



Intracorporeal Suturing of Mesh and Peritoneum during TAPP as Substituting for Tackers

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

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List of Abbreviations

Abb.	Full term
<i>COPD</i>	<i>Chronic obstructive pulmonary disease</i>
<i>DDH</i>	<i>Developmental Hip Dysplasia</i>
<i>ECM</i>	<i>Extracellular matrix</i>
<i>EHS</i>	<i>European Hernia Society</i>
<i>GPRVS</i>	<i>Giant prosthetic reinforcement of the visceral sac</i>
<i>MMPs</i>	<i>Matrix metalloproteinases</i>
<i>PHS</i>	<i>Prolene Hernia System</i>
<i>TAPP</i>	<i>Transabdominal pre-peritoneal hernia repair</i>
<i>TEP</i>	<i>Totally extraperitoneal</i>
<i>TIPP</i>	<i>Transinguinal preperitoneal repair</i>
<i>U/S</i>	<i>Ultra sonography</i>

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INTRODUCTION

The hernia repair is one of the most common surgical procedure, worldwide at least 20 million hernia repair procedure are annually performed, in US around 700000 inguinal heriorrhaphies annually performed (*Muschalla et al., 2016*).

The rate of laparoscopic approach had doubled in the past decade, but open repair was still the mainstay of treatment, the overall laparoscopic rate had increased from 10.5 to 23 per cent (*Wong et al., 2017*).

The first laparoscopic hernia repair performed by Ger in 1970s, Schultz described Transabdominal pre-peritoneal hernia repair (TAPP) in 1990s (*Altintoprak et al., 2018*).

The most commonly used laparoscopic techniques for an inguinal hernia are transabdominal pre-peritoneal (TAPP) and totally extraperitoneal (TEP), hernia repair. TAPP require access to the peritoneal cavity with insert a mesh through the peritoneal incision so the mesh is placed in the preperitoneal space to cover all potential sites (*Bittner and Schwarz, 2015*).

Even the laparoscopic approach is widely accepted for many diseases and became a gold standard technique in some surgical procedures nowadays like (Cholecystectomy, appendectomy) We found the laparoscopic approach for treatment of hernia is not the first choice also the choice between its type TAPP or TEP still controversial (*Schmedt et al., 2002*).

However, continuing increase in the number of laparoscopic approaches performed since their introduction using mesh in late 1991 and laparoscopic technique is becoming increasingly more utilized also the laparoscopic exploration allows intraoperative diagnosis of any associated diseases and the anatomical landmark is easily recognized (*Zendejas et al., 2013*).

Laparoscopic hernia repair is more difficult technically than open surgery and there is evidence of learning curve in its performance and many complications which reported from laparoscopic procedure is due to learning curve as Laparoscopic hernia repair performed by inexperienced doctors lead to operative complications (*Wakasugi et al., 2015*).

Schrenk thought that we can choose laparoscopic approach due to its benefits as rapid recovery, quicker return to work, less acute pain complication, better quality of life outcomes (*Arslan et al., 2015*).

However, many complications have been also reported after laparoscopic hernia repair like nerve injury, bladder injury and bowel obstruction (*Mercoli, 2017*).

TAPP is preferred in large, direct, bilateral inguinal hernia, also in inguinodynia, recurrent hernia, scrotal hernia, incarceration and strangulation and prior abdominal surgical history involving lower midline (*Ielpo et al., 2017*).

AIM OF THE WORK

To use intracorporeal sutures during TAPP hernia repair as substituting for Tackers, we find it available, cheaper and more handle than using the Tackers which are expensive and less available.

Chapter 1**PATHOPHYSIOLOGY OF
INGUINAL HERNIA**

A groin hernia is defined as a protrusion of a portion of an organ or abdominal content through an opening in the groin area, with a hernia sac covering the abdominal content. Groin hernias are classified according to anatomy in inguinal hernias and femoral hernias. An inguinal hernia is the protrusion of intra-abdominal contents through a defect in the abdominal wall. The 2 types of inguinal hernias are direct inguinal hernias and indirect inguinal hernias (*Lockhart et al., 2018*).

An indirect inguinal hernia forms as a result of the failure of the processus vaginalis to fully obliterate. When it remains open, the potential for herniation occurs. Thus, it is referred to as a congenital hernia. This hernia lies lateral to the inferior epigastric artery. It passes through the deep (internal) inguinal ring and may pass through the entire inguinal canal and into the scrotum, depending on the patency of the processus vaginalis (*Burcharth et al., 2014*).

The second type of inguinal hernia is the direct hernia. This hernia forms as a result of weakening of the posterior wall of the inguinal canal. It typically occurs as a result of increased abdominal pressure. Thus, it is known as an acquired hernia.

The herniation is found to be medial to the inferior epigastric artery (*Burcharth et al., 2014*).

One of the largest challenges regarding groin hernia surgery is recurrence and this still remains a clinical problem, even though treatment modalities and technical aspects have improved. The definitive reason for recurrence after inguinal hernia surgery still remains unclear and it has not been possible to identify single parameters or risk factors as being responsible (*Burcharth et al., 2014*).

A new concept of hernia biology puts forward the premise that disturbances in collagen metabolism contribute to hernia disease and high recurrence rates. The collagens are major components of the Extracellular matrix (ECM). Indeed, the ECM is in a dynamic balance of synthesis and degradation by matrix metalloproteinases (MMPs). This highly interlinked network embraces tissue remodeling and wound healing, which are additionally orchestrated by cytokines and chemokines. Morphologic and molecular investigations in hernia patients underscore the significance of impaired wound healing and raise the hypothesis that genetic traits might predispose to hernia formation (*Öberg et al., 2017*).

i. Biochemical and Fascial Factors:

Numerous studies have analyzed changes of collagen synthesis and metabolism in tissue samples from hernia patients. In direct inguinal hernias, the rectus sheath is thinner

and has irregularly arranged collagen fibers that exhibit a disturbed hydroxylation of the collagen. Within the transversalis fascia, an alteration in collagen composition leads to increased tissue elasticity. The collagen matrix has been evaluated in recurrent and incisional hernia diseases (*Berrevoet, 2018*).

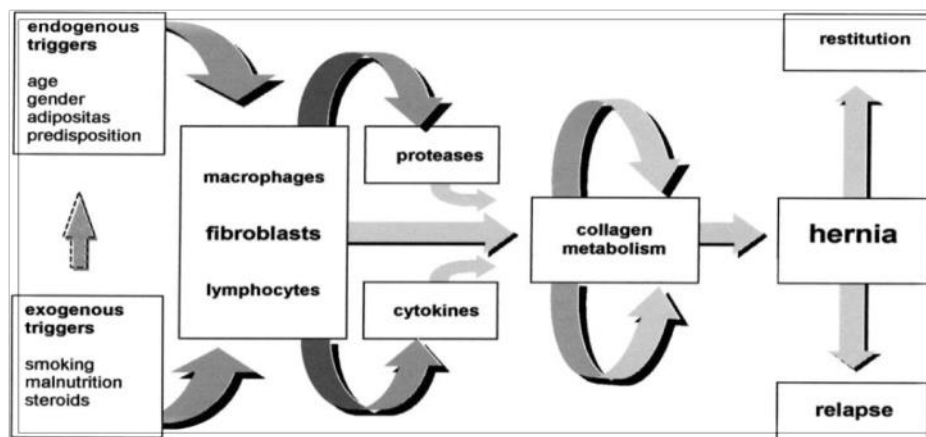


Figure (1): Pathogenesis of hernia formation (*Franz, 2008*).

ii. Congenital factors:

At birth, 70% to 80% of male infants have a patent processus vaginalis. This figure decreases to 25% to 35% at 4 years. Closure is more frequent on the left (*Öberg et al., 2017*).

iii. Muscular Factors:

From Bassini onward, herniologists have been concerned about atrophy of the internal oblique and transversus muscles that contributes to defects at the internal inguinal ring. Contraction of the external oblique muscle and aponeurosis contributes and reinforces the posterior wall by counter

pressure against intra-abdominal forces. The inguinal ligament is pulled up, which diminishes the exposure of Hesselbach's triangle. "Thus acts of coughing straining or lifting which tend to blow out the internal ring and the fascia transversalis, act simultaneously to bring into action the protective physiological mechanisms that oppose those tendencies (*Abrahamson et al., 2001*).

iv. Smoking factors:

Cigarette smoking inactivates antiproteases in the lung and likely other tissues. It has been suggested that this disruption of the protease/ antiprotease balance causes injury to the fascia of the inguinal region as well and predisposes to herniation. This is somewhat confounded by the increased abdominal pressures with chronic obstructive pulmonary disease (COPD)/emphysema that result from smoking and some trials place the risk of COPD as the variable associated with hernia and not the cigarette smoking (*Öberg et al., 2017*).

v. Aging Factors:

The prevalence of groin rupture is known to peak in young and old patients. Whereas the incidence in early life is attributed to congenital, maturation, or genetic factors. In elderly patients the incidence of inguinal hernia has been blamed on aging. A progressive weakening of elastic and elastin-related fibers in the transversalis fascia of elderly patients. Furthermore, recent data show that, in elderly patients,