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CASE REPORT

Tracheal obstruction due to nasal packing aspiration: a case report

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ABSTRACT

Airway obstruction caused by aspiration of nasal packings is an extremely rare but potentially fatal complication. Anesthesiologists must consider it in the differential diagnosis of patients with acute respiratory failure following nasal surgery. We report the case of a 46-year-old man who, during emergence from a routine septoplasty, suffered tracheal obstruction due to nasal packing dislocation. Various oxygenation techniques were attempted until a can't intubate, can't oxygenate situation developed, prompting emergency front-of-neck access and activation of the extracorporeal membrane oxygenation team. Resuscitation and oxygenation through the cricothyrotomy were successful, with no need for extracorporeal support. Proper fixation of nasal packings and avoiding nasal manipulation are essential to minimize risk. If aspiration occurs despite these precautions, the priority should be to maintain adequate oxygenation until the packing can be removed.

KEYWORDS

Airway extubation; airway management; airway obstruction; extracorporeal membrane oxygenation

INTRODUCTION

The placement of nasal packings (NP) is a common procedure in nasal surgery and epistaxis[(1)]. Aspiration of NP is an extremely rare but potentially fatal complication, given its ability to obstruct the airway. We describe a case that, to our knowledge, constitutes the first tracheal obstruction by NP requiring emergency front-of-neck access (eFONA), and having a team ready for extracorporeal membrane oxygenation (ECMO). This report highlights the importance of maintaining oxygenation when ventilation becomes impossible, considering extracorporeal oxygenation modalities as a last resort.

CASE REPORT

A 46-year-old man with no known allergies and a medical history of polymyositis was scheduled for endonasal septoplasty and turbinectomy. Difficult airway was anticipated due to limited mouth opening: we observed Cormack-Lehane IIB during intubation with BURP (backward, upward, rightward pressure) maneuver, securing the airway with the aid of a flexible stylet.

Balanced anesthesia with sevoflurane, guided by bispectral index, and remifentanil (TCI Schneider 2.0–3.0 ng/ml) was administered. At the end of the procedure, the otorhinolaryngology (ENT) team placed

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7 cm SPIGGLE&THEIS® nasal packings bilaterally, with their external threads tied together at the columella.

Extubation was performed in the operating room after neuromuscular blockade reversal, having confirmed adequate spontaneous ventilation with capnography. Immediately after, the patient became agitated and manipulated his nose, requiring physical restraint. Seconds later, still in the operating room, the patient developed acute respiratory failure with ineffective ventilation, cyanosis and a rapid drop in pulse oximetry (SpO_2) to 75%, which improved to 92% with face mask ventilation and 100% fraction of inspired oxygen (FiO_2). At this point, the team noticed that one of the NP was missing.

One minute after, stridor and a new drop in pulse oximetry occurred. Rapid sequence induction and upper airway examination with a video laryngoscope were performed. With no NP visible in the pharynx or larynx, reintubation was performed and another anesthesiologist was called for assistance. High airway pressures led to difficult ventilation and poor oxygenation. Flexible bronchoscopy through the orotracheal tube revealed the NP lodged at the tracheal carina and two attempts to push it into a main bronchus failed.

As pulse oximetry continued to drop despite manual high-pressure ventilation and 100% FiO_2, we initiated jet ventilation with a Manujet (2.5–3.5 bars, 20 times per minute) through a cannula inserted in the orotracheal tube, maintaining SpO_2 above 85%. At this point, the plan was to perform rigid bronchoscopy to remove the NP and prepare the team for an emergent veno-venous ECMO as a rescue option. The ENT team was present at all times, prepared to perform an eFONA if necessary.

Once prepared, the orotracheal tube was removed to allow passage for the rigid bronchoscope. However, three attempts to pass the scope through the larynx failed, leading to progressive desaturation. Mask and Guedel airway ventilation became impossible, two anesthesiologists failed at reintubation due to severe glottic edema, and the patient progressed to cardiopulmonary arrest (asystole).

Advanced cardiopulmonary resuscitation (CPR) was initiated while the ENT team performed a surgical cricothyrotomy as eFONA, and the cardiovascular team inserted two femoral vein guidewires in preparation for possible ECMO support. A 5-mm tracheal tube was inserted through the cricothyrotomy and ventilation was restarted. After three minutes of CPR and administration of 1 mg of intravenous epinephrine, spontaneous circulation returned and SpO_2 rapidly improved to 100%. Adequate volume-controlled ventilation was tested and confirmed, showing low airway pressures. At this point, we decided to practice a new rigid bronchoscopy that identified and successfully removed the NP from the subglottic space (Figure 1).

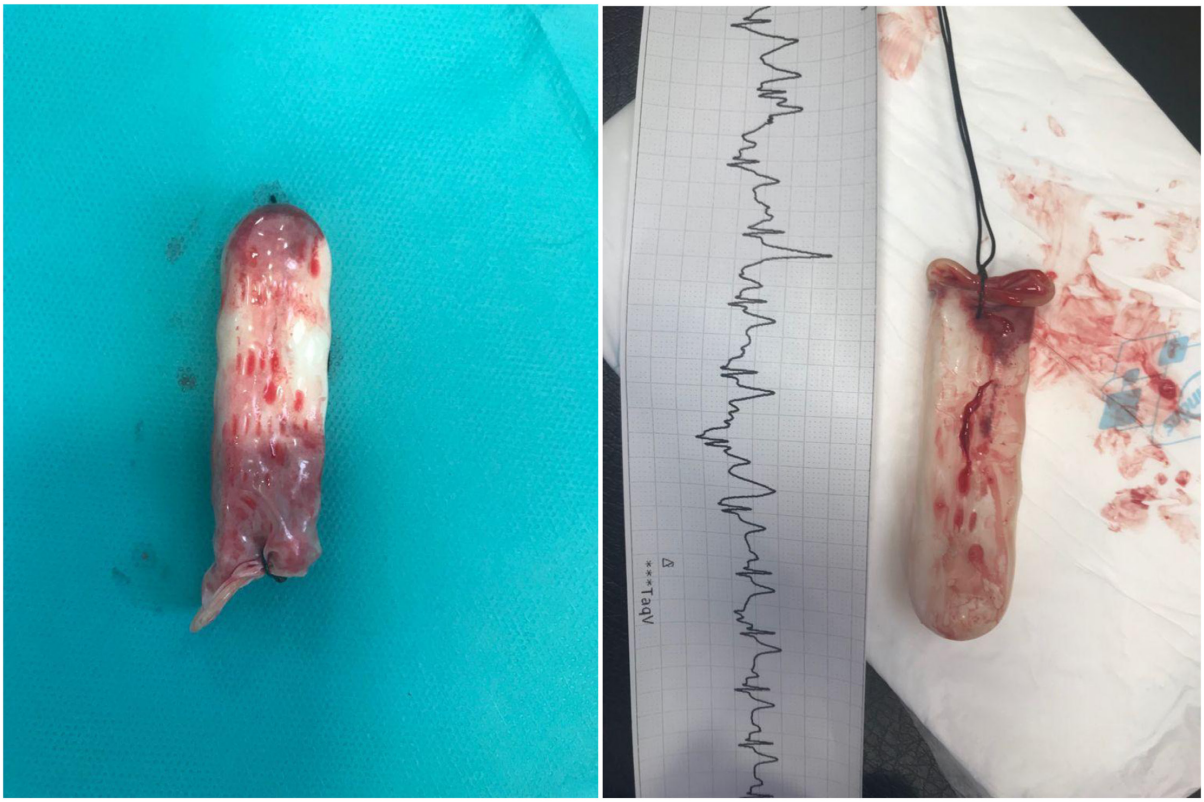

Figure 1. Nasal Packing removed from the trachea (left) and its contralateral, removed from the nostril when the patient was reintubated (right).

Finally, a planned tracheostomy was performed, and the femoral guidewires were removed. The patient was admitted to the intensive care unit, where he regained consciousness and was breathing without support within 24 hours. He was discharged after five days with no neurological sequelae or long-lasting complications. Two months later, the tracheostomy stoma was completely closed, and one year later, the patient was discharged from ENT follow-up care.

DISCUSSION

NP are commonly used to treat epistaxis and to prevent bleeding and synechiae after endonasal surgery[1]. Their posterior aspiration, though extremely rare, is one of the most feared complications as it can obstruct the airway, hindering or preventing proper ventilation.

All NPs can migrate through the nasal choanae into the pharynx, from where they can be aspirated into the airway. This can be prevented by selecting the appropriate type of NP and securing their external threads on the patient's face: either taped to the nose or cheeks for unilateral NP or tied together and taped over the columella for bilateral NP. The knot should be double tied, with threads long enough for secure taping[1].

Human error alone poses a risk of NP displacement due to improper fixation, but agitation during the early awakening phase increases the likelihood of nasal manipulation and dislocation. This phenomenon, occurring in the early stages of general anesthesia recovery, is characterized by disorientation, agitation and confusion. Although its incidence varies between 4.7% and 21.3% of procedures under general anesthesia, nasal surgery constitutes a risk factor of its own, with a reported incidence as high as 22.2%[2].

After the incident, we conducted an exhaustive review to study analogous cases and improve our hospital's safety measures. To our surprise, we only found eight similar cases documented in the literature[3-7]: all eight patients were resuscitated and had NPs extracted through rigid bronchoscopy, but half of them died due to cerebral hypoxia[3]. These fatalities were reported in the early 1980s, while no new cases were documented until 2010[4]. Advances in anesthesia, monitoring, and patient safety may explain the absence of further reported fatalities, but the gap in time also suggests that similar cases remain unpublished. Therefore, it is very likely that the mortality rate is lower than 50%, but it is also undeniable that this is a serious and potentially life-threatening complication of routine procedures.

As anesthesiologists, it is essential to know the different strategies and devices for managing a difficult airway, as well as the different ventilation and oxygenation techniques available. In this case, jet ventilation helped us maintain SpO_2 above 85%, giving us the time to ask for help and gather resources. Subsequently, as reintubation proved impossible, we chose a surgical airway approach and ECMO preparation for rescue oxygenation.

None of the previous cases reported eFONA or ECMO being used to oxygenate the patient. Since the NP was placed at the tracheal carina, neither a cricothyrotomy nor a tracheotomy would bypass the obstruction. As our primary concern was to restart oxygenation as quickly as possible, we chose cricothyrotomy over tracheotomy, as it is faster and simpler according to ASA (American Society of Anesthesiologists) 2022 guidelines[8], while preparing for ECMO in case it proved unsuccessful.

ECMO therapy has been reported as a valid alternative in situations where ventilation is ineffective due to airway obstruction[9,10], and it has been included in airway management algorithms[8]. However, its role in unanticipated failed airway remains constrained by team availability and cannulation time. Thus, ECMO should constitute a parallel preparation rather than a first-line maneuver in rapidly evolving hypoxemia.

Ultimately ECMO was not required for our patient, as ventilation through the cricothyrotomy was successful. We suspect that the NP, previously lodged at the tracheal carina, was displaced proximally during CPR chest compressions.

During a clinical debriefing carried out a few days later by the anesthesia team, it was agreed that an airway exchange catheter (AEC) should have been placed before removing the orotracheal tube to allow passage for the rigid bronchoscope, as it may have facilitated reintubation. Using an AEC is one of the main recommendations for extubating high-risk airways[8].

It was also noted that, when dealing with tracheal obstruction by foreign bodies, definitive removal should always be the priority, since distal displacement could cause a ball-valve effect and bilateral compromise. However, since ventilation was already difficult and rigid bronchoscopy was not readily available, we decided that pushing the NP into a main bronchus would help oxygenation until it could be removed.

Finally, we implemented a checklist in which different members of the surgical team verify adequate NP fixation (including double-tied knot with threads long enough for secure taping), and physical protection of the nose during emergence and extubation once the patient is fully awake.

CONCLUSIONS

Airway obstruction due to NP aspiration is a potentially fatal complication of nasal surgeries. After the procedure, it is crucial to verify their correct fixation and avoid nasal manipulation by the patient. Their aspiration should be considered in the differential diagnosis for acute respiratory failure during the postoperative period of nasal procedures requiring NP placement. Once confirmed, prompt removal via rigid bronchoscopy is essential.

Anesthesiologists must be familiar with available oxygenation rescue techniques to prevent severe hypoxemia-related outcomes. When ventilation becomes impossible and oxygenation cannot be maintained, rescue techniques such as ECMO therapy should be considered.

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This study was carried out at the Hospital Clínic of Barcelona, Barcelona, Cataluña, Spain.

Authors' contributions: Javier Domenech was the anesthesiologist responsible during the surgery and the main writer of this case report. Juan Manuel Perdomo and Albert Carramiñana were the two anesthesiologists that helped during the patient's resuscitation, contributed to write the discussion and reviewed the report before submission. Edgar Mauricio López was the ENT surgeon operating the patient and the one that performed the emergent cricothyrotomy. He reviewed all aspects related to his specialty and contributed with valuable references.

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