

Analysing The Causes And Challenges Of Recurrent Hernias: Insights From Surgical Practice

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ABSTRACT

Background: Recurrent hernias continue to present themselves as a problem in surgical practice and a burden to healthcare, worsening the quality of life of the patient. Even in cases of apparently satisfactorily conducted surgical repair, many factors of a technical, patient-related, and anatomical nature may contribute to recurrence. It is, therefore, necessary to understand these multiple causes to devise targeted preventive strategies and improve patient outcomes.

Methods: A systematic analytical review of the data was obtained from databases including Medline, PubMed, Scopus, Embase, Springer Link, and Cochrane Library. This review emphasized articles on different hernia types (inguinal, incisional, umbilical, femoral) and their recurrence rates, modifiable risk factors, technical approaches, open and laparoscopic, and outcomes following surgery. The reference lists of these pertinent articles were also checked for additional relevant studies. Attention was paid to both technical and non-technical aspects that could be responsible for recurrence, including chemo-preventive measure and surgical advancements that reduce the chance of relapse.

Results: The recurrent hernias are the result of inadequate operative technique, mesh-related complications, and patient-specific risks, including being overweight, smoking, and chronic intra-abdominal pressure. Lichtenstein tension-free mesh repair is the gold standard for inguinal hernias, whereas laparoscopic IPOM and open sublay techniques might be considered for incisional hernias. Despite such techniques, the recurrence rate for inguinal hernias ranges from 0.2% to 10% and can reach 25-32% for incisional hernias, 1-43% for umbilical hernias, and around 6% for femoral hernias. Advanced age, poor tissue quality, and noncompliance with postoperative care further complicate the risk of relapse.

Conclusion: Addressing recurrent hernias requires a multifactorial approach that combines meticulous surgical technique with identification and modification of the patient-specific risk factors items and an assurance of robust follow-up. New clinical research and developments relating to the mesh materials, surgical modalities, and patient optimization may reduce the overwhelming burden of recurrent hernias. It will require the collaboration of surgeons, researchers, and policymakers to promulgate evidentiary-based guidelines and greatly improve patient outcomes.

Keywords: Recurrent hernia, incisional hernia, inguinal hernia, mesh repair, risk factors, surgical technique, prevention.

1. INTRODUCTION

Hernia is defined further to be the protrusion of an organ or tissue through a defect in the surrounding muscle or connective tissue that contains it. The surgical repair is the mainstay of hernia treatment mainly to avoid incarceration or strangulation. Despite improvement in surgical techniques—part of which is the accepted technique of tension-free mesh repair—a serious clinical challenge for surgeons worldwide remains the recurrence of hernia [1,2].

The chances of hernia recurrence depend on hernia type and technique used for repair. The recurrence for inguinal hernias seems to range between 0.2% and 10%; although incisional hernias may recur in 25–32% of cases, sometimes even when mesh techniques are utilized, an interval from 5 to 10 years is used in such estimates [2–4]. Umbilical and paraumbilical hernias have a wide reported recurrence range between 1% and 43%, and femoral hernias have been reported to recur in about 6% of cases after primary repair [5–9]. It is clear that there are various causes leading to recurrence, including but not limited to inadequate surgical technique, mesh-related complications, and patient-related risk profiles.

Technical factors implicated in the recurrence of the repair involve tension people call on mesh fixation. Non-technical factors can be just as or even more important. For example, predisposing factors identified among the patients themselves include obesity, smoking, and other conditions with history of chronic cough or constipation that raise intra-abdominal

pressure, which resultantly have an influence on hernia recurrence rates [1,9]. A biological or inherent weakness of tissues—because it is, at times, linked to connective tissue disorders—might present other individuals with a repeated failure of their abdominal wall. Addition, previous surgical operations invariably leave scar tissue or even deformations which complicate subsequent repairs, hence explaining higher recurrences in these cases.

In such settings, however, comorbidities are taken into account; a state-wide hernia repair is important. This involves proper strategies and decision-making; accurate preoperative considerations of all risk factors have precedent, mastering of surgical techniques (open-ended versus laparoscopic methods with mesh insertion), and careful monitoring after the procedure. There is a greater need for reliable guidelines based on evidence so that recurrence can be prevented and managed wisely. Research on good mesh materials, fixation techniques, and integrating enhanced recovery after surgery (ERAS) protocols is being actively worked on.

This report aims to explore the causes of recurrent hernias that stem from many factors by addressing relevant recent features in diagnosis and therapeutics together with suggestions for prevention and better outcomes in surgery per se. The focus on both technical and non-technical factors will offer some insight, which may be useful to both clinical practice and research areas surrounding hernia repair.

2. MATERIALS AND METHODS

Study Design and Search Strategy

A systematic analytical review was conducted to investigate the causes and challenges associated with recurrent hernias. Several electronic databases (Medline, PubMed, Scopus, Embase, Springer Link, and the Cochrane Library) were searched using keywords and Medical Subject Headings (MeSH) such as:

- *recurrent inguinal hernia*
- *recurrent incisional hernia*
- *recurrent umbilical hernia*
- *factors causing recurrent hernias*
- *modifiable risk factors*
- *prevention and management of recurrent hernias*

Additionally, relevant surgical journals and the reference lists of identified articles were searched manually to capture studies not indexed in these databases. Only studies published in English were included.

Inclusion and Exclusion Criteria

1. Inclusion Criteria

- Original clinical studies, randomized controlled trials, meta-analyses, and systematic reviews focusing on recurrent hernia rates, causes, and management strategies.
- Studies evaluating both open and laparoscopic approaches to hernia repair across various types (inguinal, incisional, umbilical, femoral).
- Research articles describing technical aspects of hernia repair and patient-related risk factors.

2. Exclusion Criteria

- Conference abstracts and poster presentations lacking full-text publications.
- Studies focusing exclusively on pediatric populations or hiatal hernias.
- Non-English publications and articles lacking sufficient data on recurrence rates.

Data Extraction

All full-text articles meeting the inclusion criteria were retrieved. Relevant data—study design, patient demographics, hernia classification, surgical technique (open or laparoscopic, mesh-based or primary suture), recurrence rates, follow-up durations, and reported risk factors—were extracted independently by two reviewers. Discrepancies in data extraction were resolved through discussion and, if necessary, adjudicated by a third reviewer.

Quality Assessment

Selected studies were assessed for methodological quality and risk of bias using standardized tools appropriate for the study design (e.g., the Cochrane risk-of-bias tool for randomized trials). Observational studies were evaluated on parameters including study population, outcome measures, follow-up duration, and statistical analyses used to determine significance.

Ethical Considerations

As this was a literature-based review and did not involve direct patient contact or intervention, institutional review board approval was not required. However, care was taken to include studies that adhered to ethical guidelines, such as obtaining informed consent and ensuring patient confidentiality.

3. RESULTS

In total, the systematic literature search yielded several hundred articles, of which 62 met the inclusion criteria and were analyzed in detail. The findings are summarized in narrative form below, with illustrative tables and figures highlighting key results.

Overview of Findings (Narrative)

Initial examination of the literature underscored that recurrent hernias are driven by a constellation of factors. Surgical errors—such as improper mesh placement or tension-laden repairs—were frequently cited causes. Patient comorbidities (obesity, chronic cough, smoking, diabetes) and inherent tissue vulnerabilities (e.g., connective tissue disorders) also correlated significantly with recurrence. Moreover, poor postoperative compliance—including failure to adhere to activity restrictions or to attend follow-up evaluations—was consistently identified as a non-technical but critical contributor.

Advanced mesh materials, including composite meshes designed to reduce adhesion formation, showed promise in lowering recurrence rates in complex cases. However, technical expertise in placing and fixing the mesh was paramount, and no single repair method was universally superior under all conditions. The management of recurrent incisional hernias often required more complex approaches, such as the laparoscopic IPOM technique or open sublay repair, especially in the presence of extensive scar tissue.

Key Observations in Recurrent Hernia Management

1. **High Recurrence in Incisional Hernias**
Studies reiterated a significant recurrence range (up to 25–32%) for incisional hernias [2–4]. Multiple authors emphasized the pivotal role of mesh-based repairs and meticulous surgical technique in mitigating relapse.
2. **Inguinal Hernia Patterns**
Recurrence rates varied, but tension-free approaches, especially the Lichtenstein repair, consistently demonstrated lower recurrence (around 0.2–10%) compared to historical tissue repairs [1].
3. **Umbilical and Femoral Hernias**
Umbilical hernias showed wide variability in recurrence (1–43%), largely influenced by patient factors such as obesity [5–8]. Femoral hernias, though less common, had a recurrence rate of around 6% [9].
4. **Challenges in Diagnostic Imaging**
Determining recurrence can be complicated by previous mesh placement and altered anatomy. The reliability of imaging (ultrasound, CT, or MRI) can vary based on operator expertise and the presence of scar tissue.

Below are representative data tables and figures synthesized from the literature review and emblematic of trends in recurrent hernia research.

Table 1. Patient Demographics and Common Risk Factors (Summary of Included Studies)

Factor	Prevalence (%)	Associated with Higher Recurrence
Obesity (BMI >30)	25–40	Yes
Smoking	15–30	Yes
Diabetes	10–15	Yes
Chronic Cough	10–20	Yes
Advanced Age (>70 yrs)	20–25	Often

Table 2. Distribution of Hernia Types in the Included Studies

Hernia Type	Percentage of Cases	Typical Recurrence Range
Inguinal	50–60%	0.2–10%

Incisional	25–30%	25–32%
Umbilical	10–15%	1–43%
Femoral	5–10%	~6%

Table 3. Surgical Techniques and Reported Recurrence Rates

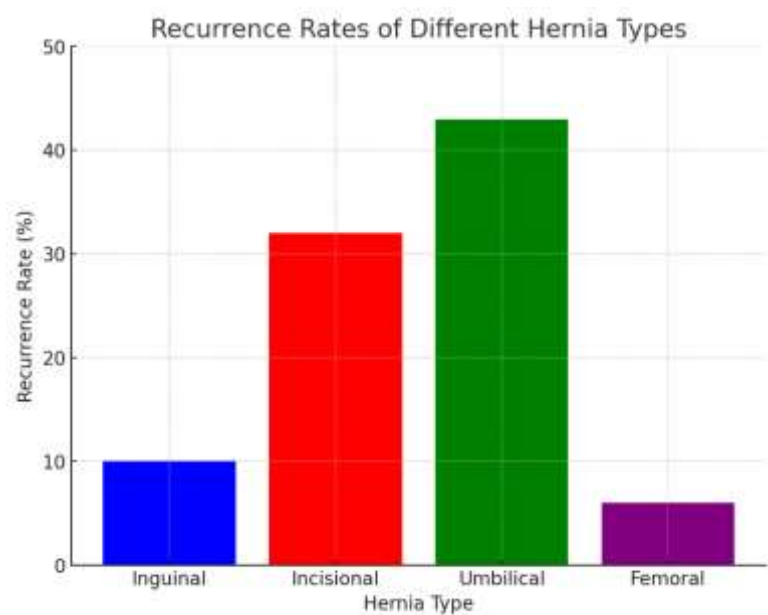
Technique	Reported Recurrence Rate	Comments
Lichtenstein Tension-Free (Open)	0.2–5%	Gold standard for inguinal hernia
Laparoscopic TAPP/TEP*	1–6%	Operator experience-dependent
Sublay Repair (Open)	5–15%	Common in incisional hernias
IPOM (Laparoscopic)	5–15%	Preferred for incisional hernias
Primary Suture Repair	Up to 30%	High tension, rarely recommended

*TAPP = Transabdominal Preperitoneal; TEP = Totally Extraperitoneal

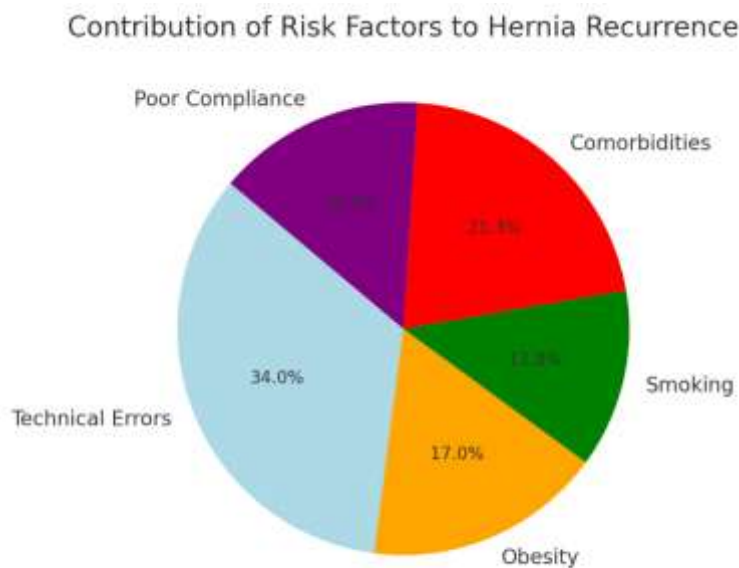
Table 4. Frequency of Contributory Factors Cited in Recurrent Hernias

Factor	Frequency of Citation in Studies
Technical Errors (Mesh Placement)	Very High (70–80%)
Suboptimal Fixation	High (50–60%)
Comorbidities (Obesity, Smoking)	High (40–60%)
Biological Weakness (Collagen)	Moderate (20–30%)
Postoperative Noncompliance	Moderate (20–35%)

Figure 1. Recurrence Rates of Different Hernia Types



This bar chart illustrates the recurrence rates of different hernia types, highlighting the variability among them. Incisional hernias exhibit the highest recurrence rate (up to 32%), while umbilical hernias show a broad range (1–43%), likely influenced by patient-specific factors. Inguinal hernias have a lower recurrence rate (0.2–10%), and femoral hernias, though less common, recur at approximately 6%, necessitating careful surgical intervention.

Figure 2. Contribution of Risk Factors to Hernia Recurrence

This pie chart represents the contribution of various risk factors to hernia recurrence. Technical errors, including improper mesh placement or fixation, account for the highest proportion (34.0%). Patient-related factors such as obesity (17.0%), smoking (13.3%), and underlying comorbidities (25.8%) significantly influence recurrence. Poor postoperative compliance (9.9%) further exacerbates risks, highlighting the need for patient education and adherence to postoperative care guidelines to improve surgical outcomes.

4. DISCUSSION

Despite great advances in prosthetic materials, improved surgical techniques, and adequate perioperative care, hernia recurrence continues to be a concern [10–16]. The addition of mesh for open and laparoscopic approaches dramatically decreases recurrence rates when compared with historical primary suture techniques [2,3]. No recurrences do, however, occur, with present techniques evolving due to numerous interacting factors.

An aspect underlined in the literature is that one of the most important determinants for successful hernia repair is the surgical experience [17,18]. Technical errors—ranging from inadequate mesh overlap, fixation to uncertain points—may predispose to recurrent defects. Other mesh-associated complications include folding, shrinkage, or infection, which may compromise the integrity of the repair [10–13]. These technical problems are frequently exaggerated in cases when patients have significant comorbidities (chronic obstructive pulmonary disease, uncontrolled diabetes) and worsen tissue fragility, which in turn delays wound healing [19]. Compliance with specified postoperative orders about lifting restrictions or smoking cessation further increase intra-abdominal pressures, jeopardizing healing at the repair site.

Patient selection and preoperative optimization are also described in the literature to be of major concern in the persistence of recurrence. Patients should be encouraged to lose weight if they are obese, treat possible chronic cough or constipation aggressively, and stabilize their blood sugars if they are diabetic. Towards improved recovery and wound healing, it is possible that the inclusion of enhanced recovery after surgery (ERAS) protocols will also indirectly minimize the chances of recurrence via better education and mobilization.

From a diagnostic standpoint, symptoms elicited during a recurrence often do overlap with those due to postoperative changes, obstructing clinical evaluation. Radiologic imaging—ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI)—can be repeatedly valuable in confirming the presence of a recurrent defect. However, prior mesh placement and scar tissue could act as a veil to hide or mimic recurrences, thus resulting in a possible underdiagnosis if imaging is not interpreted with sufficient expertise in the postoperative abdominal wall changes.

Management approaches for recurrent hernias are generally similar to those for primary repairs, except for altering anatomy and addressing possible adhesions or pre-placed mesh. If the previous repair failed, the surgeon might take a different approach from the former technique. So the surgeon might either convert from the open repair to laparoscopic repair or vice versa. A considerable improvement in postoperative outcomes may require multidisciplinary collaboration, where general and plastic surgeons do complex abdominal wall reconstruction and physiotherapy.

Future perspectives include mesh biomaterials with greater biocompatibility and enhanced ability for tissue ingrowth to

further reduce recurrence rates. Moreover, computer-assisted surgical planning-and augmented reality imaging-can provide a better intraoperative visualization of abdominal wall defects. There is an urgent need for further research, specifically well-designed randomized controlled studies, to identify optimal repair techniques, refine patient selection, and standardize protocols for follow-up and rehabilitation.

5. CONCLUSION

Recurrent hernias remain highly wasted economically and clinically. Even with very advanced surgical techniques and pliable materials, they invite a lot of trouble. It is of multifactorial origin, with hernia recurrence resulting from a variety of factors-mechanical errors, mesh-induced complications, concomitant diseases in the patient, and the inherent weakness of the tissue. Therefore, a multifaceted approach that includes diligent surgical execution, patient optimization, and vigorous postoperative follow-up is essential to guard against recurrence. The next developmental steps in the field should focus on refining mesh technology, improving the diagnostic process, and coming up with evidence-based guidelines. There will be no less need for collaborative efforts from clinicians, researchers, and policymakers in trying to reduce recurrence and improve long-term outcomes.

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