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Original Research Article

The use of prosthetic mesh in adult inguinal hernia repair

Laith Qauis Majeed*, Mohammed Hillu Surriah, Amine Mohammed Bakkour, Ayaad Makki Saaid

Department of Surgery, Al-Karama Teaching Hospital, Baghdad, Iraq

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***Correspondence:**
Dr. Laith Qauis Majeed,
E-mail: laithmajeed05@yahoo.com

ABSTRACT

Background: An abdominal wall hernia is a protrusion of a viscus or part of a viscus through an abnormal opening in the wall of the abdominal cavity. Different approaches have been described in regards to management and repair of hernia. The present study aims at showing the rate of frequency to use the prosthetic mesh versus classical repair in adult inguinal hernia.
Methods: A retrospective study lasted from October 2014 to July 2018 in Al-Karama Teaching Hospital. The study Samples consist of 315 patients with inguinal hernia, the age group (20-70) years old they were diagnosed according to clinical examination. There are 76 patients operated on using mesh technique (tension free).
Results: All patients in our series were male, with age group (20-70) years. However, the inguinal hernia more frequent with increase age. In age groups; (40-49) was 25 patients (32.89%). The indirect inguinal hernias are most common in the young 65% whereas direct hernias are most common in the old. In our series sixty-one (80.26%) patients with indirect inguinal hernias, eleven (11.82%) patients with direct hernias and six (5.263%) patients with pantaloon type.
Conclusions: The frequent uses of mesh in inguinal hernioplasty increasing with age. Tension –free hernioplasty is technically simple surgical operation, which can be used to repair any groin hernia. The use of mesh patch with or without plug is technically easier to work than the classical methods and far simple to secure to surrounding tissues.

Keywords: Direct hernia, Indirect hernia, Inguinal hernia, Mesh repair

INTRODUCTION

The most common hernia develop in the abdomen, when a weakness in the abdominal wall evolves into a localized hole, or "defect", through which adipose, or abdominal organs covered with peritoneum, may protrude.[1]

The most common site of hernia is in the groin or around the umbilicus.[2] The use of prosthetic mesh has now become accepted practice in the treatment of patients with both inguinal and ventral hernias.[3] Hernia may or may not present either with pain at the site, a visible or palpable lump, or in some cases by vaguer symptoms resulting from pressure on an organ which has become "stuck" in the hernia, sometimes leading to organ dysfunction. [4] Fatty tissue usually enters a hernia first, but it may be followed by or accompanied by an organ. Most of the time, hernia develops when pressure in the compartment of the residing organ is increased, and the boundary is weak or weakened. [5] There are many types of mesh products available, but surgeons typically use a sterile, woven material made from a synthetic plastic-like material, such as polypropylene. The mesh can be in the form of a patch that goes under or over the weakness, or it can be in the form of a plug that goes inside the hole.[6] Mesh is very sturdy and strong, yet extremely thin. It is also soft and flexible to allow it to easily conform to body's movement, position, and size. Mesh is used in

both tension-free and laparoscopic tension-free hernia repairs.[7]

Inguinal hernias include: Indirect inguinal hernia: a persistence of a congenital peritoneal tract that follows the indirect path of the spermatic cord and direct inguinal hernia: a defect in the floor of the inguinal canal.[8]

Traditional hernia repair "tissue repair" described by Bassini "1880" emphasized the importance of reconstitution of transversalis facial layer of posterior wall of inguinal canal. He used interrupted silk suture in approximating of conjoint tendon to inguinal ligament including transversalis fascia (recurrent rate was <10% in 5 years follow) then many modification of technique done.[9-11] Some surgeons thought for re-inforcement of posterior wall of inguinal canal using either biological or synthetic material "darning".[12-14]

River and Stoppa introduced preperitonial approach in placing of prosthetic mesh and it use specially in bilaterally and recurrent hernia.[15] Laparoscopic inguinal hernia repair was described by Ger in 1982 especially for recurrent and bilateral hernia, and it has two approaches

TAPP (transabdominal preperitonial), and TEP (totally extraperitonial) which is now the standard laparoscopic technique a large prosthetic mesh is placed preperitonial. Unless a significant medical condition prevents it, all hernias should be repaired with surgery. The present study aims at showing the rate of frequency to use the prosthetic mesh versus classical repair in adult inguinal hernia.

Meshes repair

Permanent Mesh, Commercial Mesh: Commercial meshes are typically made of prolene (polypropylene) or polyester. Marlex, Gore-Tex or Teflon meshes are sold by some companies. Light-weight meshes seem to cause less discomfort than heavy-weight meshes. Some repair kits combine a plug and a patch. Some plug and patch kits combine an absorbable plug with a non-absorbable patch.[16,17]

Mosquito-net Mesh: Meshes made of mosquito net clothes, in copolymer of polyethylene and polypropylene have been used for low-income patients in rural India and Ghana. Each piece costs 0.01$, 3700 times cheaper than an equivalent commercial mesh. They give results identical to commercial meshes in terms of infection and recurrence rate at 5 years.[18-20]

Laparoscopic repair

There are mainly two methods of laparoscopic repair: Transabdominal preperitoneal (TAPP) and totally extra-peritoneal (TEP) repair. When performed by a surgeon experienced in hernia repair, laparoscopic repair causes fewer complications than lichtenstein, particularly less chronic pain. However, if the surgeon is experienced in general laparoscopic surgery, but not in the specific subject of laparoscopic hernia surgery, laparoscopic repair is not advised, as it causes more recurrence risk than Lichtenstein, while also presenting risks of serious complications, as organ injury. Indeed, TAPP approach needs to go through the abdomen. All that said, many surgeons are moving to laparoscopic methodologies, as they are more lucrative, and cause smaller incisions, resulting in less bleeding, less infection, faster recovery, reduced hospitalization and reduced chronic pain.[21-23]

METHODS

This is a retrospective study was made from first of October of 2014 to the first of July of 2018 in Al-Karama Teaching Hospital and in the private hospitals. The study Samples consist of 315 patients with inguinal hernia, the age group (20-70) years old they were diagnosed according to clinical examination. There are 76 patients operated on using mesh technique (tension free repair), all operations were done by deferent surgeons. All patients were investigated as for routine surgical operation special form had to be filled for each patient including medical, surgical history and preoperative, operative, and postoperative details.

The aim of the operation is to reduce the hernia, ligate the sac and repair the defect in the posterior inguinal canal. After general anesthesia, the classical incision was made in the inguinal region in a skin crease 1–2 cm above the inguinal ligament, centered midway between the deep ring and the pubic tubercle. Divide and ligate the veins in the subcutaneous tissue. Visualize the external oblique aponeurosis which is incised along its fibers and extending the wound to open the external ring. The process of Identify the ilio-inguinal nerve and protect it during surgery by holding it away from the operating field. Using blunt dissection, if it is indirect type, delivers the spermatic cord together with the hernia sac as one mass and separate the sac from the cord (vas deferens and vessels) and layer by layer. The hernia sac is located in the anteromedial aspect of the cord. Transfixation suture done immediately above the neck, the sac is then cut 1cm distal to ligature while sac in a direct type not need to be excised but only invaginated back and kept inside by purse string stitch around the neck of the sac externally. Then whole posterior wall of the canal must be exposed. The polypropylene mesh is cut to cover the whole posterior wall of the canal and extend around the deep ring. There is no tension and sutures are only used to prevent early displacement before tissue ingrowths secures it in position. Either non absorbable or long lasting absorbable suture should be used. Multiple interrupted sutures are used around the mesh for fixation. Close the external oblique aponeurosis with continuous and subcutaneous fascia with interrupted 2/0 absorbable suture after secure hemostasis. Stitch the skin with interrupted 2/0 suture. Apply a layer of gauze and hold it in place. Patients included if the meet inclusion criteria

which are aged 18 and above, consented to participate in the study. Exclusion criteria included patients who are suffering from other malignant diseases or having serious heart disease that affect outcome of surgery. All data were entered and analyzed using Statistical Package for Social Sciences (SPSS) version 22.

RESULTS

In this study 315 case of inguinal hernia in Al-Karama Teaching Hospital. There were 76 patients used hernioplasty by prosthetic mesh while others classic repair as adult inguinal hernia.

Table 1 show that there were 76 patients used prosthetic mesh while other 239 patients used classical repair for inguinal hernia.

Table 1: Distribution of patients according to the type of repair.

Type of repair	Number of patients	Percentage (%)
Repair by mesh	76	24.126
Classic repair	239	75.874
Total	315	100

Table 2 shows the distribution of patients with prosthetic mesh according to patients' age, the highest number of patients is 25 represented 32.89% was seen in fourth decade of life. There are 70% of hernia occurred in those aged group between (30-60) years.

Table 2: The distribution of the hernia according to age groups.

Age	Frequency	Percentage (%)
20-29	6	7.89
30-39	11	14.47
40-49	25	32.89
50-59	19	25
60-69	15	19.73
Total	76	100

Table 3 shows the distribution of patients with type of inguinal hernia according to the position of sac, the higher percentage which is the indirect hernia 80.26% then direct hernia 11.842% and the lower percentage was pantaloon 5.264%.

Table 3: Distribution of the studied samples according to type of inguinal hernia.

Type of hernia	Number	Percentage (%)
Indirect	61	80.26
Direct	9	11.82
Pantaloon	6	5.263
Total	76	100

DISCUSSION

The most important era in the evolution of groin hernia surgery is that of the early nineteenth century when cadaver dissection and clinical studies culminated in a more through anatomic understanding of groin hernia. Various surgical literatures and books chapters attest to the efficacy of mesh hernioplasty.[24,25] It is technically simple surgical operation, which can be used to repair any groin hernia. The use of mesh patch with or without plug is technically easier to work than the classical methods and far simple to secure to surrounding tissues. The interstices of mesh become completely infiltrated with fibroblast and remain permanently.[26]

The inguinal hernias mainly occur in male. Male to female ratio of (20:1). All patients in our series were male, with age range between (20-70) years. However, the inguinal hernia more frequent with increase age because of aging process and muscle weakness leading to lax abdomen and susceptible for inguinal hernia. In age groups; (40-49) was 25 patients (32.89%). The indirect inguinal hernias are most common in the young 65% whereas direct hernias are most common in the old. In our series Sixty-one patients 80.26% with indirect inguinal hernias, eleven patients 11.82% with direct hernias and six patients 5.263% with pantaloon type.

Liechtenstein introduced his pioneer concept of "tension-free" repair of primary inguinal hernia using synthetic mesh.[13,15] This method was further improvised by Gilbert to tensionless repair of inguinal hernia. Rutkow advanced these two concepts and combined them to produce his innovative; Open-Mesh plugs hernioplasty; for repair all types of primary and recurrent hernia.[16]

Rutkow has suggested several outcome measures in assessing the choice of operation. These should include ease of operation, reproducibility by junior staff, likelihood or severity of possible complications, postoperative discomfort, time of return to work and daily activities and the financial cost involved. We found that mesh hernioplasty is among the easiest of hernia repair for the average surgeon to understand and requires a minimal learning curve.

Mesh prosthesis was widely used in USA and European countries, in about 80% of primary repair and more than 85% of recurrent repairs. The Shouldice technique most preferred but declined in popularity thereafter. Today the anterior mesh technique in Swedish hernia surgery (45% of all repairs).[20]

A similar development is described in Scotland, Plug method were used in 18% of repair.[20-22]

Natalie et al showed in their study approximately 71% of all hernia repairs under taken were inguinal.[27] Shaikh et al. showed in their study there are 108 male patients were

included. Mean age was 38.5±10 years old 75% patient undergo hernioplasty of inguinal hernia.[28]

Prolene mesh has inherent strength and produces no tissue reactions.[26] It is biologically inert, becomes easily incorporated in the growing granulation tissue and does not interfere with healing, even in the presence of infection.[29] It is very strong, able to stands 250 pound of pressure for square inch. A dense fibrous reaction takes place all through the mesh, and this, in addition, strengthens the inguinal floor.

Martin and Shureth used Marlex mesh routinely in (299) primary inguinal hernia repair over ten years period with no reported wound infection and no recurrences after follow up of ten years.[30] Barnes used Marlex mesh for all groin hernia in (277) patients over eleven year's period, he noted high patient satisfaction. Nowadays the use of polypropylene mesh is called tension-free hernioplasty, is rapidly gaining world-wide acceptance and, especially in USA, it is gaining popularity even for primary hernia.[31,32]

CONCLUSION

The frequent uses of mesh in inguinal hernioplasty increasing with age. Tension–free hernioplasty is technically simple surgical operation, which can be used to repair any groin hernia. The use of mesh patch with or without plug is technically easier to work than the classical methods and far simple to secure to surrounding tissues. Further researches are needed to explore applicability in different population.

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