Laparoscopic Transabdominal Preperitoneal Inguinal Hernia Repair without Mesh Fixation

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ABSTRACT

Background*: Mesh fixation had been reported as a possible cause for persistent groin pain manifested by a significant number of patients following laparoscopic transabdominal preperitoneal (TAPP) inguinal hernia repair. It is also associated with increased operative cost. Nonfixation could be done especially for patients with small defects, thus reducing the cost, postoperative and chronic pain.* ***Patients and methods****: This study was conducted between May 2014 and January 2016. The study included 40 patients with inguinal hernia operated with laparoscopic TAPP technique without mesh fixation. Patients with huge inguinoscrotal hernia with large defect were treated with mesh fixation and were excluded from the study. They were followed up for at least 1 year post-operative for early and late complications.* ***Results:*** *No intra-operative complications have been registered. Two patients (5%) with direct hernias developed seroma, and one patient (2.5%) had subcutaneous emphysema. No chronic pain or hernia recurrence was observed within the follow up period.* ***Conclusion:*** *For selected patients, the nonfixation of mesh in TAPP seems a safe alternative that is associated with fewer costs, shorter operative time and decreased incidence of chronic pain without increased risk of recurrence.*

Key words: *laparoscopic hernia repair, transabdominal preperitoneal, without mesh fixation.*

INTRODUCTION

Inguinal hernia repair is one of the most frequent abdominal operations.[1] The laparoscopic repair is a minimally invasive surgery and may cause less pain, shorter recovery, and less risk of chronic pain compared with the open repair.[2-4] It can be performed through TAPP approach or totally extraperitoneal (TEP) approach.

TAPP laparoscopic groin hernia repair is reported as an excellent choice in numerous studies, providing patients a good quality of life, especially when performed by an experienced surgeon.[5-11]

Chronic neuralgia after hernia repair can be disabling, with great impact on quality of life. In fact, the largest problem with inguinal hernia surgery today remains the risk of chronic pain .[12] It is defined as pain lasting more than 3 months after surgery.[13]

The incidence of chronic pain after hernia surgery ranges widely in the literature,[14,15] according to a systemic review, postoperative chronic pain was present in 11% of patients who underwent inguinal hernioplasty.[16] Although laparoscopic repair appears to be significantly less likely to induce postoperative chronic pain, this complication is still present in 1–2% of patients.[17] One of the risk factors for developing chronic pain after laparoscopic inguinal hernia repair, is the fixation method of the mesh.[18]

Stapling of the mesh, which may lead to nerve injury and osteitis pubis, has been identified as one of the possible causes of the persistence or development of pain after hernia surgery.[15] The recently published 2014 update of the European Hernia Society guidelines on inguinal hernia repair stated that ‘‘penetrating fixating or traumatic devices like sutures, staples, and tacks cause local trauma that may result in nerve injury and chronic pain.’’[19]

Renee Stoppa, one of the pioneers of modern herniology, had reported that a large prosthetic mesh placed in the preperitoneal space reduces the risk of recurrence even without excessive fixation.[20] The mesh is kept in place by the intra-abdominal pressure until it is definitively fixed by scar tissue. In the early years of laparoscopic inguinal hernia repairs, a strong fixation seemed to be the most important factor in prevention of recurrence. With growing size of the mesh and true macroporous materials being used, the belief in strength reduced and gave way to the concern of acute/chronic pain possibly caused by fixation. The controversy of fixing or nonfixing the mesh is currently under scrutiny. There are reports of

excellent results with meshes that are not fixed.[21] The aim of this study was to present the retrospective experience of laparoscopic transabdominal preperitoneal inguinal hernia repair without mesh fixation.

PATIENTS AND METHODS

This retrospective case series study was conducted between May 2014 and January 2016 at Ain Shams University hospitals. The study included 40 patients having primary unilateral inguinal hernias aged 19-53 years and not having any contraindication for general anesthesia or laparoscopic surgery. Patients with a history of lower abdominal or pelvic surgery were excluded. The patients were recruited from the outpatient clinic. Complete history and physical examination were carried out, including abdominal ultrasound to exclude any possible cause of recurrence. An informed consent was obtained from the patients for participation in this study according to the Ethical Committee of the Faculty of Medicine, Ain Shams University.

All patients were operated with laparoscopic TAPP technique. Polypropylene Mesh (Ethicon, Johnson and Johnson Co.) size 15x12 cm was used without fixation. Patients with huge inguinoscrotal hernia with large defect were treated with mesh fixation and were excluded from the study. A scrotal support was applied to all males for 1 week postoperative. Patient's data, operative and postoperative course, and outpatient follow-up were studied. Continuous variables were expressed as means and SDs; Categorical variables were expressed as frequencies and percentage. The following data were collected retrospectively: age, sex, duration of surgery, type of hernia, intraoperative complications, postoperative complications, hospital stay, post-operative and chronic pain and recurrence. Patients were followed -up for at least 1 year post-operative for early and late complications.

Surgical technique

After shaving and disinfecting the skin, a Foley catheter is inserted in all patients under general anesthesia. The patient is positioned in the supine position with the arms to the side and the operating table in a 15◦ Trendelenburg position. The monitor was placed at the foot of the table. A10 mm port was placed just above the umbilicus, via the open Hasson technique, for laparoscopy and for CO2 pneumoperitoneum up to pressure of 14 mmHg. Two working ports were placed lateral to the rectus muscle at the level of the umbilicus, one in the right side (10 mm) and the other in the left side of the abdomen (5 mm).

Systematic exploration of abdominal cavity is done. The groin anatomy, inferior epigastric vessels, the spermatic vessels, the vas deferens and the hernia defect are identified **(Fig. 1)**. The other inguinal canal is inspected. The peritoneum is incised several centimeters above the hernia defect, starting from the anterior superior iliac spine to the edge of the median umbilical ligament **(Fig. 2)**. Dissection is performed in the preperitoneal avascular plane using scissor, hook and a harmonic scalpel (Ethicon Endo Surgery, USA). If the sac is small, it was completely dissected free from the cord. When the sac is large, it was dissected and divided beyond the internal ring, and the subsequent peritoneal defect was closed with vicryl 3/0. In case of direct hernia, dissection was done to cross the midline.

After dissection of the sac **(Fig. 3)**, a large piece of polypropylene Mesh (Ethicon, Johnson and Johnson Co.) size 15x12 cm, is used to cover the myopectineal orifices, including the direct, indirect, and femoral hernia spaces **(Fig. 4)**. The mesh was left without fixation taking in consideration that the mesh should stay in the pre peritoneal space without any folds particularly at the corners, if the mesh got folded; the pre peritoneal space was further dissected. The peritoneum was closed by continuous absorbable sutures (vicryl 3/0) **(Fig. 5)**. The 10 mm ports puncture sites were closed to prevent port site hernia. The trocar wounds were infiltrated with long acting local anesthetic to reduce post-operative pain and analgesia requirements. The Foley catheter was removed at the end of surgery.

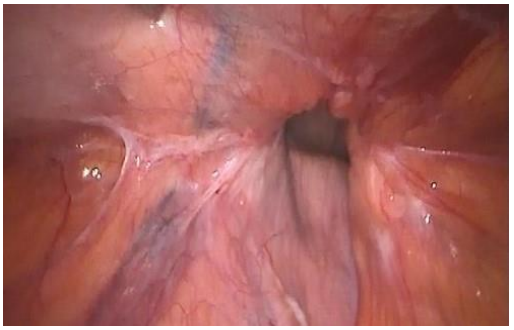

Fig. (1) Lt direct inguinal hernia

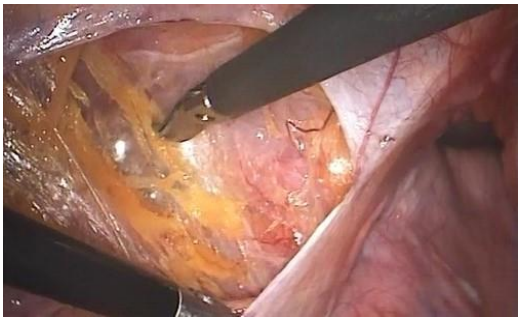

Fig. (2) Opening peritoneal flap

Fig. (3) Peritoneal flap check after sac dissection

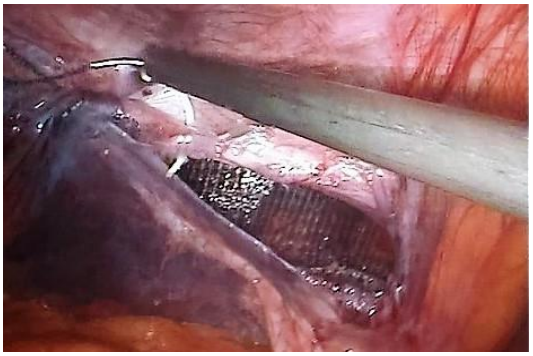

Fig. (4) After application of mesh and starting peritoneal closure

Fig. (5) Closure of the peritoneal flap

RESULTS

The study included 40 patients, 38 males (95%) and two females (5%), eight patients (20%) had direct hernias, whereas 32 patients (80%) had indirect hernias, none of the patients had recurrent or bilateral hernia. All these patients underwent laparoscopic TAPP repairs, with no conversions to open surgery. The age of subjects was 19-53 years with a mean age of 29.775 years. The operative time was 69±11 minutes. Liquid diet was started six hours after surgery, if no vomiting or nausea. Next postoperative day dressing was removed and puncture sites were observed.

The hospital stay ranged from 1 to 2 days with a mean hospital stay of 1.295 days. The patients were followed-up in the postoperative period for any complications such as bleeding, hematoma formation, post-operative ileus, seroma, trocar site or mesh infection, adhesions, and postoperative pain. The pain was scored according to Numeric Rating Scale where 0= no pain and 10 = extremely painful. The ranges then were divided into mild pain (1–3), moderate pain (4–6), and severe pain (7–10). The pain is scored in the first 48 hs postoperatively and after 1 week, 1, 6 and 12 months. The pain was most intense on day 0 and is aggravated by coughing and movement and controlled with simple analgesia. In the first 48 hs, the pain score was 2.216±0.642. It decreased to 1.651±0.514 after 1 week and to 0.6±0.363 after 1 month. None of patients complained of chronic pain at follow up after 6 and 12 months.

No intra-operative complications have been registered. Two patients (5%) with direct hernias developed seroma, and one patient (2.5%) had subcutaneous emphysema. All these complications were managed conservatively. One of the patients with seroma needed repeated ultrasound guided aspiration. Four male patients (10%) had temporary urinary retention postoperatively. They required temporary reinsertion of a Foley catheter with uneventful removal and resumption of urinary continence. All patients resumed their usual light work or preoperative daily activities within 3 weeks after surgery. All patients have been followed up for at least 1 year after surgery. A clinical examination aiming for detection of hernia recurrences was performed at 6 and 12 months. No chronic pain or hernia recurrence was observed within the follow up period.

DISCUSSION

Inguinal hernias are common; with a lifetime risk of 27% for men and 3% for women.[22] Inguinal hernia surgery is one of the most common surgical procedures performed worldwide. [23]

Choosing the most suitable groin hernia repair technique is challenging. The best technique should have the following attributes: low risk of complications (pain and recurrence), (relatively) easy to learn, fast recovery, reproducible results and cost effectiveness. The decision is also dependent upon many factors like: hernia characteristics, anesthesia type, the surgeon's preference, training, capabilities and logistics. The patient's wishes must be considered. There are cultural differences between surgeons, countries and regions.

Most laparoscopic inguinal hernia repairs are performed with placement of a synthetic mesh into the preperitoneal space, which can be done in one of two ways: the TAPP or the TEP approach. The TAPP approach requires laparoscopic access into the peritoneal cavity and placement of mesh in the preperitoneal space after reducing the hernia sac.[24] The TEP approach involves preperitoneal dissection and mesh placement without entering into the abdominal cavity.[25] This is a retrospective study to determine the effect of mesh nonfixation on the incidence of postoperative and chronic pain and the risk of hernia recurrence.

In this study, the postoperative pain was mild and controlled with simple analgesia. The pain was most intense on day 0 and is aggravated by coughing and movement. In the first 48 hs, the pain score was 2.216±0.642. It decreased to 1.651±0.514 after 1 week and to 0.6±0.363 after 1 month. This is similar to the study reported by Tolver et al., who concluded that early pain within the first week after TAPP and TEP is most severe on the first post-operative day.[26]

None of patients complained of chronic pain at follow up after 6 and 12 months. This agreed with the study reported by Li et al. who stated that the key to prevent Postoperative and chronic pain, is proper surgical procedures, including reducing suturing and fixation as much as possible. Procedures without mesh fixation skip the stapling process and avoid injuries to nerves and vessels, thereby decreasing the risk of postoperative and chronic pain.[27]

Stapling of the mesh had been often considered as the potential cause of chronic pain after hernia surgery,[28,29] so many authors had used fibrin glue as an alternative to stapling,[30,31] others used a self-adhesive mesh.[32,33] Non fixation of the mesh is theoretically a predisposing factor for hernia recurrence due to the risk of mesh displacement. In this study, no hernia recurrence was observed within the follow up period, this is consistent with the study performed by Sajid et al., he conducted a meta-analysis on laparoscopic inguinal hernia repair comparing mesh fixation versus no fixation, and proposed that hernioplasty without mesh fixation did not increase the risk of hernia recurrence.[34]

The results in this study are similar to those found in the literature, a study conducted by Li et al. showed that TAPP inguinal hernioplasty without mesh fixation, not only reduced operative duration, promoted early recovery, and cut down expense, but also improved the quality of life. [27] A randomized study in TAPP hernia by Smith et al.[35] showed no recurrences in over 250 patients receiving no fixation at a median follow-up of 16 months. Another randomized trial had demonstrated that is no difference in recurrence rates and postoperative pain after repairs using fixation versus non fixation.[36]

CONCLUSION

Laparoscopic inguinal hernia repair by the TAPP technique is a good option. Precondition for excellent results is the strict application of a standardized technique. For selected patients, the nonfixation of mesh in TAPP seems a safe alternative that is associated with fewer costs, shorter operative time and decreased incidence of chronic pain without increased risk of recurrence.

Surgeons should consider nonfixation on a case-by-case basis; likely, those patients with large direct hernias should have some form of fixation, whereas those with small indirect defects less than 3 cm, likely do not require fixation if a large piece of mesh is used. The choice of a greater mesh and ‘‘complete medial sac reduction’’ must be carefully made to obtain a plane inguinal region surface for mesh placement and greater mesh overlap. This helps to reduce both the recurrence and the seroma rates.

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