INTRODUCTION

Nasal packing constitutes a common step in nasal procedures. A correct fixation is of uttermost importance to avoid posterior dislocation and aspiration. This case report highlights the risk of acute airway situations involving nasal packs and discusses common errors that should be avoided to prevent this life-threatening complication.

Nasal packs (NP) are commonly used in nasal procedures to prevent bleeding and synechiae while helping to stabilize anatomical structures. Among the complications associated with NP, aspiration is the most feared. This life-threatening situation is prevented by choosing the correct type of NP and by securing the external threads outside the nose. While human failure constitutes in itself a risk of NP dislocation by means of inadequate fixation, the development of emergence agitation (EA), in the early awareness phase of the anesthesia, increases the possibility of NP dislocation.

We describe the case of a patient with EA and sudden hypoxemia following NP aspiration after performing a turbinate surgery.

CASE REPORT

A 32-year-old healthy woman underwent an elective endoscopic inferior turbinoplasty. A total intravenous anesthesia was administered, and the intraoperative follow-up was uneventful. There was no history of allergies, nicotine intake, medication or general anesthesia. At the end of the surgery, an 8-cm Netcell® NP with a nonstick outer surface, covered in nasal ointment, was inserted bilaterally (Figure 1). The external threads were tied over the columella and the exceeding length trimmed immediately over the knot as routinely performed. Following extubation, the patient presented agitation during the awakening phase with constant manipulation of the nose, requiring physical restraint by the medical team and sedation. Both NP were initially missing, and one was found in the hand of the patient. Facing the possibility of a pharyngeal dislocation of the Netcell® despite normal, spontaneous breathing and ventilation, preparations were made for a pharyngeal examination and pack removal.

A sudden decrease in oxygenation with peripheral cyanosis shortly occurred, requiring orotracheal intubation. By means of high-pressure ventilation, the SpO₂ increased from...
72% to 88% without CO₂ signal recovery, which raised the suspicion of aspiration. A complete tracheal obstruction due to aspiration of the Netcell® was confirmed through a flexible endoscopy (Figure 2). A rigid bronchoscopy was immediately performed and the NP was removed. Following reintubation, a negative pressure pulmonary edema was prevented by ventilation with PEEP 10mmHg during one hour. The patient was discharged home 24 hours later with no long-lasting complications.

**FIGURE 1** Dimensions of the Netcell® nasal pack before and after expansion with saline solution. (A) The Netcell® nasal pack with the nonstick outer surface is inserted in the nose in the compressed form and (B) increases in size (8 x 1 x 2 cm) when hydrated providing an equal pressure within the nasal cavity.

**FIGURE 2** Tracheal obstruction due to Netcell® aspiration. The distal trachea was completely obstructed with the Netcell® nasal pack resulting in severe hypoxemia and peripheral cyanosis.

3 | DISCUSSION

Aspiration of NP constitutes a severe and potentially lethal complication to nose procedures.¹ Despite improvements in functionality and comfort of the pack being made over the years, the risk of dislocation is still present and should not be underestimated.

Inward dislocation of the NP may occur independently of the size and type used as long as they are able to pass through the choana. This risky situation is avoided by securing the external threads, either by taping them to the cheeks, nose, or in case of bilateral packing, making additional knots over the columella.

Our patient presented sudden hypoxemia as a consequence of a complete tracheal obstruction due to aspiration of a Netcell® NP. Failure to secure the pack was the main reason for this complication. First, the external threads were shortened immediately over the knot, therefore increasing the risk of slippage. Secondly, a combination of the nasal ointment and the nonstick surface of the pack may have facilitated the passage through the choana and eventually the trachea.

A final factor contributing to the NP aspiration was the constant manipulation of the nose during EA. This postanesthetic phenomenon occurs in the early phase of general anesthesia recovery and is characterized by agitation, confusion, disorientation, and possible violent behavior. It has a general incidence between 4.7% and 21%, with nose surgery being one of the main risk factors with an incidence of up to 22%.²

Our patient showed no signs of breathing problems during the EA and the aspiration first became evident with the presence of sudden hypoxemia.

In this regard, during both the anesthesia and awakening phase, there is an absence of the coughing and swallowing reflex. The absence of these reflexes leads to an unprotected and mostly unnoticed inhalation of the NP directly into the airway.
Whether a dissolvable material could have been a safer option compared to our chosen NP is debatable considering that aspiration of NasoPore® has also been described. In this case, the biodegradable NasoPore® was placed loose in the posterior aspect of the nasal cavity close to the choana and dislodged after extubation, resulting in sudden hypoxia and tachypnea.³

Despite the successful resolution of our case, fatalities have been attributed to NP aspiration. In these cases, NP aspiration occurred during the awakening phase after removal of the tracheal tube. Either a prolonged breathing attempt through mask ventilation, renewed intubation or a late foreign body extraction led to brain hypoxia and eventually death.¹

Final emphasis must be placed on the risk of aspiration caused by nonsecured and latterly forgotten pieces of gauze placed in the nose during emergency procedures. In one patient with Alzheimer’s disease, acute respiratory distress occurred 48 hours after epistaxis and insertion of a gauze pack into the nasal cavity. The suspicion of NP aspiration was raised based on clinical history, and the pack was removed through a rigid bronchoscopy.⁴ In a second case, CPR was performed after acute dyspnea and cardiac arrest. During this procedure, gauze obstructing the larynx was found and removed. This patient had a history of epistaxis days beforehand when short gauze pieces were placed in the nose as part of the treatment.⁵

4 | CONCLUSION

Aspiration of NP is a life-threatening complication that should not be underestimated. While NP with external threads offers a higher level of security, we advise the reexamination of the quality of the external fixation before ending surgery and to correctly document the number and type of NP used, especially if the postoperative medical team was not primarily involved in the surgery. Dislodgement and aspiration of the NP must be suspected in patients with hypoxia following nose procedures, especially in those with reduced levels of consciousness or suffering from neurodegenerative disorders. When suspecting aspiration, an immediate coordinated response from both anesthetists and ENT surgeons is mandatory to identify and quickly remove the NP by means of rigid bronchoscopy to avoid severe and potentially lethal complications.

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CONFLICT OF INTEREST

None declared.

AUTHOR CONTRIBUTIONS

EN and HJ: were the medical team that performed both the surgical and the anesthesiological treatment of the patient. Both authors: planned and co-wrote the paper.

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