INTRA-OPERATIVE EPIDURAL CATHETER MIGRATION INTO SUBARACHNOID SPACE LEADING TO MASSIVE SUBARACHNOID INJECTION OF MORPHINE

- A Case Report -

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Introduction

Epidural catheter (EC) migration is well documented entity in literature. However, most of these reports are consistent with introduction of Tuohy needle, either partially or completely, into intravascular, subdural and subarachnoid spaces prior to the placement of catheter. We report an intra-operative delayed migration of epidural catheter into subarachnoid space after apparently normal needle placement and negative test dose.

Key words: Subarachnoid, Epidural, Test dose

Case Report

Austin Moore prosthesis insertion was planned under combined spinal epidural anesthesia (CSE) technique in a 78 year old man with a fracture neck of right femur. Epidural catheter (EC) insertion technique consisted of right lateral position and midline approach at L_3-$_4$ interspace. Epidural space was identified on first attempt with 18G Tuohy needle (Portex) by loss of resistance to saline technique. Subarachnoid block (SAB) was done with 27G Whitacre needle via needle through needle technique and 8.75 mg of hyperbaric bupivacaine with 25 µg of fentanyl was injected.

A multi-orifice EC was introduced 5 cm into the epidural space and secured with adhesive dressing at 10 cm mark after negative aspiration for blood and CSF.

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Patient was turned left lateral after attaining T_8 sensory block and surgery was started. Block regressed to T_{10} level after 70 minutes. Epidural test dose was given after negative aspiration for CSF and it was negative. At this juncture, surgeon started hammering the prosthesis. Epidural top up was withheld to prevent hypotension which follows application bone cement (polymethyl methacrylate). Surgeons finished fixation of prosthesis by 20 minutes. The block by that time regressed to T_{11} level and bupivacaine 0.25% 10 ml with 3 mg morphine was injected through EC.

The BP immediately dropped to 60/40 mmHg from 110/60 mmHg and HR sank to 38/min. Patient was resuscitated with intravenous 0.5L ringer lactate, 0.5 L 6% hydroxy ethyl starch, mephentermine boluses and atropine. Level of block was noted up to T_1. The EC aspiration resulted in a free fluid with some difficulty, and the fluid was confirmed to be CSF by the presence of precipitation with thiopentone and glucose estimation. EC was noted to have migrated inwards by less than 0.5 cm with 11 cm mark visible outside. EC was removed and patient was shifted to high dependency unit.

As expected, patient became increasingly drowsy with drop of respiratory rate to 8/min and oxygen saturation to 88%. Naloxone infusion was started at the rate of 1 µg/kg/hr after bolus of 200 µg to which patient responded with improved sensorium and saturation. Naloxone infusion continued for next 24 hours. Rest of the post-operative course was uneventful.

Discussion

Migration of EC into intravascular, subdural and subarachnoid spaces is of common clinical occurrence with incidence showing wide variation between 21 to 43%[1-3]. It is considered clinically significant if movement is more than 1 cm into the space or 2 cm outwards[2,3]. Intravascular and subarachonoid migration can have catastrophic consequences, whereas many failures have been attributed to outward migration[1,3,4]. An appropriate fixation technique such as subcutaneous tunneling[2], suturing[5], adhesive devices and Lockit EC clamp[3,6] have been used to reduce its incidence.

Routine test dose of 60 mg lignocaine with 15 µg of epinephrine does not always ensure correct placement as in our case and each dose should be considered as a test dose given in increments[7]. In our experience, interpretation of an epidural test dose can be sometimes difficult when CSE is performed by needle through needle technique. As SAB is done prior to insertion of EC, subarachnoid placement cannot be ruled out by a standard test dose unless anesthesiologist is very careful about sensory block level. It is almost impossible to detect a subdural placement because a subdural block and receding SAB share common characteristics. This problem does not arise if SAB is done after epidural catheter insertion by an epidural needle with side to side or double space approach.

Hypotheses such as sub-atmospheric pressure in epidural space exaggerated by movement/ respiration and gripping action by ligamentum flavum propelling the catheter inwards as patients straighten their backs from the flexed position, have been used to explain catheter migration[8,9]. In our patient there is a probability of catheter migration during hammering of prosthesis as aspiration and test dose were negative before that. The other factor supporting this hypothesis is the fact that catheter moved less than 0.5 cm which is clinically insignificant. Considering the fact that EC cannot penetrate an intact dura[10] the EC in our patient was most probably placed in subdural space during insertion which migrated to subarachonoid space during prosthesis insertion.

As there is no full proof method to diagnose or prevent SA migration of EC, we omit morphine while administering drugs through EC for the first time and prefer to use local anesthetics at highest concentration possible to achieve surgical anesthesia. Once SA migration is clinically ruled out by the first epidural dose, we proceed to inject morphine either with first top up or in between.

Conclusion

Epidural catheter may migrate into subarachnoid space in the intra-operative course of event even if test dose and aspiration were negative. It may be advisable to omit morphine from first epidural dose to avoid massive subarachnoid administration of morphine.

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