

# A Comparative Study Between Light Weight 3D Polyester Mesh vs Light Weight Polypropylene Mesh in Laparoscopic e-TEP Inguinal Hernia Repair

Firdaus Afzalhusein Dekhaiya<sup>1</sup>, Jignesh Joshi<sup>2</sup>

**Author's Affiliation:** <sup>1</sup>Associate Professor, <sup>2</sup>Resident, Department of Surgery, Government Medical College, Bhavnagar, Gujarat 364001, India.

## How to cite this article:

Firdaus Afzalhusein Dekhaiya, Jignesh Joshi. A Comparative Study Between Light Weight 3D Polyester Mesh vs Light Weight Polypropylene Mesh in Laparoscopic e-TEP Inguinal Hernia Repair. *New Indian J Surg.* 2020;11(2):130-133.

## Abstract

**Context:** A hernia is the bulging of part of the contents of the abdominal cavity through a weakness in the abdominal wall. Synthetic mesh implants are one of the commonly used materials in many surgical interventions, especially during hernia repair. Mesh repair is now standard procedure which is widely accepted and superior to primary suture repair. Nowadays we use mainly three groups of material regarding to non-absorbable meshes: polypropylene, polyester and polytetrafluoroethylene. They are non-absorbable mesh and provoke less tissue reaction.

**Aims:** To compare use of light weight 3d polyester mesh vs. light weight polypropylene mesh in laparoscopic e-tep inguinal hernia repair.

**Settings and Design:** Prospective study

**Methods and Material:** This study was conducted on patient of inguinal hernia admitted from May 2018 to September 2019 in Sir T. Hospital Bhavnagar. This study involving 60 patients with inguinal hernia, who were classified into two groups. Group I: 30 patients with inguinal hernia who were operated by e-TEP hernia repair using light weight

polypropylene mesh. Group II: 30 patients with inguinal hernia who were operated by e-TEP hernia repair using light weight 3D-polyester mesh. All patients provided informed consent to participate in the trial and for the surgical procedure. Both groups are compared with certain parameter and result obtained.

**Results:** In our study, Group II has lesser mesh fixation time, less incidence of post-op pain and discomfort, less use of additional analgesic with less incidence of seroma as compared to Group I.

**Conclusions:** The use of 3D-polyester mesh for laparoscopic e-TEP inguinal hernia repair offers many advantages as compared to lightweight polypropylene mesh.

**Keywords:** e-TEP hernia repair, light weight polypropylene mesh, light weight 3D-polyester mesh

## Introduction

A hernia is the bulging of part of the contents of the abdominal cavity through a weakness in the abdominal wall.<sup>3</sup>

Synthetic mesh implants are one of the commonly used materials in many surgical interventions, especially during hernia repair.

The term 'mesh' refers to prosthetic material, either a net or a flat sheet, which is used to strengthen a hernia repair. Mesh can be used:

---

**Corresponding:** Jignesh Joshi, Resident, Department of Surgery, Government Medical College, Bhavnagar, Gujarat 364001, India.

E-mail: [joshijignesh45@gmail.com](mailto:joshijignesh45@gmail.com)

Received on 31.01.2020, Accepted on 02.03.2020

- to bridge a defect: the mesh is simply fixed over the defect as a tension-free patch;
- to plug a defect: a plug of mesh is pushed into the defect;
- to augment a repair: the defect is closed with sutures and the mesh added for reinforcement.

The concept of mesh repair in hernias was introduced over 50 years ago. Mesh repair is now standard procedure which is widely accepted and superior to primary suture repair.

Nowadays we have mainly three groups of material regarding to non-resorbable meshes: polypropylene, polyester and polytetrafluoroethylene. They are non-absorbable mesh and provoke less tissue reaction.<sup>1,2</sup>

Polypropylene mesh makes a strong monofilament mesh. It does not have any antibacterial properties but its hydrophobic nature and monofilament microstructure impede bacterial in-growth. PPM 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).<sup>4,5</sup>

Polyester mesh is a braided filament mesh. This structure may allow infection to take hold, aided by its hydrophilic property. However, this property also allows rapid vascular and cellular infiltration within the fibrils, aiding host immune responses to infection and providing a stronger host-tissue interface. It's key benefits of being is more malleable so deployment time intraoperative is less.

**Materials and Methods**

This was a prospective observational comparative study conducted on patient of inguinal hernia admitted from May 2018 to Sept 2019 in Sir T. Hospital Bhavnagar.

**Inclusion Criteria**

- (1) Patients with uncomplicated inguinal hernias.
- (2) Age between 15 to 65 years.
- (3) Patients fit for laparoscopic surgery.

**Exclusion Criteria**

- (1) Patients not fit for laparoscopic surgery.
- (2) Those who are unwilling.

This study involving 60 patients with inguinal hernia, who were classified into two groups:

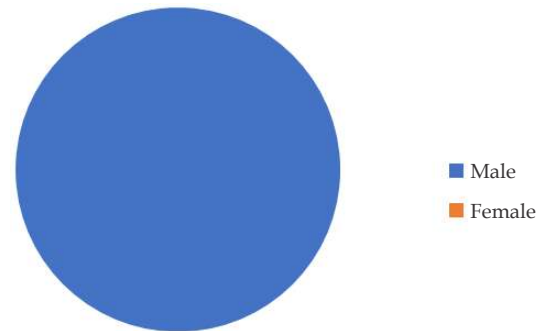
1. Group I included 30 patients with inguinal hernia who were operated by e-TEP hernia repair using light weight polypropylene mesh.
2. Group II included 30 patients with inguinal hernia who were operated by e-TEP hernia repair using light weight 3D polyester mesh.

*Randomization:* randomization was done on odd-even method i.e. every alternate patient was given the same method.

**Gender distribution of patients**

**Table 1:** Gender distribution of patients

Gender	No. of patient
Male	60
Female	00



**Fig. 1:** Gender distribution of patients

**Graphic representation of gender distribution in our study**

After admission patients fulfilling the inclusion criteria were taken into study. written informed consent about their willingness to participate in study and also they were informed regarding method by which they would be operated upon and the data was collected: clinical history, examination, diagnosis, investigations, detail of previous operative procedure.

Investigations include routine preoperative hematological, biochemistry, serological and microbiological and radiology as well as specific such as ultrasonography and for some recurrent cases, CT or MRI of abdomen.

All patients provided informed consent to participate in the trial and for the surgical procedure.

### Post-operative follow-up

Following parameters was evaluated:

1. Mesh fixation time
2. post-operative pain
3. post-operative discomfort
4. Use of additional analgesia
5. Seroma
6. Recurrence

Post-operative pain assessment was done according to the visual analog scale in first post-operative day and analgesia given accordingly.

Post-operative follow-ups were taken.

1. At the time of discharge
2. At 1 month
3. At 3 months

The patients were instructed to avoid lifting heavy objects and other strenuous activities for at least 6 weeks, and then return to normal activity gradually.

### Results

Our study conducted on 60 patient of inguinal hernia admitted from May 2018 to September 2019 in Sir T. Hospital Bhavnagar in which all patient are male.

In our study, mean mesh fixation time in Group I (light weight polypropylene mesh) was 14.5 min which was higher than the Group II (light weight 3D polyester mesh) 8.5 min.

The incidence of severe immediate post-operative pain was higher in Group I (polypropylene mesh) 12 patient than Group II (polyester mesh). Post-op discomfort were much common in Group I than Group II (10 and 6 patient respectively)

Analgesic given post-operatively in form of i.m injection of 1 ampoule of diclofenac injection in all patient underwent e-TEP hernia repair. Additional analgesic needed more in Group I patient than Group II (& patient and 4 patient respectively)

The post-operative seroma was less in using light-weight 3D polyester mesh, than polypropylene mesh (2 patient and 1 patient respectively).

No recurrence of hernia observed after 6 months follow-up in both group.

**Table 2:** Mean mesh fixation time in groups

Parameter	Group I (light weight polypropylene mesh)	Group II (light weight 3D polyester mesh)	p-value
Mesh fixation time (Mean value)	14.5 min	8.5 min	-
post-operative pain	12 patient	5 patient	0.0449 (significant)
Post-operative discomfort	10 patient	4 patient	0.0670
Use of additional analgesia	7 patient	3 patient	0.1658
Seroma	2 patient	1 patient	0.5535
Recurrence	0	0	-

### Discussion

Inguinal hernias are associated with reduced daily activities and high socio-economic costs for its operations. The use of mesh has reduced risk of surgical failure.

The study was conducted to assess the e-TEP repair of inguinal hernia in comparison of light weight 3D polyester mesh *versus* light weight polypropylene mesh.

To achieve this aim, 60 patients were included in this study who were divided into two groups: Group I included 30 patients with inguinal hernia who were operated on by e-TEP repair using polypropylene and Group II included 30 patients with inguinal hernia who were operated by e-TEP repair using light weight 3D polyester mesh.

Regarding to mean mesh fixation time, group I (light weight polypropylene mesh) require more time in comparison to Group II (light weight 3D polyester mesh) with *p*-value, thereby using light weight 3D polyester mesh, operative time for hernia repair can be reduced.

Complain of immediate post-operative pain occurred in 12 patient of Group I, out of which 10 patient felt post-op discomfort whereas in Group II, post-op pain occurred in 9 patient out of which 6 patient felt post of discomfort.

Need of additional analgesia required in 7 patient of Group I whereas in Group II, 4 patient need additional analgesia in form of i.m injection of diclofenac injection.

The post-operative seroma was less in using light-

weight 3D polyester mesh, than polypropylene mesh.

There was no hollow viscous injury or vascular or mesh related complication reported in both groups of this study.

No recurrence observed in both group after 6 month of follow-up.

### Conclusion

The use of three-dimensional polyester mesh (3D mesh) for laparoscopic e-TEP inguinal hernia repair is a safe and viable option. It offers many advantages in terms of less mesh fixation time, lesser incidence of post-operative pain and discomfort thereby decrease need of additional analgesia, less incidence of seroma as as it is more malleable compared to lightweight polypropylene mesh.

*Acknowledgement:* Nil

*Conflict of Interest:* Nil

*Key Messages:* Nil

### References

1. Kuldeep Singh, Anand Singla, Megha Sharma. A Prospective study comparing flat polypropylene mesh and 3D monofilament mesh in laparoscopic mesh hernioplasty. International Journal of Contemporary Medicine Surgery and Radiology 2017;2(2):53-57.
2. Shah S, Shah SM. A Study of Comparison of Light Weight 3D Polyester Mesh vs. Light Polypropylene Mesh in Laparoscopic Inguinal Hernia Repair. Clin Surg 2019;4:2405.
3. Wantz GE. Abdominal Wall Hernias. Schwartz SI, ed. Principles of Surgery: 7<sup>th</sup> Ed 1999;1585-611.
4. Rashid T, Reshi FA, Mir IS, et al. A comparative study of three-dimensional mesh (3D mesh) and polypropylene mesh in laparoscopic inguinal hernia repairs in adults. Int Surg J 2018 Jan;5(1):174-80.
5. Agarwal BB, Agarwal KA, Mahajan KC. Prospective double-blind randomized controlled study comparing heavy and lightweight poly-propylene mesh in totally extraperitoneal repair of inguinal hernia: Early results. Surgendosc 2009;23(2):242-7.