

Original research article

Examining the Outcomes of Laparoscopic (TAPP Mesh Repair) Versus Open Hernia Repair

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Abstract

Aim: The aim of the study at comparing the outcome of laparoscopic (TAPP mesh repair) and open hernia repair with respect to the duration of surgery, intra and postoperative complications, postoperative pain, recurrence, stay in the hospital and resumption of daily activities.

Methods: A comparative study was conducted in the Department of General Surgery, IGIMS, Patna, Bihar, India from feb 2020 to Jan 2021 to compare laparoscopic hernioplasty and Lichtenstein's open mesh repair. The study consisted of 130 patients with unilateral or bilateral inguinal hernia and they were randomly allocated into either group. Various parameters like duration of surgery, intra and post-operative complications, post-operative pain, recurrence, stay in the hospital and resumption of daily activities were compared.

Results: Out of the 130 patients, 30 had bilateral inguinal hernia and the rest 100 had unilateral. 19 patients with bilateral hernia underwent laparoscopic repair and 11 underwent open mesh repair. 46 patients with unilateral hernia underwent laparoscopic hernioplasty and 54 underwent open mesh repair. The mean operative time for unilateral open hernioplasty was 46.45 mins and bilateral was 87.16 mins whereas, for unilateral laparoscopic hernioplasty it was 63.38 mins and bilateral was 121.35 mins. Intra-operative complications like injury to spermatic cord, vessels and bowel were nil in both laparoscopic and open hernioplasty groups. But, post-operative complications, like wound infection was noted in 13.85% (9 out of 65 patients) and 16.92% had seroma formation (11 out of 65 patients) in the open hernioplasty group. In laparoscopic hernioplasty group 3.08% (2) had wound infection but, seroma formation was noted in 12.31% (8 out of 65 patients). Urinary retention was noted 18.46% of open hernioplasty group (12 out of 65) and 61.54% of laparoscopic hernioplasty group (4 out of 65 patients).

Conclusions: Laparoscopic hernia repair is safe and provide less postoperative morbidity in experienced hands compared to open hernia repair.

Keywords: hernioplasty, laparoscopic, hernia

Introduction

The first laparoscopic repair of inguinal hernia repair was reported round the 1990s¹ since then many techniques have been described which can be divided in to two major groups^{2,3} ; intra-corporeal technique that included dissection, ligation and division of the sac that resemble the true classic inguinal herniotomy^{4,5} and the extra-corporeal percutaneous technique which compromised ligate the patent process us vaginalis without its division.⁶⁻⁸ Up till now no consensus existed that could favour any of both techniques. It was found that laparoscopic repair is minimally invasive, safe and effective method for management of inguinal hernia if adequate training and mentorship are assured.^{9,10}

Recently this procedure is less invasive, less painful and it has allowed the early diagnosis and adequate repair of the contra lateral hernia in the same procedure.¹¹ But it had some limitations like twice longer operative time, longer learning curve, higher hospital cost, a potential for serious life threatening accidents and a higher recurrence rate especially immediately in early postoperative period as compared with open surgery.

Laparoscopic hernioplasty can be accomplished in two ways i.e. trans-abdominal preperitoneal repair (TAPP) and totally extra peritoneal repair (TEP). TEP, like open hernioplasty does not need invasion of the peritoneal cavity. Technically it eliminates the hazards of intra operational injuries.

Material and Methods

A comparative study was conducted in the Department of General Surgery, IGIMS, Patna, Bihar, India from feb 2020 to Jan 2021, Total 130 patients with unilateral and bilateral inguinal hernia were operated.

Inclusion criteria

- Patients above 18 years of age
- Patients with unilateral or bilateral primary inguinal hernia.

Exclusion criteria

- Patients with complicated hernia (irreducible, obstructed, strangulated)
- Large size sac
- Laparoscopy or pneumoperitoneum
- Patients with Cardiac diseases, Renal or hepatic diseases
- Bleeding disorders

Methodology

The patients were divided into two groups of 65 each and randomized in 1:1 ratio using computer random sequence generator to receive either laparoscopic technique or open hernioplasty. Demographic data, medical history, concomitant medications, physical examination was recorded by the treating surgeon in the study proforma and relevant investigations such as complete blood count and ultrasound abdomen and pelvis were done at the baseline visit.

Patients in group A underwent laparoscopic hernioplasty whereas, patients in group B underwent open hernia mesh repair. For open hernioplasty, Lichtenstein's tension free repair was done under spinal anesthesia. The laparoscopic repair was done by TAPP mesh repair method under general anesthesia. The parameters assessed were operative time, intra and post-operative complications, post-operative pain, recurrence, duration of stay in the hospital and time taken to resume normal daily activities post-surgery. The data was represented as

mean \pm SD. The post-operative pain was assessed using visual analogue pain scale. The mean of two groups were compared using t test and $p < 0.05$ was considered statistically significant

Results

Our study consisted of 130 patients of whom 105 were men (80.77%) and 25 were women (19.23%). The mean age group of those who underwent open mesh repair was 51.06 years and laparoscopic technique was 48.45 years.

Table 1: Gender and age distribution of patients

Gender	N=130
Male	105
Female	25
Mean age for laparoscopic technique	49.45
Mean age for laparoscopic technique	51.06

Out of the 130 patients, 30 had bilateral inguinal hernia and the rest 100 had unilateral. 19 patients with bilateral hernia underwent laparoscopic repair and 11 underwent open mesh repair. 46 patients with unilateral hernia underwent laparoscopic hernioplasty and 54 underwent open mesh repair as shown in table 2.

Table 2: Type of hernia

	Unilateral inguinal hernia	Bilateral inguinal hernia	Total
laparoscopic hernioplasty	46	19	65
Open Hernioplasty	54	11	65
Total	100	30	130

The mean operative time for unilateral open hernioplasty was 46.45 mins and bilateral was 87.16 mins whereas, for unilateral laparoscopic hernioplasty it was 63.38 mins and bilateral was 121.35 mins as seen in table 3.

Table 3: Mean duration of surgery

Duration of surgery	Unilateral inguinal hernia	bilateral inguinal hernia
Laparoscopic hernioplasty	63.38 min	121.35 min
Open Hernioplasty	46.45 min	87.16 min

Intra-operative complications like injury to spermatic cord, vessels and bowel were nil in both laparoscopic and open hernioplasty groups. But, post-operative complications, like wound infection was noted in 13.85% (9 out of 65 patients) and 16.92% had seroma formation (11 out of 65 patients) in the open hernioplasty group. In laparoscopic hernioplasty group 3.08% (2) had wound infection but, seroma formation was noted in 12.31% (8 out of 65 patients). Urinary retention was noted 18.46% of open hernioplasty group (12 out of 65) and 61.54% of laparoscopic hernioplasty group (4 out of 65 patients). The following results are represented in (table 4). Both groups were followed up for 3 months and there was no mesh rejection and recurrence of hernia. Also, no port site hernia was noted in the laparoscopic group.

Table 4: Post-operative complications

Complications	Wound infection	Seroma formation	Urinary retention
Laparoscopic hernioplasty	2	8	4
Open Hernioplasty	9	11	12

Mean pain score was noted on post-operative day (POD), POD 0, POD 3 and POD 7 as show in (table 5). The mean pain score for; laparoscopic hernioplasty (LH) and open hernioplasty (OH) were POD 0: LH– 6.2 and OH–6.8 and POD 3: LH– 4.4 and OH– 5.3 but, on POD 7: pain score for LH was 1.9 and OH was 3.2.

Table 5: Post-operative pain score

	Visual Analogue Scale score		
	POD 0	POD 3	POD 7
Laparoscopic hernioplasty	6.2	4.4	1.9
Open Hernioplasty	6.8	5.3	3.2

The average duration of hospital stay was 4.4 days for laparoscopic hernioplasty in contrast to open hernioplasty which was 6.7 days as seen in table 6.

Table 6: Mean duration of hospital stay

	No of days
Laparoscopic hernioplasty	4.4
Open Hernioplasty	6.7

The mean duration for resumption of day-to-day activities was 4.7 days following laparoscopic hernioplasty and 8.5 days following open hernioplasty as seen in (table 7)

Table 7: Time taken to resume daily activities

	No. of days
Laparoscopic hernioplasty	4.7
Open Hernioplasty	8.5

Discussion

Inguinal hernia is considered a common surgical complain and its surgical management by herniotomy is considered its standard management, as it could be performed easily, has a high success rate in addition to low rate of complications.¹² Despite that, the advancement in minimally invasive surgery made laparoscopy to gain popularity.¹³ Additionally, the basic principle of laparoscopic inguinal hernia repair is a high ligation of the hernia sac from inside in continuity through using complete purse string suture or after peritoneal dissection around the internal inguinal ring to separate the distal hernia sac.

This study compares the outcomes in patients with unilateral and bilateral inguinal hernias who underwent laparoscopic hernioplasty (TAPP) versus Lichtenstein's open mesh repair. The mean age of the patients was similar in both the groups in our study. This was similar to earlier studies by Sudarshan PB et al and Hamza et al.^{14,15} Our study analyzed both unilateral and

bilateral hernia patients unlike the previous studies such as Sudarshan PB et al which looked into unilateral hernias only.^{14,16} Out of the 130 patients, 30 had bilateral inguinal hernia and the rest 100 had unilateral. 19 patients with bilateral hernia underwent laparoscopic repair and 11 underwent open mesh repair. 46 patients with unilateral hernia underwent laparoscopic hernioplasty and 54 underwent open mesh repair. The mean operative time for unilateral open hernioplasty was 46.45 mins and bilateral was 87.16 mins whereas, for unilateral laparoscopic hernioplasty it was 63.38 mins and bilateral was 121.35 mins. Hamza et and Rathod CM et al reported similar results where laparoscopic mesh repair took longer than Lichtenstein's open mesh repair.^{15,17} In our study, we did not record any intra operative complications like injury to spermatic cord, vessels and viscera in both the groups. Sudarshan PB et al and Hamza et al had reported similar results in their studies.^{14,15} Whereas, Neumayer L et al had reported that 4.8% of laparoscopy patients and 1.9% of open repair patients had intra operative complications.¹⁸ McCormack et al conducted a meta-analysis and noted that operative complications such as visceral, especially bladder and vascular injuries were higher in laparoscopic technique.¹⁹ Several other older studies had observed higher complications with laparoscopic surgeries.²⁰⁻²⁶ Intra-operative complications like injury to spermatic cord, vessels and bowel were nil in both laparoscopic and open hernioplasty groups. But, post-operative complications, like wound infection was noted in 13.85% (9 out of 65 patients) and 16.92% had seroma formation (11 out of 65 patients) in the open hernioplasty group. In laparoscopic hernioplasty group 3.08% (2) had wound infection but, seroma formation was noted in 12.31% (8 out of 65 patients). Urinary retention was noted 18.46 % of open hernioplasty group (12 out of 65) and 61.54% of laparoscopic hernioplasty group (4 out of 65 patients). Sudarshan PB et al had reported similar results with respect to seroma formation and urinary retention.¹⁴

The mean pain score for; laparoscopic hernioplasty (LH) and open hernioplasty (OH) were POD 0: LH– 6.2 and OH–6.8 and POD 3: LH– 4.4 and OH– 5.3 but, on POD 7: pain score for LH was 1.9 and OH was 3.2. Hence, laparoscopic hernia had significantly lesser pain score on postoperative day 3 and 7. Sudarshan PB et al had reported similar results in their study.¹⁴

The average duration of hospital stay was 4.4 days for laparoscopic hernioplasty in contrast to open hernioplasty which was 6.7 days ($p < 0.0001$). Sudarshan PB et al reported that in laparoscopic surgeries it was 3.07 days and 7.8 days post open surgery.¹⁴ V Singh et al on the contrary reports a stay of 1.8 days after open surgery and 3.5 days after laparoscopic surgery. The longer duration of stay in laparoscopic surgery was due to complications seen post operatively.²⁷

In our study, the mean duration for resumption of day-to-day activities was 4.7 days following laparoscopic hernioplasty and 8.5 days following open hernioplasty which was statistically significant ($p < 0.0001$). Rathod CM et al reported similar results with $p < 0.03$ where laparoscopy group took 4.56 days and open group took 5.76 days.²²

Conclusion

Laparoscopic hernia repair is safe and provide less postoperative morbidity in experienced hands and definitely had many advantages over open repair such as early resumption of daily activities and work, better subjective and objective cosmetic results with some limitations like more operative time, need of drainage and high recurrence rate. For bilateral and recurrent inguinal hernias laparoscopic approach is recommended.

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