



This month's top papers: May 2026

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 cover

- Assessing swallowing with electronic stethoscopes
- Can Pro-BNP influence timing of tracheostomy?
- Weaning programs
- LLMs for paediatric tracheostomy
- Training and testing LLMs for tracheostomy care

Featured Papers – May 2026

1. Matsumoto S et al.
Monitoring Spontaneous Swallowing After Tracheostomy Using a Neck-Worn Electronic Stethoscope: A Pilot Study.
Journal of Clinical Medicine. 2026.
2. Leem AY et al.
Admission NT-proBNP as a Prognostic Biomarker for Ventilator Weaning Failure: Implications for Tracheostomy Timing.
Biomedicines. 2026.
3. Dolinay T et al.
Randomized Clinical Trial of Ventilator Liberation with Pressure Support Ventilation versus Therapist-Implement Patient-Specific Weaning in Prolonged Weaning Patients via Tracheostomy.
BMC Pulmonary Medicine. 2026.
4. Celik B et al.
Assessment of Large Language Models for Tracheostomy Care in Pediatrics: ChatGPT vs Claude.
Journal of Pediatric Health Care. 2025.
5. Gorst B et al.
Evaluating the Quality of Expert-Trained Generative Artificial Intelligence when Answering Tracheostomy-Related Questions.
Anaesthesia Reports. 2026.

Monitoring Spontaneous Swallowing After Tracheostomy Using a Neck-Worn Electronic Stethoscope: A Pilot Study

Citation: Matsumoto S et al. Journal of Clinical Medicine. 2026.

Lay Summary:

Swallowing problems are common after tracheostomy and can increase the risk of aspiration, chest infections and difficulty returning to eating and drinking safely.

This study explored whether a neck-worn electronic stethoscope could help monitor spontaneous swallowing activity in tracheostomy patients. The device used artificial intelligence-supported sound analysis to identify swallowing events over a ten-minute monitoring period.

The researchers found that patients tended to swallow more frequently when tracheostomy cuffs were deflated and when patients were able to eat and drink more normally. Patients with more frequent spontaneous swallowing also had less secretion pooling seen during swallowing examinations.

The study suggests that wearable monitoring technologies may one day support swallowing assessment and rehabilitation. However, this was a very small pilot study and the technology cannot determine whether swallowing is safe or whether aspiration occurs.



Summary for Healthcare Professionals:

Background

Reduced spontaneous swallowing frequency (SSF) has been proposed as a potential marker of dysphagia and impaired airway protection. Previous SSF monitoring approaches have lacked standardisation and scalability.



Methods

Single-centre observational pilot study involving 18 tracheostomised patients undergoing dysphagia assessment. A neck-worn electronic stethoscope with AI-assisted swallow detection measured SSF over approximately 10 minutes.

SSF was compared against:

- cuff inflation status
- Functional Oral Intake Scale (FOIS)
- pharyngeal secretion retention on FEES using Hyodo scoring

Key Findings

- SSF increased significantly with cuff deflation
- Higher SSF was associated with FOIS ≥ 3 and FOIS ≥ 4
- Moderate negative correlation observed between SSF and secretion retention grade
- Patients swallowing more frequently demonstrated less pooled pharyngeal secretion burden

Clinical Relevance

The study supports the physiologic plausibility of SSF as a marker of swallowing function in tracheostomised patients.

Potential future applications may include:

- longitudinal swallowing monitoring
- rehabilitation tracking
- objective ward-based surveillance

Strengths

- Novel physiologic monitoring concept
- Objective measurement approach
- Integration with FEES findings
- Focus on clinically relevant tracheostomy population

Limitations

- Small sample size
- Single-centre design
- No speaking valve assessment
- Device measures swallow occurrence rather than swallow safety
- Unable to determine aspiration risk

Future Directions

Larger multicentre validation studies are needed alongside correlation with aspiration outcomes, secretion burden and rehabilitation trajectories.

Admission NT-proBNP as a Prognostic Biomarker for Ventilator Weaning Failure

Citation

Leem AY et al. *Biomedicines*. 2026.

Lay Summary:

Coming off a ventilator after critical illness can place major strain on the heart and lungs. Some patients struggle to breathe independently even after tracheostomy.



This large ICU study investigated whether a blood test called NT-proBNP — commonly used to assess cardiac stress — could help predict which patients might struggle during ventilator weaning.

Patients with higher NT-proBNP levels were more likely to experience weaning failure, longer ICU stays and higher mortality. Earlier tracheostomy placement was also associated with better weaning outcomes.

The findings highlight how heart function may play an important role during ventilator liberation and reinforce the importance of multidisciplinary assessment during prolonged weaning.

Summary for Healthcare Professionals:

Background

Weaning-induced cardiac dysfunction is increasingly recognised as a contributor to ventilator liberation failure. NT-proBNP may act as a surrogate marker of cardiovascular reserve during critical illness.

Methods

Retrospective cohort study involving 707 tracheostomised ICU patients undergoing prolonged mechanical ventilation.

Primary analyses examined relationships between:

- admission NT-proBNP



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- ventilator weaning outcomes
- tracheostomy timing
- ICU outcomes and mortality

Key Findings

- Higher admission NT-proBNP associated with increased weaning failure
- NT-proBNP >3271 pg/mL independently associated with weaning failure
- Elevated biomarker levels correlated with prolonged ICU stay and increased 90-day mortality
- Tracheostomy within 10 days associated with lower odds of weaning failure

Clinical Relevance

The paper reinforces the importance of cardiopulmonary interaction during ventilator liberation.

Repeated weaning failure should prompt consideration of:

- cardiac dysfunction
- fluid balance
- cardiovascular reserve
- weaning-induced cardiac stress

Strengths

- Large cohort size
- Clinically relevant ICU population
- Integration of biomarker and procedural timing data
- Multivariable analysis performed

Limitations

- Retrospective observational design
- Single-centre study
- NT-proBNP influenced by multiple confounders
- Association does not prove causation
- Tracheostomy timing decisions were not protocolised

Future Directions

Prospective biomarker-guided weaning studies may help identify whether physiologic phenotyping can individualise ventilator liberation pathways.

Randomized Clinical Trial of PSV versus TIPS Weaning

Citation: Dolinay T et al. BMC Pulmonary Medicine. 2026.

Lay Summary:

Some patients remain dependent on ventilators for weeks or months after critical illness and require prolonged rehabilitation through a tracheostomy.



This study compared two different ventilator weaning strategies in patients requiring prolonged mechanical ventilation.

The researchers found no major differences between the two weaning approaches in terms of ventilator liberation, mortality or hospital outcomes.

The findings highlight how difficult prolonged ventilator weaning can be and reinforce that successful recovery usually depends on broad multidisciplinary rehabilitation rather than a single ventilator strategy alone.

Summary for Healthcare Professionals:

Background

Evidence supporting optimal prolonged weaning strategies remains limited, particularly in highly complex chronic critical illness populations.

Methods

Prospective randomised non-blinded study comparing:

- pressure support ventilation-based weaning
- therapist-implemented patient-specific (TIPS) weaning



Participants were tracheostomised prolonged mechanical ventilation patients admitted to a specialised weaning hospital.

Key Findings

- No significant difference in liberation success between groups
- No significant differences in mortality or discharge outcomes
- Continued weaning beyond 30 days improved liberation rates
- Both pathways demonstrated similar overall effectiveness

Clinical Relevance

The study highlights:

- the complexity of prolonged weaning populations
- limitations of protocol-focused approaches in isolation
- importance of MDT rehabilitation and recovery support

Successful prolonged weaning likely depends on:

- physiotherapy
- secretion management
- swallowing rehabilitation
- communication support
- mobilisation
- nutrition
- psychological care

Strengths

- Prospective randomised design
- Real-world prolonged weaning population
- Specialised weaning centre experience
- Functional rehabilitation outcomes included

Limitations

- Small sample size
- Non-blinded design
- Single specialised centre
- Limited statistical power
- Heterogeneous patient population

Future Directions

Larger multicentre studies examining integrated rehabilitation pathways may be more informative than ventilator protocol comparisons alone.

Assessment of Large Language Models for Tracheostomy Care in Pediatrics

Citation: Celik B et al. *Journal of Pediatric Health Care*. 2025.

Lay Summary:

Families caring for children with tracheostomies often search online for advice and educational information.

This study compared responses generated by two artificial intelligence systems — ChatGPT and Claude — when answering common paediatric tracheostomy caregiver questions.

Both systems generally produced useful and understandable information, although performance varied slightly between categories.

The authors emphasised that AI should only be used as supplementary educational support and should never replace professional medical advice or emergency assessment.



Summary for Healthcare Professionals:

Background

Caregivers increasingly access AI-generated healthcare information, yet evidence evaluating tracheostomy-specific AI guidance remains limited.

Methods

Seventeen paediatric tracheostomy caregiver questions were submitted to:

- ChatGPT-4.o
- Claude 4.0 Sonnet

Nine paediatric otolaryngologists assessed responses across:

- accuracy
- completeness
- clarity
- clinical relevance

Key Findings

- ChatGPT scored higher for accuracy and readability
- Claude scored higher for completeness
- No significant difference in clarity or relevance
- Both systems performed reasonably well overall

Clinical Relevance

The paper highlights:

- growing patient use of AI tools
- need for governance and oversight
- potential supplementary educational applications

Importantly, emergency scenarios were not assessed.

Strengths

- Structured blinded evaluation
- Multiple specialist assessors
- Real-world caregiver-focused questions
- Readability analysis included

Limitations

- Small question set
- No emergency scenario testing
- Responses may vary over time
- AI hallucination risk persists
- Generalisability uncertain

Future Directions

Further work is needed examining:

- emergency advice reliability
- safeguarding risks
- multilingual support
- integration into supervised education systems

Evaluating the Quality of Expert-Trained Generative Artificial Intelligence

Citation: Gorst B et al. Anaesthesia Reports. 2026.

Lay Summary:

Researchers developed an expert-trained tracheostomy artificial intelligence educator called “AI-Brendan” using curated educational material from NTSP training programmes.

The AI system was compared against standard ChatGPT and human experts when answering tracheostomy-related questions.

Interestingly, the expert-trained AI performed very well and achieved higher educational quality scores than standard AI systems and even human experts in some categories.

The study suggests that carefully designed AI educational systems may help support accessible and consistent tracheostomy training in the future.



Summary for Healthcare Professionals:

Background

Delivering scalable, standardised tracheostomy education remains challenging due to workforce pressures and training resource limitations.

Methods

AI-Brendan utilised:

- ChatGPT-4.0 base model
- curated NTSP educational datasets
- interactive avatar integration



Responses from:

- AI-Brendan
- standard ChatGPT-4.0
- human experts

were assessed using modified EQuIP scoring.

Key Findings

- AI-Brendan achieved higher mean scores than ChatGPT and expert responses
- Good response consistency observed
- No alarming responses identified
- Inter-rater reliability was high

Clinical Relevance

The paper suggests expert-trained AI may:

- improve consistency of educational messaging
- support remote training
- augment workforce education delivery
- improve accessibility of educational resources

Importantly, the authors frame AI as adjunctive educational support rather than replacement clinical expertise.

Strengths

- Domain-specific curated training dataset
- Blinded adjudication methodology
- Repeated response testing
- Focus on educational quality and consistency

Limitations

- Small number of evaluated questions
- Educational rather than clinical decision-making context
- Long-term safety and governance unknown

- Potential dataset bias
- Generalisability uncertain

Future Directions

Further evaluation is needed regarding:

- clinical governance
- implementation safety
- user trust
- integration into formal tracheostomy training programmes

Overall Reflections – May 2026

This month's literature reflects increasing interest in:

- AI-supported education
- physiologic monitoring technologies
- biomarker-guided rehabilitation
- personalised prolonged weaning pathways

Despite technological advances, the papers consistently reinforce that:

- multidisciplinary clinical reasoning remains essential
- technology should augment rather than replace expertise
- prolonged ventilator rehabilitation remains highly complex
- patient-centred tracheostomy care depends on integrated MDT working

The NTSP encourages thoughtful, evidence-based adoption of emerging technologies whilst maintaining a strong focus on safety, governance and human-centred care.