Mini-Hernia: Inguinal Hernia Repair through a 2-cm Incision

CHARLES C. NDUKA, B.A., M.B. B.S., RESEARCH FELLOW
ARA DARZI, M.D., F.R.C.S., F.R.C.S.(I.), CONSULTANT SURGEON
DEPARTMENT OF MINIMAL ACCESS SURGERY
ST. MARY'S HOSPITAL
LONDON, ENGLAND

The optimal management of inguinal hernia continues to excite lively debate and, despite centuries of research, the ideal approach has yet to be established.[1] The traditional repairs of McVay, Bassini, and Shouldice involve suturing together tissues that are not normally in apposition.[2-4] This approximation of tissues under tension may account for the reported recurrence rates of up to 21% for primary repairs[5-9] and also explain the lengthy, painful recovery periods. Laparoscopic hernia repair has demonstrated good short-term results[10-13] but is technically demanding, requires violation of the peritoneal cavity, and has unknown long-term results. Between October 1993 and April 1995, we performed 103 hernia repairs using a novel approach, the mini-hernia repair (endoscopically guided surface repair of inguinal hernia).[14] This technique allows the benefits of an open surgical approach such as hands-on manipulation, three-dimensional vision, a familiar anatomical approach, and the use of conventional instruments, to be combined with the advantages derived from the use of laparoscopic instrumentation, namely, minimized tissue trauma and improved cosmesis.

OPERATIVE TECHNIQUE

The procedure is performed in a day-case surgery unit under local or general anesthesia. The patient is placed in a supine position and draped as for an open hernia repair. A 2-cm incision is made in the skin at the level of the internal inguinal ring (Fig. 1). The subcutaneous tissues are bluntly dissected down to the external oblique aponeurosis and a 1-cm incision made in it parallel to its fibers. An index finger is inserted into the inguinal canal to separate the external oblique aponeurosis from the spermatic cord down to the level of the external inguinal ring (Fig. 2).

To allow retraction of the abdominal wall for visualization of the inguinal canal, the use of an abdominal wall lift is required. The Laparolift™ (Origin Medsystems, Inc., Menlo Park, Calif.) was originally designed for gasless laparoscopy and consists of a hydraulic arm and a telescoping arm that extends over the patient's abdomen. The

Laparofan™ (Origin Medsystems, Inc., Menlo Park, Calif.) is a device possessing fan blades which are spread following insertion into the abdominal incision, thus allowing tenting of the abdominal wall.

The finger is withdrawn and a 10-mm Laparofan is inserted into the inguinal canal under direct vision. The fan retractor blades are spread and locked into an open position and the device attached to the Laparolift. The arm is raised to retract the abdominal wall and create a working space in the inguinal canal. A 5-mm laparoscope, connected to routine videoimaging equipment is inserted into the inguinal canal (Fig. 3). This arrangement allows the inguinal canal to be visualized directly using light from the laparoscope, and also allows a magnified image of the canal to be viewed on the monitor (Fig. 4).

Conventional grasping and dissecting instruments are inserted into the canal and the spermatic cord mobilized from the floor of the inguinal canal. The spermatic cord is grasped and a "window" is created just beneath the vas to allow an avascular plane to be developed in the mesentery between the inferior cremaster fibers and the spermatic cord. When elevating the spermatic cord, great care should be taken to include the external spermatic vessels and the ilio-inguinal nerve with the cord. This ensures that the genital nerve is preserved.

Following mobilization of the cord from the floor of the inguinal canal, the laparoscopic fan retractor is removed and the spermatic cord delivered through the skin incision. An incision is made in the spermatic cord and its contents are inspected for the presence of a hernial sac. Where a sac is identified, it is mobilized, divided, and the peritoneal end sutured. The laparoscopic fan retractor is re-inserted and placed below the spermatic cord and the external oblique aponeurosis. The retractor is once again raised, thus providing good exposure of the inguinal canal.

A sheet of monofilament polypropylene mesh (AutoSuture Company, Ascot, U.K.) measuring 8 by 16 cm is fashioned. If necessary, this may be trimmed by 1 to 2 cm to match the varying sizes of the inguinal floor. The mesh is inserted into the inguinal canal under laparoscopic guidance using two anchoring sutures (Fig. 5). Using the VersaTack™ stapler (AutoSuture Company, Ascot, UK), the mesh is then anchored medially to the rectus sheath, the internal oblique aponeurosis or muscle above, and to the inguinal ligament below (Fig. 6). Care must be taken to avoid entrapment of, or damage to, the iliohypogastric nerve. A slit in the mesh at the internal ring allows emergence of the spermatic cord and creates two tails. The tails of the mesh are crossed over without tension and wrapped around the cord and stapled to Poupart's ligament lateral to the inguinal ring. The crossing of the two tails produces a configuration similar to that of the normal transversalis fascia sling, which is assumed to be largely responsible for the normal integrity of the internal ring. After the mesh has been secured in place and the retractor is released, the mesh should buckle slightly. This laxity is desirable to ensure a true tension-free repair and is

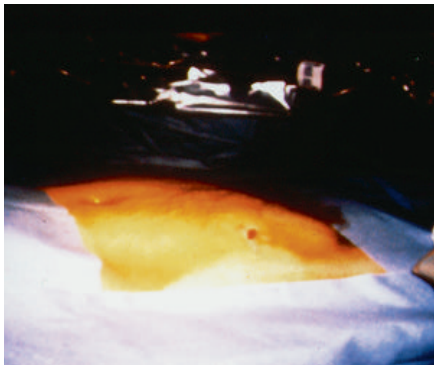

Figure 1. Two-centimeter incision at the level of the internal ring.

Figure 2. After blunt dissection with a finger, manual retraction is used prior to insertion of the abdominal wall retractor.

Figure 3. The abdominal walll retractor creates a working space within the inguinal canal. The anatomy can be directly visualized with the aid of the endoscope.

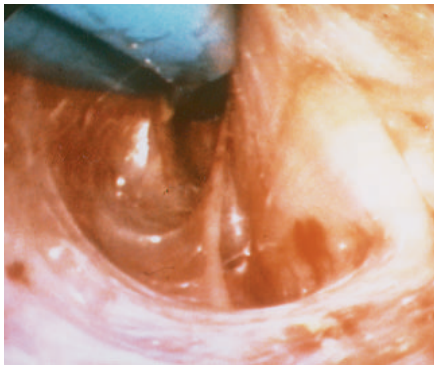

Figure 4. Endoscopic view of the inguinal canal showing the ilioinguinal nerve at the centre of the picture. The arms of the retractor are at the top of the picture.

Figure 5. Insertion of the mesh. Its position is verified endoscopically before it is stapled in

Figure 6. The mesh is stapled to the rectus sheath, internal oblique aponeurosis, and inguinal ligament.

taken up when the patient strains postoperatively.

The external oblique aponeurosis is closed over the cord using a single absorbable chromic suture. The wound is sprayed with antiseptic solution and the skin closed with a single suture or wound closure tape. Patients are discharged within 24 hours of the operation with minimal postoperative pain for which mild analgesics are prescribed. Unrestricted activity is encouraged.

RESULTS

Patients were aged 35 to 73 years (median age 51), and all had primary reducible hernias. The mean operative time was 39 min (range: 31 to 58 min). An indirect sac was identified and excised in 77 out of 103 cases. All of the patients left the hospital on the day following surgery and resumed normal activity in between 2 and 10 days. There have been no recurrences to date (follow-up period: 0 to 18 months). Complications were three scrotal swellings, which were managed conservatively, and one seroma which was aspirated.

CONCLUSIONS

Direct stereoscopic visualization and tactile feedback have long been the basis of surgical technique, instrumentation, and teaching. The introduction of modern videoimaging technology and improved instrumentation have been largely responsible for the widespread application of laparoscopic surgery. Old problems have been reappraised in the light of this new technology which, in the case of cholecystectomy, has revolutionized surgical therapy. However, new technology can also introduce new problems. Although laparoscopy is generally a safe procedure, its application to hernia repair has potentially introduced a number of serious complications.[15-17] These include injuries to the urinary bladder, major nerves, intestine, or major vessels, all of which are more likely as a result of the intra-abdominal approach. Laparoscopy also necessitates a general anesthetic, may be unsuitable in patients with cardiorespiratory disease,[18] and may be associated with postoperative small bowel obstruction associated with trocar site hernia[16] or adhesions.[19] Thus despite some good early reports and favorable small-scale studies,[12,13] the prudence of this approach is still in question.

Given its excellent long-term results (recurrence rates of less than 1%) and low complication rates,[20] many consider the Lichtenstein tension-free repair as the "gold standard" for modern hernia repair. Most importantly, it can be performed under local anesthetic using a familiar anatomical approach without violating the peritoneal cavity. However, the Lichtenstein repair still requires an incision of up to 10 cm and division of the external oblique aponeurosis. In contrast, the mini-hernia repair requires an incision of only 1 to 2 cm through the skin and external oblique to allow access to the inguinal canal. As the mini-hernia repair shares the same theoretical principal as the Lichtenstein repair, one may expect similar excellent long-term results. But because it can be performed through a much smaller incision, it is hoped that there will be reduced wound pain and better cosmesis without the cost or hazards of an intraperitoneal approach. Comparative studies are warranted to confirm the efficacy of this procedure. Nevertheless, our early experience indicates that the mini-hernia repair may represent an important advance in minimally invasive hernia repair. STI

REFERENCES

1. Hill ADK, Darzi A. Inguinal hernia: background and history. In: Darzi A, Monson JRT, eds. Laparoscopic inguinal hernia repair. Oxford: ISIS Medical Media; 1994. p 1-5.
2. McVay CB. Inguinal and femoral hernioplasty: anatomical repair. Arch Surg 1948;57:524.
3. Bassini E. Spora 100 casi di cura radicali dell'ernia inguinale operata col metodo dell'autore. Arch Atti Soc Ital Chir. 1888;5:315.
4. Shouldice EE. The treatment of hernia. Ontario Medical Review 1953;1-14.
5. Wantz GE. Shouldice repair. Cont Surg 1988;33:15-21.
6. Sisley JF, Scarbourough CS, Morris RC, et al. Shouldice hernia repair: results of a teaching institution. Am Surg 1987;53:495-6.
7. Cahlin E, Weiss L. Results of postoperative clinical examination of inguinal hernia after three years. Acta Chir Scand 1980;146:421.
8. Asmussen T, Jensen FV. A follow-up study on recurrence after inguinal hernia repair. Surg Gynecol Obstet 1983;156:198.
9. Ingimersson O, Spak I. Inguinal and femoral hernias: long-term results in a community hospital. Acta Chir Scand 1983; 149:291.
10. Ger R, Monroe K, Duvivier R, et al. Management of indirect inguinal hernias by laparoscopic closure of the neck of the sac. Am J Surg 1990;159:320-3.
11. Ger R. The laparoscopic management of groin hernias. Cont Surg 1991;39:15-9.
12. Stoker DL, Spiegelhalter DJ, Singh R, et al. Laparoscopic versus open inguinal hernia repair: randomised prospective trial. Lancet 1994;343:1243-5.
13. Wilson MS, Deans GT, Brough WA. Prospective trial comparing Lichtenstein with laparoscopic tension-free mesh repair of inguinal hernia. Br J Surg 1995;82:274-7.
14. Darzi A, Bouchier-Hayes D, Menzies-Gow N, et al. Endoscopically guided surface repair of inguinal hernia. Br J Surg 1995; 82:515-7.
15. Sewell RW, Waddell RL. Comlications of laparoscopic inguinal hernia repair. In: Arregui ME, Nagan RF, eds. Inguinal hernia repair: advances or controversies. Oxford: Radcliffe Medical Pr; 1994. p 489-93.
16. Phillips E, Carroll B. Laparoscopic inguinal hernia repair. Gastroint Endosc Clin North Am 1993;3:297-307.
17. MacFadyen BV Jr, Arregui ME, Corbitt JD Jr, et al. Complications of laparoscopic inguinal hernia repair. Surg Endosc 1993; 7:155-8.
18. Holzman M, Sharp K, Richard W. Hypercarbia during carbon dioxide insufflation for therapeutic laparoscopy: a note of caution. Surg Laparosc Endosc 1992;2:11-4.
19. Arregui ME, Navarrete J, Davis CJ, et al. Laparoscopic inguinal herniorrhaphy: techniques and controversies. Surg Clin North Am 1993;73:513-27.
20. Lichtenstein IL. Herniorrhaphy: a personal experience with 6321 cases. Am J Surg 1987;153:553-9.