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# Outcomes of Laparoscopic Transabdominal Preperitoneal Inguinal Hernioplasty

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## ABSTRACT

**Background:** Inguinal hernia is a common problem that can be treated only by surgery. The surgeons should improve their technical skills in laparoscopic repair of inguinal hernia (TAPP) with short learning curve. The aim of the present study was to evaluate the safety, effectiveness and feasibility of TAPP inguinal hernia repair.

**Patients and methods:** A total of 18 consecutive male patients with inguinal hernias were prospectively randomized to TAPP repair at the surgical outpatient clinics of Zagazig University Hospitals. Postoperative pain was estimated using the visual analogue scale (VAS). Postoperative hospital stay and early postoperative complications were recorded.

**Results:** The present study showed age was distributed as 44.22±15.7 and majority was manual worker.VAS reduced significantly from 4.16±1.5 one week postoperative to 0.32± 0.31 six months postoperative. During follow-up, no pain, seromaformation were noticed in any patient. Complicated cases were 3 cases (16.7%). 2 cases with scrotal edema (11%) and recurrence 1 case (5.6%). Follow-up was performed at 7 days and at 1, 4, 6 months. When comparing complicated and uncomplicated cases in terms of post- operative pain, hospital stay, return to work and socio-demographic data, only hospital stay was significantly longer in cases that complicated later on.

**Conclusion:** Laparoscopic transabdominal preperitoneal mesh repair is safe and effective technique in treating inguinal hernia with less post-operative complications associated with and satisfaction and faster recovery.

**Keywords**: Inguinal Hernioplasty; TAPP; Laparoscopic Transabdominal Mesh

## INTRODUCTION

The inguinal hernia is termed incarcerated when it is not clinically reducible in abdomen. The estimated incidence ranges from 0.29 to 2.9%, being the second most common cause of small bowel obstruction**(1)**. Developments of transabdominal preperitoneal (TAPP) techniques led to valuable options for the management of inguinal hernia**(2)**.The operative management of inguinal hernia and significantly reduce recurrence when compared with traditional anterior hernia repair**(3).**Vascular injury is common occurring in hernia repair and often a reason for conversion. The various sites occur is rectus muscle vessel injury during trocar insertion; bleeding from venous plexus on the pubic symphysis; testicular vessel injury; and iliac vessels which requires an emergency conversion to control the bleeding and the immediate services of a vascular surgeon to repair the same**(4)**.

Previous studies had compared Lichtenstein, Should ice, and laparoscopic repair for inguinal hernia with each other, and found none of them was superior to the others

in long term follow-up**(5)**. Meanwhile, laparoscopic repair had certain advantages in aspects of postoperative pain scores, morbidity, and recovery compared with open repair**(6)**. Preperitoneal placement of the mesh has the benefit of intra-abdominal pressure to drive the mesh against fascia in repair and reductions of postoperative chronic pain due to preventing inguinal nerves connection**(7)**. Using a polypropylene mesh with a memory-ring that offers an easy placement in the preperitoneal space**(8)**.

Up to date, although guideline for laparoscopic hernia repair was formulated by the International Endohernia Society. However, some studies reported that TAPP was associated with higher pain scores, longer operation time, and more incidence of cord edema. Postoperative pain and discomfort may attend as concern changes to the postoperative quality of life**(9).**

Therefore, this study aimed to evaluate the safety, effectiveness and feasibility of TAPP inguinal hernia repair.

## PATIENTS AND METHODS

This study included 18 adult male patients presenting with inguinal hernias who admitted to the surgical outpatient clinics of Zagazig University Hospitals. Informed consent was obtained from all patients to participate in the present study.

**Inclusion and exclusion criteria:**

Patients within guinalhernia in age of 17-70 years performed laparoscopic hernioplasty (TAPP) and patients with recurrent inguinal hernia. While, patients with obstructed and strangulated hernia, chest diseases; and patients unfit for anaesthesia.

**Preoperative evaluation:**

Patients were subjected to full history taking; general and local examination, laboratory investigation and electrocardiogram for patients over 40 years of age were performed.

**Surgical technique:**

The patients were prepared for laparoscopic TAPP and placed in a supine position on the operating table. The patient is draped with the entire abdomen, groin, penis and scrotum scrubbed. The surgeon stands on the contra-lateral side of the hernia being repaired with the assistant standing on the ipsilateral side of the hernia but joining the surgeon once the ports have been placed. The monitor is set at the foot of the hernia side. The camera trocar is introduced infra umbilical with open technique and two 5mm trocars are introduced at the same level of umbilicus on both sides of the rectus sheath. The abdomen is inflated with CO2 with pressure set at 14 mmHg. A 30-degree telescope provides better view. Exploratory laparoscopy is carried out at first to identify the inguinal area and the important anatomical landmarks like epigastric vessels and umbilical ligament and the triangle of doom and triangle of pain. Dissection of the peritoneal flap is started at a point near the ASIS and running medially up to the midline then the space is created by dissection of the peritoneum from the fascia transversalis. Dissection is done until the sac is completely separated from the cord and other structures and dissection continues medially to the side of the bladder to give enough room for mesh placement. The sac is the pulled inwards out of the defect. A 15 x 15 cm sheet of polypropylene mesh is rolled into a tubular shape and introduced through the 10 mm umbilical trocar. The mesh is used to cover the direct space, the indirect space, and the femoral ring area. Fixation by tracker in the cooper's ligament and in the anterior abdominal wall on both sides of the inferior epigastric vessels to avoid haemorrhage **(Figure 1)**.Closure of the

peritoneal flap is done using 2/0 Vicryl sutures (Continuous sutures)**(Figure 2)**.

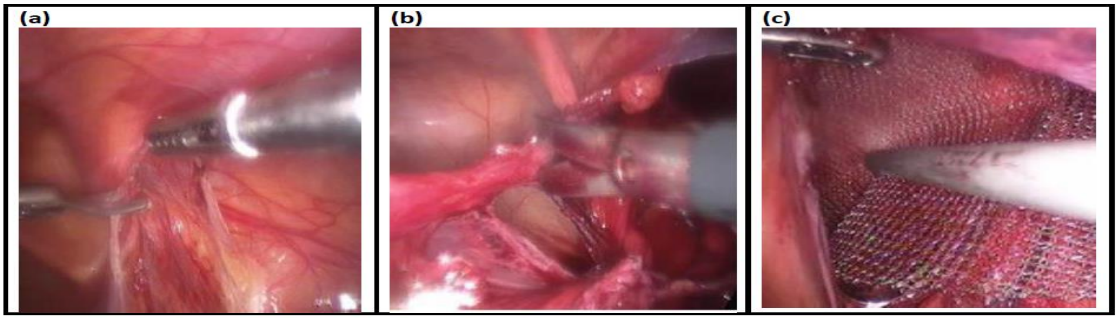


**Figure (1): laparoscopic TAPP showing: (a) dissectionoftheperitonealflap; (b) dissectionofthe sacfromthe spermaticcord and (c) Fixationofthemesh**

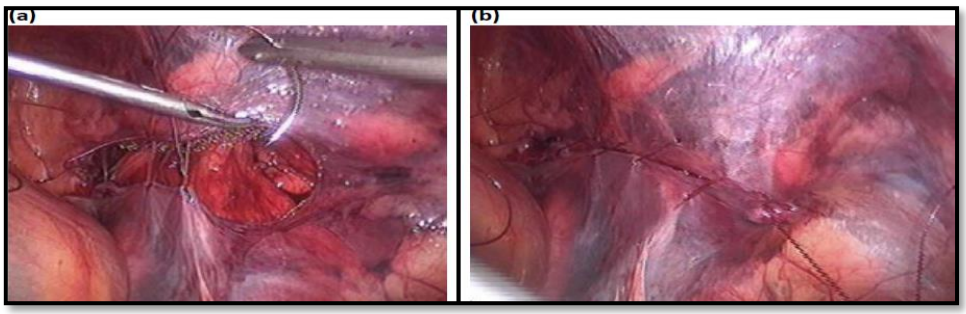


**Figure (2): Showing closure of the peritoneum at the end of laparoscopic TAPP.**

**Post-operative care and follow up:**

All patients received a second dose of antibiotic, a single dose of pethidine hydrochloride 50 mg intramuscular and anti-inflammatory drugs (Diclofenac sodium 75mg) orally upon discharge. Postoperative pain was estimated using the visual analogue scale (VAS). Postoperative hospital stay andearly postoperative complications were recorded. Patients were followed up for, 4 and 6 months post-operative at surgery outpatient clinic. Time at which the patient returned to work, late post-operative complications such as chronic pain (presence of inguinal or scrotal pain or pain in the mid-thigh area) and detection of early recurrence were recorded.

**Statistical analysis**

Data analyzed using Microsoft Excel software and Statistical Package for the Social Sciences (SPSS version 20.0) software. Qualitative data represent as number and percentage, quantitative continues group represent by mean ± SD, the following tests were used to test differences for significance; Chi square test ($X^2$) and t-test. P value was set at <0.05 for significant results &<0.001 for high significant result.

**RESULTS**

The present study showed age was distributed as 44.22±15.7 and majority were manual worker 50% followed by office clerk and student 16.7%, 44.4% were smoker, 16.7% were ex-smoker and no smoker were 38.9% **(Table 1).**The operation time improved significantly with repeated training (reduced from 2.5 hours to only 45 minutes)**(Figure 3)**. Hospital stay averaged around 7.77±2.21 hours **(Figure 4)**.Return to work was 4.55±1.51 days**(Figure 5)**. VAS reduced significantly from 4.16±1.5 one week postoperative to 0.32± 0.31 six months postoperative **(Figure 6)**.

The follow-up after period lasted months. During this period, no pain, seromaformation were noticed in any patient. Complicated cases were 3 cases (16.7%). 2 cases with scrotal edema (11%) and recurrence in 1 case (5.6%). Follow-up was performed at 7 days and at 1, 4, 6 months**(Table 2)**.When comparing complicated and uncomplicated cases in terms of post- operative pain, hospital stay, return to work and socio-demographic data, only hospital stay was significantly longer in cases that complicated later on**(Table 3)**.

**Table (1): socio-demographic data distribution among studied group**

| | | Age | |
|---|---|---|---|
| Mean± SD | | **44.22±15.7** | |
| Median (Range) | | **42.0 (18-70)** | |
| | | **N** | **%** |
| Occupation | **Manual worker** | **9** | **50.0** |
| | **Teacher** | **1** | **5.6** |
| | **Student** | **3** | **16.7** |
| | **Office clerk** | **3** | **16.7** |
| | **Retired** | **2** | **11.1** |
| Smoking | **No** | **7** | **38.9** |
| | **Ex-smoker** | **3** | **16.7** |
| | **Smoker** | **8** | **44.4** |
| | **Total** | **18** | **100.0** |

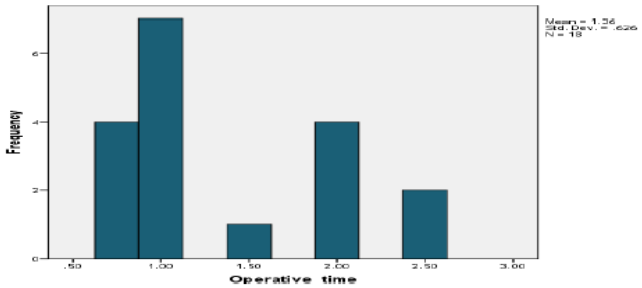


**Figure (3): Operative time in hours of studied cases.**

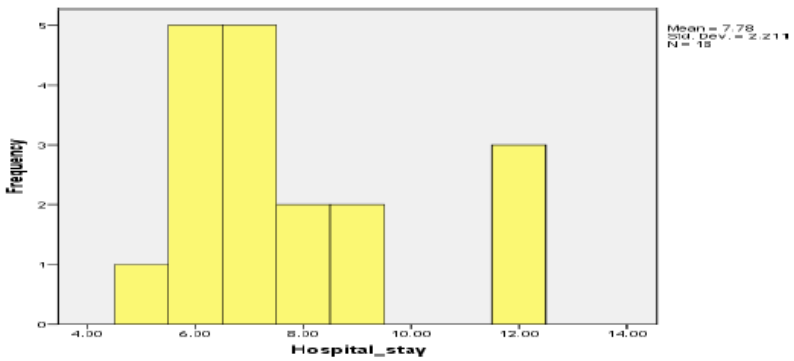


**Figure (4): Hospital stay in hours of studied cases.**

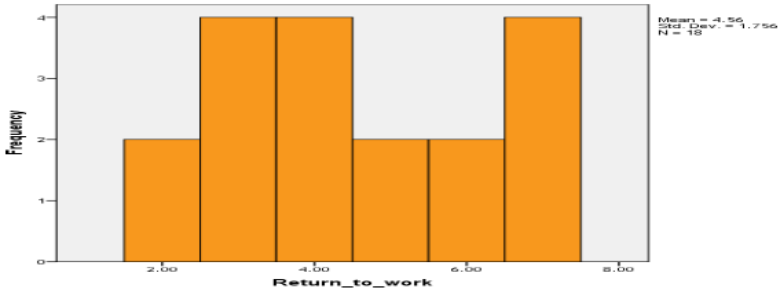


**Figure (5): return to work in days of studied cases.**

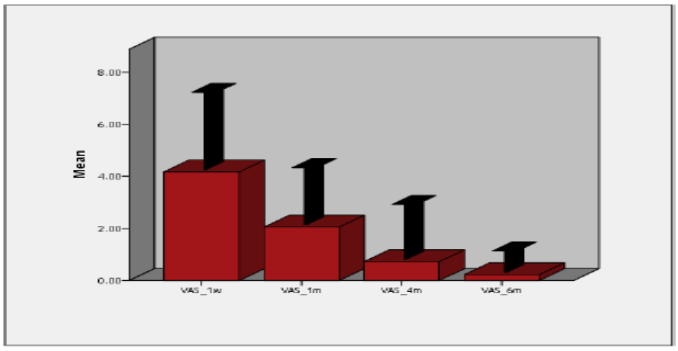


**Figure (6): Post-operative pain follow up of studied cases.**

**Table (2): Complication and outcome distribution among studied group**

| | | N | % |
|---|---|---|---|
| Complication | **Not** | **15** | **83.3** |
| | **Complicated** | **3** | **16.7** |
| Infection | | **0** | **0.0** |
| Bleeding | | **0** | **0.0** |
| Urine retention | | **0** | **0.0** |
| Scrotal edema | | **2** | **11.1** |
| Recurrence | | **1** | **5.6** |
| Total | | **18** | **100.0** |

**Table (3):Comparison between complicated and not complicated cases**

| | | | Not complicated | Complicated | $t/X^2$ | P |
|---|---|---|---|---|---|---|
| Age | | | 45.53±15.3 | 37.66±3.05 | 1.66 | 0.116 |
| Operative time | | | 1.28±0.42 | 1.75±0.62 | -1.19 | 0.25 |
| Hospital stay | | | 6.33±2.23 | 8.1±1.8 | -2.61 | 0.03* |
| Return to work | | | 4.33±1.42 | 5.66±1.74 | -1.21 | 0.24 |
| Occupation | Manual | N | 7 | 2 | | |
| | | % | 46.7% | 66.7% | | |
| | No | N | 8 | 1 | 6.8 | 0.14 |
| | | % | 53.3% | 33.3% | | |
| Co morbidities | -VE | N | 9 | 3 | | |
| | | % | 60.0% | 100.0% | | |
| | +VE | N | 6 | 0 | 1.8 | 0.18 |
| | | % | 40.0% | 0.0% | | |
| Smoking | NO | N | 7 | 0 | | |
| | | % | 46.7% | 0.0% | | |
| | Ex smoker | N | 3 | 0 | 4.5 | 0.105 |
| | | % | 20.0% | 0.0% | | |
| | smoker | N | 5 | 3 | | |
| | | % | 33.3% | 100.0% | | |
| Total | | N | 15 | 3 | | |
| | | % | 100.0% | 100.0% | | |

## DISCUSSION

Operative techniques have evolved over the past decades to provide the best management for inguinal hernias**(4).**After the introduction of laparoscopy, new techniques such as the trans abdominal preperitoneal (TAPP) repair gained acceptance with hopeful results and outcomes compared to the Open approach**(5)**.

Laparoscopic inguinal hernia repair is one of the most common procedures a general surgeon performs and is recognized as, reliable approach to inguinal hernia repair**(10)**.There is a scarcity of data comparing the laparoscopic trans abdominal preperitoneal (TAPP) approach follow up.

This study included 18 adult male patients presenting with inguinal hernias were prospectively randomized to TAPP repair. We evaluate the safety, effectiveness and feasibility of TAPP inguinal hernia repair.

Our study was in agree with **Mancini et al. (11)** reported 132 patients undergone surgical inguinal hernia repair, 31 (2.7%) were submitted to emergency procedures, of whom 20 underwent to Trans Abdominal Pre-Peritoneal laparoscopic surgery for incarcerated hernia. All of them were males; median age was 50 ranging from 35 to 77 years. There was no significant intraoperative complications were observed, while conversion to open surgery was not claimed. Median operative time was 81.3 min and the median hospital stay was 2 days.

However, **Aiolfi et al., (12)**revealed that the TAPP was associated with an estimated longer operative time**,** but this seems imputable to instrument maintenance and equipment costs.

In our study, during 1-month follow-up period, there was moderate pain in two patients (11%) and mild pain in 15 patients (83.3%); by the end of the fourth month, there were only seven patients with mild pain. Follow-up was performed at 7 days and at 1, 4, 6 months. **Campanelliet al. (13)**found postoperative chronic pain associated with perioperative nerves injury or entrapment.

Also, **Colvin et al., (14)** explained that nerves trapped in a shrinked mesh or by periprosthesis infammatory processes. In addition, the type of the mesh, the weight of the mesh (g/m2), and fxation method may be contributing factors for the development of postoperative chronic pain**.**

Indeed, the intraoperative identifcation and preservation of all three inguinal nerves during open surgery reduces signifcantly the incidence of postoperative chronic incapacitating groin pain (<1%)**(15)**. Thus, Some authors successively proposed laparoscopic/open combined approach to better evaluate abdominal cavity and bowel viability in case of irreducible inguinal mass **(16,17)**.

Similar satisfactory results to our clinical outcomes, **Mason et al. (18)**concluded that laparoscopic hernia repair was associated with lower complicated hernias.

Postoperative seroma and hematoma represented the most common surgery-related complications**(13)**. The method for mesh fxations, large hernia size, and medial hernia represent independent risk factors for seroma formation **(19)**.In our study, complicated cases were 2 cases with scrotal edema(11%) and recurrence 1 case (5.6%).**Mancini et al. (11)**recorded a minor postoperative complications were recorded in 5 patients (25%). After a median follow-up of 39 months, 1 patient recurred (5%).

Therefore, laparoscopic approach is well accepted as confirmed by the interviews administered during the follow-up. The favorable issues which surprised the patients were fast relief of pain and the coexistent treatment of the hernia without any additional invasive procedure emerged.

## CONCLUSION

Laparoscopic transabdominal preperitoneal mesh repair is safe and effective technique in treating inguinal hernia with less post-operative complications associated with and satisfaction and faster recovery.

**No Conflict of interest.**

## REFERENCES

**1-** Shuo Y, Guangyong Z, Cujhong J, Jinxin C, Yilin Z, Yingmo S, Minggang W (2016) Transabdominalpreperitoneal laparoscopic approach for incarcerated inguinal hernia repair. Medicine (Baltimore) 95(52):e5686 25.

**2-** Jagad RB, Shah J, Patel GR (2009) The laparoscopic trans peritoneal approach for irreducible inguinal hernias: Perioperative outcome in four patients. J Minim Access Surg 5(2):31–34 21.

**3-** Siow SL, Mahendran HA, Hardin M, Chea CH, Azim NAN (2013) Laparoscopic transabdominal approach and its modified technique for incarcerated scrotal hernias. Asian J Surg 36:64–68.

**4-** Legnani GL, Rasini M, Pastori S, Sarli D (2008) Laparoscopic trans-peritoneal hernioplasty (TAPP) for the acute management of strangulated inguino-crural hernias: a report of nine cases. Hernia 12(2):185–188 20.

**5-** Choi YY, Kim Z, Hur YK (2011) Laparoscopic total extraperitoneal repair for incarcerated inguinal hernia. J Korean SurgSoc 80:426–430 23.

**6-** Hoffman A, Leshem E, Zmora O, Nachtomi O, Shabtai M, Ayalon A, Rosin D (2010) The combined laparoscopic approach for the treatment of incarcerated inguinal hernia. SurgEndosc 24:1815–1818 22.

**7-** HerniaSurge Group (2018) International guidelines for groin hernia management. Hernia 22(1):1–165.

**8-** Gong K, Zhang N, Lu Y, Zhu B, Zhang Z, Du D, Zhao X, Jiang H (2011) Comparison of the open tension-free mesh-plug, transabdominalpreperitoneal (TAPP), and totally extraperitoneal (TEP) laparoscopic techniques for primary unilateral inguinal hernia repair: a prospective randomized controlled trial. SurgEndosc 1:234–239.

**9-** Iraniha, A., &Peloquin, J. (2018). Long-term quality of life and outcomes following robotic assisted TAPP inguinal hernia repair. Journal of robotic surgery, 12(2), 261-269.

**10-** Dreuning, K., Maat, S., Twisk, J., van Heurn, E., &Derikx, J. (2019). Laparoscopic versus open pediatric inguinal hernia repair: state-of-the-art comparison and future perspectives from a meta-analysis. Surgical endoscopy, 33(10), 3177-3191.

**11-** Mancini, R., Pattaro, G., &Spaziani, E. (2019). Laparoscopic trans-abdominal pre-peritoneal (TAPP) surgery for incarcerated inguinal hernia repair. Hernia, 23(2), 261-266.

**12-** Aiolfi, A., Cavalli, M., Micheletto, G., Lombardo, F., Bonitta, G., Morlacchi, A, Bona, D. (2019). Primary inguinal hernia: systematic review and Bayesian network meta-analysis comparing open, laparoscopic transabdominalpreperitoneal, totally extraperitoneal, and robotic preperitonealrepair. Hernia, 23(3), 473-484.

**13-** Campanelli G, Bruni PG, Morlacchi A, Lombardo F, Cavalli M (2017) Primary inguinal hernia: the open repair today pros and cons. Asian J EndoscSurg 10:236–243.

**14-** Colvin HS, Rao A, Cavalli M, Campanelli G, Amin AI (2013) (2013) Glue versus suture fxation of mesh during open repair of inguinal hernias: a systematic review and meta-analysis. World J Surg 37:2282–2292.

**15-** Charalambous MP, Charalambous CP (2018) Incidence of chronic groin pain following open mesh inguinal hernia repair, and effect of elective division of the ilio-inguinal nerve: meta-analysis of randomized controlled trials. Hernia 22:401–409.

**16-** Lavonius MI, Ovaka J (2000) Laparoscopy in the evaluation of the incarcerated mass in groin Hernia. SurgLaparoscEndosc 14:488–489 28.

**17-** Lin E, Wear K, Tiszenkel HI (2002) Planned reduction of incarcerated groin hernias with hernia sac laparoscopy. SurgEndosc 16:936–938.

**18-** Mason RJ, Moazzez A, Sohn HJ, Berne TV, Katkhouda N (2011) Laparoscopic versus open anterior abdominal wall hernia repair:30-day morbidity and mortality using the ACS-NSQIP database. Ann Surg 254(4):641–652.

**19-** Nahid, A. K., Rahman, S., Veerapatherar, K., &Fernandes, R. (2021). Outcomes on mesh fixation vs non-fixation in laparoscopic totally extra peritoneal inguinal hernia repair: a comparative study. Turkish Journal of Surgery, 37(1), 1-6.