



# Tracheostomy in Critically Ill Children—Bypassing the Hurdle and Running into More!

Lalit Takia<sup>1</sup> · Muralidharan Jayashree<sup>1</sup>

Received: 22 February 2021 / Accepted: 24 February 2021 / Published online: 18 March 2021  
© Dr. K C Chaudhuri Foundation 2021

The indications for tracheostomy in critically ill children are two-fold: emergent, to relieve upper airway obstruction and elective, for those requiring prolonged mechanical ventilation. In the latter group, tracheostomy tube (TT) has several advantages which include airway security, patient comfort, better oral hygiene and decreased work of breathing, ventilator-free days, ventilator-associated pneumonia, need for sedoanalgesia and increased ICU-free days and lower hospital cost [1]. Despite the outlined advantages, tracheostomy in children is technically challenging and associated with increased morbidity and mortality as compared to adults [2]. Furthermore, the timing of tracheostomy, unlike in adults, is highly variable in children [3, 4]. In a large retrospective study from the US involving 82 pediatric intensive care units (PICUs), an average 6.6% of pediatric admissions underwent tracheostomy between 4.3–30.4 d of ventilation [1]. In another study across 29 PICUs in the UK, the reported frequency of tracheostomy was 2% of all pediatric admissions, and the timing varied from 14 to 90 d after initiation of mechanical ventilation, mostly determined on an individual basis [5].

In this issue, Jain et al. report a higher frequency of tracheostomy in ventilated children (26 of 283; 9.1%) as compared to previously published reports [6]. Prolonged mechanical ventilation secondary to neurological and neuromuscular disorders (24; 92%) was the most common indication for tracheostomy followed by upper airway obstruction (2; 8%). Average time to tracheostomy was 11.65 (range 1–21) d. Similar indications have been reported previously where majority of children who underwent

tracheostomy had underlying chronic conditions such as neuromuscular weakness [3, 5, 7].

However, the complication rates observed by Jain et al. are much higher compared to developed countries [1, 4–6]. More than half of the children (14; 55%) had complications which included granulation tissue, accidental decannulation, occlusion, pneumothorax, local site infection, and cardiac arrest. Sixteen (61%) patients were discharged post decannulation while 5 (21%) were sent home with TT in situ. The overall mortality in the study was 11.5% but none was attributable to tracheostomy [6].

Tracheostomy care in children is complex and requires multidisciplinary inputs [8]. In resource limited settings, the morbidity of tracheostomy outweighs its benefits. Providing safe home environment, equipment for continuous or intermittent ventilation, emergency airway management, and supplies for tracheostomy care are challenging. Care of TT in these settings largely rests with an untrained family member. It is widely recognized that tracheostomized children in such settings are at high risk for potentially preventable adverse events, that can cause significant morbidity and mortality [9].

In this context, the study by Jain et al. sensitizes us towards the magnitude of this problem [6]. Decreasing tracheostomy-associated morbidity is an urgent need of the hour in resource-constrained setups. Use of noninvasive ventilation in all possible situations and proactive weaning from ventilation in intubated children may help avoid tracheostomy in the first place. In those, where it is unavoidable, good tracheostomy care will prevent complications and improve quality of life of these children. Last but not the least, more clarity is needed with respect to timing of tracheostomy (early versus delayed) in children.

✉ Muralidharan Jayashree  
mjshree@hotmail.com

<sup>1</sup> Division of Pediatric Emergency and Intensive Care, Department of Pediatrics, Advanced Pediatrics Centre, Postgraduate Institute of Medical Education and Research, Chandigarh 160012, India

## Declarations

**Conflict of Interest** None.

## References

1. Wakeham MK, Kuhn EM, Lee KJ, McCrory MC, Scanlon MC. Use of tracheostomy in the PICU among patients requiring prolonged mechanical ventilation. *Intensive Care Med.* 2014;40(6):863–70.
2. Watters KF. Tracheostomy in infants and children. *Respir Care.* 2017;62(6):799–825.
3. Meyer-Macaulay CB, Dayre McNally J, O’Hearn K, et al. Factors impacting physician recommendation for tracheostomy placement in pediatric prolonged mechanical ventilation: a cross-sectional survey on stated practice. *Pediatr Crit Care Med.* 2019;20(9):e423–31.
4. Abdelaal Ahmed Mahmoud M Alkhatip A, Younis M, Jamshidi N, et al. Timing of tracheostomy in pediatric patients: a systematic review and meta-analysis. *Crit Care Med.* 2020;48(2):233–40.
5. Wood D, McShane P, Davis P. Tracheostomy in children admitted to paediatric intensive care: table 1. *Arch Dis Child.* 2012;97(10):866–9.
6. Jain MK, Patnaik S, Sahoo B, Mishra R, Behera JR. Tracheostomy in pediatric intensive care unit: experience from eastern India. *Indian J Pediatr.* 2020. <https://doi.org/10.1007/s12098-020-03514-6>.
7. Ishihara T, Tanaka H. Factors affecting tracheostomy in critically ill paediatric patients in Japan: a data-based analysis. *BMC Pediatr.* 2020;20(1):237.
8. Mahida JB, Asti L, Boss EF, et al. Tracheostomy placement in children younger than 2 years: 30-day outcomes using the National Surgical Quality Improvement Program Pediatric. *JAMA Otolaryngol Head Neck Surg.* 2016;142(3):241–6.
9. Schweiger C, Manica D, Becker CF, et al. Tracheostomy in children: a ten-year experience from a tertiary center in southern Brazil. *Braz J Otorhinolaryngol.* 2017;83(6):627–32.

**Publisher’s Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.