NTSP Podcast series

National Tracheostomy Safety Project

This month's top papers: May 2021

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.

You can find the links to the podcast on www.tracheostomy.org.uk and by searching for NTSP on your favourite podcast platform. Some of the podcasts are also uploaded to YouTube if you prefer to get your news that way. Check out the NTSP YouTube channel at https://www.youtube.com/c/NationalTracheostomySafetyProject. Please follow us and/or subscribe to keep up to date! https://x.com/NTSP_UK

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This month's top papers

- Evidence for Above Cuff Vocalization in Patients With a Tracheostomy: A Systematic Review
- Speech Pathology Services Are Integral, but Underutilized in TracheostomyRehabilitation
- Standardized Endoscopic Swallowing Evaluation for TracheostomyDecannulation in Critically Ill Neurologic Patients-a prospective evaluation
- CostAnalysis of Open Surgical Bedside Tracheostomy in Intensive Care Unit Patients

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Evidence for Above Cuff Vocalization in Patients With a Tracheostomy: A Systematic Review

Lay Summary:

This paper is a review of existing research on a technique called Above Cuff Vocalization (ACV), which is used to help patients with a tracheostomy tube talk. The tracheostomy tube often has an inflated cuff, which prevents air from reaching the vocal cords, making it impossible to speak. ACV works by sending a small flow of air or oxygen from a special port on the tube up past the vocal cords, allowing the patient to make sounds and talk.

The review found that while ACV can help with communication, swallowing, and quality of life, the evidence is limited and often of poor quality. Many of the studies were small, and they used different methods and ways of measuring success, making it difficult to compare them. The researchers noted that there isn't enough information to create clear guidelines on how to best use ACV, such as the right amount of air to use or how often to do it.

The paper also highlights that while ACV can be beneficial, there are potential risks and complications, though the full extent of these issues isn't clear from the existing research. For example, some patients experienced issues like air trapped under the skin of the neck or swelling. The authors conclude that more and better-quality research is needed to fully understand the benefits and risks of ACV and to develop standardized procedures to ensure it is used safely and effectively.

Summary for Healthcare Professionals:

This systematic review by Mills et al. evaluates the evidence for Above Cuff Vocalization (ACV) in patients with a cuffed tracheostomy, focusing on its implementation, effectiveness, safety, and acceptability. The review included 13 eligible studies, comprising case studies, case series, observational studies, one quasi-experimental study, and one randomized controlled trial. The overall quality of the included studies was low, with a high risk of bias and significant heterogeneity in study design and outcome measures, precluding a meta-analysis.

The findings suggest potential benefits across several domains. Positive effects on communication were reported in seven studies, with patients achieving an audible voice or whisper in 50% to 80% of cases. Four studies noted positive effects on swallowing, including an increase in spontaneous swallow frequency and a reduction in subglottic secretion volume. Improvements in cough response and quality of life were also reported, but the evidence for these outcomes was limited to two studies each.

Despite these reported benefits, the review found insufficient evidence to provide recommendations for optimal intervention delivery. The studies often lacked detailed information on ACV application, such as airflow rates, frequency, and duration. Furthermore, adverse events and complications, including subcutaneous emphysema and tracheal dilation, were reported in nine of the studies, highlighting the need for cautious implementation. The authors emphasize the importance of involving a multidisciplinary team, particularly an experienced Speech and Language Therapist (SLT), to supervise ACV delivery, ensure proper patient selection, and minimize complications. The review concludes that more rigorous, high-quality research with larger sample sizes and a consistent set of outcome measures is needed to establish clear clinical guidelines for ACV.

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Speech Pathology Services Are Integral, but Underutilized in TracheostomyRehabilitation.

Lay Summary:

This study looked at how often speech language pathologists (SLPs) are involved in the care of patients with tracheostomy tubes and how their involvement affects patient outcomes. A tracheostomy is a hole in the neck with a tube that helps a person breathe, and it's often used for critically ill patients. SLPs help these patients regain their ability to speak and swallow, which can be difficult with a tracheostomy tube.

The findings showed that SLP services are not used as much as they should be, and when they are, there is often a delay. The study found that almost a quarter of patients with a tracheostomy were never seen by an SLP. However, when SLPs were involved, patients were more likely to have their tube downsized and eventually removed completely. Patients with head and neck cancer or trauma, and those who had a successful swallowing test, had higher chances of having their tracheostomy removed. On the other hand, patients who were obese or had a history of a previous tracheostomy had a lower chance of having the tube removed.

The authors created a new hospital protocol to make sure SLPs are called in earlier and more often to help with the process. They believe that bringing in SLPs as a key part of a hospital tracheostomy team can make the process of removing the tube safer and more efficient, ultimately leading to better care and outcomes for patients.

Summary for Healthcare Professionals:

This retrospective case series investigated the utilization of Speech Language Pathology (SLP) services for adult tracheostomy patients at an urban Level 1 trauma center from April 2016 to December 2018. The study's primary objective was to determine the rate of SLP evaluation, while secondary outcomes included the use of speaking valves and swallow studies, decannulation rates, and complications.

The study analyzed 255 subjects and found that SLP services were underutilized, with only 77.3% of patients receiving a general SLP evaluation. A significant delay was observed, with a mean of 5.9 days from surgery to the first SLP evaluation. Furthermore, only a minority of patients received a speaking valve (33.7%), and approximately half underwent a swallow study (52.9%).

Despite the underutilization, the results showed a strong association between SLP involvement and successful decannulation. Patients who received an SLP evaluation had consistently higher rates of downsizing (87%) and decannulation (68%) compared to those who did not (53% and 43%, respectively). A successful swallow study also conferred increased odds of eventual decannulation. The study identified key factors associated with higher odds of decannulation, including head and neck cancer, trauma, and a successful swallow study. Conversely, obesity and a history of a previous tracheostomy were found to decrease the odds of decannulation.

Based on these findings, the authors developed an interdisciplinary decannulation pathway to standardize and improve the process, recommending immediate SLP consultation after tracheostomy and continued involvement throughout the rehabilitation phases. The study concludes that SLPs are an integral, yet underutilized, resource for tracheostomy rehabilitation, and their earlier and more consistent involvement through a structured team approach can improve patient outcomes, reduce delays, and potentially decrease overall costs.

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Standardized Endoscopic Swallowing Evaluation for TracheostomyDecannulation in Critically Ill Neurologic Patients-a prospective evaluation

Lay Summary:

This paper looks at a new and objective way to decide when it's safe to remove a tracheostomy tube from critically ill patients with neurological issues, such as stroke. The process, called the Standardized Endoscopic Swallowing Evaluation for Tracheostomy Decannulation (SESETD), uses a small, flexible camera (endoscope) to look at the patient's throat and assess their ability to manage saliva, swallow on their own, and cough to protect their airway.

The study followed 377 patients and found that the SESETD protocol is both safe and effective. Only 3.5% of patients who had their tube removed using this method needed to have it reinserted due to problems with swallowing. The study also found that patients who were on a ventilator for a longer period of time were more likely to have a difficult time with the process and fail decannulation. Younger patients were more likely to have their tube removed quickly after being taken off the ventilator. The results suggest that this standardized evaluation tool can help doctors make better decisions about when to remove a tracheostomy tube, which can lead to better outcomes for patients and a safer, more efficient hospital stay.

Summary for Healthcare Professionals:

This prospective observational study evaluates the safety and effectiveness of the Standardized Endoscopic Swallowing Evaluation for Tracheostomy Decannulation (SESETD) protocol in a cohort of 377 critically ill neurological patients. The SESETD utilizes a fiberoptic endoscopic evaluation of swallowing (FEES) to objectively assess three key parameters for decannulation readiness: secretion management, spontaneous swallowing, and laryngeal sensitivity.

The findings indicate that the SESETD is a safe and efficient tool for guiding decannulation decisions in this patient population. The decannulation failure rate, defined as the need for reintubation due to dysphagia-related complications, was 3.5%. This rate is considered an acceptable balance between a conservative and an overly aggressive approach to decannulation. The mean time from decannulation to reintubation was 81.1 hours, with most failures occurring within the first few days.

Logistic regression analysis identified prolonged mechanical ventilation as the only significant predictor of decannulation failure. Conversely, younger age was a significant predictor of early decannulation after weaning from mechanical ventilation. Transforming the binary SESETD outcome into a 4-point sum score demonstrated its predictive value for eventual decannulation success, with a score of ≥1 having an optimal cutoff sensitivity of 64% and specificity of 66%. The study concludes that the SESETD protocol provides an objective, bedside method to safely and efficiently guide decannulation decisions, with the initial sum score potentially aiding in predicting the likelihood of decannulation throughout the ICU stay.

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CostAnalysis of Open Surgical Bedside Tracheostomy in Intensive Care Unit Patients

Lay Summary:

This study compares the cost and efficiency of two types of surgical tracheostomy procedures performed on patients in the intensive care unit (ICU). The first is an open surgical tracheostomy performed at the patient's bedside in the ICU (BeOST), and the second is the same procedure performed in a hospital operating room (OROST).

The research, which looked at 142 procedures, found that performing the surgery at the bedside was significantly more cost-effective. A BeOST cost about 343 EUR (around $375 US dollars) less than an OROST, saving the hospital over 41,000 EUR in one year. Besides the financial savings, performing the procedure at the bedside also freed up a significant amount of time in the operating room, about 279 hours in one year. This saved time could have been used for about 100 other surgical procedures. The study also noted that BeOST requires fewer staff members, making it a more efficient use of human resources. The authors conclude that performing a tracheostomy at the bedside is better for cost, time, and staff resources when there are no medical reasons not to do so.

Summary for Healthcare Professionals:

This retrospective study analyzed the cost-effectiveness and resource utilization of bedside open surgical tracheostomy (BeOST) versus operating room open surgical tracheostomy (OROST) for ICU patients. The study cohort included 142 OSTs performed at a single hospital in 2017, with 122 (86%) being BeOSTs and 20 (14%) being OROSTs.

The primary finding was that BeOST was significantly more cost-efficient than OROST. A single BeOST procedure was 343 EUR less expensive than an OROST, resulting in an annual cost savings of 41,818 EUR for the institution. The cost differential was primarily attributed to personnel and operating room expenses. OROST required a larger team of 8 personnel, including transport and surgical nurses, compared to 4 for BeOST.

In addition to cost benefits, BeOST demonstrated substantial time and resource efficiencies. An OROST procedure took 82 minutes longer than a BeOST, and performing the 122 BeOSTs at the bedside freed up 279 hours of operating room time in a single year. This saved time was equivalent to the time needed to perform an additional 100 maxillofacial surgical procedures. The authors conclude that given comparable safety and complication rates documented in other studies, BeOST should be the preferred option for eligible ICU patients.

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Scientific abstracts and references

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Laryngoscope. 2021 May 1. doi: 10.1002/lary.29591. Online ahead of print.

Evidence for Above Cuff Vocalization in Patients With a Tracheostomy: A Systematic Review.

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OBJECTIVES/HYPOTHESIS: To determine how above cuff vocalization (ACV) is implemented in clinical practice, to identify what evidence exists on the effectiveness and safety of ACV, and to evaluate the acceptability of ACV. STUDY DESIGN: Systematic review. METHODS: A literature search was conducted in eight databases (MEDLINE, Embase, AMED, CINAHL, Cochrane Library, PsycINFO, Scopus, and Web of Science) in May 2019 and updated in June 2020. Two reviewers independently screened, selected, and extracted data. Study quality was appraised using the Joanna Briggs Institute Critical Appraisal Tools and a narrative synthesis was conducted. Systematic review registration number: CRD42019133942. RESULTS: The searches identified 1327 records. The 13 eligible studies included four case studies, three case series, four observational studies without a control group, one quasi-experimental study, and one randomized controlled trial. Study quality was low, with most studies having high risk of bias. There was a high level of heterogeneity in study design and outcome measures used. Detailed information on ACV application and dose-delivered was lacking in 12 studies. Positive effects were reported for communication (n = 7), swallowing (n = 4), cough response (n = 2), and quality-of-life (n = 2), but with inconsistent use of objective outcome measures. There is limited quantitative or qualitative evidence for acceptability. Adverse events and complications were reported in nine studies, and four highlighted the importance of involving an experienced speech and language therapist. CONCLUSIONS: There is limited evidence for the acceptability, effectiveness, safety, or optimal implementation of ACV. The evidence is insufficient to provide recommendations regarding optimal intervention delivery. Future research should ensure detailed recording of ACV delivery and utilize a core outcome set. Laryngoscope, 2021.
DOI: 10.1002/lary.29591 PMID: 33932229

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Craniomaxillofac Trauma Reconstr. 2021 Jun;14(2):110-118. doi: 10.1177/1943387520948381. Epub 2020 Aug 18.

Speech Pathology Services Are Integral, but Underutilized in Tracheostomy Rehabilitation.

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STUDY DESIGN: Retrospective case series. OBJECTIVE: Speech language pathology (SLP) is an underutilized but important component in rehabilitation after tracheostomy. The purpose of this study was to determine rates of SLP utilization and to streamline tracheostomy decannulation to be more efficient and safer through increased utilization of SLP. METHODS: Adult patients who underwent tracheostomy from April 2016 to December 2018 were evaluated. The primary outcome was completion of any SLP evaluation after tracheostomy, and secondary outcomes were duration from surgery to evaluation, speaking valve and swallow study utilization, downsize and decannulation rates, mean duration of cannulation, and complications. RESULTS: A total of 255 subjects were included, where 197 (77.3%) underwent SLP evaluation. A minority received a speaking valve (33.7%), while approximately half underwent a swallow study (52.9%). There was a delay in SLP evaluation, with mean duration from surgery to SLP evaluation of 5.9 ± 8.0 days. There was consistent improvement in downsize and decannulation rates in all cohorts that utilized SLP services. Tracheostomy indication of head and neck cancer, trauma, completing a successful swallow study conferred increased odds of eventual decannulation, while obesity and tracheostomy history conferred lower odds. An interdisciplinary decannulation pathway was created, based on literature review and results, to assist in decision-making while progressing toward decannulation. CONCLUSION: Speech language pathologists are underutilized for rehabilitation of tracheostomy patients, where they are able to offer many skills to diagnose, treat, manage, and troubleshoot, as patients advance through the decannulation process.

DOI: 10.1177/1943387520948381 PMCID: PMC8108103 PMID: 33995831

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Neurol Res Pract. 2021 May 10;3(1):26. doi: 10.1186/s42466-021-00124-1.

Standardized Endoscopic Swallowing Evaluation for Tracheostomy Decannulation in Critically Ill Neurologic Patients - a prospective evaluation.

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BACKGROUND: Removal of a tracheostomy tube in critically ill neurologic patients is a critical issue during intensive care treatment, particularly due to severe dysphagia and insufficient airway protection. The "Standardized Endoscopic Evaluation for Tracheostomy Decannulation in Critically Ill Neurologic Patients" (SESETD) is an objective measure of readiness for decannulation. This protocol includes the stepwise evaluation of secretion management, spontaneous swallowing, and laryngeal sensitivity during fiberoptic endoscopic evaluation of swallowing (FEES). Here, we first evaluated safety and secondly effectiveness of the protocol and sought to identify predictors of decannulation success and decannulation failure. METHODS: A prospective observational study was conducted in the neurological intensive care unit at Münster University Hospital, Germany between January 2013 and December 2017. Three hundred and seventy-seven tracheostomized patients with an acute neurologic disease completely weaned from mechanical ventilation were included, all of whom were examined by FEES within 72 h from end of mechanical ventilation. Using regression analysis, predictors of successful decannulation, as well as decannulation failure were investigated. RESULTS: Two hundred and twenty-seven patients (60.2%) could be decannulated during their stay according to the protocol, 59 of whom within 24 h from the initial FEES after completed weaning. 3.5% of patients had to be recannulated due to severe dysphagia or related complications. Prolonged mechanical ventilation showed to be a significant predictor of decannulation failure. Lower age was identified to be a significant predictor of early decannulation after end of weaning. Transforming the binary SESETD into a 4-point scale helped predicting decannulation success in patients not immediately ready for decannulation after the end of respiratory weaning (optimal cutoff ≥1; sensitivity: 64%, specifity: 66%). CONCLUSIONS: The SESETD showed to be a safe and efficient tool to evaluate readiness for decannulation in our patient collective of critically ill neurologic patients.

Ear Nose Throat J. 2021 May 19:1455613211018578. doi: 10.1177/01455613211018578. Online ahead of print.

Cost Analysis of Open Surgical Bedside Tracheostomy in Intensive Care Unit Patients.

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OBJECTIVES: Open surgical tracheostomy (OST) is a common procedure performed on intensive care unit (ICU) patients. The procedure can be performed bedside in the ICU (bedside open surgical tracheostomy, BeOST) or in the operating room (operating room open surgical tracheostomy, OROST), with comparable safety and long-term complication rates. We aimed to perform a cost analysis and evaluate the use of human resources and the total time used for both BeOSTs and OROSTs. METHODS: All OSTs performed in 2017 at 5 different ICUs at Oslo University Hospital Ullevål were retrospectively evaluated. The salaries of the personnel involved in the 2 procedures were obtained from the hospital's finance department. The time taken and the number of procedures performed were extracted from annual reports and from the electronic patient record system, and the annual expenditures were calculated. RESULTS: Altogether, 142 OSTs were performed, of which 122 (86%) and 20 (14%) were BeOSTs and OROSTs, respectively. A BeOST cost 343 EUR (95% CI: 241.4-444.6) less than an OROST. Bedside open surgical tracheostomies resulted in an annual cost efficiency of 41.818 EUR. In addition, BeOSTs freed 279 hours of operating room occupancy during the study year. Choosing BeOST instead of OROST made 1 nurse, 2 surgical nurses, and 1 anesthetic nurse redundant. CONCLUSION: Bedside open surgical tracheostomy appears to be cost-, time-, and resource-effective than OROST. In the absence of contraindications, BeOSTs should be performed in ICU patients whenever possible.

DOI: 10.1177/01455613211018578 PMID: 34006128