

Title: THORACIC EPIDURAL MORPHINE ANALGESIA FOR PAIN RELIEF AFTER THORACIC SURGERY

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Introduction. Administration of morphine, either intrathecally or epidurally, is thought to selectively depress the nociceptive pathway in lamina 1, 2, and 5 of the dorsal horn. Animal and human studies have shown that morphine effectively blocks experimental pain and adequately relieves chronic pain. The application of these techniques for postoperative and obstetric analgesia is associated with a high failure rate (35-45%), urinary retention (20-30%), pruritis (10%), and nausea and vomiting (10%). In an effort to improve analgesia and reduce side effects we evaluated two methods of morphine administration for patients after thoracic surgery.

Methods and Materials. We studied 30 patients, aged 13-79. This study was approved by the HIC and informed consent was obtained from each patient. Patients had undergone a variety of intrathoracic procedures (segmentectomy, lobectomy, pneumonectomy, esophagectomy). Each patient was premedicated with diazepam 10 mg orally. Anesthesia was induced with thiopental 4 mg/kg, followed by pancuronium 0.1 mg/kg for muscle relaxation. Endotracheal anesthesia was maintained with N₂O and halothane. At the end of surgery an epidural catheter was placed at the spinal segment (T-5) corresponding to the surgical incision, after which muscle relaxants were reversed and each patient was extubated in the operating room.

The first 15 patients (Group A), received alternate injections of morphine 5 mg in 5 ml normal saline and 5 ml of bupivacaine 0.5%. Epidural injections were given after complaints of pain, in this sequence: morphine-bupivacaine-morphine. Pain relief (quality and duration) in this group was compared to that with conventional epidural bupivacaine during the first three postoperative days. We also compared the effect of morphine and bupivacaine on pulse, BP, respiratory rate, level of consciousness, and FEV₁/FVC. Each patient served as his own control.

The other 15 patients (Group B) received a continuous infusion of morphine 100 mcg/hour in 1 ml normal saline before they experienced pain. Pain relief, cardiorespiratory parameters, and side effects were assessed in this group. Pain relief was evaluated subjectively by the

patient on a scale of 0 to 10 (0-no pain, 10-severe pain). Continuous epidural morphine analgesia was used in this group for 3 to 5 days.

Results. In Group A, adequate analgesia was achieved in all patients. The pain scores were below 4 with either drug. During the second and third postoperative days pain relief lasted significantly longer with morphine than with bupivacaine. There was no significant difference in pulse, BP, respiratory rate, or FEV₁/FVC during analgesia established either with morphine or with bupivacaine.

| | Duration of Pain Relief (hours) | | |
|-------------|---------------------------------|---------|---------|
| | 1st Day | 2nd Day | 3rd Day |
| Morphine | 3 | 8 | 12 |
| Bupivacaine | 3 | 6 | 7 |

In Group B, the continuous infusion of morphine provided adequate pain relief in 11 patients (73%). In 4 patients (aged 23-45) the technique failed and frequent intramuscular administration of morphine was required to provide analgesia. Pain relief during continuous epidural morphine was associated with sedation and feeling of well-being. Continuous low-dose thoracic epidural morphine was not associated with urinary retention, pruritis, nausea or vomiting in any patient in Group B.

During continuous morphine infusion, pulse, BP, and respiratory rate were stable and FEV₁/FVC was above 75% in all patients. Morphine levels in plasma after 48 hours in group B were undetectable (below 0.1 mcg/ml using gas liquid chromatography (GLC)).

Discussion. Segmental thoracic epidural block for postoperative pain relief avoids the problems of IM and IV narcotics. In this study, the substitution of morphine for bupivacaine significantly improved the duration and quality of pain relief. The use of a continuous infusion of morphine early in the postoperative period provided adequate pain relief and eliminated the side effects described with intermittent injections of large doses of morphine.

We believe that continuous epidural morphine provides a specific approach to the problem of postoperative pain in thoracic surgery and should be considered as an alternative to conventional analgesic techniques for such patients.

References.

1. Lanz E, et al: Epidural morphine for postoperative analgesia: A double-blind study. *Anesth Analg* 61:236-240, 1982