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Salvage of Infected Mesh by Conservative Measures; A Retrospective Single-Centre Study

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ABSTRACT

Background: Mesh hernioplasty remains an effective surgery for the treatment of abdominal wall hernias. However, postoperative mesh infection is a common complication that ranges from 5- 10%. Management in conventional medicine entails mesh removal, which exposes the patients to such things as incisional hernias and technical difficulties at the time of mesh removal. **Methodology:** This cross-sectional retrospective medical record review was performed at the department of General Surgery, Recep Tayyip Erdogan Hospital, Muzaffargarh. After approval from the Institutional Review Board, approval number IHHN_IRB_2023_05_005, the computerized medical records of all the patients (any gender, any age) presenting with SSI after any type of mesh repair for any type of hernia done from January 2015 to March 2023 were reviewed. The data were entered into the computer and analyzed by using software IBM SPSS Statistics 26. **Results:** Of the 22 documented SSI patients, 19 cases (86.4%) were treated conservatively without mesh removal, while only one patient required mesh removal. **Conclusion:** This expanded case-control analysis examines the outcomes of conservative treatment for the infected mesh, which may entail antibiotics, drainage, debridement, and NPWT. The findings also confirm that it is possible to salvage most of the meshes to minimize surgical risks, resulting in better outcomes for the patients. Whenever feasible and particularly in situations with known intraocular penetration or Worthington degree III or IV exposure, removal of the foreign body should not be considered unless conservative management fails.

INTRODUCTION

Mesh Hernioplasty is the preferred surgical procedure for hernias of the abdominal wall, and infection remains one of the most common complications of this procedure. The benefits of mesh are somewhat offset by potential risks, most notably the incidence of mesh infection, which ranges from 5 to 10%.[1] Some patients may require the removal of the mesh to overcome the infection, whereas others may be able to survive with conservative treatment.

Antibiotic prophylaxis can reduce the risk of infection but cannot eliminate it. Despite antibiotic use, up to 1.5% infection rate has been reported in the literature.[2] As many prosthetic hernia repairs are performed annually, a substantial number of mesh infections may be anticipated. If mesh removal is the only option for infection, the surgeon and the patient will be hesitant to choose prosthetic repair. It should be emphasised that the removal of the mesh is frequently a technically challenging procedure. Due to the incorporation of local tissue into the mesh, removal is hazardous. And may result in acute bleeding or enterocutaneous fistula following adjacent vascular or gastrointestinal injury. Failure to close the primary defect may result in an incisional hernia of greater size.[3]

To salvage mesh, the conservative treatment includes an antibiotic course, draining the purulent collection, debridement and thorough lavage and application of negative wound pressure. Various studies have indicated a high success rate of mesh salvage by conservative treatment.

Siegel et al. in 2020 compiled results from two different centres that showed that conservative management with debridement, antibiotics and negative pressure therapy had successfully salvaged the mesh. All patients

received antibiotics for a median of 17 days, 92% required operative management of deep surgical site infections with mesh involvement, all had incision and drainage, and 66% had soft tissue debridement. Negative pressure wound therapy (NPWT) was utilised in 92% for an average of 26 days. One patient was successfully managed without an operation. With a median follow-up of 34 months, there were two recurrent hernias, only one requiring repair.[4]

Another study published in 2015 by Meagher included 150 patients. Of these, thirteen patients had mesh infections. Twelve patients were treated conservatively with local wound care and antibiotics when clinically indicated, and one returned to the theatre to have the mesh removed.[5]

In Pakistan, active efforts are being made to conserve the mesh, however, not enough published literature is available on this topic. Research conducted at Ayub Medical College in 2007 had thirteen patients who had infected mesh. Staphylococcus aureus was found in 8 patients (61.53%) and E. coli in 3 patients (23.07%). Two patients with cellulitis were discharged after 10–12 days with full recovery without opening the wound. Eight patients needed a partial wound opening, and infection involving the mesh was confirmed. These patients required daily dressings and 5–7 debridements. Three patients had severe sepsis and complete dehiscence of the wound. These three patients had 10–12 debridements during treatment. The mean hospital stay of all these patients was 22 days (range 18–26 days). All the patients had follow-ups for three months. There was no recurrence of infection or hernia during this period.[6]

At our hospital, our first approach is to conserve the mesh. We aim to retrospectively collect the patients' data regarding mesh infection at our hospital and provide a comprehensive management strategy for the patients of this region.

MATERIALS AND METHODS

This cross-sectional retrospective medical record review was performed at the department of General Surgery, Recep Tayyip Erdogan Hospital, Muzaffargarh (managed by The Indus Health Network), a free for all tertiary healthcare facility. After approval from the Institutional Review Board, approval number IHHN_IRB_2023_05_005, the computerized medical records of all the patients (any gender, any age) presenting with SSI after any type of mesh repair for any type of hernia done from January 2015 to March 2023 were reviewed.

A questionnaire was filled in for all the patients. The information included age, gender, BMI of the patient, ASA status, Diabetes mellitus status, type of hernia, type of SSI, post operative stay in the hospital, days between surgery and the SSI and the type of management (conservative or mesh removal). SSI were classified according to the CDC guidelines.[7] The data were entered into the computer and analyzed by using software IBM SPSS Statistics 26. Mean (SD) was computed for all the quantitative variables like age, weight and post operative hospital stay in days. Frequency and percentage were computed for all the qualitative variables like gender, Diabetes mellitus, type of SSI up to 30th postoperative day and the conservation or removal of the mesh.

RESULTS

A total of 22 patients were found to have developed SSI after mesh repair during the study period. Out of those, 59.1% were male (n=13) and 40.9% were female (n=9). The mean (SD) age of the patients was 41.55 $\pm$ 4.667 years (maximum 49 years, minimum 31 years, and the range 15 years). The mean (SD) BMI of the patients was 21 $\pm$ 1.12 (maximum 23, minimum 19). None of the patients had any comorbidities like diabetes and chronic obstructive pulmonary disease. All the patients belonged to ASA class I. 19 patients (86.4%) developed superficial SSI. 3 patients (13.6%) developed deep SSI. 1 out of 22 (13.6%) patients who developed deep SSI needed mesh removal. The other 21 patients (86.4%) were managed conservatively successfully leading to the mesh salvage without any further complications. The age, gender, BMI and presence of co-morbidities had no statistically significant effect on the risk of mesh explantation due to SSI ($p > 0.05$).

Table 1

Patient Demographics

Characteristic	Value (n=22)
Mean Age (SD)	41.55 ± 4.667 years
Age Range	31 – 49 years
Mean BMI (SD)	21 ± 1.12
BMI Range	19 – 23
Gender (Male)	13 (59.1%)
Gender (Female)	9 (40.9%)
Comorbidities	None
ASA Class I	22 (100%)

Table 2

Surgical Site Infection (SSI) Characteristics

Type of SSI	Number of Patients (%)
Superficial SSI	19 (86.4%)
Deep SSI	3 (13.6%)

Table 3

Management of SSI Cases

Management Approach	Number of Patients (%)
Conservative Management (Mesh Salvage)	21 (86.4%)
Mesh Removal Due to Deep SSI	1 (13.6%)

Table 4
Statistical Analysis of Risk Factors for Mesh Explantation

Factor	Effect on Mesh Explantation	P-value
Age	No significant effect	>0.05
Gender	No significant effect	>0.05
BMI	No significant effect	>0.05
Comorbidities	No significant effect	>0.05

DISCUSSION AND CONCLUSION

Abdominal wall hernias have always been a common problem. Traditionally, these hernias were managed with suture repair of the abdominal wall, but recurrence rates were high. Since the introduction of prosthetic mesh, it has been widely used for the reinforcement of the abdominal wall. The use of prosthetic mesh increases the risk of infection ranging from superficial to deep SSI. The infection which involves the prosthetic mesh is hard to eradicate. Initially it was believed that if mesh is involved by infection, mesh must be removed. But recent studies have shown that mesh can be preserved. Mesh explantation leads to further weakening of the abdominal wall and may even cause larger hernia. If the patient can be managed conservatively without mesh removal, it does not affect the repair of hernia in the long term.

Out study proves that in case of superficial SSI, it is not necessary to remove mesh at all. Superficial SSI can be managed simply by drainage and wound wash. In case of deep SSI, mesh removal was required in a case of sublay mesh repair technique, but it was not required in the cases of onlay mesh repair. Deep SSI were managed successfully by conservative method. Wound was opened, pus drained, wound irrigated with saline and aseptic dressing was done. This was repeated until the deep space had no more pus. In this way, mesh could be preserved and the patient's hernia repair was not affected.

Many studies have demonstrated that mesh removal is not necessary to get rid of surgical site infection. (studies to be mentioned).

Some other studies have advocated for mesh explantation in cases of SSI. These studies argue that bacteria can colonize pores of the prosthetic mesh and it is very hard to eradicate infection without removing the mesh. (studies to be mentioned). In conclusion, mesh removal is a major undertaking after mesh hernioplasty and it should be considered only if it is impossible to manage the SSI without mesh removal. But SSI whether superficial or deep, can be managed conservatively without the need to remove the prosthetic mesh.

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REFERENCES

1. Sanchez VM, Abi-Haidar YE, Itani KM. Mesh infection in ventral incisional hernia repair: incidence, contributing factors, and treatment. Surg Infect. 2011;12(3):205-10. https://doi.org/10.1089/sur.2011.033
2. Tubre D, Schroeder A, Estes J, Eisenga J, Fitzgibbons R. Surgical site infection: the "Achilles Heel" of all types of abdominal wall hernia reconstruction. Hernia. 2018;22(1):1003-13. https://doi.org/10.1007/s10029-018-1826-9
3. Cobb WS, Kercher KW, Heniford BT. The argument for lightweight polypropylene mesh in hernia repair. Surg Innov. 2005;12(1):63-9. https://doi.org/10.1177/155335060501200109
4. Siegal SR, Morrell DJ, Orenstein SB, Pauli EM. Mesh salvage following deep surgical site infection. Int J abdom wall surg. 2020;3(1):4. https://doi.org/10.4103/ijawhs.ijawhs_47_19
5. Meagher H, Clarke Moloney M, Grace P. Conservative management of mesh-site infection in hernia repair surgery: a case series. Hernia. 2015;19(1):231-7. https://doi.org/10.1007/s10029-013-1069-8
6. Ahmad S, Mufti TS, Zafar A, Akbar I. Conservative management of mesh site infection in ventral hernia repair. J Ayub Med. 2007;19(4):75-7.
7. Horan TC, Gaynes RP, Martone WJ, Jarvis WR, Emori TG. CDC definitions of nosocomial surgical site infections, 1992: a modification of CDC definitions of surgical wound infections. Infect Control Hosp Epidemiol. 1992;13(10):606-8. https://doi.org/10.1086/646436
8. Pantalone KM, Misra-Hebert AD, Hobbs TM, Kong SX, Ji X, Ganguly R, et al. The probability of A1C goal attainment in patients with uncontrolled type 2 diabetes in a large integrated delivery system: a prediction model. Diabetes Care. 2020;43(8):1910-9. https://doi.org/10.2337/dci20-0061
9. Shubinets V, Carney MJ, Colen DL, Mirzabeigi MN, Weissler JM, Lanni MA, et al. Management of infected mesh after abdominal hernia repair: systematic review and single-institution experience. Annals of plastic surgery. 2018;80(2):145-53. https://doi.org/10.1097/sap.0000000000001189
10. Earley M. Wounds, healing, tissue repair. In: O'Connell PR, McCaskie A, Williams NS, editors. Bailey & Love's short practice of surgery. 27 ed. Boca Raton, Florida: CRC press; 2018. p. 24-33. https://doi.org/10.1201/9781003106852-