National Tracheostomy Safety Project

This month's top papers: January 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, sometimes alongside an automated transcript of the podcast. We also provide a lay and professional summary of the papers. Please note that the transcript and summaries are generated by AI and so may not be totally accurate.

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This month's top papers

- **Early trachy in COVID**
- **Capping before decannulation?**
- **Timing of trachy and delirium**

Early Outcomes From Early Tracheostomy for Patients With COVID-19.

In a nutshell (healthcare professional summary)

In New York City during the early days of the COVID-19 pandemic, doctors faced tough choices about when to perform tracheostomies for patients with severe COVID-19. A tracheostomy is a procedure where a tube is placed into the windpipe through a cut in the neck to help with breathing. There was a debate about whether doing this surgery early or later was best, especially considering the risks to the surgeons from the virus.

A study looked back at the medical records of 148 patients with COVID-19 who needed such tubes. They were interested in how long these patients took to reach different stages: from first feeling sick to needing a breathing tube, getting a tracheostomy, having the tracheostomy size reduced, having it removed, and how long they stayed on a ventilator and in the hospital.

The study found that patients who had an early tracheostomy, within 10 days of needing a breathing tube, left the hospital sooner than those who had it later. Also, those who had the surgery later were slightly less likely to come off the ventilator.

These findings suggest that early tracheostomy could be as safe and effective as later ones. This challenges the advice to delay tracheostomies and suggests that with proper safety measures, early tracheostomies might be better for patients and not increase risks to healthcare workers.

In a nutshell (layperson summary)

During the initial surge of the COVID-19 pandemic, a retrospective cohort study at a tertiary-care center in New York City investigated the timing of tracheostomy and associated outcomes in mechanically ventilated COVID-19 patients. Amidst prevailing recommendations to delay tracheostomy to minimize healthcare worker exposure to SARS-CoV-2, this study aimed to provide evidence on the impact of tracheostomy timing on patient outcomes.

The study encompassed 148 patients requiring mechanical ventilation with a mean age of 58.1 years, predominantly male (81%). It assessed intervals from symptom onset to intubation, tracheostomy, and subsequent milestones such as tube downsizing and decannulation, as well as overall ventilation duration and hospital length of stay.

Findings indicated a median time from intubation to tracheostomy of 12 days. Early tracheostomy (within 10 days of intubation) was associated with a reduced hospital stay (median difference of 8 days) compared to later procedures. Additionally, late tracheostomy patients were 16% less likely to be weaned off mechanical ventilation.

This study challenges current guidelines advocating delayed tracheostomy, suggesting that early intervention may be noninferior regarding patient outcomes and may not compromise clinician safety when proper precautions are taken. These results underscore the potential benefits of re-evaluating tracheostomy timing protocols for COVID-19 patients in the context of evolving evidence on viral infectivity and transmission.

Early Outcomes From Early Tracheostomy for Patients With COVID-19.
JAMA Otolaryngol Head Neck Surg. 2020 Dec 17. doi: 10.1001/jamaoto.2020.4837.

Kwak PE(1), Connors JR(2), Benedict PA(1), Timen MR(1), Wang B(3), Zhang Y(3), Youlios S(1), Sureau K(3), Persky MJ(1), Rafeq S(4), Angel L(4), Amin MR(1).

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IMPORTANCE: Decision-making in the timing of tracheostomy in patients with coronavirus disease 2019 (COVID-19) has centered on the intersection of long-standing debates on the benefits of early vs late tracheostomy, assumptions about timelines of infectivity of the novel coronavirus, and concern over risk to surgeons performing tracheostomy. Multiple consensus guidelines recommend avoiding or delaying tracheostomy, without evidence to indicate anticipated improvement in outcomes as a result.

OBJECTIVE: To assess outcomes from early tracheostomy in the airway management of patients with COVID-19 requiring mechanical ventilation.

DESIGN, SETTING, AND PARTICIPANTS: A retrospective medical record review was completed of 148 patients with reverse transcriptase-polymerase chain reaction-confirmed COVID-19 requiring mechanical ventilation at a single tertiary-care medical center in New York City from March 1 to May 7, 2020.

INTERVENTIONS: Open or percutaneous tracheostomy.

MAIN OUTCOMES AND MEASURES: The primary outcomes were time from symptom onset to (1) endotracheal intubation, (2) tracheostomy; time from endotracheal intubation to tracheostomy; time from tracheostomy to (1) tracheostomy tube downsizing, (2) decannulation; total time on mechanical ventilation; and total length of stay. RESULTS: Participants included 148 patients, 120 men and 28 women, with an overall mean (SD) age of 58.1 (15.8) years. Mean (SD; median) time from symptom onset to intubation was 10.57 (6.58; 9) days; from symptom onset to tracheostomy, 22.76 (8.84; 21) days; and from endotracheal intubation to tracheostomy, 12.23 (6.82; 12) days. The mean (SD; median) time to discontinuation of mechanical ventilation was 33.49 (18.82; 27) days; from tracheostomy to first downsize, 23.02 (13.76; 19) days; and from tracheostomy to decannulation, 30.16 (16.00; 26) days. The mean (SD; median) length of stay for all patients was 51.29 (23.66; 45) days. Timing of tracheostomy was significantly associated with length of stay: median length of stay was 40 days in those who underwent early tracheostomy (within 10 days of endotracheal intubation) and 49 days in those who underwent late tracheostomy (median difference, -8; 95% CI, -15 to -1). In a competing risks model with death as the competing risk, the late tracheostomy group was 16% less likely to discontinue mechanical ventilation (hazard ratio, 0.84; 95% CI, 0.55 to 1.28).

CONCLUSIONS AND RELEVANCE: This cohort study from the first 2 months of the pandemic in New York City provides an opportunity to reconsider guidelines for tracheostomy for patients with COVID-19. Findings demonstrated noninferiority of early tracheostomy and challenges recommendations to categorically delay or avoid tracheostomy in this patient population. When aligned with emerging evidence about the timeline of infectivity of the novel coronavirus, this approach may optimize outcomes from tracheostomy while keeping clinicians safe.

High-Flow Oxygen with Capping or Suctioning for Tracheostomy Decannulation

In a nutshell (healthcare professional summary)

In this clinical trial, the efficacy of two decannulation strategies for tracheostomized patients in the ICU was compared. Traditionally, readiness for decannulation is assessed by capping the tracheostomy tube for 24 hours; however, this trial investigated whether using the frequency of airway suctioning as a readiness indicator, coupled with continuous high-flow oxygen therapy, would lead to better outcomes.

The study enrolled conscious adults post-weaning from mechanical ventilation across five ICUs. Participants were randomized into two groups: a control group, which underwent a 24-hour capping trial plus intermittent high-flow oxygen therapy, and an intervention group, which received continuous high-flow oxygen therapy with decannulation timing based on suctioning frequency.

The primary endpoint was the duration until decannulation. Secondary outcomes included rates of decannulation failure, weaning failure, respiratory infections, sepsis, multiorgan failure, lengths of ICU and hospital stays, and mortality in both settings.

Involving 330 patients, the intervention group demonstrated a significantly shorter median time to decannulation (6 days) compared to the control group (13 days), with a reduced incidence of respiratory infections and shorter hospital stays. Other secondary outcomes did not differ significantly between the groups.

The study concludes that using suctioning frequency as a decannulation readiness indicator, in conjunction with continuous high-flow oxygen therapy, can expedite the decannulation process without increasing the risk of decannulation failure or other adverse outcomes.

In a nutshell (layperson summary)

The study was about finding the best way to decide when a patient with a tracheostomy (a tube inserted in the throat to help with breathing) is ready to have the tube removed. Doctors usually cover the tube for a day to see if the patient can breathe without it. This research wanted to see if checking how often the airway needed to be cleaned (suctioning) and using a constant flow of oxygen to the patient could be a better method.

They tested their idea in five intensive care units with adults who had a tracheostomy tube but were no longer on a breathing machine. Patients were put into two groups randomly. One group had the tube capped for 24 hours plus some oxygen given in bursts (control group), while the other group had a steady flow of oxygen with the decision to remove the tube based on how often suctioning was needed (intervention group).

The findings showed that patients in the intervention group could have their tubes removed sooner, on average 7 days earlier, compared to the control group. They also had fewer lung infections and shorter hospital stays. Other problems, like failing to remove the tube, needing to go back on a breathing machine, and rates of severe infections or organ failure, were similar in both groups.

In conclusion, deciding when to remove a tracheostomy tube based on how often suctioning is needed, along with continuous oxygen, seems to be a better approach than just covering the tube for a day. This method got patients tube-free faster without increasing the risk of other complications.

High-Flow Oxygen with Capping or Suctioning for Tracheostomy Decannulation

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Background: When patients with a tracheostomy tube reach a stage in their care at which
decannulation appears to be possible, it is common practice to cap the tracheostomy tube for
24 hours to see whether they can breathe on their own. Whether this approach to establishing
patient readiness for decannulation leads to better outcomes than one based on the frequency
of airway suctioning is unclear.

Methods: In five intensive care units (ICUs), we enrolled conscious, critically ill adults who
had a tracheostomy tube; patients were eligible after weaning from mechanical ventilation. In
this unblinded trial, patients were randomly assigned either to undergo a 24-hour capping
trial plus intermittent high-flow oxygen therapy (control group) or to receive continuous
high-flow oxygen therapy with frequency of suctioning being the indicator of readiness for
decannulation (intervention group). The primary outcome was the time to decannulation,
compared by means of the log-rank test. Secondary outcomes included decannulation failure,
weaning failure, respiratory infections, sepsis, multiorgan failure, durations of stay in the ICU
and hospital, and deaths in the ICU and hospital.

Results: The trial included 330 patients; the mean (±SD) age of the patients was 58.3±15.1
years, and 68.2% of the patients were men. A total of 161 patients were assigned to the
control group and 169 to the intervention group. The time to decannulation was shorter in the
intervention group than in the control group (median, 6 days [interquartile range, 5 to 7] vs.
13 days [interquartile range, 11 to 14]; absolute difference, 7 days [95% confidence interval,
5 to 9]). The incidence of pneumonia and tracheobronchitis was lower, and the duration of
stay in the hospital shorter, in the intervention group than in the control group. Other
secondary outcomes were similar in the two groups.

Conclusions: Basing the decision to decannulate on suctioning frequency plus continuous
high-flow oxygen therapy rather than on 24-hour capping trials plus intermittent high-flow
oxygen therapy reduced the time to decannulation, with no evidence of a between-group
difference in the incidence of decannulation failure.

Association Between Early Tracheostomy and Delirium in Older Adults in the United States.

In a nutshell (healthcare professional summary)

Researchers looked into whether doing an early tracheostomy can affect the chances of patients experiencing delirium, which is a confused and disoriented state. A tracheostomy is a procedure where a tube is placed in the windpipe to help patients breathe. In this study, an early tracheostomy was defined as having the procedure within eight days of being put on a ventilator.

They used information from a large U.S. database, focusing on patients 65 years and older who had been intubated and received a tracheostomy between 2010 and 2014. Patients who had more than one tracheostomy or intubation were not included.

The study found that out of 23,310 patients, nearly a quarter had an early tracheostomy. These patients were less likely to have delirium compared to those who had the procedure later. This was true for patients regardless of their reason for admission, but especially for those who were in the hospital for medical reasons or because of non-surgical injuries.

In conclusion, doing a tracheostomy earlier rather than later might reduce the chances of older patients developing delirium during their hospital stay.

In a nutshell (layperson summary)

This retrospective cross-sectional analysis utilized the National Inpatient Sample to evaluate the relationship between early tracheostomy (within eight days post-intubation) and the incidence of delirium. The cohort comprised patients aged 65 and older, who underwent intubation and tracheostomy during hospital admission from 2010 to 2014, excluding those with multiple such procedures.

The sample included 23,310 patients, 24.8% of whom received an early tracheostomy. Multivariate logistic regression analysis demonstrated that early tracheostomy was associated with a decreased likelihood of a delirium diagnosis (OR 0.77, $p < 0.00001$). Further subgroup analysis revealed a significant reduction in delirium odds for medical admissions (OR 0.74, $p < 0.00001$) and nonsurgical injury admissions (OR 0.74, $p = 0.00116$).

The findings indicate a considerable association between early tracheostomy and lower delirium incidence, consistent across both medical and nonsurgical patient subgroups. The implications of these results suggest potential benefits of early tracheostomy in mitigating delirium, a common and impactful complication among the elderly in acute care settings.

Association Between Early Tracheostomy and Delirium in Older Adults in the United States.

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OBJECTIVES: Early tracheostomy (fewer than eight days after intubation) is associated with shorter length of stay in the intensive care unit and shorter duration of mechanical ventilation. Studies assessing the association between early tracheostomy and incidence of delirium, however, are lacking. This investigation sought to fill this gap. DESIGN: Retrospective cross-sectional study.

SETTING: Multi-institutional acute care facilities in the United States. PARTICIPANTS: Data were derived from the National Inpatient Sample data from 2010 to 2014. Included patients were 65 or older and underwent both intubation and tracheostomy during the hospitalization. The authors excluded patients who underwent multiple intubations or tracheostomy procedures.

INTERVENTIONS: Early tracheostomy versus non-early tracheostomy.

RESULTS: In total, 23,310 patients were included, of whom 24.8% underwent early tracheostomy. From multivariate logistic regression, early tracheostomy was associated with lower odds of having a delirium diagnosis (odds ratio [OR] 0.77, p < 0.00001) across all admission classifications. Upon subgroup analysis, early tracheostomy was associated significantly with lower odds of having delirium for patients admitted with medical (OR 0.74, p < 0.00001) and nonsurgical injury admissions (OR 0.74, p = 0.00116).

CONCLUSIONS: Early tracheostomy was associated significantly with lower odds of delirium among all patients studied. This association held true across medical and nonsurgical subgroups.