Assessment of Intra-Operative Difficulties and Early Post-Operative Complications in Laparoscopic Inguinal Hernia Repair using Conventional Polypropylene Mesh Versus 3D Mesh

Thesis

Submitted for Partial Fulfillment of Master Degree in General Surgery

By

Shaimaa Atef Ismaeil Awwad Elkomy

M.B., BCh, Faculty of Medicine, Ain Shams University

Under supervision of

Prof. Dr. Hazem AbdelSalam Mohamed

Professor of General Surgery
Faculty of Medicine - Ain Shams University

Dr. Karim Fahmy

Lecturer of General Surgery
Faculty of Medicine - Ain Shams University

Dr. Mohammad Ahmad Abd-erRazik

Lecturer of General Surgery
Faculty of Medicine - Ain Shams University

Faculty of Medicine
Ain Shams University
2020

سورة البقرة الآية: ٣٢

Acknowledgment

First and foremost, I feel always indebted to **ALLAH,**
the Most Kind and Most Merciful.

I'd like to express my respectful thanks and profound gratitude to **Prof. Dr. Hazem AbdelSalam Mohamed,** *Professor of General Surgery Faculty of Medicine - Ain Shams University for his keen guidance, kind supervision, valuable advice and continuous encouragement, which made possible the completion of this work.*

I am also delighted to express my deepest gratitude and thanks to **Dr. Karim Fahmy,** *Lecturer of General Surgery Faculty of Medicine - Ain Shams University, for his kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.*

I am deeply thankful to **Dr. Mohammad Ahmad Abd-erRazik,** *Lecturer of General Surgery Faculty of Medicine - Ain Shams University, for his great help, active participation and guidance.*

Shaimaa Atef

List of Contents

List of Tables

List of Figures

List of Figures Cont...

List of Figures Cont...

List of Abbreviations

Abb.	Full term
3D MESH	Three-dimensional mesh
CT	Computed tomography
EHS	European hernia society
FLS	Functional limitation score
GPRVS	Giant prosthetic reinforcement of the visceral sac
LAP	Laparoscopic
MRI	Magnetic resonance imaging
PHS	Proline hernia system
PPM	Polypropylene Mesh
TAPP	Trans abdominal preperitoneal
TEP	Totally extra peritoneal
VAS	Visual analogue score

INTRODUCTION

With more than 20 million patients annually, inguinal hernia repair is one of the most often performed surgical procedures worldwide. The lifetime risk to develop an inguinal hernia is 27-43% for men and 3-6% for women. In spite of all advances, 11% of all patients suffer from a recurrence and 10-12% from chronic pain following primary inguinal hernia repair ***(Kings North A and Le Blank K, 2003)***

The conventional repair with tissue approximation was associated with a recurrence rate of 60% until the introduction of a polypropylene based prosthesis to bridge the hernia defect and to reinforce the abdominal wall without tension. With the implantation of prosthesis the recurrence rate in hernia repair was downsized ***(Kurmann and Beldi, 2011).***

Repair of an inguinal hernia via surgery is the only treatment for inguinal hernias and can prevent incarceration and strangulation. Health care providers recommend surgery for most people with inguinal hernias and especially for people with hernias that are symptomatic. Research suggests that men with hernias that cause few or no symptoms may be able to safely delay surgery until their symptoms increase. Men who delay surgery should watch for symptoms and see a health care provider regularly. Health care providers usually recommend surgery for infants and children to prevent incarceration ***(Kleigman et al., 2011).***

It has been estimated that complications like ischaemic orchitis and testicular atrophy occur in approximately 2% to 3% of all hernia repairs, other complications that may happen include Wound infection, Bladder injury, Intestinal injury, A hydrocele from fluid accumulation in the distal sac usually resolves spontaneously but sometimes requires aspiration. The overall prognosis is good depending on comorbidity ***(Kulacoglu, 2011)***

Conventional surgery was based on Bassini's operation; this consisted of apposition of the transversus abdominis and transversalis fascia and the lateral rectus sheath to the inguinal ligament. However, the Lichtenstein technique is widely used, where a piece of open-weave polypropylene mesh is used to repair and reinforce the abdominal wall. This operation is easier to learn, gives earlier mobility and has a very low recurrence rate ***(Currie et al., 2011).***

Since the early 1990s, laparoscopic techniques have entered the field of general surgery; the first cases of minimally invasive inguinal hernia repair were reported in 1992. Transabdominal preperitoneal (TAPP) inguinal hernia repair includes laparoscopic exploration of both inguinal areas and the whole peritoneal cavity, a further incision to the overlying peritoneal sheet in order to reduce the hernia sac and to place a prosthetic mesh against the inguinal wall at the level of properitoneal space ***(Arregui et al., 1992).***

The technique of totally extraperitoneal repair (TEP) allows exploration of the myopectineal orifices, the dissection and reduction of the hernia sac and its content and placement of the mesh without entering the abdominal cavity ***(McKernan and Laws, 1993).***

The most common method in use is the use of nonabsorbable spiral tacks. The use of this technique in fixation is also demonstrated in laparoscopic inguinal hernia repair and for fixation of propylene mesh in rectopexy procedures for rectal prolapse. Other surgeons prefer to use the transabdominal suture with polypropylene that is knotted outside the abdomen and to which the surgeon has postoperative access ***(Bangash and Khan, 2013).***

The optimal method for fixation of the prosthetic mesh is controversial. Sutures pass through all layers of the fascia and muscle of the anterior abdominal wall, while tacks secure the mesh to only the innermost millimeters of the peritoneal cavity ***(Lee, 2007).***

The used standard mesh is a Polypropylene mesh. (PPM). These are made of prolene fibers arranged in a network with pores of differing sizes. PPM is classified on the basis of density of the material and its surface area as heavyweight; middle weight and light weight.

Three-dimensional mesh was developed by Dr. Pajotin in 1998, where he came to the realization that a flat sheet of mesh may not be the ideal configuration for a laparoscopic repair. The key benefits of 3D mesh as some recent studies suggest are: anatomically designed, easy positioning, fixation free, reduced post-operative pain, and reduced chronic post-herniorraphy groin pain (inguinodynia) ***(Rashid et al., 2018).***

AIM OF THE WORK

The aim of this study is to asses intra-operative difficulties of laparoscopic inguinal hernia repair using two different meshes: The conventional polyproline mesh and the three-dimensional (3D) mesh, as regard the operative application time, early post-operative complications including post-operative seroma, early postoperative pain, chronic pain. The ease of return to physical activity is monitored as well.

Chapter 1

SURGICAL ANATOMY OF INGUINAL REGION

The inguinal region of the body, also known as the groin, is located on the lower portion of the anterior abdominal wall, with the thigh inferiorly, the pubic tubercle medially, and the anterior superior iliac spine (ASIS) superolaterally. The inguinal canal is a tubular structure that runs inferomedially and contains the spermatic cord in males and the round ligament in females. The floor of the inguinal canal is the inguinal ligament, otherwise known as the Poupart ligament, which is formed from the external oblique aponeurosis as it folds over and inserts from the ASIS to the pubic tubercle. This folded edge is called the shelving edge and is important for surgeons in hernia repairs. The inguinal canal is a conduit where structures pass, which has significance from a pathological standpoint.

- **Tissue layers of the groin:**

The lower abdominal wall is composed of several layers, each placed on top of the other from the peritoneum outward to the skin, similar to the layers of an onion ***(Flament, 2001).***