

Experience Using a Flexible Reinforced Fiber Suture for Sternal Closure in Bilateral Lung Transplantation Recipients Undergoing Bilateral Transverse Thoracosternotomy

Coster JN, Chan EG, Furukawa M, Sz PG—*JTCVS Techniques*, 2022

Objective

There is a high incidence of sternal wire pull-through, with sternal complications in the literature ranging from 8% to 46%. The purpose of this investigation was to present early outcomes of patients who underwent transverse thoracosternotomy closure with the FiberTape® Sternal Closure System following bilateral lung transplantation.

Methods

Patient Selection

IRB approval was obtained prior to the collection of patient data. Bilateral lung transplantation (BLTx) recipients from the University of Pittsburgh Medical Center between January 2021 and January 2022 were retrospectively reviewed. Subjects were categorized into two groups: patients who underwent bilateral transverse thoracosternotomy with traditional sternal wire (SW) closure or with the FiberTape Sternal Closure System (Arthrex). Subjects were reviewed for early postoperative sternal complications including infection, chronic pain, instability, and dehiscence that required operative intervention.

Subject demographics, including age at time of transplant, sex, body mass index, and diagnosis, were obtained for the 2 groups.

Surgical Technique

The ribs are approximated with four figure-of-8 #5 Ti-Cron™ sutures bilaterally. Two FiberTape sutures are passed through the superior and inferior sternum and the needle is cut from the flexible fiber suture. The suture is passed through the pretied knot on the loading device. Following intercostal and sternum approximation, the FiberTape is passed into the tensioning device, and sternal edges reduced with appropriate tension. Then the intercostal sutures are tied, and the tensioning process is repeated. 5 knots are thrown after appropriate tension is achieved.

Muscle and subcutaneous tissue is closed in layers with absorbable suture, and skin closed with staples. The FiberTape sternal closure sutures can be easily cut with scissors if urgent reentry is required.

Table 1. Subject demographics

	SW closure (n = 28)	FiberTape sternal closure (n = 22)	P value
Age, y, median (IQR)	64 (57-67)	63 (59-69)	.70
Male sex, n (%)	18 (64)	16 (73)	.53
Diagnosis, n (%)			.93
COPD	11 (39)	7 (32)	
IPF	11 (39)	10 (45)	
Other	6 (21)	5 (23)	
BMI, median (IQR)	24.8 (22.2-27.4)	26.0 (22.0-29.3)	.74
Induction regimen			.42
Alemtuzumab, n (%)	12 (43)	7 (32)	
Basiliximab, n (%)	16 (57)	15 (38)	

Results

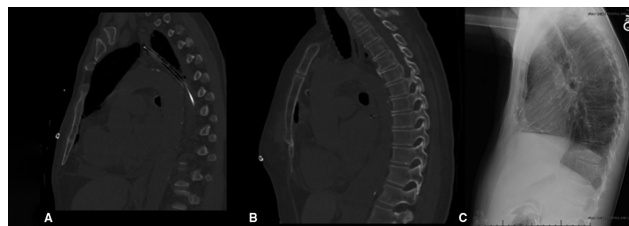
The lung transplant surgery team completely transitioned to FiberTape sternal closure in July 2021.

A total of 50 patients underwent BLTx requiring sternal approximation. No differences in patient demographics were present (Table 1). Twenty-eight recipients had SW closure and 22 subjects received FiberTape sternal closure. Eight of 28 subjects (28.6%) in the SW group had sternal complications requiring operative intervention (Table 2). No sternal complications were present in the FiberTape sternal closure group.

Table 2. Description of sternal complications in the sternal wire group

	Complication	Days after transplant	Operative intervention
1	Sternal dehiscence, deep surgical site infection, wires pulled through bone	40	Multiple washouts; wound vac; eventual closure and pectoral flap with plastic surgery
2	Increased anterior chest wall pain, instability from sternal dehiscence	29	Washout, wire removal, sternal plating
3	Sternal override, wires visible in superficial incision	12	Washout, wire removal, sternal plating
4	Delayed deep wound infection, infected hematoma	237	Washout, wire removal, wound vac
5	Superficial sternal wound developed after proning	12	Wound vac, delayed primary closure, musculocutaneous flaps with plastic surgery
6	Sternal dehiscence, instability, wires pulled through bone	12	Sternal Zipfix closure (DePuy Synthes)
7	Deep surgical wound infection	225	Debridement, wound vac
8	Sternal instability, clicking	15	Rewiring of sternum and primary closure

Figure 1. Sagittal CT of the sternum with the FiberTape Sternal Closure System at (A) 12 days and (B) 6 weeks; (C) lateral chest radiograph 6 months post-operative



Conclusions

The FiberTape system allows sternal approximation similar to sternal wire; however, the fabric-reinforced tape does not pull through fragile bone. The tension device engages and sets the appropriate amount of compression, and the FiberTape suture is easy to remove when required for re-entry.

Reference

1. Coster JN, Chan EG, Furukawa M, Sanchez PG. Experience using a flexible reinforced fiber suture for sternal closure in bilateral lung transplantation recipients undergoing bilateral transverse thoracosternotomy. *JTCVS Tech.* 2022;14:168-170. doi:10.1016/j.jtc.2022.05.006

Ti-Cron is a trademark of MedTronic