that the use of IV-PCA kt is effective in the reduction of VAS scores for pain following cesarean section. The study does point out however, that the incidence of nausea, skin rash, pruritus, sedation and respiratory depression is nearly non-existent in this patient population. In conclusion, our results show the side-effects profile of kt in our patients is excellent.

**References**

ASSESSING THE AUDIT OF AN OBSTETRIC EPIDURAL SERVICE

R. J. T. Wilson, I. J. B. Jackson, T. H. Madej, R. G. Wheatley
York District Hospital, York YO3 7HE, UK

Introduction
Audit of medical practice using computer database management systems has become routine in recent years. The active encouragement from specialist organisations within anaesthesia has resulted in the publication of a recommended minimum data set by the Obstetric Anaesthetists' Association. Our unit has monitored the activity of its epidural service since 1985, using a computer database. Many of the parameters recorded are now included in the OAA minimum data set. We feel that there are 3 important functions of our audit
- to ensure the service is being used to its full potential
- to monitor the efficacy and safety of epidurals when used
- to determine 'customer satisfaction' with the service

This paper examines the results of our audit with relevance to their usefulness as part of a minimum data set for obstetric anaesthetic audit.

Methods
The following data were collected for 3551 patients who had an epidural in the maternity unit from 1985 to 1991: patient data, indication for and timing of epidural, effectiveness of pain relief for labour and delivery, mode of delivery, complication rate and patient satisfaction. Over a 2 month period in 1989 a post partum questionnaire was completed by all parturients. Results from this were used to estimate the number of women who were requesting, but not getting, epidurals.

Results
Many features describing the patient population are unchanging over the years. The epidural rate remains constant despite attempts to provide more information for patients. Our audit fails to pick up the group of patients who request but do not get an epidural. The failure rate of epidurals has fallen from 7-2% but there is a modest increase in the number of painful deliveries, possibly due to the use of infusions. The complication rate remains low and the majority of patients would have an epidural in a future labour.

Conclusions
Audit of an epidural service is necessary in order to maintain standards and to identify shortfalls in the service. Our present data set contains demographic information that is unlikely to change and probably unhelpful to analyse. Future random surveys are indicated to identify patients who would have liked an epidural but who did not get one. The data set should contain only that information which provides significant insight into trends in the quality of service and the impact of new techniques, such as epidural infusions. Since April 1992 we have used a new form, designed to be read by an optical mark reader (OMR) which has greatly simplified the collection and analysis of data.