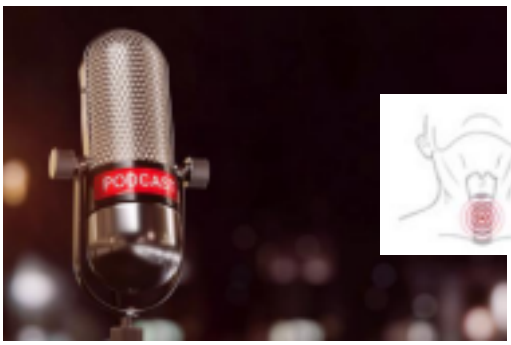
# NTSP Podcast series




National Tracheostomy Safety Project

## This month's top papers: February 2022

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**

- Hospital training and preparedness of parents and carers in paediatric tracheostomy care: A mixed methods study.
- The feasibility and safety of percutaneous dilatational tracheostomy without endotracheal guidance in the intensive care unit.
- Aerosol-generating procedure; percutaneous versus surgical tracheostomy.
- Role of ultrasonography in upper airway assessment for decannulating tracheostomy in acquired brain injury - a pilot study.

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**Hospital training and preparedness of parents and carers in paediatric tracheostomy care: A mixed methods study.**

**Lay Summary:**

This study looked at how parents and caregivers of children with a tracheostomy felt about the training they received from the hospital before taking their child home. A tracheostomy is a breathing tube placed in a child's neck, and care for it at home requires extensive training.

The study, which used both interviews and a survey, found that while caregivers were generally very satisfied with the training (scoring it a mean of 8.42 out of 10) , a deeper look revealed several areas that could be improved. The main issues identified by caregivers were:

- **Emergency Training**: Less than half (48%) felt they were adequately prepared for emergencies like the tube becoming dislodged or blocked. In fact, a quarter of the surveyed caregivers had already experienced an emergency after going home. A majority of caregivers (83%) felt that videos or podcasts focusing on these emergency scenarios would be a helpful refresher.
- **Emotional Support**: Nearly half of the participants (45%) felt the emotional impact of the tracheostomy was not well-represented in the current training.
- **Ongoing Support**: Caregivers felt they didn't get enough supervision or refresher training after they were discharged from the hospital. Their confidence in local community nurses was low, with a mean score of 4.69 out of 10.

As a result of these findings, the hospital made several changes to its training program, including creating videos, offering access to a psychologist, and increasing training for community healthcare teams. The study concludes that listening to caregivers' experiences is the best way to improve training programs.

**Summary for Healthcare Professionals:**

This mixed-methods study evaluated the perceptions of parents and caregivers regarding in-hospital training for pediatric tracheostomy care at a quaternary pediatric airway center in the UK. The study aimed to identify areas for service improvement by adopting a carer-centric approach. Phase I involved semi-structured interviews with five caregivers, which informed the development of a questionnaire. In Phase II, the questionnaire was distributed to 92 eligible caregivers, with 35 completed responses (38% response rate) analyzed using thematic analysis and descriptive statistics.

Despite a high overall satisfaction score (mean 8.42 out of 10) for the training program, in-depth analysis revealed several key areas for improvement identified by caregivers:

- **Emergency and Complication Training**: Less than half of the participants (48%) felt adequately prepared for emergencies, with 23% having already experienced an accidental decannulation or tube blockage after discharge. A majority (83%) desired video-based training on these scenarios as a refresher.
- **Psychological Support**: 45% of participants felt the emotional impact of the tracheostomy was underrepresented in the training, highlighting a need for professional psychology support.
- **Post-Discharge Support**: Caregivers expressed low confidence in community healthcare professionals (mean score: 4.69) and felt the transition from hospital to community care was poorly supported. They also requested "refresher training" to maintain competence once at home.

Based on these findings, the hospital implemented several interventions, including web-based training videos, formal emergency simulation training, a competency booklet, and dedicated training days for community nurses. The study concludes that focusing on the needs and experiences of caregivers is crucial for improving tracheostomy training programs and ensuring confidence and competence for home care.

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**The feasibility and safety of percutaneous dilatational tracheostomy without endotracheal guidance in the intensive care unit.**

**Lay Summary:**

This study explores whether a common procedure called a percutaneous dilatational tracheostomy (PDT) can be safely performed without using a bronchoscope, which is a camera that doctors typically use to see inside the windpipe. While using a camera is considered the standard, the authors wanted to see if the procedure is still safe and effective without it.

The study looked back at the records of 78 critically ill patients who received a PDT from a single experienced doctor without a camera for guidance. The results showed that the procedure was highly successful on the first try in most patients (94.9%). There were some minor complications:

- Hypoxia: Four patients (5.1%) experienced a drop in oxygen levels, but all recovered without any lasting problems.
- Minor Bleeding: Five patients (6.4%) had minor bleeding that was easily controlled.
- Hypotension: Sixteen patients (20.5%) experienced a drop in blood pressure, which was managed with standard care.

Importantly, there were no serious airway problems or deaths directly caused by the procedure. The study concludes that for experienced doctors, performing a PDT without a camera is a safe and practical option. This is especially helpful for hospitals where these guidance devices may not be readily available.

**Summary for Healthcare Professionals:**

This retrospective observational study assessed the feasibility and safety of percutaneous dilatational tracheostomy (PDT) without endotracheal guidance in critically ill patients. The study reviewed the electronic medical records of 78 patients who underwent the procedure at a single tertiary hospital in 2018. The procedure was performed by a single medical intensivist using the Griggs technique without the use of bronchoscopy, ultrasound, or other guidance devices.

The primary outcome of successful PDT was achieved in 94.9% of patients on the first attempt. Failure of the initial attempt occurred in four patients (5.1%), all of whom experienced hypoxia. In two of these cases, the procedure was successfully reattempted after reintubation, while the other two were converted to surgical tracheostomy. All patients recovered without hypoxia-related sequelae.

Secondary outcomes included:

- Minor Bleeding: Five patients (6.4%) experienced minor bleeding that required direct compression or simple dressing.
- Hypotension: This was the most common complication, occurring in 16 patients (20.5%) and was managed with crystalloid replacement and/or vasopressors.
- Major Complications: There were no reported cases of major bleeding, posterior tracheal wall injury, or other procedure-related sequelae requiring therapeutic interventions.

The study concludes that PDT performed without endotracheal guidance can be considered a safe and feasible option for experienced physicians. This approach may offer advantages in terms of time and cost by eliminating the need to wait for specialized devices and technicians.

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**Aerosol-generating procedure; percutaneous versus surgical tracheostomy.**

**Lay Summary:**

This study compares two types of tracheostomy procedures to see which one creates fewer airborne particles that could spread viruses like COVID-19. A tracheostomy is a surgery to create a hole in the windpipe for a breathing tube. The two methods are:

1. Percutaneous Tracheostomy (PCT): A minimally invasive procedure done at the bedside in the intensive care unit.
2. Surgical Tracheostomy: A traditional open surgery usually done in an operating room.

Researchers used a special particle counter to measure the amount of airborne particles released during both procedures in 35 patients. They found that PCT created significantly more particles of various sizes compared to surgical tracheostomy. In fact, surgical tracheostomy was not found to be an "aerosol-generating procedure" at all.

The study suggests that because surgical tracheostomy releases fewer particles, it may be a more appropriate choice for patients with a suspected viral infection. The authors recommend performing surgical tracheostomy as soon as possible with appropriate protective equipment to help keep healthcare workers safe.

**Summary for Healthcare Professionals:**

This study aimed to compare aerosol and droplet scattering between percutaneous tracheostomy (PCT) and surgical tracheostomy using a particle counter. The study was conducted on 35 patients between October 2020 and June 2021. All procedures were performed in negative pressure rooms with appropriate personal protective equipment (PPE) for healthcare workers.

The results showed a significant difference in aerosol generation between the two methods. Particle amounts were found to be significantly higher during PCT at various sizes (

0.3 µm,p=0.034; 5 µm,p=0.001; and 10 µm,p=0.003) when compared to surgical tracheostomy. In contrast, surgical tracheostomy did not show a significant increase in the number of particles after the tracheal incision. The procedural time was also significantly different, with PCT taking an average of 8.44 minutes compared to 18.36 minutes for surgical tracheostomy.

The authors conclude that based on their data, surgical tracheostomy was not identified as an aerosol-generating procedure (AGP). Given the risk of airborne transmission, particularly with viral mutations, the study suggests that surgical tracheostomy may be a more appropriate choice for patients who need a tracheostomy, and it should be performed as soon as possible with PPE to minimize risk to healthcare workers.

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**Role of ultrasonography in upper airway assessment for decannulating tracheostomy in acquired brain injury - a pilot study.**

**Lay Summary:**

This study looked at whether using a special ultrasound could be a good way to check if a patient with a brain injury is ready to have their tracheostomy tube removed. A tracheostomy is a tube in the neck that helps a person breathe, and it's a big step to remove it, so doctors need to be sure the patient can breathe and swallow safely on their own. The traditional method for this is using a flexible camera called a laryngoscope, but that requires special equipment and expertise.

Researchers used an ultrasound on 24 patients with a brain injury and then compared the results with the traditional camera method. The ultrasound was able to accurately assess the movement of the vocal cords, which is a key indicator of a patient's readiness for the tube to be removed. The study found a strong link between normal vocal cord movement on the ultrasound and the ability to have the tube safely removed. They also found a link between vocal cord movement and the risk of aspiration (inhaling food or liquid into the lungs).

The study concludes that this type of ultrasound is a promising and easy-to-use tool for assessing a patient's vocal cords and airway. It could be a valuable alternative for hospitals and rehabilitation centers that don't have the specialized equipment or staff needed for the traditional camera method.

**Summary for Healthcare Professionals:**

This prospective cross-sectional pilot study investigated the efficacy of transcutaneous laryngeal ultrasonography (TCLUS) as a diagnostic tool for upper airway assessment prior to tracheostomy decannulation in patients with acquired brain injury (ABI). The study compared TCLUS findings with flexible fiberoptic laryngoscopy, which is considered the criterion standard for this assessment.

The study included 24 patients with ABI, with the majority having severe brain injury (GCS <8 in 95.8% of participants). TCLUS showed a high degree of accuracy in assessing vocal cord mobility, with a sensitivity of 81.25% and a specificity of 87.5% when compared to laryngoscopy (P=.002). A statistically significant association was also observed between normal vocal cord mobility on ultrasonography and successful decannulation (P=.002). The study also found a significant association between vocal cord mobility as assessed by ultrasonography and the presence of aspiration as assessed by laryngoscopy (P=.011).

The authors conclude that TCLUS is an emerging, noninvasive diagnostic modality with a potential role in assessing vocal cord mobility and airway adequacy in ABI patients. It may serve as a valuable alternative in resource-restricted settings that lack the expertise and infrastructure required for flexible laryngoscopy to aid in decannulation decision-making.

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## Scientific abstracts and references

**Int J Pediatr Otorhinolaryngol. 2022 Jan 29;154:111058. doi: 10.1016/j.ijporl.2022.111058. Online ahead of print.**

# Hospital training and preparedness of parents and carers in paediatric tracheostomy care: A mixed methods study.

Antoniou I(1), Wray J(1), Kenny M(1), Hewitt R(1), Hall A(2), Cooke J(3).

Author information: (1)Great Ormond Street Hospital, London, UK. (2)Children's Hospital for Wales, Cardiff, UK. (3)Great Ormond Street Hospital, London, UK. Electronic address: Jo.cooke@gosh.nhs.uk.

INTRODUCTION: Within the UK, the majority of paediatric tracheostomy care is delivered by parents and carers at home. To facilitate this, extensive in-hospital training is delivered by a variety of health care professionals. Our goal was to assess carer perceptions of this process and highlight areas in which we can further improve our service and the training for other hospital providers of paediatric tracheostomy care. METHODS: A mixed method approach was adopted. In Phase I, qualitative data from five semi-structured interviews with carers of children with a tracheostomy were thematically analysed and subsequently used to develop a questionnaire. In Phase II, the piloted questionnaire was distributed via telephone, email or post to all eligible caregivers who had been tracheostomy trained at GOSH in the last three years (n = 92). Qualitative and quantitative data were analysed using thematic analysis and descriptive statistics respectively. RESULTS: Thirty-five completed questionnaires were received (38% response rate). Overall participants were highly satisfied with the training provided (mean score 8.42 on a scale of 1 (lowest) to 10 (highest)). Carer identified areas requiring improvement were caregiver education pre-tracheostomy; emergency and complication training; supervision and training post hospital discharge; training schedule; emotional support; and support from community healthcare teams. These findings led to multiple subsequent interventions to further improve the carer training programme including training videos, psychology provision on request and increased community training. CONCLUSION: Although the evaluation of the service revealed high participant satisfaction in home carer training overall, in-depth analysis of caregivers' experiences indicated common themes in the tracheostomy training service where further support would be beneficial. A carer-centred rather than health professional focus on training needs will allow future attention to be directed to areas of need identified by carers themselves as important to improve the tracheostomy training programme.



DOI: 10.1016/j.ijporl.2022.111058 PMID: 35139446

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**Acute Crit Care. 2022 Feb 17. doi: 10.4266/acc.2021.00906. Online ahead of print.**

**The feasibility and safety of percutaneous dilatational tracheostomy without endotracheal guidance in the intensive care unit.**

Kim JE(1), Lee DH(2).

Author information: (1)Department of Emergency Medicine, Dong-A University Hospital, Dong-A University College of Medicine, Busan, Korea. (2)Department of Intensive Care Medicine, Dong-A University Hospital, Dong-A University College of Medicine, Busan, Korea.

BACKGROUND: Percutaneous dilatational tracheostomy (PDT) is a common procedure in intensive care units (ICUs). Although it is thought to be safe and easily performed at the bedside, PDT usually requires endotracheal guidance, such as bronchoscopy. Here, we assessed the clinical outcomes and safety of PDT conducted without endotracheal guidance. METHODS: In the ICU and coronary ICU at a tertiary hospital, PDT was routinely performed without endotracheal guidance by a single medical intensivist using the Griggs technique PDT kit (Portex Percutaneous Tracheostomy Kit). We retrospectively reviewed the electronic medical records of patients who underwent PDT without endotracheal guidance. RESULTS: From January 1 to December 31, 2018, 78 patients underwent PDT without endotracheal guidance in the ICU and coronary ICU. The mean age of these subjects was 71.9±11.5 years, and 29 (37.2%) were female. The mean Acute Physiology and Chronic Health Evaluation (APACHE) II score was 25.9±5.8. Fifty patients (64.1%) were on mechanical ventilation during PDT. Failure of the initial PDT attempt occurred in four patients (5.1%). In two of them, PDT was aborted and converted to surgical tracheostomy; in the other two patients, PDT was reattempted after endotracheal reintubation, with success. Minor bleeding at the tracheostomy site requiring gauze changes was observed in five patients (6.4%). There were no airway problems requiring therapeutic interventions or procedure-related sequelae. CONCLUSION: PDT without endotracheal guidance can be considered safe and feasible.

DOI: 10.4266/acc.2021.00906 PMID: 35172525

**Am J Otolaryngol. 2022 Feb 17:103401. doi: 10.1016/j.amjoto.2022.103401. Online ahead of print.**

# Aerosol-generating procedure; percutaneous versus surgical tracheostomy.

Tüzemen G(1), Kaya PK(2).

Author information: (1)Department of Otorhinolaryngology, Head and Neck Surgery, Ministry of Health, Bursa City Hospital, Bursa, Turkey. Electronic address: tuzemeng@yahoo.com.tr. (2)Department of Anesthesia and Intensive Care, Ministry of Health, Bursa City Hospital, Bursa, Turkey.

PURPOSE: This study aims to compare percutaneous tracheostomy (PCT) and surgical tracheostomy's aerosol and droplet scattering by using a particle counter. MATERIALS AND METHODS: This study was carried out with 35 patients between October 2020 and June 2021. All personal protective equipment was provided to protect healthcare workers. Measurements were made in the 5 s period before the tracheal incision and the 5 s period after the tracheal incision. RESULTS: The mean age of the 15 female and 20 male patients in this study was 68.88 ± 13.48 years old (range: 33-95 years old). Patients were intubated for an average of 22 days. Particle amounts were found to be significantly higher at 5 μm ($p = 0.003$) and 10 μm ($p = 0.012$) during PCT. In surgical tracheostomy, there was no significant increase in the number of particles. When the particle measurement values of both methods were compared with each other, there was a significantly more particle scattering in PCT than in surgical tracheotomy at 0.3 μm ($p = 0.034$), 5 μm ($p = 0.001$), and 10 μm ($p = 0.003$). CONCLUSION: According to the data in our study, a surgical tracheotomy was not identified as an aerosol-generating procedure. Considering the risk of airborne transmission may increase due to viral mutations, we have shown that surgical tracheostomy may be more appropriate in patients who need a tracheostomy. Of course, the use of personal protective equipment during these processes is very important.



DOI: 10.1016/j.amjoto.2022.103401 PMID: 35210114

**Arch Phys Med Rehabil. 2022 Feb 21:S0003-9993(22)00229-5. doi: 10.1016/j.apmr.2022.01.158. Online ahead of print.**

# ROLE OF ULTRASONOGRAPHY IN UPPER AIRWAY ASSESSMENT FOR DECANNULATING TRACHEOSTOMY IN ACQUIRED BRAIN INJURY - A PILOT STUDY.

Sikha DSB(1), Prakash DNB(1), Thomas DNC(1), John DJA(2), Mathews DSS(3), Mannam DP(4), George DP(3).

Author information: (1)Department of Physical Medicine and Rehabilitation, Christian Medical College, Vellore, Tamil Nadu, India. (2)Department of Physical Medicine and Rehabilitation, Christian Medical College, Vellore, Tamil Nadu, India. Electronic address: judy@cmcvellore.ac.in. (3)Department of E.N.T, Christian Medical College, Vellore, Tamil Nadu, India. (4)Department of Radiology, Christian Medical College, Vellore, Tamil Nadu, India.

OBJECTIVE: To compare the findings of ultrasonography of the upper airway with flexible fiberoptic laryngoscopy and determine the efficacy of transcutaneous laryngeal ultrasonography for decannulation. DESIGN: Prospective cross sectional study SETTING: Tertiary care referral centre in South India PARTICIPANTS: Twenty- four patients with acquired brain injury MAIN OUTCOME MEASURES: Participants underwent an airway assessment by ultrasonography followed by assessment of airway by flexible laryngoscopy done within the next 72 hours. RESULTS: Vocal cord assessment by ultrasonography revealed a sensitivity of 81.2% and specificity of 87.5%. A statistically significant association between vocal cord mobility as assessed by ultrasonography and decannulation was observed (sensitivity of 81.25%, specificity of 87.5%, p= 0.002). Although aspiration was not assessed by ultrasonography, a statistically significant association was observed between vocal cord mobility on ultrasonography and aspiration as assessed by laryngoscopy (sensitivity of 81.25%, specificity of 87.5%, p= 0.011). CONCLUSION: Laryngeal ultrasonography is an emerging diagnostic modality with a potential role for assessing vocal cord mobility and airway prior to decannulation in centres which lack the expertise and the infrastructure to perform a flexible laryngoscopy.



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