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Case Report

Delayed Diagnosis of a Tracheobronchial Foreign Body: A Case Report on Peanut Shell Aspiration and Management Challenges

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A B S T R A C T

Abstrak

Latar Belakang: Diagnosis Aspirasi benda asing trakeobronkial yang terlambat sering kali menyebabkan komplikasi yang signifikan, termasuk pneumonia dan bronkiektasis. Gejala aspirasi benda asing dapat menyerupai kondisi pernapasan lainnya seperti asma, pneumonia, atau virus croup, yang menyebabkan kesalahan diagnosis. Bronkoskopi kaku tetap menjadi baku emas untuk pengangkatan benda asing trakeobronkial.

Tujuan: Memahami diagnosis dan tatalaksana aspirasi benda asing yang tertunda di trakeobronkial

Laporan Kasus: Seorang anak laki-laki berusia 2 tahun dibawa oleh orang tuanya ke poliklinik rawat jalan THT-BKL RSUP Dr. M. Djamil Padang, dengan keluhan utama sesak nafas disertai batuk sejak 1 bulan sebelum masuk rumah sakit. Orang tuanya tidak mengetahui secara pasti kapan aspirasi yang terjadi, pasien didiagnosis dengan suspek benda asing "Kacang" pada bronkus. Pasien menjalani tindakan ekstraksi benda asing dengan bronkoskopi kaku dan forsep penjepit fleksibel

Kesimpulan: Penatalaksanaan aspirasi benda asing yang tertunda perlu dilakukan secara komprehensif, dan ditangani tepat waktu, koordinasi antara keluarga, pengasuh, dokter spesialis dan pengetahuan tentang gejala, risiko dan komplikasi aspirasi benda asing harus lebih dipahami. Deteksi dan penanganan dini dapat secara signifikan mengurangi risiko masalah pernapasan jangka panjang, dengan menggunakan bronkoskop kaku dan forsep fleksibel benda asing dapat dikeluarkan dengan baik dengan komplikasi minimal dan visualisasi yang baik.

Kata Kunci: Keterlambatan diagnosis, benda asing trakeobronkial, bronkoskop kaku, fleksibel forsep

What is already known about this topic?

Tracheobronchial anatomy and physiology.

What does this study add?

An education for diagnosis and management of delayed foreign body in tracheobronchial.

Abstract

Introduction: *Delayed diagnosis of tracheobronchial foreign body aspiration often leads to significant complications, including pneumonia and bronchiectasis. Symptoms of foreign body aspirations can mimic other respiratory conditions such as asthma, pneumonia, or viral croup, leading to misdiagnosis. Rigid bronchoscopy remains the gold standard for the removal of tracheobronchial foreign bodies.*

Objective: *To understand the diagnosis and management of a delayed aspiration foreign body in tracheobronchial.*

Case Report: *A 2 years old boy was brought by his parents to outpatient clinic ORL-HNS of Dr. M. Djamil Hospital Padang, with chief complaints difficulty in breathing with cough since a month before admission. The parents do not know exactly what kind of aspiration incident occurred; patient was diagnosed suspected foreign body "Peanut" on bronchus. The patient underwent foreign body extraction using rigid bronchoscope and flexible grasping forcep.*

Conclusion: *Management of delayed foreign body aspiration needs to be done comprehensively, and treated on time, coordination between family, caregivers, specialists and knowledge about symptoms, risks and complications of aspiration foreign bodies should be better understood. Early detection and treatment can significantly reduce the risk of long-term respiratory problems, by using rigid bronchoscope and flexible forceps foreign bodies can be removed properly with minimal complications and good visualization.*

Keyword: *Delayed diagnosis, tracheobronchial foreign body, rigid bronchoscope, flexible forceps.*

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Introduction

Tracheobronchial Foreign Body (FB) is one of the most common acute and severe diseases in children. Previous research has shown that tracheobronchial FB for 7.9–18.1% of accidental injuries in children aged 0–14 years in China and 80% in children aged 1–3 years.[1] FB in children increases as soon as they acquire prehension with a peak around the age of two. Over 75.4% of inhalation accidents occur in children under three years of age, Zuleika also reported that, in a review of 81 cases in M. Hoesin hospital Palembang, 77.8% of tracheobronchial foreign body aspirations occurred in children under 5 years of age, 16% in children aged 5–15 years, and 6.2% in individuals older than 15 years.[2,3]

Delayed presentation of tracheobronchial foreign body aspiration often leads to significant complications, including pneumonia and bronchiectasis. In the study, 44.4% of patients presented after one month.[4] with many misdiagnosed as bronchopneumonia, delayed diagnosis of foreign body aspiration in low setting resources is related to a lack of resources and health awareness.[5]

Foreign body may not be seen in X-Ray chest, particularly when it is made of thin plastic, Chest X-Ray didn't show the classical earlier feature of unilateral hyperinflation rather showed, consolidation, bronchiectasis which is the late complication of FB, Computed Tomography (CT) scan could help to identify radiolucent FB, Rigid bronchoscopy guided removal of foreign objects from the airway is the recommended standard of care in the treatment of suspected aspiration. It is the preferred method to recognize and extract the foreign object because it allows good control of the airway, visualization, and manipulation for extraction of the object from the respiratory tract.[6,7]

Case Report

Reported a case of a 2 years old boy was brought by his parents to outpatient clinic ORL-HNS of Dr. M. Djamil hospital Padang on December 24th, 2025 with chief complaints difficulty in breathing with cough since a month before admission.

Previously, a month ago patient was brought to private hospital, pediatrician diagnosed bronchopneumonia and in warded for 14 days and discharged, patient was controlled to outpatient clinic then patient was referred to second private hospital and suggested to bronchoscopy diagnostic but the parents didn't want to continue to procedure, patient brought back to his home but the patient was in warded again for 7 days in first private hospital diagnosed by bronchopneumonia persistent, after discharged and controlled to outpatient clinic patient was referred to ORL-HNS province hospital with diagnosed suspected foreign body at bronchus, The parents do not know exactly what kind of aspiration incident occurred, but the patient had last eaten peanuts himself and the parents were informed by the patient's family who were around the patient, there was history of fever a months ago, there was no bluish face, there were no difficulty in swallowing, patient could eat and drink normally, there were no drooling and bloody saliva, pain in swallowing was unknown, there were no history of inserted foreign bodies into the ear, nose and mouth, there was no history of bronchial asthma, there was no hoarseness.

Physical examination found general condition was moderately ill, alert, respiratory rate 32x/minute, pulse rate 120x/minute, temperature 37,5^{0}C, oxygen saturation 96% free air, body weight 9 kilograms. There was no cyanosis. Regio thorax inspection examination chest movement was symmetrical, there was suprasternal and epigastric retraction, there was no intercostal retraction, auscultation examination bronchovesicular breath sound, there was ronchi on both lung, there was no stridor, there was no wheezing, Ear, nose and throat examination within normal limits, laryngoscopy indirect couldn't be evaluated. Chest X-Ray examination in there was increased of bronchovascular consolidation in right lung (Figure 1). Blood laboratory results Eosinophilia.

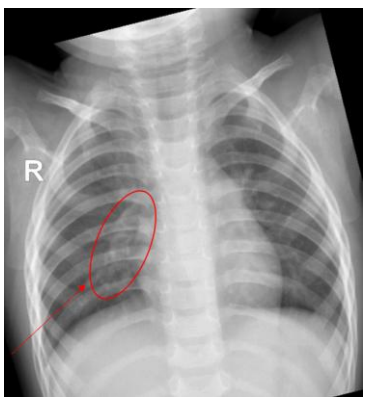

Figure 1. Posteroanterior thorax X-ray Showed increased of broncovascular consolidation in right lung (Red arrow)

Based on anamnesis, physical and supporting examination, working diagnosis is suspected foreign body "Peanut" on bronchus. The patient was planned to bronchoscopy diagnostic and therapeutic under general anaesthesia. Informed consent was obtained from the patient's parents. Patient was referred to pediatrician department with and anaesthesia department for operative tolerance;. no contraindications to bronchoscopy under general anesthesia were identified. After consultation with the Anesthesiology Department, bronchoscopy under general anesthesia was approved, with a requirement for a 6-hour preoperative fasting period. Patient was in warded in ORL-HNS department and got medication IVFD RL 12 drop per minute, Dexamethasone 3x2 mg Intravena (IV), Ampicillin sulbactam 3x400 mg IV for 3 days before operation.

On December 27th 2024, bronchoscopy diagnostic and therapeutic was performed. The operation begins with patient was position supine on operating table under general anaesthesia, the head was extended, performed aseptic and antiseptic procedure on operating field. Miller laryngoscope is held with left hand and then inserted into the mouth from the right side until the rhyme glottis was visible. Rigid bronchoscope measure 3.5 mm x 20 cm, held with right hand and inserted by tracing the laryngoscope (in the direction of laryngoscope blade) until it approaches the glottic rhyme. The position of bronchoscope is rotated to right 90^0 until it passes the vocal cords, then the position of bronchoscope is rotated back to its original position, the laryngoscope is carefully removed, then the left hand moves to hold the distal part of the bronchoscope like holding a pencil. The bronchoscope is slowly pushed along the trachea, anaesthesia and oxygen circuits are connected to the bronchoscope, lumen of the bronchoscope is closed with a glass cover, until it reaches the carina. An evaluation was carried out on the right main bronchus and left main bronchus. From the evaluation results, there was a peanut shells foreign body in main bronchus and removed by flexible forceps (Figure 2A), evaluation was performed there was foreign body below the first one in right main bronchus and removed by flexible forceps carefully (Figure 2B). A Re-evaluation there were hyperemic and excoriation on right main bronchus (Figure 2C), there were no foreign body, laceration, clotting and active bleeding, bronchoscope removed slowly. Operation was finished. Patient was diagnosed with post bronchoscopy diagnostic and therapeutic with indication corpus alienum "Peanut shells" et bronchus (Figure 2D).

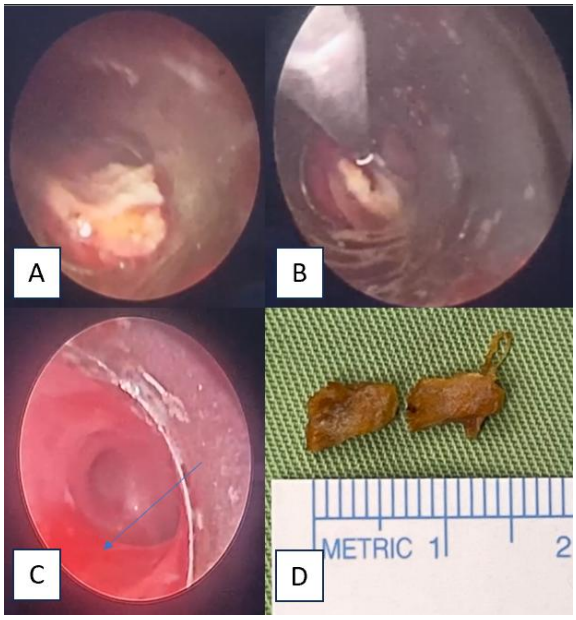

Figure 2. A. Peanut shells foreign body in main bronchus and removed by flexible forceps. **B.** evaluation was performed there was foreign body below the first one in right main bronchus and removed by flexible forceps carefully, **C.** evaluation there were hyperemic and excoriation on right main bronchus (Blue Arrow), **D.** The foreign body Peanut Shells.

Post-bronchoscopy instructions included monitoring vital signs and checking for bleeding, inwarded in ORL-HNS department and got medication IVFD RL 12 drop per minute, Dexamethasone 3x2 mg IV, Ampicillin sulbactam 3x400 mg IV, paracetamol 3x125 mg syrup peroral. The patient was observed for 24 hours Postoperatively, the patient reported no dyspnea, chest pain, or hemoptysis. Physical examination revealed symmetrical chest expansion without retractions or stridor, normal vesicular breath sounds, and no crepitation in the neck or chest.

On December 29th, 2024 (postoperative day 2), the patient was conscious and asymptomatic, with no cough, dyspnea, fever, or hoarseness. Vital signs were within normal limits, with a respiratory rate of 22 breaths/minute. Physical examination revealed symmetrical chest expansion, normal vesicular breath sounds bilaterally, and no stridor, rhonchi, wheezing, or subcutaneous emphysema. The patient was diagnosed as post diagnostic and therapeutic bronchoscopy for a foreign body

(peanut shell) in the right bronchus. The patient was planned for discharge on the same day with oral cefixime and paracetamol, and follow-up at the Otorhinolaryngology–Head and Neck Surgery outpatient clinic was scheduled one week later.

On January 6th, 2025, during follow-up at the Otorhinolaryngology–Head and Neck Surgery outpatient clinic (postoperative day 10), the patient was conscious and asymptomatic, with no cough, dyspnea, fever, or hoarseness. Vital signs were within normal limits, with a respiratory rate of 22 breaths/minute. Physical examination showed symmetrical chest expansion, normal vesicular breath sounds bilaterally, and no stridor, rhonchi, wheezing, or subcutaneous emphysema. The patient was assessed as post diagnostic and therapeutic bronchoscopy for a foreign body (peanut shell) in the right bronchus. The patient was advised to seek immediate medical attention if severe cough, shortness of breath, fever, or voice changes developed.

Discussion

A case was reported a boy 2 years a old with chief complaint difficulty in breathing with cough since a month before admission, patient was diagnosed by pediatricians by bronchopneumonia persistent. Young children, particularly those under five years old, are at higher risk due to immature swallowing reflexes and a tendency to explore objects orally.[8] This age group often lacks the ability to communicate effectively about their symptoms, further complicating diagnosis, there were many other predisposing factors are listed in Table 1.[9]

One of complication delayed foreign body aspiration often leads to insidious respiratory symptoms, such as cough and shortness of breath, and can result in complications like recurrent infections pneumonia, atelectasis, the formation of granulation tissue.[10–12]

Patient went to pediatrician and diagnosed with bronchopneumonia. Symptoms of foreign body aspirations can mimic other respiratory conditions such as asthma, pneumonia, or viral croup, leading to misdiagnosis. Common symptoms include coughing, wheezing, and respiratory distress, which are non-specific and can be attributed to various diseases, another factor is often a lack of awareness among caregivers and primary care physicians about the possibility of FBA, especially when there is no witnessed choking event. This can delay the consideration of FBA in differential diagnoses.[5,13]

Table 1. Predisposing factors in Foreign body aspiration[9]

Factor	Details
Age	< 5 years old
Gender	Boys are more affected than girls because they tend to be more active compared to girls
Behavioural	Mouthing frequently seen before 24 months Young children can be easily distracted: playing/crying/laughing/running while eating
Anatomical and functional	Absence of molars which makes chewing difficult and incomplete mastication through early childhood Underdeveloped ingestion mechanism Neuromuscular immaturity Small diameter of the airways Cough may be less effecting in dislodging an airway obstruction
Cognitive	The young child's inability to distinguish between edible and non-edible items
Medical History	Gastroesophageal reflux disease Malformations of the respiratory or digestive systems Dysphagia Altered swallowing/cough reflex Mental retardation
Educational	Lack of parental education regarding foods with a high risk of aspiration
Cultural	Introduction of solid foods before general recommendations
Diet	Solid foods with a high risk of aspiration/choking: - round-shaped foods (blueberries, grapes, sausages, cherry tomatoes, hot dogs, cherries, whole corn kernels, raisins, etc.) - foods with a hard texture: nuts, hazelnuts, sunflower seeds, pumpkin seeds, melon seeds, popcorn - fish bones

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The patient's parents do not know exactly what kind of aspiration incident occurred, but the patient had last eaten peanuts himself and the patient's parents were informed by the patient's family who were around the patient. A lack of a witnessed choking event significantly increases the likelihood of delayed diagnosis. Children without a witnessed aspiration crisis are more likely to be misdiagnosed.[12] Failure to elicit a comprehensive case history, including previous episodes of respiratory distress or recurrent infections, can lead to misdiagnosis and treatment delays.[14]

Physical examination on thorax examination chest movement was symmetrical, there was suprasternal and epigastric retraction, auscultation examination bronchovesicular breath sound there was ronchi on both lungs, Symptoms of foreign body aspirations can mimic other respiratory conditions such as asthma, pneumonia, or viral croup, leading to misdiagnosis. Common symptoms include coughing, wheezing, and respiratory distress, which are non-specific and can be attributed to various disease.[12]

Chest X-Ray examination in there was increased of broncovascular consolidation in right lung. Radiological diagnostics, such as CXR and CT scans, may not always detect foreign bodies, especially if they are non-radiopaque. This can lead to false negatives and further delay in diagnosis, normal CXR are frequently observed in early-presenting cases of FBA and may not confidently exclude the diagnosis.[7] since foreign bodies are non-opaque, the diagnosis is based on secondary findings, It has been stated in the literature that computed tomography can be a good alternative and even be used with sensitivity rate of 94.5%, When there is even the slightest suspicion of foreign bodies in the airways, a radiological scan is required.[15] Children in the study group had indirect indicators: pneumonic opacities, atelectasis, mediastinal shift and localized emphysema.[16]

Blood laboratory results eosinophilia, eosinophilia are most often associated with pathological conditions, particularly in allergic diseases such as asthma, allergic rhinitis, and atopic dermatitis, where they contribute to chronic inflammation and tissue damage, Recent research has revealed that eosinophils play regulatory roles beyond their well-known effector functions in immunity and inflammation, These regulatory roles suggest that eosinophils may also act as "friends" in maintaining immune homeostasis and tissue repair.[17]

Patient was consulted to pediatrician department and anaesthesia department for preparation. Foreign bodies aspiration requires a multidisciplinary approach involving pediatricians, anaesthesiologists, otorhino-laryngologists and thoracic surgeons. Effective communication and collaboration among these specialists are essential to ensure optimal outcomes. [4] Anaesthesiologists plays a critical role in the management of delayed foreign body aspiration. The use of short-acting anaesthetic agents with minimal side effects is recommended to facilitate controlled ventilation and minimize complications such as desaturation, laryngeal oedema, and bronchospasm.[18,19]

Rigid bronchoscopy diagnostic and therapeutic using flexible forceps to extract the foreign body was performed on patient, Rigid bronchoscopy was gold standard for the removal of tracheobronchial foreign bodies. It allows for precise visualization and retrieval of the foreign body using rigid forceps or other specialized instruments.[4] Rigid bronchoscopy is particularly effective in managing central airway obstructions, massive hemoptysis, and foreign body removal, especially in children.[20] It allows for better control and access to the central airways, which is crucial in life-threatening situations.[21]

Rigid bronchoscope offers a direct line of sight and the ability to use larger instruments, which can be advantageous for certain therapeutic procedures.[21] While Flexible bronchoscope is highly versatile, allowing for both diagnostic and therapeutic procedures but risk of complications

such as desaturation, it may not be suitable for more complex interventions that require the stability and control provided by a rigid bronchoscope, flexible bronchoscope may need to be converted to rigid bronchoscope, particularly when dealing with certain types of foreign bodies or severe obstructions.[22,23]

Rigid bronchoscope was using in this patient with size 3.5 mm, Rigid bronchoscopes are available in several sizes. The size of the bronchoscope selected should be longer than the length of the trachea to allow access to the main bronchus was listed in Figure 3.[24] Selection of a bronchoscope was according to age, with the age of 1-5 years was listed in Table 2.[25]

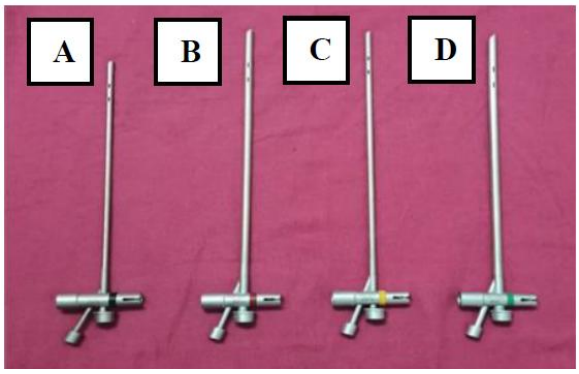

Figure 3. Rigid bronchoscope. A. Size 3, B. Size 3.5, C. Size 4, D. Size 5.[24]

Table 2. Size of bronchoscope according to age[25]

Age	Bronchoscope size
Term Newborn	3.0
6 Months	3.0
1 Year	3.5
2 Year	3.5
3 Year	4.0
4 Year	4.5
5 Year and above	5.0

Flexible forceps used in this patient. Flexible instruments can navigate through narrow and distal airways that rigid instruments cannot reach, making them ideal for removing foreign bodies lodged in these areas, The use of flexible forceps through a rigid bronchoscope can minimize trauma to the airway, as the flexible instruments can maneuver around obstructions and granulation tissue without causing additional damage, another forceps instruments can be seen in Figure 4.[26]

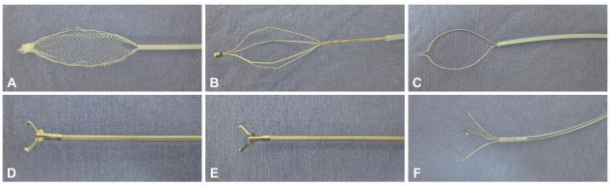

Figure 4. Flexible instrument forceps for removal foreign bodies, A. Net catheter, B. basket catheter, C. Snare, D. Rat tooth forceps, E. Alligator jaw forceps, F. five-pronged grabber.[26]

Antibiotic was used on patient before operation, In cases of foreign body aspiration, antibiotics may be used if there is evidence of infection or if the foreign body has caused significant inflammation or obstruction, as seen in a case where a child with aspiration pneumonia was treated with antibiotics alongside bronchoscopy.20 Corticosteroid was used on patient before operation, Corticosteroids, such as dexamethasone, are used to manage inflammation and prevent complications like airway swelling. This is particularly important in pediatric cases where the airways are smaller and more susceptible to obstruction. The use of corticosteroids can help in reducing the risk of post-procedural complications, such as persistent bronchial obstruction, by minimizing inflammation.[20]

Postoperative pain management was achieved through the administration of analgesics following bronchoscopy. Given that the procedure may cause discomfort, appropriate analgesia is essential to ensure patient comfort, particularly in pediatric patients.[20] The patient was advised to seek immediate medical attention if severe coughing, shortness of breath, fever, or voice changes occurred. Recurrent foreign body aspiration in children is associated with various long-term respiratory complications, including bronchiectasis, a chronic condition characterized by irreversible bronchial dilatation that leads to mucus retention and recurrent respiratory infections.[16] It can develop as a long-term complication when foreign bodies are not promptly removed from the airways.[27]

Recurrent foreign body aspiration can lead to repeated episodes of pneumonia, a common complication due to the obstruction and infection caused by the foreign body. Atelectasis, or the collapse of part of the lung, can occur when foreign bodies obstruct airflow, leading to reduced ventilation and subsequent lung collapse.[16]

Another complication could happened like bronchial deformity and bronchial perforation.[28]

The long-term impact of recurrent foreign body aspiration highlights the importance of early diagnosis and intervention.[29] The use of bronchoscope, both rigid and flexible, is essential in diagnosing and removing foreign bodies to minimize the risk of long-term respiratory complications. In some cases, follow-up imaging such as chest X-rays or CT scans may be performed to confirm the complete removal of the foreign body and to check for any secondary changes in the lungs.[28] In this case, further imaging with chest X-ray or CT scan was deemed unnecessary due to complete symptom resolution and the absence of ongoing respiratory complaints.

Conclusion

Management of delayed foreign body aspiration requires a comprehensive and timely approach. Effective coordination among family members, caregivers, and medical specialists is essential, along with adequate awareness of the symptoms, risk factors, and potential complications of foreign body aspiration.

Early detection and prompt intervention can significantly reduce the risk of long-term respiratory sequelae. The use of rigid bronchoscopy with flexible forceps allows safe and effective foreign body removal, providing optimal visualization and minimizing procedural complications.

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