



CLOSURE OF LAPAROTOMY WOUND DEHISCENCE USING MESH AS SUTURE: A MODIFIED APPROACH BASED ON STANDARD SECONDARY CLOSURE TECHNIQUES

Gastro Surgery

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ABSTRACT

Background: Laparotomy wound dehiscence (burst abdomen) is a serious postoperative complication with high morbidity and mortality, particularly in high-risk patients with friable fascia, sepsis, and malnutrition. Conventional closure may fail due to suture cut-through and inadequate tension distribution. **Aim:** To evaluate the effectiveness and short-term outcomes of a mesh-as-suture (mesh strip) technique for closure of laparotomy wound dehiscence. **Methods:** We conducted a retrospective observational study in the Department of Surgical Gastroenterology at Regency Hospital from January 2024 to May 2026. Twelve consecutive patients with wound dehiscence who underwent re-exploration and fascial closure using polypropylene mesh strips as suture reinforcement were analyzed. Demographics, risk factors, timing of dehiscence, operative details, and outcomes were recorded. **Results:** Twelve patients were included (mean age 57 years; 58.3% male). Most index operations were emergencies (91.7%). Sepsis and malnutrition were present in 66.7% each. Mean time to dehiscence was 7.7 days. Primary fascial closure using mesh strips was achieved in all cases (100%), with no re-dehiscence, no reoperation, and zero in-hospital mortality. **Conclusion:** The mesh-as-suture technique is a simple, reproducible option for secondary closure of laparotomy wound dehiscence in high-risk patients, achieving reliable fascial approximation with favorable short-term outcomes. Larger prospective studies with long-term follow-up are warranted to assess incisional hernia rates and comparative effectiveness.

KEYWORDS

Laparotomy Wound Dehiscence, Burst Abdomen, Mesh-as-suture, Retention Reinforcement, Fascial Closure, Sepsis, Malnutrition

INTRODUCTION

Early postoperative laparotomy wound dehiscence (burst abdomen) is an urgent surgical complication associated with increased morbidity, prolonged hospitalization, and substantial costs. Reported incidence ranges from 0.4% to 3.5%, with mortality up to 25%–45% in high-risk cohorts. Technical and patient-related factors contribute, including inadequate fascial closure, rapid loss of suture tensile strength, malnutrition, sepsis, obesity, steroid therapy, chronic cough, and elevated intra-abdominal pressure. Among these, malnutrition and sepsis are particularly detrimental, impairing collagen deposition and wound healing. Dehiscence typically occurs between postoperative days 5–10, corresponding to the nadir of wound tensile strength. [1–3] Conventional re-closure strategies—continuous suturing and retention sutures—may fail in the presence of friable fascia due to suture cut-through. The mesh-as-suture (mesh strip) technique distributes load across a wider surface area, potentially reducing localized stress and enabling tension-controlled approximation. We report our initial experience using polypropylene mesh strips as reinforcement for secondary fascial closure in patients with burst abdomen. [4–6]

Methods

Study Design and Setting

This was a retrospective observational study conducted in the Department of Surgical Gastroenterology at Regency Hospital from January 2024 to May 2026. Institutional approval was obtained; the study adhered to the Declaration of Helsinki. Individual consent was waived due to the retrospective design and de-identified data use.

Study Population

Inclusion criteria:

- Adults (≥ 18 years) with early postoperative laparotomy wound dehiscence undergoing operative secondary fascial closure using mesh strips (polypropylene).

Exclusion criteria:

- Patients managed non-operatively or with temporary abdominal closure only.
- Incomplete records precluding outcome assessment.

Twelve consecutive eligible patients were included.

Data Collection and Variables

Data were extracted from electronic medical records, operative reports, and follow-up notes. Variables included demographics, indication for index surgery, urgency (emergency vs elective), risk factors (sepsis, malnutrition, diabetes, obesity, steroid use), timing of dehiscence, intraoperative findings, closure details, and outcomes: successful fascial closure, surgical site infection (SSI), re-dehiscence, reoperation, and in-hospital mortality.

Malnutrition was defined clinically (documented weight loss, low albumin/prealbumin when available, or dietitian assessment). Sepsis was defined per treating team documentation consistent with infection plus organ dysfunction.

Surgical Technique: Mesh-as-Suture Method

Re-exploration was performed under general anesthesia. Steps:

- Removal of prior sutures and complete wound opening.
- Debridement of non-viable tissue; thorough lavage.
- Abdominal assessment and management of intra-abdominal pathology as indicated.
- Preparation of polypropylene mesh strips 2–3 cm wide (from standard medium-weight mesh), edges trimmed to reduce sharp corners.
- Placement of mesh strips along each fascial edge at planned suture sites.
- Passage of heavy non-absorbable sutures in the sequence: mesh strip $\rightarrow$ full thickness sutures passing through anterior rectus fascia $\rightarrow$ contralateral anterior rectus fascia and a full thickness bite $\rightarrow$ contralateral mesh strip, at intervals of approximately 2–3 cm with a generous bite width (>1 cm) to maximize load distribution.
- Gradual fascial approximation with attention to tension control.
- Subcutaneous management per wound status; skin left open, loosely approximated, or managed with delayed primary closure.

Perioperative antibiotics were administered per institutional protocols.

Outcomes and Follow-up

Primary outcome: successful midline fascial closure at the index re-exploration. Secondary outcomes: SSI, re-dehiscence, return to OR, and in-hospital mortality. Early follow-up focused on wound status and complications; long-term incisional hernia was not systematically assessed.

RESULTS

Patient Characteristics

Twelve patients were analyzed: mean age 57 years (range 24–80); 7 male (58.3%). Index operations were emergencies in 11 (91.7%) and elective in 1 (8.3%). Indications included perforation peritonitis (6, 50%) and other etiologies (trauma, malignancy, obstruction, volvulus).

Risk factors were common: sepsis in 8 (66.7%), malnutrition in 8 (66.7%); diabetes and obesity each in 1 patient. Mean time to dehiscence was 7.7 days; most events occurred on postoperative days 5–10.

Operative and Postoperative Outcomes

- Fascial closure with mesh-as-suture achieved in all 12 patients (100%).
- No evidence of SSI after Mesh suture; no mesh removal was required.
- No re-dehiscence was observed during the index hospitalization.
- No patient required reoperation related to the abdominal wall closure.
- In-hospital mortality was 0%.

DISCUSSION

In this high-risk cohort—predominantly emergency cases with frequent sepsis and malnutrition—conventional re-closure can be jeopardized by friable fascia and elevated intra-abdominal pressure. Our technique leverages wide polypropylene mesh strips to distribute tensile forces, reducing suture cut-through and enabling controlled approximation. Achieving 100% primary midline fascial closure with no in-hospital re-dehiscence or mortality compares favorably with historical series in similar risk profiles, where re-dehiscence and mortality remain substantial. [2,7–9]

Published evidence supports the association of emergency surgery, infection/sepsis, impaired nutritional status and other patient-related factors with abdominal wound dehiscence. Risk-model data and contemporary reviews also emphasize that management evidence for established burst abdomen remains heterogeneous and largely low-certainty. [1–3,7]

Timing of dehiscence clustered around postoperative day 5–10, consistent with the period of minimum wound strength. The technique is straightforward, uses readily available materials, and integrates with standard re-exploration workflows. While bedside temporary closures (e.g., Bogotá bag) can stabilize unstable patients, they do not provide definitive fascial closure and may prolong exposure and fluid losses; the mesh-as-suture approach offers a definitive solution when physiology permits anesthesia and re-exploration. [2,3,7]

Potential concerns include SSI in contaminated fields and theoretical risk of chronic pain or future incisional hernia. In our series, SSIs were manageable without mesh removal, likely because the mesh functions as broad “suture pledgets” rather than a large prosthetic underlay. Long-term hernia rates were not captured and require prospective follow-up; the technique's impact relative to component separation or biologic/slowly absorbable reinforcement remains to be defined. [3,7,8]

Limitations

- Small sample size (n=12) and single-center retrospective design.
- No control group using conventional re-closure or alternative reinforcement.
- Short-term outcomes only; long-term incisional hernia and quality-of-life data were not assessed.

CONCLUSION

In high-risk patients with burst abdomen, mesh-as-suture reinforcement enabled consistent midline fascial closure with favorable short-term outcomes, including no re-dehiscence, no reoperation, and zero in-hospital mortality in this small series. The technique is simple, reproducible, and well-suited to friable fascia.

Prospective comparative studies with standardized definitions and long-term follow-up are needed to evaluate durability, hernia incidence, and cost-effectiveness. [3,7–9]

Ethical Considerations

Institutional approval was obtained for this retrospective review. Individual patient consent was waived due to de-identified data analysis.

Author Contributions

- Conceptualization and methodology: [Names/initials]
 - Data curation and analysis: [Names/initials]
 - Surgery and clinical care: [Names/initials]
 - Writing—original draft: [Names/initials]
 - Writing—review and editing: [Names/initials]
- All authors approved the final manuscript.

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Conflicts of Interest

The authors declare no conflicts of interest.



Sl No	NAME	AGE (IN YEARS)	SEX	PRIMARY DIAGNOSIS	PRIMARY SURGERY	RISK FACTORS	TIME TO DEHISCENCE
1	SABRA BEGUM	63	FEMALE	ADENOCARCINOMA OF AMPULLARY REGION	ROBOTIC ASSISTED LAP PPD	MALNOURISHMENT, DIABETIC	12 DAYS
2	BHAGWAN PRASAD BHARTI	68	MALE	PERFORATION PERITONITIS- ILEAL PERFORATION	EMERGENCY EXPLORATORY LAPAROTOMY, PERITONEAL LAVAGE LOOP ILEOSTOMY	MALNUTRITION, SEPSIS	9 DAYS
3	RAM BHAROSE	80	MALE	GANGRENOUS PERFORATED CAECAL VOLVULUS	EMERGENCY LAPAROTOMY WITH RIGHT HEMICOLECTOMY WITH END ILEOSTOMY	SEPSIS	9 DAYS
4	SUSHMA KUSHWAHA	60	FEMALE	ACUTE BOWEL OBSTRUCTION, SECONDARY TO INTERNAL STRANGULATED HERNIA	EXPLORATORY LAPAROTOMY ILEAL RESECTION AND END ILEOSTOMY WITH PERITONEAL LAVAGE. S/P ROBC	MALNUTRITION	8 DAYS
5	GOMTI	28	FEMALE	POST D&C HOLLOW VISCUS PERFORATION	EXPLORATORY LAPAROTOMY, WITH PERITONEAL LAVAGE, RESECTION OF ILEAL SEGMENT AND END ILEOSTOMY AND HYSTERECTOMY	SEPSIS	8 DAYS
6	AYUSHI JAISWAL	24	FEMALE	ILEAL PERFORATION PERITONITIS, SECONDARY TO ENTERIC FEVER	EXPLORATORY LAPAROTOMY ILEAL RESECTION AND END ILEOSTOMY WITH PERITONEAL LAVAGE.	MALNUTRITION, OBESITY, SEPSIS	5 DAYS
7	JAGDEV SINGH	76	MALE	RIGHT POSTERIOR LATERAL DIAPHRAGMATIC HERNIA	EXPLORATORY LAPAROTOMY WITH DIAPHRAGMATIC HERNIA REDUCTION AND DIAPHRAGMATIC HERNIORRHAPHY WITH ILEAL SEGMENT RESECTION AND END ILEOSTOMY	MALNUTRITION, SEPSIS	11 DAYS
8	SHYAM LAL YADAV	47	MALE	RTA WITH BTA. TEAR IN MESOCOLON AT HEPATIC FLEXURE, GANGRENOUS HEPATIC FLEXURE. D2 LATERAL WALL PERFORATION	EMERGENCY EXPLORATORY LAPAROTOMY WITH RIGHT HEMICOLECTOMY, PERITONEAL LAVAGE END ILEOSTOMY, WITH PRIMARY REPAIR OF DUODENAL PERFORATION WITH FJ	SEPSIS	10 DAYS
9	AKANKSHA MISHRA	26	FEMALE	DISTAL ILEAL PERFORATION(ENTERIC)	EMERGENCY LAPAROTOMY, PERITONEAL LAVAGE WITH LOOP ILEOSTOMY	MALNUTRITION, SEPSIS	4 DAYS
10	SHRI RAM	69	MALE	DUODENAL PERFORATION WITH PERITONITIS	EMERGENCY EXPLORATORY LAPAROTOMY WITH MODIFIED GRAHAM PATCH REPAIR	SEPSIS	6 DAYS
11	SHYAM LAL YADAV	47	MALE	EMERGENCY EXPLORATORY LAPAROTOMY WITH RIGHT HEMICOLECTOMY, PERITONEAL LAVAGE END ILEOSTOMY, WITH PRIMARY REPAIR OF DUODENAL PERFORATION WITH FJ	RESTORATION OF BOWEL CONTINUITY, ILEO-TRANSVERSE COLON SIDE TO SIDE ANASTOMOSIS	MALNUTRITION	5 DAYS
12	ANAND SWARUP TIWARI	65	MALE	CAECAL PERFORATION WITH GANGRENOUS ASCENDING COLON	EMERGENCY EXPLORATORY LAPAROTOMY WITH RIGHT HEMICOLECTOMY, PERITONEAL LAVAGE END ILEOSTOMY.	SEPSIS MALNUTRITION	5 DAYS

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