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I Miss the Sound of Your Voice: Earlier Speech in Tracheostomy Patients

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The inability to verbally communicate is one of the most frustrating experiences reported by patients undergoing mechanical ventilation via tracheostomy and a major impediment to quality of life while in the ICU (1). Qualitative reports offer important insights from this uniquely vulnerable population including feelings of being trapped and caged, loss of personhood, and loss of control (2,3). Thus, efforts to restore verbal communication represent an important area of patient-centered investigation with the potential to meaningfully improve patient, family, and clinician experiences. A variety of devices have been developed to facilitate phonation with the presence of a tracheostomy tube including speaking and swallowing valves that can be utilized in line with positive pressure mechanical ventilation (4). This technologic advance provides the potential for earlier verbal communication among a subset of ventilator dependent patients but has not received sufficient investigation to demonstrate improved outcomes.

In this issue of *Critical Care Medicine*, Freeman-Sanderson and colleagues (5) report results from a randomized trial of an intervention to achieve earlier time to initiation of phonation in two groups of tracheostomy patients who were mechanically ventilated. The study showed statistical significance with respect to the primary outcome of time between tracheostomy insertion and return to phonation with subjects in the intervention group achieving phonation a median of 11 days earlier as compared to control subjects. Secondary outcomes including duration of tracheostomy, duration of mechanical ventilation, length of stay, time to oral intake, and quality of life were not different between groups. The intervention and control groups had similar, low numbers of clinical, adverse events.

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Prior research on this important topic is limited to observational studies (6), case series (7), and before-after trials (8). Limitations to these designs have included unclear inclusion/exclusion criteria, ambiguity and variation in the 'intervention,' and bias all of which make it problematic to infer which patients might be appropriate for and benefit from an in line speaking valve. A notable strength of the current investigation is the randomized design and systematic approach to subject recruitment which help minimize bias. From the perspective of ICU clinicians, the study's inclusion and exclusion criteria could be readily adapted into clinical practice. In general, patients were required to have modest ventilator support needs, be able to follow commands, and be considered tolerant of tracheostomy cuff deflation.

Another aspect of the study by Freeman-Sanderson et al (5) with potential clinical application is the structured approach used for the early intervention. Specifically, the intervention included: 1) cuff deflation; 2) an in line speech and swallowing valve and; 3) daily, progressively longer periods of time with the speech valve in place contingent on tolerating pre-specified periods of time during the prior day's session. Physiologic criteria were used to proactively monitor clinical status and speech sessions were terminated if patients deviated outside a priori chosen parameters (Table 1 in [5]). While this approach may mirror what has evolved in many ICUs, the systematic and stepwise protocol used by the investigators could inform a detailed and less ad hoc approach to utilization of in line speaking valves among patients on mechanical ventilation.

While these strengths are notable, the study has limitations. The sample size was small with a total of 30 patients (15 subjects per group) and thus definitive conclusions regarding efficacy or safety cannot be drawn. Furthermore, the primary study endpoint was reported as 'return to phonation' which typically implies some sound generation produced by true vocal vibration. The operational definition of 'return to phonation' in this study was defined as sustained counting from 1-10 that not only includes phonation produced by vocal fold vibration but also the process of speech production. Further, there was no mention of the quality of phonation such as intensity, duration or quality which have notable implications for the return to functional oral communication. Given that this study was motivated by the isolation and quality of life issues related to the inability to communicate, and a study powered on a functional oral communication endpoint would have been more appropriate. As designed, the earlier time to some degree of voicing during counting is not surprising because phonation is expected in the absence of paralysis or injury and was facilitated early in the intervention group and not attempted until after mechanical ventilation was no longer needed in the control group.

Other investigators have utilized speech outcomes in ventilator dependent patient populations such as voice intensity, speech intelligibility, and phonation duration that might have provided more nuanced insight into the benefits of the early intervention (9). Subsequent studies are necessary to characterize whether important patient-centered measures such as time to adequate verbal communication, quality of life, and psychological well-being are impacted. Also, staff time and staff perceptions of communication quality achieved through the use of in line speaking valves represent important dimensions for future study since ICU staff exert considerable effort in communication attempts with tracheostomy patients. Clinical outcome measures are important to characterize from a

patient safety and resource utilization perspective but should probably be viewed as secondary to patient-centered measures.

In summary, the findings from Freeman-Sanderson et al can inform an ICU's efforts to help patients confined to mechanical ventilation achieve earlier phonation of unspecified quality and potentially mitigate the substantial patient distress by facilitating progression to speech production and effective verbal communication. ICUs are well-served by adding speech-language pathologists to the ICU multi-disciplinary team to facilitate oral communication.

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