Spinal anaesthesia (SA) is popular for Caesarean section (CS) because of the ease, effectiveness, and rapidity. Higher doses of 0.5% hyperbaric bupivacaine were associated with severe hypotension and delayed motor block recovery. In one study, the author stated that adequate anaesthesia for CS can be achieved with significantly less hypotension by adjusting the dose of hyperbaric bupivacaine according to patient’s height and weight.

Study was conducted on 80, ASA I/II parturients scheduled for CS under SA. Parturients were randomly allocated to two groups, comprising 40 parturients each: GROUP FD: received 2.2ml and GROUP AD: received 0.5% hyperbaric bupivacaine according to their height and weight. SA was performed in left lateral position at L2–L3 intervertebral space and the drug (0.5% hyperbaric bupivacaine) was given as per the group allocation. Immediately after the block, each patient was placed supine with 15°–20° left uterine displacement.

There were no significant differences in both groups with respect to age, height, and weight. Onset time for adequate sensory blockade and consequently the time interval between spinal injection and skin incision and delivery of baby was longer in AD group. In AD group there was decreased incidence and severity of maternal hypotension and bradycardia, thus leading to decreased mephentermine and atropine requirement. Two segment recessions time was longer in FD group. No case was converted to general anaesthesia. Using the results of our study we derive a formula for calculating the dose based on the height and weight:

\[
\text{dose of drug} = -2.432 + .03 (\text{height}) - .007 (\text{weight})
\]

Adjusted doses of hyperbaric bupivacaine provided adequate anaesthesia for CS without causing haemodynamic instability.

Reference:

The aim of study was to confirm the grade of haemodynamic stability and levels of myocardial and renal dysfunction markers during and after gynaecology surgery treatments in cardiovascular patients using sevoflurane as inhalatory anaesthetic. Precondition with sevoflurane is our therapeutic strategy expecting better haemodynamic stability and adequate renal perfusion and glomerular filtration rate.

Thirty patients scheduled for elective gynaecological treatment of ASA II and III category. Two separated groups of 15 patients were randomised to preconditioning by sevoflurane (1–3 vol%) or placebo. As intravenous anaesthetic during the introduction we used propofol (1, 5–2 mg/kg) and we used opioid analgetic – fentanyl. Routine monitoring was applied and pulse, non-invasive blood pressure, ECG and end-tidal vapour concentration were recorded continually. Biochemical markers of myocardial dysfunction and ischaemia and renal dysfunction markers were determined perioperatively.

Sevoflurane preconditioning significantly decreases postoperative levels of troponin, creatinine-kinase MB, myoglobin and markers of glomerular function (urea, uric acid and creatinine) were less increased in sevo than in placebo group. Mean values of sevo group markers (troponin 0.001U/l, CK-MB 24U/l, myoglobin 148, 9 μg/l) versus placebo group values (troponin 0.01U/l, CK-Mb 45U/l, myoglobin 217, 9 μg/l) shows better effect of sevofluran as preconditioning agent on myocardium and its function. Renal dysfunction markers in sevo group (BUN 4, 5 mmol/l, creatinine 65 μmol/l) and in placebo group (BUN 5, 9 mmol/l, creatinine 147, 7 μmol/l) were statistically significantly different. During the perioperative period in both groups we did not find any significant changes of ST segment, any new Q waves, heart rate differences and disrhythmias.

Sevoflurane as volatile anaesthetic can be useful agent in intraoperative treatment of cardiovascular patients.

References:
Development and validation of a dynamic model for predicting pain scores during the first stage of labour

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Labour pain is often described as the worst pain in a woman's life, but the experience is highly variable. Although many factors have been linked to labour pain, it has been difficult to assess the individual effects of these factors because labour is a dynamic process and pain intensity changes over the course of labour.

This study was conducted with a retrospective data base drawn from the medical records of 200 consecutive nulliparous parturients that delivered at New York Presbyterian hospital between October 2006 and January 2007. Numerical rating scores for pain with contractions (0–10 scale), cervical dilation, and oxytocin use before analgesia request were recorded. Non-Linear Effects Modeling was used to describe the relationship between pain report and cervical dilation with a sigmoid equation.

The model derived from our training set was predictive of the data from our validation set (P < 0.001). Our model used cervical dilation to predict NRS pain report and provided an unbiased description of pain intensity over the course of labour. Average predicted scores were 2 NRS points above or below measured pain scores. Analysing oxytocin as a covariant showed that women treated with oxytocin reported 39% more pain at low cervical dilations but did not have a significantly more rapid increase in pain or higher maximal pain when compared with women not treated with oxytocin. Women treated with oxytocin had slower latent labour and more rapid active labour.

We have developed and validated a model for describing pain over the course of labour. Previous studies have used average pain scores. Our model is suited to the statistical analysis of covariance and could potentially be used to compare the effects of covariants on labour pain and the rate of change of pain.

Comparison of continuous spinal anaesthesia and continuous epidural anaesthesia for labour and vaginal delivery

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Regional techniques provide excellent analgesia with minimal depressant effects in fetus. Continuous techniques with use of epidural catheters are the most common. The main objective of this research was to compare efficacy and safety of continuous spinal anaesthesia (CSA) versus continuous epidural anaesthesia (CEA) for labour and vaginal delivery.

40 healthy pregnant were randomised to receive CSA or CEA for labour. The women from CSA group received spinal anaesthesia with 2.5 mg of isobaric bupivacaine 0.5% and 2.5 μg of sufentanil. The women from CEA received epidural anaesthesia with 20 mg of ropivacaine 0.2% and 10 μg of sufentanil. The use of additional local anaesthetic, haemodynamic variables and Visual Analogue Scale (VAS) were analysed. The incidence of accidental dural puncture, post dural puncture headache (PDPH), catheter displacement, forceps and pain during episiotomy were also recorded.

Eleven patients were allocated in CSA and nine in CEA. The onset for pain control was 3.7 and 9.5 minutes, and the time required for additional AL dose was 119 minutes and 47 minutes, respectively. The research was interrupted because of high incidence of complications in the CSA: spinal catheter displacement, the anaesthesiologist wasn’t able to introduce the spinal catheter, and PDPH.

The CSA has a smaller onset for pain control than CEA and good analgesia for labour and vaginal delivery but is associated with a higher incidence of anaesthetic complications.

References:

Acknowledgement
We thank the Lifecenter Hospital that made it possible to perform this study and collect the data needed.
Audit of intra-operative pain during Caesarean section under spinal anaesthesia at Edendale Hospital in KwaZulu Natal, South Africa

Hugo Wellesley, Landy Taylor

Edendale Hospital is a regional referral centre with approximately 8,000 deliveries per year and a Caesarean section (CS) rate of 35%. There are no national standards for CS under spinal anaesthesia in South Africa and few published audits from similar institutions. In the UK, the Royal College of Anaesthetists propose a standard for conversion to general anaesthesia (GA) of < 1% for elective CS and < 3% for emergency CS.¹ No standards exist for intra-operative pain but, based on published rates, an incidence of < 10% should be achievable. Guidelines at Edendale Hospital recommend 1.8 ml 0.5% hyperbaric bupivacaine with 10 μg fentanyl for CS under spinal anaesthesia. We wanted to see whether our results met the standards.

A prospective audit of all Caesarean sections under spinal anaesthesia over 31 days.

Two hundred and sixty three Caesarean sections were performed during the study period. Two hundred and fifty one were under spinal anaesthesia and data were returned for 196 of these (78%).

Mean doses used were 1.84 ml 0.5% hyperbaric bupivacaine (1.6–2.4 ml) and 11 μg fentanyl (10–20 μg). Thirty women experienced pain intraoperatively (15%), 21 required supplemental analgesia (11%). There were no conversions to GA. Hypotension was seen in 46% of cases. The rate for conversion to GA of zero meets the standard, however the rate for intraoperative pain of 15% is higher than the proposed 10%.

Increasing the dose of opioid in a spinal has been shown to reduce intra-operative pain during Caesarean section² but does not raise the level of block or exacerbate hypotension. We recommend increasing the dose of spinal fentanyl to 20 μg to reduce the incidence of intraoperative pain.

References:

Echocardiographic assessment of left ventricular filling during elective Caesarean section under spinal anaesthesia

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Modern understanding of the haemodynamic changes during puerperium is based on investigations from 1969¹ and 1979². They describe a state of hypervolaemia with an increase in cardiac output up to 75% above predelivery values. No recent studies have addressed the changes following delivery through Caesarean section (CS).

This is a prospective observational study examining the LV volume pre- and post-delivery in healthy parturients at term, undergoing elective CS under spinal anaesthesia. Ethical approval was obtained and 18 patients were consented for the study. All participants received the same spinal and were positioned supine, with left uterine displacement. When the sensory block reached a T4 level, the first transthoracic echocardiogram (TTE) was recorded using a portable 2D GE Vivid machine. Through an apical view, the left ventricular end-diastolic volume (LVEDV) and end-systolic volume (LVESV) were measured using Simpson’s apical biplane rule. Stroke volume and cardiac output were calculated. The transmitral flow patterns were also recorded. A second TTE exam was conducted after placental delivery and surgical confirmation of adequate uterine contraction. The TTE images were analysed and a second set of values recorded.

Mean and standard deviation were calculated for the pre- and post-delivery sets of values.

Three subjects were excluded from the study. Surprisingly, post-delivery values for the LVEDV, LVESV and SV were lower than the pre-delivery values, contradicting the accepted view of puerperium as a state of hypervolaemia. The transmitial flow pattern analysis showed an improvement in diastolic function, consistent with previously reported findings.³

Our understanding of the haemodynamic changes accompanying Caesarean sections is incomplete. Echocardiography allows us a glimpse into these complex mechanisms.

References:
Invasive haemodynamic monitoring during spinal anaesthesia for Caesarean section

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Hypotension is a common side-effect of spinal anaesthesia for Caesarean section. All previous studies have used non-invasive methods. The goal of this study was to conduct the first invasive study on this subject to demonstrate the effects of both intrathecal bupivacaine and intravenous phenylephrine on cardiac output, blood pressure and system vascular resistance.

We included 80 pregnant women. They were randomised to four different groups with bupivacaine 7 mg or 10 mg added 4 μg sufentanil and intravenous phenylephrine- or placebo-infusion. An arterial line was inserted and a LiDCOPlus-monitor was connected giving continuous haemodynamic variables. Cohydration with crystalloid 750 ml i.v and the phenylephrine/placebo-infusion were started simultaneously with the spinal induction. The study was double-blind.

The 7 mg bupivacaine group with phenylephrine-infusion was significantly more haemodynamically stable compared with the three other groups regarding system vascular resistance (p < 0.0001), and systolic blood pressure (p = 0.008). Comparing the phenylephrine groups to the placebo groups we found a significant lower cardiac output (p = 0.016). We are questioning Ngan Kee et al’s1 use of unnecessarily high doses of bupivacaine for small women (mean height 156 cm), and the use of high doses phenylephrine (6 times more than in this study) to keep blood pressure at baseline. High doses of phenylephrine have a negative effect on cardiac output.

This study documents a balanced way of preventing haemodynamic instability during spinal anaesthesia using 7 mg bupivacaine, cohydration with 750 ml crystalloids and a low dose phenylephrine (2.8 μg/kg) keeping cardiac output stable and blood pressure = 90 mmHg.

Reference:

Placenta praevia – three year retrospective study

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Background: Women with placenta praevia are at high risk from morbidity and mortality from major haemorrhage. Aim: We wished to identify risk factors in this group where setting up a cell saver in anticipation would be cost effective.

Method: We did a retrospective study from September 2002 to August 2005, including those patients with placenta praevia who required a Caesarean delivery. Details collected: patient characteristics, anaesthetic and surgical details, estimated blood loss, blood transfusion, pre- and postoperative haemoglobin.

Results: Of the 15,033 deliveries there were 70 patients with placenta praevia including one case of placenta accreta. Overall transfusion rate was 10%. Patients given general anaesthesia (GA) were transfused three times more commonly than those given regional anaesthesia (RA) [4/23 (17.3%) vs 3/47 (6.3%)].

Conclusion: Patients with placenta praevia, given GA tend to bleed more and were more likely to be transfused than those given RA. Risk factors for major blood loss: multiple previous Caesarean sections, major placenta praevia and receiving a GA. We suggest the use of cell savers would be cost effective in patients with more than one of the risk factors mentioned above.

Reference:
Routine oxygen supplementation during elective Caesarean section under regional anaesthesia

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Fetal benefits of routine oxygen administration during an elective Caesarean section (CS) under regional anaesthesia lack evidentiary support in the literature. The basis for this technique was the belief that transfer of oxygen from the mother to the fetus would increase fetal oxygen concentration and improve the infant’s ability to handle a hypoxic event during delivery. Previous studies have failed to demonstrate an improvement in APGAR scores or umbilical artery pH with increasing maternal hyperoxia but showed increased umbilical concentration of free oxygen radicals. The purpose of this research is to evaluate the effect of varying concentrations of supplemental oxygen on fetal outcome and to make a recommendation regarding this practice.

To date 64 parturients without history of fetal compromise presenting for an elective CS have been enrolled. Patients were randomly assigned to one of three groups: room air, nasal cannula oxygen at 3L/min, or oxygen by mask at 10L/min. The patient’s demographic information and fetal APGAR scores, umbilical vein and arterial blood gases were obtained.

All three groups of patients were demographically similar. A one way analysis of variance (ANOVA) failed to demonstrate any significant differences in APGAR scores (p > 0.01) or umbilical cord blood gases (p > 0.01) between the groups.

Preliminary data from this ongoing research does not provide evidence to support the routine administration of oxygen to healthy parturients during elective CS under regional anaesthesia. Future research would include estimation of free radicals in umbilical cord blood samples and evaluation of the effects of free radical concentration on neonatal development.

References:

Acknowledgement
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