

Cervicothoracic Emphysema After Nasotracheal Intubation Attempt: A Life-Threatening Complication—A Case Report

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Nasotracheal intubation is a commonly used technique in elective oral and pharyngeal surgeries. This case report details an incident involving a young adult patient in which an attempt at nasotracheal intubation resulted in a life-threatening cervicofacial and thoracic emphysema. Although complications associated with nasotracheal intubation are rare, their potential severity necessitates a comprehensive preprocedural discussion and risk assessment with the surgical team to confirm its appropriate indication for each individual patient. This case underscores the need for increased awareness and readiness for managing rare but critical complications associated with airway management techniques. (A&A Practice. 2025;19:e01884.)

Nasotracheal intubation is a frequently used technique to manage secure ventilation in patients undergoing throat surgeries such as adenotonsillectomy.¹ While improving the exposure of the surgical field, this procedure can lead to rare and severe complications, including retropharyngeal dissection,^{2–4} infections,⁵ and intracerebral infarction.⁶ The present case report describes the event of a retropharyngeal dissection after nasotracheal intubation, which manifested through massive cervicofacial and thoracic emphysema. This report highlights the potentially life-threatening nature of such complications.

Written consent has been obtained from the patient for the publication of this case report.

CASE DESCRIPTION

A 32-year-old woman was scheduled for elective tonsillectomy under general anesthesia (GA) to treat recurrent pharyngeal infections. The patient's medical history included substituted hypothyroidism and overweight with a body mass index of 28.5 kg/m². She has not had any previous surgeries but had a pregnancy complicated by cholestasis.

For the GA induction, the patient was positioned supine with standard equipment including electrocardiogram, pulse oximetry, noninvasive blood pressure measurement, neuromuscular blockade monitoring, and depth of

anesthesia monitoring. The induction agents used were sufentanil, propofol, ketamine, and rocuronium.

After our institutional guidelines, an atraumatic 18 french (FR) polyvinyl chloride (PVC) vent catheter (ANDOCOR, N.V. Belgium) was inserted into a 7.0 mm internal diameter (ID) preformed cuffed nasotracheal tube (Shiley Nasal RAE Tracheal Tube with TaperGuard Cuff, COVIDIEN, Ireland) (Figure 1). Both the tube and the catheter were lubricated and softened in an oven to enhance flexibility.

The initial attempt at nasotracheal intubation was performed through the right nostril. The intubation catheter was inserted without immediate issues, but the nasotracheal tube encountered resistance after the first 2 cm, prompting cessation of the attempt. A subsequent trial using a 6.5 mm ID tube in the left nostril also failed due to similar resistance. Gentle mask ventilation was performed between intubation attempts.

After consulting with the ear-nose-throat (ENT) surgeon, it was decided to switch to orotracheal intubation with a direct laryngoscopy. A successful intubation was then achieved on this patient, assessed as Cormack Grade 1, using a 6.0 mm ID cuffed endotracheal tube (Portex Tracheal Tube, Smiths Medical International Ltd).

The surgery was challenged by significant bleeding from the upper pole of the right pharyngeal pillar, which required extensive hemostatic measures including sutures, local compression, and the intravenous administration of 1 g of tranexamic acid.

After termination of the surgical procedure, the patient was woken up, extubated, and transferred to the postanesthesia care unit (PACU). During the transfer from the operating room to the PACU, an oxygen mask without positive pressure was applied on the patient's face.

On admission to the PACU, the patient was monitored and oxygen was administered at 2 L per minute through a nasal cannula. The patient received morphine for pain management and the nurse increased the oxygen therapy to 4 L per minute. About an hour after admission, the patient developed shortness of breath and cervicofacial swelling.

A clinical examination and point-of-care ultrasound (POCUS) identified a significant cervicofacial emphysema, leading to airway compression. Given the patient's swelling

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Accepted for publication November 13, 2024

The authors declare no conflicts of interest.

Funding: None.

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DOI: 10.1213/XAA.0000000000001884

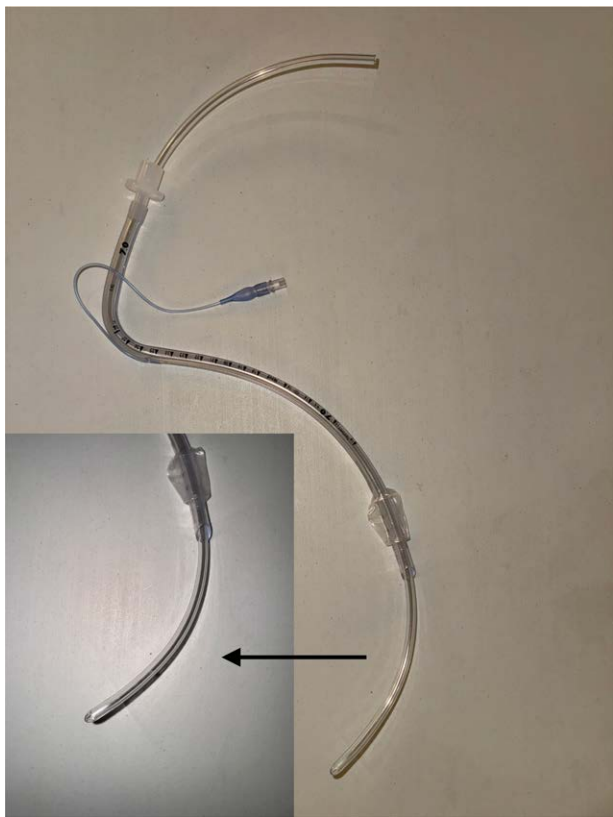


Figure 1. Atraumatic 18 FR PVC vent catheter (ANDOCOR, N.V. Belgium) inserted into a 7.0mm ID preformed cuffed nasotracheal tube (Shiley Nasal RAE Tracheal Tube with TaperGuard Cuff, COVIDIEN). FR indicates French; ID, internal diameter; PVC, polyvinyl chloride.

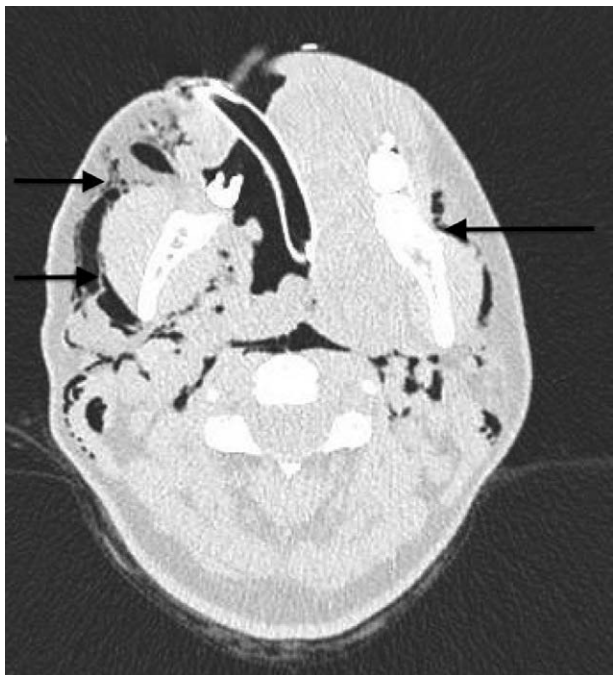


Figure 2. Computed tomography, transverse plane through cervical vertebra C1, showing extensive subcutaneous emphysema in the neck region and in the deep facial planes (around the right carotid and in the right parapharyngeal space).

and dyspnea, the patient was rapidly put under GA with ketamine, propofol, and succinylcholine to perform urgent orotracheal intubation and thus secure the airway. Given the anticipated challenges of intubation (in an emergency context outside the operating room and with facial swelling), the intubation was performed using a videolaryngoscope, and no difficulties were encountered. The patient was then transferred to conduct a computed tomography (CT) scan of the head and cervical region.

The CT images (Figures 2–4) revealed extensive subcutaneous emphysema around the neck and deeper facial structures, extending to the mediastinal area. The radiologist did not detect any fistula.

The ENT team performed a nasal endoscopy which disclosed an air leak, a hematoma (Figure 5), and a defect in the right upper nasopharynx. The patient was subsequently admitted to the intensive care unit. She remained intubated and sedated while awaiting a reduction in emphysema to enable safe extubation. The ENT surgeon decided to let the nasal defect close spontaneously without performing additional surgery.

On day 2 after surgery, a follow-up CT scan indicated a reduction in the emphysema. Further nasal endoscopy showed no ongoing air leak. A cuff leak test was performed and was negative. The patient was extubated successfully. On day 3 after surgery, she was transferred to the surgical ward.

Empirical antibiotic prophylaxis with ceftriaxone was administered for 5 days to prevent infection. During the hospital stay, the patient experienced blurred vision. An ophthalmic evaluation diagnosed exophoria related to the orbital emphysema, which resolved spontaneously in a few days.



Figure 3. Computed tomography, transverse plane through trachea, showing extensive subcutaneous emphysema in the neck region and in the deep facial planes (around the right carotid and in the right parapharyngeal space).



Figure 4. Computed tomography, transverse plane through upper mediastinum, showing the extension of the emphysema to the mediastinum.



Figure 5. Photo of the hematoma on the right nasal septum seen on fibroscopy by ENT specialists. ENT indicates ear-nose-throat.

The patient was discharged from the hospital on day 7 after surgery.

CASE DISCUSSION

Complications associated with nasotracheal intubation are rare¹⁻⁶ but noteworthy. We report the case of a young woman who developed a massive cervicofacial and mediastinal

emphysema after an attempt of nasotracheal intubation. A few case reports in the literature have documented a retropharyngeal dissection after nasotracheal intubation^{2-4,7} but none needing prolonged intubation due to the massive emphysema.

Various mechanisms or contributing factors have been described regarding the occurrence of this complication, including forceful insertion, multiple attempts, incorrect tube size, overinflation of the cuff, inexperienced operators, or the use of a stylet.² Even though this technique is more than a hundred years old, first described in 1902 by Kuhn, there are currently no definitive guidelines from anesthesiology societies regarding the optimal technique or equipment for nasotracheal intubation.

In our institution, we put an atraumatic vent catheter in a preformed cuffed nasotracheal tube to visualize the catheter in the oropharynx before pushing the larger tube in the nasal passage, therefore making sure the tube does not dissect the retropharyngeal wall²⁻⁴ or take another unwanted direction.⁶ In this case report, the tip of the catheter even though atraumatic is responsible for the lesion in the nasal passage that led to the hematoma and the defect in the cavity, leading to the emphysema. An alternative intubation method, ie orotracheal intubation, should be used when resistance is encountered during nasotracheal intubation. Some types of endotracheal tubes, such as the Parker Flex-Tube (Parker Medical), are associated with fewer complications like epistaxis and mucosal damage,^{8,9} although a case of nasopharyngeal dissection with such a tube has been documented.⁷ It is essential that the equipment used is specifically approved for this purpose, but this does not guarantee the safety of the procedure and anesthesiologists should be aware of the risk before using this technique.

In our case, the patient developed respiratory symptoms due to the massive emphysema, leading to an emergency orotracheal intubation in the PACU. The use of a nasal cannula for postoperative supplemental oxygen delivery may have potentially exacerbated the emphysema. While the World Health Organization recommends administering oxygen in the postoperative period,¹⁰ this practice is still debated in current literature,^{11,12} reflecting the need for a nuanced approach based on individual clinical scenarios.

Competency in managing such potentially severe complications in the immediate postoperative period is critical. In this scenario, the swelling of the patient's face was typical for emphysema and the use of POCUS confirmed it on the patient's bedside, before transporting her to the CT scan. POCUS proves to be a valuable tool to differentiate the emphysema from anaphylaxis and in assessing the severity and extent of laryngeal edema or cervicothoracic emphysema.¹³

The hematoma in the nostril, observed during the emergency nasal endoscopy, confirmed that the nasal intubation attempt caused the lesion. The lesion was not anticipated, as no epistaxis was noted. Epistaxis being the most common complication encountered during nasotracheal intubation (incidence of 15%–80% depending on a variety of factors), performing a direct laryngoscopy to assess the laryngeal view before passing the tube in the nostril may be interesting to avoid adding a possible epistaxis to a difficult intubation.^{14,15}

In summary, nasotracheal intubation is a frequently used technique for elective procedures but it can be associated with severe complications. The decision to perform it, which may allow a better surgical view, should be made in close consultation with the ENT team. It is crucial that anesthesiologists are aware of the potential complications and are able to identify and manage them to prevent any deterioration for the patient's condition. Currently, there is a need of comprehensive guidelines outlining the necessary precautions to be taken with this technique. ■■

ACKNOWLEDGMENTS

This article adheres to the CARE guidelines

This manuscript was handled by: Kent H. Rehfeldt, MD.

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