Case report

Inadvertent dural puncture following thoracic epidural anesthesia for mastectomy: A case report

ABSTRACT

Background: Thoracic Epidural has been successfully used to administer anaesthesia for mastectomy. However inadvertent dural puncture is a major complication occurring in about 0.19 to 3.6% during epidural anaesthesia, even in very experienced hands with need for immediate and proper management. We present a case of mastectomy done under thoracic epidural anaesthesia following inadvertent dural puncture, using same interspace.

Case presentation: A 62-year-oldknown hypertensive female patientwith good drug compliance, weighing 68kg and 1.68m in height with stage IV right breast cancer. She underwent modified radical right mastectomy, under thoracic epidural anaesthesia administered at the T8/T9 interspace using an 18G Tuohy needle. Although there was inadvertent dural puncture, patient recovered without untoward effects.

Conclusion: Epidural anaesthesia can be undertaken in the same interspace following accidental dural puncture if necessaryprecautions are taken.

Key Words: Thoracic epidural anaesthesia, Inadvertent dural puncture, Mastectomy, Port Harcourt, Nigeria

INTRODUCTION

The epidural space is very significant in the practice of modern anaesthesia,[1] and thoracic epidural has been successfully used to administer anaesthesia for mastectomy.[2] However inadvertent dural puncture is a major complication occurring in about 0.19 to 3.6% during epidural anaesthesia,[3-5]even in very experienced hands with need for immediate and proper management. Intraoperative management alternatives include placement of the epidural catheter in another interspace, which does not exclude another accidental dural puncture.[6, 7]The second option is conversion to spinal anaesthesia using the same epidural needle, in which case there is no post operative analgesia. Intrathecal catheterization through the same dural hole in which case loss of CSF is minimized in addition to the possibility of continuous spinal and post operative analgesia. In the extreme, the procedure can be completely abandoned. Our experience points to the fact that following accidental dural puncture, epidural anaesthesia can still be safely administered at the same interspace. The use of same interspace for the

administration of epidural anesthesia following inadvertent dural puncture has not been fully explored, hence the case report.

Thoracic epidural anesthesia was combined with brachial plexus nerve block for modified mastectomy in Thailand, and the outcome of this procedure was published in 2005.[8] Although segmental thoracic anesthesia has been known for postoperative pain control, a Korean study in 2006 highlighted its successful use for mastectomy among twenty patients.[9] Thereafter many other centers have experimented and reported their findings with this technique especially for high-risk patients.[10-13] In Nigeria, successful use of thoracic epidural anesthesia for major abdominal surgeries was reported in Uyo where two out of the twelve patients had total spinal anesthesia and were resuscitated.[14] Single shot lamina thoracic paravertebral block technique has been used as an adjunct to general anesthesia for modified radical mastectomy.[15] The experience of another researcher in Nigeria is also highlighted.[16]

CASE PRESENTATION

Pre-operative Preparation: A 62-year-old known hypertensive female was diagnosed with stage IV right breast cancer at the Rivers State University Teaching Hospital. She had a thorough pre-anesthetic evaluation and informed consent was obtained. General baseline investigations were done, including a full blood count, electrolyte urea and creatinine, clotting profile and a chest radiogram. All results were within normal limits. She had taken her oral antihypertensives drugs in addition to oral diazepam the evening and morning before surgery to ensure anxiolysis and well controlled hypertension. Patient was premedicated with intravenous metoclopramide 10mg 30 minutes before surgery, and preoperative hydration done with 0.9% normal saline 1L.

Intra-operative Procedure: In sitting position, thoracic epidural was aseptically established through a midline approach at T8/T9 interspace with an 18G Tuohy needle. Monitoring was non-invasive, including non-invasive blood pressure (NIBP), pulse rate, electrocardiogram and arterial oxygen saturation. At 6cm depth during the procedure, a clear free flow of cerebrospinal fluid (CSF) was observed, and the Tuohy needle was gradually withdrawn until cessation of CSF flow. A 5 ml syringe was attached to the Tuohy needle and aspiration of CSF was negative. On release, the plunger was sucked inward suggesting correct epidural needle placement and the epidural catheter was threaded to the twelfth centimeter marking. The epidural catheter was further aspirated to exclude accidental intrathecal catheterization. A test dose of 4ml plain lidocaine plus adrenaline (1:200,000) was also administered to rule out intrathecal catheterization. The absence of signs of motor block after 3min and transient tachycardia ruled out intrathecal and intravascular catheterization. The Patient was returned to supine position and epidural anesthesia subsequently activated with 2ml, 3ml and 5ml 0.5% plain bupivacaine, at 0 minute, 3 minutes and 5 minutes intervals, respectively. The catheter and filter were sealed aseptically and labeled to avoid inadvertent epidural administration of other medications. The vital signs were vigorously monitored at

2minutes intervals for 20 minutes. Patient had loss of sensation to needle prick at T_2 level after 15 minutes, and surgery commenced by the twentieth minute and lasted for 72 minutes. Mild anxiolysis was achieved with intravenous diazepam 5mg and pentazocine 30mg, respectively, and surgery was successfully completed.

Post-operative Care: Oral fluids were commenced about 8 hours following completion of surgery and deep vein thrombosis prophylaxis was started with clexane after 24 hours in line with hospital protocol. Patient was advised to remain in supine position for 24 hours to reduce the risk of post dural puncture headache. The epidural catheter was removed the morning after surgery.

Features of Epidural Puncture: `Patient complained of mild neck stiffness on the second day post operative but could sit upright in bed, and tolerated her meals. There were no complaints of headache, residual motor weakness or fever. She was followed up until discharge on the seventh day post op.

DISCUSSION

A chronicle of neurologic complications following thoracic epidural anesthesia has already been reported in literature.[17, 18] In this report, we highlighted that thoracic epidural anaesthesia (TEA) using same interspace following accidental dural puncture is possible and can be safely used for modified radical mastectomy. Our patient had hypertension which posed a challenge to the safe conduct of general anaesthesia (GA). We therefore preferred thoracic epidural anaesthesia over GA as it involves the blunting of stress response and avoidance of airway manipulation. Moreso, TEA has other widely reported advantages in the literature, including hemodynamic stability, lower analgesic consumption, superior postoperative analgesia, reduced postoperative nausea and vomiting (PONV), early alimentation and shorter hospital stay. However, in our patient, adequate analgesia was achieved with epidural bupivacaine supplemented with intravenous diazepam and pentazocine.

In general, the paucity of literature on the use of same interspace for epidural anaesthesia following accidental dural puncture for oncologic breast surgeries may be due to the fear of inadvertent intrathecal catheterization apart from other potential complications like spinal cord injury, respiratory complications, spinal/epidural hematoma, and post-dural puncture headache. Our experience however suggests that with experience and due precautions, these complications can be circumvented. The innervation of the breast, axillary nodes, and pectoral muscles are derived from multiple sources, including branches from the first to the sixth intercostal nerves, brachial plexus, intercostal brachial nerve (T2-T3), supraclavicular nerve, and lateral and medial pectoral nerves from the cervical plexus.[19]The supplementation of TEA with interscalene block in patients undergoing modified radical mastectomy(MRM) has been shown to improve pain scores and reduce opioid consumption during the first 24 hours postoperatively.[20]However, this was not done in our patient, who rather had mild anxiolysis with good patient satisfaction. The use of cervical epidural anaesthesia for modified radical mastectomy has also been widely documented in the literature.

The concern, however, is possible compromise of the pulmonary function and poor cardiovascular reserve. Our patient was elderly and a known hypertensive. This is in addition to the likelihood of paralysis of the phrenic nerve with a cervical epidural block.[21]

One of the advantages of TEA is adequate postoperative epidural analgesia, with improved perioperative outcome in patients at high risk for postoperative pulmonary complications. We successfully avoided the addition of opioids by giving incremental doses of bupivacaine which was supplemented with mild anxiolysis. The success of our case is a clear indication that the same interspace can be used successfully for epidural anaesthesia following inadvertent dural puncture.

This approach is preferred to using another interspace which is froth with the possibility of another accidental dural puncture in low-income countries where landmark technique is commonly used.

The limitation of this report is the absence of a definitive study like ultrasound or MRI to ascertain the actual level of the epidural catheter placement.

CONCLUSION

A careful, skillful withdrawal of the Tuohy needle into the epidural space, confirmation of correct epidural space catheter placement and careful titration of the local anesthetic to effect can serve as a safe alternative anesthetic technique in the event of inadvertent dural puncture during epidural anaesthesia for mastectomy. Also, the absence of significant complications with a smooth anaesthesia after catheterization of same interspace following accidental dural puncture is good reason for a case series. Management of PDPH, if it occurs, should be along established treatment guidelines.

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