INTRODUCTION

Foreign body (FB) aspiration is commonly seen in pediatrics, particularly, in children under three years of age. Diagnosis can be challenging since many frequently aspirated items are radiolucent, organic materials. Physical exam findings are nonspecific including cough, dyspnea, wheezing, and decreased breath sounds depending on the location of the FB. Imaging via plain radiographs, CT scans, and less commonly airway fluoroscopy, is often used for diagnostic purposes to either directly visualize radiopaque objects or to demonstrate indirect evidence such as air trapping or lung atelectasis. The gold standard of management is rigid bronchoscopy to retrieve the confirmed or suspected object. While airway foreign bodies in the neonatal period are rare, the clinical situation can result in severe complications leading to morbidity and mortality. This case demonstrates a micro-premature, very low birthweight neonate with an iatrogenic airway foreign body and a successful outcome.

CASE REPORT

A two-week-old ex 25.1-week infant weighing 820 grams was transferred to a tertiary children's hospital for an iatrogenic airway FB. She was born via emergent cesarean section secondary to a non-reassuring fetal heart rate. The neonate was intubated with a 2.5 endotracheal tube (ETT) in the delivery room and received surfactant. On day of life 7, she developed pulmonary hemorrhage requiring deep suctioning for a few days. Repeat chest x-ray (CXR) on day of life 11 revealed a portion of a suction catheter in the right mainstem bronchus. The 2.5 ETT was replaced with a 3.0 ETT and Interventional Radiology attempted removal using flexible, long alligator forceps via the ETT under fluoroscopy. Otolaryngology attempted a bronchoscopy with a flexible fiberoptic scope, but was unsuccessful due to equipment size. The patient was transferred to a tertiary children's hospital on a high frequency oscillating ventilator and managed medically to optimize her respiratory status. She was successfully converted to a conventional mechanical ventilator on day of life 14. A CT angiogram demonstrated a small, opaque tube measuring approximately 3 cm in length from the carina extending to the right lower lobe segmental bronchus with collapse of the right lung with no pneumothorax (Figure 1). Free air from necrotizing enterocolitis was identified in the abdomen and a peritoneal drain was placed by pediatric surgery.

On day of life 16, otolaryngology successfully removed the foreign object in a stepwise approach. Operating room staff, neonatologists, respiratory therapists, otolaryngology, and anesthesia services were all present at bedside and contributed to the success of this case. First, a neonatal Karl
Storz 2.3 mm inner diameter flexible scope was introduced via an adaptor valve through the 3.0 ETT to allow simultaneous ventilation and direct visualization of the object (Figures 2 and 3). Approximately 0.5 cc of 2% lidocaine was instilled through the ETT to minimize the possibility of bronchospasm. Next, the neonatal scope was introduced to the tip of the foreign body and the distance to the FB was measured (Figure 4). An Olympus 2.0 mm flexible biopsy cup forceps was introduced to the previously measured distance and a portion of a 6-F suction catheter was retrieved on the first attempt (Figure 5). Subsequent direct visualization of the airway with the neonatal flexible scope demonstrated a patent carina with no trauma to the mucosa or any distal mucous plug formation. Increased tidal volumes were obtained and a repeat CXR revealed resolution of the right lung atelectasis. Patient continued on several modalities of conventional ventilation after the procedure given the extent of bronchopulmonary dysplasia and eventually discharged on room air 3 months after the procedure.

3 | DISCUSSION

Removal of many different types of foreign bodies has been described in the literature, and to our knowledge, there has been only one report of iatrogenic suction catheters in a premature infant.5 This previous report focused on diagnosis and did not specify the removal technique or the challenges met during removal of FBs in premature infants of this size. Premature neonates have smaller anatomy and often respiratory compromise making removal of an airway FB challenging. Equipment limitations, size of ETTs, and the lack of precision in determining the exact etiology, location, and involvement of surrounding structures can make interventions difficult to plan in this age group. Moreover, the complexity of the premature infant with multiple comorbidities including respiratory support with mechanical ventilation makes obtaining diagnostic studies and performing interventions exponentially more challenging. This patient was high-risk to transport out of the NICU and therefore portable CT imaging was utilized and intervention was performed at bedside.
Use of rigid bronchoscopy in the operating suite is widely accepted as the gold standard in cases similar to this infant, but was ultimately deferred in order to avoid transportation and use of an anesthetic in a fragile premature infant. Therefore, this innovative approach was used in an attempt to minimize manipulation of the airway and safely remove the foreign body.

4 CONCLUSION

This micro-premature infant had a portion of a 6-French suction catheter lodged in her right mainstem bronchus, which had broken off during deep suctioning for pulmonary hemorrhage. Optimizing respiratory status, obtaining further imaging before removal, and utilizing instruments outside of the normal armamentarium allowed physicians to understand impending complications and assist in the surgical approach, resulting in a successful outcome.

ACKNOWLEDGEMENTS

Luisa Cervantes, MD- Chief of Cardiothoracic and cardiac imaging, Department Pediatric Radiology, Nicklaus Children’s Hospital, Miami, Florida who contributed towards the article with the creation of Figure 1.

AUTHOR CONTRIBUTIONS

AA was a major contributor in writing the manuscript. AP was a major contributor in writing the manuscript. YT analyzed and interpreted the patient data, performed the removal of the foreign body and was a major contributor in writing the manuscript. All authors read and approved the final manuscript and have agreed both to be personally accountable for the author’s own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even ones in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature.

DATA AVAILABILITY STATEMENT

Not applicable.

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How to cite this article: Alruwaili A, Payson A, Tirado Y. 800 Gram Infant with A bronchial foreign body. Clin Case Rep. 2021;9:1469–1471. https://doi.org/10.1002/ccr3.3802