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Laparoscopic hernioplasty: A ten year experience

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Abstract

Since laparoscopic hernioplasty was first introduced 10 years ago, the technique has matured and changed. This article reviews the experience of a single laparoscopic surgeon practicing laparoscopic hernia repair during this period. It describes the techniques used in his center for hernia repair and the results of over 2000 repairs. Suggestions are made in an effort to improve overall results in the future.

Key words: Hernioplasty, laparoscopy.

Resumen

Desde que la hernioplastia laparoscópica fue introducida hace 10 años, la técnica ha madurado y cambiado. Este artículo revisa la experiencia de un solo cirujano laparoscopista que practica la reparación laparoscópica de la hernia inguinal durante este periodo de tiempo. Describe las técnicas utilizadas en su centro para reparación de hernia y los resultados de más de dos mil reparaciones. Se hacen sugerencias en un esfuerzo para mejorar los resultados globales en el futuro.

Palabras clave: Hernioplastía, laparoscopia.

INTRODUCTION

In 1991, I began my study of laparoscopic hernia repair. At that time I was using a tension free repair modeled after the Lichtenstein repair,[1] but did not see the minimal morbidity and rapid recovery described by its creators. Encouraged by the, early work of Shultz,[2] I thought that a laparoscopic approach offered a theoretical advantage over open repairs. Because the repair utilized laparoscopic techniques that decreased recovery for other open procedures and was based on an open posterior mesh buttressed approach that had a low recurrence rate,[3] I felt that laparoscopic hemioplasty would reduce recovery time and still have minimal recurrence.

My first laparoscopic approach was patterned after the Nyhus posterior repair,[4] but accessed the extraperitoneal space via a transabdominal laparoscopic route.[5] From the beginning, the dissection was extremely aggressive and the size of the patch was large.[6] Other investigators were initially critical, because they felt the complication rate from such extensive laparoscopic dissection would be too great. In fact, the opposite proved to be true. The key to success for laparoscopic hernioplasty is wide dissection of the entire inguinal floor and repair of all three potential hernias with a large polypropylene mesh.[7] With experience over the last ten years, my approach has been modified and refined to further improve results and decrease the incidence of complications. The majority of repairs performed by my center each year is now performed using a totally extraperitoneal approach.

Although laparoscopic hernioplasty remains controversial in the minds of some surgeons, there is now no doubt that in experienced hands the approach does what it was designed to do. Recurrence rates of less than less than 1% are possible[7-10] and complication rates are comparable to open repairs.[11-13] In some reviews results have not been as good.[14-16] The reason for this difference may be that laparoscopic hernioplasty is an extremely difficult operation to master with a long learning curve.[17] To achieve the desired results, a surgeon must be an experienced laparoscopist, have a comprehensive knowledge of the anatomy, and perform enough procedures under the guidance of a skilled laparoscopic hernia surgeon to overcome the learning curve. Many of the studies[16] comparing laparoscopic hernioplasty to more conventional tension free repairs have failed to show any difference, because the surgeons performing the laparoscopic repairs were early in the learning curve. Average laparoscopic operative times of 60 and 90 minutes in these studies demonstrates that the surgeons in these randomized trials had not quite perfected the laparoscopic technique.

Choosing when to perform a laparoscopic hernia repair may be as important as how to perform it. Complications can be reduced or potentially eliminated by choosing the right procedure for each patient and hernia. Early in my experience virtually all patients with groin hernias who were good candidates for general anesthesia[5] were accepted. With experience, I have learned that patients who potentially have an obliterated extraperitoneal space due to previous pelvic sur-

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Table 1.

Hernia	Tep	Tapp
Simple	*	
Bilateral	*	
Large scrotal		*
Incarcerated		*
Recurrent	*	*
Diagnostic		*
Previous pelvic incision		*
Transverse		*
Midline	*	

gery, such as radical prostatectomy or radiation should undergo an anterior tension free repair rather than a laparoscopic repair. Also patients that have had extensive intrabdominal pelvic infections may have bowel adherent to the posterior wall, making any attempt to gain access to the extraperitoneal space too risky.[11] Choosing which laparoscopic repair, tapp or tep, may also influence the outcome. Some hernias may he better repaired via an extraperitoneal route while others via a tapp approach *(Table 1)*.

There has been a recent trend away from a transabdominal preperitoneal (tapp) approach and toward a totally extraperitoneal (tep) repair. It is essential that surgeons understand both techniques however, since some tep repairs need to be converted to tapp repairs to be completed successfully[11] and others are best begun as tapp repairs as described in *table 1*. No matter which approach, tapp or tep, is utilized there are certain basic principles that must be followed. In a multi-centered study authored by 7 centers experienced in laparoscopic hernioplasty including my own, 4 basic principles were found that were common to successful laparoscopic hernioplasties; the entire posterior floor was dissected, the mesh covered the entire posterior floor, the mesh was anchored to the floor, and the mesh was completely covered by peritoneum. In addition, there are specific techniques that I have found helpful during the last ten years in performing over 2000 laparoscopic repairs.

TEP

The tep hernioplasty is begun with the surgeon standing on the side of the patient opposite the dominant hernia. A small transverse incision is made just below the umbilicus off the midline on the side of the hernia. Using "S" retractors the anterior fascia is identified and incised with an eleven blade. The rectus muscle is retracted laterally, exposing the posterior rectus sheath. A balloon dissector simplifies the dissection and is slid along the posterior sheath until the pubis is palpated. If resistance is met, the procedure is converted to a Tapp approach to prevent tearing the peritoneum inadvertently. After the central extraperitoneal space is created by the dissector, a Hasson trocar is placed and the CO_2 infused at 10-12 mm of mercury pressure. Two 5 mm trocars are placed in the midline under direct vision. The first is placed as close to the Hasson as possible and the second three finger breaths below the first. If the lower trocar is placed too close to the pubis, it will interfere with mesh placement.

Dissection begins with identification of Cooper's ligament and the inferior epigastric vessels, both landmarks essential to continuing safe dissection of the direct, indirect and femoral spaces. If a direct hernia is present it is reduced by gentle traction on the sac. Care is taken not to injure the bladder if it is incarcerated in the hernia. After the direct hernia is reduced or the direct floor adequately cleaned of fat to determine that there is no direct hernia, the lateral space is opened by sweeping the dissector downward just lateral to the inferior epigastric vessels. The peritoneal sac or edge is identified at this point. The lipoma of the cord is lateral to the testicular vessels and must be reduced to prevent recurrence. It should be stripped off the cord structures and placed in the retroperitoneum above the dissection. The sac is then completely dissected off the vas deferens and testicular vessels as originally described by Stoppa.[3] If a hole is made in the sac it is ligated with an endoloop at this time. The surgeon must identify the iliopubic tract at this point. If it is still covered with fat, a lipoma remains in the canal and needs to be reduced.

After the entire posterior floor has been dissected including the femoral space, the mesh is cut to fit the floor. The mesh is trimmed from a flat 6 by 6 inch polypropylene mesh. It usually measures approximately at least 5 x 4 1/2 inches, but may he as large as 6 x 6 inches, and is always wider on its medial half. The mesh overlaps the pubis, crosses the midline and extends far lateral to the internal ring. It is anchored to Cooper's ligament, the transversalis fascia above the direct space, and lateral to the inferior epigastric vessels above the iliopubic tract. One hand is placed on the abdominal wall to feel the tacker or stapler as it is pressed against the wall. This maneuver prevents misfiring anchors below the iliopubic tract into the area of the lateral cutaneous, femoral branch of the genitofemoral or femoral nerves. Care however, must also he taken not to push the tacker too firmly into the wall. In a thin patient, tacks placed too deeply can catch the ilioinguinal and iliohypogastric nerves causing severe localized abdominal wall and groin pain. More recently I have used a preformed mesh that fits the pelvis and does not require anchoring. So far in approximately 50 patients no recurrences have developed with a six-month follow-up.

When the surgeon is satisfied that the mesh is in place without folds or wrinkles, the CO_2 is evacuated. Because the most common cause of failure of a laparoscopic hemioplasty is lateral lifting of the mesh by the peritoneum,[7] the gas is evacuated

slowly while the inferior lateral corner of the mesh is held down. The peritoneum expands slowly over the mesh, holding it in place rather than elevating it. The 10 mm fascial incision is closed and local anesthesia injected around the incisions if it was not placed at the beginning of the procedure.

TAPP

The Tapp repair is technically easier to perform than the tep, because the working space is larger, the anatomy more easily recognized and the laparoscopic technique more familiar to most laparoscopic surgeons. There are potential risks when violating the peritoneal cavity such as trocar injuries to the viscera or vessels, therefore, care needs to he used to avoid potential trocar complications. Once the 10 mm umbilical trocar and two lateral 5 mm trocars at the level of the umbilicus are in place, the hernia is reduced by gentle traction on the omentum or bowel. The incision in the peritoneum is made from lateral to medial, well above the internal ring. The lower peritoneal flap is dissected off the wall and the peritoneal sacs are reduced. If the indirect sac is extremely adherent to the cord structures or difficult to reduce, it is opened on its superior lateral edge in order to avoid injury to the cord structures and then dissected free of the cord. After the sac is completely dissected off the cord it is ligated.

The floor dissection and repair are continued as described for the tep. If necessary a double-buttressed repair is employed as described in my first published reports of laparoscopic hernioplasty,[5,6] using a piece of mesh with a slit for the cord covered by a second mesh. Now this technique is reserved for only extremely large or difficult hernias when the cord structures tent the mesh upwards potentially causing a recurrence. Once the floor is repaired, the peritoneum is completely closed with a running suture to prevent entrapment of bowel or exposure of bowel to mesh.

RESULTS

Laparoscopic hernioplasty has definitely undergone a gradual evolution over the last ten years. From an experimental repair,[2] it has become a reliable hernioplasty with an extremely low recurrence rate and low morbidity.[7-10] Experienced laparoscopic surgeons have demonstrated that laparoscopic hernia repair is safe and offers the appropriate patient a viable alternative. My own results have mirrored those of other experienced laparoscopic surgeons. In over 2100 repairs performed under general anesthesia there have been no anesthetic complications. The recurrence rate is less than 1% (9 out of 2140) with a median follow up of 6 years and the over all complication rate is similar to comparable reviews of open hernioplasties.

Even though some of the most ardent opponents to laparoscopic hernia repair now admit that the approach is useful,[18] it is doubtful whether laparoscopic hernia repair will ever become as popular as simpler open tension free repairs. Laparoscopic repairs must be reserved for those surgeons willing to under go the extensive education required to perfect the approach and overcome the learning curve.

There is sure to be future refinements of the laparoscopic approach. Laparoscopic hernioplasty without fixation,[9] the most recent, may increase the techniques popularity. This approach reduces cost slightly and reduces the potential for nerve injury. In my mind as well as others[18,19] further studies are required to prove that recurrence rates won't be increased in the hands of most surgeons when the mesh is not fixed to the wall. Preformed meshes may solve this potential problem. To continue to improve our results, however, we must continue to examine this and other new techniques and make changes to our approach as proven appropriate.

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