# The Effect of TAPP Technique for Hernia Repair with or without Mesh Fixation

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## ABSTRACT

***Objective:*** *the aim of this study is to compare the effect of TAPP hernia repair with or without mesh fixation as regard the post-operative pain, recurrence rate, and cost effectiveness over 15 months follow up duration.* ***Methods:*** *sixty patients with a unilateral or bilateral oblique inguinal hernia were included in this study, operated with the TAPP technique at dar alshifa hospital and prince medical Centre,UAE, in coordinate with ain shams university hospirtal,and menoufia university, from march 2014 to June 2015. 30 Patients were done with TAPP technique with mesh fixation, and 30 patients operated without mesh fixation. Follow up indices such as mean operative time, hospitalization expense, and postoperative pain were included.* ***Results:*** *No significant postoperative complications were observed during15 months follow-up in either group. The mean operative time, postoperative pain, and hospital expenses of the non-fixation group were markedly reduced compared to those of the fixation group, no recurrent cases were recorded in both groups over the time of follow up.* ***Conclusions:*** *TAPP technique for inguinal hernia repair without mesh fixation was safe and effective when compared to the mesh fixation group, shortened operative time, decreased hospital expenses, decreased postoperative pain, and improved quality of life, with no evidence of recurrence.*

***Key words:*** *TAPP,hernia,mesh.*

## INTRODUCTION

**Inguinal hernia repair** is one of the commonest surgical procedures worldwide. Many procedures were introduced to repair the inguinal hernia. Currently, two famous techniques have been scientifically validated and can be recommended for clinical application. These repairs are, open repair with mesh (Lichtenstein tension free technique) and laparoscopic technique [(1)]. Several studies have demonstrated many advantages for laparoscopic repair over open repair with regard to reduced post-operative pain and earlier return to work and normal activities [(2,3)]. The laparoscopic repair also gives a good advantage in bilateral inguinal hernia repair and recurrent inguinal hernia repair [(4)].

The optimal surgical procedure for inguinal hernia repair is still widely debated. Transabdominal preperitoneal (TAPP) laparoscopic inguinal hernia repair is considered to be an excellent choice in various studies, providing patients a good quality of life, especially when performed by an experienced surgeon[(5-8)]. properties of the mesh such as weight, surface area, size of pores combined with its chemical properties, seem to affect the risk of mesh related post-operative complications like shrinkage, migration, infection and nerve entrapment [(9-12)]. Mesh Stapling has been often accused to be the potential cause of chronic pain after hernia surgery either due to peri osteitis of the pubic bone or due to nerve entrapment. Applying mesh without fixation just to be covered by peritoneum seems to achieve both effective and secured mesh position, without the potential post-operative complications caused by mesh stapling.[(13-24)]. recently, absorbable titanium tacks were widely used for mesh fixation and peritoneum closure. [(25-26)].

**Objective:**

The objective of this article is to document the total effect of the laparoscopic inguinal hernia repair (TAPP) technique with mesh fixation in comparison with the same technique but without fixing the mesh, as regard the advantages and disadvantages and to highlight the incidence of

post-operative complications as regard recurrence rate and chronic groin pain in the non-fixation group compared to the fixation group using the absorbable tacks over a period of 15 months.

## PATIENTS AND METHODS

This study was conducted in 2 private centers from march 2014 to june 2015. 60(sixty) cases of oblique inguinal hernia were included in this study distributed as 30 cases each in a group, group 1 and 2, Patients demographics as regard age preference ranging from 21 years of the youngest and 62 years for the eldest, all having informed written consent,52 cases were males and 8 cases were females. GROUP 1(TAPP with mesh fixation) and GROUP 2 (TAPP without mesh fixation). Patients in each group were assessed regarding the following parameters: 1. Conversion rates to open method 2. Operative time 3. Intra operative complications- bleeding, bowel and bladder injury 4. Post-operative pain 5. Post-operative complications- seroma, scrotal edema, surgical site infection 6. Duration of hospital stay 7. Early recurrence rates .

**Inclusion criteria:** 1) Patients diagnosed as having a unilateral or bilateral inguinal hernia 2) Patients with recurrent inguinal hernia.

**Methodology:**

We have done a follow up study during a 15 months period. All had undergone laparoscopic TAPP repair by the standard techniques, using Polypropylene mesh 10 x 15 cm in size for the affected side, mesh was fixed ingroup 1 using absorbable protacks (covidien), and was not fixed in group 2, just to be properly placed on the affected hernia site and to be kept in place by the covering peritoneum ,intra-abdominal pressure and normal placement of bowel situated in pelvic cavity. in either technique, the peritoneum was closed using endo clip or absorbable tacks. Patients were examined on the first post-operative day, 1 week after the procedure, and over a 3 months period till the end of study,i.e. on 3,6,9,12,15 month time post operatively.

**Surgical Technique:**

Under general anesthesia, the patient was placed on the operating table in supine position with both arms adducted to the side and in Trendelenburg position. The monitor was placed at the foot of the patient on the same side of the hernia. A 10-mm umbilical port was placed slightly above the umbilicus for camera (30-degree telescope) and for pneumoperitoneum up to pressure of 14 mm Hg; two 5 mm working ports were placed on both sides of the umbilical port and on the same level in the mid clavicular line. The hernia was identified, and the peritoneum was incised using the harmonic scalpel from the iliac tubercle extending medially to the median umbilical ligament. Allow gas to enter through the incised peritoneal opening, this will separate peritoneum from preperitoneal space and facilitates dissection, avoid injury of inferior epigastric vessels. The peritoneum was meticulously dissected from the spermatic cord and vessels. The hernial sac was completely dissected from the cord and totally reduced without injury to spermatic vessels or vas deferens, the pubic tubercle was then clearly defined. Polypropylene mesh was inserted into the abdominal cavity via the 10-mm port. The size of mesh should be fashioned according to the size of the hernia defect, the standard size is 10 by 15 cm. On placing the mesh, it is important to spread it from medial to lateral into the preperitoneal space. At the lateral side of the internal ring, the mesh has to be completely covering spread the myopectineum, especially in patients with indirect hernias. The mesh was fixed medially to the pubic tubercle and along the upper margin of the dissected space away from the inferior epigastric vessels, using 5 mm absorbable tacks for laparoscopic hernia repair (Covidien). No mesh fixation devices done at the inferior aspect of the mesh to avoid nerve entrapment or vascular injury. The peritoneum was then closed using tacks or endoclips ,make sure that there is no collecting hematoma under the peritoneum or make sure that there is no bowel or bladder injury, usually we don't use a drain intraabdominal or at site of repair, ports are taken out under vision.

**Fig. 1:** Left side oblique inguinal hernia

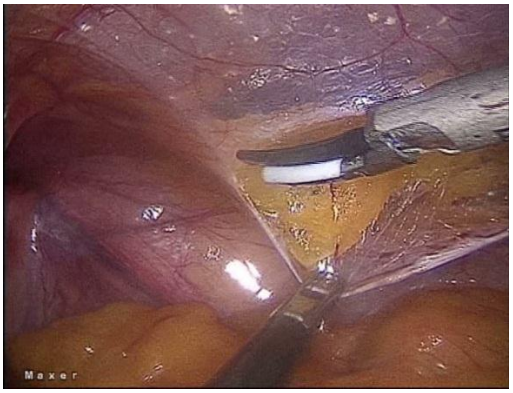
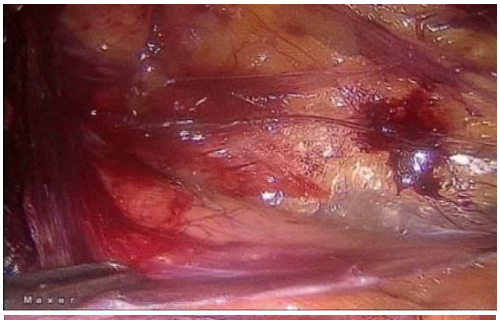


**Fig. 2:** Peritoneal dissection



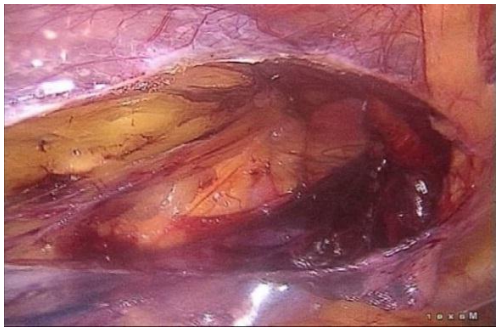


**Fig. 3:** Complete peritoneal dissection

**Fig. 4:** Mesh applied in a stapless hernia repair technique

**Fig. 5:** Stapled hernia repair

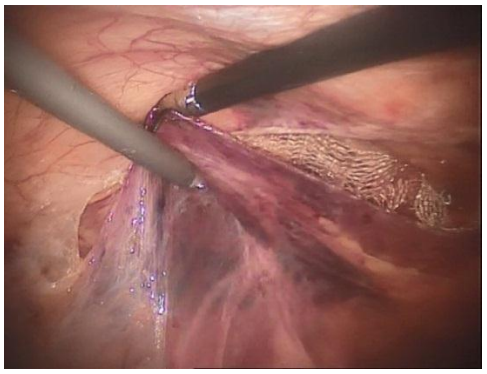


**Fig. 6:** Peritoneal closure over the mesh

## RESULTS

60 patients were included in this study with primary or recurrent, unilateral or bilateral oblique inguinal hernia between march 2014 and june 2015, patients had a mean age of 41.5 years (range of age from 21-63 years),52 patients were males (86.6%) and 8 patients were females (13. 3%).both patients in the fixation and non-fixation groups were all matched for age, sex, type of hernia, insurance policy.

All patients in the study came for post-operative follow up over the whole period of scheduled follow up time.

| | **TAPP with fixation** | **TAPP without fixation** |
|---|---|---|
| **Age** | 32.4 | 36.2 |
| **Sex** | Males:24, females: 6 | Males:28, females: 2 |
| **unilateral** | 23 | 28 |
| **Bilateral** | 7 | 2 |
| **Primary** | 28 | 26 |
| **Recurrent** | 2 | 4 |

**Operative time:**

The operative time is almost the same in both groups with a little bit more time among the TAPP group with mesh fixation, with mean operative time about 62.7 mins in this group compared to 56.4 mins among the non-fixation group, this little time difference may be adopted to the careful positioning of tacks in the fixation group away from dangerous areas like the triangles of pain and doom.

**Complication:**

No intra-abdominal bleeding, or post-operative scrotal edema of wound seroma were recorded in any of the cases of the 2 groups.

No bowel or bladder injury were discovered in any of the patients of the 2 groups.

**Pain**:

Apart from the initial post-operative groin pain normally felt by all cases, chronic groin pain was felt by 18% of patients (5 patients) in the non-fixation group, while 38% of patients (11 patients) in the fixation group discovered this type of pain. This pain was felt once a week by 24% of patients of the fixation group compared to 12% of patients of the non-fixation group that felt this pain on a weekly basis. however, this pain was chronically felt several times a week (up to 3 times maximum) in about 6% of the non-fixation group compared to 14 % of the fixation group, this pain was described as a matter of discomfort or pain of a mild degree.

Moderate or severe pain that can interfere with the daily activity or prevent patient from was not recorded in any of the 2 groups.

**Recurrence:**

One case of recurrence was recorded over the 15 months follow up period, it was detected in the fixation group, it was diagnosed clinically and confirmed by laparoscopy to be recurrence beyond lateral aspect due to in folded mesh, it was repaired in same session and by same described technique, however no recurrent cases were recorded among the non-fixation group.

**Cost:**

The cost of the materials and disposable equipment were markedly less in the non-fixation group more than in the fixation group, this difference was attributed to the cost of the disposable titanium tack applier.

## DISCUSSION

Many surgeons who perform TAPP technique for hernia repair, appear to hold the unproven fact that mesh fixation is mandatory for the prevention of hernia recurrence. At the same time, it is widely accepted that the need for mesh fixation is only temporary, as tissue encroaching over the mesh, In the form of cellular ingrowth occurs by two weeks and collagen deposition within two months, performs an effective permanent fixation[26].

It was not the goal of our study to discuss the long-term recurrence rate of TAPP; this has been previously Discovered to be approximately 1% after five years follow up [3]. Rather, it was to test the experience that, without fixation, mesh might migrate or fold before tissue growth has had a chance to occur, and lead to recurrence by the exposed hernial defects. Recurrence by this mechanism would be expected to be an early fact, and hence the theory for the initial trial follow-up after six postoperative months through which in normal situations recurrence cannot happen before this time. Maybe the mesh stabilization which can happen intrinsically due to the location of the mesh in TAPP IN THE PREPERITONEAL SPACE.

Evidence for this exists by Choy et al. who found that unfixed mesh could not easily migrate from its location confirmed by inspection of the mesh by laparoscopy of the pre-peritoneal space together with continuous on table hip flexion [27]. This stability was further confirmed by Irving et al. through postoperative X-ray studies [28]. Mesh stabilization mostly occur by the sandwich effect between the intact peritoneal layer and the pelvic wall, maintaining mesh position by even application of abdominal pressure. Limiting the extent of the preperitoneal dissection may help to further prevent any mesh migration, however some surgeons in performing preperitoneal hernia repair including Stoppa and Ferzli stated that fixation of mesh in the preperitoneal space may be unnecessary [29,30]. In their view, the more important factor of a successful long-term repair is adequate dissection (featured by complete exposure of all potential areas of weakness and parietalization of the cord structures) and avoidance of mesh that is too small.

In clinical experience, more than 6,500 laparoscopic hernia repairs without mesh fixation have now been reported [30,31,32,33,34,35,36,37]. The mean recurrence rate in these series is very minimal almost less than 1% after 15 months' time, comparable with the published recurrence rate of standard repairs involving mesh fixation.

Prior to the current trial, two other randomized prospective trials had been conducted attempting to address the need for mesh fixation in TAPP repair [30, 36]. Both trials finalized the result that mesh fixation was unnecessary and added more expenses. However, both studies were limited with small patient numbers (60 and 170 patients) making it difficult to detect anything other than very big differences in recurrence rates, and also dealt rather lightly with the assessment of chronic groin pain. An important point to be taken into consideration in this study, that most of hernial defects were smaller than 2 cm, and clinically most of cases were bubonoceles, however no recurrent case seen in funicular or inguino scrotal types, which means that smaller defect size maybe in favor of non-fixation (provided a 10-15 cm mesh is used), the question of whether larger defects (> 4 cm) can be comfortably repaired without mesh fixation has not yet been answered.

As regard post-operative chronic groin pain, the majority of patients that suffered groin pain, appeared to be mild with little or no interference with daily life even when tacks were used. Actually two-thirds of those in the fixation group reported no persisting groin discomfort whatsoever, even when pushed by direct questioning. depending on this, it would be unlogic to draw the conclusion that mesh fixation was associated with an unacceptable groin pain or discomfort. More accurately, it is mostly not necessary than forbidden in most cases, but it was associated with significant pain in a small percentage of patients. Fixation may still be appropriate in selected patients where the mesh was not applied properly or displayed tendency for folding, particularly in the sharply angled narrow pelvis [(31)]. Limiting the number of tacks in such situations appears to reduce the risk of pain. And the long term absorbable character of tacks diminishes the incidence of suffering long term groin pain but we are dealing in this series with the short-term groin pain [(32)].

As regard the operating time, The operative time is almost the same in both groups with a little bit more time among the TAPP group with mesh fixation, with mean operative time about (68.7) mins in this group compared to (62.4) mins among the non-fixation group, this little time difference may be adopted to the careful positioning of tacks in the fixation group away from dangerous areas like the triangles of pain and doom, these data were compared to One more randomized control trial showed a significantly longer operative time for TAPP with mesh fixation (72.31) over TAPP without mesh fixation (65.11).[(38)]

## CONCLUSION

Laparoscopic TAPP hernioplasty without mesh fixation proved its efficacy and feasibility as regard minimal recurrence rates, diminished post-operative chronic groin pain which affect quality of life as well as its cost effectiveness due to deduction of absorbable tack applicator price.

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