EVALUATION OF LAPAROSCOPIC HERNIOPLASTY IN GROIN HERNIA

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ABSTRACT

Background:laparoscopic groin hernia repair has gained wide popularity in surgical practice in the last two decades. Trans abdominal pre peritoneal (TAPP) and totally extra peritoneal (TEP) repair are standing head to head as the most common laparoscopic techniques for groin hernia.

Methods: This prospective randomized study was conducted between December 2013 and December 2015. Sixty male patients suffering from non complicated inguinal hernia were included. Patients were randomized into group A (TAPP) and group B (TEP). Intra operative variables and postoperative pain and complications were recorded in a pre structured form

Results: In TEP group patient had lees post operative pain, were able to resume their normal daily activities and spent less operative time than TAPP group. No significant difference in terms of Intra operative and post operative complications between both groups.

Conclusion:. TEP has a significant advantages over TAPP in reduction of operative time and postoperative pain, which resulted in earlier recovery and return to normal activity. Although both techniques seem to effective, TEP has a step over TAPP.

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INTRODUCTION

Inguinal hernia repair is one of the commonest elective surgical procedures done by surgeons all over the world.[1]

Repair should consider not only recurrence as a primary outcome to be evaluated, but also other outcome measures including postoperative pain, postoperative complications & rate of recovery should be taken into consideration. Recently, the Lichtenstein tension-free mesh repair has been the standard surgical approach for years, it gained that huge popularity because of its technical simplicity, reproducibility, rapid recovery, and excellent recurrence rates.[2,3]

Laparoscopic approach for groin hernia was evolved including two main techniques TAPP and TEP. TAPP involves access to the abdominal cavity and peritoneal flapping to place the mesh in the pre peritoneal space covering the whole myopectineal orifice and finally closing the peritoneum again over the mesh, while TEP does not require access to the peritoneal cavity and so less risk of visceral injuries. [4,5]

Because the possible risk of complications that may need laparotomy ,surgeon must have an accurate knowledge of anatomic relations in the groin as viewed from the peritoneal surface.[6]

Although Laparoscopic hernioplasty results in less post operative pain , rapid return to work and absence of wound related complications when compared to open repair. But still there is a Controversy about both laparoscopic techniques because of their comparable outcomes an lack of long term results.[7,8]

So in our study we aimed to compare both techniques as regard their relative advantages and complications

PATIENTS AND METHODS.

This prospective randomized study was carried out in Surgery Department, Mansoura University Hospitals during the period from December 2013 through December 2015. The study included 60 patients presented with uncomplicated inguinal hernia for which they

were operated upon by laparoscopic hernioplasty. Patients were randomly arranged into two groups using closed envelop technique ; group (A) as TAPP included 30 patients and group (B) as TEP included 30 patients.

All patients were subjected to full history taking, clinical examination, and all routine blood works.

Operative Planning:

General anesthesia was routinely used. Single dose peri operative antibiotic (amoxi-clav. 1gm. IV.) was given at induction. The patient was placed in the supine position with both arms tucked along side of the body.

TAPP procedure :

Pneumo peritoneum was created using Veress needle inserted in Palmers Point (closed technique) and intra abdominal pressure was adjusted to 14 mmHg. One 11 mm port was inserted in the supra umbilical region in the mid line for the 30 degree scope. Other two ports (one 11mm and one 5mm port) were placed at the same transverse plane of the supra umbilical port 5-7 cm away

A transverse peritoneal incision was done 2 cm above the internal ring to create a peritoneal flap, starting at the inner edge of the anterior superior iliac spine to the outer edge of the homo lateral medial umbilical ligament. Dissection continued medially to the symphysis pubis to visualize the spce of Retzius identifying the shiny Cooper' s ligament. The hernial sac was dissected from the spermatic cord structures.

A 15 x 10 cm of polypropylene mesh was rolled and introduced into the abdominal cavity through the 11 mm right trocar. The mesh was unrolled to cover the entire myopectineal orifice (Hesselbach's triangle, the indirect space, and the femoral ring areas). An endoscopic multifire hernia tucker was used to fix the mesh in place. Finally closure of peritoneal flap by tucker and port site closure.

TEP procedure:

A 1- to 2-cm skin incision is made below the umbilicus, and the subcutaneous tissue was bluntly divided to reach the anterior rectus sheath which is then incised, and under blunt dissection a space between the rectus muscle and the posterior rectal fascia was created to introduce the dissecting balloon to dissect the extra peritoneal space, balloon was kept inflated for three minutes to allow hemostasis .

After deflation of balloon, introduction of 11 mm blunt 'Hasson' trocar directly into the pre peritoneal space.CO2 then was insufflated to enlarge this space.

A 5 mm port was placed in the mid line two finger breadth above the symphesis pubis , a third 11 mm trocar was inserted mid way between the camera port and supra pubic port and slightly to the contral lateral side.

If the hernia was direct or incomplete indirect it would be reduced easily even before identification of inferior epigastric vessels. But if it was complete indirect sac it has to be dissected of the cord structures and divided after ligation .

The mesh was then introduced and fixed by tuckers as done in TAPP procedure Finally anterior rectus sheath was closed by vicryl 0 and skin by skin stapler .

Operative parameters were recorded 1- operative time from the skin incision till skin closure was. 2- Intra operative complications as Visceral , vascular, vas or nerve injuries. 3- any shifting from laparoscopic to open techniques .

Post operative course:

In the day of operation one ampoule of diclofenac sodium 75 mg was given as intramuscular injection every 12 hours for the relief of immediate post operative pain.

Early morning of the first post operative day, pain was evaluated based on a visual analog scale (VAS) where 0 indicated no pain and 10 indicated the worst possible pain.

Postoperative hospital stay, and post operative complications, including scrotal edema ,hematoma or seroma formation and wound infections, were recorded.

Follow-up:

Follow up was conducted at outpatient clinic, patients were advised to come every week

during the first month then every 3 months in the first year and then if needed.

A - Time of return to work usual (domestic) activity as walking, running, climbing stairs and driving

B - Recurrence rate within 1year.

STATISTICAL ANALYSIS

All patients' data were collected, checked and analyzed by using (SPSS version 22). Data were expressed as mean ± standard deviation (SD) and number with (%) according to type of variable. Chi-square test ($\chi 2$) or Fischer's exact t test or Mann–Whitney were used when appropriate. P value <0.05 was considered statistically significant.

RESULTS

Sixty consecutive male patients with uncomplicated inguinal hernia were prospectively randomized into two groups: group A was trans abdominal pre peritoneal (TAPP) and group B was totally extra peritoneal (TEP). Thirty patients were randomized in each group.

Age distribution:

All included patients were males. The mean age of patients in TAPP group was 35.67 ± 12.96 y (range= 20-57 y) while in TEP group was 36.73 ± 12.06 y (range= 20- 55 y) .

Hernia characteristics:

The vast majority of the hernia was indirect 19 patients (63.3%) in group A and 25 patients (83.3%) in group B. Direct inguinal hernia was found in 9 patients (30%)in group A and 5 patients (16.7%) in group B .Only 2 patients (6.7 %) had recurrent hernia and they were in group A. There were no femoral or obturator hernia (Figure 1).

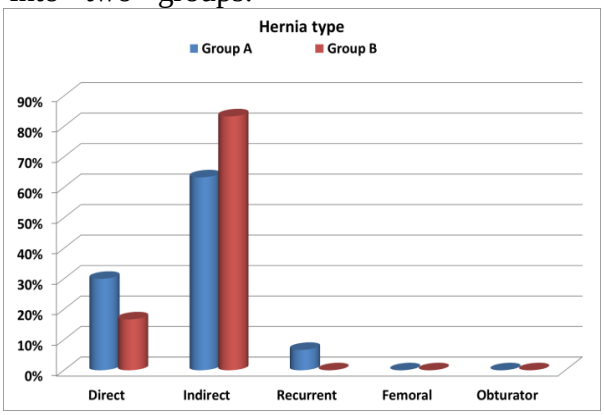

Figure (1) Types of hernia included

Twenty three patients 76.7% had right sided hernia and 7 patients 23.3% had left sided hernia in A group while in B group left sided hernia was much higher 18 patients 60% compared to right sided ones 12 patients 40%.

Operative time in minutes (table 1):

The operative time was ranged between 45-90 with mean time of 67.00 ± 15.62 minutes for TAAP group and was ranged between 40-75 with mean time of 57.00 ± 11.58 minutes for TEP group. So the mean operative time was significantly more in TAPP group when compared with the TEP group (p= 0.010).

Table (1) operative time.

Operative time	TAPP	TEP	Test
- Minimum	45	40	Z = 2.676 P = 0.010*
-Maximum	90	75	
- Mean	67.00	57.00	
- SD ±	15.62	11.58	

Intra operative complications(table 2): There were no significant difference in intra operative complications between both groups (P = 0.145). The most frequent intra operative complications occurred during surgery included three main complications: tearing of peritoneum which was closed by clipping, bleeding from inferior epigastric vessels that was secured by clipping and bleeding from injury to corona mortis which was controlled by electro cautery. There were no major intra operative complications like bowel injury or major blood vessels injury.

Conversion to open repair: All the cases were completed laparoscopically none of them were converted to open repair in both groups.

Post operative pain: Immediate postoperative pain was evaluated using numeric rating scale (VAS),as shown in (table 3) . Significant less post operative pain was noticed in the group B compared with the other group.(P = < 0.001).

Hospital stay: all the patient spent 24hours in the hospital and went home on second postoperative day.

Chronic groin pain: There was no significant difference in chronic groin pain incidence between both groups ,it was manifested only in group A only in 3 patients (10%), no patients in group B expressed chronic groin pain after surgery.

Table(2) Intra operative un favorable events.

	Technique				**χ^2**	**P**
	TAPP		**TEP**			
	N	**%**	**N**	**%**		
Intraoperative complications						
No events	21	70.0%	21	70.0%		
tear of peritoneum	6	20.0%	4	13.3%		
bleeding from corona mortis	3	10.0%	1	3.3%	5.400	0.145
bleeding from inferior epigastric	0	0.0%	4	13.3%		

Table (3) : post operative pain on VAS scale.

Post operative pain VAS	Group A	Group B	T	P
Minimum	3	2	7.427	*<0.001
Maximum	8	6		
Mean	5.57	3.57		
SD ±	1.28	1.00		

Post operative complications (table 4) :
In group A 1 patient (3.3 %) expressed superficial skin infection of the wound and was managed conservatively with local wound care and topical antibiotic creams. 4patients (13.3 %) developed cord edema with in the first week after surgery resolved within 3 weeks with conservative measures. Four patients(13.3%) developed clinically evident subcutaneous seroma that was aspirated under complete a septic technique. In group B 1 patient (3.3%) presented with mild hydrocele 2 months after surgery documented with scrotal U/S, 1 patient (3.3%) expressed cord edema early weeks after surgery resolved with conservative measures and 1 patients (3.3 %) developed subcutaneous seroma with in 2weeks after surgery.

Table (4) post operative events.

Post operative complications	Technique				χ^2	P
	TAPP		TEP			
	No	%	No	%		
wound infection	1	3.3%	0	0.0%	2.00	0.26
Hydrocele	0	0.0%	1	3.3%		
Cord Edema	4	13.3%	1	3.3%	1.96	0.16
Subcutaneous seroma	4	13.3%	1	3.3%		

No reported cases of recurrence within one year postoperative neither in group A nor B.
Time to resume daily activities (table5): Patients under went TEP technique were able to resume their normal daily activities (mean 7.5±1.14days) earlier than patients underwent TAPP procedure (mean 10 ±2.13 days) . (P <0.001).

Table(5):Time to restore normal activities.

	Group A	Group B	T	P
Time to resume normal daily activities (mean ± SD)	10.00 ± 2.13	7.50 ± 1.14	5.664	<0.001

DISCUSSION

The search for the ‘‘gold standard’’ technique for inguinal hernioplasty continues. Two laparoscopic techniques for inguinal hernia repair namely TEP repair and TAPP repair, both of which have evolved over a period of just three decades with a conflict regarding the superiority of one over the other. The present study aimed to compare TAPP and TEP and evaluate each technique for proper selection of each in laparoscopic treatment of inguinal hernia.
Regarding the operative time, our mean time of operation in TAPP group was 76.00 ± 15.62

min while in TEP group was 57.00 ± 11.58 min. Hence the overall mean operative time was significantly less in TEP than in TAPP repair. This longer operative time for TAPP was attributed to the time consumed for creation and closing the peritoneal flap to cover the mesh. These results are consistent with randomized controlled trials conducted by ***Gunal et al.,***[9] that showed TAPP consumed more operative time than TEP and it was significant.

Krishna et al.,[7] wrote that more operative time was spent in TAPP procedure when compared with TEP (mean 72.32 min for TAPP versus 62.13 min for TEP group) but it was not statistically significant.

On the contrary ***Wake et al.,***[10] and ***Bracale et al.,***[11] reported that TAPP takes less operative time than TEP; but the difference was not significant. The reason explaining this longer operative time for TEP could be the narrow working space and unfamiliar view of the anatomical landmarks that are usually seen from inside the peritoneal cavity.

Regarding intra operative complications: in our current study there was no incidence of visceral or vascular injuries in both groups which is comparable with results of ***Krishna etal.,***[7] ***Vanhee etal.,***[12] ***and khoury***[13] that reported no visceral injury in comparative studies.

Bringman et al.[14] , and ***Felix et al.,***[15] reported that The rate of intestinal injury as an intra operative complications in laparoscopic hernioplasty was 0 – 0.06%

Cohen.[16] found a higher incidence of visceral injury in TAPP than in TEP.

Baca etal.,[17] and ***leibl etal.,***[18] reported 0.64% incidence of bowel injury in TAPP while ***Tamme etal***.[19], reported 0.20% and no bowel injury in TEP.

Andersson et al.[20] described three types of intra operative complications (epigastric artery bleeding, injury to peritoneum, and serosal tear in the colon) .

Post operative pain :

In current study post operative pain on VAS score was considerably higher in TAPP patients than in those underwent TEP procedure (P < 0.001).

Krishna etal.,[7] shared the same opinion as post operative pain in TAPP patients was higher than those in TEP group with significant P value (0.0001).

Bansal etal.,[21] in a comparative study found that the post operative pain in TAPP technique was considerably higher 24 hours after surgery than in TEP repair(P 0.001).Incision of the peritoneum and flapping and then closing by suturing or tacking may be blamed for this higher pain scores in TAPP.

Khoury.[13] found that TAPP patients consumed extra analgesics in the early postoperative period than patients underwent TEP repair.

Lepere et al.[22]**,**in the study that compared TAPP and TEP had found much higher pain scores 24 h after the surgery in TAPP patients than those underwent TEP repair.

In the randomized, controlled trial conducted by ***Gong et al.***[23] ,similar post operative pain scores was found in both TAPP and TEP patients in the first postoperative day and 1 week after surgery. ***Lau et al***.[24] reported some factors affecting expression of post operative pain after laparoscopic hernioplasty Pain was found higher in young and female patients.

Chronic groin pain :

In the current study ; the incidence of chronic groin pain in TAPP group was (10 %), while no patients in TEP group expressed chronic groin pain the difference between both groups was not statistically significant (P = 0.076).

Aasvang and Kehlat[25] found that in general the rate of incidence of chronic groin pain following laparoscopic hernia repair was 6 %

Poobalan et al.[26] described 3 kinds of chronic groin pain following hernia repair; somatic, neuropathic and visceral pain.

Bansal etal.,[21] and ***Cunningham et al***.[27] reported no significant difference between TAPP and TEP as regard the incidence of chronic groin pain (p = 0.70).

Postoperative complications:

In the current study no statistically significant difference between both groups as regard the occurrence and the pattern of post operative complications.

In TAPP group post operative complications were superficial wound infection in 1 patient (3.3%), cord edema in 4 patients (13.3%) and seroma in 4 patients (13.3%) while in TEP group , 1 patient (3.3%) developed hydrocele, 1 patient (3.3%) developed cord edema and 4 patients(13.3%) expressed seroma.

Krishna etal.,[7] reported no significant difference in postoperative complications between both techniques, there were no life threatening or major post operative complications .wound infection was found in (6.4%) in TAPP group versus (1.9%) in TEP group. Cord edema was present in (23.5 %) in TAPP group versus (27.5 %) in TEP group ,as regard seroma (17 %) of patients in TAPP group developed seroma while in TEP group (37 %) of patients developed seroma.

Perko etal.[28] and ***Dulucq etal.,***[29] reported over all post operative complications rates below 5 % which is comparable to most studies in the literature.

On the contrary, ***Felix etal.***[15] conducted large study showed significantly more major post operative complications in the TAPP group than in the TEP group.

Moreno etal.,[30] found that incidence of scrotal edema in TAPP patients was (34%) which is higher than in TEP patients (9.4%) (P = 0.001).

In the study conducted by ***Bansal etal.,***[21] (29.5 %) of TAPP patients developed scrotal edema versus (12.6 %) in TEP patients with significant P value (0.01). ***Misra etal.***[31] reported scrotal edema in (17%) of TEP patients

Leible etal[18]***., Misra etal.***[31] ***and Lepere etal***[22]***.,*** reported the incidence of seroma formation following laparoscopic hernioplasty ranging from 1.9 % to 11%.

Krishna etal.,[7] detected a higher incidence of seroma formation in TEP (37%) than in TAPP repair (18%) .

Kapiris etal.[32]***,*** reported 4.4% - 8 % incidence of seroma following TAPP while ***O'Riordain etal.,***[33] and ***Lau etal.,***[24] reported 4.0% - 7.2% after TEP procedure.

Reddy etal.,[34] reported that inward inversion of the transversalis fascia in laparoscopic hernioplasty is associated with decreased incidence of postoperative seroma.

Recurrence:

Upon follow up of the patients for 1 year post operative there was no reported cases of recurrence in both groups .

Fitzgibbons et al.[35] concluded some factors may lead to recurrence including operator inexperience, improper dissection, insufficient size of the mesh, and folding of the mesh.

Neumayer etal.,[36] found that in early studies recurrence rate after laparoscopic inguinal hernia may be high reaching up to 25 %.

Weiser etal.,[37] ***and lau etal.,***[24] reported that the incidence of recurrence after TAPP procedure had been around(0 - 3 %) while after TEP (1– 2%).

Krishna etal.,[7] did not notice any recurrence neither in TEP nor TAPP group early postoperative and during the follow-up period (36 moths).

Bansal et al.,[21] reported one case of recurrence (0.3%) in TAPP (0.3%).while no cases in TEP group developed recurrence .

Akolekar etal.,[38] found no significant difference in recurrence rate between both groups.

McCormack etal.,[39] reported one case (3.57%) of recurrence after TAPP technique while no reported cases of recurrence after TEP procedure.

Lepere etal.[22] found similar recurrence rates in TEP and TAPP (1 %) .

Higher recurrence rate in TAPP versus TEP was reported by ***Khoury etal.,***[13] (3.4 % versus 0.0), and ***Cohen etal.***[16]***,*** (1.9 % versus 0.0) but the difference was not statistically significant

Time to resume normal daily activities: In our study patients under went TEP procedure were able to resume their normal daily activity (10.00 ± 2.13) earlier than those underwent TAPP procedure (7.5 ± 1.14) with significant P value (P <0.001) this is due to less postoperative pain after TEP repair.

Krishna etal., [7] reported that patients underwent TEP expressed more satisfaction as regard post operative pain and hence time to return to normal activity than patients underwent TAPP and the difference was statistically highly significant (P = 0.002).

In the study conducted by ***Bansal etal.,*** [21] no significant difference between both groups was reported ,The mean time to return to work was (15.6±6.4) days in the TAPP patients and (17.3±5.2) days in the TEP patients.

Schrenk etal. [40]***, Hamza et al.,*** [41] ***and Dedemadi et al.*** [42] also reported no significant difference in return to normal activity between both techniques.

Conclusion

TEP had a significant advantages over TAPP repair in terms of reducing postoperative pain and earlier resuming normal daily activities and hence more patient satisfaction and better social and economic impact.

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