Original Research Article

DOI: http://dx.doi.org/10.18203/2349-2902.isj20170505

Laparoscopic versus open mesh repair of unilateral inguinal hernia: a comparative study

Sudarshan P. B.*, Sundaravadanan B. S., Kaarthik V. P., Prabu Shankar S.

Department of Surgery, Saveetha Medical College, Saveetha University, Chennai, Tamil Nadu, India

Received: 16 January 2017 Accepted: 29 January 2017

*Correspondence: Dr. Sudarshan P.B.,

E-mail: pbsudarshan@yahoo.co.in

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Inguinal hernia repair is now one of the most commonly performed general surgical procedures in practice. Laparoscopic inguinal hernia repair was started in year 1999 and since then has gained popularity over the last 2 decades. The introduction of a laparoscopic technique has sparked a debate in the literature over the superiority of this method versus open repair. Even though for bilateral and recurrent inguinal hernias, laparoscopic approach is recommended, there is not enough literature to recommend its routine use in unilateral inguinal hernia repair.

Methods: A randomised prospective study was conducted at a tertiary care teaching hospital, comparing both Laparoscopic inguinal hernia repair and lichensteins tension free mesh repair as treatment modalities for unilateral inguinal hernia. Total number of patients in the study group was 60. Patients who were willing for the study were selected for the open or laparoscopic procedure in a randomised way. Open procedure was done by 2 senior surgeons and laparoscopic procedure was performed by 2 other senior surgeons at associate professor designation. Various parameters like the complication rate, post-operative pain, post-operative stay and time to return to work were analysed.

Results: Out of the 60 patients, 30 patients underwent open inguinal hernia repair and another 30 patients underwent Laparoscopic inguinal hernia repair. The mean age group was 46.73 in open surgery group and 42.10 in laparoscopic group. 23.3% of the patients in open hernioplasty developed seroma, hematoma in the post-operative period. Whereas 10% had seroma collection in laparoscopic group. No incidence of recurrence in both the groups. No significant difference in pain score between both the groups during immediate post-operative period on POD 0, however there was significant difference in pain score on POD 3 (mean pain in open group 4.13 and lap group 2.87) and POD 7(mean pain in open group 2.90 and lap group 1.23). Mean duration of stay in hospital for open hernioplasty was 7.8 days and for Laparoscopic hernioplasty was 3.07 days. Mean duration of return to work in open hernioplasty was 14.37 days and in laparoscopy group was 9.13 days.

Conclusions: There are potential benefits for laparoscopic inguinal hernia repair over lichtenstein's repair for unilateral inguinal hernias in terms of post-operative pain, hospital stay and early return to work.

Keywords: Inguinal hernia, Laparoscopic hernia repair, Lichtenstein's repair, Unilateral

INTRODUCTION

Dating back to the ancient Egyptian cultures, the surgical history of inguinal hernias has paralleled the evolution in anatomical understanding and development of the techniques of general surgery. The late nineteenth century, when Edoardo Bassini proposed his first

successful reconstruction of the inguinal floor those surgical techniques started rapidly evolving. Then, in the late twentieth century the tension-free repair, introduced by Irving Lichtenstein, caused a dramatic drop in recurrence rates and became the procedure of choice. However, the introduction of a laparoscopic technique by Ralf Ger in the early 1990s sparked a new debate over the

best method of inguinal hernia repair.³ Since then there has been many studies and reviews comparing Laparoscopic procedure and open tension free repairs. But clear consensus has not been arrived as to which procedure is superior. This study aimed in comparing the benefits of laparoscopic hernia repair over open hernioplasty in terms of complications of surgery-including early recurrence, post-operative pain, duration of hospital stay and time to return to work.

METHODS

This randomized study was conducted in the Department of General Surgery, Saveetha Medical College and hospital, Thandalam for duration of 2 years and six months. Sixty patients above the age of 18 years, with unilateral inguinal hernia were included in the study. Bilateral inguinal hernias, recurrent hernia, hernias with complication and patients who were not fit for general or spinal anaesthesia were excluded. A detailed history and physical examination was done, complete blood analysis and ultrasound of the abdomen done. Each group consisted of 30 patients. Patients were randomly divided into group A, who will undergo open procedure and group B, those subjected for laparoscopic repair by simple randomization at 1:1 ratio. Laparoscopic hernia repair included both TEP and TAPP methods by a standard port technique which has been reported previously.³⁻⁵ General anaesthesia was used. Size of mesh used was 10 x 15 cms polypropylene mesh. Tackers were used to fix the mesh. Open hernioplasty included the tension free lichtenstein's hernioplasty. It was done under Spinal anaesthesia using 6 x 11 cm and 7.5 x 15 cm polypropelene mesh depending on the size of the defect and mesh was fixed with 2-0 Polypropylene sutures.

Parameters assessed were the complication rate, postoperative pain, post-operative hospital stay and time to return to work post-surgery. The pain was measured qualitatively by using a visual analog scale. The anaesthetic, intra operative and post-operative complications was noted in a profoma during the hospital stay and as well as in follow up visit. Duration of hospital stay and time to return to work were also recorded.

Data was represented as mean±SD. The differences between the two groups were determined by Chi -square test for categorical variables, Mann – Whitney test and the independent samples test for continuous scale variables. P value less than 0.05 was considered as significant.

RESULTS

Mean age group of patients included in open hernioplasty was 46.73 whereas in laparoscopic hernia it was 42.10. Anaesthesia complications: 6.7% (2 out of 30) of the patients developed spinal headache in open hernioplasty group whereas none of the patients had headache in laparoscopic group. 6.7% (2 out of 30) of the patients

developed atelectasis in laparoscopic group when none of the patients had similar problems in open group. Intraoperative complications like visceral and vascular organ injuries were nil in both laparoscopic and open hernioplasty groups. Postoperative complications included, 13.3% of open hernioplasty patients developed urinary retention (4 out of 30 patients) when compared to laparoscopic hernioplasty group where 10% of patients developed urinary retention (3 out of 30). 23.3% (7 out of 30 patients) of the patients in open hernioplasty group developed seroma/hematoma of scrotum whereas in laparoscopic group 10% (3 out of 30 patients) had seroma in scrotum. 6.7% (2 out of 30) of the patients developed neuralgia in open group whereas none of the patients in laparoscopic group had similar complications. Figure 1 shows a chart comparing these three post-operative complications.

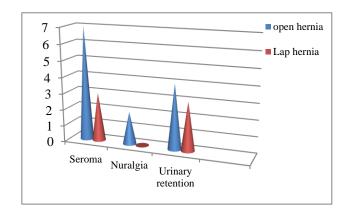


Figure 1: Comparison of post-operative complications.

There were no recurrences in both the groups for a follow up period of 3 months. No incidence of port site hernia in laparoscopic group. No incidence of mesh rejection in both the groups (Figure 1).

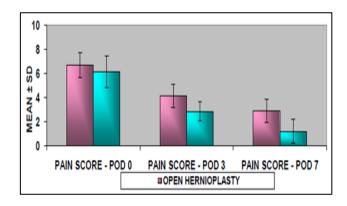


Figure 2: Comparison of pain score.

Pain score

Mean pain score on POD 0 between two groups were almost similar. But however there was a significant difference in between the two groups on POD 3 and POD 7.

Mean pain score was significantly less in laparoscopic hernioplasty groups on POD 3 and POD 7 (POD 3 mean pain score in OH - 4.13 and LH - 2.87, on POD 7 mean pain score in OH - 2.90 and LH - 1.23), which is represented in Figure 2.

Hospital stay

Mean duration of stay for open hernioplasty patients was 7.8 days as compared to stay for laparoscopic hernioplasty patients, which was 3.07 days. Hence duration of hospital stay was less (almost less than 4 days) compared to those undergoing open hernioplasty.

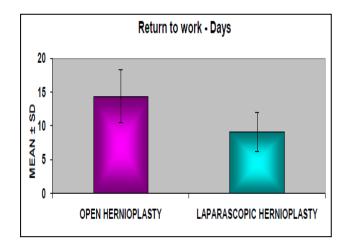


Figure 3: Time taken to return to work.

Return to work

Mean duration of return to work was 9.13 days in laparoscopic hernioplasty when compared with 14.37 in open hernioplasty. Laparoscopic hernioplasty patients were able to return to their work earlier than open hernioplasty patients. Fig 3 shows the comparison between the two groups (Figure 3).

DISCUSSION

This study compares the outcomes in patients with unilateral inguinal hernias treated by laparoscopic repair (TEP and TAPP) with general anaesthesia to that of unilateral inguinal hernia repair treated with tension free hernioplasty as described by lichtenstein with spinal anaesthesia.

In our study, we observed that there was no significant difference in mean age of the patients in both the groups. This was similar to earlier studies by Hamza Y et al International Journal of Surgery (2009) and Mostafa Tolba et al, Journal of Minimally Invasive Surgical Sciences.⁶

There were few operative complications in either surgical groups, although, in common with earlier studies.⁷⁻¹⁵ We did not encounter any intraoperative complications like

visceral organ or vascular injuries in both the groups. This correlated with other studies done by Hamza Y et al, and Ansari M et al. But intraoperative visceral complications have been reported in studies done by Neumayer L et al (4.8% of lap group and 1.9% of open group had intra operative complications) and Tolba M et al. ¹⁶ Tolba M et al, reported two cases of bladder injury while placing trocars and Neumayer L et al, reported injury to visceral organ, spermatic cord and bladder injuries in his study.

In our study, there was significant postoperative complication rate between open and laparoscopic group. Open group patients had complications like seroma in 7 cases (23.3%) where as in laparoscopic group only 3 patients (10%) had scrotal seroma. Neuralgia was present in 2 cases who underwent open hernia repair. It settled with analgesics. In laparoscopic group we didn't have any such complication. This was similar to a study done by Tolba M et al, and Ansari M et al.¹⁷ Hernia recurrences after surgical repair may occur in 15% of the cases or more. 18 In a 2003 Cochrane Database Systematic Review, McCormack et al reported 86 recurrences amongst 3138 patients who underwent laparoscopic repair and 109 amongst 3504 patients who underwent open repair (p = 0.16). The largest reviews of inguinal hernia repairs suggest no apparent difference in recurrence between laparoscopic and open mesh methods of hernia repair. ²⁰⁻²² In our study also we did not have any apparent difference in recurrence rate till 3 months of follow up in both the groups.

When we analysed the pain score between the two groups, it was not statistically significant on post operative day (POD) 0. But there was statistically significant difference in pain on POD 3 and POD 7. These results were consistent with other studies by Neumayer L et al and Hamza Y et al. (day1 in lap group - 5.8 and open group - 6.5 and day 2 in lap group - 4.1 and open group - 4.6). But early postoperative pain for a period of 2 weeks was almost the same as reported by a study by Tolba M et al. (0.95 in lap group and 1.35 in open group). A 2003 Cochrane Database Systematic Review demonstrated less persisting pain (overall 290/2101 vs. 459/2399, p < 0.0001), and less persisting numbness (overall 102/1419 vs. 217/1624, p < 0.0001) in the laparoscopic groups.²³

Here, patients who underwent laparoscopic hernioplasty had shorter hospital stay than the open group. But whereas in other studies by Yasser Hamza et al, and Ansari M et al, patient in both the groups were discharged on POD 1. This might be probably due to the reason that the patients who are treated in our hospital belonged to a much lower socio economical status so that they found a better comfort in staying at hospital because it did not cost them more and open procedure was not done under local anaesthesia. There is a general consensus in the literature that patients who undergo laparoscopic inguinal hernia repair return to work and

normal activities more rapidly than those who undergo open repair. 24-26 In our study patients who underwent laparoscopic hernioplasty returned to their work early than those undergoing open hernioplasty. This was equivocal with other studies by Yasser Hamsa et al, (open group - 16 days and lap group - 13 days) and Neumayer L et al (where patients undergoing laparoscopic hernioplasty resumed work earlier than open group).

CONCLUSION

Inguinal hernia repair is one of the commonly performed general surgical procedures. Currently both open and laparoscopic procedures are being performed for inguinal hernia repairs and they have various advantages and disadvantages. In our study we have come to a conclusion that laparoscopic repair of unilateral inguinal hernia have a considerable short term clinical advantage than open hernia repair.

ACKNOWLEDGEMENTS

Author would like to thank Dr. Sruthikamal V. (Professor, HOD) and Dr. Chakravarthi N. (Professor), Department of Surgery, Saveetha Medical College and Hospital.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

institutional ethics committee

REFERENCES

- 1. Lichtenstein IL, Shulman AG, Amid PK, Monttlor MM. The tension free hernioplasty. Am J Surg. 1989;157:188-93.
- 2. Horeyseck G, Roland F, Rolfes N. Tension-free repair of inguinal hernia: laparoscopic (TAPP) versus open (lichtenstein) repair. Chirurg. 1996;67(10):1036-40.
- 3. Patino JF. A history of the treatment of hernia. In: Nyhus LM, Condon RE, editors. Hernia. 4th edition. Philadelphia: Lippincott. 1995:3-15.
- 4. Corbitt JB. Transabdominal preperitoneal herniorrhaphy. Surg Laparosc Endosc. 1993;3:328-32.
- 5. Stoker DL, Spiegelhalter DJ, Wellwood JM. Laparoscopic versus open inguinal hernia repair: randomised prospective trial. Lancet. 1994;343:1243-5.
- 6. Hamza Y. Four-arm randomized trial comparing laparoscopic and open hernia repairs. International Journal of Surgery. 2009;8(1):25-8.
- 7. Stoker DL, Spiegelhalter DJ, Wellwood JM. Laparoscopic versus open inguinal hernia repair: randomise prospective trial. Lancet. 1994;343:1243-5.
- 8. Maddern GJ, Rudkin G, Bessell JR, Devitt P, Ponte L. A comparison of laparoscopic and open hernia

- repair as a day surgical procedure. Surg Endosc. 1994;8:1404-8.
- 9. Lawrence K, Mcwhinnie D, Goodwin A, Doll H, Gordon A, Gray A, et al. Randomised controlled trial of laparoscopic versus open repair of inguinal hernia: early results. BMJ. 1995;311:981-5.
- 10. Leibl B, Daubler P, Schwarz J, Ulrich M, Bittner R. Standardised laparoscopic (TAPP) versus shouldice repair of inguinal hernia. results from a prospective randomised and controlled trial. Chirurg. 1995;66:895-8.
- 11. Barkun JS, Wexler MJ, Hinchey EJ, Thibeault D, Meakins JL. Laparoscopic versus open inguinal herniorrhaphy: preliminary results of a randomised controlled trial. Surgery. 1995;118:703-10.
- 12. Vogt DM, Curet MJ, Pitcher DE, Martin DT, Zucker KA. Preliminary results of a prospective randomised trial of laparoscopic only versus conventional inguinal herniorrhaphy. Am J Surg. 1995;169:84-90.
- 13. Hauters P, Meunier D, Urgyan S, Jouret JC, Janssen P, Nys JM. Prospective randomised study comparing laparoscopy and shouldice technique in the treatment of unilateral inguinal hernia. Ann Chir. 1996;50:776-81.
- 14. Wright DM, Kennedy A, Baxter JN, Fullarton GM, Fife LM, Sunderland GT, et al. Early outcome after open versus extraperitoneal endoscopic tension-free hernioplasty: a randomized clinical trial. Surgery. 1996;119:552-7.
- 15. Tolba M, Khairi A, Nour-Eldin O. Tension-free mesh inguinal hernia repair, laparoscopic or open? J Mini Inv Surg Sci. 2012;1:149-53.
- 16. Ansari M, Srivastava V. Comparison of outcomes (early and late) following open and laparoscopic repair of inguinal hernias: an experience of a single surgical unit. Inter J Res Appl Nat Soci Sci. 2014;2(2):163-8.
- 17. Neumayer L, Hurder GA, Jonasson O, Fitzgibbons R, Dunlop D, Gibbs J, et al. Open mesh versus laparoscopic mesh repair of inguinal hernia. N Engl J Med. 2004;350(18):1819-27.
- 18. Cormack K, Scott NW, Go PM, Ross S, Grant AM, EU. Hernia trialists collaboration. laparoscopic techniques versus open techniques for inguinal hernia repair. Cochrane Database Syst Rev. 2003;1:CD001785.
- 19. Feliu X, Claveria R, Besora P, Camps J, Sallent FE, Viñas X, et al. Bilateral inguinal hernia repair: laparoscopic or open approach? Hernia. 2011;15(1):15-8.
- Tanphiphat C, Tanprayoon T, Sangsubhan C, Chatamra K. Laparoscopic vs open inguinal hernia repair a randomized, controlled trial. Surg Endosc. 1998;12(6):846-51.
- 21. Yang C, Zhang H, Pu J, Mei H, Zheng L, Tong Q. Laparoscopic vs open herniorrhaphy in the management of pediatric inguinal hernia: a systemic review and meta-analysis. J Pediatr Surg. 2011;46(9):1824-34.

- 22. Cormack K, Scott NW, Go PM, Ross S, Grant AM, EU. Hernia trialists collaboration. laparoscopic techniques versus open techniques for inguinal hernia repair. Cochrane Database Syst Rev. 2003;1:CD001785.
- 23. Kozol R, Lange PM, Kosir M, Beleski K, Mason K, Tennenberg S, et al. A prospective, randomized study of open vs laparoscopic inguinal hernia repair. An assessment of postoperative pain. Arch Surg. 1997;132(3):292-5.
- 24. Cormack K, Wake B, Perez J, Fraser C, Cook J, McIntosh E, et al. Laparoscopic surgery for inguinal

- hernia repair: systematic review of effectiveness and economic evaluation. Health Technol Assess. 2005;9(14):1-203.
- 25. Wall ML, Cherian T, Lotz JC. Laparoscopic hernia repair the best option? Acta Chir Belg. 2008;108(2):186-91.

Cite this article as: Sudarshan PB, Sundaravadanan BS, Kaarthik VP, Pabu Shankar S. Laparoscopic versus open mesh repair of unilateral inguinal hernia: a comparative study. Int Surg J 2017;4:921-5.