

Tubular silicone stent removal via tracheostomy stoma: when rigid bronchoscopy is not an option!

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Background

Interventional pulmonology centers around the use of advanced bronchoscopic techniques to treat airway disorders. There are two main types of stents, silicone and metallic. Although silicone stents have the advantages of being easily repositioned, removed, and customizable, they have a higher risk of migration compared to metallic stents.¹

When such situations arise, silicone stent removal requires rigid bronchoscopy and use of rigid forceps. The inability to intubate the rigid bronchoscope represents a rare challenge for stent removal. To our knowledge, published techniques for silicone tubular stent removal via tracheostomy stoma do not exist.

Case Report

A fifty-two-year-old obese female with complex idiopathic subglottic stenosis who was a non-surgical candidate for tracheal resection and re-anastomosis required a 14 x 40 mm hourglass silicone stent insertion after multiple prior endoscopic treatments. Twenty-four hours later, she developed respiratory insufficiency, requiring emergent cricothyrotomy and distal stent dislodgement.

Elective open tracheostomy was later performed but stent retrieval was not feasible due to inability to advance any bronchoscope beyond the glottic anatomy. Multifactorial ventilator-dependent respiratory insufficiency ensued secondary to MRSA pneumonia and the tracheal stent's partial obstruction of the left mainstem bronchus takeoff. Subsequent formation of stent-induced main carinal granulation tissue complicated ventilatory support secondary to a very severe refractory cough. Therefore, stent removal was considered imperative to patient's recovery.

Three weeks later under general anesthesia, bronchoscopic intubation failed again due to persistent glottic and subglottic obstruction. As the tracheostomy's stoma was now mature, the decision to attempt stent removal via the stoma was made.

Herein we will describe and graphically illustrate our successful stepwise technique for safe removal of the tubular silicone stent via the tracheostomy's stoma when rigid bronchoscopy was not feasible.

Materials and Methods

Materials:

1. 2-0 silk suture
2. Forceps biopsy
3. Kelly clamps
4. Bronchoscope (Olympus BF-P190)
5. Tracheostomy tube (Proximal XLT 6.0 Shiley)

Technique:

1. Forceps extended beyond bronchoscope channel to grasp distal suture and withdrawn 2cm within channel. Proximal suture remains outside patient. (Figure 1)
2. Bronchoscope advanced via tracheostomy tube to the stent's proximal edge.
3. Closed forceps advanced at 3 o'clock between stent and tracheal wall to distal end of stent.
4. Forceps opened to release suture at distal end of stent.
5. Via stent's lumen, bronchoscope advanced towards distal stent edge with forceps opened and closed to grasp distal suture.
6. Closed forceps with suture withdrawn approximately 2 cm within stent's channel. Bronchoscope removed from tracheostomy tube.
7. Both proximal and distal ends of sutures grasped with Kelly clamp. (Figure 2)
8. Steps 1 through 8 repeated at 9 o'clock position. (Figure 3 & 4)
9. Firmly grasping both suture loops, created along the longitudinal axis (i.e 3 and 9 o'clock), sutures were tightly pulled to meet resistance against distal tracheostomy tube (Figure 6 & 7).
11. Simultaneously grasping both suture loops with Kelly clamps, the trach tube and silicone stent was manually removed as a unit.
12. Kelly clamp was used to grasp proximal stent edges and compress stent to facilitate removal of stent via stoma site.

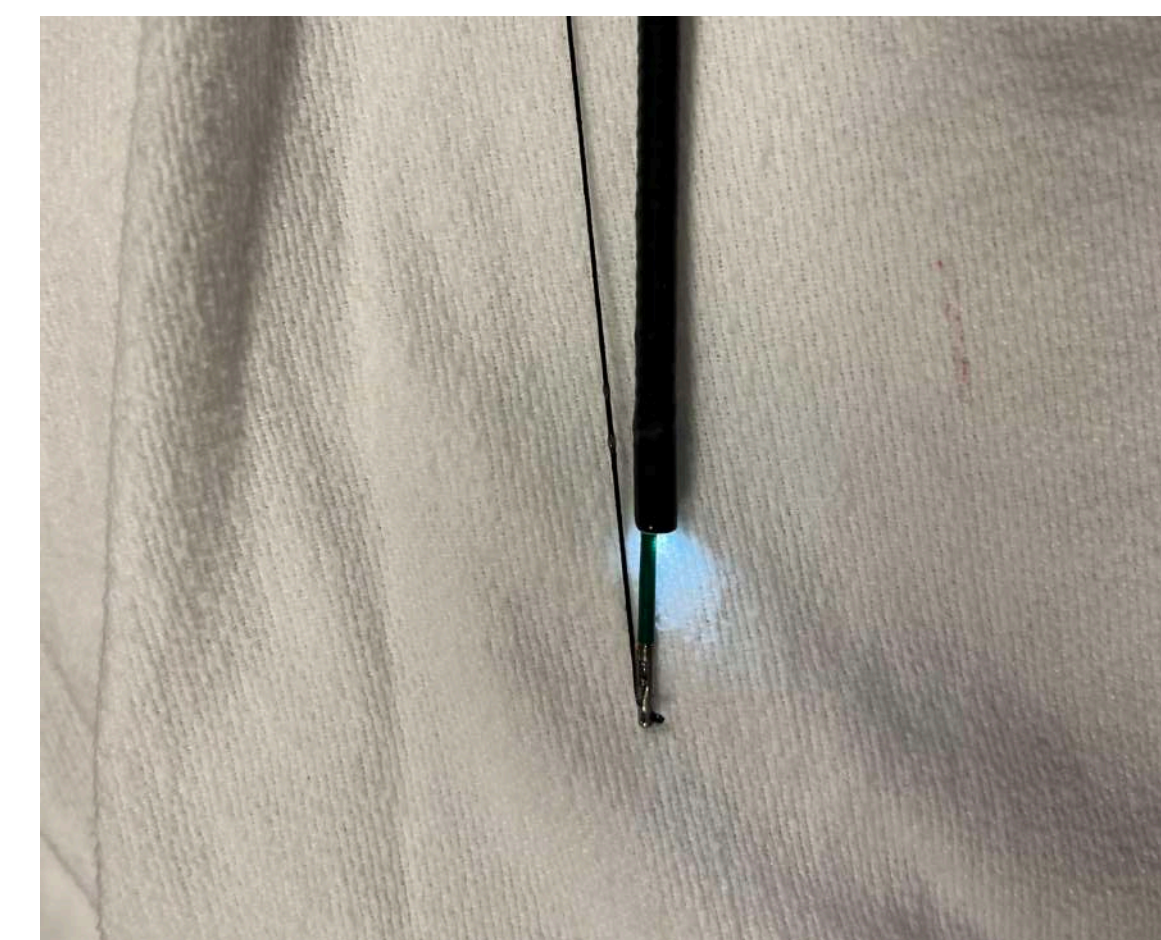


Figure 1



Figure 2

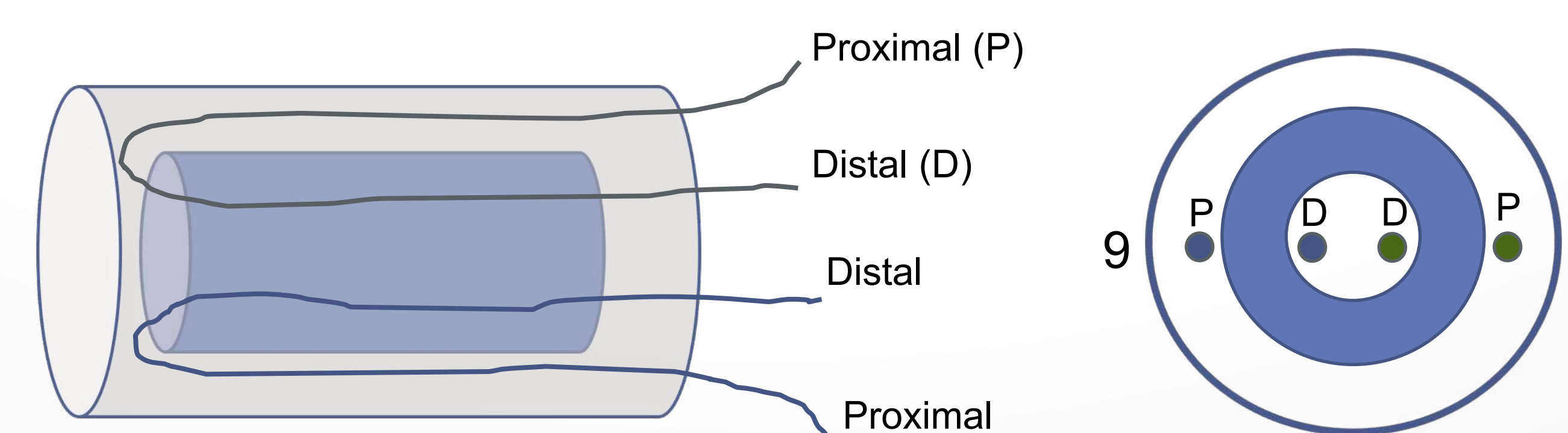


Figure 3

Outcome

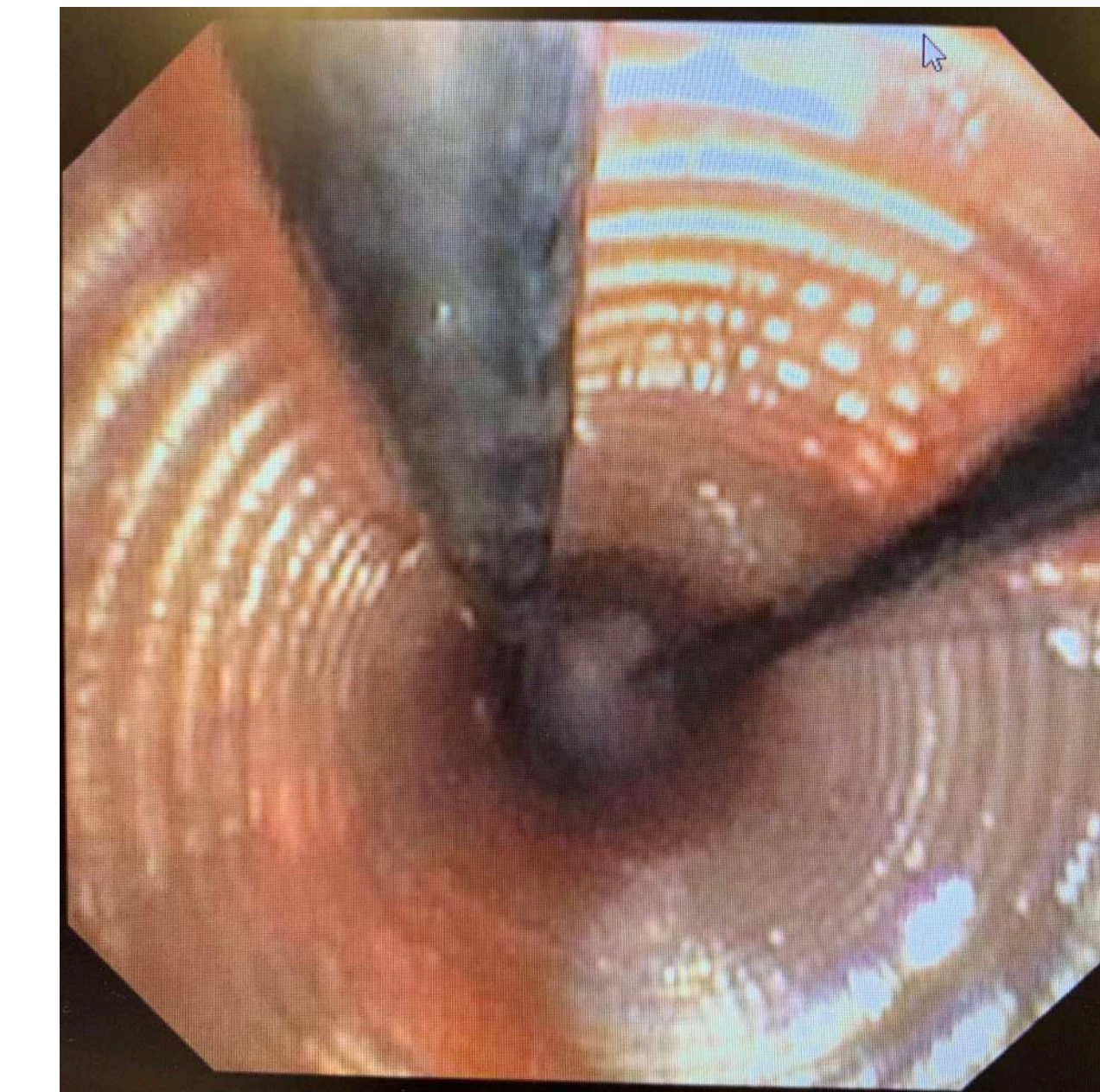


Figure 4



Figure 5



Figure 6

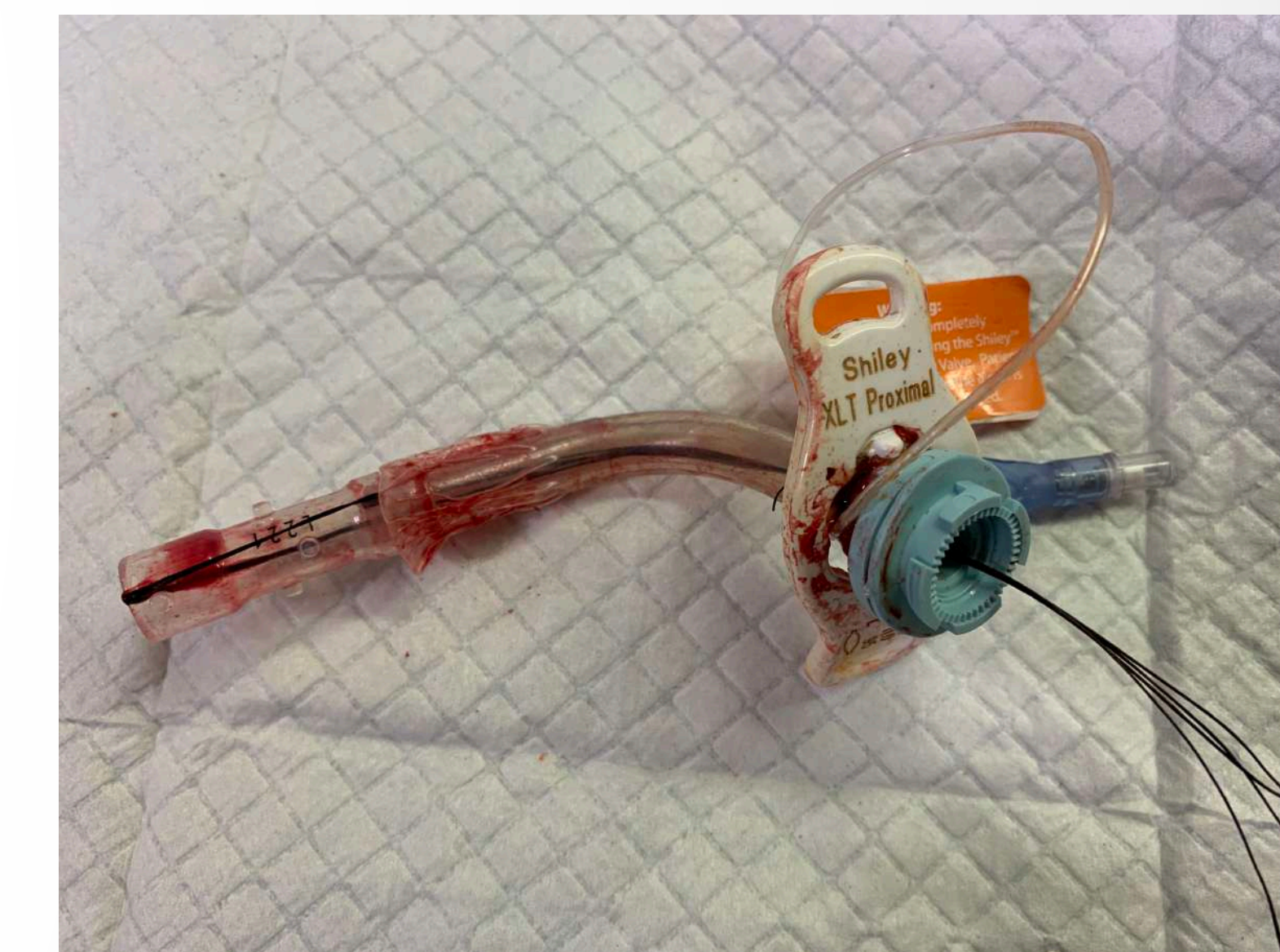


Figure 7

Conclusion

A novel technique based on creating suture loops along multiple longitudinal axes in different clock positions of tubular stents, can safely facilitate stent removal via mature tracheostomy stomas in rare instances wherein rigid bronchoscopy is not feasible.

References

Folch E, Keyes C. Airway stents. Ann Cardiothorac Surg. 2018 Mar;7(2):273-283. doi: 10.21037/acs.2018.03.08. PMID: 29707506; PMCID: PMC5900089.