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Original Research Paper

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"CONTINOUS BILATERAL PERINEURAL CATHETER BRACHIAL PLEXUS NERVE BLOCK FOR PERI-OPERATIVE MANAGEMENT OF BILATERAL UPPER LIMB TRAUMA."

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ABSTRACT While giving brachial plexus block, brachial plexus catheters are often placed to provide regional anesthesia to the shoulder, upper arm, forearm, wrist and hand. However, there are risks associated with the placement of catheters which include infections and local anesthetic systemic toxicity (LAST).

In our case we provided anesthesia using bilateral perineural catheter infusion via ultrasound guided supraclavicular brachial plexus nerve block technique. If performed with caution, the benefits outweigh the risks. These catheters aid in the multimodal pain control regimen, with the goal of achieving adequate pain management with minimal opioid use. Our patient suffered severe bilateral upper-extremity trauma, requiring multiple surgical procedures and debridements. This also provided peri-operative analgesia and improved patient outcome.

KEYWORDS : Brachial Plexus Block, Bilateral brachial plexus catheter, Regional Anesthesia, Local Anesthetic Systemic Toxicity, Bilateral perineural catheter, Bilateral upper extremity trauma.

INTRODUCTION

Bilateral brachial plexus blocks provide regional anesthesia and are an alternative to general anesthesia providing adequate perioperative analgesia in upper limb trauma surgeries. Various complications have been reported such as diaphragmatic paralysis, pneumothorax, and local anesthetic toxicity (LAST) [1, 2]. Other complications including hemothorax and Horner's syndrome have also been reported [3, 4]. However, these complications are clinically insignificant when performed unilaterally but there are severe consequences when performed bilaterally. There is a very high risk of LAST while using bilateral perineural catheter infusion technique [5,6]. Fewer complications and more effective delivery of local anesthetic have been reported while using ultrasound guided technique [7]. In our case we discuss a patient where we found bilateral brachial plexus perineural catheters to be appropriate if performed with caution and the benefits outweigh the risks.

Case Report

Our patient was a 38 year old female who had injuries to bilateral hands and forearms secondary to a blast injury while working. Her vitals were stable and all her investigations were normal. The patient was posted for emergency debridement and closed reduction of her injuries. Adequate blood was arranged and the patient was shifted to the emergency operating room. When inside the operating room two wide bore (18G) i.v. cannulas were secured in the left lower limb and left external jugular vein. Then 0.9% normal saline infusion was started at 100ml/hour. All the standard monitorings were attached and baseline parameters were recorded. She was planned for bilateral ultrasound guided supra-clavicular peripheral nerve block. As she had to undergo multiple surgeries further a decision was made to place bilateral perineural catheters for continous infusion to provide analgesia. After proper positioning the area was clean, draped and the skin at needle insertion was anesthetized with 1% lidocaine. An 18 G, Tuohy needle was used to perform these blocks and a 20 G, 60 cm stimulating catheter was inserted to various depths and desired position was confirmed with ultrasound. All catheters were secured in place with Tegaderm. All injections through the catheters were in incremental doses and subjected to intermittent aspiration. The left supraclavicular catheter was placed first and 15 ml of 0.5% Bupivacaine was injected through the catheter. Subsequently, a right supraclavicular catheter was inserted and 15 mL of 0.5% Bupivacaine was then injected through the catheter. The catheters were attached to continuous infusions, each delivering 0.25% Bupivacaine at 7 mL/hour. The patient had a very dense motor block and surgery was performed. Once the surgery was completed the patient was shifted to general ward continuing the infusions.The next day patient complained of no motor activity in both arms. So, the infusion was stopped and motor activity was regained within 2-3 hours. The catheters were kept in place and not removed. Then she was planned for open reduction and internal fixation on day 3 post surgery. She was shifted to the operating room and 30 ml of 0.5% bupivacaine was injected through each catheter for motor and sensory blockade. Infusions of 0.25% bupivacaine was started in the post anesthesia care unit at 6 ml/hr on each side. On catheter day 4, the right supraclavicular catheter tip was noted to have dislodged and was removed. The left supraclavicular catheter was removed on catheter day 5. There were no clinical signs of local anesthetic toxicity [Table 1].

Table 1: Details of Patient.

Catheter placement	Duration of catheter	Complications
Left Supraclavicular	5 days	None
Right Supraclavicular	4 days	Right catheter tip dislodged and removed

DISCUSSION

Brachial plexus block is a valuable tool in upper-extremity surgery and pain control. Bilateral brachial plexus blocks are rarely described in the literature. Frequently cited reasons for performing these techniques judiciously include complications such as a pneumothorax, diaphragmatic paralysis and need for larger doses of local anesthetic increasing the risk of LAST [8].

Due to anatomic proximity to the brachial plexus, phrenic nerve involvement is a potential complication of a brachial plexus block. Studies have shown a 100% incidence of hemi-diaphragmatic paralysis following an interscalene block with nerve stimulation [9,10]. The incidence is however very lower with supraclavicular and infraclavicular approach [11]. In our case we have demonstrated that utilizing ultrasound guided bilateral supraclavicular brachial plexus catheters can be utilized for surgical anesthesia and pain management without causing bilateral paresis of the diaphragm.

Local anesthetic systemic toxicity (LAST) can occur with excessive administration of a local anesthetic, accidental intravenous injection or due to rapid absorption of the drug used. Though its incidence is less than 0.2%, LAST can be difficult to treat and is potentially fatal [12]. Ultrasound guided

nerve blockade has been shown to reduce the incidence of LAST by virtue of lowering the incidence of unintended vascular puncture [13]. The use of ultrasound in our patent may have reduced the possibility of LAST by allowing for visualization of vasculature in relation to the needle tip.

Case reports resulting in hematoma after brachial plexus blocks have been described in the literature [14, 15]. However, it should be noted that in these studies the blocks were not performed under ultrasound guidance.

In our case series, we had one instance where we suspected that the catheter had dislodged after four days. Although there was no imaging obtained to confirm the location of catheter tip, the catheter was removed. There was no adverse incident associated with removal of the catheter.

CONCLUSION

In our study we found that bilateral brachial plexus continuous perineural catheters can be safely and effectively used to provide anesthesia and analgesia in upper limb trauma. They are a potentially valuable tool as part of a multimodal pain control regimen, with the goal of achieving adequate pain management, while limiting opioid use and thus, limiting the long-term complications.

REFERENCES

1. Koyyalamudi VB, Arulkumar S, Yost BR, Fox CJ, Urman RD, et al. (2014) Supraclavicular and paravertebral blocks: Are we underutilizing these regional techniques in perioperative analgesia? Best Pract Res Clin Anaesthesiol 28: 127-138.
2. Neal JM, Moore JM, Kopacz DJ, Liu SS, Kramer DJ, et al. (1998) Quantitative analysis of respiratory, motor, and sensory function after supraclavicular block. Anesth Analg 86: 1239-1244.
3. Perlas A, Lobo G, Lo N, Brull R, Chan VW, et al. (2009) Ultrasound-guided supraclavicular block: outcome of 510 consecutive cases. Reg Anesth Pain Med 34: 171-176
4. Singh S, Katyal S, Kumar A, Kumar P (2014) Massive hemothorax: A rare complication after supraclavicular brachial plexus block. Anesth Essays Res 8: 410-412.
5. Hegde H, Santhosh M, Roopa S, Deshpande S, Rao PR, et al. (2013) Bilateral brachial plexus blocks in a patient of hypertrophic obstructive cardiomyo pathy with hypertensive crisis. Indian J Anaesth 57: 72-75.
6. Toju K, Hakozaki T, Akatsu M, Isosu T, Murakawa M (2011) Ultrasound-guided bilateral brachial plexus blockade with propofol-ketamine sedation. J Anesth 25: 927-929.
7. Sadowski M, Tułaza B, Lysenko L (2014) Renaissance of supraclavicular brachial plexus block. Anaesthesiol Intensive Ther 46: 37-41.
8. Toju K, Hakozaki T, Akatsu M, Isosu T, Murakawa M (2011) Ultrasound-guided bilateral brachial plexus blockade with propofol-ketamine sedation. J Anesth 25: 927-929.
9. Sala-Blanch X, Lázaro JR, Correa J, Gómez-Fernandez M (1999) Phrenic nerve block caused by interscalene brachial plexus block: effects of digital pressure and a low volume of local anesthetic. Reg Anesth Pain Med 24: 231-235.
10. Urmey WF, Talts KH, Sharrock NE (1991) One hundred percent incidence of hemidiaphragmatic paresis associated with interscalene brachial plexus anesthesia as diagnosed by ultrasonography. Anesth Analg 72: 498-503.
11. Petrar SD, Seltenrich ME, Head SJ, Schwarz SK (2015) Hemidiaphragmatic Paralysis Following Ultrasound-Guided Supraclavicular Versus Infraclavicular Brachial Plexus Blockade. Reg Anesth Pain Med 40: 133-138.
12. Auroy Y, Benhamou D, Bargues L, Ecoffey C, Falissard B, et al. (2002) Major complications of regional anesthesia in France: The SOS Regional Anesthesia Hotline Service. Anesthesiology 97: 1274-1280.
13. Neal JM, Brull R, Horn JL, Liu SS, McCartney CJ, et al. (2016) The Second American Society of Regional Anesthesia and Pain Medicine Evidence-Based Medicine Assessment of Ultrasound-Guided Regional Anesthesia. Reg Anesth Pain Med 41: 181-194.
14. Howell SM, Unger MW, Colson JD, Serafini M (2010) Ultrasonographic evaluation of neck hematoma and block salvage after failed neurosti mulation-guided interscalene block. J Clin Anesth 22: 560-561.
15. Mani M, Ramamurthy N, Rao TLK, Winnie AP, Collins VJ (1978) An Unusual COmplication of Brachial Plexus Block and Heparin Therapy. Anesthesiology 48: 213-214.