

Accidental Migration of Epidural Catheter into Subarachnoid Space: A Case Report

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Abstract

Epidural analgesia forms the mainstay of pain relief in abdominal surgeries. Epidural administration of appropriate local anesthetic is helpful in attaining rapid onset of intraoperative surgical anesthesia and post-operative pain relief. We report a case of accidental migration of the epidural catheter into the subarachnoid space. A female aged 42 years with American Society of Anaesthetists Class I was scheduled for total abdominal hysterectomy. The patient was explained about the anesthetic technique and informed high-risk consent was obtained. The patient was taken up in the OT, and baseline pulse and blood pressure were noted as 78/min and 110/80 mmHg respectively. A loading dose of epidural bupivacaine 0.5% + clonidine 50 mcg in 8 ml was given after negative aspiration. After 15 min, bupivacaine 0.5% + clonidine 25 mcg in 4 ml was given after negative aspiration. Five minutes later patient developed convulsions. The patient was aphonic. She went suddenly into respiratory arrest; immediately rapid sequence intubation was done and kept on a mechanical ventilator. She recovered after 1 h.

Key words: Bupivacaine, Epidural analgesia, Epidural catheter migration, Subarachnoid space

INTRODUCTION

Subdural space, a potential space between the arachnoid mater and dura mater, usually remains closed.¹ The incidence of the subdural blockade during neuroaxial block is reported to be approximately of 0.82%. Several recent studies of clinical findings analyzed with radiographic evaluation indicate that the incidence may be much higher than reported, ranging from 1% to 13%.^{2,3} The diagnosis of subdural blocks is difficult to make based on the clinical picture because of its varied presentation. Recently, algorithms have been developed which (Lubenow *et al.*'s diagnostic paradigm, Hoffman and Ferrante's four-step algorithm, and an electrical stimulation of the epidural catheter application) provide strong strategies to facilitate diagnosis.^{2,4,6}

We often experience the migration of an epidural catheter into an undesirable space. Migration of an epidural

catheter into the subarachnoid space is a potentially lethal complication. Although almost all migrations of epidural catheters have been reported to occur at the insertion of the catheter, we experienced a case of catheter migration into the subarachnoid space. The large doses of a local anesthetic agent that is given for epidural injection can block large area of the spinal cord leading to cardio-respiratory arrest. Much needs to be done to support both the systems for a better outcome.

CASE REPORT

A 42-year-old, 35 kg female diagnosed with abnormal uterine bleeding was posted for total abdominal hysterectomy. On general examination, she was moderately built. She had no history of any chronic illness, seizures, syncopal attacks. She was graded as American Society of Anaesthetists Grade I laboratory results and electrocardiogram were unremarkable except for hemoglobin value of 10 g/dl.

After thoroughly educating the patient regarding the anesthesia associated risks epidural analgesia was planned. Initially patient was loaded with ringer lactate of 5 ml/kg body weight. Under strict aseptic precautions right lateral L₂-L₃, 18 G tuohy, the epidural space was identified by loss-

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of-resistance technique and confirmed with hanging drop method, the epidural catheter was placed up to mark 10. Before giving epidural loading dose her parameters were blood pressure (BP) - 110/80 mmHg and pulse rate (PR) was - 78/min; it was decided to give a total dose of 16 ml bupivacaine along with 75 mcg clonidine. After negative aspiration, 8 ml of the drug was given. After 10 min the findings were BP - 100/70 mmHg; PR - 76/min; the level of sensory loss was - T₈. A further dose of 4 ml of the solution was given; following which patient became aphonic and developed an episode of convulsion. BP fell to 53/21 mmHg and PR - 56/min; SPO₂ - 100%. Injection phenylephrine 40 mcg/IV; injection atropine 0.6 mg/IV was given. She developed apnea and immediately rapid sequence intubation was done and ventilated with 100% oxygen. Epidural catheter aspiration was done and proved positive for cerebrospinal fluid. The patient regained consciousness after 1 h and the parameters were BP - 160/100 mmHg; PR - 80/min; SPO₂ - 100%. The patient regained full consciousness and obeying commands. The patient was extubated and the parameters were BP - 150/100 mmHg, PR - 90/min, SpO₂ - 100% with room air, level - T₄. The patient was shifted to the post-operative ward after removing the epidural catheter.

DISCUSSION

Migration of epidural catheter into subarachnoid space invites serious complications along with the failure of the purpose. Reynolds and Speedy; Abouleish and Goldstein have reported catheter migration into the subarachnoid space.^{7,8} Migration to intravascular space was reported by Ravindran *et al.* Subarachnoid injection of large amount of the local anesthetic leads to extensive block, including the cranial nerves and the respiratory muscle. Injection to subarachnoid space should be suspected when there is a negative aspiration but an extensive block occurs in 15-20 min. A cardio-respiratory support is necessary till the effect of local anesthetic wears off.⁹

Migration of catheters was studied in 153 women undergoing analgesia in labor. Inward or outward migration occurred in 36% of patients.¹⁰

Prevention of migration was done by subcutaneous tunneling of the epidural catheter which showed a success rate of 97% as compared to 79% in the control group;¹¹ Clark *et al.* studied the efficacy of Lockit Clamp and found that there was no migration in 88% as compared to 28% in standard group.¹²

Song *et al.*, reported migration in two cases and concluded that although subdural catheter placement is a relatively rare occurrence, it is imperative for anesthesiologists to recognize the presentation and treat accordingly.¹³

In our case, epidural catheter migration occurred while administering the first dose of the local anesthetic agent.

CONCLUSION

Epidural injection resulted in high subarachnoid block probably because of migration of the epidural catheter into the subarachnoid space, which was confirmed by aspiration of cerebrospinal fluid.

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