

Short Term Outcome of Laparoscopic Trans-Abdominal Preperitoneal (TAPP) Inguinal Hernia Repair Without Mesh Fixation, a Comparative Study

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ABSTRACT

Background: Laparoscopic repair of groin hernia is gaining popularity, most surgeons follow up the consensus of mesh fixation especially by tissue penetrating methods, as mesh fixation helps prevent recurrence it also, may cause nerve injuries leading to acute and/or chronic postoperative pain, many alternatives for mesh fixation do exists as use of self-gripping mesh, use of absorbable tacks, use of fibrin glue and the mesh placement in the extra-peritoneal space without fixation as we tried to investigate in this study.

Patient and method: 46 patients undergoing laparoscopic trans-abdominal preperitoneal repair of groin hernia were randomly allocated into two equal groups, A (group of mesh fixation with absorbable tacks) and B (group of mesh no fixation). Preoperative, operative, and postoperative data in both groups, namely recurrence rate, acute and chronic pain, and local complications were statistically analyzed in comparison to each other.

Results: Throughout the analysis of the data there were no statistically significant differences between both groups regarding demographic data, hernia side, and hernia type. the operative time, acute pain score, and incidence of chronic pain were longer in the fixation group without statistical significance, we recorded one case of recurrence in the non-fixation group but without statistical significance.

Conclusion: Mesh placement in the preperitoneal space during laparoscopic trans-abdominal pre-peritoneal repair of inguinal hernia is a safe efficient method as it is not associated with increased recurrence rate or postoperative pain.

Keywords: Groin hernia, Mesh fixation, Laparoscopic repair.

INTRODUCTION

Inguinal hernia is a common surgical condition especially in males ^(1,2). Throughout the history of inguinal hernia surgery, tension-free repair with the use of mesh prosthesis was proved to have the least recurrence rate ⁽³⁾. The implication of endoscopic technique in groin hernia surgery either total extra-peritoneal repair (TEP) or trans-abdominal preperitoneal repair (TAPP) maintained the principle of tension-free repair and provides the benefits of laparoscopic surgery as early ambulation ^(4, 5, 6), resumption of normal activity, less hospital stay time and better post-operative pain control. The mesh prosthesis used in laparoscopic repair has a wide dimension supporting a vast area of the lower part of the anterior abdominal wall as it extends beyond the defected margins covering the deep ring, Hassel Bach's triangle, femoral ring and extends down to cover the obturator foramen ^(7, 8, 9).

Fixation of mesh prosthesis using tissue penetrating techniques (tacks) either titanium or absorbable tacks guarantee mesh stability and incorporation in surrounding tissues, but complications of these methods were not uncommon as many studies reported different complications ^(10, 11), the most reported complications were injuries to; inferior epigastric vessels, femoral nerve, genito-femoral nerve, lateral cutaneous nerve of the thigh and even injury to the operating surgeon hands, the pain caused

by nerve injury may need surgical intervention , some studies reported colonic and small intestinal fistula due to adherence between the viscera and the used tacks ^(12,13,14,15), non-tissue penetrating fixation techniques like fibrin glue use or using self-gripping mesh can avoid these complications, in some localities those safe techniques may exceed the financial capabilities of the health systems ⁽¹⁶⁾, so in our study we aimed at evaluation of the short term results of no mesh fixation in laparoscopic trans-abdominal preperitoneal groin hernia repair.

PATIENTS AND METHODS

This comparative study was performed in Zagazig University Hospitals, General Surgery Department, and Private Hospitals in Jeddah, Saudi Arabia, in the period between July 2018 and May 2020, on 46 patients undergoing laparoscopic trans-abdominal preperitoneal (TAPP) repair for uncomplicated unilateral inguinal hernia.

Patient selection:

In this study, we enrolled patients above 18 years old suffering unilateral, non-recurrent, uncomplicated inguinal hernia.

We excluded patients with

- Previous abdominal or pelvic surgery,



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- Unfit for laparoscopic surgery,
- Those with ascites, abdominal malignancy
- Big defect
- Patient on chemotherapy and immune-compromised patients.

Randomization: using computer-generated random numbers, the study participants were randomly allocated into two equal groups each group 23 individuals, the first group; group A; patients underwent laparoscopic TAPP repair of inguinal hernia and the mesh prosthesis was fixed in position using absorbable Vicryl tacks (Abstack 30 Medtronic), and group B patient underwent laparoscopic TAPP repair of inguinal hernia and the mesh prosthesis was placed in position without fixation.

All the study participants were subjected to thorough history taking, detailed clinical examination, determination of the presence of an inguinal hernia, measurement of the hernia defect diameter by ultrasound or computerized tomography in difficult cases, preoperative laboratory tests were performed as per usual.

Operative details:

All patients received antibiotic prophylaxis (Cefotaxime 1 gm) 1 hour before surgery, under general anesthesia, in supine position, after skin preparation and patient draping, through a supra-umbilical 10 mm incision pneumo-peritonium was created at pressure 12-14 mm mercury using medical CO₂ gas, then 10 mm port was inserted through the supra-umbilical incision, through which 30° telescope was inserted, abdomen explored and hernia defect identified, two 5 mm ports were inserted in the mid clavicular line near the level of the umbilicus, an arcuate incision was taken in the peritoneum covering the anterior abdominal wall 4 cm above the hernia defect and extending from a point just medial to the anterior superior iliac spine laterally to the medial umbilical ligament medially, the inferior epigastric vessels were identified and peritoneal flap was dissected medial and lateral to them, the sac was then dissected from the vas and spermatic vessels in male, round ligament in female, the dissection extended medially in the retro pubic space identifying the symphysis pubis, pubic rami, inguinal and pectineal ligaments, thus a capacious space sufficient for insertion of polypropylene mesh 12X 15 cm without folding was created, the mesh was then placed in position, extended at least 3 cm from defect margin without crumbling. In group A the mesh was fixed in

place with 4 vicryl tacs two in the pectineal ligament the other two in the upper medial and upper lateral margins.

In group B mesh was left in position without fixation, the peritoneum of the anterior abdominal wall was then closed by sutures using vicryle 3 zero sutures, the abdomen was deflated, ports removed under vision then wounds closed.

The operative data especially operative time and intraoperative complications were recorded for statistical analysis.

Follow up:

In early postoperative time, the patient received non-steroidal anti-inflammatory medications like pain killers, data during the admission were collected, as pain score (measured by visual analog scale (VAS), hematoma formation, early recurrence, the time needed for ambulation.

Follow-up was carried out in outpatients' clinics by the attending surgeon after 1 week, 1 month, 3 months, and 6 months of the operation, the recorded follow up data included wound complications, seroma formation, chronic pain, foreign body sensation, and recurrence.

Ethical Consideration:

The study was approved by the local ethical committee and institutional review board (IRB) of our university hospitals and registered in clinical trials with unique identifier NCT04532983, all patients signed an informed written consent before participation in this study.

Preoperative, demographic, operative, and postoperative data were collected and properly analyzed using t-test, Z test in SPSS 22 program package.

RESULTS

In the current study, we recruited 46 patients who underwent (TAPP) repair for uncomplicated inguinal hernia. Group A (the fixation group) and group B (the non-fixation group).

The mean age in group A was 43.8±16.5 years, in group B it was 45.13±14.1 years, male represents 91.3% of group A and 95.7 % of group B patients, female represents 8.7% and 4.3% of group A and B respectively, with no statistically significant differences between the two groups.

Also, body mass index (BMI) or Nyhus classification or location and duration of the hernia had no statistically significant differences in both groups. Demographic and preoperative evaluation data were presented in **Table 1.**

Table 1: Demographic data and preoperative findings

	Group A (N =23)		Group B (N =23)		P-value
Age (mean ±SD)	43.8±16.5		45.13±14.1		0.78
Gender	<i>N</i>	%	<i>N</i>	%	
Male	21	91.3	22	95.7	0.54
Female	2	8.7	1	4.3	
BMI (mean ±SD)	27.25±4.2		26.8±3.33		0.7
Hernia site	<i>N</i>	%	<i>N</i>	%	
Rt	14	60.9%	13	56.5%	0.76
Lt	9	39.1%	10	43.5%	
Nyhus class	<i>N</i>	%	<i>N</i>	%	
1	1	4.3 %	2	8.7%	0.55
2	8	34.9%	7	30.4%	0.76
3a	10	43.4%	9	39.2%	0.76
3b	4	17.4%	5	21.7%	0.54
Symptom duration (mean ±SD)	22.13±7.9		18.3±7.4		0.42

In regards to the operative and post-operative data as presented in table 2, the mean operative time in group A was 113.17±9.34 minutes, in group B it was 111.3±6.49 minutes, the hospital stay time in group A was 2.22 ± 0.47 days, and in group B 1.99±0.61 days with no statistically significant differences between both groups. Early postoperative pain as measured by visual analog scale (V.A.S) reported no significant differences between both groups (5.65±0.98) in group A and (5.9±1.12) in group B.

chronic pain described as foreign body sensation or discomfort was reported in 6 cases of group A patients and 3 patients of group B patients, acute and chronic pain was determined to be slightly higher in the group A without statistically significant differences. Recurrence was occurred in one case in group B (4.35 %) and not recorded in group A at the time of examination. Hematoma and seroma had no statistically significant differences in both groups; we reported zero cases of port site hernia in both groups during the follow-up time.

Table 2: Operative and postoperative data

	Group A (N =23)		Group B (N =23)		P-value
Operative time (mean ± SD)	113.17±9.34		111.3±6.49		0.34
Hospital stay (mean ± SD)	2.22 ± 0.47		1.99±0.61		0.14
V.A.S (mean ± SD)	5.65±0.98		5.9±1.12		0.41
Post-operative complications	<i>N</i>	%	<i>N</i>	%	
Hematoma	1	4.34	2	8.69	0.55
Seroma	6	26.08	8	34.8	0.52
Recurrence	0	0	1	4.35	0.31
Port-site hernia	0	0	0	0	1
Chronic pain	6	26.08	3	13.04	0.26

DISCUSSION

In the last two decades, laparoscopic surgery has been gaining a wide privilege in surgical practice especially in groin hernia repair. Many advantages support laparoscopic hernia repair as, decreased postoperative pain and postoperative morbidity, decreased risk of chronic pain, foreign body reaction, even though decreased recurrence rate, also the smooth recovery, early recurrence to normal activity, and improved quality of life as compared to the conventional open methods^(1, 2, 3, 4). Recurrence in both open surgery and laparoscopic method, it still one of the most significant causes in hernia repair^(4, 5). So, mesh fixation was practiced by most surgeons as a consensus for mesh repair for the fear of mesh migration or crumbling that may hinder the integration of the mesh material in the newly formed tissues thus predisposing to hernia recurrence^(6, 9). The methods used for mesh fixation either the tacks, staples, or suture may cause nerve damage, neuritis, and obstinate pain syndromes⁽⁶⁾. Chronic pain sensation is the main factor in poor patient contentment after laparoscopic inguinal hernia repair⁽¹⁰⁾. A probable method to decrease this morbidity is to release fixation of the mesh⁽¹¹⁾. Owing to a greater frequency of chronic pain sensation following repair of inguinal hernias with mesh fixation many essential theories have been settled regarding the potential causes contributing to the occurrence of chronic pain and providing solutions. Switch of heavy weight meshes to lightweight mesh and invasive to non-invasive methods of mesh fixation are the two supreme briefly investigated measures to reduce the incidence of chronic pain following laparoscopic inguinal hernia repair. Mesh non-fixation in laparoscopic inguinal hernia repair was also investigated to explore the impact of mesh non-fixation on the chronic pain and foreign body sensation also the frequency of hernia recurrence is affected or not, the results of this studies have shown that mesh non-fixation in laparoscopic inguinal hernia repair does not significantly increase the incidence of the hernia recurrence and that agree with our article, we found one case recurrence in group B and there was no recurrence in group A with no significant difference. In our study, we found post-operative early and chronic pain slightly more in group A than group B and this supported by several other studies⁽¹²⁻¹⁷⁾.

We reported in our study operation time, post-operative complications (hematoma and seroma), and length of hospital stay was slightly higher in group A with no significant difference this was found in **Khajanchee et al.**⁽¹²⁾ and **Sajid et al.**⁽²⁰⁾. **Claus et al.**⁽²¹⁾; also supports the findings of our study as he reported non mesh fixation method was better than mesh fixation in early and chronic pain recurrence rate even the differences have no statistical significance.

CONCLUSION

Mesh placement in the preperitoneal space during laparoscopic trans-abdominal pre-peritoneal repair of

inguinal hernia is a safe and efficient method as it is not associated with increased recurrence rate or postoperative pain.

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