Safety of a no-fast protocol for tracheotomy in critical care

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SUMMARY

With modern anesthesia, aspiration is an exceedingly rare complication, and we have learned that a prolonged fast can result in serious adverse effects in critically ill patients. We discuss the no-fast protocol implemented at Vancouver General Hospital in 2007 for intubated, tube-fed adult patients who underwent elective open tracheotomy.

Tracheotomy remains one of the most commonly performed procedures in critically ill patients; as many as 12% of patients receiving mechanical ventilation in the intensive care unit (ICU) undergo tracheotomy for prolonged mechanical ventilation or airway support.[1]

Minimizing gastric residuals before surgery with the patient under general anesthesia is considered standard practice to reduce the risk of pulmonary aspiration during surgery. To achieve this goal, a policy for preoperative fasting exists in many hospital ICUs, and the procedure is commonly implemented as nulla per os (NPO) from midnight the evening before surgery.

However, with modern anesthesia, aspiration is an exceedingly rare complication, and we have learned that a prolonged fast can result in serious adverse effects in this patient population. In the last decade, changes to the NPO from midnight policy have been suggested by various professional groups, including the American Society of Anesthesiologists, which has developed guidelines in support of more liberal preoperative fasting protocols in certain situations.[1] Based on this guideline and on the rational judgment of intensivists and otolaryngologists at the Vancouver General Hospital (VGH), in 2007 the VGH ICU changed its policy for intubated, tube-fed adult patients who underwent elective open tracheotomy; for these patients, a "no-fast" protocol was implemented.

We evaluated the safety (relative to the traditional fasting protocol) of this new no-fast protocol. We compared the number of clinically significant aspiration events that occurred during an open tracheotomy procedure the year before and the year after the no-fast protocol was introduced in the VGH ICU. We defined "clinically significant aspiration" based on a landmark study conducted in 1993 of more than 120 000 procedures involving general anesthetic:

> (…) The occurrence of objective aspiration of gastric contents during the procedure (as documented in the surgical postoperative note and/or anesthetic record) combined with 1 or more signs of respiratory deteriorations (new cough or wheeze, new pulmonary infiltrate reported on chest X-ray, a ≥ 10% increased required oxygen flow rate (FiO_2), or an alveolar-arterial oxygen tension ≥ 300 mm Hg) that occurred within the first 2 hours after the open tracheotomy procedure.[2]

To evaluate the protocol, we conducted a retrospective, observational cohort study using data obtained from the target population of intubated, tube-fed, adult (> 16 yr) patients in the VGH ICU who underwent elective open tracheotomy between May 1, 2007, (date of protocol change) and Apr. 30, 2008. Our preprotocol control group underwent elective open tracheotomy between May 1, 2006, and Apr. 30, 2007.

The protocol received ethical approval from the University of British Columbia Clinical Research Ethics Board.

A total of 318 patients were evaluated in the study. The characteristics of each study group were roughly the same; a summary is presented in Table 1.

Table 1. Patient population characteristics

Characteristic	Group	
	No-fast	Control
Tracheotomies, no.	160	158
ENT	102	111
Other	58	47
Sex, no. male:female	103:57	94:64
Age, mean ± SD yr	54.8 ± 19	56.1 ± 17
Admission diagnosis, no.		
Trauma/surgical	54	64
Medical	104	94
Indication for trache, no.		
Prolonged Int/FTW	131	117
Pulm toilet	23	34
Other	6	7

ENT = Ear, Nose and Throat Service; FTW = failure to wean; SD = standard deviation.

In the no-fast group, no significant events occurred, whereas in our historical NPO after midnight control group, 1 event meeting our definition occurred. These results indicate that a no-fast protocol may be a safe alternative to a traditional fasting policy for these patients when undergoing this procedure. However, our relatively small sample size precludes us from making a statistically significant comparison; the incidence of pulmonary aspiration of gastric contents during general anesthesia for all patients undergoing elective procedures is reported to be approximately 1 in 3000 cases;[2] therefore, aspiration is expected to be an exceedingly rare event.

The potential benefits of a change to the traditional fasting protocol in this setting deserve our attention. The ability to safely provide nutrition for the entire preoperative period has significant advantages in this patient population. Patients who are admitted to the ICU are much more likely to experience the adverse effects associated with malnutrition, such as a poorer ventilatory status; increased vulnerability to infection; and increased length of stay in the hospital,[3] including poorer healing, complications related to nonhealing wounds and improved patient comfort. Furthermore, the hypercatabolic state of this patient population due to the known metabolic response to critical illness can lead to wasting of lean body mass, a decrease in immune function and impairment of visceral organ function.[4] The ability of the surgical team to have these patients in the OR without any interruption in nutrition is therefore a likely benefit to the overall well-being and recovery of the patient.

In addition to these potential patient benefits, it is important to note that shortened wait times for a tracheotomy (a noted side effect of the policy change at VGH) also benefit the medical system with regard to efficiency and cost. Decreasing recovery time and postoperative complications results in the ability to transfer ventilator-dependent patients from the ICU earlier and more safely to a ward bed and reduces the overall length of stay in hospital and hospital costs.

In the critical care setting, where patients are intubated and tube-fed and require an open tracheotomy, a preoperative no-fast protocol may be a safe alternative to traditional fasting, bringing significant potential health benefits to critically ill patients as well as real cost and system advantages. During our evaluation period, no aspiration events were recorded in the 160 tracheotomies performed. Given the rarity of the event, a multicentre analysis with requisite case volumes may be the next step to adequately power a conclusive comparison.

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