

Case Report

Continuous negative airway pressure “CNAP”: Novel nasal foreign body removal

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ABSTRACT

We report on a novel and innovative method used to extricate nasal foreign bodies in infants and young children— a common presentation in pediatric emergency care that can at times have potentially serious consequences. In the case of a three-year-old girl, ‘continuous negative airway pressure (CNAP)’ using a continuous positive airway pressure (CPAP) mask and a domestic vacuum cleaner, a nasal foreign body was removed quickly and effectively in a simple and painless procedure. While more cases are needed to confirm safety and efficacy, the principles underlying this technique could have great potential for future clinical use due to its simplicity and accessibility, particularly when compared to other techniques currently used in the home and in the emergency department.

Keywords: Nasal, Foreign body, CPAP, Infant, Removal, Child

INTRODUCTION

Nasal foreign bodies are a common presentation in paediatric emergency care.¹ The management of foreign bodies in the nasal cavity of infants can be challenging, invasive, and potentially life threatening— failure to carry out a prompt removal may lead to serious complications including posterior dislodgement and aspiration, infection, trauma caused by the object itself or from removal attempts, and choanal stenosis, which may require further medical procedures.²

CASE REPORT

We report the case of a three year-old otherwise normally developing and healthy girl, who reported to her pre-school Sunday school teacher that she had placed a foam bead up her left nostril. The foam bead was around 3 mm

diameter and commonly used in so-called bean bag chairs.

Inspection of the nasal cavity confirmed the foreign body lodged around 4 mm from the left nares. A nasal CPAP mask (“Wisp”, size S/M, Philips Respironics, Murrysville, Pennsylvania) was carried in the luggage of the author who had just returned from a Sleep Medicine Scientific Conference.

This was attached to a domestic vacuum cleaner (Hoover, Smart Bagless model, Glenwillow, Ohio). To secure a better seal of the CPAP tubing to the vacuum hose fitting, kitchen paper was used. With parental consent, the child was quickly oriented to what was about to happen in the presence of both her parents. This involved letting the child feel the CPAP mask for herself and placing it on her nose. A calm atmosphere with low volume voices was encouraged. The vacuum cleaner was then turned on with

the CPAP mask on the nose. Within 1 or 2 seconds the bead had been sucked out. The father emptied the vacuum cleaner to confirm the success. Only one bead was found in the vacuum cleaner.

DISCUSSION

The most common sites where the foreign body is lodged are the inferior turbinate or immediately anterior to the middle turbinate.³ Most frequent objects include plastic toys and beads.² Current methods that can potentially be used by carers to dislodge foreign bodies from the nose in the home environment are the 'kissing technique', which employs positive pressure, instrumentation and the 'self-blow' technique.¹ However, it is children under the age of four that most commonly present with nasal foreign bodies.^{2,4} As such, communication and co-operation from a fearful child is often an issue, particularly when administering the 'self-blow' technique, where the child may inadvertently inhale and cause aspiration of the foreign body.² Furthermore, the mouth to mouth 'kissing technique' which involves administering a sharp exhalation against the child's closed glottis while occluding the unaffected nostril, can be complicated for a worried parent to administer. It has a 40% failure rate, with many children eventually being admitted to the emergency department.^{5,6}

Techniques employed in the emergency department include the use of positive-pressure techniques (via the kissing technique, an Ambu bag, or nasally applied pressure through a catheter or oxygen source), and washing out with nasally applied saline. Direct mechanical extraction is possible with alligator forceps, hooks, or balloon-tipped catheters.⁷ Each of these comes with its own set of complications.³

To our knowledge this is the first reported case of such a technique being used for nasal foreign body extrication. Paediatricians and sleep physicians often describe the use of nasal mask continuous positive airway pressure for the treatment of obstructive sleep apnoea as a vacuum cleaner in reverse. It is ironic that the technique we described uses a common household vacuum cleaner as intended. This "continuous negative airway pressure" technique has advantages in that no specialized equipment apart from the timely availability of the CPAP

mask was needed, no anaesthetic or sedation was required and the expiratory port built into the CPAP mask minimizes the risk of barotrauma as the system is not airtight. With the increasing use of nasal mask CPAP for the common malady of obstructive sleep apnoea, it is envisaged that 32 years after its invention by our co-author (CS), this will not be a rare domestic commodity.⁸

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