



Invited Commentary



Tracheostomy in high-risk patients on ECMO: A bedside hybrid dilational technique utilizing a rummel tourniquet

Intensive Care Unit (ICU) procedures can present many challenges to medical care teams related to the chronicity and/or instability pertaining to patient care. Many procedures have been adapted to be performed in ICUs attempting to minimize complications related to transport, delays, and expense of the operative theater. Still, by nature of ICU needed care, inherent risks still present themselves in ever challenging patients. Although tracheostomies have become a very common ICU procedure, physicians can still struggle with timing and resources that can compromise safe execution of tracheostomy tube placements. Complications can occur quickly and unexpectedly resulting in rapidly deteriorating situations. Procedural related hemorrhage is the most common complication that can turn a straightforward procedure into an emergent situation [1]. The authors here present a novel technique in performing percutaneous tracheostomies in an ICU environment in a unique set of patients with COVID at greater risk of postoperative bleeding.

Percutaneous tracheostomy was first introduced in the late 80's as an alternative to open tracheostomy [2]. The procedure has had several minor improvements including changing the multi-dilation to a single dilation technique (Cook Medical Blue Rhino®) including a textural change in the dilator. Despite these improvements, complications still arise with the greatest being hemorrhage occurring in up to 28 % of patients at high risk of bleeding with some necessitating transfusion and/or operative intervention [1]. Postoperative hemorrhage also has the highest mortality rates among all complications after percutaneous tracheostomy at 38 % [3]. Outside of attempting to optimize coagulation parameters and holding anticoagulants, little has been described in minimizing postprocedural bleeding after percutaneous tracheostomy placement.

The authors here describe a nearly traditional approach to placing percutaneous tracheostomies in a cohort of patients with COVID respiratory failure requiring Extracorporeal Membrane Oxygenation (ECMO) and therefore anticoagulation. After completion of the primary described procedure, a “purse-string” O Prolene is placed around the tracheostomy stoma attached to a Rummel tourniquet for potential postoperative hemostasis. The Rummel tourniquet is left tightened for postoperative hemostasis for 48 h. After, the tourniquet is left in place loosened for up to several weeks whilst anticoagulation continues allowing for quick retightening in case bleeding recurs. Although the

study population is small, the incidence of postprocedural bleeding was 16.6 %, 40 % less than the reported by Attarde et al. [2] It is clearly understandable how a tourniquet may limit or quell superficial sources of acute hemorrhage with direct suturing. It is less clear of the benefit from deeper tissue bleeding. Circumferential “noosing” of a wound clearly will not prevent deep tissue bleeding but may limit ongoing hemorrhage with a tamponade effect if the space does not expand. It is also clear that the authors are not advocating this technique for later acute hemorrhage that may be related to tracheoinnominate fistula. All in all, this is clearly an effective means of preventing significant postprocedural blood loss and may also provide time to potentially transport a hemorrhaging patient to a surgical suite to best manage an uncontrolled expanding hematoma.

CRedit authorship contribution statement

Mark Falimirski: Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

References

- [1] Attarde V, Tamboli A, Sakhavalkar P, Tabassum S, Devi BUG. Percutaneous tracheostomy in patients at high risk of bleeding complications. *J. Cardiovasc. Dis. Res.* 2023;14(10):1735–42.
- [2] Ciaglia P, Firsching R, Syniec C. Elective percutaneous dilatational tracheostomy. A new simple bedside procedure; preliminary report. *Chest* 1985;87(6):715–9.
- [3] Simon M, Metschke M, Braune S, Püschel K, Kluge S. Death after percutaneous dilatational tracheostomy: a systematic review and analysis of risk factors. *Crit Care* 2013;17(5):R258.

Mark Falimirski

*Indiana University School of Medicine, 1030 W Michigan St, C5226,
Indianapolis, IN 46022, United States of America*

E-mail address: mfalimir@iupui.edu.

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