Author’s response to reviews

Title: Case report: difficulty in diagnosis of delayed spinal epidural hematoma in puerperal women after combined spinal epidural anaesthesia

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Author’s response to reviews:

Thank you for the positive comments concerning our manuscript and thank you for considering it eligible for publication in your prestigious journal once the requested changes have been made.

We have performed all the major revisions as suggested by the reviewers and we have uploaded the final version of the manuscript (with all changes highlighted).

Answers to Editor:

1. What are the current guidelines regarding Daltaparin and neuraxial anesthesia?

We have added the following references regarding the guidelines:


2. What was the patient's renal function - as this is known to prolong the duration of low molecular weight heparin?

Renal function was normal. We have added this information in the manuscript.

3. Please change D to T (for thoracic)

Done

4. Was the patient receiving any additional anticoagulant? (i.e. aspirin)

No additional anticoagulant was administered before surgery. After surgery we administered only ketorolac 30 mg/die for 2 days. This dosage is very low in consideration of the patient’s weight (70 Kg).

5. Including reference from the medical literature about epidural hematoma in the obstetric population would improve the strength of the manuscript.

See reference numbers 4 and 5. We have also added another reference, see reference number 6.

6. Did this case result in any practice changes in your hospital? Should Factor Xa levels have been placed prior to epidural/spinal placement or removal?

We performed an audit and after that we decided to intensify patient control: from once a day to twice a day. In our opinion it is not useful to place Factor Xa in every patient. It could be useful in patients with particular risk factors or high risk anamnessis.

7. How should clinicians prevent a delay in diagnosis? what should trigger an immediate MRI?

As suggested in our manuscript, the first action to prevent a delay in diagnosis of SEH, is to consider that it is a possible complication. After that, intensify patient checks should be intensified and, when neurological symptoms appear, start investigations promptly.

8. What was the patient's weight?
Weight was 70Kg and height 172 cm. BMI 23.7

9. What was this dose chosen for dalteparin?

As written at line 76, the dose was 2500 UI one per day at 08.00 pm.

10. Platelet count? specific coagulation parameter - PT, PTT are missing from manuscript

We have added coagulation information in the manuscript. Platelet count 120,000 per microliter of blood; Prothrombin time 12 sec, Partial thromboplastin time 30 sec, fibrinogen 540 mg/dL, INR 0.90

11. What is the lesson that the authors wish to convey to the reader?

The most important lesson to be obtained from our case is to consider that SEH exists and is a potential complication of epidural anaesthesia, so we must always take into consideration this complication in the case of the appearance of neurological symptoms.

Anticoagulation and neuraxial anaesthesia were recently addressed in A&A by the Society for Obstetric Anaesthesia and Perinatology (SOAP) in the United States. Please review to see if any information in this consensus statement could add to the educational aspect of this case report.

We have read the article, and our actions are in line with its recommendations (dalteparin 5000 U once daily for weight between 50 and 90 Kg). Moreover, NSAIDs are not contraindicated.

Answers to Michael Wee (Reviewer 1):

- The case report lacks information on why the epidural analgesia was prolonged for at least 48 hours after what was described as a routine Caesarean section for twin pregnancy. Was it a classical incision but even then other techniques such as the use of rectus sheath catheters have been shown to be effective without the risk of epidural haematoma complicated by anticoagulation post-operatively.

We used a double-space CSE anaesthesia, because a Caesarean section is major surgery, as well as for the concerns regarding potential surgical complications with consequent time prolongation in this patient (44 years old, FIVET, twin, diabetes). If an epidural catheter is available, our protocol (which is in line with SIAARTI guidelines and with Tuscany regional protocol) for postoperative pain management considers the possibility to prolong epidural analgesia for 48 hours. Moreover, our hospital is a Baby Friendly Hospital, which means that it is at the forefront in the promotion of breastfeeding. In this view, postoperative pain control is of primary importance, with the aim of promoting skin-to-skin contact and the start of breastfeeding.

We think that rectus sheath catheters could be a good choice, but they are not available in our Hospital.
There were no details on whether the patient was encouraged to mobilise post-operatively immediately or whether she was confined to bed which again increases the risk.

At lines 84 and 85 we indicate: “Four hours after the operation, the urinary catheter was removed, the patient began to stand up and take care of the newborns”

There were also no details on what neurological observations were conducted in patients on PCEA in the ward and with the low dose PCEA, the signs and symptoms could have manifest earlier giving an index of suspicion of a developing epidural haematoma.

Anaesthesiologists check patients’ conditions 4-6 hours after surgery, followed by a daily check. In our case the patient walked and urinated without problems four hours after surgery.

The discussion section did not elaborate on what lessons have been learnt and whether there was a root cause analysis of this serious complication which has affected the patient even at the 36 months investigation.

After this case we performed an audit that involved all staff members and we have introduced some actions of improvement. For example, we have changed the number of patient checks from once to twice a day. We have also organized a review day about SEH with the aim to inform all staff members about the onset symptoms and early diagnosis of this condition.

What is helpful in this case report is to highlight the dangers of giving continued central neuraxial blockade in an anticoagulated patient - this is already known and not new. What would have been helpful is to highlight in the discussion the observations necessary to avoid this potential serious complication in terms of the protocol to be adopted.

What would also be good to know is the justification for prolonged epidural analgesia in what was described as routine caesarean section for twin delivery. For example, our parturients after routine CS mobilise 6-12 hours after surgery without the need prolonged epidural analgesia and with acceptable pain scores which does not impede mobilization or care of the baby.

We used a double-space CSE anaesthesia because a caesarean section is major surgery and for the concerns about the potential surgery complications with consequent time prolongation. If epidural catheter is available, our protocol (that is in line with SIAARTI guidelines and with Tuscany regional protocol) for postoperative pain management consider the possibility to prolong epidural analgesia for 48 hours. In our experience, this technique is a good choice.
- The authors have not made the case for their version of "multimodal pain therapy" and indeed, have made the case for not using this regime due to the serious consequences for their patient.

We think that PCEA is a possibility, and with correct indications could be useful.

Answers to Jan Blaha, M.D., Ph.D. (Reviewer 2)

- The main point of the case is the late recognition of epidural hematoma symptoms and inappropriate response. However, the message is not a missed or inadequate assessment of risk factors, but a poor control management. Who was responsible for recognition - anaesthesiologist, obstetrician or nurse? Who was responsible for following time and treatment management - anaesthesiologist, obstetrician or someone else? Why there was a such delay? This should be mainly discussed.

Nurses usually check the patients’ parameters every six hours and an anaesthesiologist and gynaecologist check patients once daily. The postoperative treatment is decided by the anaesthesiologist and gynaecologist together. The delay in diagnosis was caused by confounding effect of anamnesis (sciatica history) and by an unusual delay in the onset of SHE.

In our hospital, the PCEA technique is commonly used in abdominal surgery (about 3000 surgeries per year), and this experience is very useful for young anaesthesiologists, also in the labour ward (about 800 epidurals/year).

- Time. The time is of course the most critical factor in development and outcome of epidural hematoma. But the only time reference given is the time of urgent neurological consultation after the onset of symptoms. But we do not know how long it took to pass MRI and start neurosurgical removal of the hematoma. It would be much more telling if we knew the full timeline of the case and could evaluate the time consequences between all important moments. Time of puncture - time of catheter removal - time of first symptoms - time of conservative treatment - time of MRI - time of surgery…

We have added a full timeline of the case. Moreover, our neurosurgery department is located in another hospital, so the transfer of the patient must be organized to perform neurosurgery.

- It should be also mentioned, that even the spinal hematoma is quite rare in obstetrics, in most cases published there was an association with low platelets (HELLP, preeclampsia, &hellip; and that not puncture but epidural catheter removal means the highest risk.

We have add this in the Background section.

- Why double-space CSE technique was used? This is certainly not the most common regional technique for caesarean delivery!
Also for us, double-space CSE is not a common regional technique for caesarean section. We decided to perform this technique in this case due to the concerns regarding potential surgery complications with consequent time prolongation in this patient (44 years old, FIVET, twin, diabetes). If epidural catheter is available, our protocol (that is in line with SIAARTI guidelines and with Tuscany regional protocol) for postoperative pain management consider the possibility to prolong epidural analgesia for 48 hours. In our experience, this technique is a good choice.

Moreover, our hospital is a Baby Friendly Hospital that means that is in first line in promotion of breastfeeding. In this view, the postoperative pain control is a prime importance, with the aim to promote skin to skin contact and the start of breastfeeding.

- At what depth and how deep was the epidural catheter inserted? On how many attempts?

The epidural catheter was inserted for 4 cm in depth. Only one attempt was done.

- Basis demographic data beside the age (height, weight, BMI)?

We have added this information

- Preoperative PLTs?

We have added this information

- Why so wide postoperative pain therapy was used (PCEA + ketorolac + tramadol + acetaminophen) - because of some complications?

We used a multimodal pain therapy, with very low dosage, to reduce side effects, to avoid pelvic chronic pain and to encourage breastfeeding

A mother-tongue English translator has checked the document.