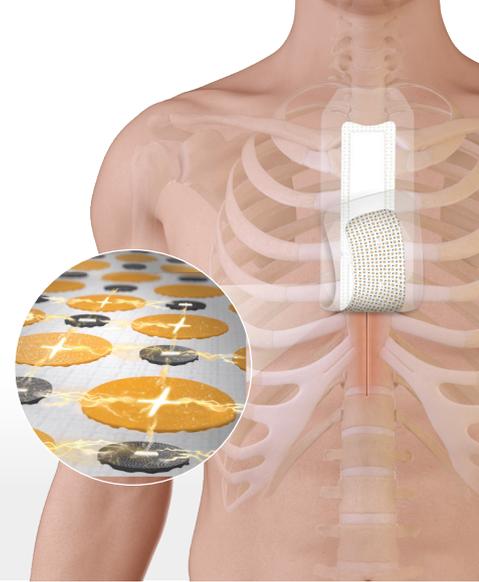


Novel Use of an Electroceutical Wound Dressing to Complement Wound Closure in High-Risk Sternotomy Patients: Clinical Safety and Outcome

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Cureus. 2025;17(2):e78405. doi:10.7759/cureus.78405



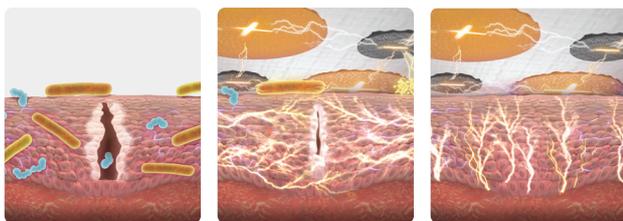
OBJECTIVE

This single-center, retrospective observational study aimed to assess the impact of applying an electroceutical wound dressing following median sternotomy in a cohort of high-risk cardiac surgery patients.

METHODS AND MATERIALS

Inclusion Criteria: Patients who underwent cardiac surgery via median sternotomy were retrospectively reviewed. Those with previous sternal wound complications and less than 18 years of age were excluded.

Sternal Closure Technique: All patients received FiberTape® sternal closure. Four sutures were placed through the manubrium and sternal interspaces and sequentially tightened in a figure-of-8 pattern. A JumpStart® FlexEFit® antibacterial wound dressing was placed over the incision site.



Follow-Up and Outcomes: ICU total duration and hospital length of stay were recorded for all cases. In accordance with standard protocols, patients were evaluated 2 weeks and 1 month postoperatively. Wounds were examined and pain was assessed by applying pressure to the breastbone and intercostal spaces to gauge pain levels.

Additionally, with the patient standing, the surgeon placed two fingers on the breastbone and instructed the patient to rotate their upper body laterally to assess their pain. Newly prescribed opioid usage was also used to classify pain level. Hospital mortality, sternal wound infections, and wound dehiscence were recorded at all interactions.

Table 1. Patient demographics and operative characteristics. Categorical variables are represented as N. Parametric continuous variables are presented as mean \pm SD. Nonparametric continuous variables are presented as median (lower quartile – upper quartile).

Demographic and Operative Characteristics

Number of patients	100
Age (y)	65 \pm 2
Sex	60 M, 40 F
STS score	1.77 (1.19 – 2.5)
STS DSWI score	0.241 (0.124 – 0.258)
Elective surgery	82
Procedure	
CAGB \pm maze	43
Valve \pm maze	39
CABG & valve \pm maze	9
Aortic	9
Cardiopulmonary bypass (min)	83 \pm 4
Aortic cross-clamp (min)	64 \pm 3
Operative time (min)	243 \pm 16

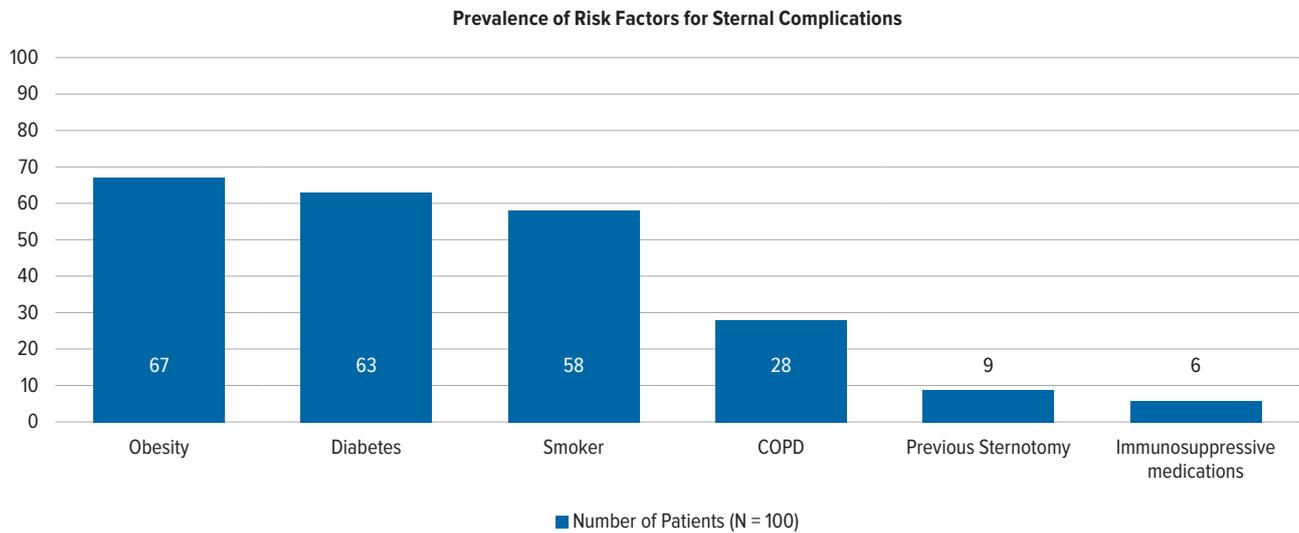


RESULTS

One hundred patients met the inclusion criteria and were evaluated for postoperative sternal complications.

Prevalence of Risk Factors: Obesity was the primary risk factor among the cohort with 67 patients (mean population BMI of $33.48 \pm 1.11 \text{ kg/m}^2$). Diabetes and smoking were highly prevalent (Figure 1).

Figure 1. Prevalence of risk factors. Chronic obstructive pulmonary disease (COPD)



Postoperative Outcomes: Median ICU admission duration was 3 days, while the overall hospital length of stay was a median of 6 days. No in-hospital deaths were reported. No significant postoperative complications, including sternal wound infection or dehiscence, occurred in this cohort of patients who received JumpStart dressing over the incision site.

Postoperative Pain: No patients reported significant pain at either the 14-day or 30-day follow-up visits, suggesting patient comfort was well-managed.

Financial Comparison: The authors hypothesized \$605-\$935 in potential savings per obese patient when using a protocol with FiberTape sternal closure and JumpStart dressing, largely driven by the elimination of postoperative chest-stabilization adjuncts typically required for high-risk patients.

CONCLUSION

Results from this study suggest the use of electroceutical wound dressing is an effective solution to stabilize sternal wound closure in high-risk cardiac surgery patients. The cohort showed well-maintained incisions without early complications, no need for postoperative stabilization devices, and postoperative findings consistent with antimicrobial and bioelectric activity. The cohort had high rates of common risk factors including hypertension (86%), diabetes mellitus (63%), obesity (67%), and smoking history (58%).

