

Accidental Multicompartment Placement of Epidural Catheter and Timely Detection of It after Test Dose

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Abstract- Although epidural anesthesia is routinely practiced in all of the major clinical settings, accidental subdural and subarachnoid block still remains its poorly understood complication with its variable clinical presentation. Here, we are describing a 29 years old primigravida who was in labor after premature rupture of membranes. Patient was given lumbar epidural anesthesia following which she developed an episode of supraventricular tachycardia along with complete lower limb motor block and sensory block upto T4 after giving test dose of local anesthetic solution. An emergency caesarean section was performed. She was successfully managed. Hence, patients receiving epidural anesthesia should be closely observed for any such untoward complication.

Keywords- Epidural, subdural and subarachnoid block

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I. Introduction

Epidural analgesia involves the injection of a local anesthetic agent and an opioid analgesic agent into the lumbar epidural space. These agents diffuse across the dura and act on the spinal nerve roots. Between the arachnoid mater and dura mater lies a potential space with minimal serous fluid known as subdural space. [1] The incidence of inadvertent subdural blockade is reported to be 0.82%, whereas recent studies using radiographic evaluation indicates higher incidence of one to 13%. This case illustrates a situation where epidural block was complicated by a presumed subdural or multicompartmental block. Only few practitioners are familiar with most of its clinical presentation, as the presentation may be quite variable.

CASE SUMMARY-

A 29 years old primigravida with 37 weeks of gestation presented with complain of premature rupture of membrane. Preanesthetic check-up was carried out and the patient was categorized to ASA Gr I. Continuous epidural anesthesia was planned and the patient was explained about the anesthetic technique & informed consent was obtained. Patient was taken up in the OT & baseline pulse & B.P were noted as 120/min & 134/80 mmHg respectively. Intravenous access was secured using an 18G intracath & patient was preloaded with injection Ringer's Lactate 10 ml/kg-1 body weight. Pulse oximeter & cardioscope were attached. With patient in sitting position, under all aseptic precautions after local infiltration of skin with 2% lignocaine epidural needle 18G was inserted in L2-3 interspace. Epidural space was located with loss of resistance to saline technique. At the time of instillation of saline patient complained of frontal headache. Skin to epidural space distance was 3cms. After negative aspiration test, multihole epidural catheter of 18G was inserted through the epidural needle which could be passed quite smoothly. Five cms of epidural catheter was left inside epidural space. Careful aspiration for CSF/ blood was done through epidural catheter which turned out to be negative despite repeated aspirations. Epidural catheter was fixed on the back using sterile dressings & patient made supine. Test dose was given, again after confirming negative aspiration, using 3cc of 2% xylocaine with 1:200000 adrenaline through the epidural catheter. No head down tilt was given. Immediately after giving supine position pulse & B.P. were normal. On further examination the patient was unable to lift up both the lower-limbs & the motor blockade was upto the level of T6 within 30 seconds. Abdominal superficial reflexes were absent. We were alarmed. Immediately patient was given head-up position. 100% oxygen was started through a face mask. Patient's B.P. dropped down to 90 mm Hg systolic with a pulse rate 210 min-1, RR = 18min-1. SpO2-100%. ECG showed supraventricular tachycardia. Injection phenylephrine was given. Repeated doses of esmolol was given. The sensory level of blockade was T4 within 5 to 7 minutes after giving the test dose. When the patient became haemodynamically stable (ie. P=120 min-1 & B.P.=100/70 mmHg) surgery was allowed to begin. A healthy female infant was delivered. In the postoperative period the patient was

conscious well oriented and haemodynamically was stable. Level of Sensory blockade was upto T12 &. Before shifting to the ward, the epidural catheter was removed, after confirming again the non aspiration of CSF through the same.

II. Discussion

The usage of epidural anesthesia is on a rise now a days & so we have to be vigilant enough to guard our patient against possible hazards or complications arising out of its usage. Anatomically the duramater in the lumbar region is thin posteriorly and relatively thicker on its anterior aspect, this fact predisposes to dural puncture by epidural catheters with a pointed tip.

Dawkins 1969 et al.^[2] report an incidence of 2.5% regarding accidental dural puncture during epidural anesthesia even in experienced hands. So it is recommended that patient be kept under observation for up to 5 minutes after injection of test dose. In our patient there was no backflow of CSF through the epidural catheter despite repeated aspirations. Our observations have been supported by J. Bertil Lofstrom et al^[3] who opine that even if there is no backflow of CSF the dura may still have been punctured. A test dose of 3-5 ml of local anaesthetic solution should in most instances produce signs and symptoms of spinal analgesia within 5 minutes as was observed in our case. We were vigilant enough to detect this mishap early and take corrective measures so that development of total spinal block was averted.

The only possible clue to abnormal placement on insertion was the frontal headache experienced on injection of saline through the needle. It is possible that CSF may have been displaced intracranially to cause symptoms of a high pressure headache. Williamson reported a severe frontal headache which persisted for several days after inadvertent subdural injection of a steroid mixture.

During pregnancy, obesity and oedema frequently obscure anatomical landmarks, the interspinal ligament is hormonally softened, and inhomogeneous tissue can cause false loss of resistance. These changes may make neuraxial anaesthesia technically more difficult with more complications.

S.Michael et al^[4] have compared complications and quality of sensory blockade between open-end (single hole) and closed-end (three lateral holes) epidural catheters and found that the closed-end catheters caused sensory blockade to be more frequently unilateral and more frequently missed sensory segments. Open-end catheters despite their theoretical advantages in the detections of intravenous and subarachnoid placement caused an unacceptably high incidence of unsatisfactory sensory blockade. We had used a closed end catheter with three lateral holes.

C.B. Collier^[5] in their study have opined that the undoubted^[5] advantage of a single-holed catheter is that the terminal eye can only lie in one anatomical space at a time, so that incorrect placement should be easier to detect. In contrast the standard multihole catheter can come to lie with its eyes in two (possibly three) anatomical spaces. There may be difficulty in aspirating blood or CSF (as was in our case) & on injection the local anesthetic may behave unpredictably as the progress of fluid through the catheter eyes depends largely on the pressure exerted on the syringe. The resulting clinical picture, or multicompartment block, includes the combinations of epidurovasal, epiduro subarachnoid, & epiduro subdural injections, which may have devastating results.

Discussing migration of epidural catheters S. G. Werster^[6] recommends that 3cm is the ideal length of the portex catheter (with side holes) to be inserted into the epidural space. He states that there is considerable movement of the skin and soft tissues over the lumbar spine with change of position in an obese patient so it is his practice to insert the epidural catheter and then change the patient's position before applying the fixative dressing (either sitting to left lateral, or left lateral to sitting). In our case we had given epidural in sitting position, catheter was inserted and fixed with sterile dressings and then the patient was positioned which could have resulted in a migration of the catheter.

Deborah C. Phillips^[7] describes a case of possible subarachnoid migration of an epidural catheter in a 21 year-old primigravida who was given epidural for pain relief during labor. They postulate that a small 'nick' was made in the dura that did not allow free leakage of CSF until the intradural pressure was raised by the expulsive efforts of delivery. The test dose of lignocaine produced no discernible effects and dural tap was not suspected. It is also possible that only one of the three ports in the catheter lay intradurally resulting in the bulk of the dose being given epidurally but allowing free leakage of CSF when catheter was removed.

III. Conclusion

So we want to emphasize especially on following aspects:

1. A negative aspiration test can't always rule out subarachnoid migration of an epidural catheter. So one has to be extremely cautious while threading an epidural catheter and undue force shouldn't be used to push in epidural catheter. This is especially true in cases of obese patients, or patients with softened ligaments and duramater like patients with anasarca, intra-abdominal malignancy etc.

2. Test dose should always be first given before administering the bolus dose & a careful watch kept for signs & symptoms of high spinal blockade.
3. Never use undue pressure while injecting drug through epidural catheter .Always give topups in small aliquots.
4. Catheter should not be kept more than 3-4 cm in epidural space.
5. Even if no fluid is aspirated through the epidural catheter, but a continuous fluid column is present & no air columns can be seen in the catheter, suspect a subarachnoid placement of the catheter.
6. Identification of subdural placement is difficult, but should always be considered if a more extensive block occurs than would normally be expected with a given dose of local anesthetic.

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