2002 Fall A39

AXILLARY BLOCK USING AN EPIDURAL CATHETER

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Introduction: The concept of threading a catheter into the axillary sheath was pioneered by Selander.1 Finucane developed a technique using a 20-g bullet tipped epidural needle covered with an 18-g catheter and a nerve stimulator to block all four major nerves of the brachial plexus using an axillary approach.2 This technique has been adapted to introduce an epidural catheter into the brachial plexus to provide anesthesia or continuous infusion of local anesthetic for postoperative analgesia. This study examined the efficacy of this technique to provide anesthesia and postoperative analgesia.

Methods: This is a retrospective review of a series of 36 axillary blocks in 32 ASA I-III patients. A bullet-tipped epidural needle ensheathed in a 9 cm Teflon catheter (Arrow kit #) was inserted into the axillary sheath. Nerve stimulation to confirm correct placement was performed. The needle was withdrawn and the Teflon catheter was left in place. A bolus dose 40-50 cc of local anesthetic was administered via the Teflon catheter. The epidural catheter was then threaded 3-9 cm beyond the end of the Teflon catheter, and secured with benzoin, steri-strips and Tegaderm. The epidural catheter was then dosed with local anesthetic. Descriptive statistics, frequencies and the Chi square test were used to analyze the data.

Results: This technique blocked all four major nerves of the brachial plexus. It was used as a primary anesthetic for a variety of operative procedures ranging in duration from 90-350 mins; hyperbaric oxygen (HBO) dives of 90 mins each; post-operative analgesia for 2-6 days, and as adjunct to general anesthesia with utilization for postoperative analgesia. Mepivacaine, bupivacaine and lidocaine in descending order of frequency were used to provide surgical anesthesia and bupivacaine was used for analgesia. Continuous infusions were performed in 28 of the 36 cases reported. Successful blocks for surgical anesthesia were obtained in 10/10 - 100% surgical and 4/4 - 100% HBO dive cases. Successful post-operative analgesia (pain rest score < 3/10, activity score < 5/10) was associated with consumption of MSO4 equivalence of < 2 mg/hr 23/28 - 82% cases. Length of catheter in the axillary sheath > 9 cm was associated with success (n = 35, Chi square 9.86, P < 0.005). There were no complications.

Conclusions: This is a safe, effective and simple technique for blocking the radial, median, ulnar and musculocutaneous nerves using an axillary approach with a large volume of local anesthetic. The success rate of this method is comparable to other regional anesthetic approaches.2,3 The proximal insertion site and catheter placement at the level of the cords provides reliable anesthesia and/or analgesia in the distribution of the radial, medial, ulnar and musculocutaneous nerves without the risk of pneumothorax associated with an infraclavicular approach. Catheter insertion length > 9 cm is associated with an increased rate of success.

1. Selander D: Catheter technique in axillary plexus blocks. Acta Anaesthesiol Scand 21:324-329, 1977. 2. Finucane BT, Yilling F: Safety of supplementing axillary brachial plexus blocks. Anesthesiology 70:401-403, 1989. 3. Ganapathy S, Wasserman RA, Watson JT, Bennett J, Armstrong KP, Stockall CA, Chess DG, MacDonald C: Modified continuous femoral three-in-one block for postoperative pain after total knee arthroplasty. Anesth Anal 89:1197-1202, 1999.

Table. The Effect of Catheter Length on Successful Block			
	Success	Failure	
γ 9 cm	26	3	29
<9	2	4	6
	28	7	35
X^2=9.856 > ÷ ^{2}0.995, 1 dif = 7.879 γ P < 0.005 γ catheter length γ 9 cm is associated with success			