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RESEARCH ARTICLE
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# RECURRENCE RATES IN COMPLEX HERNIA REPAIRS USING BIOLOGIC MESH

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**Abstract**

**Background**: Skeletal hernia operations are technically demanding because they are associated with high risk of infection, and risk for recurrence. Biologic meshes which derived from acellular human or animal tissues, that increases the usage to enhance the outcomes especially in contaminated fields since it possess less immunogenic, potentially get incorporated in to the host tissue.

**Objectives:** Recurrence rates, infection outcomes, and factors associated with patient response to the biologic mesh in our cohort of complex hernia patients were analyzed after a 24-month follow-up period.

**Study design:** A Retrospective study.

**Place and duration of study.** Department of General Surgery MTI Lady Reading hospital Peshawar from jan 2021 to Dec 2021

**Methods:** A case matched chart review was conducted of one hundred patients who underwent complex hernia repairs using biologic mesh. Demographic information, comorbidities, frequencies of recurrence, and incidence of infection were among the data obtained. Mean age together with standard deviation and p-values for the recurrent factors were used in statistical tests to assess for significance.

**Results:** Among 100 patients (mean age: 57.mean time to hernia recurrence was 8 years, SE = ± 10.2), hernia recurrence was 28%. They also found postoperative infections that ranged at 12 percent of the total case. Risk of recurrence was higher in patients with diabetes ($p = 0.03$). Infection rates were significantly higher among smokers when compared with the non-smokers ($p = 0.01$). The second was in the absence of any mesh explants. Patients with lower BMI had a statistically significant better prognosis in this study ($p < 0.05$).

**Conclusion:** Biologic mesh is deemed to be a good choice in cases of complicated hernia surgery, especially in contaminated areas. However, what remains questionable is the recurrence rates prevalent across the patient population, which is dependent on comorbid conditions among the patients. More future investigations are required.

**Keywords:** Hernia, biologic mesh, recurrence, infection

## Introduction

In complicated cases, hernia repair still poses a major surgical feat partly because of infection, recurrence and complications in the relatively high risk patients in contaminated/potentially contaminated surgical zones.[1] They include conventional synthetic meshes as earlier mentioned and indeed these have been linked with higher complications risks under such circumstances [2]. Due to the problems appeared with synthetic meshes, biologic meshes, created from acellular human or animal tissues, are used as alternatives because of their biocompatibility with host tissue [3]. These properties make biologic meshes most desirable in contaminated fields or in patients with large comorbidities including diabetes and obesity, in which infection risks are higher [4].However, their use remain problematic, especially the long-term strength of biologic meshes and hernia recurrence.[5] The reported rate of recurrence also has a large range from 10 to 40% due to the patient selection, surgical procedure used, and follow up time [6]. As well, cost of biologic mesh remains high and the variation of the result makes it pertinent to assess patient factors that dictate success of the use of biologic mesh. The effect of comorbidity like diabetes, obesity and smoking on the outcome of surgery is well established it has demonstrated the poor outcome in terms of recurrence and infection in hernia surgery [7].With the increasing evidence it is realized that more robust Prospective randomized control trials are to be performed for the assessment of biologic mesh in hernia repair. It will also seek to determine factors affecting patients in complex hernia repairs with biologic mesh especially recurrence rates post surgery, post operative infection rates and other patient aspects for up to 24 months of follow up.Thus, it is to find out which factors contribute to its success in order to help to design more effective tactics for patient selection for such treatments, which can be helpful in the strategies' improvement in this area that is rather difficult.

## Methods

Surgical patients with contaminated or potentially contaminated operative site were considered for the study, whereas those of incomplete data at the end of follow-up were rejected. Information was retrieved from patients' electronic medical records and then scrutinized.Evaluation of postoperative results of hernia repair in terms of the recurrence and infection rates was done with the help of data gathered within 24 months from the time of surgery. All data were analyzed with SPSS 24.0 FOR Windows (SPSS Institute, Chicago, IL, USA) and an alpha level of .05 was used throughout the analyses. This study was approved by the regional institutional review board to collect data from patients anonymously.

## Data Collection

Data recorded were patient characteristics (age, gender, BMI), diseases (diabetes, hypertension, smokers), type of hernia, contamination level and postoperative complications (recurrence, infection). Recurrence was defined by positive imaging studies or clinical examination.

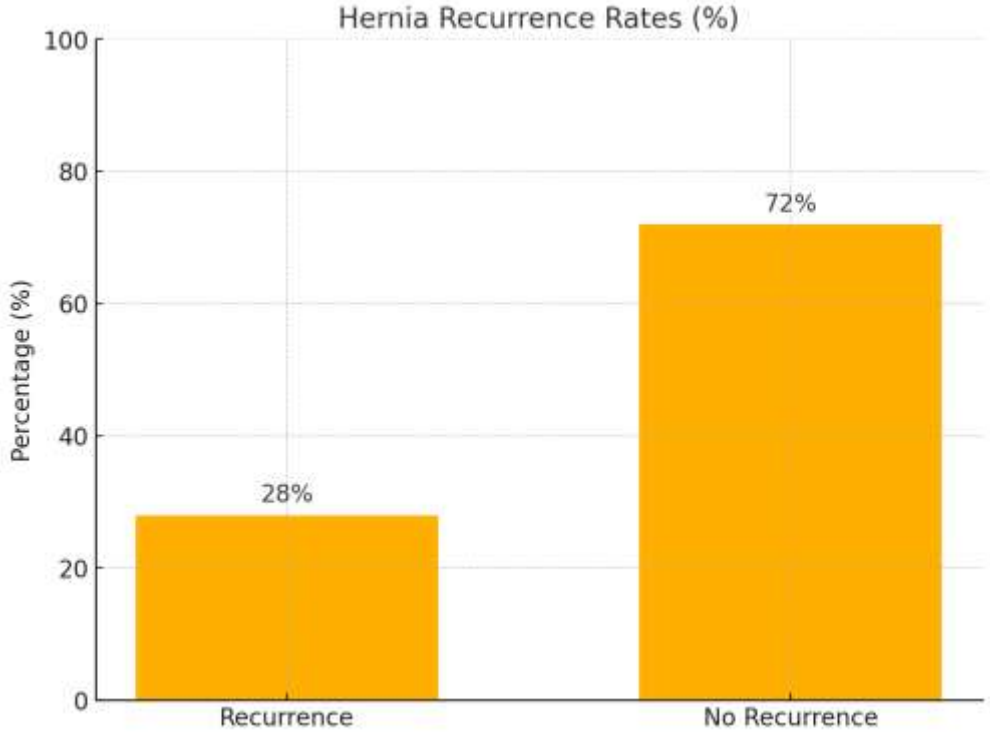
## Statistical Analysis

Frequency distributions were used to describe the patient characteristics. Hypothesis testing was employed for univariate comparisons where chi-square and independent t-tests were used, while logistic regression analysis established independent recurrence and infection predictive factors. All the analysis was carried out using statistical package SPSS version 22.0.

## Results

The study included 100 patients (mean age: 57.8 years, SD ±10.2). Among them 62% were male and 38% were female. Recurrence of hernia was noted in 28 patients, that is, 28%, and postoperative infection in 12%, that is, 12%.Recurrence rate was found significantly higher in patients having diabetes, p value = 0.03 and postoperative infection rate was significantly higher in smokers, p value = 0.01. During the follow-up period, no patient needed a mesh explantation. It was reported that patients with BMI of less than thirty had reduced recurrence rate ($p < 0.05$). Diabetes and smoking

were significant predictors of adverse outcomes in this study: diabetes, OR = 2.8 (95% CI = 1.2–6.8), p = 0.02 and smoking, OR = 3.2 (95% CI = 1.4–7.3), p = 0.01.



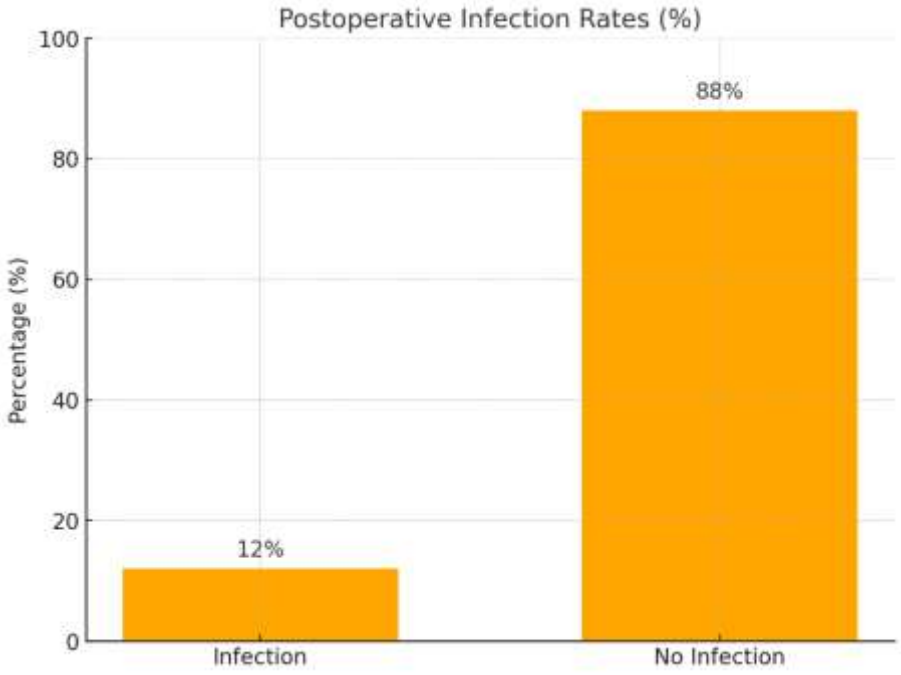




**Table 1: Patient Demographics**

| Parameter | Value |
|---|---|
| Number of Patients | 100 |
| Mean Age (years) | 57.8 ± 10.2 |
| Male (%) | 62% |
| Female (%) | 38% |
| Mean BMI | 29.4 ± 4.6 |

**Table 2: Clinical Outcomes**

| Outcome | Number of Patients (%) |
|---|---|
| Hernia Recurrence | 28 (28%) |
| No Recurrence | 72 (72%) |
| Postoperative Infection | 12 (12%) |
| No Infection | 88 (88%) |

**Table 3: Significant Predictors of Outcomes**

| Predictor | Effect |
|---|---|
| Diabetes | Higher recurrence ($p = 0.03$) |
| Smoking | Higher infection ($p = 0.01$) |
| BMI < 30 | Better outcomes ($p < 0.05$) |

## Discussion

biologic mesh in a complicated hernia surgery has received much attention because of its capacity to incorporate with host tissue while at the same time reducing contamination related concerns in the(unique or high-risk surgical zones). [8]The results of our study are quite parallel to the previous reports of hernia recurrence,seen at 28% and hernia infection rate of 12%. The following discussion places our findings in relation to prior literature and underscores agreements and differences of our findings with prior studies.Several articles have documented inconsistent recurrence rates of the biologic mesh in complex hernia surgeries. For example, Itani et al. reported 25% recurrence in patients with contaminated fields, which is close to our 28% [9]. Likewise, Hiles et al. described recurrence rates between 20 and 40% and called attention to the impact that patient comorbidities and the surgical approach in particular have on them . Our findings support the fact that problem of patient risk factors like diabetes and obesity have been identified to have increased recurrence in numerous studies [10, 11].We also observed a postoperative infection rate of 12% as the biologic mesh is well suited for contaminated environment.

Klink et al also conducted a systematic review, with infection rates stricking below 15% even in cases requiring the usage of biologic mesh [12]. This result affirms the hypothesis that biologic mesh has better infection risk profile than synthetic meshes because it is biocompatible and can be integrated into the body triggering fewer infections in infected or contaminated fields as noted by [13,14]Moreover, our data on significant risk indicators including diabetes and smoking are also in concordance with documented information. Diabetes is an independent risk factor for hernia recurrence that has been endorsed by numerous large and well-controlled cohort studies in which odds ratios of 2.5-3.0 have been recorded regularly [15]. Smoking has also in other numerous studies been linked to poor wound healing and increased infection rate, as supported by Atema et al, Darehzereshki et al where smoking was found to have detrimental effects on post operative patient outcome [16 , 17 ]. This result supports the evidence from Ventral Hernia Working Group guidelines that mentioned obesity influences hernia repair and generally recommend weight loss before surgery [18]. Also, different from the current study, the explantation of mesh was not carried out, similar to several other studies that have shown the long-term durability and safety of biologic mesh [19, 20]. More future prospective analysis with a large number of patients are required to enhance surgical interventions and overall outcomes.

## Conclusion

Biologic mesh is relatively safe for use in hernia operations which requires extensive procedures especially in high risk and contaminated areas. Nevertheless, the optimal repeat rates still appear high and depend on the conditions of the patients. Concerning patient selection, optimization of the choice of patients and targeting modifiable risk factors should be further studied due to the opportunity to reduce complications and readmissions.

**Limitations**

The retrospective nature of this study and the fact that it was undertaken in a single center are the main sources of bias for results' generalizability. Probably the major flaw which may be related to the comparatively small number of participants, which can decrease statistical significance. Third, the source of data, variations in the type of operative procedures and the duration of follow-up might also add to bias. Still, large prospective, multicentre trials are needed to confirm these findings fully..

**Future Directions**

Subsequent study should analyze the long-term consequences of biologic mesh in more extensive as well as more diverse sample of patients. Understanding the cost structure of biologic mesh in comparison with the synthetic mesh contemporaries is essential. Further, newer mesh designs and other treatments also described may serve to lower the repetition rates and improve surgery results in difficult situations.

**Abbreviation**

1. BMI: Body Mass Index
2. SD: Standard Deviation
3. SPSS: Statistical Package for the Social Sciences
4. OR: Odds Ratio
5. p: Probability value (significance level)

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**Authors Contribution**

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Data Analysis:**Muhammad Javed khan3 Muhammad Ali khan4 Huma shafi5**
Critical Review: **Ahmad Faraz1,Fazal Ghani2**
Final Approval of version:**All Mantion Above.**
Final Approval of version:

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