

Literature Reviews

A Comparison of Epidural Bupivacaine-Fentanyl and Bupivacaine-Clonidine in Children Undergoing the Nuss Procedure

Cucchiaro G, Adzick S, Rose J, et al. *Anesthesia & Analgesia* 2006;103:322-327.

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Review:

The goal of the study was to test the hypothesis that the incidence of side effects of epidural clonidine compared with epidural fentanyl are decreased. The secondary goal of the study was to examine whether the analgesic efficacy of bupivacaine-fentanyl compared with bupivacaine-clonidine was similar. In addition, the investigators of this study examined whether a small dose of clonidine would enhance the effects of a small dose of fentanyl, while reducing the incidence of side effects. This randomized double-blind study consisted of 47 patients, aged 10 – 19 yrs old. The patients were scheduled for a Nuss procedure for correction of pectus excavatum. A thoracic epidural catheter was placed in these patients for postoperative pain management. Exclusion criteria for this study were patients in whom it was technically impossible to place an epidural catheter, patients with a malfunctioning epidural catheter, and also in patients where the epidural catheter was removed within eight hours of the end of surgery.

Prior to the induction of general anesthesia, the thoracic epidural was placed at the T 6 – 10 level. General anesthesia was induced with propofol (3 – 5 mg/kg) and endotracheal intubation was facilitated with vecuronium (0.1 mg/kg). Maintenance anesthesia consisted of desflurane in 40% - 50% air – oxygen. Patients were randomized to one of three groups that included bupivacaine + clonidine (BC),

bupivacaine + fentanyl (BF) or bupivacaine + fentanyl + clonidine (BFC). The previously mentioned combinations of medications were injected via the epidural catheter as 0.3 mL/kg (maximum 10 mL) and an infusion with the same mixture of medications was started at a rate of 0.25 mL/kg/hr (maximum, 10 mL/hr) during the intra-operative period. Patients did not receive intravenous narcotics during the surgery. At the end of surgery, following tracheal extubation patients were transferred to

the postanesthesia care unit (PACU) and connected to patient-controlled epidural analgesia device. The same medication combinations used during the intraoperative period were employed for PCEA.

Postoperative variables examined in this study included arterial blood pressure and heart rate; respiratory rate and oxygen saturation; sedation level using the De Kock scale; episodes of vomiting and pruritus; and level of pain at rest, on mobilization and coughing. This data was recorded at the time of arrival into the PACU, 1 hr after extubation, every 4 hrs for the first 24 hrs, and every 6 hrs for the next 48 hrs.

Although, 47 patients were initially enrolled in the study, eight patients could not be included in the final analysis. Four of these patients were not included in the final analysis due to an inability to place the epidural catheter. Another four patients were excluded because of ineffective analgesia from the epidural catheter. Patient demographics among the three groups were similar.

Of particular note, an interim analysis showed the incidence of vomiting and pruritus to be clinically and statistically more frequent in patients receiving epidural fentanyl compared with patients receiving clonidine. Due to these findings the investigators decided to conclude the study. Following final analysis of the data, this study showed that the occurrence of side effects associated with the use of epidural fentanyl may be significantly reduced by the use of clonidine. In addition, the study proved that epidural clonidine possess the same safety and analgesic efficacy as epidural fentanyl when used with a local anesthetic.

Comments:

This study is one of very few to examine the use of epidural clonidine in children. More specifically, this study demonstrates that epidural clonidine is efficacious when compared with epidural fentanyl for use in children undergoing a pectus excavatum repair. Earlier studies describing the use of epidural clonidine centered on its optimal dose.

The use of clonidine in the pediatric population as noted in the medical literature is becoming more widespread. If you are not already using clonidine in your anesthesia practice you may want to consider its use. The results generated from this study point to the safety and effectiveness of epidural clonidine. The investigators also mentioned that another area of study for the future would be to examine whether the findings of their study have an impact on overall patient satisfaction with postoperative care. This is a great idea!