

## Case Report

---

# Unintentional epidural catheter migration to subarachnoid space followed by continuous spinal anaesthesia: a case report

K Sardar<sup>1</sup>, AKMN Chowdhury<sup>2</sup>, MK Rahman<sup>3</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Professor and Head, <sup>3</sup>Honourary senior consultant, Department of Anaesthesiology, BIRDEM, Dhaka

Corresponding author: email: [kawsardr@yahoo.com](mailto:kawsardr@yahoo.com)

### Abstract:

*Among the complications of epidural anaesthesia catheter migration is a very rare one. A 45 years old lady was scheduled for repairing of post caesarean incisional hernia. We prefer the hanging drop technique for epidural space identification, and 3 ml air injection to reconfirm the epidural space. After a test dose of 2% lignocaine 2 ml with 10 microgram adrenaline, the catheter was secured with at 3 cm of its length within the epidural space. Immediately after test dose, she complained of lower limb motor lost. On monitor, bradycardia and severe hypotension was shown. Hemodynamic instability was corrected promptly. After proper resuscitation, we aspirate through epidural catheter. CSF was coming freely. We decided to continue with continuous spinal anaesthesia. We assembled a syringe pump. Continuous spinal anaesthesia was maintained with 0.125% bupivacaine @ 3ml/hour.*

**Key words:** Epidural, catheter migration

*(Journal of BSA, 2010; 23(1): 37-39)*

### Introduction:

Epidural anaesthesia is a central neuraxial block technique with many applications. The epidural space was first described by Corning in 1901, and Fidel Pages first used epidural anaesthesia in humans in 1921. In 1945 Tuohy introduced the needle which is still most commonly used for epidural anaesthesia. Both single injection and catheter techniques can be used. The advantages of epidural anaesthesia include a reduced perioperative stress response, lower blood loss, less postoperative analgesia, lower cost, early ambulation and oral intake, making it a good alternative to general anaesthesia<sup>1</sup>. Among the complications of epidural anaesthesia hypotension, inadvertent high epidural block, local anaesthetic toxicity, total spinal, accidental dural puncture, epidural haematoma, infection, failure of block and catheter migration are remarkable<sup>2</sup>.

### Case report

A 45 years old lady was scheduled for repairing of post caesarean incisional hernia. Her

anthropometric measurement was- height 157 cm, weight 66 kg. She was coexisted with diabetes mellitus and hypertension. Her DM was controlled with insulin and there were no visible micro or macrovascular complications. Her HbA<sub>1c</sub> and 24 hours blood sugar profile was within normal limit. Hypertension was controlled with single dose atenolol 50 mg. Cardiovascular renal and liver function was within normal limit. Lung function test shows mild restrictive disorder.

Premedication was done with 3mg bromazepam at night before surgery. She was fasted for 8 hours prior to surgery and morning dose of insulin was omitted but antihypertensive agent was given. On arrival at preoperative room EMLA was applied over the relevant site of skin (both for peripheral cannulation and epidural needle insertion). After 40 minutes an 18G intravenous cannula was inserted into the left cephalic vein near to wrist for administration of fluid and other medications. The patients were next brought to the operating

room where she underwent epidural anesthesia and surgery.

After preloading with 300 ml Ringer's lactate, the patient was made to sit on operation table with her neck flexed anteriorly and arms hanging by the side of the body and holding a pillow with abdomen. After skin disinfection, the T<sub>7</sub> spinous process was identified by the help of lower end of scapula. By counting caudally T<sub>9</sub>-T<sub>10</sub> interspace was found and lignocaine 1% was infiltrated locally in this interspace. An 18-gauge Tuohy's needle was then introduced into the interspace in the mid-sagittal plane, and a drop of anesthetic solution was placed in its hub. Entry into the epidural space was heralded by feeling of "giving way" and immediate inward movement of the fluid drop from needle hub as a result of negative pressure in the epidural space. Localization of the epidural space was further confirmed by free movement of air (3 ml) injected through a resistance-free syringe.

We prefer the hanging drop technique for epidural space identification, and 3 ml air injection to reconfirm the epidural space, over the use of normal saline or 1% lignocaine. The bevel of the needle was directed cephalad in the epidural space, and an 18-gauge epidural catheter was placed overcoming the resistance with force during insertion. After a test dose of 2% lignocaine 2 ml with 10 microgram adrenaline, the catheter was secured with at least 3 cm of its length within the epidural space. Immediately after test dose, she complained of lower limb motor. On monitor, bradycardia and severe hypotension was shown. Hemodynamic instability was corrected promptly with atropine, ephedrine, 15° head down position and fluid load. After proper resuscitation, we aspirate through epidural catheter. CSF was coming freely. Surgeons refused to do the surgery. After counseling, surgeons agree to do the surgery. We decided to continue with continuous spinal anaesthesia. We assembled a syringe pump. Continuous spinal anaesthesia was maintained with 0.125% bupivacaine @ 3ml/hour. Twenty five mg of pethidine was given intravenously for mild sedation and to prevent shivering. Surgery was completed within hour without any pain experienced by the patient.

After surgery catheter was removed without prophylactic epidural blood patch. Analgesia was

maintained with intramuscular ketorolac 30mg combination with pethidine 100mg 8 hourly. Patient was followed up upto 7 days. She developed no remarkable complications.

### Discussion

Catheter misplacement into the subarachnoid space is a rare complication having the incidence less than 1 in 1000<sup>3</sup>. Catheter is accidentally misplaced into the subarachnoid space either due to accidental dural puncture by epidural needle or catheter tip itself may penetrate dura. Total spinal is a rare complication occurring when the epidural needle, or epidural catheter, is advanced into the subarachnoid space without the operator's knowledge, and an "epidural dose" e.g. 10-20 ml of local anaesthetic is injected directly into the CSF. The result is profound hypotension, apnoea, unconsciousness and dilated pupils as a result of the action of local anaesthetic on the brainstem. The use of a test dose can prevent most cases of total spinal. In our case where the epidural initially appeared to be correctly sited, but subsequent test dose of 2ml 1% lignocaine caused the symptoms of motor block in both lower limbs. This has been ascribed to migration of the epidural catheter into the subarachnoid space, although the precise mechanism is uncertain.

In our case, it was due to catheter penetration through dura because after reaching the tip of Touhy needle in epidural space there was no CSF in the hub of needle. Partial tearing of dura by the tip of Touhy needle followed by catheter penetration is another possibility. Normally cerebrospinal fluid can be freely aspirated from the catheter. If, however, this is not recognized, large doses of anaesthetic may be delivered directly into the cerebrospinal fluid. This may result in a high block, or, more rarely, a total spinal, where anaesthetic is delivered directly to the brainstem, causing unconsciousness, seizures and sometimes even death.

The incidence of accidental dural puncture is about 1-3 in 100 insertions<sup>4,5</sup>. The epidural space in the adult lower thoracic spine is only 3-4mm deep, which means it is comparatively easy to cross it and accidentally puncture the dura (and arachnoid) with the needle. It is more common in inexperienced hands. This may cause cerebrospinal fluid (CSF) to leak out into the epidural space, which

may in turn cause a post dural puncture headache (PDPH). This can be severe and last several days, and in some rare cases weeks or months. It is caused by a reduction in CSF pressure and is characterized by postural exacerbation when the patient raises their head above the lying position. When the headache is severe or unresponsive to conservative measures, an epidural blood patch may be used to treat the headache. This procedure is effective in treating approximately 90% of post dural puncture headaches. If unsuccessful, the blood patch may be repeated, and the success rate increases to 96% on the second attempt. The blood injected into the epidural space is thought to seal the hole in the dura. In our case, she developed no symptom of PDPH in postoperative follow up.

Catheter misplacement into a vein is very uncommon and incidence is less than 1 in 300<sup>6</sup>. Occasionally the catheter may be misplaced into an epidural vein, which results in all the anaesthetic being injected intravenously, where it can cause seizures or cardiac arrest in large dose<sup>7</sup>.

### Conclusion

Test dose should be given routinely before giving full dose of drugs to prevent life threatening complications. Catheter migration into subarachnoid space does not need to convert to general anaesthesia to continue operation. But need more monitoring and attention of anaesthetist.

### References

1. Kchict H. Stress response to surgery: release mechanisms and the modifying effect of pain relief. *Acta Chir Scand Suppl* 1988; 550: 22.
2. Bonnet F, Derosier JP, Pluskwa F, *et al*. Cervical epidural anaesthesia for carotid artery surgery. *Can J Anaesth* 1990;37:353–358.
3. Norris MC, Leighton BL, DeSimone CA. “Needle bevel direction and headache after inadvertent dural puncture”. *Anesthesiology* 1989; **70** (5): 729–31.
4. Sprigge JS, Harper SJ. “Accidental dural puncture and post dural puncture headache in obstetric anaesthesia: presentation and management: a 23-year survey in a district general hospital”. *Anaesthesia* 1980; **63** (1): 36–43.
5. Wilson IH, Allman KG. *Oxford handbook of anaesthesia*. Oxford: Oxford University Press. 2006. p. 20.
6. Clarkson CW, Hondeghe LM (April 1985). “Mechanism for bupivacaine depression of cardiac conduction: fast block of sodium channels during the action potential with slow recovery from block during diastole”. *Anesthesiology* 1985; **62** (4): 396–405.
7. Groban L, Deal DD, Vernon JC, James RL, Butterworth J. “Cardiac resuscitation after incremental overdosage with lidocaine, bupivacaine, levobupivacaine, and ropivacaine in anesthetized dogs”. *Anesth Analg*. 2001; **92** (1): 37–43.