A RANDOMIZED-CONTROLLED STUDY OF INTRatheCAL VersUS ePIDURAL THORAcIC ANALGESIA IN PATIENTS UNDERGOING ABDOMINAL CANCER SURGERY

Sebastiano Mercadante, MD1, Patrizia Villari, MD1, Alessandra Casuccio, BS2 and Antonio Marrazzo, MD3

ABSTRACT. Background. We sought to determine the effectiveness of continuous intrathecal thoracic analgesia (ITA) in comparison with continuous epidural thoracic analgesia (ETA) for the management of postoperative pain after abdominal cancer surgery in a randomised controlled study. Materials and methods. Catheters were inserted at T8-10 level for both techniques. Sixty patients were randomized to receive ITA providing levobupivacaine 0.25%, at 0.5–0–7 ml/h, associated with a single bolus of morphine 0.15 mg, or ETA with levobupivacaine 0.25% 4–6 ml/h and a single bolus of epidural morphine 2–3 mg. Data were collected before discharging from recovery room to the surgical ward, 1, 2, 3, 8, 12, 24 h, and 48 h after operation. The primary outcome was pain intensity evaluation. Postoperative morphine consumption, hemodynamics, fluids, and blood losses for the first postoperative 48 h, surgical outcome, hospital stay, and complications were also collected. Results. Pain intensity at rest mean values ranged from 1.12 to 1.44 and from 1.04 to 1.20 in ITA group and ETA group, respectively. Dynamic pain intensity mean values ranged from 1.28 to 1.70 and from 1.16 to 1.80 in ITA group and ETA group, respectively. No significant differences were found between the two groups. Total amount morphine consumption was minimal in both groups, 4.4 mg (±2.9) and 3.1 mg (±2.4), for ITA and ETA groups, respectively. There were no severely sedated patients. Hemodynamic variables, diuresis, amounts of fluids, and red cell transfusion were equivalent between the groups. No important technical complications were reported in both groups and postoperative surgical complications were not related to the examined techniques. Conclusion. ITA and ETA produced the same levels of analgesia, without relevant complications.

KEY WORDS. epidural analgesia, intrathecal analgesia, postoperative pain.

INTRODUCTION

Inadequate pain control after abdominal procedures can result in increased morbidity, length of stay, and delay in overall recovery. Importantly, control of postoperative pain after abdominal laparotomy has been demonstrated to decrease the incidence of postoperative pulmonary complications, such as mucous plugging, hypoxia, atelectasis, and pulmonary infections [1].

Many beneficial aspects of perioperative epidural analgesia have been reported, although the superior analgesic efficacy compared with conventional analgesia or patient-
controlled analgesia for patients having abdominal procedures still generates controversy [1, 2]. In comparison with opioid analgesia by either intravenous or epidural routes, epidural administration of a local anesthetic and opioid mixture improved pain relief. Moreover, in patients undergoing abdominal or thoracic surgery, thoracic epidural analgesia (TEA) with local anesthetics and morphine could result in earlier recovery of bowel activity and fulfillment of discharge criteria, with a low incidence of adverse effects [3–6]. There is level 1 evidence that it provides better analgesia than parenteral opioids [7]. Combination of general anesthesia with TEA has been shown to provide a better patient outcome, an improvement of early analgesia, good hemodynamic stability, and reduction of perioperative complications in off-pump coronary artery bypass procedures [8, 9]. Although there is reasonable evidence that outcome is improved, studies are still conflicting [9–11].

Both continuous intrathecal anesthesia and continuous epidural anaesthesia are supposed to provide adequate postoperative pain relief. Continuous intrathecal anesthesia makes it possible to adjust the duration of anesthesia to the duration of the operation and can be also extended into the postoperative period as a natural progression from its intraoperative use. However, this technique is less commonly used, particularly in the thoracic area, probably due to the risks of spinal cord injury or postoperative complications, at least for postoperative purposes, and is principally reserved to the treatment of chronic pain conditions. Analgesia is potentially optimal and the presence of cerebrospinal fluid facilitates spread and availability of local anesthetic administered either as a bolus or as a continuous infusion, compared to multiple factors that may inhibit epidural drug spread and availability. Factors altering drug availability in the epidural space could introduce more variability in determining clinical efficacy.

Data about the use of continuous intrathecal treatment are lacking, and mainly reported in orthopedic surgery and labor analgesia [1, 2]. No data exist about the comparison of these techniques for postoperative pain control after abdominal cancer surgery. Therefore, we performed a prospective, randomized study to compare safety and efficacy of TEA and thoracic intrathecal analgesia (TIA) during the first 48 h after laparotomy.

**METHODS**

Sixty patients aged 18–80 years, who were in ASA risk class II–III, undergoing elective abdominal abdominal cancer surgery, were enrolled in the study. Institutional approval of ethical committee and informed consent were obtained. Patients were recruited during the period September 2003 to October 2005. Exclusion criteria were allergy to local anesthetics or opioids, current opioid use, history of alcohol or drug abuse, active infectious process, neurological disorders, abnormal coagulation tests, significant renal or hepatic disease, and inability to cooperate.

On the day before surgery patients received instructions on pain assessment with numerical pain scale (0–10), measured at rest and dynamically, during deep breathing. Patients were premedicated with fentanyl 50 μg, dehydrobenzoperidol 1.25 mg, and diazepam 5 mg, and an infusion of 500 ml of Hetastarch 6% was started. Patients were randomized using appropriate tables to receive ETA or ITA according to the following protocol.

In group 1 (ETA) an epidural catheter was placed into the epidural space at T8–T10 vertebral space in a lateral position, by using a 17 gauge Tuhoy needle. A catheter was inserted 3–4 cm beyond the tip of the needle (Braun perifix, 19-gauge, 10.5–0.6 mm, external–internal diameters, respectively). An epidural test dose of 3 ml of lidocaine 2% was injected through the catheter. A slow bolus of 4 ml (for older or debilitated patients), or 6 ml (for others) of levobupivacaine 0.25% was then injected. A continuous epidural infusion of levobupivacaine 0.25% was started at a rate of 6 ml/h (or 4 ml/h in elderly debilitated patients), and a bolus of epidural morphine 2–3 mg was given before the start of surgery.

In group 2 (ITA) an intrathecal catheter was placed at T8–T10 vertebral space in a lateral position, by using a 18 gauge Tuhoy needle. After free flow of CSF was obtained, a 20-gauge catheter (Braun perifix, 20-gauge, 0.85–0.45 mm, external and internal diameters, respectively) was inserted 3–4 cm beyond the tip of the needle. After a slow bolus of 0.7 ml of levobupivacaine 0.25% (or 0.5 ml/h in elderly-debilitated patients), an intrathecal infusion of levobupivacaine 0.25%, was started at a rate of 0.7 ml/h (or 0.5 ml/h in elderly debilitated patients). A bolus of 0.150 mg of intrathecal morphine was given before the start of surgery. Catheters were inserted at T8 level in 18 patients with gastric cancer, and at T10 level for 32 patients with colon/rectum cancer, independently of the technique. Doses and infusion rates chosen were based on a preliminary experience for ITA, and department policy for ETA in the daily practice.

The presence of bilateral abdominal hypoalgesia to needle was confirmed in all patients, although the exact level was not formally assessed. In both group, general anesthesia was induced with propofol (1.5 mg/kg) and succinylcholine (1 mg/kg). General anesthesia was maintained with sevorane, nitrous oxide, and oxygen. Cisatracurium, fentanyl, fluids, red cells transfusion, and inotropic support with dobutamine and plasma expanders.