NTSP Podcast series

National Tracheostomy Safety Project

This month's top papers: March 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://twitter.com/NTSP_UK

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This month's top papers

- It's all about the timing!
- Resources for trach Moms
- Trachy-ing a Kaiser

Clin Neurol Neurosurg. 2021 Feb 10;203:106554. doi: 10.1016/j.clineuro.2021.106554. Online ahead of print.

Early tracheostomy in stroke patients: A meta-analysis and comparison with late tracheostomy.

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Tracheostomy (TQT) timing and its benefits is a current discussion in medical society. We aimed to compare the outcomes of early (ET) versus late tracheostomy (LT) in stroke patients with systematic review and meta-analysis, according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline. Five hundred and nineteen studies were retrieved, whereas three were selected for the systematic review and meta-analysis. There were 5636 patients in the ET group (3151 male, 2470 female, 15 not reported - NR) and 7637 patients in the LT group (4098 male, 3542 female, and 33 NR). ET was significantly associated with fewer days in the hospital (weighted mean difference: -7.73 [95 % CI -8.59-6.86], $p < 0.001$) and reduced cases of ventilator-associated pneumonia (VAP) (risk difference: 0.71 [95 % CI 0.62-0.81], $p < 0.001$). There were no between-group statistical differences in intensive care unit stay duration, mechanical ventilation duration, or mortality. The findings from this meta-analysis cannot state that ET in severe stroke patients contributes to better outcomes when compared with LT. Scandalized assessments and randomized trials are encourage for better assessment.

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Early Percutaneous Tracheostomy in Coronavirus Disease 2019: Association With Hospital Mortality and Factors Associated With Removal of Tracheostomy Tube at ICU Discharge. A Cohort Study on 121 Patients

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Objectives: Early tracheotomy, defined as a procedure performed within 10 days from intubation, is associated with more ventilator free days, shorter ICU stay, and lower mortality than late tracheotomy. During the coronavirus disease 2019 pandemic, it was especially important to save operating room resources and to have a shorter ICU stay for patients, when ICUs had insufficient beds. In this context of limited resources, early percutaneous tracheostomy could be an effective way to manage mechanically ventilated patients. Nevertheless, current recommendations suggest delaying or avoiding the tracheotomy in coronavirus disease 2019 patients. Aim of the study was to analyze the hospital mortality of coronavirus disease 2019 patients who had received early percutaneous tracheostomy and factors associated with removal of tracheostomy cannula at ICU discharge.

Design: Cohort study.

Setting: Coronavirus disease 2019 ICU.

Patients: Adult patients with coronavirus disease 2019 3 days after ICU admission.

Interventions: None.

Measurements and main results: Three days after ICU admission, 164 patients were present in ICU and included in the analysis. One-hundred and twenty-one patients (74%) were tracheostomized, whereas the other 43 (26%) were managed with translaryngeal intubation only. In multivariable analysis, early percutaneous tracheostomy was associated with lower hospital mortality. Sixty-six of tracheostomized patients (55%) were discharged alive from the hospital. Age and male sex were the only characteristics that were independently associated with mortality in the tracheostomized patients (45.5% and 62.8% in tracheostomized and nontracheostomized patients, respectively; p = 0.009). Tracheostomy tube was removed in 47 of the tracheostomized patients (71%). The only variable independently associated with weaning from tracheostomy at ICU discharge was a faster start of spontaneous breathing after tracheotomy was performed.

Conclusions: Early percutaneous tracheostomy was safe and effective in coronavirus disease 2019 patients, giving a good chance of survival and of weaning from tracheostomy cannula at ICU discharge.

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Association of Early vs Late Tracheostomy Placement With Pneumonia and Ventilator Days in Critically Ill Patients: A Meta-analysis.

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IMPORTANCE: The timing of tracheostomy placement in adult patients undergoing critical care remains unestablished. Previous meta-analyses have reported mixed findings regarding early vs late tracheostomy placement for ventilator-associated pneumonia (VAP), ventilator days, mortality, and length of intensive care unit (ICU) hospitalization. OBJECTIVE: To compare the association of early (≤7 days) vs late tracheotomy with VAP and ventilator days in critically ill adults. DATA SOURCES: A search of MEDLINE, CINAHL, Cochrane Central Register of Controlled Trials, references of relevant articles, previous meta-analyses, and gray literature from inception to March 31, 2020, was performed. STUDY SELECTION: Randomized clinical trials comparing early and late tracheotomy with any of our primary outcomes, VAP or ventilator days, were included. DATA EXTRACTION AND SYNTHESIS: Two independent reviewers conducted all stages of the review. The Preferred Reporting Items for Systematic Reviews and Meta-analyses guideline was followed. Pooled odds ratios (ORs) or the mean difference (MD) with 95% CIs were calculated using a random-effects model. MAIN OUTCOMES AND MEASURES: Primary outcomes included VAP and duration of mechanical ventilation. Intensive care unit days and mortality (within the first 30 days of hospitalization) constituted secondary outcomes. RESULTS: Seventeen unique trials with a cumulative 3145 patients (mean [SD] age range, 32.9 [12.7] to 67.9 [17.6] years) were included in this review. Individuals undergoing early tracheotomy had a decrease in the occurrence of VAP (OR, 0.59 [95% CI, 0.35-0.99]; 1894 patients) and experienced more ventilator-free days (MD, 1.74 [95% CI, 0.48-3.00] days; 1243 patients). Early tracheotomy also resulted in fewer ICU days (MD, -6.25 [95% CI, -11.22 to -1.28] days; 2042 patients). Mortality was reported for 2445 patients and was comparable between groups (OR, 0.66 [95% CI, 0.38-1.15]). CONCLUSIONS AND RELEVANCE: Compared with late tracheotomy, early intervention was associated with lower VAP rates and shorter durations of mechanical ventilation and ICU stay, but not with reduced short-term, all-cause mortality. These findings have substantial clinical implications and may result in practice changes regarding the timing of tracheotomy in severely ill adults requiring mechanical ventilation.

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Chest. 2021 Feb 3:S0012-3692(21)00246-4. doi: 10.1016/j.chest.2020.12.064. Online ahead of print.

Counterpoint: "Tracheostomy in patients with COVID-19, Should we do it before 14 days ? NO".

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Comment on doi: 10.1016/j.chest.2021.01.074.

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Chest. 2021 Feb 3:S0012-3692(21)00247-6. doi: 10.1016/j.chest.2021.01.074. Online ahead of print.

POINT: Tracheostomy in patients with COVID-19. Should we do it before 14 days? Yes.

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Crit Care Med. 2021 Mar 3. doi: 10.1097/CCM.0000000000004884. Online ahead of print.
Early Percutaneous Tracheostomy in the Coronavirus Disease 2019 Era: Shining New Light on Old Questions.
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Rosani and colleagues provide much-needed data on outcomes of early percutaneous tracheostomy in critically ill patients with respiratory failure from COVID-19.(1) By demonstrating that early tracheostomy can be performed with an acceptable safety profile in the midst of a pandemic, it is difficult to argue against these data being, “As good as it gets”.(2) The study does, however, raise a few important questions, considered below.

For example, what are the negatives of routinely performing early tracheostomy? How can the approach be customized? Last, can the findings be generalized? We consider each question in turn.

1. Routine early tracheostomy can help protect resources and therapies for patients during pandemic surges, but in the absence of a surge, timing must be more carefully weighed. Routinely performing tracheostomy before one week requires acceptance that tracheostomy will be performed in some patients who would have recovered swiftly or succumbed to their disease early. Whilst the pandemic has added a major wrinkle, the debate of optimal timing will remain after we have cleared away the rubble of COVID-19. Unless we have got it all wrong prior to the pandemic, the timing of tracheostomy for patients with COVID-19 should be similar to that for other causes of respiratory failure requiring prolonged mechanical ventilation.(3)

2. Progressive multi-organ failure is a contraindication to tracheostomy and we suggest that there should be some evidence of improvement prior to performing the procedure, with demonstration of adequate physiological reserve to tolerate tracheostomy. Although not utilized by Rosani and colleagues, apneic tracheostomy suspends ventilation at key steps during percutaneous or surgical procedures and almost certainly mitigates aerosolisation of potentially infectious material. We recommend a pre-procedural apnea test which positions the patient supine and evaluates respiratory physiological reserve, predicting the response to and tolerance of the apnea required to conduct the procedure safely.(4)

3. Perhaps the most interesting question relates to how generalizable the findings are. The findings may generalize to other developed countries, but in low and middle income countries, resource constraints are far more severe, often with little or no PPE available for staff and lack of necessary materials and supplies, such as suction or inner cannulas. Even within developed countries, different approaches are employed by multidisciplinary tracheostomy teams who guide management of patients before, during and after tracheostomy. We commend the authors for their proactive approach in tracheostomy decannulation but would caution against the universal use of methylene blue to colour oral

secretions and look for evidence of aspiration from tracheostomal secretions. The authors note the increased incidence of upper airway problems with SARS-CoV-2, and when combined with the known complexities of laryngeal recovery after critical illness, a more dynamic evaluation such as expert Fibre-optic Endoscopic Evaluation of Swallow (FEES) is recommended, recognizing that this may not be universally available.(5)

We commend the authors on shedding light on the current pandemic and illuminating potential considerations for the next one. Perhaps through comprehensive data collection, such as via the Global Tracheostomy Collaborative (www.globaltrach.org) together we will shine further light on these old questions.

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DOI: 10.1097/CCM.0000000000004884 PMID: 33653975

Pediatr Pulmonol. 2021 Mar 5. doi: 10.1002/ppul.25355. Online ahead of print.

"New Trach Mom Here…": A Qualitative study of Internet Based Resources by Caregivers of Children with Tracheostomy.

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OBJECTIVE: Decision-making around tracheostomy placement and chronic respiratory support in children is complicated. Families often seek support and advice from outside the medical care team, including from social media. We undertook this study to characterize the content and nature of online resources created and managed primarily by caregivers of children living with tracheostomy and chronic mechanical ventilation. DESIGN/SETTING: We used a 'grey literature' search methodology to identify internet resources created by caregivers of children with tracheostomy. We included only publicly available, non-industry associated, English language, North American websites updated at least once in 2019. We then applied inductive content analysis to establish central themes, patterns and associations. MEASUREMENTS/MAIN RESULTS: We identified 6 blogs/forums that met our search criteria. We identified four main themes: 1. Uncertainty, 2. Lived experience - wants, needs, and emotions, 3. Seeking context and meaning, and 4. Advice/information sharing/support. Two patterns of coping were identified on the basis of the relationships between codes. The 'Acceptance pathway' is associated with a sense of self-actualization, mastery, satisfaction, return to normalcy, and ultimately acceptance. The 'Resignation pathway' is associated with a sense of lack of control, frustration, burnout and stress, persistent lack of normalcy, and resignation to the tracheostomy as a negative but necessary outcome. CONCLUSION: Caregivers often come to see themselves as experts in the care of children with tracheostomy, though many still express ambivalence about their knowledge and skills. Those early in the experience express a desire for community and can potentially benefit from online resources. This article is protected by copyright. All rights reserved.

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Handgrip Force and Maximum Inspiratory and Expiratory Pressures in Critically Ill Patients With a Tracheostomy.

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BACKGROUND: The association between peripheral striated muscle strength and respiratory muscle strength has been confirmed in a number of disorders. However, this association is unknown in intensive care unit patients with tracheostomies. OBJECTIVE: To examine correlations between handgrip force, maximum inspiratory pressure (MIP), and maximum expiratory pressure (MEP) in intensive care unit patients with tracheostomies. METHODS: Twenty patients (7 women, 13 men) with tracheostomies, in the intensive care unit longer than 11 days, in stable condition, with functional limbs, and with Glasgow Coma Scale scores of 15 were recruited. Both MIP and MEP were measured with a membrane manometer; handgrip force was measured with a hydraulic hand dynamometer. RESULTS: Handgrip force was significantly correlated with MIP ($r = 0.45$, $P = .04$) and MEP ($r = 0.78$, $P = .001$). Handgrip force was significantly predicted by MIP and MEP when the effect of sex was controlled for ($P < .05$). However, when MIP and MEP were included as predictors in a regression model, MEP was the only significant predictor ($R = 0.80$, $R2 = 0.63$, adjusted $R2 = 0.57$). CONCLUSIONS: Strength of the hand flexors and strength of the expiratory muscles (abdominal) were significantly correlated in intensive care unit patients. Handgrip strength appears to be an easy, fast way to evaluate expiratory muscle strength by using a simple handhold command without special equipment. A strong handhold may also correspond to strong expiratory muscles. ClinicalTrials.gov: NCT03457376.

DOI: 10.4037/ajcc2021248 PMID: 33644812

HNO. 2021 Mar 22. doi: 10.1007/s00106-021-01026-z. Online ahead of print.

[The tracheotomy of Kaiser Friedrich III in the Year of the Three Kaisers, 1888 : Presentation of the original historical image to the DGHNO-KHC]. [Article in German; Abstract available in German from the publisher]

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The current article describes an image depicting an otorhinolaryngologic surgical intervention being performed on Kaiser Friedrich III. The image was captured by the lithography of an unknown artist and originates from a Cologne printing press. Kaiser Friedrich III was the penultimate German Kaiser and died June 15, 1888, in Potsdam, after ruling for only 99 days (the Year of the Three Kaisers). Toward the end of his period as Prince Regent and during his time on the throne, Kaiser Friedrich III was tracheostomized and wore a silver cannula. This publication on the Kaiser's disease and the background of the lithography marks the occasion of presentation of this historic image to the German Society of Otorhinolaryngology, Head and Neck Surgery by the author.

Publisher: In dem vorliegenden Beitrag wird eine Abbildung beschrieben, die einen HNO-chirurgischen Eingriff bei Kaiser Friedrich III. zeigt. Dabei handelt es sich um die Lithographie eines unbekannten Künstlers, sie stammt aus einer Kölner Druckerei. Kaiser Friedrich III. war der vorletzte deutsche Kaiser und starb nach nur 99 Tagen Regierungszeit am 15. Juni 1888 („3-Kaiser-Jahr“) in Potsdam. Bereits zum Ende seiner Prinzregentenzeit und während seiner Regierungszeit war er tracheotomiert und trug eine Silberkanüle. Die Überreichung der historischen Abbildung durch den Autor an die Deutsche Gesellschaft für Hals-Nasen-Ohren-Heilkunde, Kopf- und Hals-Chirurgie (DGHNO-KHC) ist Anlass für diese Publikation zur Erkrankung des Kaisers und zum Hintergrund der Lithographie.

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