Mesh Suture Closure for Contaminated Midline Incisional Hernia Repairs: A Multispecialty Early Outcomes Study

Megan M Perez MD • Gregory A Dumanian MD • Michael Shapiro MD•
Northwestern University, Feinberg School of Medicine. Department of Surgery

INTRODUCTION

Midline incisional hernia repairs in contaminated and clean-contaminated fields pose a significant clinical challenge due to elevated risks of recurrence and surgical site infection (SSI). While permanent planar mesh reinforcement has demonstrated reduced recurrence rates, its use in contaminated settings remains limited by concerns over infection and the technical demands of implantation.

Mesh suture is a novel suture device (Fig 1) that integrates the ease of primary suture repair with the biomechanical advantages of mesh. Its large-pore, braided design aims to distribute tension across the suture–tissue interface, potentially improving outcomes while minimizing the need for extensive dissection and the amount of foreign body load.

Fig 1 Mesh Suture

AIMS/HYPOTHESIS

It was hypothesized that mesh suture could provide improved early mechanical support and complication rates comparable to conventional suture-only and planar mesh-based repairs, as reported in the literature.

METHODS

A retrospective cohort study was conducted of 51 patients undergoing contaminated (CDC III) or clean-contaminated (CDC II) midline, incisional hernia repair with mesh suture between Jan 2023-Jul 2024 across an integrated academic health system. Cases involving planar mesh were excluded. Outcomes included 90-day SSI, surgical site occurrence (SSO), reoperation, readmission, and hernia recurrence. Recurrence-free survival was analyzed using Kaplan-Meier methods, truncated at 18 months.

RESULTS

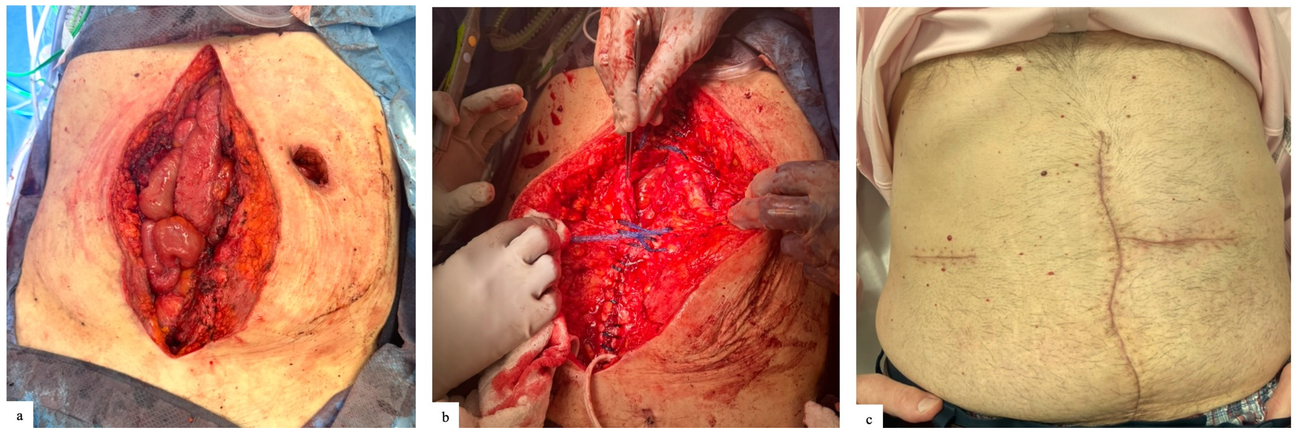

Fig 2 (a) defect after completion of ostomy and fistula takedown and hernia sac excision, fascial edges were circumferentially cleared to healthy tissue to optimize approximation, (b) mesh suture closure of defect in a continuous running fashion, using full-thickness, 1 cm through-and-through bites of the anterior abdominal wall with 8 mm travel between bites, (c) immediately postoperative, the incision on the right was used for the right anterior components separation, the ostomy site on the left was used for the left components separation and was then closed transversely.

Table 1. Sources of Contamination

Bowel resection	22 (43.1)
Ostomy reversal	3 (5.9)
Gynecologic procedure	4 (7.8)
Urologic procedure	4 (7.8)
Creation of stoma/revision	4 (7.8)
Enterotomy	1 (2.0)
Cholecystectomy	2 (3.9)
Fistula	5 (9.8)
Lysis of adhesions	6 (11.7)

Table 2. Operative details

	N = 51 (%)
Length of inpatient stay (days) (mean, SD)	7.7±6.0
Stoma present	19 (37.3)
Operative time (minutes)	328.3±172.6
Pre-operative abdominal wall Botox	6 (11.8)
Anterior components separation	13 (25.5)
Mesh suture for second indication	
Ostomy site fascial closure	8 (15.7)
Parastomal hernia repair	4 (7.8)

The mean patient age was 62.4 years; 41.2% were male. Bowel resection (43.1%) was the most common source of contamination (Table 1). The mean hernia width was 8.1 cm. Anterior component separation was required in 25.5% of cases, and 11.8% received preoperative botulinum toxin. The mean hospital stay was 7.9 days.

Outcomes are summarized in Table 2. Major complications (SSI, SSO, or reoperation within 90 days) occurred in 21.6% of patients. Stoma presence at the time of hernia repair was significantly associated with complications (p = 0.041).

Table 3. Primary and secondary outcomes following mesh suture repair

	N = 51 (%)
SSI	
Superficial infection	2 (3.9)
Deep infection	2 (3.9)
Organ space infection	4 (7.8)
SSI 0-90 days	8 (15.7)
SSO	
SSI	8 (15.7)
Seroma	4 (7.8)
Hematoma	2 (3.9)
Soft tissue breakdown	1 (2.0)
Fascial dehiscence	1 (2.0)
Cellulitis	0 (0)
Suture granuloma	0 (0)
Chronic draining sinus	0 (0)
Enterocutaneous fistula	1 (2.0)
SSO 0-90 days	12 (23.5)
SSO requiring procedural intervention	7 (13.7)
Readmissions related to abdominal repair	3 (5.8)
Reoperations related to abdominal repair	5 (9.8)
Death 1-year	3 (5.9)
Hernia recurrence	4 (8.2)
Length of time hernia recurrence (mo.) (mean±SD)	12.9±7.3

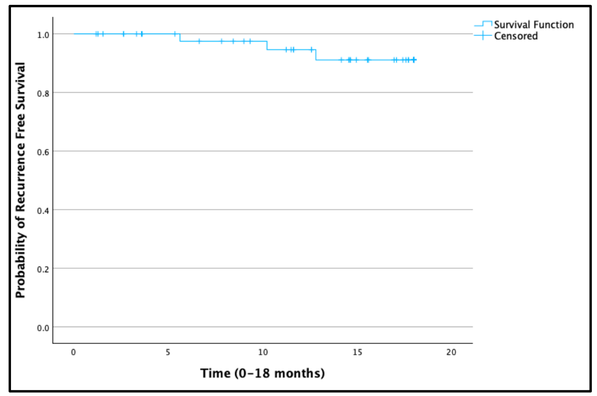

Figure 2 Kaplan-Meier curve demonstrating recurrence-free survival truncated at 18 months. Three hernia recurrences occurred during the truncated follow-up period. An additional recurrence that occurred after 18 months is not shown on this curve but is included in the overall event count. Vertical ticks represent censored observations (patients with no recurrence by last follow-up). Mean length of time to recurrence 12.9 months (±7.3).

CONCLUSION

Mesh suture closure appears feasible for midline hernia repair in contaminated and clean-contaminated settings. In this series, 90-day SSI (15.7%) and SSO (23.5%) rates were within reported ranges for biologic, biosynthetic, and synthetic mesh (SSI 15–24%, SSO 25–48%) [1-4]. No chronic infections occurred.

Mesh suture has a lower foreign material burden and is easily removed when needed. The recurrence rate (8.2%) in this cohort is favorable compared to published real-world rates (23–40%) for planar mesh, though further prospective studies are needed to confirm long-term outcomes.

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