

Comparison of Outcomes of Open Tension-free Mesh Repair and Totally Extraperitoneal Laparoscopic Repair of Inguinoscrotal Hernias

Shazi Bhekithemba, Koto Modise, Osuagwu Chukwuemeka, Schoeman Hermanus

Department of Surgery, Sefako Makgatho Health Sciences University, Pretoria, 0204, South Africa

Correspondence to: Dr. Shazi Bhekithemba; email: shazibhekithemba@gmail.com

Received: 28 April 2020; Revised: 04 July 2020; Accepted: 25 July 2020; Available online: 31 July 2020

Abstract

Background: This study aimed to determine the differences in postoperative complications experienced by patients with inguinoscrotal hernia after laparoscopic versus open repair, and the association of risk factors to development of postoperative complications. **Methods:** We retrospectively reviewed the charts of all patients with inguinoscrotal hernias who had either Lichtenstein repair or totally extraperitoneal laparoscopic (TEP) repair from January 2014 to December 2017. **Results:** The study was performed on evaluable data that could be extracted for 49 patients: 14 were offered TEP repair and 35 Lichtenstein repairs. There was no statistical difference in the mean operative time and mean time taken to return to normal activities between the two groups. The length of hospital stay was one day for both groups. Two patients from the TEP repair group and one patient from the Lichtenstein repair group developed

recurrence. Three patients from the TEP group and one patient from the Lichtenstein repair group developed chronic groin pain. One patient from the totally extraperitoneal laparoscopic repair group developed a seroma. **Conclusion:** Our study demonstrated a trend towards better postoperative outcomes in the Lichtenstein repair group than in the TEP group.

Keywords: Open tension-free mesh repair, Totally extraperitoneal laparoscopic repair, Inguinoscrotal hernias

Ann Afr Surg. 2021; 18(1):29–33

DOI: <http://dx.doi.org/10.4314/aas.v18i1.6>

Conflicts of Interest: None

Funding: None

© 2021 Author. This work is licensed under the Creative Commons Attribution 4.0 International License.

Introduction

Inguinal hernia is a common surgical condition with a reported incidence of 1.5–5% of the population (1). The natural history of inguinal hernia is either incarceration or strangulation. Patients with an indirect inguinal hernia who present late are also likely to have an inguinoscrotal hernia. In a setting where there is no significant delay in providing repair to patients who present to a healthcare facility early with an indirect inguinal hernia, one should expect to find very few patients who present with inguinoscrotal hernias. Thus, few studies from developed countries looked at inguinoscrotal hernias.

Inguinal hernia repair can be performed as an open procedure or laparoscopically. Some of the surgical techniques for open inguinal hernia repair include Bassini, Shouldice, McVay and Lichtenstein. Lichtenstein repair is the most common open technique that uses mesh to repair an inguinal hernia. It is regarded as the gold standard and the most commonly performed open repair at Dr George Mukhari Academic Hospital, South Africa. Laparoscopic repair can be either totally extraperitoneal laparoscopic repair (TEP) or transabdominal preperitoneal repair (TAPP). TEP is the

preferred laparoscopic method of repair at our institution. The best method of repairing inguinal hernias has remained a controversial topic. However, TEP repair is superior in terms of less postoperative pain and early recovery in inguinal hernias (1).

Before Lichtenstein repair became the standard operation in the management of inguinal hernias, recurrence of post tissue repair was as high as 50–60% but came down to approximately 1–4% with the use of mesh (2). However, some believe that tissue repair, such as Shouldice repair, also produces excellent results in high-volume centers. Other postoperative complications after inguinal hernia repair include seroma, chronic groin pain and mesh sepsis. TEP repair of inguinal hernia was introduced in 1990. The introduction of laparoscopy in the management of inguinal hernia is regarded as another important development in the search for an ideal method of repairing inguinal hernia. Laparoscopy appears to have short-term advantages than Lichtenstein repair (3). However, TEP repair has been found to be costlier than Lichtenstein repair (4). Studies comparing the two approaches are more on inguinal hernias and not so much on inguinoscrotal hernias. We performed our study to ascertain if there were differences in postoperative outcomes, especially recurrence, seroma and chronic groin pain, in patients with inguinoscrotal hernia post either laparoscopic TEP repair or Lichtenstein repair, and to determine any association between risk factors and comorbid conditions to postoperative complications.

Patients and Methods

Our study took place at a teaching hospital with 1652 beds. The hospital still relies on a cabinet storage system to keep patients' files. As a result, a significant number of patients' files get lost. Permission to undertake the study was obtained through applying to the Executive Management, and ethical clearance was obtained from the institutional Research Committee.

Our study included all male patients 18 years and older with a unilateral inguinoscrotal hernia who were offered either TEP or Lichtenstein from January 2014 to December 2017. The study was a retrospective cross-sectional chart review. Details of patients who had

undergone repair of an inguinoscrotal hernia were obtained from their files. These included demographic data, comorbid conditions, smoking status, type of repair, operative time, length of hospital stay, time taken to return to normal activities, visceral or vascular complications, and mortalities.

All patients post-repair would be given a 2-week follow up clinic visit where the treating surgeon would enquire about time of return to normal activities and assess the patient for wound complications. Patients were called at 12 months to provide information pertaining to chronic groin pain and recurrence. We defined giant inguinoscrotal hernias as inguinoscrotal hernias that extended beyond the scrotum towards the mid-thigh area. Operative time was calculated in minutes, starting from the time of skin incision to skin closure.

Exclusion criteria included patients with giant inguinoscrotal hernias, recurrent hernias, bilateral hernias, those younger than 18 years of age, those who had had tissue repair (typically done for patients who presented as emergencies where there was a possibility of contamination of bowel contents or translocation of bacteria), and those whose files had incomplete data. Cases regarded as emergencies were those done on patients who presented with life-threatening complications, such as incarceration or strangulation, and as electives in patients who were operated on their appointed dates of surgery without complications.

All elective Lichtenstein repairs were performed under the supervision of one and the same senior consultant, who would do the first case, and after the registrar was shown the procedure would do the rest of the booked cases under the senior consultant's supervision. TEP repairs, on the other hand, were performed by senior surgical registrars or fellows in Minimal Access Surgery rotation and no constant surgeon participated in all the TEP repairs. This should be taken into account when analyzing our findings between the TEP and Lichtenstein groups.

Comparative analysis between the two groups focused on the following outcomes: age, operative time, time to return to normal activities, recurrence, seroma, chronic groin pain, history of smoking, and comorbidities. Outcome variables were summarized by mean and

median values and were compared by the two-sample *t* test and by nonparametric Wilcoxon rank sum test respectively. Percentages were compared using the Fisher Exact test. All statistical procedures were performed on SAS (SAS Institute Inc, Carey, NC, USA), Release 9.4, running under Microsoft Windows for a personal computer. *p* values ≤ 0.05 (5%) were considered statistically significant.

Results

Over the four-year review period, 117 patients had inguinoscrotal hernia. Sixty-eight patients were excluded for the following reasons: one patient had his TEP repair converted to TAPP repair, 2 patients were below 18 years of age, 20 patients had bilateral hernias, and data were incomplete for 45 patients whose duplicate files did not have the operative details after the original files had been lost. Evaluable data could only be extracted for 49 patients. Fourteen of these patients were offered TEP repair and 35 had Lichtenstein repair. The mean ages for the Lichtenstein group and the TEP group were 47.7 years and 45.7 years respectively, which did not differ significantly ($p=0.69$).

Most (63%) of the 49 patients under review had a right-sided inguinoscrotal hernia. The TEP group had more smokers than the Lichtenstein group (57% vs 41%). In the Lichtenstein group, 30% had comorbid conditions such as hypertension and/or diabetes compared with 37% in the TEP group. The operative time was longer in the TEP group than in the Lichtenstein group; however, the mean values of the two groups was not statistically significant ($p=0.43$). The average length of hospital stay was one day for both groups. There were no serious visceral complications or mortalities in either group.

Discussion

Risk factors

Our study did not demonstrate any statistical difference in age or comorbid condition between the two groups ($p=0.69$ and 0.54 respectively). Therefore, these risk factors did not play any role in affecting any of the postoperative outcomes that we looked at in our study. Studies that investigated these risk factors also found similar results (5). However, in one hernia registry, a

higher perioperative complication rate in patients older than 80 years was observed (5). Some of these studies also looked at body mass index, which was not within the scope of this study.

The proportion of smokers was larger in the TEP group than in the Lichtenstein group. Even though statistically this is not significant, difference between the two groups in exposure to smoking is significant. Taking this difference to account and the trend towards the TEP group having more postoperative complications, our study demonstrates some association between smoking and poor postoperative complications in patients with inguinoscrotal hernia.

Operative time

Our finding on operative time was that the laparoscopic approach took longer, but the difference between the mean values of the two groups was not statistically significant. This finding is in line with what is found in literature, as laparoscopic approach is technically more challenging, associated with a longer learning curve and requires general anesthesia (6).

Time taken to return to normal activities

As stated in our results, all our patients were discharged after one day postoperative, regardless of the approach of repair. As expected, patients from the TEP group on average returned to normal activities about a week earlier than those from the Lichtenstein group. This is attributed to known benefits of laparoscopy such as less postoperative pain, early recovery and early return to normal daily activities or work. This difference, however, was not statistically different ($p=0.51$). Our findings reveal the known fact that overall laparoscopic repair is cost-effective in society as patients are able to return to work early, but it is more costly for the hospital when comparing laparoscopic equipment and theatre time associated with it to open repair cases.

Recurrence

The European Hernia Society guidelines recommend either open or laparoscopic repair in men with primary unilateral inguinal hernia, and laparoscopic repair in female patients with primary unilateral inguinal hernia

and in all patients with primary bilateral inguinal hernia. When a recurrence occurs and the previous repair had been laparoscopic, the operation of choice should be open repair; if the previous repair was open, the operation of choice should be laparoscopic repair (6–9). The recurrence rate for Lichtenstein repair in our study was 2.9% and for TEP repair 14%. Such a high recurrence rate, especially for TEP repair, is because of our small sample size. Technique may also have played a role since there was no constant surgeon in the TEP repairs as there was in the Lichtenstein repairs. As we mentioned above under risk factors, smoking could also have contributed to the rate of 14%.

Chronic groin pain

Patients post TEP repair have chronic groin pain incidence of between 2 and 5% (9–11). Some studies suggest that laparoscopic repair is associated with less chronic groin pain (9–11,17), and other studies suggest that both open and laparoscopic approaches are associated with significant chronic groin pain. Our findings were that more patients developed chronic groin pain from the TEP repair than from the Lichtenstein repair. However, this was not statistically significant ($p=0.06$). Many theories try to explain the development of chronic groin pain post inguinal hernia repair, including the role of methods of mesh fixation (sutures or tackers) or involved bony structures, or presence of direct nerve injury during repair during fixation. Again, in our setting, there was no standardized approach to handling the mesh laparoscopically. This could explain why more patients developed chronic groin pain from the TEP repair than from the Lichtenstein repair.

Seroma formation

Lal et al. in their study found 12% of the patients who had been offered TEP repair for inguinal hernia to have developed a seroma (11). Their patients did not have inguinoscrotal hernias but only inguinal hernias. Debate is still ongoing on the best method of performing inguinal hernia repair, one of the most commonly performed operations in surgery (12–16). At least one study concluded that laparoscopic repair of

inguinoscrotal hernias is associated with as much as four-fold increased risk of developing a seroma, while other studies concluded that it was not an approach per se that determines the risk of seroma formation, rather it was the use of prosthetic material that results in local, inflammatory response (20–22). In our study, only one patient from the TEP group developed a seroma.

Limitations

Our study was limited mainly by the small sample size as a result of the loss of most patients' files. Even in some of the files that we could get hold of, the contact numbers on the files were not of actual patients but of relatives who were not staying with the patients we were seeking to follow-up on. Thus, because of lack of a database of hernia repairs done in our institution, we lost a lot of data that could have strengthened our study. There was no standardization with TEP repairs. As a result, there are many confounding factors in trying to explain why this group had such a high recurrence rate than the Lichtenstein group. Another limitation of our study is its retrospective nature with its associated inherent biases.

Conclusion

Our study demonstrated a trend towards better postoperative outcomes in the Lichtenstein repair group than in the TEP repair group for patients that had inguinoscrotal hernias. Smoking and lack of standardization in the handling of mesh may have had a role in the more cases of recurrence seen post TEP repair in our study. However, ours was a retrospective study with a small sample size. Larger, randomized controlled studies are still needed to answer the question of whether or not TEP repair is associated with poor postoperative outcomes compared with Lichtenstein repair in patients with inguinoscrotal hernia. Thus, until we have results from such studies that demonstrate findings different from our study, laparoscopic repair or open repair can be safely performed by experienced surgeons when managing patients with inguinoscrotal hernias.

Disclosure statement

No financial contribution was received for this project.

References

1. Günal Ö, Özer Ş, Gürleyik E, et al. Does the approach to the groin make a difference in hernia repair? *Hernia*. 2007; 11(5):429–34.
2. Sajid MS, Caswell J, Singh KK. Laparoscopic versus open preperitoneal mesh repair of inguinal hernia: an integrated systematic review and meta-analysis of published randomized controlled trials. *Indian J Surg*. 2015; 77(3):1258–69.
3. Bobo Z, Nan W, Qin Q, et al. Meta-analysis of randomized controlled trials comparing Lichtenstein and totally extraperitoneal laparoscopic hernioplasty in treatment of inguinal hernias. *J Surg Res*. 2014;192(2):409–20.
4. Grant AM. Laparoscopic versus open groin hernia repair: meta-analysis of randomised trials based on individual patient data. *Hernia*. 2002;6(1):2–10.
5. Kockerling F. Data and outcome of inguinal hernia repair in hernia registers—a review of the literature. *Innov Surg Sci*. 2017;2(2):69–79.
6. Dambrauskas Z, Pankratjevaite L, Bogusevicius V, et al. Laparoscopic versus open repair of inguinal hernia. *Sveikatos Mokslai/Health Sciences*. 2017;17(1).
7. Hamza Y, Gabr E, Hammadi H, et al. Four-arm randomized trial comparing laparoscopic and open hernia repairs. *Int J of Surg*. 2010;8(1):25–8.
8. Lateef AU, Khan AA, Khan SM, et al. Complications of total extraperitoneal (TEP) repair for adult inguinal hernia. *APMC*. 2016;10(3):162–5.
9. Voorbrood CEH. Developments in inguinal hernia repair [dissertation]. University of Utrecht. 2016.
10. Momiyama M, Mizutani F, Yamamoto T, et al. Treatment of a giant inguinal hernia using transabdominal preperitoneal repair. *J Surg Case Rep*. 2016;9:1–3.
11. Lal P, Kajla RK, Chander J, et al. Randomized controlled study of laparoscopic total extraperitoneal versus open Lichtenstein inguinal hernia repair. *Surg Endosc*. 2003;17(6):850–6.
12. Ferzli GS, Kiel T. The role of the endoscopic extraperitoneal approach in large inguinoscrotal hernias. *Surg Endosc*. 1997; 11(3):299–302.
13. Sudarshan PB, Sundaravadanan BS, Kaarthik VP. Laparoscopic versus open mesh repair of unilateral inguinal hernia: a comparative study. *Int Surg J*. 2017;4(3):921–5.
14. Ahmed A, Chowdhury SY, Rahman MM, et al. Open versus laparoscopic inguinal hernioplasty—outcome correlation. *J. Shaheed Suhrawardy Med Coll*. 2017;8(1):3–7.
15. Leibl BJ, Schmedt CG, Kraft M, et al. Scrotal hernia: a contraindication for an endoscopic procedure? Results of a single-institution experience in transabdominal preperitoneal repair. *Surg Endosc*. 2000;14(3):289–92.
16. Heikkinen T, Bringman S, Ohtonen P, et al. Five-year outcome of laparoscopic and Lichtenstein hernioplasties. *Surg Endosc*. 2004; 18(3):518–22.
17. Koning GG, Wetterslev J, Van Laarhoven CJHM, et al. The totally extraperitoneal method versus Lichtenstein's technique for inguinal hernia repair: a systematic review with meta-analyses and trial sequential analyses of randomized clinical trials. *PLoS One*. 2013;8(1):e52599.
18. Pokorny H, Klingler A, Schmid T, et al. Recurrence and complications after laparoscopic versus open inguinal hernia repair: results of a prospective randomized multicenter trial. *Hernia*. 2008; 12(4):385–9.
19. Mihăileanu F, Chiorescu S, Grad O, et al. The surgical treatment of inguinal hernia using the laparoscopic totally extra-peritoneal (TEP) technique. *Clujul Med*. 2015;88(1):58–64.
20. Lau H, Lee F. Seroma following endoscopic extraperitoneal inguinal hernioplasty: incidence and risk factors. *Surg Endosc Other Interv Tech*. 2003;17(11):1773–7.
21. Winslow ER, Quasebarth M, Brunt LM. Perioperative outcomes and complications of open vs laparoscopic extraperitoneal inguinal hernia repair in a mature surgical practice. *Surg Endosc Other Interv Tech*. 2004;18(2):221–7.
22. Kuhry E, Van Veen RN, Langeveld HR, et al. Open or endoscopic total extraperitoneal inguinal hernia repair? A systematic review. *Surg Endosc Other Interv Tech*. 2007; 21(2):161–6.