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Clinical Profile and Management Outcomes of Incisional Hernia Following Obstetrics and Open Gynecologic Surgery: A Prospective Study

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ABSTRACT

Background and aim: Incisional hernia is a known complication following abdominal surgery, particularly following obstetric and open gynecological procedures. In settings where these procedures are prevalent, understanding risk factors and effective management strategies is crucial for improved patient care. This study aimed to provide a more precise characterization of risk factors and surgical outcomes in this population through a streamlined prospective analysis.

Material and methods: This prospective observational study was conducted at a tertiary teaching hospital between January 2022 and December 2024, enrolling 61 consecutive patients presenting with incisional hernia resulting from obstetric or gynaecologic surgery. Data on demographics, index operation, hernia characteristics, operative details, and postoperative complications were collected and analyzed descriptively.

Results: The most common index procedures were emergency procedures, with cesarean section accounting for 62% and abdominal hysterectomy accounting for 19.6%. The most common risk factor was wound infection, observed in 30 patients. Hernia defects ranged from 2 cm to >4 cm, with most measuring 3–4 cm. Sublay mesh repair was the most common surgical repair, performed in 36 patients. Postoperative complications included seroma in 24 patients, wound infection in 17 patients, and chronic Pain in 12 patients. No recurrence was observed during follow-up; however, interpretation is limited by the sample size and the duration of follow-up.

Conclusions: Incisional hernia after obstetric and gynecologic procedures remains a clinical challenge. Sublay mesh repair demonstrated favorable, durable outcomes with no recurrence in this series. Preventive strategies focusing on infection control are critical for reducing the burden of this condition locally.

1. Introduction

Incisional hernia is a well-recognized long-term complication of abdominal operations, with global estimates ranging between 10% and 20%, depending on patient profile, the nature of the index procedure, and perioperative wound factors.[1] Obstetric and gynecologic surgeries represent a major contributor to incisional hernias in low- and middle-income countries because of high cesarean section rates and variable perioperative optimization.[2] Emergency cesarean sections are consistently associated with higher rates of wound-related morbidity, including infection, seroma, and fascial separation, contributing to later hernia formation.[3] Patient-specific variables such as anemia, Obesity, Diabetes, nutritional deficits, and multiparity further impair wound healing and collagen deposition, predisposing women to hernia formation after obstetric and gynecologic surgeries.[4] Gynecologic laparotomies such as hysterectomy and myomectomy also exhibit high rates of wound complications and postoperative abdominal wall defects, especially when performed for large uteri or in emergency settings.[5] Clinical presentation varies widely, ranging from an asymptomatic abdominal bulge to large complex defects associated with Pain, functional limitation, or risk of incarceration.[6] Most patients present within 2 years of the index surgery, although delayed presentation is well documented.[7] Traditional suture repair is associated with high recurrence rates, particularly when the defect exceeds 2 cm. The introduction of synthetic mesh has significantly reduced recurrence and improved long-term outcomes.[8] Among mesh-based techniques, sublay (retrorectus) placement has shown superior outcomes due to better mesh integration, reduced tension on the repair site, and lower infection and recurrence rates compared with onlay repair.[9] Despite these advances, the optimal management of incisional hernia following obstetric and gynecologic surgeries remains debated, especially in resource-constrained environments where factors such as delayed presentation, limited access to mesh, and high

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rates of wound infection complicate management.[10] Evidence from India and other developing countries remains limited, with few prospective studies focusing specifically on women who develop incisional hernia after obstetric or gynecologic procedures.[11] Understanding local patterns of risk factors, defect characteristics, and outcomes of different repair techniques is essential for improving surgical decision-making. This prospective study aimed to evaluate the clinical profile and management outcomes of incisional hernias following obstetric and open gynecologic surgeries at a tertiary teaching hospital.

2. Material and methods

Study design and setting

This prospective observational study was conducted in the Department of General Surgery at a tertiary care teaching hospital over 24 months. The study was designed to evaluate the clinical characteristics, predisposing factors, surgical management, and postoperative outcomes of patients presenting with incisional hernia following obstetric or open gynecologic surgery.

Ethical considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee before patient enrollment. Written informed consent was obtained from all participants prior to inclusion. All procedures were performed in accordance with the ethical principles of the Declaration of Helsinki (2013 revision).

Study population

All consecutive female patients presenting with incisional hernia following open obstetric or gynecologic procedures between January 2022 and December 2024 were screened for eligibility. Index procedures included cesarean section, abdominal hysterectomy, tubectomy, and myomectomy. Patients were eligible if they had a clinically diagnosed incisional hernia requiring elective surgical repair and provided informed consent to participate. Patients with recurrent incisional hernia following previous repair, hernias associated with intra-abdominal malignancy, pregnancy, or those deemed medically unfit for surgery were excluded. A total of 61 patients fulfilled the eligibility criteria and were included in the final analysis. No formal sample size calculation was performed because all consecutive eligible patients presenting during the study period were included.

Data collection

Baseline demographic and clinical characteristics were prospectively recorded using a standardized case record form. Variables included age, parity, body mass index (BMI), interval between the index operation and hernia presentation, previous abdominal incision, type of index surgery, and whether the primary operation had been performed electively or as an emergency procedure. Clinical evaluation included assessment of presenting symptoms, reducibility of the hernia, evidence of bowel obstruction or strangulation, and measurement of fascial defect size during preoperative evaluation and intraoperative assessment. Potential predisposing factors, including obesity, diabetes mellitus, postoperative wound infection, hypoproteinemia, chronic chest infection, and abdominal distension, were documented.

Surgical technique

All patients underwent elective open incisional hernia repair under either spinal or general anesthesia. The choice of repair technique was based on the size of the fascial defect, local tissue quality, and the operating surgeon's clinical judgment. Primary anatomical repair without mesh was reserved for small defects (<2 cm). Mesh reinforcement was performed for larger defects using either the onlay or retrorectus (sublay) technique according to standard surgical principles. Prophylactic intravenous antibiotics were administered before skin incision, and all procedures were performed under strict aseptic conditions.

Outcome measures and follow-up

The primary outcome was postoperative recurrence of incisional hernia. Secondary outcomes included postoperative complications, namely seroma, surgical site infection, mesh infection, skin necrosis, chronic postoperative PainPain, operative duration, and length of hospital stay. Patients were followed in the outpatient clinic at 1, 3, and 6 months, and subsequently at regular intervals for up to 24 months. Clinical examination was performed at each visit to assess wound healing, postoperative complications, and evidence of hernia recurrence.

Statistical analysis

Data were analyzed using descriptive statistical methods. Continuous variables were summarized as mean ± standard deviation or median values, as appropriate, while categorical variables were presented as frequencies and percentages. Given the relatively small sample size and the study's descriptive objective, no formal comparative or multivariable analyses were conducted. All analyses were conducted using IBM SPSS Statistics (Version 26.0; IBM Corp., Armonk, NY, USA). Statistical significance was not assessed because the study was designed as a descriptive observational analysis.

3. Results

A total of 61 women with incisional hernia following obstetric or open gynecologic surgery were included in this prospective study. Baseline demographic and clinical characteristics are summarized in Table 1.

Patient characteristics and index procedures

The mean age of the study population was 34 years. Caesarean section was the most common index procedure, accounting for 38 patients (62.3%), followed by abdominal hysterectomy in 12 patients (19.6%), tubectomy in 6 patients (9.8%), and myomectomy in 5 patients (8.2%). A previous Pfannenstiel incision was identified in 55 patients (90.2%), whereas 5 patients (8.2%) had a lower midline incision. The median interval between the index surgery and presentation with incisional hernia was 26 months. Emergency procedures accounted for 33 cases (54.1%), while 28 patients (45.9%) had undergone elective surgery. Multiparity was observed in 52 patients (85.2%), with primiparous and nulliparous women accounting for 13.1% and 1.6% of the cohort, respectively.

Clinical presentation and hernia characteristics

All patients presented with an abdominal wall swelling (100%). Swelling associated with pain was reported in 18 patients (29.5%). Irreducible hernia was present in 10 patients (16.4%), bowel obstruction in 6 patients (9.8%), and strangulation in 2 patients (3.2%). Regarding defect size, 18 patients (29.5%) had defects measuring 2–3 cm, 33 patients (54.1%) had defects measuring 3–4 cm, and 10 patients (16.4%) had defects larger than 4 cm (Table 2).

Predisposing factors

Multiple predisposing factors were identified among the study population. Wound infection was the most common risk factor, occurring in 30 patients (49.2%), followed by obesity in 28 patients (45.9%), hypoproteinemia in 20 patients (32.8%), diabetes mellitus in 19 patients (31.1%), chest infection in 10 patients (16.4%), and abdominal distension in 6 patients (9.8%). The distribution of these factors according to the index procedure is presented in Table 3.

Surgical management

Sublay (retrorectus) mesh repair was the most frequently performed procedure, performed in 36 patients (59.0%). Onlay mesh repair was performed in 20 patients (32.8%), whereas primary anatomical repair without mesh was performed in 5 patients (8.2%). The mean operative duration was 68 minutes for sublay repair, 43 minutes for onlay repair, and 25 minutes for anatomical repair. The mean postoperative hospital stay was 6 days, 8 days, and 2 days for the sublay, onlay, and anatomical repair groups, respectively.

Postoperative outcomes

Postoperative seroma was the most frequent complication and occurred in 24 patients (39.3%), followed by wound infection in 17 patients (27.8%), chronic postoperative pain in 12 patients (19.6%), skin necrosis in 4 patients (6.5%), and mesh infection in 2 patients (3.2%). Mesh infection occurred only among patients who underwent onlay mesh repair. During the 24-month follow-up period, no recurrence of incisional hernia was observed in any of the treatment groups (Table 4).

Table1. Clinical profile of patients.

Sl No	Variables	Numbers/Percentage
1	Mean age	34 years
2	Previous surgery	61
	LSCS	38 (62%)
	Hysterectomy	12 (19.6%)
	Tubectomy	6 (9.8%)
	Myomectomy	5 (8%)
3	Previous scar	
	Pfannestiel incision	55 (90.16%)
	Lower midline	5 (8.1%)
4	Median interval to hernia presentation	26 months
5	Emergency procedure	33 (54.09%)
	Elective procedure	28 (45.9%)
6	Multipara	52 (85.24%)
	Primipara	8 (13.11%)
	Nullipara	1 (1.6%)

All patients (100%) presented with a swelling, confirming that a visible bulge is the universal presenting symptom. Pain was reported by 29.5%, suggesting symptomatic hernias may impair quality of life. Irreducibility (16.39%), obstruction (9.8%), and strangulation (3.2%) reflect the spectrum of complications, with a notable subset at risk for emergency intervention. More than half (54.09%) had defects measuring 3–4 cm, making this the most common category. Only 16.39% had defects >4 cm, indicating a moderate defect size profile in this population. These findings reflect typical incisional hernia patterns in obstetric/gynecologic patients—moderate-sized, symptomatic defects with occasional complications.

Table 2. Characteristics of incisional hernia.

Symptoms		Frequency (total = 61)	Percentage
	Swelling	61	100%
	Swelling with pain	18	29.5%
	Irreducibility	10	16.39%
	Obstruction	6	9.8%
	Strangulation	2	3.2%
Defect size			
	2-3 cm	18	29.5%
	3-4 cm	33	54.09%
	More than 4cm	10	16.39%

Wound infection (49.18%) was the leading risk factor, followed by Obesity (45.9%), hypoproteinemia (32.78%), Diabetes (31.14%), and chest infection (16.39%). Most patients had >1 risk factor. Surgical site infection disrupts collagen formation and wound healing, increasing the likelihood of fascial breakdown. In Obesity (45.9%), increased intra-abdominal pressure and poor vascularity contribute to impaired wound healing. Hypoproteinemia (32.78%) & Diabetes (31.14%) compromise tissue healing and resistance to infection. Persistent coughing elevates intra-abdominal pressure and stresses the healing wound. Abdominal Distension (9.8%): though less common, it is a recognized mechanical risk factor. Overall, multiple overlapping risk factors were present in most patients, reflecting the multifactorial nature of incisional hernia. Wound infection was most frequently observed following cesarean section (20 of 38 patients), followed by hysterectomy (6 patients), whereas Obesity and Diabetes also occurred predominantly among women undergoing cesarean delivery.

Table 3. Predisposing factors for incisional hernia.

Sl no	Associated Risk Factors	LSCS	Hysterectomy	Tubectomy	Myomectomy	Percentage (Total= 61)
1	Wound infection	20	6	2	2	30 (49.18%)
2	Obesity	15	7	4	2	28 (45.9%)
3	Chest infection	6	3	0	1	10 (16.39%)
4	Diabetes	10	5	2	2	19 (31.14%)
5	Abdomen distension	5	1	0	0	6 (9.8%)
6	Hypoproteinemia	10	7	2	1	20 (32.78%)

Sublay repair was the most performed technique (36 cases), followed by onlay (20 cases) and suture repair (5 cases). Seroma (39.34%) was seen across both mesh groups; it was more common with onlay repairs due to extensive subcutaneous dissection. Wound Infection (27.8%) was more frequent in onlay repairs (9 cases) compared to sublay (7 cases). Sublay repair has a lower infection risk as the mesh is placed in a deeper, well-vascularized plane. Mesh Infection (3.2%) occurred only in the onlay group (2 cases). Skin Necrosis (6.5%)was more common in onlay repairs due to flap creation. Chronic Pain (19.6%) had a similar distribution across techniques; Pain is likely related to nerve irritation or mesh fixation.No recurrence was documented during the 24-month follow-up, demonstrating excellent short-term outcomes, particularly for sublay repair. Mesh infection occurred exclusively in patients who underwent onlay mesh repair (2 cases), whereas none were observed following retrorectus or anatomical repair.

Table 4. Surgical outcomes and complications.

		Onlay (20 Cases)	Retro-rectus (36 Cases)	Anatomical Repair (5 Cases)	Total (61Cases)
Details of surgery	Surgery duration	43 minutes	68 minutes	25minutes	
	Mean Hospital Stay	8 days	6 days	2 days	
Post-operative complications	Seroma	13	10	1	24(39.34%)
	Wound infection	9	7	1	17(27.8%)
	Mesh infection	2	0	0	2(3.2%)
	Skin necrosis	3	1	0	4(6.5%)
	Chronic pain	6	5	1	12(19.6%)
	recurrence	0	0	0	0

4. Discussion

Incisional hernia continues to be a significant postoperative morbidity following abdominal surgeries, especially in women undergoing obstetric and gynecologic procedures. The predominance of caesarean section as the index surgery in our study (62%) is consistent with contemporary global and Indian trends, where rising caesarean rates have contributed to a proportional increase in abdominal wall complications.[12] Our findings support previous work demonstrating that emergency caesarean deliveries are associated with higher rates of wound complications and subsequent hernia formation.[13] More than half of our patients underwent emergency procedures, highlighting operative urgency as an important modifiable risk factor. Wound infection emerged as the strongest predisposing factor (49.18%) in this study. This aligns closely with large multicentre analyses showing that surgical site infection can increase the risk of incisional hernia by up to sixfold due to impaired collagen synthesis and fascial integrity.[14] Other common risk factors in our cohort—obesity, diabetes, and hypoproteinaemia—have also been consistently identified as independent predictors of poor wound healing and hernia development.[15] Multiparity, observed in 85.24% of our cohort, represents an additional mechanical risk due to repeated stretching and weakening of the abdominal wall.[16] The majority of hernia defects measured 3–4 cm, which is comparable to defect sizes reported in recent prospective studies of women following obstetric surgeries.[17] Clinical presentation in our cohort—universally involving a swelling, with PainPain or irreducibility in a subset mirrors the typical symptomatology described in ventral hernia literature.[18]

Comparison of surgical techniques

Sublay mesh repair was the most commonly employed method (59%) and demonstrated favorable outcomes, with lower rates of wound infection, skin necrosis, and mesh infection than onlay repair. These results are supported by recent randomized trials and meta-analyses showing superior outcomes with the retrorectus (sublay) approach, including lower recurrence rates and reduced postoperative complications.[19] Our observation of a 0% recurrence rate during 24-month follow-up further reinforces the durability of the sublay repair technique. Although this finding is encouraging, recurrence rates in larger series range from 5% to 20% at longer follow-up, indicating that extended surveillance is necessary.[20] Onlay repair was associated with higher rates of seroma and wound complications in our study, as documented in the literature, due to the larger subcutaneous dissection required.[21] Suture repair was limited to small defects and demonstrated no recurrence, although the sample size is too small to draw meaningful conclusions. Current guidelines continue to recommend mesh reinforcement for defects larger than 2 cm to minimize recurrence risks.[22]

Limitations of the study

The present study has several strengths, including its prospective design, the inclusion of a homogeneous patient population undergoing obstetric and gynecologic index surgeries, and a standardized follow-up protocol, all of which enhance the reliability of the findings in a patient subgroup that has been relatively underrepresented in the literature on incisional hernia. Nevertheless, several limitations should be acknowledged. As a single-center study with a relatively small sample size (n = 61), the generalizability of the findings is limited, and the statistical power for comparisons between treatment groups is reduced. In addition, although the 24-month follow-up period was sufficient to assess short-term outcomes, it may not have captured late hernia recurrences. Furthermore, laparoscopic repair, which has become increasingly adopted in contemporary surgical practice, was not evaluated because of institutional resource limitations. Despite these limitations, the findings have important clinical implications. Optimizing modifiable risk factors, particularly through effective infection control, strict glycemic management, and improvement of nutritional status, may reduce the incidence of incisional hernia following obstetric and gynecologic procedures. Moreover, the favorable postoperative outcomes observed with sublay mesh repair suggest that this technique should be considered the preferred approach for patients with moderate-sized fascial defects. Finally, implementing preventive measures, including meticulous fascial closure techniques and careful patient selection, particularly in emergency surgical settings, may substantially reduce the burden of incisional hernias, especially in resource-limited healthcare systems.

5. Conclusion

Incisional hernia following obstetric and gynaecologic surgeries is a common clinical entity, with caesarean section being the predominant index procedure. Wound infection, Obesity, and nutritional deficiencies are key predisposing factors. Sublay mesh repair appears to provide the best outcomes in terms of complications and recurrence. Meticulous surgical technique and perioperative infection control remain vital for prevention.

Conflict of Interest

The authors declared that there is no conflict of interest.

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