

A Comparison of Epidural Versus General Anesthesia for Outpatient Endoscopic Preperitoneal Herniorrhaphy

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ABSTRACT

Objectives: To study the efficacy of epidural versus general anesthesia on length of stay, patient recovery and anesthetic-related complications in patients undergoing endoscopic preperitoneal herniorrhaphy.

Methods: One hundred sixty-seven consecutive patients undergoing endoscopic preperitoneal herniorrhaphy from July, 1994, to August, 1995, were retrospectively studied. A total of 243 herniorrhaphies were performed. Four patients required conversion of epidural anesthesia to general anesthesia because of inadequate sensory blockade (67/71; 94% success rate). One-hundred-forty-eight patients were available for review. Sixty-seven patients underwent successful epidural anesthesia during the case, while 81 patients were managed with general anesthesia.

Results: Thirty patients (37%) receiving general anesthesia required interventions for nausea compared to only six patients (9.0%) in the epidural anesthesia group ($p < 0.001$). Thirty patients (37%) in the general anesthesia group required intervention because of complaints of pain, compared to 13 (19.4%) in the epidural group ($p < 0.05$). There were no differences between the two groups for length of stay in OR, PACU, or total hospital times.

Conclusions: The use of epidural anesthesia during the performance of endoscopic preperitoneal herniorrhaphy was associated with a decrease in the incidence of postoperative pain and nausea. The technique was successful in 94% of the cases in which it was used. Epidural anesthesia is recommended as an effective alternative to general anesthesia for the performance of outpatient endoscopic preperitoneal herniorrhaphy.

Key Words: Laparoscopic herniorrhaphy, Epidural anesthesia.

INTRODUCTION

Although laparoscopic technical advances have made minimal access surgery a more attractive and decreasingly costly method of surgery, they have traditionally implied the requirement of general anesthesia. Endoscopic preperitoneal herniorrhaphy is based on the established open repair techniques of Stoppa, Nyhus, Wantz and others and avoids the creation of a pneumoperitoneum. Thus, the utilization of a regional anesthetic may be facilitated by such an approach. Between July, 1994 and August, 1995, 167 consecutive patients underwent a total of 243 endoscopic preperitoneal herniorrhaphies by a single surgeon. These procedures were performed utilizing either epidural or general anesthesia. The purpose of this study was to evaluate the efficacy of epidural versus general anesthesia on length of stay, patient recovery and anesthetic-related complications in this patient population.

MATERIALS AND METHODS

One hundred sixty-seven consecutive patients undergoing endoscopic preperitoneal herniorrhaphy from July, 1994 to August, 1995 were retrospectively studied. A total of 243 herniorrhaphies were performed. All endoscopic preperitoneal herniorrhaphies were performed by a single surgeon (ALS) in a teaching setting. All repairs were performed on an elective, outpatient basis. There were no incarcerated hernias in this series. Comparison was made between those patients receiving general anesthesia for their operative procedure and those receiving epidural anesthesia with systemic sedation.

Of the 167 patient charts reviewed, twelve patients were deleted due to an inability to obtain all pertinent perioperative data. Three patients were deleted from the study because of postoperative admission to the hospital. Four patients required conversion of epidural anesthesia to general anesthesia because of inadequate sensory blockade (67/71; 94% success rate). Thus, 148 patients were available for review. Sixty-seven patients underwent successful epidural anesthesia during the case, while eighty-one patients were managed with general anesthesia.

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Table 1.

Demographic Data for Epidural Anesthesia vs. General Anesthesia

	Epidural Anesthesia	General Anesthesia
Number (%)	67 (45.3%)	81 (54.7%)
Age	55.5*	49.9*
Male:female ratio	65:2*	75:6*
Unilateral: bilateral ratio	36:31*	42:39*

* p > 0.05.

The average age and male: female ratio for each group is as follows: Epidural Anesthesia (EA): 55.5 years (range 20-84), male:female ratio of 65:2. General anesthesia (GA): 49.9 years (range 18-89), male: female ratio 75:6. There were 36 unilateral repairs and 31 bilateral repairs in the EA group and 42 unilateral repairs and 39 bilateral repairs in the GA group. There were no statistically significant differences in any of these demographic comparisons (**Table 1**).

Epidural Anesthesia Technique:

Epidural anesthesia was administered by a nurse anesthetist under the supervision of a staff anesthesiologist. Peripheral venous access was obtained and patients received premedication consisting of midazolam and/or fentanyl. Once external monitoring was established, a bolus of 1000 cc of crystalloid was given. Patients were then placed into the sitting position. A lumbar epidural catheter was placed under sterile conditions using the loss of resistance technique. Subarachnoid and intravenous placement of the catheter was ruled out by a negative aspiration followed by a test dose of 1.5% lidocaine with 1:2000 epinephrine.

Epidural block was established by bolus administration of 2% lidocaine until a T-4 level was established. During the performance of the hernia repair, intermittent bolus administration of lidocaine was continued to maintain appropriate anesthesia. The epidural catheter was removed at the end of the procedure.

Endoscopic Preperitoneal Herniorrhaphy Technique:

All patients underwent endoscopic herniorrhaphy by a totally extraperitoneal approach. Patients were positioned

Table 2.

Perioperative Data for Epidural Anesthesia vs. General Anesthesia

	Epidural Anesthesia	General Anesthesia
Number (%)	67 (45.3%)	81 (54.7%)
Operating Room Time	111.7 min*	112.1 min*
PACU Time	66.7 min*	69.3 min*
Total Hospital Time	420.0 min*	458.0 min*

* p > 0.05.

supine. Preoperative antibiotic prophylaxis consisted of a single dose of cefazolin or vancomycin. The preperitoneal space was created with the use of a Properitoneal Distension Balloon (PDB, Origin Medsystems, Menlo Park, CA) and was maintained with CO₂ insufflation at a pressure of 12 mm mercury. For all hernia repairs, dissection was carried out to expose and/or identify Cooper's ligament, the inferior epigastric vessels, the internal ring, the spermatic cord and the iliofemoral vessels.

A single sheet of 3-by-5 inch polypropylene mesh was used to perform all repairs in this series. A keyhole incision was created superiolaterally in the mesh to allow the mesh to wrap around the cord, thus recreating the internal ring. The mesh was fixed to the anterior abdominal wall and Cooper's ligament using the Endoscopic Multifire Stapler (EMS, Ethicon Endo-Surgery, Cincinnati, OH), or Tacker (Origin Medsystems, Menlo Park, CA). No staples or tacks were placed below the iliopubic tract except at Cooper's ligament.

At the completion of the repair(s), 30 cc of 0.25% bupivacaine with epinephrine (1:100,000) were placed into the preperitoneal space for the purpose of postoperative analgesia. Postoperative pain control was managed with oral acetaminophen with codeine (Tylenol #3) in all patients. Intramuscular ketorolac (Toradol, 30 mg) was used additionally in five patients at the discretion of the anesthesiologist. All patients returned for at least one postoperative visit.

Data analysis included patient gender, age, height, weight, and ASA classification, as well as anesthetic technique, adjunct narcotics, and anesthetic-related complications. Length of stay in the operating room, postanesthesia care unit, and hospital were also analyzed. Anesthetic-related

complications included any occurrence or situation which required intervention intraoperatively or postoperatively. These included nausea and/or vomiting, pain, subcutaneous emphysema, the need for conversion from epidural to general anesthesia, or any occurrence which adversely affected length of stay.

RESULTS

Sixty-seven patients received epidural anesthesia (45.3%), while eighty-one (54.7%) received general anesthesia. Perioperative data is summarized in (Table 2). Analysis revealed an average Operating Room length of stay of 111.7 minutes for the epidural group, compared to 112.1 for the general anesthesia group. Post Anesthesia Care Unit (PACU) length of stay was 66.7 minutes for epidural patients and 69.3 minutes for the general anesthesia group. Total hospital length of stay for the patients receiving epidural anesthesia was 420.0 minutes and for general anesthesia was 458.1 minutes. There were no significant differences between the two groups for length of stay in OR, PACU, or total hospital times.

A comparison of complication rates between the two groups was also performed. Complications analyzed were nausea, vomiting, and/or pain which required intervention by the anesthesia provider. This data is summarized in (Table 3). Thirty patients (37%) receiving general anesthesia required interventions for nausea compared to only six patients (9.0%) in the epidural anesthesia group ($p < 0.001$). In addition, thirty patients (37%) in the general anesthesia group required intervention because of complaints of pain, compared to 13 (19.4%) in the epidural group ($p < 0.05$).

DISCUSSION

Anesthetic considerations and the associated perioperative complication profiles during the performance of inguinal herniorrhaphy are dependent on the surgical approach selected. Anterior (open) approaches to herniorrhaphy are well established procedures for the repair of congenital or acquired abdominal wall defects and can usually be performed on an outpatient basis with the use of local anesthesia with or without systemic sedation. The use of open techniques does not necessarily reduce the incidence of postoperative complications when compared to laparoscopic methods. Overall complication rates of 21% for open repairs and 8% for laparoscopic techniques have been reported. These complications include infection, persistent wound pain, primary wound hemorrhage, symptomatic hematoma and urinary retention.¹

A recent survey of surgeons' preferences for inguinal herniorrhaphy showed that two of the compelling reasons

Table 3.
Perioperative Complications for Epidural Anesthesia vs. General Anesthesia.

	Epidural Anesthesia	General Anesthesia
Number (%)	67 (45.3%)	81 (54.7%)
Nausea (%)	6 (9%)*	30 (37%)*
Pain (%)	13 (19.4%)**	30 (37%)**

* $p < 0.001$.

** $p < 0.05$.

for choosing an open technique over a laparoscopic alternative were the lack of violation of the peritoneal cavity and the avoidance of general anesthesia.² The adaptation of laparoscopic techniques by general surgeons for intraperitoneal pathology led to the use of laparoscopy for hernia repair. A transabdominal approach for laparoscopic herniorrhaphy requires peritoneal insufflation of carbon dioxide for visualization and exposure. In an attempt to avoid the potential for complications associated with a transabdominal approach to laparoscopic herniorrhaphy, a totally extraperitoneal (preperitoneal) technique has evolved.

Since insufflation is used only in the preperitoneal space and the peritoneal cavity is not insufflated, the procedure may be performed under regional anesthesia.³ Epidural anesthesia may afford particular advantages in the outpatient setting. The somnolence, pain, nausea and vomiting that may be associated with the use of general anesthesia can result in unscheduled hospital admission or prolonged hospital stay, which can decrease patient satisfaction.⁴ Regional anesthesia for ambulatory patients has been shown to improve postoperative pain control and decrease nausea and vomiting, somnolence, and recovery time. It has also been shown to reduce the number of unexpected admissions.^{5,6,7}

Our experience confirms statistically significant differences in the incidence of nausea ($p < 0.001$) and pain ($p < 0.05$) requiring intervention between the groups receiving epidural anesthesia and general anesthesia. There were no statistically significant differences in either operating room, PACU, or hospital length of stay.

CONCLUSIONS

The use of epidural anesthesia during the performance of endoscopic preperitoneal herniorrhaphy was associated with a decrease in the incidence of postoperative pain and

nausea. The technique was successful in 94% of the cases in which it was used. Epidural anesthesia is recommended as an effective alternative to general anesthesia for the performance of outpatient endoscopic preperitoneal herniorrhaphy. This anesthetic approach should also be applicable to other preperitoneal laparoscopic procedures, such as bladder neck suspension, pelvic lymphadenectomy, and spine surgery.

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