Safety and Effectiveness of Continuous Popliteal Fossa Blocks with Levobupivacaine in Children Undergoing Single Limb Foot and Ankle Surgery

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Introduction: Regional anesthesia techniques for postoperative pain control are used frequently in adults and children. Using peripheral nerve blocks for postoperative pain control in lower extremity surgery is attractive because they are safe, effective and do not require the routine use of indwelling urinary catheters. In 1999 we introduced the use of continuous posterior fossa blocks (CPFB) for postoperative pain control in children undergoing foot and ankle surgery. The purpose of this study is to determine the safety and effectiveness of CPFB for postoperative analgesia in children undergoing single limb foot and ankle surgery using levobupivacaine administered as a continuous infusion with or without intermittent bolus injections.

Methods: After Institutional Review Board approval and informed consent 53 patients undergoing foot and ankle surgery using CPFB for post operative pain control were randomized into one of two groups. Group A (n=27) received CPFB with 0.25% levobupivacaine administered at a continuous infusion rate of 0.4mg/Kg/Hr. Group B (n=26) received CPFB with 0.25% levobupivacaine administered at a continual basal rate of less than or equal to 2ml/Hr with intermittent q 6 Hr bolus injections totaling an equivalent levobupivacaine dose of 0.4mg/Kg/Hr x 6 up to a maximum bolus of 20 mls of 0.25 % levobupivacaine. All patients underwent placement of an indwelling. CPFB catheter in the operating room under general anesthesia and received an initial bolus injection of 1 ml/kg of 0.25% Levobupivacaine in 1:200,000 epinephrine solution up to a maximum dose of 25 mls. CPFB infusion was started in the PACU and was discontinued after 48 hours or two hours prior to discharge, whichever came first. Plasma levels of levobupivacaine were determined in all patients 30 and 60 minutes after initial bolus injection and 6 hours after continuous local anesthetic infusion. Patients in group B had a fourth levobupivacaine level determination 30 minutes following the first postoperative levobupivacaine bolus. Age appropriate postoperative pain scores were recorded at least every 4 hours until the infusion was terminated. Pain management surveys were distributed to all patients or their legal guardians. The efficacy of CPFB was determined by evaluating the average pain and daily worse pain scores using the appropriate 0 to 10 scores. The total daily dose of analgesic medications used for treatment of breakthrough pain, as well as any adverse local anesthetic drug reaction or complications related to the CPFB were recorded.

Results: There was no intergroup difference with respect to age, sex, weight and surgical procedure performed. 85 % of patients in Group A and in Group B underwent saphenous or femoral nerve conduction blocks at the end of surgery. Postoperative pain control was satisfactory as determined by low mean pain scores, limited reporting of poor pain control, limited use of parenteral analgesic medications for breakthrough pain control and patient willingness to undergo repeat CPFB with future single limb foot and ankle surgery. Plasma levels of bupivacaine were low (<1.3 mg/L) in all patients studied regardless of the method of administering CPFB (Table 1). The only difference found between Group A and Group B results was a significantly lower mean pain score in Group B patents after 10 hours of CPFB (Group A = 1.9 and Group B = 0.3 in 0 to 10 scale, p=0.003). No adverse local anesthetic drug reaction or complications related to CPFB were identified.

Table 1: Plasma Levels of Levobupivacaine with CPFB

	30 min after initial bolus	60 min after initial bolus	6 hrs after CPFB	Post-bolus CPFB
Group A	0.06 (± 0.067) mg/L	0.03 (± 0.032) mg/L	0.051 (± 0.226) mg/L	N/A
Group B	0.08 (± 0.103) mg/L	0.04 (± 0.042) mg/L	0.23 (± 0.139) mg/L	0.48 (± 0.285) mg/L

Discussion: Continuous Popliteal Fossa Block in children controlled postoperative pain following single limb foot and ankle surgery. Plasma levels of levobupivacaine using CPFB were low, even after initial and repeat bolus injections of 0.25 % levobupivacaine. The use of equivalent standard racemic bupivacaine epidural dosing for bolus and continuous infusion with CPFB was safe and effective.