Original Research Article

Comparing the outcome of laparoscopic (TAPP mesh repair) and 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, AIIMS, Patna, Bihar, India from Dec 2017 to November 2018 to compare laparoscopic hernioplasty and Lichtenstein's open mesh repair. The study consisted of 140 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 140 patients of whom 120 were men (85.71%) and 20 were women (14.29%). The mean age group of those who underwent open mesh repair was 53.06 years and laparoscopic technique was 50.45 years. Out of the 140 patients, 35 had bilateral inguinal hernia and the rest 105 had unilateral. 22 patients with bilateral hernia underwent laparoscopic repair and 13 underwent open mesh repair. 48 patients with unilateral hernia underwent laparoscopic hernioplasty and 57 underwent open mesh repair. The mean operative time for unilateral open hernioplasty was 47.55 mins and bilateral was 88.26 mins whereas, for unilateral laparoscopic hernioplasty it was 64.48 mins and bilateral was 122.45 mins. Post-operative complications, like wound infection was noted in 15.71% (11 out of 70 patients) and 18.57% had seroma formation (13 out of 70 patients) in the open hernioplasty group. In laparoscopic hernioplasty group, 2.86%(2) had wound infection but, seroma formation was noted in 14.29% (10 out of 70 patients). Urinary retention was noted 21.43 % of open hernioplasty group (15 out of 70) and 7.14% of laparoscopic hernioplasty group (5 out of 70 patients). 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– 6.1 and OH–6.7 and POD 3: LH– 4.3 and OH– 5.2 but, on POD 7: pain score for LH was 1.8 and OH was 3.1. **Conclusions:** Laparoscopic hernia repair is safe and provide less postoperative morbidity in experienced hands compared to open hernia repair.

Keywords: Inguinal hernia, Lichtenstein's repair, Laparoscopic hernioplasty.

Introduction

Hernia is the abnormal exit of an organ or fatty tissue, such as the bowel, through the weak wall of the cavity in which it normally resides. Repair of inguinal hernia is one of the common surgical procedures done worldwide.[1]

Anatomical understanding of inguinal canal anatomy increased through the work of Camper, Scarpa, Cooper, Hasselbach and Hunter. Still, it was not until the late nineteenth century, when Edoardo Bassini proposed his first successful reconstruction of the inguinal floor that 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.[2] However, the introduction of a laparoscopic technique by Ralf Ger in the early

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1990s sparked a new debate over the best method of inguinal hernia repair.[3] In 1984, Lichtenstein et al coined the term "Tension-Free Hernioplasty" and broke the convention by advocating routine use of mesh for hernia repair, thereby making tissue repair a thing of the past. Real controversy started in 1990, when laparoscopic Tension-Free repair came in to vogue and was routinely advocated and aggressively marketed by promising less pain and shorter recovery period, but the things in the small prints were completely ignored.[4]

Several studies have shown the benefit of the laparoscopichernioplasty over open hernioplasty (OH) in terms of less postoperative pain and morbidity, wound complications, postoperative pain, early resumption of activity and work and better cosmetic results.[5-7] 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 extraperitoneal repair (TEP). TEP, like open hernioplasty does not need invasion of the peritoneal cavity. Technically it eliminates the hazards of intra operational injuries.

This study aims 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.

Material and Methods

A comparative study was conducted in the Department of general surgery, AIIMS, Patna, Bihar, India from December 2017 to November 2018. Total 100 patients with unilateral and bilateral inguinal hernia were operated.

Inclusion criteria

- 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 70 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±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 140 patients of whom 120 were men (85.71%) and 20 were women (14.29%). The mean age group of those who underwent open mesh repair was

53.06 years and laparoscopic technique was 50.45 years.

Table 1 Gender and age distribution of patients

Gender	N=140
Male	120
Female	20
Mean age for laparoscopic technique	50.45
Mean age for laparoscopic technique	53.06

Out of the 140 patients, 35 had bilateral inguinal hernia and the rest 105 had unilateral. 22 patients with bilateral hernia underwent laparoscopic repair and 13 underwent open mesh repair. 48 patients with unilateral hernia underwent laparoscopic hernioplasty and 57 underwent open mesh repair as shown in table 2.

Table 2: Type of hernia

	Unilateral inguinal hernia	bilateral inguinal hernia	Total
laparoscopic hernioplasty	48	22	70
Open Hernioplasty	57	13	70
	105	35	140

The mean operative time for unilateral open hernioplasty was 47.55 mins and bilateral was 88.26 mins whereas, for unilateral laparoscopic hernioplasty it was 64.48 mins and bilateral was 122.45 mins as seen in table 3.

Table 3: Mean duration of surgery

	Unilateral inguinal hernia	bilateral inguinal hernia
laparoscopic hernioplasty	64.48 min	122.45 min
Open Hernioplasty	47.55 min	88.26 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 15.71% (11 out of 70 patients) and 18.57% had seroma formation (13 out of 70 patients) in the open hernioplasty group. In laparoscopic hernioplasty group, 2.86% (2) had wound infection but, seroma formation was noted in 14.29% (10 out of 70 patients). Urinary retention was noted 21.43 % of open hernioplasty group (15 out of 70) and 7.14% of laparoscopic hernioplasty group (5 out of 70 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

	Wound infection	seroma formation	Urinary retention
laparoscopic hernioplasty	2	10	5
Open Hernioplasty	11	13	15

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– 6.1 and OH–6.7 and POD 3: LH– 4.3 and OH– 5.2 but, on POD 7: pain score for LH was 1.8 and OH was 3.1.

Table 5: Post-operative pain score

	Visual Analogue Scale score		
	POD 0	**POD 3**	**POD 7**
laparoscopic hernioplasty	6.1	4.3	1.8
Open Hernioplasty	6.7	5.2	3.1

The average duration of hospital stay was 4.2 days for laparoscopic hernioplasty in contrast to open hernioplasty which was 6.8 days as seen in table 6.

Table 6: Mean duration of hospital stay

	No of days
laparoscopic hernioplasty	4.2
Open Hernioplasty	6.8

The mean duration for resumption of day-to-day activities was 4.9 days following laparoscopic hernioplasty and 8.7 days following open hernioplasty as seen in (table 7)

Table 7: Time taken to resume daily activities

	No. of days
laparoscopic hernioplasty	**4.9**
Open Hernioplasty	**8.7**

Discussion

Laparoscopic surgery has led to many changes in the management of surgical patients and significantly reduced the morbidity associated with open surgical procedures.[8] 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.[9,10] 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.[9,11] Out of the 140 patients, 35 had bilateral inguinal hernia and the rest 105 had unilateral. 22 patients with bilateral hernia underwent laparoscopic repair and 13 underwent open mesh repair. 48 patients with unilateral hernia underwent laparoscopic hernioplasty and 57 underwent open mesh repair. The mean operative time for unilateral open hernioplasty was 47.55 mins and bilateral was 88.26 mins whereas, for unilateral laparoscopic hernioplasty it was 64.48 mins and bilateral was 122.45 mins. Hamza et and Rathod CM et al reported similar results where laparoscopic mesh repair took longer than Lichtenstein's open mesh repair.[10,12] 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.[9,10] Whereas, Neumayer L et al had reported that 4.8% of laparoscopy patients and 1.9% of open repair patients had intra operative complications.[13] 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.[14] Several other older studies had observed higher complications with laparoscopic surgeries.[15-21] Post-operative complications, like wound infection was noted in 15.71% (11 out of 70 patients) and 18.57% had seroma formation (13 out of 70 patients) in the open hernioplasty group. In laparoscopic hernioplasty group, 2.86% (2) had wound infection but, seroma formation was noted in 14.29% (10 out of 70 patients). Urinary retention was noted 21.43 % of open hernioplasty group (15 out of 70) and 7.14% of laparoscopic hernioplasty group (5 out of 70 patients). Sudarshan PB et al had reported similar results with respect to seroma formation and urinary retention.[9]

On comparing the mean pain score of two groups, POD 0 score was not statistically significant (p value 0.1098) but the pain score of POD-3 (p=0.0124) and POD-7 (p<0.0001) were statistically significant. 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.[9]

The mean duration of hospital stays showed a statistically significant difference of 4 days for laparoscopic surgery and 7 days for open hernioplasty (p<0.0001). Sudarshan PB et al reported that in laparoscopic surgeries it was 3.07 days and 7. 8days post open surgery.[9] 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.[22]

In our study, the mean duration for resumption of day-to-day activities was 4.9 days following laparoscopic hernioplasty and 8.7 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.[12]

The strength of this study is that it compares TAPP mesh repair with Lichtenstein's open mesh repair unlike the previous studies which were TEP only or both and it includes unilateral as well as bilateral hernia. The limitation of this study is that it doesn't look into a long term follow up and it has excluded complicated hernias.

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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