

Outcome of laparoscopic inguinal hernia repair in a South African private practice setting

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Objectives. The aim of this study was to determine the recurrence and complication rates of laparoscopic inguinal hernia repair performed in a private practice in Cape Town.

Design and subjects. An unselected cohort of 507 patients who underwent laparoscopic totally extraperitoneal (TEP) inguinal hernia repair before September 2005 were included in this study, thus ensuring a minimum 5-year follow-up. Patient demographic data, clinical notes, operating notes and outpatient follow-up notes were studied. Patients were interviewed telephonically regarding hernia recurrence, chronic pain and technique preference if they had previously undergone an open repair. All data collected were recorded on an electronic spreadsheet. The primary outcome parameter was recurrence. The secondary outcome parameters were postoperative and long-term complications.

Results. Of the 507 patients, 267 were contactable telephonically. There were 384 hernia repairs with a mean follow-up of 8.8 years. There were 9 recurrences (2.3%). The overall complication rate was 7.9%. Two per cent of patients suffered from chronic groin pain with gradual improvement since surgery. Sixteen per cent of patients had had previous open repair of an inguinal hernia, either on the ipsilateral or the contralateral side, and all judged the open repair to have been more painful.

Conclusions. The recurrence and complication rates for laparoscopic TEP inguinal hernia repair in this practice are low and comparable to the best reported series. There is a low incidence of persistent postoperative pain with the laparoscopic technique, and it is the technique preferred by patients who previously underwent an open repair.

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Laparoscopic inguinal herniorrhaphy was first described by Ger in 1982.¹ Proponents of this technique have claimed several advantages over open repair: less postoperative discomfort or pain; reduced recovery time and earlier return to full activity; easier repair of a recurrent and bilateral hernia, fewer wound complications, and improved cosmesis.

A Cochrane review in 2003² showed recurrence rates for laparoscopic and open repair to be equivalent. It also concluded that laparoscopic techniques were associated with longer operating times (about 15 minutes longer), and a lower incidence of haematomas, wound infection and persisting pain and numbness. However, there was a higher incidence of seromas, vascular injuries and visceral injuries (predominantly bladder, but also stomach, small bowel and postoperative bowel obstruction). Patients undergoing laparoscopic repair were found to have a faster return to usual activities (by about 7 days).

It is not universally accepted that these advantages have been achieved, and concerns remain about increased expense, the need for a general anaesthetic and the risk of organ damage in the trans-abdominal pre-peritoneal (TAP) approach.³

The purpose of this study was to evaluate laparoscopic herniorrhaphy in a large private practice healthcare setting. The primary outcome was hernia recurrence. Complications and chronic pain were secondary measures. To our knowledge, this is the first audit of laparoscopic hernia performed in this country.

Methods

In this practice, all patients' records are stored using electronic practice management software called MedScreen. This specifically designed, non-commercial practice management system contains a complete clinical and management record for over 200 000 general surgical patients over more than 20 years. All patient details (demographic, clinical, operative details, *International Statistical Classification of Diseases and Related Health Problems*, 10th revision (ICD-10) codes, procedural codes and billing records) are entered contemporaneously into the database, ensuring complete retention of all consultation notes and operative records. Patients for the study were identified using ICD-10, procedural and billing codes, providing a high level of accuracy of data retrieval in this retrospective study. Selected details of 850 consecutive

patients undergoing laparoscopic totally extraperitoneal (TEP) inguinal herniorrhaphy between July 1997 and July 2010 were identified. To obtain follow-up of at least 5 years, 507 patients who underwent repair before September 2005 were selected for a telephonic interview.

Information was obtained during telephonic interviews by two medical students with no affiliation to the practice, who were supervised by the first author. Each patient was asked a standard question set recorded on a standard proforma. Questions included whether the hernia had recurred, with or without confirmation by a doctor; whether they had had ongoing groin pain since surgery; and whether the pain was restrictive. The pain was not scored. Patients who had previously undergone open repair were asked which technique was more painful.

Data recorded from the patient's electronic record included information from the clinical notes, the operation notes and follow-up visits (Table 1).

Ethical approval for the study was obtained from the Ethics Committee of the University of Cape Town.

The primary outcome of the study was recurrence of the hernia. Secondary outcomes were complications as assessed by the operating surgeon intra-operatively and at follow-up visits.

Chronic pain was assessed subjectively as described above.

Laparoscopic hernia repairs were performed by six surgeons working in three centres. The study patients included the learning curve of all six surgeons, which may be considered to be between 60 and 80 procedures.^{4,5} The group's initial proctor was surgeon 04, who had experience of over 70 procedures before beginning to proctor. This resulted in a high level of homogeneity among the surgeons with regard to operative TEP technique; for example, a spiral tacker was routinely used by all surgeons. However, this did not apply to mesh selection, which was not standardised for type and size.

Results

Patient demographics and hernia characteristics are shown in Table 1. A complete telephonic interview was conducted on 267 of the 507 patients in the original cohort. The remaining 240 patients were not contactable or declined to be interviewed. The patients' ages ranged from 22 to 92 years with a mean of 63 years, and 98% were males. Their age distribution is depicted in Fig. 1. The mean follow-up was 8.8 years, ranging from 5.3 to 14 years.

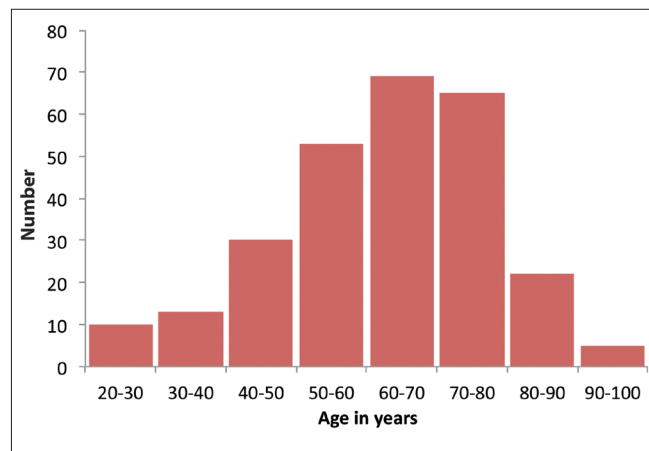


Fig. 1. Age distribution.

A total of 384 hernias were repaired; 48% of patients had bilateral hernias. There were more right-sided than left-sided hernias. Twenty-six of the hernias operated on were recurrences after previous conventional open repairs. Indirect hernias were found to be more common than direct hernias. Two hernias were irreducible at the time of surgery, 1 of which required conversion to open repair.

Table 1. Patient demographics and hernia characteristics

| | |
|---|----------------|
| Number, <i>N</i> | 267 |
| Age (years), mean (range) | 63 (22 - 92) |
| Gender, <i>n</i> (%) | |
| Male | 263 (98) |
| Female | 4 (2) |
| Follow-up (years), mean (range) | 8.8 (5.3 - 14) |
| Number of hernias, <i>N</i> | 384 |
| Side of hernia, <i>n</i> (%) | |
| Left | 60 (22) |
| Right | 79 (30) |
| Bilateral | 128 (48) |
| Type of hernia, <i>n</i> (%) | |
| Indirect | 230 (60) |
| Direct | 128 (33) |
| Recurrent | 26 (7) |
| Irreducible hernias, <i>n</i> (%) | 2 (0.5) |
| Previous open repair (ipsilateral or contralateral), <i>n</i> (%) | 43 (16) |
| Previous appendicectomy, <i>n</i> (%) | 12 (5) |

Sixteen per cent of patients had had a previous open repair of an inguinal hernia, either on the ipsilateral or the contralateral side. These patients were asked which procedure had been more painful, and all of them reported more pain after the open repair.

Five per cent of patients had had a previous appendicectomy. None of these patients required conversion to open repair or had a recurrence of their hernia.

Among the 384 hernias repaired, there were 9 recurrences (2.3%) (Table 2). Six recurred within the first year, and there were 3 late recurrences which occurred after 8, 10 and 13 years, respectively.

There were 27 complications (7.9%) (Table 2), the most common being chronic groin pain and postoperative seromas. All 8 patients with chronic groin pain reported gradual improvement after surgery and none considered the pain restrictive at the time of interview. On reviewing the case records of these patients, in none of them did the surgeon attribute the pain to the fixation tack. Postoperative seromas in 9 patients resolved with conservative management. All patients with postoperative umbilical port-site cellulitis were managed satisfactorily with antibiotics with no re-intervention. There were 3 umbilical port-site hernias. Two operations were converted to standard open mesh repairs. A left-sided sliding hernia involving the sigmoid colon could not be reduced laparoscopically. Bleeding sufficient to obscure the anatomy was responsible for the second conversion. Fifty-four hernias (14.0%) were associated with a large lipoma of the cord, and of these patients 2 (3.7%) developed a recurrent hernia. There were no deaths, and no vascular, visceral or testicular complications.

Each surgeon has a practice code number, and the number of repairs by each was as follows: 03 – 2 repairs, 04 – 124, 06 – 55, 08 – 57, 09 – 10 and 10 – 19.

Discussion

Although the techniques of modern tension-free hernia repairs have been developing for more than a century, it was only about

20 years ago that minimally invasive laparoscopic hernia repairs were introduced. In the early 1990s, laparoscopic hernia repair was controversial. Some early studies showed complication rates as high as 17%, and recurrence rates as high as 10%.^{6,7} Since then, laparoscopic techniques have become more standardised, equipment and meshes have improved and surgical experience has increased. This has resulted in lower laparoscopic recurrence and complication rates, so that a 2003 Cochrane review reported equivalent recurrence rates for laparoscopic and conventional open repairs.²

All 6 surgeons in the study performed open repairs for 5 - 25 years before practising the laparoscopic technique. All unreservedly prefer this technique and none would choose to revert to the open technique. The relevance of surgeon preference has never been evaluated as a determinant of outcome in any operation, but surgeon preference has been regarded as being primarily responsible for the wholesale shift to the laparoscopic technique for a variety of procedures such as fundoplication⁸ and cholecystectomy.⁹ In the USA, it was reported in 1990 that the number of laparoscopic cholecystectomies had increased 40-fold over 18 months.⁹

A 2003 Cochrane review of 41 randomised controlled trials involving 7 161 patients found the recurrence rate for laparoscopic repair to be 2.7% and that for open repair to be 3.1% ($p=0.16$).² Some of these trials had follow-up periods of only 6 weeks. In our study the recurrence rate of 2.3% with a follow-up of more than 5 years is similar to this Cochrane review. Several studies use complication rates as the primary or secondary focus of their analyses.^{7,10-15} Complication rates vary from 4% to 39%, lack of standardisation playing a major role in the variability. Some combine perioperative with long-term complications and include everything from constipation to urinary retention. Others list only perioperative events and are less liberal with the labelling of a complication. In this study the complication rate was comparatively low (7.7%) and

Table 2. Recurrences and complications

| | |
|-------------------------------|----------|
| Recurrence, n (%) | |
| Immediate | 0 (0) |
| Within 1 year | 6 (1.6) |
| After 1 year | 3 (0.8) |
| Total | 9 (2.3) |
| Mortality, n (%) | |
| | 0 (0) |
| Complications, n (%) | |
| Conversion to open repair | 2 (0.5) |
| Seroma | 9 (2.3) |
| Umbilical port-site infection | 5 (1.9) |
| Umbilical port-site hernia | 3 (1.1) |
| Chronic groin pain | 8 (2.1) |
| Testicular complications | 0 (0) |
| Vascular complications | 0 (0) |
| Visceral injuries | 0 (0) |
| Total | 27 (7.9) |

no serious complications were recorded. Compared with some of the larger series, our incidences of seromas, infections, testicular complications, and bowel and vascular injuries are equivalent or better.^{6,13,14,16,17} The incidence of port-site hernias is infrequently reported in the literature. The incidence in some of the larger series ranges from 0.1% to 0.5%, which is lower than our rate of 1.1%.^{2,13,16}

The reasons for recurrence are technical, the two most common causes being incomplete dissection of the myopectineal orifice and inadequate mesh size.¹⁸ The average mesh size in patients who had a recurrence in the trial by Fitzgibbons and colleagues was 6.0×9.2 cm.⁶ It is now generally accepted that mesh size should be at least 10×14 cm to ensure coverage of all potential hernia sites and provide at least 4 cm overlap of the hernia, in order to minimise recurrences associated with mesh migration, shrinkage and rolling.¹⁹ Mesh size was not recorded in our study database. Mesh fixation with staples or tacks is widely practised to prevent migration, but it has also been associated with persistent pain and increasing cost. Two randomised trials showed no difference in recurrence rates or persistent pain after repairs using fixation or no fixation.^{20,21}

The learning curve for laparoscopic repair is lengthy. A 2005 Cochrane review identified seven learning curve studies which indicate that it takes between 30 and 100 procedures to become experienced in performing laparoscopic hernia repairs, although in the majority of the studies the figure was closer to 50.²² Our study included the learning curve for all six surgeons, yet the results were still good. The reasons for this may be the consistent proctorship in this group, the surgeon's assistant usually being another member of the group, as well as a standardised technique shared by all six surgeons.

Laparoscopic repair has several advantages over open repair, the most obvious being reduced pain, fewer wound complications and earlier return to normal activities. There is wide variability in the reporting of postoperative pain, making it difficult to compare between studies, but most report less pain after laparoscopy.^{10-12,14,15,23,24} Chronic persisting pain is more debilitating. It may be due to nerve entrapment during the fixation of the mesh in open and laparoscopic techniques. The 2003 Cochrane meta-analysis and a recent randomised controlled trial looking at chronic pain as a primary outcome found less chronic pain after laparoscopic repair.^{2,25} The reporting of chronic pain in our study was subjective and depended on the accuracy of patient's recall given the long period of follow-up, but our rate of 2.1% parallels those in the current literature.

Strengths of this study include the quality and completeness of the record keeping in the practice computerised management system, resulting in a high level of accuracy in the data points recorded; an adequate follow-up of at least 5 years; and the study being multicentre with multiple surgeons using a homogeneous technique. Weaknesses include the study being retrospective; the follow-up being telephonic; a significant number of patients originally included in the study not being contactable; and the absence of recording of operation times, mesh details, and duration of hospital stay.

Conclusion

The recurrence and complication rates for laparoscopic TEP inguinal hernia repair in this practice are low and are comparable with the best series reported in the literature, despite the inclusion of the surgeons' learning curves. This is the first audit of laparoscopic herniorrhaphy in South Africa and confirms a low

incidence of persistent postoperative pain. This is the technique preferred by patients who previously underwent an open repair.

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