

Comparative Study between Open and Trans-abdominal Pre-peritoneal Repair of Inguinal Hernia

Mohammad Ahmad Abdel Gawad, Osama Ahmed Radwan, Ahmed Abdel Aal, Mohamed Gamal Eldin

Department of Surgery, Faculty of Medicine, Al-Azhar University
General and Laparoscopic Surgery Department, Al Maadi Armed Forces Hospitals

ABSTRACT

Background: Inguinal hernia repair is one of the most widely performed surgical procedures. Amongst the techniques used, the open Lichtenstein repair (OLR) which still the most widely performed. However, in the last decade there has been an increased interest in the laparoscopic approach for inguinal hernia repair, mainly the trans-abdominal pre-peritoneal (TAPP) technique. As described in recent studies, TAPP approach entails the benefits of minimally invasive surgery, such as less pain and early recovery.

Objective: To compare open Lichtenstein repair of inguinal hernia and laparoscopic trans-abdominal pre-peritoneal repair of inguinal hernia (TAPP) regarding intraoperative, postoperative complications and hospital stay. **Patients and Methods:** This Prospective study included 40 male patients from Al Maadi Armed Forces Hospitals and General Surgery Department of Al-Azhar University Hospitals. All patients were suffering from oblique inguinal hernia with an age ranged between 21 and 66 years with otherwise good health. They were divided into 2 groups: Group A comprised 20 patients who underwent laparoscopic trans-abdominal pre-peritoneal repair (TAPP) and group B comprised 20 patients who underwent open Lichtenstein repair. **Results:** Our study showed that the operative time was significantly longer in TAPP group compared to the open group (97.5 ± 19.9 min versus 70.3 ± 19.5 with P value 0.001). No difference was detected in intraoperative complication between the two groups. There was significant less postoperative pain from day 1 to day 7 in TAPP group compared to the open group (P value = 0.0001). Postoperative stay was similar as all patients were discharged 24 hours postoperative. As regards postoperative complications, wound infection was recorded in 1 patient in each group, hematoma in one patient and seroma in two patients in open group but neither hematoma nor seroma recorded in the TAPP group. **Conclusion:** Our study showed that laparoscopic TAPP approach for inguinal hernia repair is safe and reduces early post-operative pain. Furthermore, it is related to less postoperative complications, although it takes a longer operative time.

Keywords: Trans-abdominal, pre-peritoneal, hematoma, seroma.

INTRODUCTION

Courtney et al. ⁽¹⁾ defined hernia as an abnormal protrusion of part of contents of the abdominal cavity through a defect in its surrounding walls and hernia repair is one of the most common operations performed by general surgeons. Despite the frequency of this procedure, no surgeon has ideal results, and complications such as postoperative pain, nerve injury, infection, and recurrence remain.

McCormack et al. ⁽²⁾ mentioned that the standard method for inguinal hernia repair had changed a little over a hundred years until the introduction of synthetic mesh. This mesh can be placed by either using an open approach or by using a minimal access laparoscopic technique.

There is no apparent difference in incidence of recurrence between laparoscopic and open mesh methods of hernia repair. Less pain and numbness were recorded following laparoscopic repair and more rapid return to usual activities. However, the operative time was longer and there appears to be a higher risk of serious vascular injuries.

John and Andrew ⁽³⁾ stated that despite the prevalence of this disease, no universally accepted classification system exists. As a result, there is a wide spectrum of patients that develop inguinal hernias. As a result of this diversity, no single repair technique is likely to take care of all patients with inguinal hernias. Therefore, surgeons repairing inguinal hernias should be familiar with both laparoscopic and open approach to offer the patient the most appropriate

repair technique on the basis of unique patient factors and hernia defect characteristics.

Olmi et al. ⁽⁴⁾ reported that laparoscopic techniques are being used increasingly in the repair of inguinal hernias and offer the potential benefits of minimal access surgery, possibly a lower recurrence rate and lower cost according to a randomized controlled study.

Hwang et al. ⁽⁵⁾ found that laparoscopic repair is effective for the vast majority of patients with primary or recurrent inguinal hernias and results in low recurrence rates, with high patient satisfaction scores.

AIM OF WORK

This study aims to compare open Lichtenstein repair of inguinal hernia and laparoscopic trans-abdominal pre-peritoneal repair of inguinal hernia (TAPP) regarding intraoperative, postoperative complications and hospital stay.

PATIENTS AND METHODS

This is a prospective randomized controlled study including 40 male patients divided into 2 groups: *Group A*: 20 patients underwent laparoscopic trans-abdominal pre-peritoneal repair (TAPP). *Group B*: 20 patients underwent open Lichtenstein repair.

Inclusion criteria:

Patients involved in this study included those had oblique inguinoscrotal hernia with a mean age of 35.1 ± 13.3 year in TAPP group and 42.4 ± 12.6 year in the open group, all had otherwise overall good health.

Exclusion criteria:

Patients with any of the following:

- Cardiac disease
- Hepatic disease
- Renal disease
- Decompensated pulmonary disease
- Complicated hernia
- Previous abdominal operations
- Recurrent hernia

All patients included in the study were subjected to: thorough history, proper clinical examination and routine preoperative investigations. Informed written consent was obtained from all patients after being informed by average operative time, possible blood loss, mesh size and material, method of mesh fixation and

possibility of any intra-operative complications. Postoperative evaluation of pain score using numeric rating scale (NRS), need for analgesia, length of hospital stay and post-operative complications were recorded. Follow up for 6 months to compare the effectiveness and patient satisfaction of these 2 groups was done.

Anesthesia: General anesthesia for the laparoscopic group and spinal anesthesia for the open cases.

Operative technique:

In laparoscopic repair we used TAPP technique: fixation of the polypropylene mesh was done by using absorbable tacker (Fig.1), closure of peritoneum by 3/0 vicryl suture (Fig. 2).

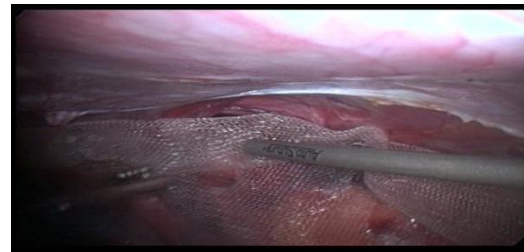


Fig. (1): Fixation of mesh using a tacker.



Fig. (2): Closure of peritoneum by suturing.

In open repair we used Lichtenstein technique fixation of polypropylene mesh was done using 2/0 prolene sutures.

Post-operative:

After recovery the patients were sent to the in-patient ward. Feeding started 6 hours post-operative with prescription of acetaminophen (IV) whenever needed as an analgesic.

Patients were discharged next day postoperatively with follow up after one week for assessment of short term complications including pain score (NRS), use of analgesia, scrotal edema and resumption to usual activity.

Six months post-operatively, the patients were asked for coming back for follow up, recording long term complications and patient satisfaction (which is 0-10 analogue scale). All patients came for follow up in the date determined for them.

Statistical Analysis:

Patients' data were tabulated and processed using SPSS (17.0) statistical package for Windows 7.

Quantitative variables were expressed by means and standard deviation and were analyzed using independent t-test, **One-way ANOVA test** was used to compare more than two groups as regard a quantitative variable ($SD < 50\%$ mean), **Qualitative data** was expressed by frequency and percent and were analyzed using Chi-square.

- P value > 0.05 is considered insignificant

- P value < 0.05 is considered significant

- P value < 0.01 is considered highly significant.

RESULTS

Table (1): Age in both groups

		TAPP	Open
		No. = 20	No. = 20
Age in years	Mean \pm SD	35.10 \pm 13.32	42.40 \pm 12.66
	Range	21 – 65	24 – 66

Table (2): Study of operative time, complications and post-operative pain in TAPP repair

		TAPP
		No. = 20
Time of operation (minute)	Mean \pm SD	97.50 \pm 19.97
	Range	60 – 130
Intra-operative complications	Negative	20 (100.0%)
	Positive	0 (0.0%)
Post-operative complications	Negative	19 (95.0%)
	Infection	1 (5.0%)
	Seroma	0 (0.0%)
	Hematoma	0 (0.0%)
Recurrence	Negative	20 (100.0%)
	Positive	0 (0.0%)
Postoperative pain		
Day 1	Mean \pm SD	1.20 \pm 0.62
	Range	0 – 2
1 Week	Mean \pm SD	0.15 \pm 0.37
	Range	0 – 1
1 Month	Mean \pm SD	0.00 \pm 0.00
	Range	0 – 0
6 Month	Mean \pm SD	0.00 \pm 0.00
	Range	0 – 0

Table (3): Study of operative time, complications& post-operative pain in open repair

		Open	
		No. = 20	
Time of operation (per minute)	Mean \pm SD	70.30 \pm 19.55	
	Range	45 – 110	
Intra-operative complications	Negative	20 (100.0%)	
	Positive	0 (0.0%)	
Post-operative complications	Negative	16 (80.0%)	
	Seroma	2 (10.0%)	
	Infection	1 (5.0%)	
	Hematoma	1 (5.0%)	
Recurrence	Negative	20 (100.0%)	
	Positive	0 (0.0%)	
Postoperative pain			
Day 1	Mean \pm SD	2.45 \pm 0.76	
	Range	1 – 4	
1 Week	Mean \pm SD	0.80 \pm 0.62	
	Range	0 – 2	
1 Month	Mean \pm SD	0.15 \pm 0.37	
	Range	0 – 1	
6 Month	Mean \pm SD	0.00 \pm 0.00	
	Range	0 – 0	

Table (4): Time of operation

		TAPP	Open	Test value	P-value
		No. = 20	No. = 20		
Time of operation (minute)	Mean \pm SD	97.50 \pm 19.97	70.30 \pm 19.55	4.353*	0.000
	Range	60 – 130	45 – 110		

Table (5): Post-operative complications & recurrence.

Complications		TAPP		Open		Test value*	P-value
		No.	%	No.	%		
Intra –operative	Negative	20	100.0%	20	100.0%	NA	NA
	Positive	0	0.0%	0	0.0%		
Post-operative	Negative	19	95.0%	16	80.0%	3.257	0.354
	Seroma	0	0.0%	2	10.0%		
	Infection	1	5.0%	1	5.0%		
	Hematoma	0	0.0%	1	5.0%		
Recurrence	Negative	20	100.0%	20	100.0%	NA	NA
	Positive	0	0.0%	0	0.0%		

Table (6): Post-operative pain

Postoperative pain		TAPP	Open	Test value*	P-value
		No. = 20	No. = 20		
Day 1	Mean \pm SD	1.20 \pm 0.62	2.45 \pm 0.76	-5.720	0.000
	Range	0 – 2	1 – 4		
1 Week	Mean \pm SD	0.15 \pm 0.37	0.80 \pm 0.62	-4.058	0.000
	Range	0 – 1	0 – 2		
1 Month	Mean \pm SD	0.00 \pm 0.00	0.15 \pm 0.37	-1.831	0.075
	Range	0 – 0	0 – 1		
6 Month	Mean \pm SD	0.00 \pm 0.00	0.00 \pm 0.00	NA	NA
	Range	0 – 0	0 – 0		

DISCUSSION

Antoniou et al. ⁽⁶⁾ stated that inguinal hernia repair is one of the most widely performed surgical procedures. Amongst the techniques used, the open Lichtenstein repair is still the most widely performed. However, in the last decade there has been an increased interest in the laparoscopic approach for inguinal hernia repair, mainly represented as the trans-abdominal pre-peritoneal (TAPP) technique.

Claus et al. ⁽⁷⁾ mentioned that TAPP approach entails the benefits of minimally invasive surgery, such as less pain and early recovery. We expect that these benefits would be more apparent in the treatment of inguinal hernias.

Simons et al. ⁽⁸⁾ found that the mean operative time was only slightly higher in the TAPP compared with the open Lichtenstein repair approach (110.3 versus 97.1 min and P value was 0.23).

In our study the mean operative time was (97.50 ± 19.97 minutes) for TAPP, (70.30 ± 19.55 minutes) for open Lichtenstein repair and this might be attributed to the small number of patients included.

Neumayer et al. ⁽⁹⁾ found that intra-operative complications were more in a laparoscopic procedure. Again, it's the surgeon's laparoscopic skill which makes a difference. Also found that the injury to spermatic cord structures was low in TAPP compared to the open group, possibly due to the magnified view of laparoscopy.

In our study none of our patients had intra-operative complications.

Grant ⁽¹⁰⁾ revealed significantly lower incidence of wound infection and hematoma together with higher incidence of seroma after laparoscopic repair.

In our study there was one patient with wound infection (5%) in each group. Two patients (10%) developed seroma and one patient (5%) developed hematoma in the open group, none of patients in TAPP group developed neither hematoma or seroma however, difference between the two groups was statistically insignificant.

Schmedt et al. ⁽¹¹⁾ found a higher recurrence rate following laparoscopic repair.

In our study there was no significant difference in terms of hernia recurrence in both groups.

Wennergren et al. ⁽¹²⁾ confirmed that the minimally invasive approach is associated with less early post-operative pain compared with the open Lichtenstein repair.

Wijerathne et al. ⁽¹³⁾ clarified that, postoperative pain and complications are closely related in open and laparoscopic procedure.

Our study confirmed that less post-operative pain from day 1 to day 7 in TAPP group compared to open group. There was no significant difference in 1 and 6 month post-operatively follow up for pain recurrence.

CONCLUSION

Our study showed that laparoscopic TAPP approach for inguinal hernia repair is safe and reduces early post-operative pain significantly. Furthermore, it is related to less postoperative complications, although it takes a longer operative time.

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