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Case report

Vagal reflex stimulation complicating retrieval of an unusual foreign body from the laryngotracheal lumen: Case report

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Abstract Foreign body impaction in the aero digestive tract is a life-threatening emergency, particularly in the paediatric age group. Removal under general anaesthesia poses both surgical and anaesthetic challenges and this may rarely result in mortality. We report a case of a 4 year old boy with an unusual foreign body (FB) impacted in the laryngotracheal causing difficult intubation and precluding tracheostomy with attendant vasovagal reflex stimulation and cardiac arrest. Clinical presentation and radiological evaluation of the patient were highlighted with a review of pertinent literature. We conclude that dis-impacting a foreign body in the trachea could potentiate bradycardia and cardiac arrest; co-existing hypercarbia and/or sepsis increase the risk and worsen the prognosis.

1. Introduction

Foreign body aspiration is a common cause of accidental death in the paediatric age group worldwide; the under-five age group are the most at risk [1,2]. It often presents as an emergency, necessitating prompt surgical intervention. However, in most cases the event leading to aspiration or ingestion of FB by the child is not witnessed by adult [2,3]. Hence, diagnosis is delayed with higher risk of complications and fatality. In the united state, foreign body in the aero digestive tract is the sixth most common cause of accidental death; accounting for 500–3000 paediatric mortality per year [4]. Majority of such death occur before getting to the hospital due to poor awareness among caregivers and delayed diagnosis [1,2]. Retrieval under general anaesthesia could also be fraught with surgical or anaesthetic complications with resultant morbidity and mortality.

2. Case report

A previously well four-year-old boy was referred from a rural health centre in the North-Central Nigeria; 432 km away from

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the tertiary health service in the city of Ilorin. He presented with eleven day history of accidental aspiration of a FB. He was said to have been playing alone under a tree in the farm when he suddenly developed respiratory distress. He later developed associated restlessness, pain distress with low cry, inability to sleep, and difficulty in breathing and swallowing. No associated cough, chest pain, haemoptysis or hematemesis, and no cyanosis were found. There was no event of FB ingestion witnessed by any member of the family until radiological investigation revealed a radiopaque object in the airway (Figs. 1 and 2). Patient was subsequently transferred to our tertiary referral unit for further management as no attempt at removal could be made at the rural health centre and several other peripheral hospital attended (over eleven days) due to lack of necessary equipment and specialist manpower.

At presentation at our emergency unit (eleven days later), child was found to be acutely ill looking, in severe respiratory distress with stridorous breathing; he appeared extremely weak and dehydrated. He was mildly pale, anicteric and a cyanosed. Pulse rate was 125 bpm, respiratory rate was 34 cpm, Blood pressure was 90/60 mmHg and arterial oxygen saturation (SpO_2) was 90%. There was demonstrable tenderness on the anterior neck region but no swelling. Auscultation of the chest revealed a reduced air entry with bronchial breath sounds.

Further review of the X-ray soft tissue neck revealed a radio opaque shadow of a bent nail lying obliquely across the subglottic region and the upper tracheal rings; the sharp end of the nail lies at the level of the 2nd cervical vertebral and the head at the level of the 6th cervical vertebral. There was no significant widening of the prevertebral shadow. Patient was consequently prepared for emergency direct laryngoscopy and foreign body removal.

Intubation was practically impossible as the foreign body blocked the laryngotracheal lumen. Although anaesthesia via tracheostomy tube had been planned in anticipation of difficult intubation, this was not possible because the tracheostomy tube could not be inserted into the tracheal lumen as the incision line fell directly on the foreign body (nail), which was wedged and impacted within the tracheal lumen. The FB was visible through the anterior tracheal incision and a slight retraction of the incision edges allowed insinuation of a forceps to grasp the nail. However, further attempt at dis-impacting the nail and delivering it out through the tracheal incision provoked bradycardia from vasovagal reflex leading to

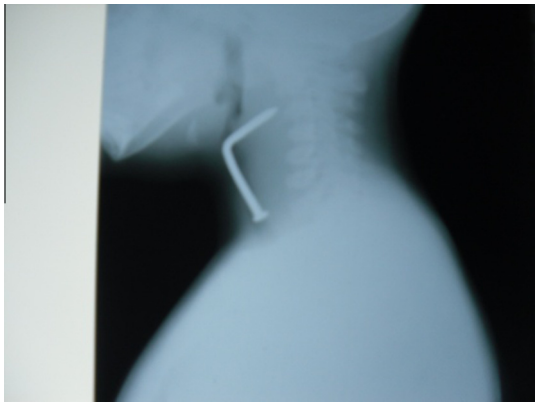

Figure 1 X-ray soft tissue neck, lateral view; showing a bent nail impacted in the laryngotracheal.

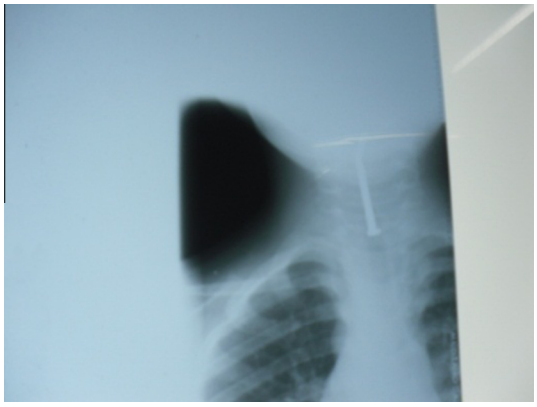

Figure 2 X-ray soft tissue neck, anterio-posterior view; showing a bent nail impacted in the trachea.

intraoperative cardiac arrest. The patient was resuscitated with return of spontaneous cardiac activity within four minutes of the arrest. Ventilation was continued through a face mask while a size 8 naso-gastric tube was adapted in place of a tracheostomy tube. The naso-gastric tube was threaded into the tracheal lumen through the tracheal incision negotiating the narrow spaces beside the impacted foreign body. The tube was then connected to the anaesthesia machine via an Ayre's T-piece breathing circuit using an empty 5 ml syringe with the plunger removed and the flange cutoff as an adaptor (Fig. 3). This enabled us to provide sufficient intermittent positive pressure ventilation to maintain SpO_2 above 96%. With the patient paralysed at an adequate depth of anaesthesia, direct laryngoscopy was performed. The impacted, rusted bent-nail was then gently dis-impacted and removed using a grasping forceps. However, the patient had a repeat cardiac arrest before the end of the procedure necessitating another episode of cardiopulmonary resuscitation. There was return of spontaneous cardiac activity but the patient did not regain consciousness and spontaneous ventilation did not resume despite reversal of neuromuscular blockade. The patient was transferred to the ICU where mechanical ventilation was commenced. However, there was another cardiac arrest within four hours of ICU admission from which the patient could not be resuscitated and was subsequently certified dead. While oxygenation was relatively maintained, hypercarbia could not be ruled out as a contributing factor to repeated intraoperative cardiac arrests, as carbon dioxide monitoring was not done because it was not available at our centre at that time.

3. Discussion

Our patient belongs to under-five age group, which is known for high risk of foreign body in the Ear, Nose and throat region because of their curiosity and habitual exploration of body orifices with objects. Although commonly aspirated objects are coins, fish bone, toy parts, pins and needles [2,5], our patient aspirated an unusually bent rusted 6-inches nail which size and shape one would ordinarily consider impossible for a 4 year old infant to swallow or aspirate. Cobanoglu et al. demonstrated that any object held with the lips could be propelled into the airway by coughing, taking a deep breath, laughing or speaking [6].