

Foreign body aspiration in two young infants: the devil in the carpet. . .

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Abstract

Foreign body aspiration is rare in children below 6 months of age. Very young children presenting with stridor, atypical croup presentation, and not responding accordingly, subglottic foreign body aspiration should be considered. These may not always be visible with bedside flexible endoscopy and may need investigation under anesthesia. We report 2 cases of devil's thorn aspiration in young infants. These children were left on the floor to play and devils thorn may be a danger lurking as the they have been deposited unknowingly by the shoes people wear and pick up by these young infants.

"To the Editor"

Foreign body aspiration in two young infants: the devil in the carpet. . .

Foreign body aspiration (FBA) is rare in children below 6 months of age as they don't crawl yet and don't have the pincer grips but aspiration is not impossible. A 6-month old female baby was collected by her mother from the creche, when she noticed the baby had difficulty breathing, inability to cough and a weak soft cry. The baby was admitted at the local hospital with increasing stridor, severe sternal recession and respiratory distress. She failed both high-flow nasal cannula (HFNC) oxygen and continuous positive airway pressure (CPAP) needing intubation. After intubation with 3.5 mm endotracheal tube (ETT), it was noted that the ETT was very high on the chest X-ray. It was attempted to push it deeper but was not successful. The chest x-ray showed a soft-tissue density foreign body in the subglottic region (blue arrow) with visible subglottic oedema of the soft tissues and a 'steeppling' appearance of the airway. (figure 1 a) Under vision with a laryngoscope an obstruction was seen just below the cords. Intubation was achieved with a 3.0 mm ETT past the obstruction after failed attempts to remove it with a magill forceps. The chest x-ray after intubation showed that the right middle and lower lobes were hyper-expanded compared to previously, and compared to the left lung suggesting a ball valve type obstruction of the bronchus intermedius. (figure 1 b) The child was referred to a tertiary hospital pediatric intensive care unit (PICU). Bronchoscopy was performed with a 2.2 mm fibre bronchoscope via 3.0 mm ETT, shortly after admission to the PICU. A foreign body (FB) was identified as a so called "devils thorn", that was located at the opening of the right main bronchus (RMB) causing obstruction of the RMB. (figure 1 c) The child was transferred to the bronchoscopy theatre for removal of the thorn. The ETT was removed and replaced with LMA size 1.5. Removal was attempted with spiral basket with a 4.0 mm video bronchoscopy. The thorn was moved into the basket after several attempts as it was very slippery and coated in mucus. (figure 1 d) The following problem encountered was that the thorn could not pass through the subglottic area, which was very swollen

and inflamed after previous attempts to remove it. The thorn was moved into the subglottic area with the basket and then was removed with a rigid alligator forceps under vision with a video laryngoscope. (figure 1 e) The airway was evaluated with bronchoscope to determine any damage from removal or induced by the FB. There was significant damage to the subglottic area and the patient was re-intubated. (figure 1 f) Dexamethasone was given 0.6 mg/kg and oral prednisone 2mg/kg /day was given for 5 days. The child was extubated in bronchoscopy theatre after 72h, and bronchoscopy performed. There was remaining damage to the subglottic area and granulation tissue on the cords. Extubation was successful and an upper airway scope was repeated 1 week later due to ongoing hoarseness. There was still granulation tissue present on the cords but improving. The second case was a 5-month-old male who presented with new onset of stridor and respiratory distress. The child's mom came home after work to find her child unwell and refusing to feed. That evening she reported noisy breathing and a loud cough. There was no history of previous stridor, but the infant did have fever suggestive of croup. The child was admitted to PICU on HFNC with the diagnosis of croup and received dexamethasone 0.6 mg /kg, adrenaline nebulations and IV Ampicillin. The lateral of the neck demonstrated a soft tissue density (blue arrow) in the subglottic region at the level of the C6 vertebral body with pre-vertebral soft tissue swelling extending from C2 to T1 .(figure 2 a) An upper airway flexible scope was done, demonstrating some swelling subglottic with a bulge and possible tear in the right vocal cord. The airway obstruction progressed and intubation was needed. A 3.5 mm ETT could be passed through the cords but could not be passed through the subglottic area. The child was moved to theatre for bronchoscopy and possible tracheostomy. A devil's thorn was found about 1 cm below the subglottic area causing near complete obstruction.(figure 2 b) This was removed with a rigid alligator forceps with difficulty due to its size. (figure 2c-e)

The parents of the both cases gave consent for the publication of these case reports.

In these 2 cases the children probably inhaled the thorn while playing on the floor. Typically, these types of thorns get stuck in the sole of people's shoes especially in the summer, thus bringing them into their households. The name, devil's thorn, comes from the shape of the seed, which is a robust oval parcel adorned with two sharp vertical-facing thorns. These thorns are reminiscent of the horns of the devil, and the plant's scientific name (*Dicerocaryum eriocarpum*) also stems from the word "dikera", which means "two horns". The devil's thorn contains saponins. These are chemicals that react with water to produce a slimy mucilage that acts like soap which probably explains the difficulty in grasping them. FBA occurs mostly in children younger than 3 years, with a peak incidence between 1 and 2 years of age. [1] Na'ara et al have reported that 15% of all cases of FBA were in infants younger than 1 year. Death due to FBA is more frequent in infants and foreign body aspiration is the most common cause of mortality owing to unintentional injury in children less than 1 year of age. [2] Schramm et al have reported that in Germany the mortality rate among cases of FBA in children aged 1–15 years were between 1% and 1.5% compared to children younger than 1 year where it was between 3% and 4.5%. [3] Laryngeal foreign bodies may mimic croup especially in very young children. [4] For children at the lower end of the expected age group for croup , the diagnosis should be carefully considered. In young children with croup not responding accordingly, or with acute presentation, subglottic foreign bodies must be considered.

In both cases FBA was not originally considered due to the age of the children, their inability to crawl and the lack of a witness during the acute episode of aspiration. Both children were placed on the floor during the course of the day to play.

The management of FB inhalation in young infants is challenging due to small airways and because smaller bronchoscopes must be used. Both rigid and flexible bronchoscopy should be available when FB removal is attempted.[5]

Very young children presenting with stridor, atypical croup presentation, and not responding accordingly, subglottic foreign body aspiration should be considered. These may not always be visible with bedside flexible endoscopy and may need investigation under anesthesia. Devils thorn aspiration has rarely been reported in young infants, and because children are left on the floor covered by carpets , it may be a danger lurking where they have been deposited unknowingly by the shoes people wear.

Keywords : Foreign body aspiration, Bronchoscopy, Basket, Devils thorn, subglottic

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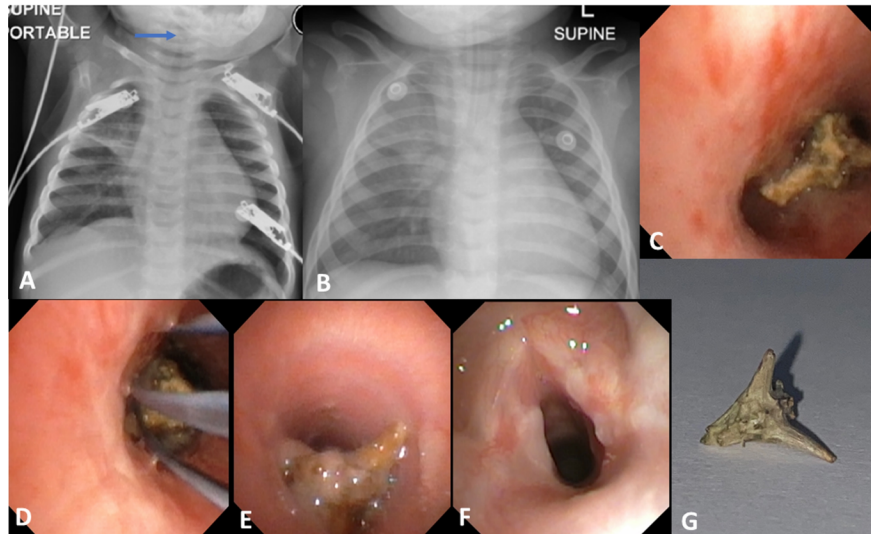
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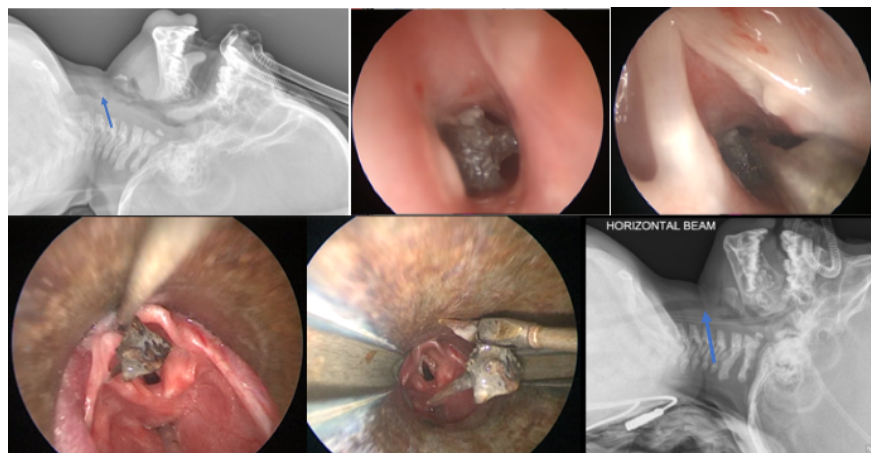
Legends



Patient 1: Figure 1 a – d:

Supine chest radiographs in a 7-month-old infant girl with an aspirated Devil's thorn

1. Soft-tissue density foreign body is noted in the subglottic region (blue arrow) with visible subglottic oedema of the soft tissues and a 'steeppling' appearance of the airway. The remainder of the airway appears normal but there is volume loss of the right lung (compared to the left) with some atelectasis in the right mid-zone.
2. Follow-up radiograph after urgent intubation due to severe respiratory distress, demonstrates the tip of the endo-tracheal tube just above the carina, but now the right middle and lower lobes are hyper-expanded compared to previously, and compared to the left lung suggesting a ball valve type obstruction of the bronchus intermedius. In addition, there is increased density and mild volume loss of the right upper lobe.
3. Devil's thorn located at the entrance of the RMB
4. Thorn moved into a basket, noted that the thorn is covered with slimy mucus
5. Thorn moved into the subglottic region and removed with rigid forceps because it kept slipping out of basket
6. Post removal injury to the vocal cords is visible
7. Picture of the thorn demonstrating the horns



Patient 2: Figure 2 a-f:

1. Lateral soft-tissue neck radiographs performed in a 5 month old infant boy who had aspirated a Devil's thorn, with the patient imaged supine with horizontal beam shoot-through technique demonstrates the soft tissue density foreign body (blue arrow) in the subglottic regions of the large airway at the level of the C6 vertebral body. There is also associated pre-vertebral soft tissue swelling extending from C2 to T1 but there is no soft tissue gas noted.
2. Rigid bronchoscopy images demonstrating the thorn lodged in the subglottic area
3. Removal with rigid forceps , also noted is a groove or depression in the right vocal cord mucosa where the thorn lay prior to the intubation attempt
4. and (e) Devil's thorn extraction , noted the sharp horns and the process of removing it without the horns causing further airway damage
5. Follow-up radiograph performed after removal of the foreign body and with an enteric tube in situ demonstrates a clear airway and improved pre-vertebral soft tissue thickness without soft tissue gas.

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