

# Use of a Continuous incisional infusion of either levobupivacaine 0.25% or bupivacaine 0.25% in pediatric patients undergoing median sternotomy.

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**Objective:** To determine the efficacy and safety of a continuous, local anesthetic infusion using an elastomeric pump for pediatric patients undergoing open heart surgery via a median sternotomy incision.

**Methods:** In a prospective, randomized and double blind study we compared either levobupivacaine 0.25% or bupivacaine 0.25% vs. saline in an elastomeric continuous infusion pump (ONQ Pain Buster) via median sternotomy soaker catheters for a duration of 72 hours after open heart surgery in 72 pediatric patients. The upper limit of local anesthetic dose was set at 0.4 mg/kg/hr. Infusion rates were predetermined by weight and set at 0.5 cc/hr (5 kg < 6.25 kg), 1 cc/hr (6.25kg < 12.5), 2 cc/hr (12.5 kg < 31.5 kg) and 5 cc/hr (> 31.5 kg). Prior to closure of the incision, a 0.5 cc/kg (with a maximum of 20 cc) bolus of local anesthetic was injected into the wound. Requirements for post-operative analgesics, and pain scores were recorded for 72 hours. Plasma levels of the respective local anesthetic were measured at 12, 24, 48, and 72 hours postoperatively. Secondary outcomes measures were also recorded. These included time to first oral intake, time to first bowel movement, time to Foley catheter removal, length of stay, requirements for anti-emetics, and requirements for sedation. All patients were offered rescue medications for breakthrough pain including morphine and ketorolac. Versed was administered for sedation as needed.

**Results:** The total amount of morphine required over the three days was less in the test group than the control group (0.048 mg/kg vs. 0.59 mg/kg, P=0.03). The number of patients requiring no morphine was greater in the test group versus the control group (7/35 vs. 1/37, P=0.019). The test group also required less midazolam (0.39 mg/kg vs. 1.15 mg/kg, P=0.0018) and less ketorolac (0.49 mg/kg vs. 0.88 mg/kg, P=0.05) than the control group. The test group's time to first bowel movement was less (2.76 days vs. 3.7 days, P=0.006) than the control group's. Overall, pain scores were less in the test group compared to the control group, but statistical significance was not achieved. However, statistical significance was approached on POD 3 (P=0.07) and overall (P=0.1). The usage of ondansetron, which we used as a marker for nausea and vomiting, also approached statistical significance in the test group compared to the control group (0.176 mg vs. 1.65 mg, P=0.07). There was no difference in any of the other secondary parameters. Plasma levels of local anesthetic remained well below the toxic threshold at all time points (previously reported).

**Conclusions:** A continuous, incisional infusion of 0.25% bupivacaine or 0.25% levobupivacaine reduced post-operative analgesic requirements in pediatric patients undergoing a median sternotomy incision. It also reduced the need for sedation and reduced the need for anti-emetics. It also effectively

decreased the time to first bowel movement. This methodology, dosed at a maximum rate of 0.4 mg/kg/hr, is safe with plasma levels of local anesthetic well below the toxic threshold.

**References:**

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