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Others

Biological Anterior Fascia Reinforcement Strip: A Novel Approach for Midline Laparotomy Closure

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Introduction

Incisional hernias are a frequent and challenging complication following midline laparotomy, posing significant clinical and economic burdens. To address these issues, a novel technique utilizing biological anterior fascia reinforcement strips (BAFRS) was developed. These strips, derived from a biological mesh (Cellis®, Meccellis Biotech), are secured to the anterior fascia with interrupted horizontal mattress sutures

Material & Methods

From January 2024 to January 2025, we conducted a prospective series of consecutive patients who underwent midline laparotomy closure using the BAFRS technique (**Figure 1**). The primary indication for using BAFRS was laparotomy closure in contaminated surgical fields (CDC wound classification ≥ 3), incarcerated incisional hernias with severe obesity, or recurrent incisional hernias in patients with significant systemic disease (ASA score ≥ 3). The objective of this study was to evaluate the safety, efficacy, and postoperative recurrence rate associated with the BAFRS technique.

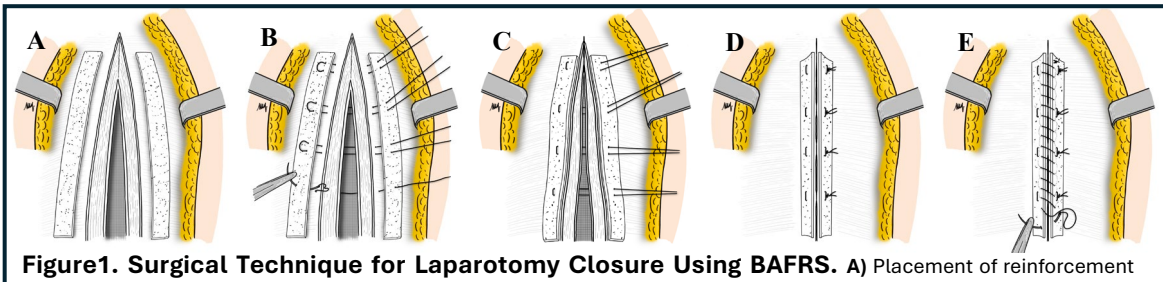

Figure1. Surgical Technique for Laparotomy Closure Using BAFRS. **A)** Placement of reinforcement strips on the anterior fascia of each edge of the incision. **B)** Placement of interrupted horizontal mattress stitches along the entire length of the incision. **C)** Gradual tightening of the interrupted horizontal mattress stitches to progressively bring the edges of the incision closer together. **D)** Progressive ligation of the stitches from bottom to top. **F)** Continuous running suture gently massaging the strips and anterior fascia from the top to the bottom of the incision to ensure optimal tissue approximation and even distribution of tension.

Results

A total of 13 patients were included. Indications for BAFRS use were: contaminated surgical fields (n = 7), incarcerated incisional hernias with severe obesity (BMI 40–56 kg/m^2; n = 3), and recurrent incisional hernias in patients with significant comorbidities (n = 3). Laparotomy closure was successfully completed in all cases (**Figure 2**). Postoperative complications occurred in 5 patients: hematoma (n = 2), seroma (n = 1), surgical site infection (n = 1), and abdominal compartment syndrome requiring ICU admission (n = 1). All complications were managed conservatively; only one patient required VAC therapy. No reoperations under general anesthesia were necessary. All complications occurred after emergency surgery. During follow-up (clinical and CT-based), two hernia recurrences were observed: one in a patient with a chronic fistula after sleeve gastrectomy, and one in a patient with severe malnutrition.

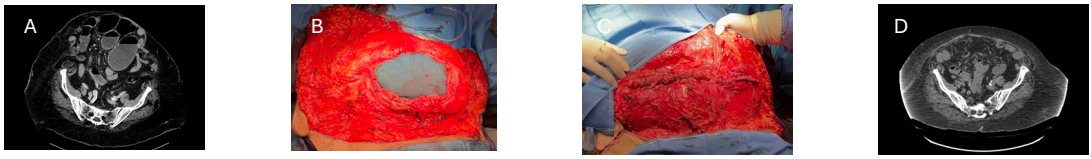

Figure 2. Case of a 76-year-old woman with severe obesity and an incarcerated incisional hernia. A) Preoperative CT scan. B) Intraoperative image of the incisional defect. C) Intraoperative image showing laparotomy closure using BAFRS. D) CT scan at 6 months postoperatively.

Conclusion

The use of BAFRS could represent a potentially significant advancement in abdominal wall reconstruction, providing a safer and more effective option for hernia prevention in complex and/or contaminated cases. Further investigation will be crucial in determining its broader applicability and establishing its role in the evolving landscape of surgical management for incisional hernias.