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Risk Factors for Recurrence After Hernia Repair: A Retrospective Clinical Study

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Abstract

Hernia recurrence remains one of the most significant postoperative complications in general surgery despite advancements in mesh-based repair techniques and minimally invasive procedures. This retrospective study evaluates major risk factors associated with recurrence following inguinal hernia repair. Clinical records of 124 patients who underwent hernia repair between 2020 and 2024 at a tertiary care center were reviewed. Variables including age, smoking status, obesity, diabetes mellitus, surgical technique, mesh size, and surgeon experience were analyzed. Among the 124 patients, recurrence was observed in 14 cases (11.2%). Smoking, obesity, previous recurrent hernia, postoperative wound infection, and surgeries performed by low-volume surgeons demonstrated significant association with recurrence. Mesh repair showed lower recurrence compared to tissue repair techniques. The findings emphasize the importance of patient optimization and surgical expertise in reducing recurrence rates after hernia repair.

Introduction

Inguinal hernia repair is among the most commonly performed surgical procedures worldwide. Although modern surgical approaches such as laparoscopic mesh repair have considerably reduced complication rates, recurrence continues to pose a clinical challenge. Recurrence not only increases patient morbidity but also adds economic burden through repeated surgeries and prolonged recovery periods.

Several studies have demonstrated that recurrence after hernia repair is multifactorial. Patient-related factors such as smoking, obesity, diabetes mellitus, collagen disorders, chronic cough, and poor nutritional status may contribute significantly. Technical factors including inadequate mesh overlap, poor fixation, and surgeon inexperience also play important roles.

The present retrospective study aims to identify major clinical and operative factors associated with hernia recurrence in patients undergoing inguinal hernia repair.

Literature Review

- ***Patient related risk factors for recurrence after inguinal hernia repair***
- By- Jakob Burcharth et al. (Surgical Innovation, 2015)

- This study is among the best evidence based summaries that mainly focusses on the non-technical factors related to the patient of inguinal hernia recurrence.
- The main findings involved were patient related and the risk factors involved were predisposed by the patient themselves.
- The risk factors mainly involved were:-
- Smoking
- Obesity
- Chronic Cough
- Collagen disorders

Risk factors for early recurrence after inguinal hernia repair

- By- Petra Lynen Jansen ,Uwe Klinge ,Marc Jansen & Karsten Junge (BMC surgery ,2009)
- This study evaluated patients with multiple recurrent inguinal hernias and focusses on the theory that does not always associate the recurrence of hernia with technical failure but may pertain due to biological predisposing factors
- The study being a cohort study with at least 2 recurrent hernias forms a base for its data outcome with risk factors involving:-
- Family History
- First hernia occurence at an early age
- Collagen metabolism disorders
- Risk factors for recurrence after laparoscopic inguinal hernia (2021)
- This retrospective cohort study involved both the technical as well as patient factors together which may lead or pertain to the recurrence of the hernia
- Risk factors involved were independent and involved the following:-
- Smoking
- Mesh size (< [12cm *15 cm])
- Previous history of recurrence
- Low experience of Surgeon due to low volume of cases
- The literature reviews were critical of both technical and patient related factors
- **Technical**
- Surgeon Experience
- Mesh related factors
- Repair techniques
- **Patient related factors**
- Smoking
- Family history
- Collagen metabolism disorder
- COPD/ Chronic cough
- Older age

Materials and Methods

A retrospective observational study was conducted in the Department of General Surgery at a tertiary care

hospital. Medical records of patients who underwent inguinal hernia repair between January 2020 and December 2024 were analysed.

Inclusion criteria included patients above 18 years of age who underwent elective inguinal hernia repair with a minimum postoperative follow-up of 12 months. Patients with incomplete records, strangulated hernias, and those lost to follow-up were excluded.

A total of 124 patients fulfilled the study criteria. Data collected included age, gender, body mass index (BMI), smoking history, diabetes mellitus, type of hernia repair, mesh usage, postoperative wound infection, surgeon experience, and history of recurrent hernia.

Statistical analysis was performed using chi-square testing, and p-values less than 0.05 were considered statistically significant.

Results

Among the 124 patients included in the study, 112 were males and 12 were females. The mean age was 52.6 years. Hernia recurrence was identified in 14 patients (11.2%).

Smoking history was present in 64.2% of recurrent cases, while obesity (BMI >30) was noted in 50% of recurrent patients. Diabetes mellitus was present in 35.7% of recurrent cases. Patients with previous recurrent hernia and postoperative wound infections demonstrated significantly increased recurrence rates. Laparoscopic mesh repair showed lower recurrence rates (4.8%) compared to open tissue repair techniques (18.7%). Surgeries performed by surgeons conducting fewer than 30 hernia repairs annually had comparatively higher recurrence rates.

Discussion

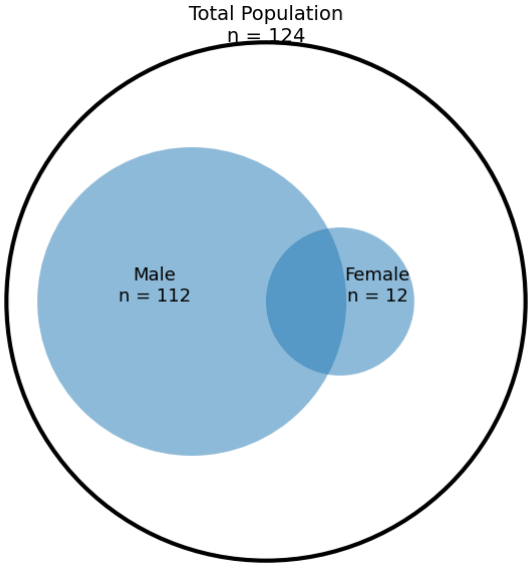
Hernia recurrence remains a multifactorial complication despite improvements in surgical technology. In the present study, smoking emerged as one of the strongest predictors of recurrence. Smoking impairs collagen synthesis by affecting collagen III gene (Col3A1 gene) and wound healing, thereby weakening fascial repair integrity.

Obesity was another significant factor associated with recurrence. Increased intra-abdominal pressure in obese individuals may contribute to tension on the repair site, resulting in mesh displacement or tissue failure. Diabetes mellitus also predisposes patients to delayed healing and postoperative infections.

Chronic cough also emerged as an important factor for the recurrence of the hernia, due to the increase in the intra-abdominal pressure due to the repetitive cough. This is may lead to mesh displacement and impaired fascial repair mostly in adults (geriatric patients)

Age being a factor related to the recurrence , tightly correlates with collagen synthesis in the body. The mean of the patients being 52.6 years , tells how much the bias of recurrence shifts towards the later age group which mainly indicates the geriatric population.

Gender bias was seen to be inclining towards the male population. With a total of 124 patients, 112 were male and 12 were female. It was noted that only 14 had the recurrence , pertaining to a total of 11.2%.



Postoperative wound infection demonstrated a strong association with recurrence. Infection may compromise mesh integration and collagen deposition, increasing the risk of fascial weakness. Adequate perioperative antibiotic prophylaxis and sterile surgical techniques are therefore essential.

Mesh-based repair techniques demonstrated superior outcomes compared to non-mesh repairs. Surgeon experience also significantly influenced recurrence rates, highlighting the importance of specialized training and technical expertise which can be influenced by the volume of procedures the surgeon performs. Though mesh size was also a factor that lead to the recurrence which can be due an inadequate mesh size on the hernia location.

Conclusion

Recurrence after inguinal hernia repair is influenced by several patient-related and technical factors. Smoking, obesity, diabetes mellitus, postoperative wound infection, previous recurrence, and inadequate surgical expertise were identified as major risk factors in this study. Mesh-based repairs demonstrated better long-term outcomes with lower recurrence rates. Proper patient optimization, meticulous surgical technique, and experienced surgical care are essential in minimizing recurrence following hernia repair.

References

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