

LETTER TO THE EDITOR

Timing of tracheostomy and associated complications in cardiothoracic intensive care patients

Tracheostomy is an invasive procedure that creates a surgical airway in the cervical trachea and is commonly performed in critically ill patients requiring prolonged mechanical ventilation (MV). Although it is an invasive surgical procedure it has many potential benefits, including reduced sedation requirements, airway security, reduced dead space and airway resistance and improved patient comfort. Performing a tracheostomy is associated with several risks including bleeding, wound infection, tracheal stenosis and occasionally death (1-4). Robust data evaluating tracheostomy practice in post-cardiac surgery patients requiring prolonged MV are lacking (5).

We retrospectively reviewed all tracheostomies performed in a high volume cardiothoracic ICU. We report tracheostomy-related complications and determine the association between timing of tracheostomy and duration of MV.

After obtaining institutional review board approval, we reviewed all consecutive patients, admitted to our cardiothoracic ICU for MV between January 2011 and May 2014. A total of 8136 patients were included. Mean age was 62 years. Of these patients, 232 (2.85%) underwent tracheostomy. Two hundred and thirty two patients received a bedside percutaneous tracheostomy and 9 patients received a surgical tracheostomy. The main reasons for tracheostomy formation were failed extubation (16.8%), dependence on MV (10.3%), and obtunded level of consciousness (10.34%).

We separated tracheostomised patients into two groups: the 'early tracheostomy group' including patients who had a tracheostomy within the first 10 days of MV; and the 'late tracheostomy group' including patients receiving a tracheostomy after 10 days of MV. Of the tracheostomy patients, 55.17% of patients had been admitted to ICU following routine cardiothoracic surgery, 11.21% after transplant surgery (either cardiac transplant, single or bilateral lung transplant or cardiac and lung transplant), 20.26% were non-surgical admissions, 10.34% were admitted with acute cardiorespiratory failure requiring

extracorporeal life support (ECLS) and 3.02% after percutaneous coronary intervention. The mean total days of MV in the early tracheostomy group was 22.6 +/-SEM1.4 vs 37 +/-SEM2.2 in the late group ($p < 0.0001$). The mean length of ICU stay in the early tracheostomy group was 38 +/-SEM9.2 vs 39.5 +/-SEM2.4 in the late group ($p = 0.889$).

In total, 99 patients (42.67%) had a tracheostomy-related complication. The three most commonly reported complications were: non fatal occlusion of the tracheostomy tube (31.31%), minor or major bleeding (21.21%), and tracheostomy cuff leak (10.1%). Bleeding (defined as bleeding requiring blood products: 1 unit of packed red cells or more and/or platelets) was the most common complication in the ECLS patients (33.33%). Six patients (6%) suffered car-

Table 1 - Clinical characteristics of study population.

Total number of patients admitted mechanically ventilated, n	8136	
Total number of patients requiring a tracheostomy, n (%)	232	(2.85%)
Number of patients discharged with tracheostomy and required re-admission, n (%)	7	(3.02%)
Number of surgical tracheostomies, n (%)	9	(3.88%)
Mean days of MV before tracheostomy was performed	10	
Median days of MV before tracheostomy was performed	8	
Mean time with tracheostomy in situ (days)	17.58	
Median days with tracheostomy in situ	13	
Mean total days of MV in tracheostomy group	27.66	
Median total days of MV in tracheostomy group	22	
Mean length of ICU stay for tracheostomy patients	40	
Mean length of ICU stay in patients without tracheostomy	3.72	
Number of patients with a tracheostomy related complication, n (%)	105	(45.26%)
Number of deaths in patients with a tracheostomy and duration of ICU stay < 30 days (%)	20	(0.08)
Number of deaths in patients with a tracheostomy and duration of ICU stay > 30 days, n deaths (%)	28	(0.12)

MV = mechanical ventilation; ICU = intensive care unit.

diorespiratory arrest secondary to tracheostomy associated causes and they were successfully resuscitated. One patient died due a tracheostomy-related cause (secondary haemorrhage and airway obstruction). Twenty-two patients died in the early tracheostomy group (10 patients died with 30 days of their ICU stay and 8 patients died after 30 days). Twenty-six patients died in the late group (10 patients died within 30 days of their ICU stay and 20 patients died after 30 days). A mortality rate of 0.08% was reported within a 30-day ICU stay and 0.12% mortality rate after 30 days (*Table 1*).

The data from our retrospective review indicate that bedside percutaneous tracheostomy is not without risks in cardiothoracic ICU patients. We report a longer period of MV in the late tracheostomy group and more importantly an increased number of complications and number of patient deaths.

REFERENCES

1. Diehl JL, El Atrous S, Touchard D, Lemaire F, Brochard L. Changes in the work of breathing induced by tracheostomy in ventilator-dependent patients. *Am J Respir Crit Care Med* 1999; 159: 383-8.
2. Plummer AL, Gracey DR. Consensus conference on artificial airways in patients receiving mechanical ventilation. *Chest* 1989; 96: 178-80.
3. Wang F, Wu Y, Bo L, Lou J, Zhu J, Chen F, et al. The timing of tracheotomy in critically ill patients undergoing mechanical ventilation: a systematic review and meta-analysis of randomized controlled trials. *Chest* 2011; 140: 1456-65.
4. Ciaglia P, Firsching R, Syniec C. Elective percutaneous dilatational tracheostomy. A new simple bedside procedure; preliminary report. *Chest* 1985; 87: 715-9.
5. Ben-Avi R, Ben-Nun A, Levin S, Simansky D, Zeitlin N, Sternik L, et al. Tracheostomy after cardiac surgery: timing of tracheostomy as a risk factor for mortality. *J Cardiothorac Vasc Anesth.* 2014; 28: 493-6.

*Vasileios Zochios¹, *Jessica Casey¹,
Ken Parhar², Alain Vuylsteke¹

¹Cardiothoracic Intensive Care Unit,
Papworth Hospital NHS Foundation Trust,
Papworth Everard, Cambridge, UK;

²Intensivist-Critical Care Medicine, University of Calgary,
Alberta, Canada

*Joint first authors

Corresponding author:

Dr Vasileios Zochios, ECMO/Research Fellow
Department of Cardiothoracic Anesthesia and Intensive Care
Cardiothoracic ICU,
Papworth Hospital NHS Foundation Trust,
Papworth Everard, Cambridge, UK, CB23 3RE
Email: vasileioszochios@doctors.org.uk

Cite this article as: Zochios V, Casey J, Parhar K, Vuylsteke A. Timing of tracheostomy and associated complications in cardiothoracic intensive care patients. *Heart, Lung and Vessels.* 2015; 7(2): 179-180.

Source of Support: Nil. **Disclosures:** None declared.

