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A randomized prospective investigation comparing outcome of laparoscopic and open inguinal hernia repair

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Abstract

Aim: To evaluate the comparative outcome of Laparoscopic technique versus open repair for inguinal hernia.

Methods: A randomized prospective study was conducted in the Department of General Surgery, Shadan Institute of Medical Sciences, Telangana, India, for the period of 1 year. The study consisted of 100 subjects 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 100 patients, 24 had bilateral inguinal hernia and the rest 76 had unilateral. 14 patients with bilateral hernia underwent laparoscopic repair and 10 underwent open mesh repair. 36 patients with unilateral hernia underwent laparoscopic hernioplasty and 40 underwent open mesh repair. The mean operative time for unilateral open hernioplasty was 46.86 mins and bilateral was 91.10 mins whereas, for unilateral laparoscopic hernioplasty it was 65.18 mins and bilateral was 120.55 mins post-operative complications, like wound infection was noted in 14% (7 out of 50 patients) and 18% had seroma formation (9 out of 50 patients) in the open hernioplasty group. In laparoscopic hernioplasty group, 2% (1) had wound infection but, seroma formation was noted in 12% (6 out of 50 patients). Urinary retention was noted 20 % of open hernioplasty group (10 out of 50) and 6% of laparoscopic hernioplasty group (3 out of 50 patients).

Conclusion: Laparoscopic hernioplasty is more beneficial than Lichtenstein's open hernia mesh repair as it is safer, with faster recovery, lesser post-operative complications and reduced morbidity.

Keywords: Inguinal hernia, Lichtenstein's repair, laparoscopic hernioplasty

Introduction

Inguinal hernia repair is one of the most common procedures undertaken by surgeons all over the world. The treatment of this common problem has progressed from pure tissue repairs to prosthetic repairs and, most recently, laparoscopic surgery. Lichtenstein's tension-free inguinal hernioplasty with a prosthetic mesh is the preferred method for open inguinal hernia repair [1]. As opposed to tissue replacements, where the recurrence rate can be as high as 15%, the recurrence rate of skilled hands is less than 1% [2]. Postoperative morbidity is minimal, and healing is swift.

In today's surgical world, laparoscopy has achieved universal recognition. The benefits and effectiveness of laparoscopic cholecystectomy over open cholecystectomy have been well known, and it has now established itself as the gold standard for gallstone disease control [3]. Several research have demonstrated that laparoscopic hernioplasty (LSH) is superior to open hernioplasty (OH) in terms of postoperative pain and morbidity, wound complications, postoperative nausea, early return to operation and function, and improved cosmetic performance [4-6]. 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 opensurgery.

Transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) mesh repair are two options for laparoscopic hernioplasty. TAPP entails penetrating the abdominal cavity and viewing the sac and contents directly before placing the mesh pre-peritoneally. On the other hand, Lichtenstein's open mesh repair is the gold standard for all open techniques [7, 8].

The aim of this research is to compare the outcomes of laparoscopic (TAPP mesh repair) and open hernia repair in terms of surgical time, intraoperative and postoperative complications,

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postoperative discomfort, recurrence, hospital stay, and return to normal activities.

Material and Methods

A randomized study was conducted in the Department of General Surgery, Shadan Institute of Medical Sciences, Hyderabad, Telangana, India for the period of 1 year, after taking the approval of the protocol review committee and institutional ethics committee.

After taking informed consent detailed history was taken from the patient or the relatives if the patient was not in good condition.

Methodology

The technique, risks, benefits, results and associated complications of the procedure were discussed with all patients. Total 100 patients with unilateral and bilateral inguinal hernia were operated.

The study included adults above 18 years of age with unilateral or bilateral primary inguinal hernia. Patients with complicated hernia (irreducible, obstructed, strangulated), those with large size sac, recurrent hernia were excluded. Also excluded were those unfit for general anesthesia, laparoscopy or pneumoperitoneum i.e. those with cardiac diseases (MI, IHD), respiratory diseases (chronic asthma, COPD), renal or hepatic diseases, bleeding disorders etc were excluded from the study.

Groups

The patients were divided into two groups of 50 each and

randomized in 1:1 ratio using computer random sequence generator to receive either laparoscopic technique or open hernioplasty. Each patient was given a unique identity number. 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

Table 1: Gender and age distribution of patients

Gender	N=100
Male	88
Female	12
Mean age for laparoscopic technique	51.14
Mean age for laparoscopic technique	52.87

Table 2: Type of hernia

Type	Unilateral inguinal hernia	bilateral inguinal hernia	Total
Laparoscopic hernioplasty	36	14	50
OpenHernioplasty	40	10	50
Total	76	24	100

Table 3: Mean duration of surgery

Type	Unilateral inguinal hernia	bilateral inguinal hernia
Laparoscopic hernioplasty	65.18 min	120.55 min
OpenHernioplasty	46.86 min	91.10 min

Table 4: Post-operative complications

Type	Wound infection	Seroma formation	Urinary retention
Laparoscopic hernioplasty	1	6	3
OpenHernioplasty	7	9	10

Table 5: Post-operative pain score

Type	Visual Analogue Scale score		
	POD 0	POD 3	POD 7
Laparoscopic hernioplasty	5.8	4.2	1.7
OpenHernioplasty	6.6	5.0	2.9

Table 6: Mean duration of hospital stay

Type	No of days
Laparoscopic hernioplasty	4
OpenHernioplasty	7

Table 7: Time taken to resume daily activities

Type	No. of days
Laparoscopic hernioplasty	5.1
OpenHernioplasty	8.4

Discussion

The results of laparoscopic hernioplasty (TAPP) versus Lichtenstein's open mesh repair in patients with unilateral and bilateral inguinal hernias are compared in this review. In our sample, the average age of the patients was comparable in both categories. Hamza *et al.* [9] and had previously published related findings.

In our research, there were 76 cases of unilateral inguinal hernia and 24 cases of bilateral inguinal hernia. 14 out of those with bilateral underwent laparoscopic hernioplasty and 10 open mesh repairs. The mean operative time for unilateral open hernioplasty was 46.86 mins and bilateral was 91.10 mins whereas, for unilateral laparoscopic hernioplasty it was 65.18 mins and bilateral was 120.55 mins. Hamza *et al.* reported similar results where laparoscopic mesh repair took longer than Lichtenstein's open mesh repair [9]. In our study, we did not record any intra operative complications like injury to spermatic cord, vessels

and viscera in both the groups. Hamza *et al.* had reported similar results in their studies ^[9]. Whereas, Neumayer L *et al.* had reported that 4.8% of laparoscopy patients and 1.9% of open repair patients had intra operative complications.¹⁰ 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 ^[11]. Several other older studies had observed higher complications with laparoscopic surgeries ^[12-18]. Post-operative complications, like wound infection was noted in 14% (7 out of 50 patients) and 18% had seroma formation (9 out of 50 patients) in the open hernioplasty group. In laparoscopic hernioplasty group, 2% (1) had wound infection but, seroma formation was noted in 12% (6 out of 50 patients). Urinary retention was noted 20 % of open hernioplasty group (10 out of 50) and 6% of laparoscopic hernioplasty group (3 out of 50 patients).

On comparing the mean pain score of two groups, POD 0 score was not statistically significant (p value 0.1188) but the pain score of POD-3 (p=0.0145) and POD-7 (p< 0.0001) were statistically significant. Hence, laparoscopic hernia had significantly lesser pain score on postoperative day 3 and 7.

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). Singh V *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 ^[19].

In our study, the mean duration for resumption of day-to-day activities was 5.1 days following laparoscopic hernioplasty and 8.4 days following open hernioplasty which was statistically significant (p< 0.0001).

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

We were able to conclude from our research that, despite taking longer to conduct, laparoscopic hernia repair had no intra-operative complications, less post-operative complications, and no recurrence. Patients had a shorter hospital stay, less postoperative pressure, and were able to resume their activities sooner. One of the most common surgical procedures is inguinal hernia repair, and using a laparoscopic treatment can result in an improved outcome and lower morbidity.

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