Using a feeding tube to intubate and ventilate a 650 gram preterm neonate

Sir,

A 28-week old male child born of a normal vaginal delivery presented on the second day of life with failure to feed, vomiting, and abdominal distension, diagnosed as necrotizing enterocolitis. The baby weighed 650 g and was planned for an exploratory laparotomy. On examination, the child was conscious and actively moving all four limbs. The respiratory and cardiovascular systems were normal on auscultation. Laboratory studies revealed a hemoglobin of 8.4 g%, total leukocyte count of 2300 mm$^{-3}$, and platelet count of 88,000 mm$^{-3}$. The child was accepted for surgery with a high risk explained to the parents.

After arrival in the operating room, monitors were attached. Patient had a pulse rate of 132 beats min$^{-1}$, BP of 52/21 mmHg, and 94% saturation on room air. An intravenous line was secured with 24G cannula. The patient was premedicated with atropine 0.1 mg, fentanyl 0.6 μg i.v. Anesthesia was induced with sevoflurane 2%-4% in oxygen. During laryngoscopy and intubation, the child had an episode of bradycardia, for which atropine 0.1 mg i.v. was administered. After adequacy of mask ventilation, succinylcholine 1 mg i.v. was administered to facilitate orotracheal intubation. Despite a good laryngoscopic view with Miller 0 blade, the smallest endotracheal tube available (2.5 mm ID; 3.5 mm OD; Portex) could not be inserted beyond the glottis. Mask ventilation was continued for a duration of 3 minutes till an ET tube was fashioned using a 10Fr (3.3 mm OD) infant feeding tube. The distal end of the infant feeding tube was cut in a beveled shape at a length of 20 cm from the connector end, and a male connector of a 3 mm ETT attached to the proximal end (Figure 1). Successful tracheal intubation was achieved with a stylet. Correct placement was confirmed by the end tidal carbon dioxide and bilateral equal air entry on auscultation. The lungs were manually ventilated with 50% N$_2$O and sevoflurane 0.4%-1% in oxygen as air was not available, with an Ayre’s T-piece using thumb ventilation.

The necrotic intestinal segment was resected and anastomosis was achieved with minimal blood loss. The child remained hemodynamically stable throughout. The baby was transferred to the neonatal intensive care unit for further management.

Although the majority of with NEC require intubation and ventilation before surgery, this child was shifted on oxygen with mask. The smallest face mask, Guedel's airway, LMA and laryngoscope were too large for the baby. Anesthesia was induced with sevoflurane with mask held in a way to cover the jaw extending onto the chin and anterior part of the neck. The larynx was anterior and the glottis could be visualized only after external pressure, yet the smallest available 2.5 mm ETT could not be negotiated beyond the glottis. This necessitated the fashioning of an endotracheal tube out of 10Fr infant feeding tube. The tube had to be supported throughout the surgery as the weight of the circuit resulted in kinking of the tube. Correct placement can be tricky due to short length of trachea and inadvertent extubation or bronchial intubation remains as an omnipresent risk.$^1$ The other concern was postoperative ventilation on this tube. The drugs had to be diluted in sufficient quantities to allow precise administration. The slightest excess could have resulted in over dosage.

The patient was transferred to NICU for further management where a Rusch 2.0 mm endotracheal tube (3.3 mm OD) was arranged and the fashioned infant feeding tube changed.

To conclude, anesthetizing a preterm neonate requires constant vigilance, rapid recognition of events and trends, swift intervention and innovation.

CONFLICT OF INTEREST

None.

ORCID

Nishant Kumar https://orcid.org/0000-0002-6064-3580

---

FIGURE 1 (A) Endotracheal tube fashioned out of 10Fr infant feeding tube. (B) Neonate with the tube in situ [Colour figure can be viewed at wileyonlinelibrary.com]
Shakespeare, perioperative respiratory adverse events, COLDS, and the room air oxygen saturation: “All’s Well That Ends Well”

Sir,

We read with some interest the article by Lee et al on using the COLDS assessment tool to evaluate the risk of perioperative respiratory adverse events in children with an upper respiratory tract infection (URI).1 This article, like many research reports looking at URI and perioperative respiratory adverse events in children, reminds us that as typically defined, perioperative respiratory adverse events are fairly common in pediatric patients, even in those who do not have a URI. Thus, using perioperative respiratory adverse events as the primary outcome measure remains problematic for two reasons: (a) the actual clinical significance of a majority of these events is unclear, and (b) it is unclear how to use risk prediction models in this article to inform the initial clinical decision to proceed since we know from the literature and experience that patients with a URI almost by definition are at increased risk of perioperative respiratory adverse events. Interestingly though, dealing with most perioperative respiratory adverse events in clinical practice feels a little like being embroiled in the plot of a Shakespearean comedy where familiarity and experience tell us that whatever untoward events, plot twists, and betrayals occur, in the end—99% of the time, things will most likely turn out positively: in truth, “All’s Well That Ends Well.”

While this is not universally true, as some perioperative respiratory adverse events can be associated with longer post anesthesia care unit (PACU) stays, lower oxygen saturations in the PACU, or increased administration of bronchodilators, in the end, the clinician has decided to press on with the case despite knowing there is an increase in these risks.2,3 Further, the COLDS assessment does not appear to be an especially accurate tool in terms of predicting the occurrence of significant perioperative respiratory adverse events. In fact, laryngospasm (probably one of the most significant perioperative respiratory adverse events) was actually the one with the lowest area under the curve using the COLDS tool.1

The more salient question clinicians want answered is not necessarily who is at risk for perioperative respiratory adverse events, because it is well known that all patients with a recent or active URI are at risk, but rather which patients should be postponed because they are at risk of inadvertent admission or intermediate-term cardiovascular or pulmonary embarrassment. In the article, the authors report that cases which were cancelled achieved a score of 19 or greater, although the COLDS score was not used in the decision to cancel. A score of 19 on the COLDS assessment requires the patient to have a fairly unambiguous and active URI with multiple symptoms, but what about situations where the patient’s URI symptoms are perhaps fewer and of lesser severity?

At our own institution, we have used the patient’s room air oxygen saturation in these less clear situations as a simple and objective piece of data to adjudicate whether to proceed or not. If a patient has symptoms of a URI or recent URI that is resolving and they are afebrile with a room air oxygen saturation >96%, our clinical impression has been that the chance of that patient requiring inadvertent admission or suffering other significantly morbid events is exceedingly small, especially in the setting of outpatient or other lower risk procedures. Further study is warranted of course, but to an extent, this approach makes physiologic sense, in that if an otherwise normal healthy child has an oxygen saturation <97% on room air, it is usually a clear indication that something potentially more sinister than a runny nose or resolving cough is present, and therefore the risks increase. That said, we are not suggesting that this should be the only criteria as patient comorbidities and procedural factors must also be weighed in the decision, but in the all too familiar clinical situation where an argument could be made to proceed or not to proceed, this piece of objective data appears to be fairly predictive of overall success defined as anticipated discharge from the post anesthesia care unit. Said another way, although it is