

Local and General Anesthesia in the Laparoscopic Preperitoneal Hernia Repair

Ermenegildo Eldo Frezza, MD, George Ferzli, MD

ABSTRACT

Objective: The extraperitoneal laparoscopic approach (EXTRA) has been shown to be an effective and safe repair for primary (PIH), recurrent (RIH) and bilateral hernia (BIH). There is very little data examining the merits of laparoscopic repair for hernias under local anesthesia. In this paper, we compare EXTRA performed under both general and local anesthesia.

Methods: This nonrandomized prospective study was performed selectively on a male population only. Patients with associated pulmonary disease and high risk for general surgery were selected. Patients with recurrence and previous abdominal operations were excluded to decrease confounding variables in the study. A Prolene mesh was used in all patients.

Results: Between May 1997 and September 1998, 92 male patients underwent the repair of 107 groin hernias using the EXTRA technique. The procedure was explained to them, and different anesthesia options were given. Fourteen of these repairs were performed under local anesthesia and 93 under general anesthesia. Of the 10 patients who underwent a repair under local anesthesia, there were 8 indirect, 5 direct and 1 pantaloon. The mean age was 53 years. In the group of general anesthesia, the types of hernias repaired were 45 indirect, 30 direct and 11 pantaloon. The mean age was 45 years. The mean follow-up was 15 months. Each patient was sent home the same day.

Two peritoneal tears were recorded in the first group. The operative time was longer in the local group (47 ± 11 vs 18 ± 3). None of the patients required conversion to an open technique or change of anesthesia. No recur-

rences were found in either group. The average time of return to work and regular activity was 3.5 ± 1 and 3 ± 1 days, respectively.

Conclusion: There appears to be no significant difference in recurrence and complication rates when the EXTRA is performed under local anesthesia as compared to general. Blunt dissection of the preperitoneal space does not trigger pain and does not require lidocaine injection. The most painful area is the peritoneal reflection over the cord structure. The laparoscopic repair under local anesthesia represents an advantage in the repair of the inguinal hernia, particularly in the population where general anesthesia is contraindicated.

Key Words: Laparoscopic preperitoneal hernia repair.

INTRODUCTION

The successful introduction of laparoscopic guidance as an aid to cholecystectomy has resulted in an intense effort to apply the technology to other operative procedures.^{1,2} The first benefit of the laparoscopic repair is that it induces less pain than an open hernia repair and enables patients to return quickly to normal activity and work.³ Among the different approaches, the extraperitoneal laparoscopic approach (EXTRA) has been shown to be an effective and safe repair for primary (PIH), recurrent (RIH) and bilateral hernia (BIH).⁴⁻⁶

Despite these advantages, surgeons have been reluctant to perform the EXTRA because of the necessity of using general anesthesia during the repair.

To date, only one report discusses the feasibility of laparoscopic repair under local anesthesia in intra-abdominal repair.⁷ At this moment, there are very few data examining the merits of laparoscopic repair for hernias under local anesthesia.

The purpose of this paper is to compare the results of EXTRA repair performed under local and general anesthesia.

Department of Surgery, Staten Island University Hospital, Staten Island, NY USA (all authors).

Fellow of the American College of Surgeons (FACS) (Dr. Ferzli).

Address reprint request to: Eldo E. Frezza, MD, University of Pittsburgh, Falk Clinic 4th floor, 3601 Fifth Avenue, Pittsburgh, PA 15213, USA. Telephone: (412) 648-3200, Fax: 412-648-3085.

© 2000 by JSLs, *Journal of the Society of Laparoendoscopic Surgeons*. Published by the Society of Laparoendoscopic Surgeons, Inc.

MATERIAL AND METHODS

Inclusion Criteria

This is a prospective nonrandomized study. Patients underwent inguinal hernia repair under local anesthesia if they requested or if they had borderline pulmonary disease (COPD, Asthma). All other patients underwent EXTRA repair under general anesthesia. Other inclusion criteria in this study were as follows: being male above 18 years of age and a first-time inguinal hernia repair. All the recurrent hernias were excluded from the study.

Preoperative Preparation

Patients arrived at the hospital the morning of surgery, after having fasted since midnight. Routine preoperative laboratory evaluations were ordered, including other preoperative tests in case the patients needed medical clearance. Prophylactic antibiotics were administered. Patients were shaved and prepared with a bethadine-based preparatory scrub.

Mesh

A 6 x 6 inch polypropylene mesh was used in each patient and trimmed accordingly. If the hernia was bilateral, two pieces of mesh were used and overlapped.

Laparoscopic Technique

After infiltration with 1% lidocaine at the midline, a 1-cm transverse periumbilical skin incision is performed. The fascia is incised transversely on one side of the midline and the rectus muscle identified. The index finger is inserted on the medial aspect of the exposed rectus muscle along the posterior rectus sheath. Blunt finger dissection of the preperitoneal space is performed. A 10-mm blunt tip cannula is introduced and secured in place. Insufflation with CO₂ is started to a pressure of 10-mm Hg. A 25 degree, 10-mm operating scope is inserted to visualize the preperitoneal space. Under direct visualization, two working trocars are placed in the midline. First, a 10-mm cannula is placed approximately two finger breaths below the first trocar. Then a 5-mm cannula is placed at the same distance below the second one. Both of the trocar insertion areas are previously injected with lidocaine in the group with local anesthesia. Once the pubic symphysis is safely identified in the midline, the retropubic space of Retzius is gently developed using blunt, gentle, short, sweeping moves. The surgeon stays along the bone on each side of the midline to identify Cooper's ligament. At this point, attention is directed

superiorly to the rectus abdominus muscle to identify the epigastric vessels. The direct space, or medial fossa, will be readily visible.

Direct and Femoral Hernias

If a direct or femoral hernia is seen, it is gently reduced by blunt, short, traction. In case only local anesthesia is used, the patients are told at this point that they may feel some pressure. If pain is felt at this level, lidocaine is injected along the rolled edge or fold that nicely demarcates the separation between the redundant thickened transversalis and the peritoneal sac. Dissection continues along this fold, reducing the entire contents of the direct defect.

Indirect Hernias

When general anesthesia is not used, infiltration with lidocaine posterior to the epigastric vessels in the peritoneal fold overlying the cord structures is required to allow manipulation of these vessels. If an indirect hernia is present, infiltration of the sac wall with lidocaine is essential in order to allow manipulation of the sac and its dissection from the cord structure without exerting pain on the patient. To avoid complications, it is preferable to start dissection in the upper outer quadrant of the deep internal ring. Dissection of the sac is done gently in a direction perpendicular to the spermatic cord. While holding the sac with a grasper laterally and superiorly, the cord structures are gently swept away medially and posteriorly. A window is thus created between the cord structures and the sac. The latter is either totally invaginated and reduced or transected, leaving the distal blunt end in situ while suturing closed the proximal end.

Mesh Placement

An approximately 5 x 6 inch polypropylene mesh is used. It is handled with a no-touch technique. It is unrolled from the pubic symphysis laterally toward the antero-superior iliac spine and posteriorly to the epigastric vessels. If an opposite-side hernia also exists, two symmetrical pieces are placed overlapping in the midline. When only local anesthesia is used, infiltration of lidocaine is performed in the Cooper's ligament, the pubic symphysis, and lateral abdominal wall where the mesh is to be secured. In the event that the surgeon does not want to secure the mesh, infiltration of lidocaine is not needed.

Statistical Analysis

Descriptive statistics were used for data analyses.

RESULTS

Between May 1997 and September 1998, 92 male patients underwent the repair of 107 groin hernias using the EXTRA technique. The procedure was explained to them, and different anesthesia options were given. Fourteen of these repairs were performed under local anesthesia and 93 under general anesthesia. Of the ten patients who underwent a repair under local anesthesia, there were eight indirect, five direct and one pantaloon. The mean age was 53 years. In the group of general anesthesia, the types of hernias repaired were 45 indirect, 30 direct and 11 pantaloon. The mean age was 45 years. All the patients were followed by one of the surgeons at 1, 3 and 6 weeks, 6 months and 1 year postoperatively, since it was shown that the recurrences after laparoscopic repair occur mostly during the first 12 months.⁸ The mean follow-up was 15 months. Each patient was sent home the same day of surgery, with pain control medication and instruction to progressively increase the activity as tolerated after the first 24 hours.

Two peritoneal tears were recorded in the first group. The operative time was longer in the local group (47 ± 11 vs 18 ± 3). None of the patients required conversion to an open technique or change of anesthesia. No recurrences were found in either group. No limitations were imposed on patients' physical activity after their pain had resolved. The average time of return to work and regular activity was 3.5 ± 1 and 3 ± 1 days, respectively in the patients with general and local anesthesia.

DISCUSSION

The laparoscopic hernia repairs have revealed significant advantages regarding analgesia requirement, postoperative pain and return to domestic activity and to work compared with the open procedure.^{9,10}

Proponents of laparoscopic herniorrhaphy reported a faster return to normal activity with less pain-control requirements.^{9,11} Some authors¹² noted, also, less analgesia requirement after the laparoscopic procedure compared to the open procedure.

Repair of recurrent inguinal hernias laparoscopically has produced results comparable to the open preperitoneal repair with low morbidity and recurrence rates.¹³ Repair

of bilateral inguinal hernias is easier to perform using only three midline trocar incisions. Finally, the laparoscopic repair can also be performed without using staples to secure the mesh.¹⁴

In a prospective study comparing intraperitoneal laparoscopic repair versus Shouldice open repair,¹⁵ it was shown that while the open procedure can be performed under local anesthesia the laparoscopic one cannot. Unfortunately, to date, there is only one paper reporting the use of local anesthesia during laparoscopic intra-abdominal hernia repair,⁷ which, in our opinion, is more difficult to handle than the EXTRA approach under local anesthesia.

Some authors, during a prospective study comparing laparoscopic intra-abdominal hernia repair versus open technique had to direct some patients, who were planned for the laparoscopic repair, to the open repair technique⁹ because of contraindications to general anesthesia. Opponents of the laparoscopic herniorrhaphy severely criticize the use of general anesthesia, which represent, in most of the laparoscopic centers, a contraindication for laparoscopic hernia repair.

Many authors have reported the successful use of spinal anesthesia in the laparoscopic herniorrhaphy.¹⁶ In a previous publication,¹⁷ we have reported the use of epidural anesthesia in 16% of our cases. Epidural anesthesia is a good option for patients with pulmonary disease, but it is not safer than general anesthesia for patients with cardiac risk factors.

In this study, we compared 14 inguinal hernias repaired under local anesthesia and 93 under general anesthesia. All the repairs were performed using the preperitoneal approach. There was no difference in the complication and recurrence rate between the two groups. The duration of surgery was longer (29 minutes) in the local anesthesia group. This can be explained by the gentle and extra meticulous dissection, using lidocaine, when needed, in order to prevent any unexpected pain. All these precautions are essential in order to obtain a good patient compliance. For these reasons, we did not convert any of the procedures to general anesthesia.

The EXTRA procedure offers an extremely safe day-case operation under local anesthesia for adult patients of all ages, including those with disabling disease or pulmonary pathology, for whom general anesthesia is contraindicated. We adopted this procedure on a select

number of patients in order to remove one of the last hurdles against laparoscopic hernia repair, which was always labeled as a solely general anesthesia method.¹⁸

There are several points that we have learned as we progressed through this technique. One is that the blunt dissection of the preperitoneal space in the midline does not trigger pain and does not require lidocaine injections. The second point is that the development of the Retzius space, identification of the Cooper ligaments and the obturator areas are not painful. Thirdly, the reduction of the direct hernia contents is uncomfortable with a pressure-like feeling requiring early injection of lidocaine along the fold separating the transversalis fascia and peritoneal sac. The fourth point is that the most painful part of the operation is the manipulation under the epigastric vessels and along the entrance of the cord structures in the internal ring, which require prior infiltration with lidocaine. The fifth point is that the pulling on the hernia sac is performed in a posterior cephalic fashion, while in the open procedure the traction is placed anteriorly and inferiorly. This could explain the absence of vagal reaction during the manipulation of the hernia sac in the laparoscopic repair.

CONCLUSION

With good knowledge of the anatomy, strict adherence to a meticulous and cautious dissection and a good interaction with the patients, EXTRA repair of inguinal hernia can be performed under local anesthesia with results comparable with the repair under general anesthesia. EXTRA repair provides an excellent option for patients with high risk for general anesthesia.

References:

1. Cuschieri A. The spectrum of laparoscopic surgery. *World J Surg.* 1992;16:1089-1097.
2. Zucker KA. Perceived future of laparoscopic surgery. *Can J Surg.* 1992;35:297-304.
3. Stoker DL, Spiegelhalter DJ, Singh R, Wellswood JM. Laparoscopic versus open inguinal hernia repair: randomised prospective trial. *Lancet.* 1994;343:1243-1245.
4. Ferzli G, Massad A, Albert P. Extraperitoneal endoscopic hernia repair. *J Laparoendosc Surg.* 1992;6:281.
5. Ferzli G, Massad A, Dysarz F, Kopatsis A. A study of 101 patients treated with extraperitoneal endoscopic laparoscopic herniorrhaphy. *Am Surg.* 1993;59:707-708.
6. Kernan JB. Extraperitoneal prosthetic inguinal hernia repair using an endoscopic approach. *Int Surg.* 1995;80:26-28.
7. Pendurthi TK, De Maria EJ, Kellum JM. Laparoscopic bilateral inguinal hernia repair under local anesthesia. *Surg Endosc.* 1995;9:197-199.
8. Liem MSL, van der Graaf Y, van Steensel CJ, et al. Comparison of conventional anterior surgery and laparoscopic surgery for inguinal hernia repair. *N Eng J Med.* 1997;336:1541-1547.
9. Wilson MS, Deans GT, Brough WA. Prospective trial comparing Lichtenstein with laparoscopic tension free mesh repair of inguinal hernia. *Br J Surg.* 1995;82:274-277.
10. Stroker DL, Spiegelhalter DJ, Singh R, Wellwood JM. Laparoscopic versus open inguinal hernia repair: randomised prospective trial. *Lancet.* 1994;343:1243-1245.
11. Liem MSL, Halsema JAM, van der Graaf Y, et al. A cost effectiveness of extraperitoneal laparoscopic inguinal hernia repair: a randomized comparison with conventional herniorrhaphy. *Ann Surg.* 1997;226:668-676.
12. Brooks DC. A prospective comparison of laparoscopic and tension free herniorrhaphy. *Arch Surg.* 1994;124:361-366.
13. Sayad P, Hallak A, Ferzli G. Laparoscopic herniorrhaphy: review of complications and recurrence. *J Laparosc Adv Surg Tech.* 1998;8:3-9.
14. Ferzli G, Frezza EE, Pecoraro A, Ahern K. Stapled or unstapled the mesh in the laparoscopic preperitoneal inguinal hernia repair? A year follow up. *Am Coll Surg.* 1999;188:461-465.
15. Zieren J, Zieren HU, Jacobi CA, Wenger FA, Muller JM. Prospective randomized study comparing laparoscopic and open tension free inguinal hernia repair with Shouldice's operation. *Am J Surg.* 1998;175:330-333.
16. Leroy J, Fromont G. Inguinal hernia in adults. Subperitoneal prosthesis under celioscopic control. *Chirurgie.* 1995;120:27-32.
17. Ferzli G, Sayad P, Hallak A, Huie F, Usal H, Hayek N. Endoscopic extraperitoneal hernia repair. Five years experience. *Surg Endosc.* 1998;12:1311-1313.
18. Ferzli G, Sayad P, Vasisht B. The feasibility of laparoscopic extraperitoneal hernia repair under local anesthesia. *Surg Endosc.* 1999;13:588-590.

Presented at the 2nd Meeting of the American Hernia Society, Las Vegas Nevada, February 21, 1999.