



A COMPARATIVE STUDY BETWEEN LIGHT AND HEAVY POLYPROPYLENE MESH IN LICHTENSTEIN REPAIR OF INGUINAL HERNIA

General Surgery

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ABSTRACT

Inguinal hernia repair is one of the most common surgical procedure performed in practice. Although numerous techniques have been described, currently tension free mesh repair is the standard of care in the treatment of hernias because of the low recurrence rates. However chronic pain, foreign body sensation, stiff lower abdominal wall have been variably reported in patients. Experimental studies have hypothesised that the inflammatory reaction and scar tissue formation caused by the mesh is responsible for the high incidence of postoperative pain. Today the meshes used are typically made from polypropylene. The original first generation of meshes described for the treatment of hernias were of the heavy type with a smaller pore size, greater weight/area, lesser elasticity and higher burst pressure. The latter generation of meshes included the light weight meshes with larger pore size resulting in smaller interface between the mesh and surrounding tissues, low weight per area, greater elasticity and a lower burst pressure. It has been surmised that the inflammatory reaction to the foreign material is correlated with the amount and structure (i.e., pore size) of the synthetic material inserted. Tension- free repair with non-absorbable mesh (polypropylene) has been used in a higher number of cases. In this study we are comparing Light vs Heavy mesh for its pros and cons.

KEYWORDS

Inguinal, Hernia, Mesh, General Surgery, Lichtenstien, Repair.

INTRODUCTION

Inguinal hernia repair is one of the most common surgical procedure performed in practice. Although numerous techniques have been described, currently tension free mesh repair is the standard of care in the treatment of hernias because of the low recurrence rates. However chronic pain, foreign body sensation, stiff lower abdominal wall have been variably reported in patients. Experimental studies have hypothesised that the inflammatory reaction and scar tissue formation caused by the mesh is responsible for the high incidence of postoperative pain.

Today the meshes used are typically made from polypropylene. The original first generation of meshes described for the treatment of hernias were of the heavy type with a smaller pore size, greater weight/area, lesser elasticity and higher burst pressure. The latter generation of meshes included the light weight meshes with larger pore size resulting in smaller interface between the mesh and surrounding tissues, low weight per area, greater elasticity and a lower burst pressure.(1)

It has been surmised that the inflammatory reaction to the foreign material is correlated with the amount and structure (i.e., pore size) of the synthetic material inserted. Tension- free repair with non-absorbable mesh (polypropylene) has been used in a higher number of cases during the past few years.(1)

The most important properties of meshes were found to be the type of filament, tensile strength and porosity. These determine the weight of the mesh and its biocompatibility. The tensile strength required is much less than originally presumed and light-weight meshes are thought to be superior due to their increased flexibility and reduction in discomfort. Large pores are also associated with a reduced risk of infection and shrinkage. When meshes are categorized by density, a mesh with density >100 g/m² is accepted as heavy, whereas a 35-50 g/m² density is classified as light weight.(2)

The comparison and outcomes of these two meshes is been analysed in this study.

METHODS

Comparative study done on 60 patients admitted in Department of General Surgery undergoing Lichtenstein repair for inguinal hernia. 30 Patients were in Light mesh group and 30 were in Heavy mesh group.

Inclusion Criteria:

- Uni or bilateral inguinal hernia of either sex
- Age more than 18 yrs.

- Hernia of all sizes.

Exclusion Criteria :

- Complicated inguinal hernias.
- Recurrent Hernias
- Femoral Hernia.
- Cases with previous history of explantation of mesh.
- Patients with active infection in the inguinal region.

A detail study of these patients were done as per Proforma regarding following points to prove which mesh is better.

- Patients will be followed up post operatively at the end of 2 weeks, 1 Month, 3 Months 6 Months and 1 year for recurrence, foreign body sensation, pain and return to normal activities.
- Patients complaining of persistent pain at the operative site during the 3rd month follow up will be considered as having chronic pain.
- Patients will be taken for Ultrasonography on 2nd 3rd 4th and 5th follow up visits for determining local tissue reaction/subclinical recurrence and mesh shrinkage.

RESULTS

- Age group of 31-40 had highest incidence of inguinal hernia. Total of 25 patients belong to this group. Mean age in heavy mesh group is 41.70 and in light mesh is 44.10.
- Males outnumber females in incidence of inguinal hernia. There is only 13.3% females in heavy mesh group and 3.3% females in light mesh group.
- Foreign body sensation in heavy mesh group is significantly high. Average of 26.7% of the patients had foreign body sensation in heavy mesh group, whereas in light group average was 10%.
- Chronic pain also showed significant readings in heavy mesh group. In the 3rd month follow-up 23.3% patients complained of pain in heavy mesh group and in light mesh group it was 10%. In the 6th month follow up heavy mesh group had 16.6% and light mesh group had 6.7%. In one year, follow up, heavy mesh had 6.7% and light mesh had 3.3%.
- Stiffness over abdominal wall was complained by 10% of patients overall in the light mesh group whereas no patients had this complaint in light mesh group.
- Recurrence was high in light mesh group where total of 5 patients had recurrence and in heavy there were only 2 patients with recurrence.

DISCUSSION

In a study conducted by Keith Rose, David Wright et al done at University Department of Surgery, South Manchester University Hospital, West Didsbury, Manchester, UK where the outcome of 200

consecutive patients with inguinal hernias repaired by the tension free mesh technique at a specialist clinic was assessed one year after operation.(3) Of the total, 118 (66%) patients were discharged on the day of operation and 60 (34%) the following morning. There were no unplanned overnight stays and no readmissions. Fifty four (30%) patients had no pain the day after operation. A further 53 (30%) had pain for up to 5 days, 38 (21%) for up to 10 days and 33 (19%) for over 10 days. Twenty seven (15%) patients had returned to normal activity within 7 days, 73 (41%) within 2 weeks and 145 (66%) within a month of operation. (3)

Lichtenstein published a personal series of 6321 repairs of which 21.3% were for recurrence, and found a recurrence rate of 0.7% after a minimum follow up of 2 years.(4)

In a study done by Kark A. E and Kurzer M of British Hernia Centre, London. the technical problems, early complications and short-term results of a tension-free method inguinal hernia repairs(Lichtenstein's repair) in 1017 patients have been assessed.

In this study of the total patients, 21.3% required no pain killers after the first night: 59.2% took oral analgesia for 1-7 days (13.2% up to 3 days and 46% for 4-7 days).

Thus, after 1 week 80% of patients required no further analgesia. Neuritic-type pain in the groin at any point from the anterior superior spine to the upper scrotum and thigh persisted in 10 patients. Pain of this type persisted beyond a 6-month period in eight patients and gradually disappeared over the next 12 months.(5)

Just E and Botet X et al in their study titled Reduction of complication rate in Lichtenstein hernia repair done in Department of General Surgery, Hospital Alt Penedes, Barcelona, Spain found that out of overall cases operated, 155 (7.7%) wounds developed complications, 74 of which (3.7%) were haematomas, 44 (2.2%) infections, 27 (1.3%) seromas, and 10 (0.5%) were complications from other causes.(6)

Konrad Pielaciński, Andrzej B. Szczepanik et al, in their study done in Warsaw, Poland discussed that although tension-free surgical techniques for inguinal hernia repair have contributed to the improvement of the outcome as well as the marked reduction of hernia recurrence, these techniques are not free of complications. The most common and still unresolved clinical problem is the chronic pain in the operated groin. One of the likely reasons which are taken into account is the presence of the mesh and its type. Research data show that the amount and structure of the implanted material have a significant influence on scar tissue formation. Heavy propylene non-absorbable meshes cause a more intense inflammatory reaction and scar formation than the light propylene partially absorbable meshes. The implied superiority of light meshes was confirmed in clinical trials but with relatively short follow-up periods.(7)

The inflammatory response seems to be characterized by increased levels of interleukin (IL)-6 and C-reactive protein associated with other modifications of inflammatory serum markers (fibrinogen, alpha-1 antitrypsin).(8) Immunological reaction to polypropylene mesh to the amount of prosthetic material.(9) Whether the immunologic reaction depends on pore size and texture instead of materials remains doubtful and controversial data have been published in the literature.(10)(11)

The study also concluded that both the light and the heavy, non-absorbable mesh used in the Lichtenstein technique are equally effective for prevention of inguinal hernia recurrence. Light vs heavy, non-absorbable mesh results in lower intensity of chronic pain, lower risk and intensity of postoperative ailments, faster return to normal activities of daily living and sport as well as higher satisfaction with treatment. The type of mesh has no effect on surgery duration, risk of intraoperative and early postoperative complications, or pain intensity in the early postoperative period.

Individual patients' characteristics such as body mass, general condition, type of hernia, surgery duration and operator have a significant effect on the risk of intraoperative damage, percentage of early complications, return to normal activities of daily living, chronic pain, ailments in the operated groin and patient's satisfaction with treatment.(7)

CONCLUSION

The comparative study between light and heavy polypropylene mesh in Lichtenstein repair of inguinal hernia concluded that-

- 1) Light Mesh has less incidence of stiffness over abdominal wall postoperatively in comparison to Heavy mesh.
- 2) Light Mesh has less incidence of foreign body sensation postoperatively than Heavy mesh.
- 3) Light mesh has less incidence and lesser severity of chronic pain than Heavy mesh.
- 4) Heavy mesh has lower recurrence rates than light mesh.

Competing Intrests

The authors declare no competing interests.

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