

Open Preperitoneal Versus Anterior Approach for Recurrent Inguinal Hernia: A Prospective Study

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Abstract

Introduction: It was Nyhus and Stoppa who spread a new light in the management of inguinal hernia by showing to the world the appropriateness of preperitoneal repair. Although the laparoscopic approach which came as a ramification of preperitoneal approach is getting popular, Lichtenstein's anterior approach is still the widely done open surgical method even for recurrent inguinal hernia. In case of recurrent inguinal hernia with the previous anterior approach, resurgery with anterior approach may prove difficult due to dense scar tissue and lead to complications. In such cases, the open preperitoneal approach may prove to be a safe and better alternative.

Aim: This study is done to empirically verify the efficacy of open preperitoneal approach in the recurrent inguinal hernia.

Materials and Methods: A comparative study was done between 15 cases of anterior approach and 15 cases of preperitoneal approach for recurrent inguinal hernia in Government Rajaji Hospital, Madurai. Following parameters including duration of procedure, acute and chronic pain, Preoperative complications, post-operative complications including seroma, hematoma, testicular atrophy, and duration of stay were compared. Results were submitted for statistical analysis and conclusions drawn.

Results: Open preperitoneal approach is better than anterior approach in terms of duration of procedure, acute and chronic pain, and duration of stay, whereas no significant differences were made out with respect to per operative complications and post-operative complications including seroma, hematoma, and testicular atrophy. Open preperitoneal approach should be considered a valid option in the management of recurrent inguinal hernias.

Conclusion: Open preperitoneal approach is better than anterior approach in terms of duration of procedure, acute and chronic pain, and duration of stay. There is no difference between anterior approach and preperitoneal approach with respect to per operative complications and post-operative complications.

Key words: Acute pain, Anterior approach, Chronic pain, Hematoma, Nyhus, Preperitoneal, Preperitoneal approach, Recurrent inguinal hernia, Seroma, Testicular atrophy

INTRODUCTION

Inguinal hernia is one of the cornerstones of a general surgery practice. The treatment of inguinal hernia is integral to the history and current status of general surgery. Despite the frequency of the procedure, no surgeon has ideal results and complications such as post-operative pain, nerve injury, infection, and recurrence continue to

challenge surgeons. Hence, there has been an evolution in different approaches for hernia treatment.¹ The most significant advances to impact inguinal hernia repair have been the addition of prosthetic materials to conventional repairs and the introduction of laparoscopy.^{2,3} Lichtenstein tension-free mesh repair (anterior approach) is still the most widely done hernia surgery in India.⁴ However, in case of recurrent inguinal hernias, anterior approach is difficult due to fibrous tissue, distorted tissue plains, and anatomy.⁵ The advantage in the preperitoneal approach is that the hernia can be approached through a virgin tissue plane without fibrous tissue and the prosthesis can be placed between hernia contents and hernia defect. The strength of the transversalis fascia is reinforced by addition of prosthesis deep to it.⁶ Laparoscopic hernia repair which approaches

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the hernia through a preperitoneal approach is increasingly becoming popular, but it has the disadvantage of having a long learning curve, where dissection becomes demanding in case of large hernias and also high cost associated with the procedure. Transinguinal open preperitoneal approach avoids all the above disadvantages while retaining the advantages of preperitoneal mesh repair.

Aim

This study is done to empirically verify the efficacy of open preperitoneal approach in recurrent inguinal hernia.

MATERIALS AND METHODS

This comparative study was conducted in the Department of General Surgery in Government Rajaji Hospital, Madurai, on the management of recurrent inguinal hernias. A total of 30 cases of recurrent inguinal hernia were included in the study. Patients were allotted for either anterior approach or preperitoneal approach of surgery randomly. Inclusion criteria: Diagnosis of uncomplicated recurrent inguinal hernia, recurrent inguinal hernia with the previous hernioplasty, age >13 years, fit for surgery, and non-diabetic patients were included in the study. Exclusion criteria: Cases of recurrent inguinal hernia with primary inguinal hernia, recurrent inguinal hernia with previous herniorrhaphy, other hernias of anterior abdominal wall, previous preperitoneal/laparoscopic hernia repair, unfit for anesthesia (cardiac disease and chronic obstructive pulmonary disease), unwilling candidates who were reluctant to oblige for the study, complicated hernia (non-reducible, incarcerated inguinal hernia, and strangulated hernia), diabetic and immunosuppressed patients, and patients who have undergone prior pelvic lymph node resection or groin irradiation or open prostatectomy were excluded from the study. The data collected by clinical history and physical examination. All patients underwent routine laboratory investigations and special investigations (ultrasound).

RESULTS

Thirty patients were underwent procedure, 15 in each group. Age distribution among those who underwent anterior approach and preperitoneal approach was almost equal (Table 1).

The duration of procedure was significantly low in preperitoneal group with 12 surgeries taking 40-50 min for complete procedure. In case of anterior group, none of the surgeries was completed within 50 min, and 6 surgeries took more than 60 min for complete procedure. The mean duration of procedure for preperitoneal approach

was 48.6 min compared to anterior approach which was 60.47 min with a statistically significant at $P < 0.0001$ (Table 2).

Acute pain recorded by visual pain analog scale on the 2nd post-operative day (POD) for preperitoneal approach ranged from 20 to 42 mm with a mean of 31.7 mm. Seven patients had pain <30 mm, and only two patients had pain more than 40 mm. Acute pain in anterior approach group ranged from 30 to 48 mm with a mean of 40.7 mm. Only two patients in the anterior group had pain <30 mm. The difference was statistically significant at $P = 0.001$ (Table 3).

Two patients in preperitoneal approach group had chronic pain compared to four patients in anterior approach group. However, the difference was not statistically significant at $P = 0.955$ (Table 4).

Table 1: Age distribution

Age distribution	Anterior approach	Preperitoneal approach
<40	0	1
41-50	3	4
51-60	10	2
61-70	1	7
>70	1	1
Total	15	15
Mean	57.1±9.22	58.3±11.06
P value	0.749	

Table 2: Duration of procedure

Duration of procedure (min)	Anterior	Preperitoneal
40-50	0	12
51-60	9	2
>60	6	1
Total	15	15
Mean	60.47±8.19	48.6±6.57
P value	<0.0001	

Table 3: Acute pain (mm)

Acute post-operative pain (2 nd POD)	Anterior	Preperitoneal
<30	2	7
31-40	5	6
41-50	8	2
Total	15	15
Mean	40.4±5.62	31.67±7.34
P value	0.001	

POD: Post-operative day

Table 4: Chronic pain (>30 days)

Chronic pain (>30 days)	Anterior	Preperitoneal
Yes	4	2
No	11	13
P value	0.955	

One case in preperitoneal approach and one case in anterior approach had an incidence of hematoma in immediate post-operative period (Table 5). There are no pre-operative complications in both groups.

One case had an incidence of seroma in preperitoneal group, whereas three cases had an incidence of seroma in anterior group. However, the difference was not statistically significant (Table 6).

Table 7 shows that the testicular atrophy mean duration of stay for preperitoneal group was 4.06 days compared to anterior approach group with 5.47 days with a statistically significant at $P = 0.004$ (Table 7). There was no evidence of testicular atrophy in both anterior and preperitoneal groups.

DISCUSSION

Recurrent inguinal hernia occurs mainly due to pre-operative patient status such as cough and benign prostatic hyperplasia, defective collagen biology, poor surgical technique, and post-operative causes such as wound infection. In words of Schumpelick *et al.*,⁷ “whereas recurrent and incisional hernias following suture repair are most likely caused by a defective biology, nevertheless, the recurrence following mesh repair may be regarded as a technical fault, at least in theory.” Whatever be the cause of recurrence, surgical technique and methodology are very important in the surgical management of recurrent inguinal hernia. In this study comparing methodology, anterior approach and preperitoneal approach for recurrent inguinal hernia were compared. The results when compared

with the previous published studies show similarities in many aspects and differ in some aspects. As old age is one of the factors causing increased surgical complications in inguinal hernia surgery, the age difference in the two groups was submitted for statistical analysis and found to be not significant. The mean age between the two groups proved to be almost equal. The mean duration of surgery for preperitoneal approach was 48.6 min when compared with the study of Karatepe *et al.*⁶ with 44.56 min. Saber *et al.*,⁸ in their studies, showed preperitoneal approach to have less operative duration compared to anterior approach (71.6 vs. 94.7 min). These values, when compared with the mean duration of surgery for anterior approach in our study (60.47 min), show preperitoneal approach to be better than anterior approach in terms of duration of procedure. No pre-operative complications such as vessel injury, bowel injury, and bladder injury were recorded in our study. However, Ray *et al.*⁹ report one case (2.7%) of vessel injury during preperitoneal approach in their studies. Karatepe *et al.*⁶ and Kurzer *et al.*¹⁰ reported no cases of pre-operative complications during preperitoneal approach in their studies. From these observations, it can be safely concluded that preperitoneal approach is safe in terms of pre-operative complications. Pain recorded on second POD by visual analog scale was taken as acute pain in our study. Acute pain was significantly lower in preperitoneal group compared to anterior approach group (mean 31.7 vs. 40.4 mm). Willaert *et al.*¹¹ also reported similar conclusion in their meta-analysis. Preperitoneal approach is similar to anterior approach in terms of reducing post-operative acute pain. Pain recorded after 30th POD is taken as chronic pain in our study. Four patients in anterior approach group and two patients in preperitoneal group showed chronic pain in our study, but the difference was statistically insignificant. Li *et al.*,¹² in their study, came to similar conclusion. However, this conclusion differed from many previous studies reporting gross difference in chronic pain with reduced pain reported in preperitoneal approach. These studies include Koning *et al.*,¹³ Ray *et al.*,⁹ Saber *et al.*,⁸ and Willaert *et al.*¹¹ This study failed to demonstrate the statistically significant difference in terms of chronic pain between anterior and preperitoneal group. No statistically significant difference was made out between anterior and preperitoneal group with respect to hematoma, seroma, and testicular atrophy, though there was more incidence of seroma in anterior group (3 cases vs. 1 case). Except Saber *et al.*⁸ who reported 5 cases of testicular atrophy in anterior approach group, several other studies including Ray *et al.*,⁹ Li *et al.*,¹² and Karatepe *et al.*⁶ came to similar conclusions. Like Farooq *et al.*¹⁴ and Kurzer *et al.*,¹⁰ this study reports preperitoneal approach to be safe in terms of post-operative complications. Duration of stay was significantly low in preperitoneal group compared to anterior approach group (4.06 vs. 5.47 days). The mean

Table 5: Post-operative hematoma

Post-operative hematoma	Anterior	Preperitoneal
Yes	1	1
No	14	14

Table 6: Post-operative seroma

Post-operative seroma	Anterior	Preperitoneal
Yes	3	1
No	12	15
P value	0.594	

Table 7: Duration of stay

Duration of stay	Anterior	Preperitoneal
<5 days	7	13
>5 days	8	2
Total	15	15
Mean duration	5.47±1.36	4.06±1.03
P value	0.004	

duration of stay for preperitoneal group was reported to be 1.6 days by Karatepe *et al.*,⁶ 4.6 days by Ray *et al.*,⁹ 1.2 days by Saber *et al.*,⁸ and Saber *et al.*⁸ report low hospital stay duration in preperitoneal group (1.6 vs. 4.7 days). This study reports preperitoneal approach to be better in terms of duration of stay.

CONCLUSION

Open preperitoneal approach is better than anterior approach in terms of duration of procedure, acute and chronic pain, and duration of stay. No significant differences were made out between anterior approach and preperitoneal approach with respect to per operative complications and post-operative complications including seroma, hematoma, and testicular atrophy. Open preperitoneal is safe in terms of having no pre-operative complications and low post-operative complications. Open preperitoneal approach should be considered a valid option in the management of recurrent inguinal hernias.

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