CASE REPORT

Combined spinal epidural anesthesia for an unusually prolonged caesarean section in a morbidly obese patient

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ABSTRACT

Summary: We present a case report of elective Caesarean section of a morbidly obese parturient under combined spinal epidural (CSE) technique, which, somehow, lasted for more than five hours. The patient remained awake of her own desire and she refused conversion to general anesthesia. The course of anesthesia required careful titration of the local analgesic solutions, well beyond the usual admissible total doses, and maintenance of her hemodynamic parameters.

Key Words: Morbid obesity; Caesarean section; Combined spinal epidural (CSE)


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CASE REPORT

A 26 years old, gravida-5, para-2 lady, with an unremarkable past medical history and uneventful current pregnancy was scheduled for elective Caesarean section (CS) at our institution. She weighed 107 Kg and was 152 cm tall (BMI 46 kg/m2). Considering that she was morbidly obese and had had two previous CS under regional anesthesia (RA), a combined spinal epidural (CSE) technique was proposed, consent obtained and planned.

At 14:50 on the scheduled day, after securing 16-gauge IV access and establishing routine monitoring with the patient in sitting position, CSE was performed at the L3-4 interspace uneventfully using a needle-through-needle technique. A 26-gauge pencil-point spinal needle was passed through a 16-gauge Tuohy needle and a combination of 2.5ml of hyperbaric bupivacaine 0.5% and preservative free diamorphine 300_g were injected in the intrathecal space. A 22-gauge epidural catheter was inserted 3 cm into the epidural space uneventfully and secured with adhesive dressing without tunneling. Following CSE, patient was placed in supine position with left lateral tilt to avoid aortocaval compression. Phenylephrine infusion, titrated to maintain SBP at baseline levels, was commenced immediately after spinal injection. A block to T4 level bilaterally, to touch and cold, which did not alter oxygenation, was established prior to skin incision at 15:25. A healthy baby followed by placenta was delivered uneventfully at 15:36. The surgeon experienced significant difficulty due to adhesions and scarring from previous CS. Phenylephrine infusion was slowly weaned off after delivery.

At 16:35, the patient complained of some discomfort; the surgeon was promptly asked to stop; explanation and
reassurance was offered to the patient and her partner and following a test dose of 3 ml of 0.5% levo-bupivacaine, epidural was activated with 10 ml of the same drug. Surgery was resumed following relief of discomfort and reassessment of block height bilaterally at T4 to pin prick. Following closure of uterus, the consultant obstetrician noted a collection of straw-coloured free fluid in the pelvic cavity but couldn’t identify the source. A urology opinion was requested at 17:45pm. Consultant urologist arrived at 18:25 and took another couple of hours to complete a thorough and detailed but unremarkable assessment of the integrity of the uro-genital system. By 20:25 it was decided to close the abdomen with drains in pelvic cavity for post-operative monitoring and the patient was finally taken to delivery suite recovery room at 21:15.

During 5 hrs and 45 minutes of surgery, invasive blood pressure, temperature monitoring and warming of the patient were commenced; thromboprophylaxis was achieved with subcutaneous unfractionated heparin (5000 IU) and antibiotic prophylaxis with co-amoxiclav (1.2 gm) and gentamycin (160 mg). Patient’s hemodynamics (systolic BP > 90 mm Hg) were maintained with IV fluids (crystalloids 4.5L + colloids 1.5L) and phenylephrine in small aliquots. Estimated blood loss (2000 ml) was replaced with 2 units of packed red blood cells raising the hemoglobin from 7.5 to 10.8gm/dL based on haemocue results RA was maintained by topping up the epidural at regular intervals using 15 ml (300 mg) of lidocaine 2% with adrenaline (75 µl) and 48ml (240 mg) of levo-bupivacaine 0.5%. The block level was repeatedly assessed at hourly intervals to be at T4 bilaterally to pin prick.

Explanations and reassurances were constantly provided to the patient and her partner. The patient complained of significant intra-operative pain and/or discomfort on three occasions (at 16:35, 17:50 and 19:55 hours). She continued to experience mild discomfort throughout most of the intra-operative period despite adequate activation of epidural. However, she persistently declined repeated and frequent offers for conversion to GA despite detailed discussions on risks/benefits of conversion to GA versus continued RA on at least three occasions, and insisted on staying awake describing her intra-abdominal discomfort as bearable.

Aliquots of alfentanil in addition to regular epidural top-ups were used to manage her discomfort. Discussions with patient and her partner, patient’s expressed wish to stay awake and resolute refusal to GA were clearly documented in notes.

Following extended stay in recovery for 60 minutes, she was admitted to high dependency unit (HDU) for overnight stay and was discharged to postnatal ward the next morning. Her postoperative instructions included; “no further epidural top-ups” (to prevent local anesthetic toxicity), thrombo-prophylaxis with subcutaneous deltamin, morphine patient controlled analgesia (PCA) and IV paracetamol for analgesia. Her immediate postoperative full blood count, urea & electrolytes and clotting results were unremarkable. She continued to pass reasonable volumes of slightly blood stained urine (> 0.5ml/kg) in recovery and HDU. She made an uneventful recovery before being disc harged from hospital on day 4. She was followed up by the first author, on day 4 and then 4 weeks later over telephone and was found to be satisfied and very pleased with the entire conduct of peri-operative care and hospital stay with no complaints whatsoever.

DISCUSSION

Problems associated with prolonged surgery under GA are well recognized, including; neurological injury, hypothermia, thrombo-embolism, pressure sores and hemodynamic instability. However, to the best of our knowledge, there is no case report(s) describing problems associated with prolonged surgery under RA as the sole anesthetic. Despite detailed search, we could not find same or similar case report(s) in either general or obstetric anesthesia literature.

This case raises several issues, most notably; i) how best to manage an unexpectedly prolonged CS under CSE, with particular reference to the following concerns; a) what factors should and would determine conversion to GA? b) how accurately and reliably, RA block adequacy and assessment could be made intra-operatively? c) how to balance the risk of venous thrombo-embolism (VTE), in an obese parturient during an unusually prolonged CS, with increased intra-operative bleeding risk, from initiation
of thrombo-prophylaxis? ii) What are the ethical and legal implications and as clinicians, our obligations in a situation where a patient is insisting to stay awake despite suffering intra-operative discomfort and whether her partner should stay or leave. Lastly, iii) How to balance the potential risks of local anesthetic drug toxicity, secondary to cumulative effect from repeated doses in epidural top-up, with potential risks associated with conversion to GA in a morbidly obese parturient?

Factors that may contribute and influence the decision to conversion to GA include; patient request, intra-operative discomfort refractory to conservative interventions, clinical or surgical need, unusual blood loss contributing to hemodynamic instability and uncertain prolongation in surgery. Although patient request is an absolute indication, in our opinion, all other factors are relative indications for conversion to GA. In our case, patient was experiencing significant intra-operative discomfort, had experienced significant blood loss (>2000 ml), there was surgical need and surgery was likely to continue for an uncertain duration. However, our patient refused to consent and persistently declined repeated offers of conversion to GA.

In clinical practice the most common modalities used to assess the adequacy of regional block are; touch, cold and pin prick. However, it is widely accepted and recognised that a differential block to these sensations exists at the upper end. Block to cold sensation is usually at a higher level than block to pinprick. Current obstetric anesthesia text books and expert opinions support the use of loss of touch sensation as the most reliable predictor of painless CS. However, in our opinion, clinical application of touch for block assessment is practical, feasible and reliable only prior to the commencement of CS; but whether or not, an accurate, reliable assessment of soft touch can be established intra-operatively is not clear because of multitude of factors like surgical drapes covering the area to be assessed, ability of patient to focus & co-operate with block assessment, concurrent ongoing surgical stimulation eliciting spatial summation. For similar reasons, following initial confirmation of block preoperatively bilaterally at T4 to touch, we used pin prick to assess the adequacy of RA during the intra-operative period. Despite reservations and misgivings about the reliability of pin prick modality to predict adequacy of block accurately, its advocates suggest that bilateral loss of pin prick sensation up to T4 is a reliable indicator of adequacy of regional block. Surprisingly, in our case, although a bilateral block to pin prick at T4 was maintained throughout the surgery by repeated and regular epidural top-ups, the patient continued to experience discomfort; an observation which further affirms that spatial and temporal summation of sensory inputs complicates the reliability of accurate block assessment by pin prick modality. Possibility of a missed segment or patch by block also could not be ruled out.

VTE remained the leading cause of maternal death in the United Kingdom following normal or operative delivery. Current recommendations include; i) all women should have undergone an assessment of risk factors for VTE antenatally and such assessment should be repeated as dictated by her clinical circumstances and progression through pregnancy, delivery and puerperium. ii) women with three or more risk factors should be considered for thromboprophylaxis with low molecular weight heparin (LMWH) antenatally and for three to five days postpartum, whereas, those with one or two risk factors should only be considered for post-natal thromboprophylaxis for three to five days. iii) excess blood loss and blood transfusion are risk factors for VTE, so thromboprophylaxis should be commenced or reinstated as soon as the immediate risk of haemorrhage is reduced.

Currently, there is no consensus or recommendation for intra-operative thromboprophylaxis in morbidly obese women undergoing CS, particularly when the surgery is complicated with excessive blood loss. While there is very little evidence to suggest that preoperative thromboprophylaxis increases risk of intra-operative bleeding except a 2% increased incidence in wound haematoma, it is considered prudent to delay postoperative thromboprophylaxis in case of significant post partum blood loss. Our patient had only one risk factor (BMI>45kg/m2), prior to CS and was scheduled to receive postoperative dalteparin 5000 IU once daily for 5 days, but considering that she was expected to remain immobilised for extended period and had lost significant blood receiving
multiple transfusions during surgery, it was considered prudent to commence thrombophrophylaxis intra-operatively rather than delaying it until after the operation.

For the validity of an informed consent, three requirements have to be met; autonomy, capacity and right information, to be given, to make decision. Capacity is the ability to understand the information being given, process the information into a decision, and communicate the decision. Consent is a continuous process and patient has the right to alter or revise her consent, as the circumstances of her treatment and/or care change. However, it is regarded as a good practice to confer patient as many times as possible prior to obtaining consent par particularly before a major treatment and intervention, and it is recommended to discuss in detail about anaesthetic options including possible conversion to GA with all patients scheduled for CS prior to proposed surgery. Similarly, regardless of concerns that stress, anxiety and pain may compromise patient capacity - that needs to be severe enough to incapacitate her, otherwise patient retains capacity to give or withhold consent.\(^5\) In this case, irrespective of the fact that intra-operative consent may not be optimal, the anaesthetic options, particularly RA conversion to GA were discussed with the patient and she was able to communicate a clear preference and we were ethically obliged to respect and accept her choice.

Intra-operative pain or discomfort during CS under RA is the most common reason for complaint and litigation in obstetric anaesthesia practice.\(^6\) In this case, we believe that medicolegal problems were averted through honest and detailed communication with patient and our decision to allow her partner to stay throughout the operation. However, significance of detailed contemporary record of events and documentation and clear communication with all staff, cannot be overemphasized.

The manufacturers (ABBOTT Laboratories Limited) and British National Formulary (BNF) recommend a maximum dose of 150 mg of 0.5% levo-bupivacaine for CS under epidural anesthesia, to be given over 15-20 min utes. However, to attain effective labour analgesia, up to 25 mg of 0.25% lev-o-bupivacaine, at 15 min utes inter val, is considered safe. In absolute terms, we did exceed their recommendation, but as our epidural top-ups (25 mg of 0.5% levo-bupivacaine) were given at 30 to 45 min utes interval, were still within maximum dosage recommendation for labour analgesia. It may be difficult to ascertain the correctness of such extrapolation of safety of levo-bupivacaine, from labour analgesia to CS. Levo-bupivacaine systemic toxicity correlates well with plasma level and safety profile of dosage regimen is validated through volunteer to xicity experiments, employing measuring serum level following intravenous infusion of levo-bupivacaine.\(^7\) Conversely, because serum measurement facilities are not routinely available at our unit clinical monitoring was employed for early recognition of toxicity. Patient was repeatedly and frequently asked (particularly subsequent to each top-up) about development of any sign of CNS toxicity, i.e. visual and hearing disturbances, dysarthria, tingling, peri-oral numbness, dizziness, paraesthesia, light headedness, gross signs of seizure activity, muscle twitching and muscle rigidity, as it precedes cardiovascular toxicity.

Although risks associated with administration of GA in morbidly obese par turient are well recognized,\(^8 - 10\) quantifying risk of toxicity associated with exceeding the manufacturers recommended maximum dose for levo-bupivacaine is not evidently reported in literature. Acute and most serious adverse effects of levo-bupivacaine usually occur following inadvertent intravascular or intrathecal injection,\(^11\) and because a higher than recommended dose has been safely used, we decided to continue topping up epidural in excess of recommended maximum dose was made following balancing the risks of GA in a morbidly obese patient and patient's refusal to consent for conversion to GA.

**CONCLUSION**

In conclusion, successful management of unanticipated prolonged CS under RA involves direct and clear communication with patient, her partner, surgeons and other team members. Epidural should regularly be topped-up, followed by repeated and regular assessment for block level and local anesthetic toxicity. Patient should be continuously explained and reassured, intra-operatvi
discomfort should be treated accordingly and GA should be offered. Clear documentation particularly about GA offered and patient response, block level and treatment of discomfort is vital to void subsequent medicolegal problems. Consideration should be given to establish invasive monitoring, patient and fluid warming, thrombo-prophylaxis, 12 lead ECG and admission to HDU post-operatively. Our case demonstrated that epidural can be used for unusually prolonged CS in high risk patients for GA provided adequate level of block is maintained throughout and patient is continuously reassured.

REFERENCES


