



Case report

The novel use of different bupivacaine preparations with combined regional techniques for postoperative pain management in non-opioid-based laparoscopic inguinal herniorrhaphy



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Abstract Opioids are important for surgical pain control but may not be appropriate for patients with narcotic abuse histories or opioid intolerance. We describe a laparoscopic bilateral inguinal herniorrhaphy performed without perioperative or postoperative narcotics. Postoperative analgesia involves a novel technique using 2 different bupivacaine formulations that act synergistically to avoid lag time and provide extended pain relief during the acute surgical recovery phase.

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1. Introduction

Opioids have historically been a first-line therapy for surgical pain control, both in the setting of the operating theater and for postoperative pain relief. However, the standard use of opioids has come at a cost of widespread opioid tolerance or abuse, and thus may not be appropriate for patients with narcotic abuse histories. Such challenges require surgeons and

anesthesiologists to look for novel nonopioid alternatives to treat surgical pain.

Use of injectable local anesthetics has been well established to decrease operative and postoperative pain. Standard bupivacaine HCl has a fast onset of action, but the anesthetic effects only last 4 to 8 hours, making it ineffective for prolonged postoperative pain relief. Adding dexamethasone to bupivacaine HCl has the effect of extending the duration of action to more than 20 hours [1]. A newer agent that has been used successfully in the surgical setting for extended postoperative analgesia is injectable liposomal bupivacaine (LB). LB has a duration up to 96 hours [2], which is effective for ambulatory surgeries; however, it has a much longer duration of onset than bupivacaine HCl and may take hours to achieve therapeutic effects. We hypothesized that using both bupivacaine HCl and LB would allow for pain relief in the immediate postoperative phase without the lag in onset that can result from LB alone.

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We describe a laparoscopic totally extraperitoneal (TEP) bilateral inguinal herniorrhaphy performed without perioperative or postoperative narcotics in a multimodal approach. Our principal technique for managing postoperative pain relies on a novel regional anesthetic technique through bilateral transversus abdominis plane (TAP) blocks with LB, administered in concert with bupivacaine HCl/dexamethasone instilled in the preperitoneal space.

2. Materials and methods

A 57-year-old African American man presented to our outpatient surgery clinic for evaluation of symptomatic fat-containing bilateral inguinal hernias with chronic groin pain. His medical history was significant for morbid obesity (152 kg, body mass index 50.2 kg/m²), diabetes mellitus, chronic obstructive pulmonary disease, and past abuse of alcohol and crack cocaine, from which he had been abstinent for 18 months. He was in a recovery program that provided housing and employment assistance, but as part of his program, he was prohibited from testing positive for any narcotics. He was scheduled for laparoscopic bilateral inguinal herniorrhaphy via TEP approach.

In consultation with anesthesiology, a narcotic-free surgical and postsurgical regimen was planned. General anesthesia was induced with midazolam 2 mg intravenous (IV), ketamine 50 mg IV, and propofol 200 mg IV. Succinylcholine 200 mg IV was used to facilitate tracheal intubation. After induction of general anesthesia, a dexmedetomidine infusion was started at 0.4 µg/kg/h and maintained throughout the perioperative period (100 µg IV total). The patient was ventilated with 100% oxygen. Sevoflurane was added to maintain anesthesia perioperatively. Neuromuscular blockade for the surgery was provided with cisatracurium (28 mg IV total). Neostigmine/glycopyrrolate (5 mg/1 mg IV) was used at the conclusion of the surgery to reverse the neuromuscular blockade. Ondansetron 4 mg IV was administered for antiemetic prophylaxis prior to emergence from anesthesia. IV ketorolac 30 mg and acetaminophen 1000 mg were administered for adjunctive pain control during the case.

Prior to TAP block infiltration, 20 mL of liposomal bupivacaine (266 mg; 13.3 mg/mL) was mixed with 4 mg of dexamethasone in 35 mL 0.9% injectable normal saline and 5 mL 0.25% bupivacaine HCl for a total of 60 mL. Under sterile technique with ultrasound guidance, a bilateral TAP block was performed with injection of 30 mL of the LB/dexamethasone mixture per side.

A standard laparoscopic TEP bilateral inguinal hernia repair was then started. A total of 10 mL of 0.25% bupivacaine HCl with 1:200,000 epinephrine was injected into the port sites prior to incision. A complete preperitoneal dissection was performed with reduction of bilateral indirect inguinal fat-containing hernias and bilateral placement of 14 × 15-cm polypropylene mesh fixated with absorbable tacks. A total of

30 mL 0.25% bupivacaine HCl with 4 mg dexamethasone was then instilled directly into the “Triangles of Pain” bilaterally, just lateral to the testicular structures. There were no immediate postoperative complications. The patient was then discharged on oral ibuprofen and acetaminophen every 6 hours as needed. Pain scores were obtained in the postanesthesia care unit on postoperative day (POD) 0 and by telephone calls on PODs 1, 2, and 3.

3. Results

There were no complications secondary to anesthesia, block placement, or herniorrhaphy. The patient’s subjective pain score in postanesthesia care unit was 0 on a 10-point scale. On POD 1, he had mild pain rated at 4/10, requiring ibuprofen 600 mg and acetaminophen 2000 mg in 24 hours. Pain on POD 2 was slightly higher at 5/10, worse with movement, but he stated “pain is not bad and is very tolerable.” He required ibuprofen 1800 mg and acetaminophen 4000 mg. Per the patient, postoperative pain relief from the block wore off the morning of POD 2 and lasted approximately 44 hours. On POD 3, pain had decreased to 3/10 and was only present with movement. He required ibuprofen 1800 mg and acetaminophen 3000 mg with good relief. He was satisfied with his surgical result and was able to return to work.

4. Discussion

Although laparoscopic inguinal hernia repair has long been considered superior to the open approach with respect to postoperative pain and faster return to work [3], as a surgical procedure, it is still likely to cause significant patient discomfort in the immediate postoperative phase. Common surgical practice is to prescribe narcotic pain medications for postoperative pain. However, patients with opioid abuse histories or tolerance merit more detailed consideration for their surgical pain management. From a public health perspective, avoiding opioids for surgical pain should be pursued whenever possible, and this necessitates not only minimally invasive procedures when indicated but also use of nonnarcotic agents during and after surgery. Our patient’s case is especially notable as he was prohibited by his recovery program to have any form of narcotics, despite his scheduled surgery.

It has been reported that TAP blocks and local anesthetic infiltration provide comparable short-term postoperative analgesia in lower abdominal surgeries [4]. Preliminary results from one of our current studies examining postoperative analgesia in laparoscopic TEP inguinal herniorrhaphy suggest that TAP blocks and preperitoneal instillation of local anesthetics provide comparable postoperative analgesia. Because it has been reported that TAP blocks provide a better long-lasting effect in lower abdominal surgeries compared with local

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