Case Report

Difficulties in the removal of whistle foreign body in the left bronchus

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ABSTRACT

Background: Tracheobronchial foreign bodies are one of the most common critical conditions in otorhinolaryngology. The mortality rate due to foreign body aspiration in children under 5 years old is quite high. The increased incidence of foreign body aspiration was triggered by the tendency of children to put everything in their mouths when crying, screaming, running, and playing. **Purpose:** To report difficulties in the management of a whistle foreign body in the left bronchus. **Case report:** A 9 years old boy, was brought to Prof. Ngoerah Hospital on December 19th, 2023, with a complaint of coughing for 2 days, because he accidentally choked on a whistle while playing. However, the results of thoracic X-ray and CTscan did not show a clear foreign body in the form of a whistle. **Method:** Literature search was conducted using keywords ”whistle foreign body in left bronchus” OR ”whistle foreign body” OR ”foreign body in left bronchus” AND ”bronchoscopy management” in Medline and PubMed from 2019–2024. **Result:** A total of 21 literatures was found, and 12 could be used as references. **Conclusion:** The management of foreign body in the bronchus is challenging in diagnostic and bronchoscopy procedures.

Keywords: foreign body, whistle, choked, pneumonia, bronchoscopy

ABSTRAK

Latar belakang: *Benda asing (BA) trakeobronkial merupakan salah satu kondisi kritis yang paling umum dalam bidang Otorinolaringologi. Angka kematian akibat aspirasi BA pada anak di bawah usia 5 tahun cukup tinggi. Peningkatan insiden aspirasi BA dipicu oleh kecenderungan anak-anak untuk memasukkan segala sesuatu ke dalam mulut saat menangis, berteriak, berlari, dan bermain.* ***Tujuan:*** *Melaporkan kesulitan dalam penanganan BA berupa peluit di bronkus kiri.* ***Laporan Kasus:*** *Seorang anak laki-laki berusia 9 tahun dibawa ke Instalasi Gawat Darurat Rumah Sakit Prof. Ngoerah pada 19 Desember 2023, dengan keluhan batuk selama 2 hari, sebelum dibawa ke rumah sakit, karena tidak sengaja tersedak peluit saat bermain. Namun, hasil foto Rontgen toraks dan* CTscan *tidak menunjukkan BA berupa peluit dengan jelas.* ***Metode:*** *Tinjauan literatur dengan kata kunci “benda Asing Pluit di Bronkus Kiri” ATAU “Banda Asing Pluit” ATAU “Benda Asing di Bronkus Kiri” ATAU “Tatalaksana Bronkoskopi”. Pencarian dilakukan di* Medline *dan* PubMed *dari tahun 2019 - 2024.* ***Hasil:*** *Didapatkan 21 literatur, dan 12 diantaranya dapat dijadikan referensi.* ***Kesimpulan:*** *Penanganan BA di bronkus merupakan tantangan dalam prosedur diagnostik dan bronkoskopi.*

Kata kunci: *benda asing, peluit, tersedak, pneumonia, bronkoskopi*

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INTRODUCTION

Tracheobronchial foreign bodies (FBs) are one of the most common critical conditions in otorhinolaryngology. Tracheobronchial FBs are more common in infants aged 1-3 years because of anatomy, physiology, feeding habit, infant curiosity, and other factors. The complications and mortality rate due to these conditions are relatively high.[1] FB aspiration is statistically reported to occur in the hypopharynx (5%), larynx-trachea (12%), and bronchi (83%). FB aspiration cases are reported to be frequently happend in children younger than 15 years old. A recent study on FB aspiration showed the incidence of aspiration was more common in males (60%).[2]

The presence of clinical symptoms may be varied by the degree of obstruction, location, nature, shape, size, and the duration of the FB in the airway. Patients might be asymptomatic and the only evidence of aspiration was found during history-taking, but sudden-onset of coughing, choking and/or shortness of breath are the most common symptoms.[1]

FBs that have been in the airway track for a long time may present with symptoms or signs, which are similar with respiratory distress syndromes such as asthma, bronchitis, or pneumonia. As a result, the initial diagnosis is often incorrect, and patients experience delays in treatment. Thoracic X-rays are often used as an initial instrument to investigate cases of FB aspiration in the airway, which will show images of atelectasis, pneumothorax, and air trapping. However, thoracic X-rays in some studies often appear normal, or difficult to distinguish from other cases of lung abnormalities. Deeper understanding into airway FB is necessary to diagnosis and adequate management.[1,5]

In cases of airway FBs, airway obstruction often happens. Airway patency is important in the management of FBs. Bronchoscopy is the management of choice in airway FB cases, which in some situations are not easy, and often meet difficulties. Difficulties in bronchoscopy are generally caused by the location, position, shape, and size of the foreign body, as well as the infection that occurs, as the reaction to the foreign body.

CASE REPORT

The patient was a 9-year-old boy, referred from Regency Hospital with a suspected whistle foreign body in the airway, and arrived at the Emergency Room (ER) of Prof. Ngoerah Hospital on December 19th, 2023 at 20.05, with complaints of coughing for the last 2 days. The patient's parents reported that he had accidentally choked on the whistle while playing with it, four days previously. Initially, the patient's parents did not know that the boy had choked on the whistle, because there was no witness to the incident. The family only found out after the patient coughed, along with the sound of the whistle. The patient had been coughing continuously for 2 days, and producing yellowish sputum, without blood in the sputum. The patient's breathing sound was accompanied by a whistle sound, especially when the patient coughed. Complaints of hoarseness, nausea, and vomiting were denied.

He had a fever since one day before, with temperature of 38^{o}C. The history of other previous illnesses was denied. The patient's development since birth was normal, with no history of developmental delay or mental retardation.

The patient came to the ER of Prof. Ngoerah Hospital in a stable condition, with Glasgow Coma Score (GCS) 4-5-6. At the time a physical examination was carried out, the patient felt a little short of breath; and it was found that the heart rate was 98 beats/minute, respiratory rate was 24 beats per minute, the temperature was 37.2^{o} C, and the O2 saturation was 95%. There were no signs

of anaemia, jaundice, cyanosis, or dyspnoea. There were no abnormalities in the ears, nose, or throat. On auscultatory examination of the thoracic region, there was a decrease in vesicular sounds, with rhonchi, wheezing, and rales in the left lung.

The patient had taken anteroposterior and lateral thoracic X-rays at Buleleng General Hospital, and the results were: Consolidation in the middle to lower region of the left lung which gave the impression of left lung aspiration pneumonia; no foreign body was seen in the right lung or left lung. (Figure 1)

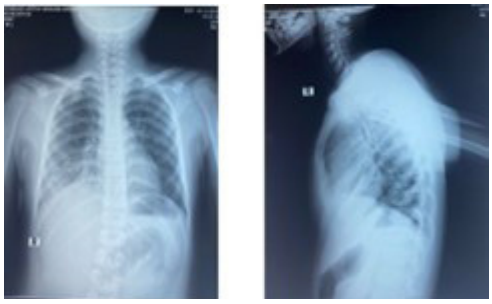

Figure 1. Anteroposterior and lateral thoracic X-rays

Hence, a thoracic CTscan was performed on December 19th, 2023, with the following results: The impression of no visible foreign body in the airway and gastrointestinal tract was visualized; there was a thick liquid density in the lumen of the left main bronchus *suspected of mucous plug;* and obstructive pneumonia of the superior segment of the inferior lobe of the left lung. (Figure 2)

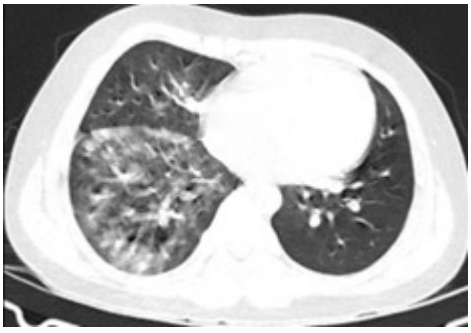

Figure 2. CT scan of the thorax

On December 22nd, 2023, bronchoscopy was performed. An FB in the form of a whistle was found in the left main bronchus, covered by edema and accumulation of mucus, along with excoriation of the bronchial wall, and minimal bleeding. (Figure 3)

Using pediatric rigid forceps, the mucus was then cleaned, and attempted to extract the FB; which unfortunately failed. Afterwards, extraction was exerted using a flexible bronchoscope, but also failed. The failure was caused by the inability of the forceps to grasp the whistle, as the whistle was very firmly attached to the lumen, and the whistle only had a very tiny partition in the middle (Figure 4), making it very difficult to seize. Eventually, using a wire ureterorenoscope combined with a rigid 0° pediatric telescope, the whistle could be pinched, and successfully removed. (Figure 5) The whistle foreign body diameter was 0.5 cm, and 1.5 cm of length. (Figure 6)

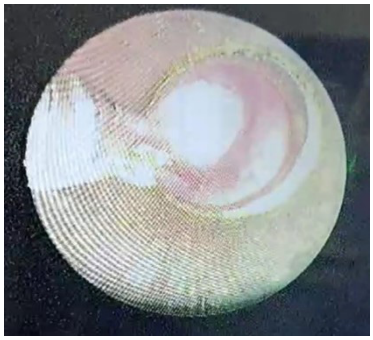

Figure 3. Rigid bronchoscopy image of a whistle foreign body in the main segment of the left bronchus

Figure 4. The shape of whistle foreign body with a partition in the middle

Figure 5. Modified extractor device, consisting of a wire ureterorenoscope and a pediatric rigid 0° telescope

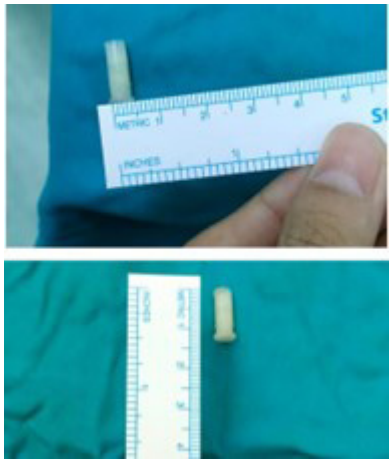

Figure 6. The whistle diameter was 0.5 cm, and 1.5 cm of length

Afterwards, the patient was transferred to the Pediatric Intensive Care Unit. Follow-up was conducted on December 23rd, 2023, the patient had no shortness of breath, no fever, and from a physical examination, there was no rhonchi, no wheezing, nor decreased breath sounds.

The patient was discharged on January 3rd 2024, with no complaints of cough, shortness of breath, nor fever. The patient came to the Pediatrics Clinic for check up on January 6th, 2024, without any complaints.

METHOD

Literature search was conducted on January 4th 2024, with the keywords "whistle foreign body in left bronchus" AND "whistle foreign body" AND "foreign body in left bronchus" AND "bronchoscopy management" in Medline and PubMed from 2019-2024. Literature on other abnormalities in the bronchi was excluded from this analysis.

RESULT

From 2019 to 2024, a total of 21 literatures found, and 12 of them could used as references.

DISCUSSION

Foreign bodies in the airway are life-threatening events. Boys less than 3 years old are at greater risk, due to immature teeth and poor pharyngeal reflexes. Children often explore their surroundings and put things in their mouths, such as nuts, seeds, and plastic materials. The increased incidence of foreign body aspiration is contributed by the tendency of children to have something in their mouth at the same time as crying, shouting, running, and playing.[4] In this case, the patient was a 9-year-old boy, above the age of 3 years, which is a more mature age than the average study. This case occurred due to he accidentally choked on a whistle while playing it into his mouth.

In this case, the symptoms found were cough with phlegm. A whistle sound was also heard simultaneously when the patient coughed. On physical examination, there was a decrease in left lung sound and wheezing when the patient exhaled. This was in accordance with research conducted by Khavidaki et al. (2021), cited by Jang et al,[5] which stated that in examining patients with foreign bodies in the airway, complaints of coughing were often found in 68%, wheezing sounds in 52.8%, and a decrease in breath sounds in the chest where there was a foreign body in 61.45%.

The locations of foreign bodies in the airway are most often in the right bronchus (70%), trachea (17%), and left bronchus (13%) because of the right bronchus has

wider lumen rather than the left bronchus, and the angle between the right bronchus from lateral to midline are more sloping than the left bronchus.[6] Kumar et al.[7] mentioned that the location of a foreign body in one of the bronchi depends on the age and physical position of the patient at the time of swallowing the foreign body. . In this reported case, the foreign body was located in the left bronchus. The Bernoulli principle occured, as the velocity of a fluid increases, its pressure decreases. The right and left lungs have the same pressure, but the left lungs have smaller diameter, so the pulling velocity during inspiration is greater toward the left lung, and causes small foreign body to more likely to fall towards the left lung.[8]

In this case, the chest X-ray image showed a pneumonia process, yet did not show the presence of a foreign body; which factually entered 4 days before, hence an infection process had occurred, and the foreign body in the form of plastic was a radiolucent object. According to Eren et al.[9], a normal apperance in a plain chest X-ray could not exclude the possibility of a foreign body in the airway. Meanwhile, the results that could be used as a sign of a foreign body in the airway through X-rays were the following: air trapping, hyperinflation, atelectasis, consolidation and pulmonary infiltration, or pneumonia.[10]

In this case, a CTscan was performed, and the results were not adequate to provide a clear picture of the presence of a whistle foreign body. CTscan was performed since the foreign body was not visible on the thoracic X-ray, and to clearly ascertain the location of the object. CT scan examination has a positive predictive value of 93.3%, and a negative predictive value of 100%, for detecting foreign bodies in the airway.[11]

The CTscan result revealed that the foreign body of the whistle in this case was combined with the presence of oedema of the lumen of the left bronchus, excoriation of the left main bronchus, minimal bleeding, and a pile of secretions covering the foreign body. This was a dilemma when performing the action, where this condition is issued from the inflammatory process and infection that occurs after the foreign body exceeds 24 hours in the bronchus.[12] The presence of infection caused swelling in the lumen of the bronchus, resulting in the position of the foreign body stuck tightly to the mucosa that had no gap, so that the forceps was unfeasible to grasp.

The type of foreign body in this case was a hard and slippery plastic-based whistle, with a small size and a very small partition in the center (Figure 4), causing difficulties in performing extraction where this whistle could not be grasped by ordinary rigid or flexible forceps. There were similar cases at Dr. M. Djamil Hospital, Padang, which had been published, stated that there were 3 cases of foreign body whistles in the bronchus, in 2015.[13]

Of the three cases at Dr. M. Djamil Hospital, Padang and compared with cases found at Prof. Ngoerah General Hospital, there were similarities in extraction techniques, in which all used bronchoscopy as a management option. However, there were differences in the type of material of the whistle, and the extraction tools used. As the FB cases at RSUP Dr. M. Djamil Padang the type of whistles was made of rubber and soft (Figure 7), so they were easy to handle using alligator forceps, while at Prof. Ngoerah General Hospital, the modified forceps consisting of a wire ureterorenoscope combined with an 0° endoscope (Figure 8) were used, because it was difficult to grip the FB with regular or flexible forceps.

Figure 7. Whistle foreign body in a case at RSUP Dr. M. Djamil Padang

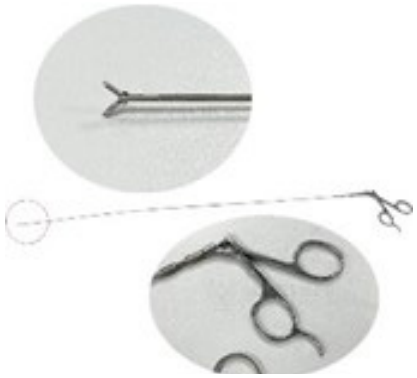

Figure 8. Modified extractor tip

The management of respiratory foreign bodies is still a matter full of challenges both in terms of establishing the diagnosis and the treatment, where the anamnesis sometimes shows no typical signs and symptoms, such as no witnesses to see, especially in children, thus, the physical symptoms are occasionally asymptomatic.

Likewise, the results of radiological investigations, in some cases, could not provide a clear sight of the object. It is very necessary to have a high level of caution for foreign body aspiration in order the management could be optimal.

In this reported case, there were difficulties when conducting the extraction. The difficulties occurred due to the infection process as well as the type and shape of the object; consequently, a modified tool had to be used to be able to remove the whistle.

In conclusion, the occurrence of tracheobronchial foreign body aspiration is a difficult case and requires skill and righteous collaboration between medical disciplines.

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