



ORIGINAL ARTICLE

Management of mesh infection after open inguinal hernia repair.

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ABSTRACT... Objective: To analyze the outcomes of mesh infection management following inguinal hernia repair. **Study Design:** Retrospective Cohort study. **Setting:** Department of Surgery, Khyber Medical University Institute of Medical Sciences DHQ Teaching Hospital Kohat. **Period:** January 2022 to December 2022. **Material & Methods:** Patients who had mesh implants for the correction of inguinal hernias were the subjects of this study. The hospital notes of these patients were retrospectively evaluated, and data concerning the patients' presentations, types of prior hernia repairs, types of mesh used, operative findings, and complications following mesh infection repair. **Results:** During the study period, 40 patients reported with mesh related infections among patients with history of inguinal hernia repair. Out of these 40 patients, 37 (92.5%) were male and 3 (7.5%) female. The mean age was reported to be 52.8 ± 6.4 years. The mean duration of inguinal hernia repair was 10.8 ± 4.2 months. All patients were examined for possible causes for the mesh infection and it was found that unincorporated polypropylene was the commonest possible factor behind mesh infection and reported in 18 (45.0%) cases. Follow up record of patients for at least 6 months was evaluated following mesh infection management and 32 (90.0%) patients reported no complications. **Conclusion:** Outcomes of mesh infection management following inguinal hernia repair were good. Clinical judgment is necessary to determine the extent of mesh removal.

Key words: Antibiotic, Inguinal Hernia, Mesh Repair, Polypropylene.

INTRODUCTION

Repairing an inguinal hernia is the elective treatment that general surgeons perform the most frequently, and this repair typically involves using prosthetic mesh.¹ Hernias recurrence rates have been greatly reduced thanks to synthetic mesh's application in treating hernias.² Despite using an aseptic approach and perioperative prophylactic antibiotics, the synthetic mesh can, unfortunately, be made more difficult by the presence of infection.³ When these difficulties arise, both the patient and the surgeon are placed in a difficult situation, which frequently calls for different surgical procedures. Due to the absence of defined definitions and reporting, a proper understanding of the true scope of this issue is difficult to achieve.⁴

In hernia repair surgeries performed anywhere in the world within the recent few years, the application

of meshes has rapidly evolved into the standard operating procedure. It has been discovered that installing a mesh during the surgical intervention of this frequent disease may minimize the rate at which a hernia returns after it has been repaired.⁵ However, difficulties associated with the mesh have become an increasingly prominent issue. Complications include seromas, adhesions, severe discomfort, migration and rejection of the mesh, and infections connected to the mesh.⁶

The biomedical materials industry has made significant strides in research and development, which has resulted in manufacturing surgical meshes that are largely non-reactive and biocompatible.^{7,8} When surgical meshes are implanted in the human body, various responses can be triggered, including inflammation, fibrosis, calcification, thrombosis, and infection. This has been observed in clinical practice.^{6,7} The term

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“foreign body reaction” refers to how the surface of the polymer initially absorbs proteins like albumin and fibrinogen during the foreign body reaction.⁹ As a consequence of this, the physiochemical characteristics of each polymer ultimately lead to the breakdown of the proteins that have been ingested.¹⁰ The end outcome of this process is the recruitment and activation of macrophages, which, in turn, causes the macrophages to respond by producing inflammatory chemicals and growth factors. They then result in the formation of granuloma, which is characterized by increased cell turnover for several years.¹¹ This study was conducted to analyze the outcomes of mesh infection management following inguinal hernia repair.

MATERIAL & METHODS

This retrospective cohort study was conducted at Department of surgery Khyber medical university institute of medical sciences DHQ Teaching hospital Kohat from January 2022 to December 2022. Approval from Institutional Ethical Committee was acquired. Being a retrospective stud, it did not require consent from the study subjects. Patients undergoing management of mesh related infection following inguinal hernia repair were analyzed. The hospital notes of these patients were retrospectively evaluated, and data concerning the patients’ presentations, types of prior hernia repairs, types of mesh used, operative findings, and complications following mesh infection repair. Evaluation was done for patients who had open hernia repair utilizing multifilament polypropylene mesh and the only technique. Infections that manifested within 30 days of the procedure and affected only the skin or the subcutaneous layer surrounding the incision were referred to as superficial incisional infections. Only patients diagnosed with deep prosthetic infections were part of this study. Those patients who presented with superficial incisional infections excluded from this study.

Before being admitted, each patient had completed multiple antibiotic treatment sessions as per history. The abscesses were drained, and the infected mesh was removed as part of our treatment strategy, including systemic antibiotic

medication. In every single one of the patients, the diseased meshes were extracted entirely, and the sinus tracts linked with them were eradicated. Even after the mesh removal, the transversal is fascia became thickened and fibrotic in all patients, but we did not seek to reinforce it in any of them. Every procedure was carried out either by a consultant surgeon or a surgeon working directly under the consultant’s supervision. After removing their mesh, patients were followed up with and evaluated at an outpatient clinic to assess whether or not their hernias had returned.

Data analysis was performed through “Statistical Package for Social Sciences (SPSS)”, version 26.0. Quantitative data had representation in the form of frequency and percentages. Mean and standard deviation (SD) were used to express numeric variables.

RESULTS

During the study period, 40 patients reported with mesh related infections among patients with history of inguinal hernia repair. Systemic signs of infection were not seen in any of the patients during the study. Out of these 40 patients, 37 (92.5%) were male and 3 (7.5%) female. The mean age was reported to be 52.8±6.4 years. The mean duration of inguinal hernia repair was 10.8±4.2 months. All patients were treated with antibacterial drug regimens, abscess drainage, and local wound during this period. Table-I is showing details of surgical management of infected mesh.

Mesh Infection	Deroofing and Drainage	Partial Mesh Removal (PMR)	Total Mesh Removal (TMR)
Sinus	-	30	-
Seroma	8	-	-
Enteric fistula	-	-	2

Table-I. Surgical management of infected mesh (n=40)

All patients were examined for possible causes for the mesh infection and it was found that unincorporated polypropylene was the commonest possible factor behind mesh infection and reported in 18 (45.0%) cases. The distribution of possible causes of mesh infection are given in Figure-1.

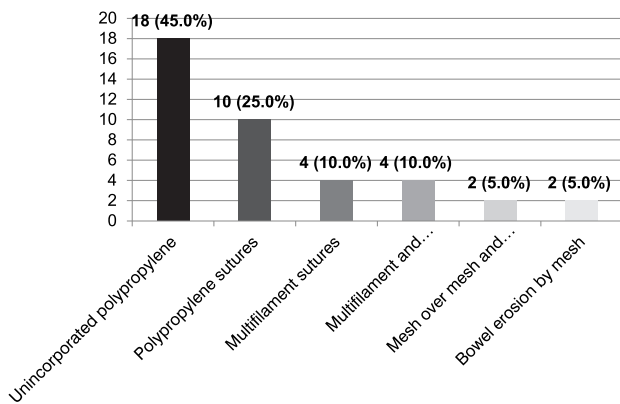


Figure-1. Possible causes for the mesh infection

Follow up record of patients for at least 6 months was evaluated following mesh infection management and 32 (90.0%) patients reported no complications. Figure-2 is showing details of outcomes in the follow up period of 6 months.

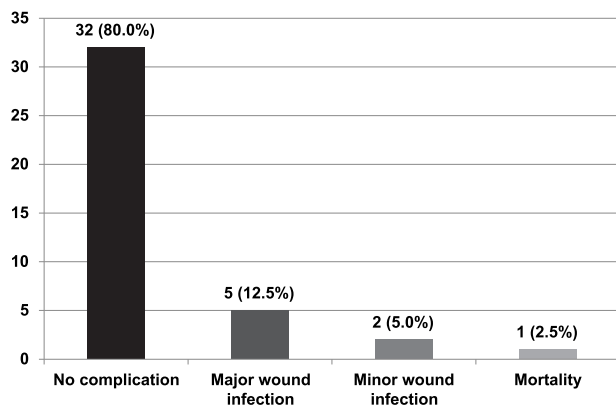


Figure-2. Outcomes during follow up period of 6 months after mesh infection management

DISCUSSION

The application of prosthetic materials for treating abdominal wall hernias accompanies lower rates of recurrence.^{7,8} Infection following surgery of a hernia in the abdominal wall can lead to a large increase in morbidity.¹² Even though conventional surgical instruction recommends eliminating prosthetic materials whenever an infection is present, multiple instances of mesh salvage have been recorded in the medical literature.¹³ In a study that was quite comparable to this one, which compared the repair of incisional hernias using sutures to the repair using mesh, only three out of 84 patients developed a wound infection

following the repair using polypropylene mesh.¹⁴ Without removing the mesh, all the patients could be successfully treated with intravenous antibiotics and local wound care. The study demonstrated that mesh site infections can be successfully treated with conservative management strategies such as appropriate intravenous antibiotics and local care strategies.¹⁴

Because of its success in lowering the likelihood of a hernia occurring again, the prosthetic mesh is most frequently utilized in repairing hernias that occur in the abdominal wall. However, it is related to an amplified risk of infection, which, in the past, would have required the patient to make a second visit to surgical room for removing the infected mesh as well as a likely recurrence of the hernia. On the other hand, the new methods do not carry this risk.¹⁵ Because there is a possibility that the mesh may be difficult to remove and because there is also a chance that the hernia will return. According to the findings of our research, only early mesh infections, those that occurred in the initial few weeks following surgery, were recorded. It would appear that mesh infection occurs during mesh integration and this is supported by the fact that infected meshes do not exhibit any evidence of integration. While it is conceivable that the number of blood vessels in fibrotic tissue may decrease, leading to a reduction in the blood supply to the mesh and an obstruction in the accessibility of granulocytes, this is not likely to occur.¹⁶

The treatment of infected mesh may vary depending on the kind of mesh that was utilized. In particular, it is indicated that an infection of a mesh made of polyester or polypropylene can be handled with drainage and antimicrobial treatments, while an infection involving a mesh made of expanded polytetrafluoroethylene might require the infected mesh to be surgically removed.¹⁷ This could have been explained by the fact that a PP mesh has become integrated into the anterior abdominal wall within two weeks of implantation, along with neovascularization. This allows leukocytes and macrophages to access the regional microenvironment, which benefits the patient.¹⁷

When it comes to treating mesh infections, we have a few alternatives to choose from.¹⁸ First of all, we can make a diagnosis based solely on the symptoms currently being displayed, and then we can employ ultrasound and CT to confirm our diagnosis. The next step is to consider the various treatment choices, which range from non-invasive to invasive procedures. We can clean and maintain the wound sterile by removing the contaminated tissue locally. Antibiotics will be given to the patient as part of conservative management, and the final stage of surgical management will involve an explanation of the mesh. This involves opening the previous incision and removing the mesh, sutures, and tacks before closing the fascia. Mesh salvage has become increasingly popular in recent years as an alternative to explanation, which carries with it the risks of hernia recurrence, and the potential for enterotomy or enterocutaneous fistula creation in order to resolve the issue.¹⁹

The quantity of the prosthesis that is worn can significantly impact the severity of any foreign body reactions that may occur.¹² Because the implanted foreign material is an excellent medium for microbial invasion, doctors should seek to minimize the area of mesh that is injected during the hernia operation. An infection caused by postoperative mesh can be avoided, even though it is difficult to treat. Initial steps, such as wanting to stick to the principles of surgery, such as meticulous hemostasis and delicate tissue handling, are crucial in its avoidance.¹² Being a single center study, conducted on a limited sample size with a relatively short period of follow up data were some of the limitations of this study.⁷

CONCLUSION

Outcomes of mesh infection management following inguinal hernia repair were good. Clinical judgment is necessary to determine the extent of mesh removal. It is vital to continue clinical trials to enhance the results of established mesh infections during hernia surgeries.





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2	Khan Karim Afridi	Methodology, Discussion.	
3	Mohammad Nasir	Data collection, Literature Review.	
4	Viqar Aslam	Study concept, Data analysis, Proof reading.	
5	Fazal Ahmad	Data collection, Literature review.	