47th ANNUAL INTERNATIONAL CONGRESS EHS 2025 JUNE 4-6 PARIS - FRANCE

Outcomes Following Mesh Suture Closure of Contaminated Laparotomies

Megan M. PEREZ, T. Hassan, M. Mittal, K. Bagdady, GA. Dumanian, M. Shapiro
Northwestern University, Department of Surgery – Chicago, IL, USA

Introduction

Achieving durable abdominal wall closure in clean-contaminated or contaminated fields remains a significant surgical challenge. Standard suture closure carries a high risk of failure due to tension-related suture pull-through, while planar mesh reinforcement adds foreign body burden, operative complexity, and may be contraindicated in infected fields.

This study evaluates the feasibility and early outcomes of mesh suture for midline laparotomy closure in clean-contaminated and contaminated cases across multiple surgical specialties.

Mesh suture is a novel device designed to combine the simplicity of fascial closure with the structural reinforcement of mesh. It consists of braided polypropylene filaments that flatten under tension, distributing force across a broader area to reduce pressure at the suture–tissue interface. Early biomechanical and preclinical data suggest improved resistance to pull-through and favorable tissue incorporation.

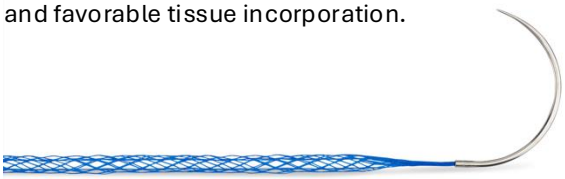

Fig 1. Mesh suture (Duramesh)

Methods

Patients undergoing mesh suture closure for laparotomy in CDC class II–III cases (Jan 2023–Jul 2024) were retrospectively reviewed. Procedures were performed across a single health system by multiple specialties. Mesh suture was placed using a continuous full-thickness technique. Primary outcome was 90-day surgical site infections (SSI). Secondary outcomes included surgical site events (SSE), hernia recurrence, reoperation, and readmission.

Table 2. Outcomes Contaminated Incisional Hernia Repairs

	N = 222 (%)
SSI	
Superficial infection	13 (5.9)
Deep infection	2 (0.9)
Organ space infection	20 (9.0)
SSI 0-90 days	**32 (14.4)**
SSE	
Seroma	5 (2.3)
Hematoma	13 (5.9)
Soft tissue breakdown	5 (2.3)
Fascial dehiscence	5 (2.3)
Cellulitis	1 (0.5)
Suture granuloma	0 (0)
Chronic draining sinus	1 (0.5)
Enterocutaneous fistula	0 (0)
SSE 0-90 days	**25 (11.3)**
Readmit 0-90 days	49 (22.1)
Reop 0-90 days	21 (9.5)
Hernia recurrence	**10 (4.5)**

Results

Demographics

- 222 patients met inclusion criteria
- 47 surgeons from 9 surgical specialties used mesh suture

Table 1. Patient Demographics

	N = 222 (%)
Age (mean, SD)	59.2±15.0
Male Gender	120 (54.1)
BMI (mean, SD)	29.4±7.5
Current smoker	26 (11.7)
Former smoker	91 (41.0)
Cancer	77 (34.7)
COPD	29 (13.1)
HTN	141 (63.5)
DM	60 (27.0)
Wound Classification	
Clean contaminated	175 (78.8)
Contaminated	47 (21.2)

Conclusion

Mesh suture appears technically feasible for midline closure in contaminated settings, with acceptable short-term outcomes in this early experience. The 90-day SSI rate was 14.4% and SSE rate was 11.3%. Fascial dehiscence occurred in 2.3% of cases, and one mesh-related sinus (0.5%) resolved after in-office excision. No enterocutaneous fistulae were observed. Hernia occurrence was 4.5%, with a median time to presentation of 193.5 days. While these findings are encouraging, further investigation with longer follow-up and comparative studies is needed to assess long-term safety and efficacy.