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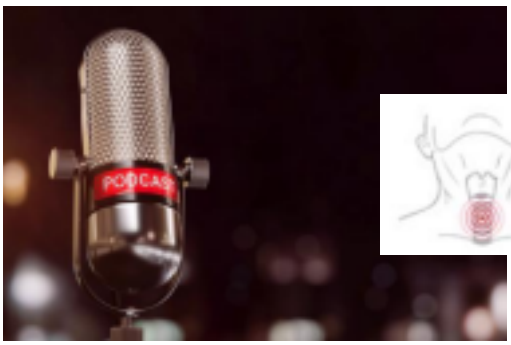

National Tracheostomy Safety Project

This month's top papers: July 2024

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

- The NICU tracheostomy team: multidisciplinary collaboration for improvement in survival of complex patients.
- Ventilator-tube holder for mobilising patients with a tracheostomy: A pilot usability study (TrachVest).
- Utility of chest x-ray for tracheostomy tube placement in pediatric patients
- Tracheostomy Decision Making and Counseling: Comparing Providers' and Caregivers' Perspectives and Perceptions.

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The NICU tracheostomy team: multidisciplinary collaboration for improvement in survival of complex patients.

Lay Summary:

This study reports on a highly successful project at a major neonatal intensive care unit (NICU) aimed at improving the care of babies with complex, long-term breathing issues who require a tracheostomy (a breathing tube in the neck). These are some of the most fragile patients in the hospital, and their complex needs put them at high risk. The solution was to establish a dedicated NICU Tracheostomy Team, which used a standardized, systematic method of multidisciplinary collaboration, including regular bedside rounds.

The project achieved a massive improvement in patient safety: the in-hospital survival rate for the 39 babies who received a tracheostomy improved dramatically from 66.7% at baseline to a sustained 89.7% after the team's interventions (p=0.03). This finding strongly suggests that organized, team-based care can save lives. Although the length of time babies stayed in the NICU remained long (a median of over 200 days), the project did not significantly prolong the stay overall (237 days vs. 217 days, p=0.9). The authors conclude that implementing a specialized tracheostomy team is a safe and feasible strategy that is critical for maximizing the survival of these extremely vulnerable and medically complex infants.

Summary for Healthcare Professionals:

This quality improvement (QI) initiative evaluated the feasibility and clinical impact of a dedicated NICU Tracheostomy Team on patient outcomes at a Level IV neonatal intensive care unit. The methodology involved implementing and evaluating three cycles of Plan-Do-Study-Act (PDSA), guided by five key drivers from the Global Tracheostomy Collaborative, which included multidisciplinary, bimonthly bedside rounds from January 2017 to December 2022. The study analyzed a total of 39 patients who received a tracheostomy during the QI period.

The primary outcome demonstrated a significant effect on survival: in-hospital survival improved and was sustained from a baseline of 66.7% to 89.7% (35/39 patients) post-QI intervention (p=0.03). This finding confirms the potent impact of a standardized, multidisciplinary approach on mortality in this highly complex patient cohort. Secondary outcomes related to resource utilization showed that the overall median length of stay (LOS) did not significantly differ between the baseline and QI periods (237 days vs. 217 days, p=0.9). However, the median LOS for the subgroup of patients with Bronchopulmonary Dysplasia (BPD) was higher post-QI, a nuance critical for resource planning. The authors conclude that implementing the NICU Tracheostomy Team is a feasible and highly effective patient safety initiative that significantly sustains improved survival outcomes.

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Ventilator-tube holder for mobilising patients with a tracheostomy: A pilot usability study (TrachVest).

Lay Summary:

This pilot study looked at a new, simple invention called the TrachVest, a technical garment designed to make it safer and easier for critically ill patients to get out of bed and walk while still connected to a tracheostomy and a mechanical ventilator. Early mobilization is known to be a crucial step in recovery, but managing the ventilator tubing is a major challenge for therapy staff. The TrachVest works by securely holding the heavy ventilator tubes and other lines, transferring the weight to the patient's torso so that physiotherapists can focus entirely on helping the patient move.

Researchers tested the vest on 10 conscious, tracheostomy-dependent patients in the Intensive Care Unit (ICU). The results were overwhelmingly positive. The staff who used the device gave it an "excellent usability" score, and patients reported high satisfaction and comfort. Crucially, during all 17 sessions where the device was used, there were no adverse events or accidental disconnections of the life-support tubing. The majority of patients were successfully mobilized to a standing position. The study concludes that the TrachVest is a safe, simple, and effective tool that successfully removes a major logistical barrier to early rehabilitation. This invention should help hospitals prioritize moving patients earlier and safer, which is essential for speeding up recovery.

Summary for Healthcare Professionals:

This pilot usability study evaluated the efficacy and safety of the TrachVest, a novel technical garment designed to manage ventilator circuit tubing for conscious, tracheostomized, mechanically ventilated patients during early mobilization in the Intensive Care Unit (ICU). Early rehabilitation is a critical determinant of functional outcome, yet the logistical burden of managing the ventilator circuit presents a significant barrier.

The cohort comprised 10 critically ill patients who participated in 17 mobilization sessions. Usability was assessed using the System Usability Scale (SUS). The results demonstrated exceptionally high usability, with therapy staff scoring the device at a mean SUS score of 87.2, categorized as excellent usability. Patient feedback also indicated high comfort and satisfaction. Crucially, the safety profile was flawless: there were no device-related adverse events, accidental ventilatory circuit disconnections, or patient injuries recorded. The device successfully mitigated the logistical burden on staff and enabled the majority of patients to achieve standing positions.

The authors conclude that the TrachVest is a simple, effective, and safe intervention that successfully addresses a major technical barrier to early rehabilitation. This evidence strongly advocates for its integration into ICU mobilization protocols to improve functional recovery, enhance patient safety, and streamline the care pathway for this complex patient population.

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Utility of chest x-ray for tracheostomy tube placement in pediatric patients

Lay Summary:

This study investigated whether the standard practice of taking a chest X-ray immediately after placing a tracheostomy tube in a child is actually helpful and necessary. A tracheostomy is a critical procedure, and an X-ray is often ordered to check for acute problems like a collapsed lung or a misplaced tube.

Researchers looked back at the records of 139 children who received a tracheostomy over a five-year period. The main finding was that routine post-procedure chest X-rays are not very useful. The majority of the X-rays looked the same before and after the surgery. Only a very small number of patients (5.8%) had any change on their X-ray.

Even when complications did occur (14.4% of patients had a complication that needed intervention), the X-ray was only able to detect a small fraction of them (25% of cases). The vast majority of problems were already found by simply monitoring the patient's clinical signs or through imaging taken before the procedure. Due to the low utility of the X-ray, the authors conclude that it may not be necessary to routinely order it for every patient. Instead, it should be saved for cases where the medical team is already concerned about a potential complication. This practice change could reduce unnecessary radiation exposure and healthcare costs.

Summary for Healthcare Professionals:

This retrospective cohort study evaluated the utility of routine post-tracheostomy tube placement chest X-rays (CXR) in identifying acute complications and guiding clinical decision-making in a cohort of 139 pediatric patients. The study aimed to assess the diagnostic yield of CXR given the associated costs and potential for radiation exposure.

The analysis determined that the majority of post-procedure CXRs were unchanged from the pre-procedure baseline. Only 5.8% (8/139) of patients had a change in the post-procedure CXR, and critically, none of these changes represented a serious acute complication such as pneumothorax, tracheoesophageal fistula, or tube displacement.

Overall, 14.4% (20/139) of the cohort experienced an acute, post-operative complication requiring intervention, with local bleeding being the most common. The CXR only contributed to the identification of 25% (5/20) of these complications. Furthermore, the findings of the post-procedure CXR prompted a change in clinical management in only 1.4% (2/139) of patients. The authors conclude that routine post-tracheostomy tube placement CXRs are a low-yield diagnostic tool with minimal impact on clinical decision-making. They recommend reserving the procedure for instances where there is a high index of clinical suspicion for an acute complication.

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Tracheostomy Decision Making and Counseling: Comparing Providers' and Caregivers' Perspectives and Perceptions.

Lay Summary:

This study investigated the crucial, high-stakes decision of placing a tracheostomy (a breathing tube in the neck) in children with complex medical needs, specifically comparing the viewpoints of the parents (caregivers) and the doctors (providers). Because this decision involves much more than just a medical procedure, the researchers conducted in-depth interviews with both groups. The core finding revealed a noticeable disconnect in perspective between the two parties. Caregivers overwhelmingly focused on the child as a person, offering personal descriptions of their children in 81% of cases, and prioritizing their growth, development (69%), and getting them discharged home (38%). They also spoke frequently about their personal hopes and dreams for their child. In stark contrast, providers offered personal descriptions in only 35% of interviews and spoke far less about the child's hopes and dreams (29%). While both groups shared concerns about the child's well-being (69% of caregivers vs. 59% of providers), the overall difference in focus highlighted that providers often remain focused on clinical factors, while families concentrate on the long-term quality of life. The study concludes that since no established guidelines for this emotional counseling exist, providers must recognize these different priorities to better tailor their communication. By acknowledging the family's values—especially their desire for home discharge and developmental growth—providers can improve trust and guide families more effectively through this difficult decision.

Summary for Healthcare Professionals:

This exploratory study investigated the differences in perception and priorities between caregivers and healthcare providers (HCPs) during tracheostomy counseling and decision-making (TDM) for children being evaluated for the procedure. The study utilized semi-structured interviews with 16 caregivers and 17 providers, applying subsequent qualitative and comparative analysis. The rationale was to address the lack of established counseling guidelines and the potential for misaligned communication during this complex, value-laden decision process.

The key finding was a significant disconnect in the thematic content discussed during TDM. Caregivers prioritized personal and functional outcomes: 81% provided personal descriptions of their children, 69% emphasized growth and development, and 38% mentioned discharge home. In sharp contrast, only 35% of providers offered personal descriptions, and a minority (29%) discussed hopes and dreams. While most caregivers (69%) and providers (59%) expressed concerns and fears, the difference in positive framing and long-term goals was notable. The study concludes that this disconnect between the family's focus on lived experience, growth, and development and the provider's more narrow focus on clinical aspects necessitates an adjustment in the counseling approach. Recognizing these differing perspectives is essential to tailor communication, align with family values, and effectively facilitate a model of collaborative decision-making. The findings underscore the need for improved communication training for HCPs to foster better understanding and support for families facing decisions about tracheostomy.

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Scientific abstracts and references

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J Perinatol. 2024 Jun 24. doi: 10.1038/s41372-024-02034-x. Online ahead of print.

The NICU tracheostomy team: multidisciplinary collaboration for improvement in survival of complex patients.

Machry JS(1), Krzyzewski J(2), Ward C(2), Thompson G(3), Green D(3), Germain A(2), Smith C(2), Teppa B(3), Ashburn A(4), Fernandez A(3), Morrison J(3), Jabre N(3), Renn K(3), Shakeel F(2), Escoto D(2), Ashour D(3), Fierstein JL(3), Moore M(3), Freire G(3), Green A(5).

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OBJECTIVE: Evaluate feasibility and impact of "Tracheostomy Team" on survival and length of stay (LOS) at a level IV NICU. METHODS: Plan-do-study-act cycles targeted five Global Tracheostomy Collaborative "key drivers". From January 2017 to December 2022 multidisciplinary, bimonthly bedside rounds were conducted. RESULTS: After 3 cycles, in-hospital survival among 39 patients with tracheostomy improved and sustained from 67% to 100% (baseline 18/27; 66.7%; QI 35/39, 89.7%; p = 0.03). Median LOS (days [IQR]) did not significantly differ between baseline and QI (237 [57-308] vs. 217 [130-311]; p = 0.9). Among patients with BPD, median LOS was higher after QI interventions (baseline 248 [222-308] vs. QI 332.5 [283.5-392]; p = .02). Special cause variation resulted from peak increase in LOS during the COVID19 pandemic (2021). Tracheitis/pneumonia was treated significantly more frequently in QI BPD patients. CONCLUSION: Multidisciplinary approach is feasible, resulting in improved survival without a sustained increase in LOS. Future QI efforts should address post-operative infectious complications.

DOI: 10.1038/s41372-024-02034-x PMID: 38914748

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Aust Crit Care. 2024 Jul 3:S1036-7314(24)00113-9. doi: 10.1016/j.aucc.2024.05.014. Online ahead of print.

Ventilator-tube holder for mobilising patients with a tracheostomy: A pilot usability study (TrachVest).

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INTRODUCTION: Patients in intensive care may have a tracheostomy and be dependent on a respiratory ventilator while yet conscious and able to mobilise. Early rehabilitation is known to be key to patient recovery. However, for these patients, therapy staff members are required to manage the ventilator tubing in addition to other patient-connected equipment whilst focussing on patient mobility and progress. A technical garment (TrachVest) was designed to hold the ventilator tubing securely during these therapeutic mobilisations. METHODS: We conducted a mixed-methods study to evaluate the use of this garment in an intensive care unit setting. The aim was to determine potential effects on patient safety, its potential benefits, and usability. Research methods included direct observations, user questionnaires (quantitative and qualitative), and staff focus groups. RESULTS: A total of 14 therapy sessions with the garment were observed, involving nine patients and 10 staff. Eleven staff members participated in two focus groups, including two previously involved in the therapy sessions. Therapy sessions consisted of a range of activities including sitting on the edge of the bed, transferring from bed to chair (including use of hoists), and mobilising with walking aids. Overall, staff members felt that the garment was easy to use and would likely improve patient safety during mobilisations. The main benefits were staff reassurance, allowing them to focus on therapy, and in potentially reducing the number of staff members needed for particular activities. Patient characteristics were found to be influential on the perceived utility, and TrachVest may have greater benefit for patients who have greater physical function (e.g., able to actively participate in rehabilitation) and can mobilise at least from bed to chair. Experience of using the TrachVest and of patient capabilities was thought to be key to knowing when it would be most useful. CONCLUSION: Within this pilot usability study, participants, both staff and patients, reported that the TrachVest garment designed to support ventilator tubing during rehabilitation to be highly useable and beneficial to supporting rehabilitation in this patient group.

DOI: 10.1016/j.aucc.2024.05.014 PMID: 38960743

Laryngoscope Investig Otolaryngol. 2024 Jul 9;9(4):e1302. doi: 10.1002/lio2.1302. eCollection 2024 Aug.

Utility of chest x-ray for tracheostomy tube placement in pediatric patients.

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OBJECTIVE: To evaluate the utility of ordering chest x-rays after pediatric tracheostomy tube placement in identifying acute, post-operative complications and how it impacts clinical decision-making. METHODS: In this retrospective cohort study, we identified tracheostomies performed in 139 pediatric patients through CPT codes over a 5-year period from 2013 to 2018. Manual chart review was performed for demographic and clinical characteristics, pre-procedure and post-procedure chest x-ray interpretations, and the presence of complications. Each complication was reviewed to see if action was taken due to post-procedure chest x-ray findings. Multivariable logistic regression was performed to determine associations with changes in pre-procedure versus post-procedure chest x-rays. RESULTS: In a cohort of 139 pediatric patients with pre-procedure and post-procedure chest x-rays, 40 (28.8%) of patients had new significant post-procedure chest x-ray findings compared to pre-procedure chest x-ray findings. Of these 40 instances of changes in pre-procedure versus post-procedure chest x-ray findings, only eight resulted in action being taken due to the observed findings. Among these eight instances of action being taken, only one instance involved in invasive action being taken with a bronchoscopy. With multivariable regression analysis, patient age, race, gender, and the presences of genetic syndromes, were not found to be significant risk factors in predicting changes in pre-procedure versus post-procedure chest x-ray. CONCLUSION: In our study, post-procedure chest x-ray after tracheostomy tube placement did not significantly impact clinical decision making. It may be worth reconsidering the value in routine chest x-rays after tracheostomy tube placement in pediatric patients.

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Conflict of interest statement: The authors declare no conflicts of interest.

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Tracheostomy Decision Making and Counseling: Comparing Providers' and Caregivers' Perspectives and Perceptions.

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Background: The decision to place a tracheostomy in children is complex and involves factors beyond the medical procedure, including quality of life, values, and goals. Providers play an important role in counseling caregivers and guiding them through the decision-making process. There are no established guidelines for tracheostomy counseling, leading to variations in practice. Additionally, how caregivers receive information differs from how providers believe they deliver it. Although studies have explored caregivers' and providers' viewpoints, none have examined them concurrently. Background: The primary aim of this exploratory study is to investigate differences between providers' and caregivers' perceptions of tracheostomy counseling and their perspectives regarding the decision-making process. Design: Semi-structured interviews were conducted with both caregivers and providers for children being evaluated for a tracheostomy. Qualitative analysis was applied to the interview transcripts to identify emergent themes. Subsequently, a comparative analysis was performed to compare these themes between caregivers and healthcare providers. Results: A total of 33 interviews were conducted, involving 16 caregivers and 17 providers. Notably, caregivers provided personal descriptions of their children in 81% of cases, whereas only 35% of providers did so. Concerns and fears for the children were expressed by 69% of caregivers and 59% of providers. In contrast, 75% of caregivers discussed their hopes and dreams for their children, compared with only 29% of providers. When it came to priorities, 69% of caregivers emphasized growth and development, and 38% mentioned discharge home, as opposed to 29% and 47% among providers, respectively. Conclusion: In conclusion, our study highlights a disconnect between caregivers and healthcare providers regarding tracheostomy counseling. These differing perspectives underscore the need for improved communication and understanding between the two groups. Recognizing these differences can help providers tailor their counseling approaches to better align with the values and priorities of families when making decisions about tracheostomy.
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