



This month's top papers: April 2025

Welcome to the latest blog in the literature podcast from the NTSP. We try to bring you a quick roundup of what is hot in the world of tracheostomy and laryngectomy publications by scouring internationally recognised journals and media and bringing you the highlights.

The papers we will discuss this month are detailed below, along with an automated transcript of the podcast. Please note that the transcript is generated by AI and so may not be totally accurate.

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This month's top papers

- Improving weaning and liberation from mechanical ventilation for tracheostomy patients: a quality improvement initiative.
- Real-time ultrasound-guided laryngeal mask assisted percutaneous dilatational tracheostomy versus bronchoscopy-guided percutaneous dilatational tracheostomy in critically ill patients: a randomized controlled trial.
- Effectiveness of ultrasound-guided versus anatomical landmark-guided percutaneous dilatational tracheostomy: a systematic review and meta-analysis
- Management of adults with a tracheostomy: An international survey of speech-language pathologists' practice.

Improving weaning and liberation from mechanical ventilation for tracheostomy patients: a quality improvement initiative.

Lay Summary:

This study reports on a successful project aimed at safely reducing the amount of time patients with a tracheostomy spend on a mechanical ventilator after leaving the Intensive Care Unit (ICU). Prolonged ventilation is associated with poor outcomes, so speeding up the weaning process is crucial for recovery. The hospital's solution was to implement a standard, multidisciplinary tracheostomy weaning protocol, designed by a dedicated Quality Improvement (QI) team. The median time patients spent on a ventilator after the tracheostomy surgery was initially 17 days. However, within just one year of introducing the new protocol, the median time was significantly reduced to 10.6 days. This saving of over six days directly translated into a shorter overall length of stay in the ICU, which was reduced by an average of 4.3 days. The successful implementation involved frequent communication with all staff and the use of a simple progress sheet to track each patient's weaning journey. The study concludes that this standardized weaning protocol was a major success, reducing the time patients needed life support and becoming a permanent part of the hospital's care culture.



Summary for Healthcare Professionals:

This study details a Quality Improvement (QI) initiative undertaken in a tertiary care Intensive Care Unit (ICU) to reduce the median duration of mechanical ventilation (MV) for tracheostomy patients. The project's rationale was to mitigate the adverse outcomes associated with prolonged MV. A dedicated QI team designed and implemented a standardized tracheostomy weaning protocol over several Plan-Do-Study-Act (PDSA) cycles. The retrospective baseline median duration of post-tracheostomy MV was 17 days. Following the prospective implementation of the new standardized protocol, the study documented a significant shift in data, showing a reduction in the median time on the ventilator to 10.6 days within 12 months. This gain in efficiency also led to a reduction of 4.3 days in the overall ICU length of stay. The sustained success of the intervention was attributed to strategies that enhanced procedural adherence, including frequent communication with stakeholders and the use of a tracheostomy weaning progress sheet for documentation. The authors conclude that a standardized, multidisciplinary tracheostomy weaning protocol can be successfully developed and integrated into routine practice, resulting in a clinically meaningful reduction in MV duration and ICU length of stay.



Real-time ultrasound-guided laryngeal mask assisted percutaneous dilatational tracheostomy versus bronchoscopy-guided percutaneous dilatational tracheostomy in critically ill patients: a randomized controlled trial.

Lay Summary:



This study investigated an advanced technique for inserting a breathing tube into a patient's neck, or percutaneous dilatational tracheostomy (PDT), by comparing it to the standard camera-guided method. The goal was to find a technique that is faster, safer, and cheaper for critically ill patients in the Intensive Care Unit (ICU). The methods compared were: the standard camera-guided method (bronchoscopy) and a newer method guided by a portable ultrasound (US-PDT), which was assisted by a specialized mask (LMA) to keep the airway open.

The findings strongly favored the ultrasound-guided approach. The US-PDT/LMA method was significantly more efficient, taking less than half the time (median 17 minutes) compared to the camera-guided method (median 35 minutes) ($p < 0.001$). Crucially, the US-PDT/LMA group experienced a much lower rate of major complications (3.3% versus 36.7%), making the procedure substantially safer for the patient ($p = 0.002$). From a hospital perspective, the ultrasound technique was far more cost-effective, reducing the median equipment cost from \$800 to \$300. The authors conclude that routinely implementing the ultrasound-guided method is the superior choice, providing significant advantages in patient safety and hospital resource management.

Summary for Healthcare Professionals:

This randomized controlled trial (RCT) compared the safety, efficacy, and cost-effectiveness of real-time ultrasound-guided percutaneous dilatational tracheostomy (US-PDT) assisted by a laryngeal mask airway (LMA) against standard bronchoscopy-guided PDT (B-PDT) in 60 critically ill ICU patients.



The analysis found compelling evidence supporting the US-PDT/LMA approach. The primary outcome, procedure time, was significantly shorter in the US-PDT/LMA group (median 17 minutes) compared to the B-PDT group (median 35 minutes) ($p < 0.001$). Furthermore, the US-PDT/LMA group demonstrated superior safety metrics, with a significantly lower major complication rate (3.3% vs. 36.7%) ($p = 0.002$). Cost-effectiveness was also confirmed, as the median procedure cost was reduced from \$800 to \$300, alongside a lower incidence of equipment damage (0% vs. 20%).

The authors conclude that US-PDT combined with LMA assistance is a safe, effective, and cost-effective method for elective tracheostomy in critically ill patients. These findings strongly advocate for the adoption of the real-time US-PDT/LMA technique, as it offers substantial operational efficiency and patient safety advantages over the standard bronchoscopy-guided approach.

Effectiveness of ultrasound-guided versus anatomical landmark-guided percutaneous dilatational tracheostomy: a systematic review and meta-analysis

Lay Summary:

This study is a comprehensive review and analysis of research comparing two common methods for performing a bedside breathing tube procedure, or percutaneous dilatational tracheostomy (PDT). The two methods compared were relying on anatomical landmarks (LMG-PDT) versus using real-time ultrasound guidance (UGT) to see the internal neck structures. The research included six high-quality studies with over 600 critically ill patients.



The findings provided strong evidence that the ultrasound-guided technique is significantly safer and more effective. Using the ultrasound dramatically increased the chance of successfully placing the puncture needle on the first attempt. Crucially, the ultrasound guidance was highly effective in reducing the risk of two major complications: it significantly decreased the likelihood of major bleeding (a potentially life-threatening event) and resulted in fewer overall periprocedural complications compared to the landmark method.

The analysis found that while the ultrasound method provides greater safety, there was no clear evidence that it shortens the total time required for the entire procedure. The study concludes that given the improved accuracy and lower complication rates, ultrasound-guided PDT is the superior method for critically ill patients who need a tracheostomy.

Summary for Healthcare Professionals:

This systematic review and meta-analysis evaluated the comparative efficacy and safety of real-time ultrasound-guided (UGT) versus anatomical landmark-guided (LT) Percutaneous Dilatational Tracheostomy (PDT). The analysis synthesized data from five Randomized Controlled Trials (RCTs) and one non-RCT, including a total of 609 intubated patients.



The meta-analysis demonstrated statistically significant superiority for the UGT technique across primary and secondary outcomes:

- First Puncture Success Rate: UGT significantly improved the success rate of the first puncture (Odds Ratio [OR] (Odds Ratio [OR] 4.41, $P < 0.000001$).
- Major Bleeding: UGT significantly reduced the incidence of major bleeding (OR 0.35, $P = 0.03$).
- Periprocedural Complications: UGT was associated with a significantly lower incidence of overall periprocedural complications (OR 0.35, $P < 0.00001$).

The analysis found no significant advantage for UGT in reducing the overall tracheostomy procedure time. The authors conclude that UGT is a safer, more effective, and non-inferior technique to the conventional landmark method. This evidence strongly supports the widespread adoption of ultrasound guidance in the Intensive Care Unit setting to mitigate procedural morbidity and enhance success rates.

Management of adults with a tracheostomy: An international survey of speech-language pathologists' practice.

Lay Summary:

This study surveyed Speech-Language Pathologists (SLPs) around the world to understand their crucial role in caring for adult patients with a breathing tube in their neck (tracheostomy). A tracheostomy can severely impact a patient's ability to speak and swallow, making the SLP's expertise vital for their physical and emotional recovery. The survey found that SLPs are heavily involved in nearly every aspect of this complex care. Specifically, 96% assess communication, 94% assess swallowing, and 83% help with the process of safely removing the tube. Their primary intervention to restore voice is using one-way speaking valves (91%). However, the study uncovered that providing this level of care is often severely limited by internal hospital issues. The biggest problems reported by SLPs were inadequate staffing (79%), lack of time (79%), and insufficient resources (75%). Furthermore, over half of SLPs (52%) felt their initial professional training was not adequate for managing complex tracheostomy care. The study concludes that while SLPs perform broad roles that align with best practices, these persistent resource limitations compromise their ability to provide optimal, consistent care. This highlights the need for hospital management to urgently address staffing and resource shortages to ensure the best outcomes for patients.



Summary for Healthcare Professionals:

This international cross-sectional survey detailed the current scope of practice, utilization, and perceived barriers for Speech-Language Pathologists (SLPs) in the multidisciplinary management of adult tracheostomy patients. The findings confirmed a broad and appropriate scope of practice, with high rates of involvement across key clinical areas. Specifically, 96% assessed communication, 94% assessed dysphagia, and 83% were integrated into the weaning and decannulation pathway. The most common communication intervention reported was the application of one-way speaking valves (91%). Despite this broad clinical efficacy, the study identified critical systemic and operational barriers that compromise optimal care delivery. The most frequently reported barriers were inadequate staffing (79%), insufficient dedicated time (79%), and a lack of necessary resources (75%). Furthermore, a significant competency deficit was noted, as 52% of SLPs felt their initial professional training for tracheostomy management was inadequate. The conclusion strongly advocates that while SLPs' practice aligns with guidelines, mitigating these persistent resource limitations and supporting robust initial and continuing professional development is necessary to reduce clinical variability and ensure consistent, high-quality, evidence-based care.



Scientific abstracts and references



BMJ Qual Saf. 2025 May 2;bmjqs-2024-018324. doi: 10.1136/bmjqs-2024-018324. Online ahead of print.

Improving weaning and liberation from mechanical ventilation for tracheostomy patients: a quality improvement initiative.

Mikhaeil M(1)(2), Bernard M(2), Currie J(2), Bolduc C(2), Radke J(2), Kranjc S(2), Meyer J(3)(2).

Author information: (1)University of Toronto, Toronto, Ontario, Canada michael.mikhaeil@medportal.ca. (2)Unity Health Toronto, Toronto, Ontario, Canada. (3)University of Toronto, Toronto, Ontario, Canada.

For patients in the intensive care unit (ICU), prolonged mechanical ventilation is associated with poor outcomes. A quality improvement (QI) initiative with the aim of reducing median time on the ventilator for tracheostomy patients was undertaken at a tertiary care ICU in Toronto, Canada. A QI team was formed, and using QI methodology, a deep understanding of our local process was achieved. Based on this information and on the latest evidence on weaning, a standard tracheostomy weaning protocol was designed. The protocol was refined through three developmental and two testing plan-do-study-act cycles. This study was a prospective time series showing the effect of the implementation of our intervention on tracheostomy patients' time on the ventilator. The baseline median number of days on the ventilator after tracheostomy insertion was 17. Within 12 months of the introduction of the intervention, a shift in the data showing a reduction in the median time on the ventilator to 10.6 days had developed. Length of stay in the ICU was reduced by 4.3 days. Adherence and compliance to the protocol also improved over time. A standard tracheostomy weaning protocol was successfully developed, tested and implemented in a tertiary care ICU. Using strategies such as frequent communication with key stakeholders and incorporating a tracheostomy weaning progress sheet to document and track tracheostomy patients and their outcomes, this QI intervention has become engrained in the local culture at our centre. This weaning protocol has successfully reduced the median time on the ventilator for tracheostomy patients by over 6 days.

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DOI: 10.1136/bmjqs-2024-018324 PMID: 40318863

Conflict of interest statement: Competing interests: None declared.

BMC Pulm Med. 2025 Apr 25;25(1):197. doi: 10.1186/s12890-025-03645-6.

Real-time ultrasound-guided laryngeal mask assisted percutaneous dilatational tracheostomy versus bronchoscopy-guided percutaneous dilatational tracheostomy in critically ill patients: a randomized controlled trial.

Taha S(1), Mallat J(2)(3), Elsaidi M(1), Al-Agami A(1), Taha A(4)(5).

Author information: (1)Department of Anesthesia, Intensive Care and Pain Management, Faculty of Medicine, Ain Shams University, P.O. Box 11331, Cairo, Egypt. (2)Critical Care Institute, Cleveland Clinic Abu Dhabi, P.O. Box 112412, Abu Dhabi, United Arab Emirates. mallatjihad@gmail.com. (3)Cleveland Clinic Lerner College of Medicine, Case Western Reserve University, Cleveland, OH, 44106, USA. mallatjihad@gmail.com. (4)Critical Care Institute, Cleveland Clinic Abu Dhabi, P.O. Box 112412, Abu Dhabi, United Arab Emirates. tahaa2@clevelandclinicabudhabi.ae. (5)Cleveland Clinic Lerner College of Medicine, Case Western Reserve University, Cleveland, OH, 44106, USA. tahaa2@clevelandclinicabudhabi.ae.

BACKGROUND: Percutaneous dilatational tracheostomy (PDT) is a common procedure for mechanically ventilated patients in the intensive care unit (ICU). This study compared the real-time ultrasound-guided PDT using a laryngeal mask airway (LMA) with the standard bronchoscopy-guided PDT technique in ICU patients requiring elective tracheostomy. **METHODS:** This randomized controlled study was conducted at Ain Shams University Hospital's Critical Care Department from December 4th, 2021, to December 3rd, 2022. The study population included 60 critically ill patients admitted to the ICU. Thirty patients were randomly assigned to the real-time ultrasound-guided LMA-assisted group, and 30 patients were randomly assigned to the bronchoscopy-guided technique. The primary study outcome was the procedure time, and the secondary outcomes included procedure-related complications rate and cost-effectiveness. **RESULTS:** The real-time ultrasound-guided LMA-assisted group had significantly shorter procedure time (median 17 [IQR: 15-20] min vs. 35 [IQR: 28-39] min, $p < 0.001$) and lower equipment damage (0% vs. 20%, $p = 0.024$) during the procedure compared to the bronchoscopy-guided group. Additionally, the cost of tracheostomy was significantly lower in the real-time ultrasound-guided LMA-assisted group (median: 300 vs. 800 USD, $p < 0.001$). The real-time ultrasound-guided LMA group had a lower major complications rate than the bronchoscopy-guided group (36.7%) vs. 3.3%, $p = 0.002$). **CONCLUSIONS:** The study demonstrated that real-time ultrasound-guided LMA-assisted PDT had shorter procedure time, reduced equipment damage, lower costs, and was associated with lower complications when compared to the bronchoscopy-guided technique. These findings suggest that ultrasound guidance can enhance the efficiency and cost-effectiveness of PDT procedures.

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DOI: 10.1186/s12890-025-03645-6 PMCID: PMC12023445 PMID: 40281453 [Indexed for MEDLINE]

Conflict of interest statement: Declarations. Ethics approval and consent to participate: The work was approved by the local Research Ethics Committee of Ain Shams University Faculty of Medicine (reference number: FMASU MD 164/2021) approved the protocol on December 3rd, 2021. The study was retrospectively registered in the ISRCTN registry (registration number ISRCTN14218985) on 02/07/2024. **Informed consent:** Informed written consent was obtained from the patients or their legal guardians in a private setting, where the study protocol was thoroughly explained to them. **Consent for publication:** Not applicable. **Competing interests:** The authors declare no competing interests.

BMC Anesthesiol. 2025 Apr 25;25(1):211. doi: 10.1186/s12871-025-03085-z.

Effectiveness of ultrasound-guided versus anatomical landmark-guided percutaneous dilatational tracheostomy: a systematic review and meta-analysis.

Wen D(#)(1), Yang X(#)(1), Liang Z(1), Hu Y(1), Wang S(1), Zhang D(1), Wang Y(1), Shen Y(1), Yan F(2).

Author information: (1)Intensive Care Unit, School of Medicine, Mianyang Central Hospital, University of Electronic Science and Technology of China, No.12 Changjia Alley, Jingzhong Street, Fucheng District, Mianyang, Mianyang, Sichuan Province, 621000, China. (2)Intensive Care Unit, School of Medicine, Mianyang Central Hospital, University of Electronic Science and Technology of China, No.12 Changjia Alley, Jingzhong Street, Fucheng District, Mianyang, Mianyang, Sichuan Province, 621000, China. smallwen123@126.com.

(#)Contributed equally

BACKGROUND: Percutaneous dilatational tracheostomy (PDT) is increasingly used in intensive care units owing to its advantages of reduced surgical trauma and fewer complications. Recently, ultrasonography has become a potentially useful tool for assisting PDT. **OBJECTIVE:** To compare ultrasound- and landmark-guided PDT for major bleeding, first-puncture success rates, periprocedural complications, and tracheotomy procedure times. **METHODS:** Randomized controlled trials (RCTs) or non-RCTs comparing ultrasound- and landmark-guided PDT were searched for in PubMed, Web of Science, MEDLINE, CINAHL, Cochrane Library, Wanfang Data Knowledge Service Platform, China National Knowledge Infrastructure (CNKI) and the Chinese Biomedical Literature Service System (SinoMed). The primary outcomes were major bleeding and first puncture success rate. Secondary outcomes were periprocedural complications and the tracheotomy procedure time. The meta-analysis was performed using RevMan 5.3 software. **RESULTS:** This meta-analysis included five RCTs and one non-RCT, with a total of 609 patients. Compared with landmark-guided PDT, ultrasound-guided PDT can reduce the incidence of major bleeding (odds ratio [OR] = 0.35, 95% confidence interval [CI; 0.14, 0.90], $P = 0.03$) and improved the success rate of first puncture (OR = 4.41, 95% CI [2.54, 7.65], $P < 0.000001$). Additionally, ultrasound-guided PDT is associated with a lower incidence of periprocedural complications (OR = 0.35, 95% CI [0.22, 0.54], $P < 0.00001$). However, there was no advantage in reducing the tracheotomy procedure time between the two methods (mean difference = - 0.64, 95% CI [-4.14, 2.85], $P = 0.72$). **CONCLUSION:** Compared to landmark-guided PDT, ultrasound-guided PDT can reduce the incidence of major bleeding and periprocedural complications and increase the success rate of the first puncture. However, the advantage of ultrasound-guided PDT in reducing the tracheotomy procedure time is unclear.

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DOI: 10.1186/s12871-025-03085-z PMCID: PMC12023463 PMID: 40281422 [Indexed for MEDLINE]

Int J Speech Lang Pathol. 2025 Apr 20:1-14. doi: 10.1080/17549507.2025.2482865. Online ahead of print.

Management of adults with a tracheostomy: An international survey of speech-language pathologists' practice.

Miles A(1), Wallace S(2)(3).

Author information: (1)Speech Science, The University of Auckland, Auckland, New Zealand. (2)Dept Speech Voice and Swallowing, Wythenshawe Hospital, Manchester University NHS Foundation Trust, Manchester, UK, and. (3)Division of Infection, immunity and respiratory medicine, School of Biological Sciences, Faculty of Biology Medicine and Health, The University of Manchester, Manchester, UK.

PURPOSE: Speech-language pathologists are specialists in communication, swallowing, and weaning as core members of the multidisciplinary tracheostomy team. Inconsistent tracheostomy care is known to result in staff and patient frustration, delayed intervention, and patient harm. Little is known about international speech-language pathology tracheostomy practices. **METHOD:** This global survey explored training, clinical practices, perceived knowledge, skills and roles, as well as barriers to change and successes. Questions consisted of likert scale and open-ended questions. 1 458 Speech-language pathologists completed the survey representing six continents and 52 countries. **RESULT:** Overall, speech-language pathologists were confident in their knowledge and skills. Tracheostomy teams were viewed as a key facilitator of best care. Access to Flexible Endoscopic Evaluation of Swallowing was variable and considered valuable by all. Four key themes emerged: Knowledge and skills, roles and multidisciplinary tracheostomy team relationships, written documentation and protocols, and access to resources. Multidisciplinary tracheostomy team relationships and being valued as a professional were the most common concerns. Speech-language pathologists had a plethora of successes to share that had changed their workplace. **CONCLUSION:** This survey shows speech-language pathologists are aligned internationally with common purpose and values. Speech-language pathologists voiced challenges in multidisciplinary tracheostomy team relationships, standardising practice, and resourcing. Benchmarking is the first step to targeted change and we hope this will support and empower clinicians to continue to innovate tracheostomy practice.

DOI: 10.1080/17549507.2025.2482865 PMID: 40253605
