

Case Report

Dangerous blind tracheal intubation attempt due to fiberscope non-availability in a pediatric patient with retropharyngeal abscess caused by a large fish bone

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Abstract: In China, foods containing bones are sometimes fed to young infants. Occasionally, this practice results in bone aspiration and retropharyngeal abscess, a potentially life-threatening infection in the deep space of the neck that can compromise the airway. The main concern in managing patients with retropharyngeal abscess is airway management. In China, not all hospitals and operating rooms are equipped with fiberscopes, particularly pediatric-size fiberscopes. Emergency airway management can be dangerous when a fiberscope is unavailable. We present the case of a 21-month-old baby girl with a retropharyngeal abscess secondary to fish bone ingestion. During an attempted blind tracheal intubation due to fiberscope non-availability, the abscess ruptured, and the pus released from it obstructed the airway. The patient was successfully treated despite the inadequate resources and dangerous complication. We recommend a detailed preoperative airway assessment and preparation for fiberoptic tracheal intubation in such patients to prevent this dangerous complication.

Keywords: Fish bone, retropharyngeal abscess, tracheal intubation

Introduction

We describe the case of a pediatric patient with retropharyngeal abscess that was particularly challenging to treat. Due to fiberscope non-availability, we inadvertently inserted an endotracheal (ET) tube into the esophagus. Pus from the ruptured abscess obstructed the airway and prevented tracheal intubation under vision. The patient was successfully managed with the reverse Trendelenburg position and quick suctioning of the pus to maintain spontaneous ventilation. However, we emphasize the need for a detailed preoperative airway assessment and preparation for fiberoptic tracheal intubation in patients with retropharyngeal abscess to prevent the dangerous complication encountered.

Case report

A 21-month-old girl was referred from a peripheral hospital to the ear, nose and throat (ENT) unit of our hospital with a 1-week history of dys-

phagia, 5-day history of fever and 4-day history of neck swelling.

She had one episode of vomiting while eating sea fish porridge 1 week ago, but no fish bone had been observed. Subsequently, she could only drink milk and was reluctant to eat solid foods. Two days later, she could only drink water and could not eat solid and semi-liquid foods. She developed a high-grade fever with bouts of cough, but no associated weight loss. Her mother observed neck swelling 4 days prior to presentation at our hospital; the swelling was progressive, painful and associated with limited neck movements. The patient expectorated a thick tenacious secretion and had episodes of irritability and excessive crying. Approximately 4 days before being admitted to our hospital, the child was noticeably breathless and was treated for pneumonia with an antitussive and antibiotics at a local hospital.

The patient's neck showed diffuse tender swelling. Positive results of laboratory tests included

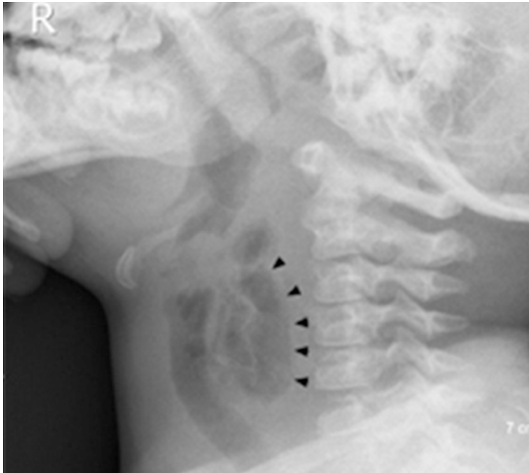


Figure 1. Lateral plain radiograph of the neck shows that the prevertebral space has widened and that there is a mixed opacity and lucent cavity (arrowheads), which is suggestive of retropharyngeal abscess formation.



Figure 3. Sagittal reformatting of the MDCT image of the same patient shows the relationship of the foreign body (small arrows), and gas-filled (broad arrow) and pus-filled portions (arrowheads) of the abscess. These findings correlate with the radiographic features.

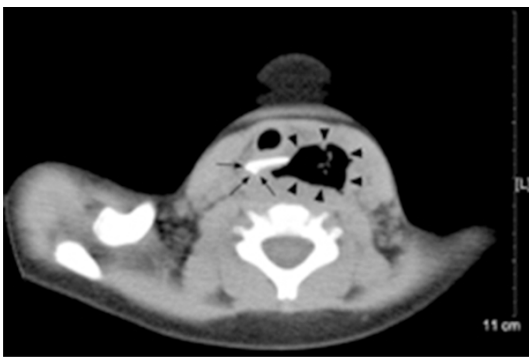


Figure 2. Axial contrast-enhanced multidetector computed tomographic (MDCT) image confirms the presence of a hyperdense foreign body (arrows) and a gas-filled component in the abscess (arrowheads).

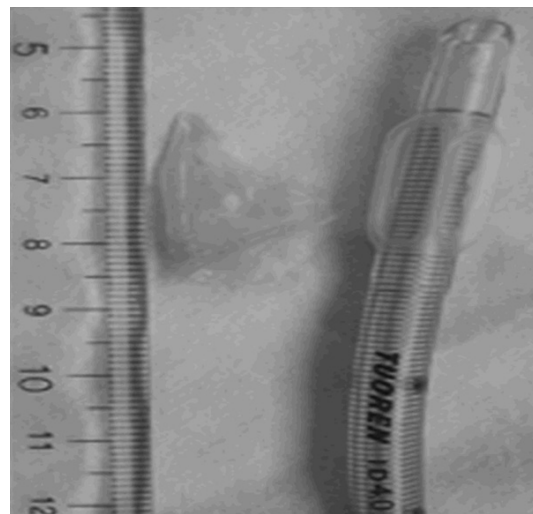


Figure 4. Fish bone removed from the abscess cavity and tracheal tube tip.

the following: white blood cell (WBC) count, $30.23 \times 10^9/l$ at 4 days; and WBC count, $11.69 \times 10^9/l$ and C-reactive protein (CRP), 28.9 mg/l at 1 day prior to admission.

A radiograph of the neck and chest showed that the retropharyngeal space had widened, but there was no definite radiopaque foreign body (**Figure 1**). A preoperative computed tomographic scan with contrast revealed a hyperdense material measuring 16 mm \times 25 mm \times 4 mm (suggestive of a foreign body) in the cricopharyngeal region and an abscess with an upper gas-filled portion and lower pus-filled portion. The abscess measured 45 mm \times 25 mm \times 64 mm (compatible with a retropha-

ryngeal abscess) and was located in the retropharyngeal region between the C3 and C7 vertebrae (**Figures 2 and 3**).

The remaining findings of the physical and laboratory examinations were within normal limits.

The patient was resuscitated with intravenous fluid and antibiotics and was taken for examination under anesthesia and drainage of the abscess. The patient was placed in the anti-Trendelenburg position while under general anesthesia.

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After standard monitoring, anesthesia was induced using 8% sevoflurane via a mask, and an intravenous access was established with a 24-gauge catheter on the right foot. Next, the patient was allowed to spontaneously breathe 3% sevoflurane for several minutes. Tracheal intubation was attempted after 2 mg/kg propofol has been administered intravenously.

Laryngoscopy revealed no visible glottic structures (Cormack and Lehane grade IV). Application of optimal external laryngeal manipulation (OELM) enabled visualization of the tip of the epiglottis, which was very edematous. Blind intubation was attempted. A strong resistance was encountered, and the ET tube could not be further advanced. The process of intubation was aborted, and a large fish bone measuring 2.7 cm long was found stuck to the plastic cuff of the ET tube when the tube was pulled out (**Figure 4**). The patient could be manually ventilated at this time. A second blind intubation with a cuffed tube with an internal diameter of 4 mm was attempted after the patient had received 1 mg/kg propofol and became apneic. Copious purulent fluid was observed upon ET tube placement, which was accomplished without any resistance. Immediate suction via the ET tube was performed, and normal saline was added to facilitate the suctioning process. No breathing sounds were heard over the chest, and the capnographic reading was 0 mm Hg when the ventilation began. The SpO₂ of the patient rapidly dropped to 15%, and her heart rate dropped to 56 beats/min. The ET tube was removed. All of the above findings indicated the occurrence of an abscess rupture and esophageal intubation. Manually assisted ventilation with a face mask was resumed until the patient returned to normal breathing, and her SpO₂ and heart rate increased to 98% and 127 beats/min, respectively. After proper preparation, the patient was successfully intubated with a cuffed tube (internal diameter, 3.5 mm); the laryngeal structures were partially visible under laryngoscopy at this time. The ET tube cuff was inflated before surgery. Anesthesia was maintained with 3% sevoflurane in oxygen at 2 l/min.

A Boyle-Davis mouth gag was gently introduced to expose the oral cavity and oropharynx. A cruciate incision was made using a size-11 surgical blade, and a surgical probe was introduced to break down all loculi. The remaining pus was

drained from the abscess cavity. Hydrogen peroxide solution, gentamicin and physiological saline were separately and sequentially injected to flush the pus cavity. No foreign body residue was observed after flushing.

After the surgery, she was transferred to the pediatric intensive care unit (PICU) with the ET tube in place. She was sedated and received synchronized intermittent mandatory ventilation (SIMV). Her condition was stable during her stay in the PICU. She was extubated and transferred to the ward on the next day. She continued to receive intravenous antibiotics, analgesics and anti-inflammatory agents. She was discharged on the 12th postoperative day.

Discussion

A retropharyngeal abscess is an infectious abscess located in the retropharyngeal space deep in the neck [1-3]. An abscess in this location is an immediate life-threatening emergency because it has the potential to compromise the airway and induce other catastrophic complications [3]. Tracheal intubation can be very difficult and dangerous in patients with retropharyngeal abscess because the pharyngolaryngeal anatomy is distorted; the abscess may be ruptured by the laryngoscope blade or ET tube, blocking the view of the airway [4].

The present case illustrates the importance of determining the precise position of an ingested foreign body and of meticulously preparing for a difficult airway intubation to avoid the risks of blind tracheal intubation in patients with retropharyngeal abscess.

Foreign body aspiration is a common complaint in children [5], and generally, food is the culprit [6]. Parents must be taught about the danger of feeding infants and young children foods that contain bones. In a recent report on food-related PICU admissions, Hon et al. reported that dry mango, bone and different substances had been fed to young children and that these materials resulted in food impaction in the criopharynx and airway obstruction [6]. In Western society, it is highly unusual for parents to feed infants and young children bone-containing foods. Bones are generally removed from foods, such as fish and chicken, so that only fish filets and chicken breast are consumed. However, in China, a few parents con-

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sider that it is more nutritious and tasty to cook fresh fish and chicken whole. It is difficult to confirm at what developmental age children are able to handle hard and indigestible foods; however, it is certain that a young child would not be able to perform such a task.

Foreign body management with a fiberscope is not widely available in China. Thus, the management of patients with ruptured retropharyngeal abscess is very dangerous, particularly in local hospitals that are not equipped with fiberscopes.

The following lessons were learned from this case. (a) During difficult airway intubation in patients with retropharyngeal abscess, esophageal intubation and abscess rupture are obvious risks, as the mass effect of the abscess distorts the airway anatomy. (b) The purulent fluid released from the ruptured abscess can block the ET tube and contaminate the entire upper respiratory tract; however, the decrease in the size of the abscess makes visualization of the laryngopharyngeal area easier. Spontaneous ventilation should be maintained in such a scenario.

In the present case, ET intubation was very dangerous because blind intubation is not a good choice in such cases. First, the site and origin of the pharyngeal abscess must be confirmed, and second, the abscess must be drained immediately without ET intubation with the patient in a supine and head-low position to avoid suffocation. Fortunately, our patient survived the asphyxiation from the blind intubation and rupture of the retropharyngeal abscess, leaving a lot to be learned for both the anesthesiologists and otolaryngologists who treat patients with retropharyngeal abscess.

Disclosure of conflict of interest

None.

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