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Original Research Article

Comparison of postoperative outcome of laparoscopic and open inguinal hernia mesh repair

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ABSTRACT

Background: The surgical history of inguinal hernia dates back to Egypt, from Bassini's repair to today's mesh based open and laparoscopic repair. Still superiority of laparoscopic over open repair is controversial. However laparoscopic technique was reported to be better in term of post-operative pain and early return to work.
Methods: A prospective cross-sectional observational study was performed in Bir Hospital from August 2020 to January 2021. Sample size was 56. Hospital ethical committee approval and written informed consent from patients was obtained. Convenient sampling was done and data analyzed with SPSS ver. 23 and Microsoft excel 2010.
Results: 26 patients each were allotted to two group: laparoscopic hernia (LH) and open hernia (OH). The mean age was 50.50±17.20 years. LH group had significantly less postoperative pain than the OH group on 12, 24 and 48 hours ($p<0.05$). Although the vas pain scores of LH group were also comparatively lower on 0 hour, these differences were not statistically significant. The mean hospital stay after surgery was less for LH group (2.14±0.356 vs 2.43±0.356) but was not statistically significant. ($p=0.286$). Although more post-operative complications were seen in OH group, these were not statistically significant (p values for wound infection 0.491, for scrotal swelling 0.193). LH group had significant early return to work than OH group (13.32±2.109 vs 21.21±5.354 days) with p value 0.000.
Conclusions: Laparoscopic inguinal hernia repair is better than open inguinal hernia repair in terms of less post-operative pain and early return to work.

Keywords: Inguinal hernia, Laparoscopic hernioplasty, Open hernioplasty

INTRODUCTION

Inguinal hernias (IHs) are a common occurrence worldwide and most performed surgeries as well. However, the true incidence of IH is unknown, and nearly 800,000 cases are repaired each year in the USA alone.[1] IHs account for 75% of abdominal wall hernias, with a lifetime risk of 27% in men and 3% in women with cumulative incidence of 13.9% and 2.1% in male and female respectively requiring repair in nearly 1 in every 2 men in their lifetime.[2-4]

Surgical repair of hernias has been documented as far as back in an ancient Egyptian and Greek civilizations.[5] Bassini (1844-1924) pioneered new method that transformed inguinal hernia repair into a successful venture with minimal morbidity. The Bassini repair was then modified into McVay and Shouldice repairs. The next major advancement in inguinal hernia repair was performed by Lichenstein in 1980, who applied a piece of mesh to the floor of inguinal canal, allowing a truly tension-free repair. Similarly, Ralph Ger described the first potential laparoscopic inguinal hernia repair in 1982. The first total extraperitoneal approach (TEP) to inguinal hernia repair was first described by McKernon and Laws in 1993. As with the transabdominal approach (TAPP), the principles touted by Rives and Stoppa for open preperitoneal repair of a large mesh providing coverage over all defects, distributing intra-abdominal pressure over the large mesh area, and requiring minimal fixation, were

primary principles of the laparoscopic approach to inguinal hernia repair.[6]

Since then, there has been many studies and reviews comparing outcomes in Laparoscopic procedure and open tension free repairs. For inguinal hernia surgery, since other way of IHs repair has its own advantages and disadvantages, there is still no clear consensus made regarding superiority of particular procedure.

Several studies have shown the benefit of the laparoscopic hernioplasty (LH) over open hernioplasty (OH) in terms of less postoperative pain and morbidity, wound complications, early resumption of activity and work and better cosmetic results.[7-9] But the LH repair has some limitation like twice longer operative time, longer learning curve, higher hospital cost, a potential for serious life threatening intra-operative complications and a higher recurrence rate especially immediately in early postoperative period as compared with open surgery.

There are advantages and disadvantages in each of these procedures which should be considered before choosing in between them. Therefore, this study was designed to compare short term complications in patients undergoing IH surgery by laparoscopic and open Liechtenstein methods- like hematoma, seroma, wound infections, cellulitis, scrotal/vulval swelling, pain score and early return to work and early discharge from hospital.

METHODS

After ethical clearance from the Institutional Review Board (IRB) of National Academy of Medical Sciences (NAMS), a prospective comparative observational study was performed in Bir Hospital, NAMS, Kathmandu from August 2020 to January 2021. Informed consent was taken from the patient. Total 56 patients were included in the study, out of which 28 were allocated in open hernia repair group (OH) and 28 were allocated in laparoscopic hernia repair group (LH). Convenient sampling was done to allocate patients on each arm.

The inclusion criteria included all elective inguinal hernia surgery cases, and patients above 16 years of age. The exclusion criteria included the patients with emergency IH surgery, associated bowel resection, unfit to any kind of anesthesia, recurrent Inguinal Hernia Repair, bleeding disorder, taking pain medicine prior to surgery for other pathology, under steroids and previous inguinal area surgery.

Patients under OH group underwent Lichtenstein's repair under spinal anesthesia with placement of standard polypropylene light weight mesh. In LH group, patients underwent TAPP repair or TEP repair under general anesthesia with placement of standard polypropylene light weight mesh.

Postoperative pains in both groups were assessed with VAS (Visual analogue score) having a score of 0 to 10 at 0 hour, 12 hours, 24 hours and 48 hours. All patients received IV analgesics, i.e IV Ketorolac and IV Paracetamol on the day of operation, which was converted into oral medications on the following day. During first postoperative day, hematoma, seroma and wound infection was recorded. The duration of hospital stay was recorded and early return to work was evaluated on subsequent follow up.

The data obtained were entered using Microsoft Excel and IBM SPSS statistics 23.

Statistical analysis was done by using Independent T test, chi-square ($\chi 2$), Fischer exact test. P value less than 0.05 termed as statistically significant.

RESULTS

Out of total 56 patients, 28 patients underwent open hernia mesh repair and 28 patients underwent laparoscopic mesh repair. Under laparoscopic repair, 6 patients underwent TAPP procedure and remaining 22 patients underwent TEP procedure The mean age of patients in both the groups were comparable.

Table 1: Age distribution of subjects with inguinal hernia.

	Laparoscopic repair		Open repair	
	Number	**%**	**Number**	**%**
Age (years)				
16-45	12	42.9	9	32.1
45-60	10	35.7	9	32.1
>60	6	21.4	10	35.7
Mean	47.36±15.19		53.64±18.78	

Table 2: Duration of hospital stay.

	Mean duration of hospital stay after surgery (days)	Standard deviation	Independent t test (p value)
Laparoscopic repair	2.14	0.356	0.286
Open repair	2.43	0.573	

Table 3: Postoperative VAS score.

Time (hours)	Laparoscopic repair (mean)	Open repair (mean)	Independent t test (p value)
Baseline	3.36±1.193	3.68±2.001	0.468
12	3.39±1.166	4.50±1.427	0.002
24	2.71±0.976	3.79±1.031	0.000
48	2.29±0.659	3.04±1.105	0.003

Table 4: Postoperative complications.

Complications	Laparoscopic repair	Open repair	Fischer's exact test (p value)
Wound infection	0	2	0.491
Seroma	0	4	0.111
Scrotal swelling	1	5	0.193

Table 5: Return to work (in days).

	Return to work (mean)	Standard deviation	Independent t test (p value)
Laparoscopic repair	13.32	2.109	0.000
Open repair	21.21	5.364	

The mean hospital stay after surgery was less for LH group (2.14 vs 2.43 days) compared to open group but was not statistically significant (p>0.05).

At 12, 24 and 48 hours postoperatively, LH patients described significantly less pain than the open group (p<0.05). Although the VAS pain scores of the LH group were also lower than the OH group on 0 hour these differences were not statistically significant.

Two patients in open mesh repair group had wound infection and four patients in open mesh repair group had seroma following surgery. Five patients in open mesh repair group had scrotal swelling while one patient in laparoscopic repair had scrotal swelling. Even though complications were found more in open repair group none of the complications were statistically significant (p>0.05).

The study showed that most of the patient returned to normal work in 13th day in laparoscopic repair group and 21st day on the open repair group, which is statistically significant (p<0.05).

DISCUSSION

In this era of minimally invasive surgery, laparoscopic surgery has gained popularity in inguinal hernia repair as well. There are some distinct advantages of laparoscopic inguinal hernia repair over conventional open Lichtenstein inguinal hernia repair.

The mean hospital stay after surgery was less for LH group (2.14±0.356 vs 2.43±0.573 days) compared to open group but was not statistically significant (p>0.05). This finding is consistent with review article published by EU Hernia Trialists Collaboration in 2000 and study done by Mc Cormack et al.[10,11] Following operation, either open or laparoscopic, patients can be mobilized early and there is no restriction on diet; patients can get discharged early from hospital if there are no any complications. However, due to other co-morbid condition, or early complications like seroma and urinary retention; some patients have prolonged hospital stay.

Postoperative pain was evaluated using VAS at 0, 12, 24 and 48 hours postoperatively. At 12, 24 and 48 hours postoperatively, LH patients experienced significantly less pain than the open group (p<0.05). Although the visual analogue scale (VAS) pain scores of the LH group were also lower than the OH group on 0 hour, these differences were not statistically significant. The findings are consistent with other studies by Leigh et al, Salingam et al, Koju et al.[12-14] However, in 2014 update to the European Hernia Society (EHS) guidelines based on meta-analysis data there was no difference in chronic pain after Lichtenstein when compared to TEP hernia repair.[15] In our study we evaluated the immediate postoperative pain only, and the pain perception can be affected by multiple factors such as type of surgery, type of anesthesia, intraoperative and postoperative analgesia. Most of the patients in both groups received similar analgesics in postoperative period; which was given intravenously up to first postoperative day followed by oral analgesics. The open hernioplasty group patients experienced greater intensity of pain than laparoscopic repair group in our study, which can be probably explained by extensive dissection involved in the tissue repairs as well as the size of the incision.

Surgical complications lead to undesired morbidity and potential mortality. In this study, 2 patients in open mesh repair group had wound infection, 4 patients in open mesh repair group had seroma following surgery, 5 patients in open mesh repair group had scrotal swelling while 1 patient in laparoscopic repair had scrotal swelling. Even though complications were found more in open repair group none of the complications were statistically

significant (p>0.05). Köckerling et al demonstrated a higher postoperative complication rate following Lichtenstein repair in comparison to TEP repair in their review of prospectively collected data on 17,388 patients (OR 2.152; CI 1.734–2.672), and a prevalence rate of 3.2% Shrestha et al found hematoma in 3.1%, Seroma 1.3% and Scrotal swelling in 3.1% out of 64 IHRs in their study.[2,16] However, in our study there were not any hematoma and seroma occurrence. In the study of Chetan et al presence of surgical site infections was more in OH group compared to TEP group.[17] Another study done by Elwan et al showed 45% cases having seroma in TAPP group and 5% in conventional group.[18] However, in meta-analysis performed in 2014 by Zheng et al, there was no significant difference in, seroma formation, wound infections or neuralgia; and no statistically significant difference in terms of hernia recurrence.[19] Surgical complications depend not only upon the technique of surgery but also the patient profile and co-morbidities. Almost all patients were advised routinely for scrotal support in postoperative period to avoid complications like hematoma and seroma formation. However, some patients developed these complications which were seen more in OH repair group, and the probable cause may be due to extensive tissue dissection.

In this study, there was early return to the work in laparoscopic repair group than in open repair group, (13.32±2.109 days vs 21.21±5.365 days); which is statistically significant (p<0.05). This finding is consistent with the studies done by Stoker et al, Wilson et al, Chetan et al, Koju et al, in which there were statistically significant early return in work in laparoscopic repair group.[14,20-22] Early return to work shows the quality-of-life following surgery, and the most essential part of any surgery is to obtain normal preoperative status. Earlier return to work in the LH repair group can be explained by the facts that these patients experienced less postoperative pain, earlier mobilization, less post-operative complications, small wounds; and less extensive tissue dissection; as this modality of surgery is minimally invasive.

There are few limitations of this study. The co-morbidities and work profile of patient are not assessed, which may have key role in case of complications. The study duration is only 6 months, hence long-term follow-up of chronic pain and hernia recurrence couldn't be assessed. Surgeries are not performed by single surgeon in either group. The cost of surgery has not taken into the consideration; cost burden is higher in laparoscopic hernia repair group. Patients were allocated in each group by convenience sampling.

CONCLUSION

This study concludes that laparoscopic inguinal hernioplasty is better than open hernioplasty in context of less post-operative pain, early return to work and less risk of wound infection and other complications. However, open surgery has shorter learning curve and can be performed under local anesthesia. Long period of follow up seems essential to assess and compare the exact efficacy of between the techniques.

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