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A COMPARATIVE STUDY BETWEEN CONVENTIONAL FLAT POLYPROPYLENE MESH AND 3D MESH IN TEP INGUINAL HERNIA SURGERY AT A TERTIARY CARE CENTRE

Surgery

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ABSTRACT

Background: Inguinal hernia repair is one of the commonest procedure done worldwide. With emergence of minimal access surgery, repair is done laparoscopically. A three dimensional mesh (3D) manifests superior qualities like better anatomical design, effective positioning, decreased pain and fixation free. Present study was done to compare 3D mesh and conventional flat mesh made of polypropylene in TEP inguinal hernia surgery.

Aims: To compare 3D mesh and conventional flat mesh made of polypropylene in TEP inguinal hernia surgery.

Material and methods: This study was conducted at Department of surgery, J.N medical college, A.M.U Aligarh between May 2018 to April 2020. A total of 60 uncomplicated inguinal hernia patients were included in the study and divided into two groups A & B. In group A, 3D polypropylene mesh while in group B conventional flat polypropylene mesh was used. At the end of the study both the groups were compared in terms of mean operative time, mesh fixation time, post-operative pain, inguinodynia, seroma formation, hospital stay, recurrence and cost effectiveness. Follow up period was 6 months.

Results: The mean operative time was less in group A 43.2±13.01 (p value-0.513). The mesh fixation time in group A was less 10.3±4.27 minutes (p value- 0.0003). The incidence of severe immediate postoperative pain was higher in polypropylene mesh 8.9% (p value of 0.513). The mean hospital stay was shorter in 3D mesh 1.9±0.71 days (p value– 0.005). The incidence of chronic groin pain was less in 3D (p value- 0.58). There was no significant difference in postoperative seroma formation. No recurrence was seen in both the groups. 3D mesh turns out to be more cost effective.

Conclusion: The use of 3D polypropylene mesh in TEP inguinal hernia surgery appears to be a better choice in terms of operative time, cost effectiveness, shorter hospital stay and complications like immediate post-operative pain and inguinodynia.

KEYWORDS

inguinal hernia, 3D mesh, TEP

INTRODUCTION

The word hernia comes from the Latin for 'Rupture' and the Greek for 'Bud' [1]. A hernia is the protrusion of part of the contents of the abdominal cavity through a weakness in the abdominal wall [2]. Groin hernias are reported to be the most common hernias accounting approximately 95% of the total. Incidence of Inguinal hernia is more common in men (approximately 9 times more) [3]. With the emergence of minimal access surgery, repair of hernia is done laparoscopically. In 1958, Usher F. demonstrated the use of Marlex mesh for hernia repair for the first time[4].Ralph Ger was the pioneer of laparoscopic hernia repair[5].Laparoscopic repairs includes two main approaches, Trans abdominal pre-peritoneal (TAPP) and Totally extra-peritoneal (TEP). Synthetic mesh is used commonly during hernia repair. Mainly three types of material regarding to non-absorbable meshes used are polypropylene, polyester and polytetrafluoroethylene. They are non-absorbable and provoke less tissue reaction [6,7]. Polypropylene mesh is classified on the basis of density of the material and its surface area as heavyweight (90 gm/sq meter to 100 gm/sq meter); middle weight (45 gm/sq meter to 50 gm/sq meter) and light weight (less than 45 gm/sq meter)[8,9].

A flat mesh may not be the anatomically configured for a laparoscopic repair. 3D mesh has key benefit of being more malleable so deployment intraoperative time is less. In postoperative period patient complains of less discomfort and pain[10-12].

MATERIAL AND METHODS

The study was a prospective observational study done at Department of surgery, Jawaharlal Nehru Medical College, AMU, Aligarh between May 2018 to April 2020. A total of 60 patients were included in the study and divided into group A & B. In group A, 3D polypropylene mesh while in group B conventional flat polypropylene mesh was used.

INCLUSION CRITERIA:

1. Age >18 years.
2. Primary uncomplicated hernia.

EXCLUSION CRITERIA:

1. Age <18 years.
2. Emergency presentation of hernia.
3. Patients not giving consent.

A detailed history was taken, thorough examination was done. Complete blood count, kidney function test, serum electrolytes, chest x-ray and ECG was done.

Laparoscopic TEP repair technique was used in both the groups. In group A no fixation was done while in group B fixation was done using tacker. Patients were followed for 6 months.

Statistical analysis was done using SPSS software. P< .05 was considered significant.

RESULTS

Out of total 60 patients 53 were males and 7 were females. Mean age of presentation was 46.7±13.04 years. 39 patients had right sided hernia and 21 patients had left sided hernia.

The mean operative time in group A (43.2±13.01) was found to be more than group B (46.2±14.31) with P-value 0.513. The mesh fixation time in group A was less 10.3±4.27 minutes (p value- 0.0003). The incidence of severe immediate postoperative pain was higher in polypropylene mesh 8.9% (p value of 0.513). The mean hospital stay was shorter in 3D mesh 1.9±0.71 days (p value– 0.005). The incidence of chronic groin pain was less in 3D (p value- 0.58). There was no significant difference in postoperative seroma formation and recurrence rate in both the groups. 3D mesh turns out to be more cost effective, as the tacker is not used while using 3D mesh. (table.1). No recurrence was seen in any group during follow-up.

Table 1: Comparison of results between 3D mesh and polypropylene mesh

parameter	3D mesh	PP mesh	P-value
Mean operative time (minutes)	43.2±13.01	46.2±14.31	0.513
Mesh fixation time (minutes)	10.3±4.27	14.6±2.74	0.0003
Immediate post-op pain (percentage)	3.2	8.9	0.513
Seroma (Patients)	1	2	1
Hospital stay (days)	1.9±0.71	2.4±0.57	0.005
Chronic groin pain (no. of patients)	1	4	0.58

DISCUSSION

Hernia is one of the commonest procedures done worldwide. With the emergence of minimal access surgery, the procedure is done laparoscopically which includes two main approaches namely, Trans abdominal pre-peritoneal (TAPP) and Totally extra-peritoneal (TEP).

Use of prosthetic materials has decreased the recurrence rate [13]. It has been documented that choice of the prosthesis in hernia repair is far more important than technique used as a determinant of outcome[14]. In long-term follow up, polypropylene mesh causes contraction and scar formation [15]. An anatomically contoured 3D mesh for laparoscopic inguinal hernia repair do not requires fixation, with less postoperative pain compared to conventional mesh. The mesh fixation time in group A was 10.3±4.27 whereas it was 14.6±2.74 in group B and the difference came out to be statistically different (p-0.0003). This can be attributed to the easy insertion, unfolding of mesh and less need of fixation. While in conventional mesh manipulation is needed to unfold the mesh also, tacker was used to fix it.

Chalkoo M et al, in their study of TEP repair using polypropylene mesh observed postoperative pain in 9.23%[16]. Mir I.S et al, in their study of 3D mesh in laparoscopic inguinal hernia reported immediate severe postoperative pain rate of 1.88%[17]. In the present study, less incidence of immediate post-operative pain was observed in group A (3.2%) compared to group B (8.9%). However the difference was not statistically significant (p-0.513). as there was no fixation done in case of 3D mesh compared to tacker used in conventional mesh , chances of nerve entrapment was more in conventional mesh.

Mir I.S et al, in their study of short term outcomes of laparoscopic inguinal hernioplasty using 3D mesh on 53 consecutive patients, reported a postoperative seroma development rate of 3.77%[17].

Incidence of seroma was 3.3% in group A and 6.7% in group B (p-1.0).

Mean hospital stay was 1.9±0.71 in group A while in group B it was 2.4±0.57 (p-005). It was less in patients in which 3D mesh was used due to early mobilisation and less immediate post-operative pain.

Chronic pain is one of the most serious long-term complications following groin hernia repair. Surgical dissection, mesh fixation, and mesh-induced entrapment have been cited as the potential causes of groin pain[18]. In the present study, incidence of chronic groin pain was more in group B (p-0.58).

There was no recurrence seen in the present study in any group.
3D mesh was found to be more cost effective as the tacker was not used for fixation.

CONCLUSION

The use of 3D polypropylene mesh in TEP inguinal hernia surgery appears to be a better choice in terms of operative time, cost effectiveness, shorter hospital stay and complications like immediate post-operative pain and inguinodynia

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