

## Paint in the Pipe: An Unusual Foreign Body

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**Background:** Foreign bodies in the airway can be a diagnostic and therapeutic challenge.

**Case characteristics:** 30-month-old girl with complaints of noisy and fast breathing following fall over a pile of sand. Sand was suctioned out by direct bronchoscopy. The child improved initially but condition worsened in next four days with marked stridor and wheeze.

**Observation:** Imaging revealed elongated sharp radiodense opacity in the cervical region, suggestive of foreign body. At repeat bronchoscopy, paint material was removed from the airway, leading to recovery **Message:** Paint material mixed in the sand can adhere to the walls of the airway, and cause persistent symptoms of obstruction.

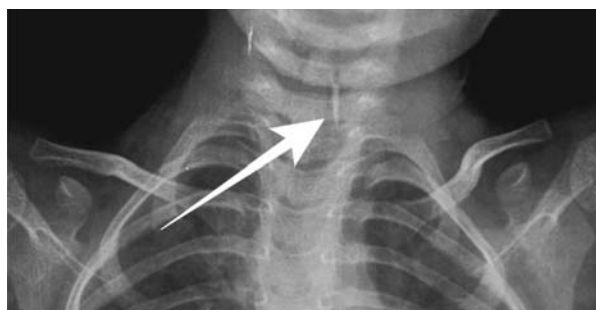
**Keywords:** Airway foreign body, Bronchoscopy, Stridor.

**T**racheobronchial foreign body aspiration in children aged between 1 to 3 years is a common medical emergency [1-4]. A long list of commonly aspirated objects amongst children is available [5]; though, aspiration of sand, gravel, or dirt is rare but potentially lethal. Majority of cases of sand aspiration reported so far share the common mechanism of either being buried accidentally under sand, dirt, or gravel masses at construction sites, as the result of the collapse of sand tunnels, sand castles and sand piles or during drowning [6]. We report a child with sand aspiration where symptoms persisted after removal of sand through bronchoscopy.

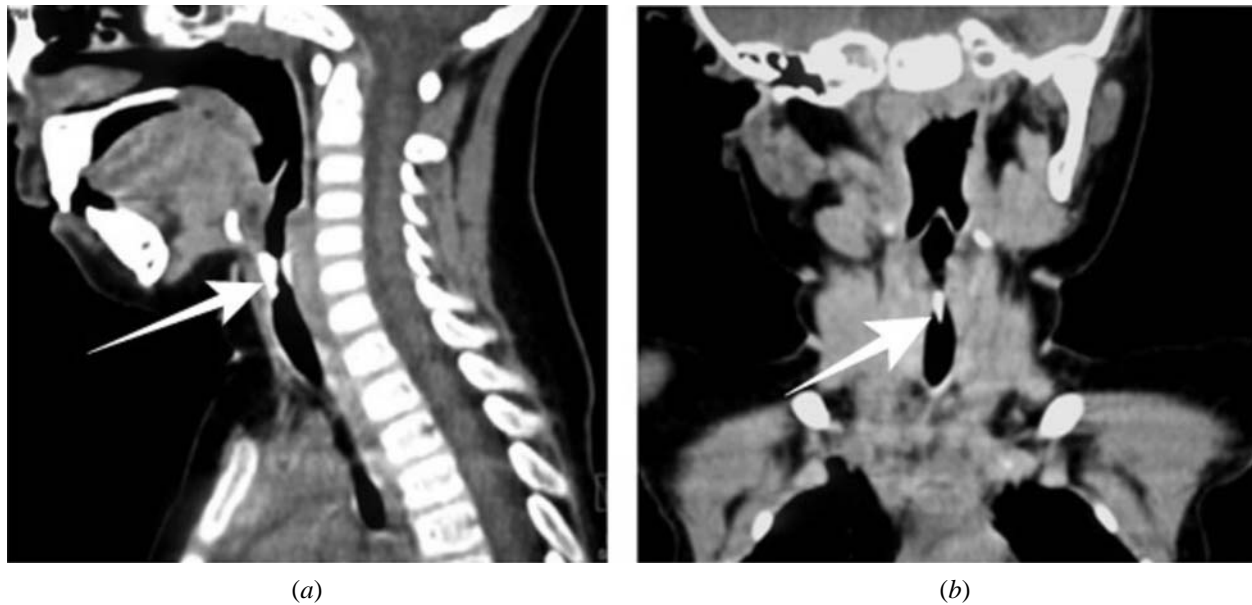
### CASE REPORT

A 30-month-old girl was brought by her parents to our hospital with complaints of sudden onset of noisy and difficult breathing for two days that started soon after accidentally falling over a sand pile while playing. There was no history of cough, fever, rhinorrhea, nasal congestion, or history of similar illness in past. Examination revealed inspiratory stridor and wheeze. Breath sounds were heard equally on both sides. Systemic examination was normal. Suspecting sand deposits as possible foreign body in airway, the child was taken up for emergency bronchoscopy. Sand particles were seen during bronchoscopy, and were suctioned out from trachea. Post-bronchoscopy, stridor and wheeze decreased; and the child was discharged after 24 hours. Four days later, child reported back with complaints of progressively increasing noisy breathing following initial improvement. There was

no associated history of cough, fever and cold. Examination revealed stridor and wheeze with equal breath sounds. Patient was treated with steroids and antibiotics considering the possibility of post-bronchoscopy edema. Frontal radiograph of the chest showed a well-defined, elongated pointed radio-opaque shadow in the airway at the level of C6-7 vertebrae, suggestive of impacted foreign body in the airway (**Fig. 1**). A Contrast-enhanced Computed tomography (CECT) of neck and thorax was planned in view of persistent symptoms and radio-opaque shadow on X-ray, which revealed an elongated structure isodense to bone, of an unusual shape with inferior sharp margin and superior rounded margin, appearing fixed to the anterior and posterior walls of airway straddling across its lumen, causing significant luminal narrowing, and lodged just below the expected location of true cords (**Fig. 2a and 2b**).



**FIG.1.** X-Ray Chest- Frontal view shows elongated pointed foreign body of metallic density (arrow) in the airway at C6-C7 level.



**FIG. 2** Contrast enhanced computed tomogram of the cervical Sagittal (a), and Coronal (b) multiplanar reconstruction of images reveal high density elongated structure with sharp inferior tip lodged in airway (thick arrow) straddling across its lumen, causing luminal narrowing (arrowheads).

Repeat bronchoscopy revealed greenish deposits of paint just below the glottis and in right main bronchus. Those 1-5 mm paint scrapings were removed using forceps. The aspirated material could not be sent for chemical analysis. Post-bronchoscopy, stridor and wheeze settled. Antibiotics and supportive care were continued for 48 hours. Child improved and on follow-up after one week, child was stable and free of symptoms.

#### DISCUSSION

Airway aspiration of sand presenting as respiratory distress is rare. Most of the accidental aspirations, notably those of children being buried under sand masses, improve after successful bronchoscopy treatment [6]. Majority do not require repeat bronchoscopy.

Sand is ubiquitously present and usually contains large or small sedimentary particles known as gravel and silt, respectively. It is usually composed of aluminium silicate, silicon dioxide and calcium carbonate as major components. The percentage of calcium carbonate present directly increases the 'radio opaque' property of the aspirated material [7]. At times it may mixed with other things like paint scrapings, small paper pieces and plastic material. Sand with thick bronchial secretions may get adhered to the mucosa, and can form casts in the airway due to its own nature and the mixed substances. Some particles can be larger than the diameter of suction catheter, and may cause

continuous plugging. Also, the sand particles can be too heavy to be lavaged easily and may require tedious, repeated manual extraction [8].

In this child, we assume that the paint material present in the sand adhered to the wall of the glottis, and could not be suctioned out during first bronchoscopy. The persistence of stridor and wheeze following emergency bronchoscopy was initially attributed to post-bronchoscopy edema as it is a well-known complication of bronchoscopy [9]. However, persistence of symptoms and radio-opaque sharp shadow on X-ray prompted us to evaluate the child for any retained foreign body, which in this case turned out to be solidified paint material.

The oil-based paint is composed of base, vehicle, pigment, thinner and dryer. Except for the vehicle and thinner, other three components are metallic. Commonly used bases are zinc oxide, iron oxide and metallic powder (Aluminium, Copper, and Bromium), which make the film harder. Calcium carbonate, mica, silicas, and talcs are used as pigment that gives the paint its colour. Organic salts of iron, zinc, lead, manganese and calcium helps in drying [10]. These radiopaque metallic components of paint made the findings evident on radiograph and CT scan in our case. Also being metallic in composition, these paint scrapings were capable of initiating an inflammatory response, which probably led to previous worsening of symptoms compared to the size of foreign material.

Irregular foreign bodies or orientation in sagittal plane may produce only partial obstruction allowing adequate air movement around the obstruction. Later worsening of symptoms in this child can be explained by the fact that air passage realigned the paint scrapings to anterior and posterior walls causing worsening of obstruction and stridor. We could not trace any other report of paint material being aspirated by the children and presenting with obstructive symptoms.

We suggest the need of follow-up and re-evaluation in case of persistence of symptoms and radio-imaging before and after bronchoscopy in cases of sand aspiration. Cases of sand aspiration should be viewed with caution as there could be other material mixed in it.

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