Mesh Fixation versus Non Fixation in Laparoscopic Transabdominal Preperitoneal Inguinal Hernia Repair

Thesis

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Abstract

Background: Inguinal hernia repair is the most common procedure in general and visceral surgery worldwide. Several studies have shown that laparoscopic repair offers the advantage of minimally invasive surgery to the patient. The mesh can be placed without fixation or can be fixed into place with tuckers.

Patients and Methods: Sixty adult males with inguinal hernia were repaired with laparoscopic transabdominal preperitoneal inguinal hernia repair, divided into; mesh fixation group (n= 35) versus non-fixation group (n= 25), and certain parameters were assessed during the operative, postoperative and follow-up periods.

Results: Mean operation time and mean hospital stay time were significantly higher in mesh fixation group than non-fixation group. VAS scores 2days, 3months, and 6months postoperative were less for non-fixation group. Non-significant difference was found between both groups regarding intraoperative injury, hernia recurrence, wound seroma, mesh infection, chronic pain, return to physical activity.

Conclusion: TAPP inguinal hernioplasty without mesh fixation does not increase recurrence rate, but reduces operative duration, hospital stay duration and decreases the incidence of postoperative pain.

Key words: inguinal hernia, TAPP, mesh fixation, and non-fixation.

List of abbreviations

ALT	Alanine transaminase
ASA	American Society of Anesthesiologists
ASIS	Anterior superior iliac spine
AST	Aspartate transaminase
BMI	Body mass index
cm	Centimeter
CO_2	Carbon dioxide
COPD	Chronic obstructive pulmonary disease
ECG	Electrocardiogram
ePTFE	Expanded polytetrafluoroethylene
gm/m2	Gram per cubic meter
IPOM	Intraperitoneal onlay mesh
PP	Polypropylene
SPSS	Statistical Package for the Social Sciences
TAPP	Transabdominal preperitoneal
TEP	Total extraperitoneal
TIPP	Transinguinal preperitoneal patch
TREPP	Trans rectus sheath extraperitoneal procedure
VAS	Visual analogue scale

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Introduction

Inguinal hernia repair is the most common procedure in general and visceral surgery worldwide. Over the past two decades, laparoscopic inguinal hernia repair has become more and more popular **(Elshof et al., 2009)**.

Laparoscopy offered less postoperative pain, less analgesic consumption, earlier return to normal activities and work, and fewer long-term complications of groin pain and permanent paresthesia, but an equivalent recurrence rate compared with open mesh repairs **(Baiomy and Oraby, 2017).**

In the laparoscopic procedure, tension-free repair is achieved by placement of a prosthetic mesh to cover the entire groin area, including the sites of direct, indirect, and femoral hernia. The laparoscopic approach is based on the principle of tension-free repair, which has been well established by open operation by Fitzgibbons *et al*. **(Fitzgibbons *et al.*, 2006)**.

Developments in laparoscopic techniques to repair inguinal hernias using polypropylene flat mesh have led to valuable options for the management of inguinal hernias **(Moldovanu and Pavy, 2014)**.

Several studies have shown that laparoscopic repair offers the advantage of minimally invasive surgery to the patient **(Butters et al., 2007).**

The mesh can be placed without fixation or can be fixed into place with tuckers. These metal tuckers increase the cost and there is an increased incidence of chronic groin pain **(Horisberger et al., 2013)**.

Although recurrence rates remain the most important outcome parameter, recently, discussions on inguinal hernia repair focus more on chronic pain,

rather than the rate of recurrence. The number of studies reporting high incidences of postoperative chronic pain after open anterior mesh repair is increasing **(Gersin et al., 1999)**.

Preperitoneal placement of the mesh has the advantage of using the intra-abdominal pressure to push the mesh against the overlying fascia in a more natural type of repair and decreases postoperative chronic pain because it prevents contact with the inguinal sensory nerves (ilioinguinal, iliohypogastric, and genital branch of the genitofemoral nerve) running in the inguinal canal repairs **(Baiomy and Oraby, 2017).**

The implanted preperitoneal mesh theoretically may migrate away from the abdominal wall defect leading to recurrence of hernia. Therefore, mesh fixation is a solution to avoid this complication. However, tucks used for mesh fixation can entrap the sensory nerves with subsequent persistent pain and burning sensations in the inguinal region, the upper medial thigh, or the scrotal skin region. When these symptoms persist, they may result in severe morbidity **(Liem et al., 2009)**.

Aim of the work

The aim of this study is to compare mesh fixation versus non fixation in laparoscopic transabdominal preperitoneal (TAPP) repair of inguinal hernia, as regards the operation time, hospitalization, postoperative complication, recurrence and chronic pain.

Laparoscopic anatomy of the groin

Introduction

Laparoscopic inguinal hernia repair is performed more and more nowadays because of its mini-invasive nature and demonstrated good results. Laparoscopic procedures are especially suitable for recurrent and bilateral inguinal hernia. The major procedures include intraperitoneal onlay mesh (IPOM) repair, transabdominal preperitoneal (TAPP) repair and total extraperitoneal (TEP) repair. The anatomy of these procedures is totally different from traditional open procedures because they are performed from different direction **(Yang and Liu, 2016)**.

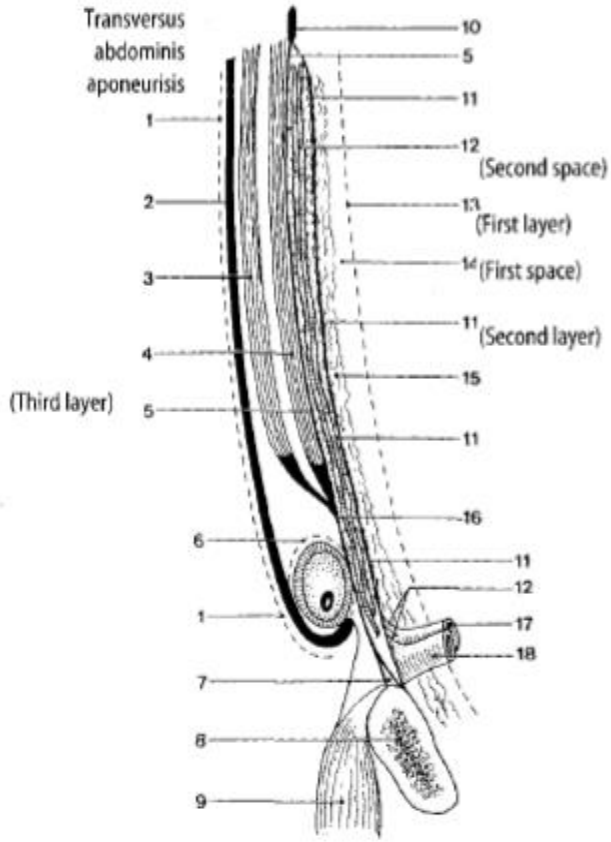

Figure (1): Diagrammatic representation of the layers of the inguinal area

1 External oblique fascia (of Gallaudet), 2 External oblique aponeurosis, 3 Internal oblique muscle, 4 Transversus abdominis muscle and its aponeurosis, 5 Transversalis fascia anterior, 6 Internal spermatic fascia, 7 Cooper's ligament, 8 Pubic bone, 9 Pectineus muscle, 10 Transversalis fascia, 11 Transversalis fascia posterior Lamina, 12 Vessels, 13 Peritoneum, 14 Home (space) of the prosthesis space of Bogros, 15 Preperitoneal fat, 16 Transversus abdominis aponeurosis and anterior lamina of transversalis fascia, 17 External iliac artery, 18 External iliac vein **(Colborn and Skandalakis, 1998)**.

Laparoscopic operations for inguinal hernia are carried out intraperitoneally or in preperitoneal space. Surgeons must understand important anatomic acknowledge of the operation area under laparoscopic views before they begin to perform these procedures, otherwise it will be very risky to cause complications such as bleeding, nerve damage, insufficient repair and recurrence. The main anatomic points include layers, spaces and others **(Yang and Liu, 2016)** as shown in **Figure (1)**.

✍ Layers

1) First layer: peritoneum and peritoneal fossae

a. <u>Peritoneum</u>

The peritoneum, this primitive lining of the early fetal celomic cavity, is the innermost layer of the internal abdominal wall. In the pelvis and, to be more specific, in the inguinal area, it has several characteristics related to the several anatomic entities with which it is associated. If one operates by the transperitoneal laparoscopic approach, that is, by beginning the herniorrhaphy from within the peritoneal cavity, knowledge of the characteristic features of the peritoneum lining the lower part of the anterior abdominal wall is of cardinal importance in initial orientation for subsequent operative procedures. The parietal peritoneum lining the anterior abdominal wall is elevated by underlying structures passing to the wall, thereby forming folds, or ligaments **(Colborn et al., 1995)**.

Between these folds of the peritoneum three fossae are formed bilaterally. The midline fold of peritoneum is caused by the urachus (whether obliterated or not) passing from the apex of the urinary bladder to