

The impact of clonidine and fentanyl added to caudal bupivacaine on peri-operative hemodynamic parameters and analgesic requirements in pediatric patients.

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Introduction: Opioids and alpha-2 agonists are frequently added to local anesthetic solutions for postoperative pain control in children receiving caudal and lumbar epidural blocks. For surgical procedures below the umbilicus, caudal or lumbar epidural blocks supplement general anesthesia. The addition of clonidine, an alpha-2 agonist, as well as fentanyl to a local anesthetic, such as bupivacaine, enhances postoperative analgesia as reported in the literature (1-3). To determine a possible influence of clonidine and fentanyl added to caudal bupivacaine on peri-operative hemodynamics and analgesic requirements, we conducted a retrospective chart review.

Methods: Following Institutional Review Board approval, we reviewed the charts of pediatric patients receiving caudal or lumbar epidural analgesia in addition to general anesthesia for lower abdominal, pelvic and lower extremity procedures, between January 2003 and October 2005. Patients received either a solution of plain bupivacaine 0.25% (PB group) or a mixture of clonidine, fentanyl and bupivacaine 0.25% (CFB group) as a single caudal or lumbar epidural injection prior to surgical incision. Data collection included patient demographics, baseline and postoperative PACU vital signs, and intra- and post-operative analgesic requirements. Differences in these parameters between PB and CFB groups were analyzed using the student T-test and the chi-square test. A p value < 0.05 was considered statistically significant.

Results: Charts of 49 patients met the inclusion criteria. There were 15 patients (20% female, 80% male) in the PB group and 34 patients (29% female, 71% male) in the CFB group. Patient ages ranged from 10 months to 8 years in the PB group and from 1 month to 16 years in the CFB group. The mean dose of either clonidine or fentanyl added to bupivacaine in the CFB group was 2 mcg/kg for each added medication. Eighty-seven percent of patients in the PB group required intra-operative opioids versus 50% in the CFB group. (p=0.015). There was a significant increase (22%) in heart rate from baseline in the PB group at the time of PACU arrival compared to no change (0%) from baseline in the CFB group (p = 0.003; 95% CI: -35.2 to -7.9). There was no significant difference in postoperative changes in systolic blood pressure, oxygen saturation and respiratory rate from baseline between the two groups.

Discussion: In this pediatric population, a caudal/lumbar epidural solution of clonidine, fentanyl and bupivacaine administered for intra- and post-operative analgesia resulted in less intra-operative systemic opioid requirement and better postoperative hemodynamic stability compared to plain bupivacaine. Our study suggests an intra-operative opioid sparing effect of neuraxial local anesthetic solutions supplemented with fentanyl and clonidine. Despite the small number of patients in each group and demographic heterogeneity, these results are intriguing. Further systematic study in randomized controlled trials is warranted to confirm efficacy and safety of mixed epidural solutions in children. Future studies should also address their effects on length of PACU and hospital stay.

- References:**
1. Lee JJ, Rubin AP. BJA 1994; 72: 258-262.
 2. de Beer DAH, Thomas ML. BJA 2003; 90 (4): 487-498.
 3. Ansermino M, Basu R, Vandebek C, Montgomery C. Paediatric Anaesthesia 2003; 13: 561-573.