

OVERLOOKED FOREIGN BODY ASPIRATION IN AN ADOLESCENT WITH AUTISM SPECTRUM DISORDER

PREVIĐENA ASPIRACIJA STRANOG TELA KOD ADOLESCENTNA SA POREMEĆAJEM IZ SPEKTRA AUTIZMA

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Summary Introduction: Foreign body aspiration is an emergency and potentially life threatening condition, most commonly observed in children under the age of three. In older children and adolescents, it occurs less frequently and is often overlooked due to nonspecific clinical manifestations and the absence of reliable anamnestic information. Individuals with autism spectrum disorder and other neurodevelopmental conditions are at particularly increased risk, as behavioral characteristics and impaired communication constitute significant factors both for aspiration and for delayed recognition and diagnosis.

Case Report: We present the case of a fifteen year old adolescent with autism spectrum disorder who was hospitalized for persistent cough and fever lasting one month, unresponsive to prior antibiotic therapy. Difficulties in obtaining a reliable medical history and the absence of witnesses to the aspiration event contributed to a delayed diagnosis. Upon admission chest radiography demonstrated atelectasis and consolidation of the basal segments of the right lung. Flexible bronchoscopy revealed complete obstruction of the right intermediate bronchus by a foreign body (a figurine from a board game), which was successfully extracted using rigid bronchoscopy. Following removal of the foreign body, the patient experienced rapid clinical improvement and complete radiological resolution of pathological findings.

Conclusion: Foreign body aspiration should be considered in older children and adolescents with autism spectrum disorder who present with prolonged, nonspecific respiratory symptoms. In the presence of a high index of clinical suspicion, bronchoscopy serves as an indispensable diagnostic and therapeutic modality and should be performed in order to prevent serious respiratory complications.

Keywords: foreign body aspiration, bronchoscopy, autism spectrum disorder, adolescents, persistent cough.

Sažetak Uvod: Aspiracija stranog tela predstavlja hitno i potencijalno životno ugrožavajuće stanje koje se najčešće javlja kod dece mlađe od tri godine. Kod starije dece i adolescenata je ređa i često ostaje neprepoznata zbog nespecifične kliničke slike i odsustva pouzdanih anamnestičkih podataka. Posebno su ugrožene osobe sa poremećajem iz spektra autizma i drugim neurorazvojnim poremećajima, kod kojih su ponašajne osobenosti i otežana komunikacija značajni faktori rizika za aspiraciju, ali i za kasnu dijagnozu.

Prikaz slučaja: Prikazan je slučaj petnaestogodišnjeg adolescenta sa poremećajem iz spektra autizma koji je hospitalizovan zbog perzistentnog kašlja i febrilnosti koji su trajali mesec dana, uprkos primenjenoj antibiotskoj terapiji. Nepouzdana anamnestički podaci i odsustvo svedoka aspiracije su doprineli odloženom postavljanju dijagnoze. Tokom hospitalizacije radiološkim ispitivanjem uočena je atelektaza i konsolidacije bazalnih segmenata desnog plućnog krila. Fleksibilnom bronhoskopijom uočena je potpuna opstrukcija lumena desnog intermedijarnog bronha stranim telom (figurica od društvene igre „Čoveče ne ljuti se“), dok je njegova ekstrakcija uspešno izvršena rigidnom bronhoskopijom. Nakon uklanjanja stranog tela došlo je do brzog kliničkog poboljšanja i potpune radiološke regresije patoloških promena.

Zaključak: Aspiraciju stranog tela treba uzeti u obzir kod starije dece i adolescenata sa poremećajem iz spektra autizma koji se javljaju sa dugotrajnim, nespecifičnim respiratornim simptomima. U prisustvu visokog stepena kliničke sumnje, bronhoskopija predstavlja nezamenljivu dijagnostičku i terapijsku metodu i potrebno je sprovesti kako bi se sprečile ozbiljne respiratorne komplikacije.

Ključne reči: aspiracija stranog tela, bronhoskopija, poremećaj iz spektra autizma, adolescenti, perzistentni kašalj.

INTRODUCTION

Foreign body aspiration (FBA) is a significant cause of morbidity and mortality in the pediatric population and requires prompt diagnosis and intervention to prevent potentially life-threatening complications. Children under three years of age are at the greatest risk, as they tend to explore their environment by placing objects in their mouths, have narrower airways, and exhibit less effective protective cough reflexes that would otherwise expel aspirated material (1,2). Although uncommon, FBA may also occur in older children and adults, most often in individuals with neurological or psychiatric disorders, trauma, or intoxication (3,4).

When FBA occurs, the protective cough reflex is typically triggered to expel the object; however, in some cases this mechanism proves insufficient, resulting in airway obstruction (1). Aspiration usually presents with characteristic symptoms such as paroxysmal cough, choking episodes, and gagging. Additional clinical manifestations may include stridor, wheezing, dyspnea, cyanosis, and respiratory distress (1,2).

The diagnosis of FBA relies on medical history, clinical presentation, physical examination, radiologic findings, and bronchoscopy. Bronchoscopy plays a pivotal role both as a diagnostic and therapeutic modality for FBA (1,2,4). In children, rigid bronchoscopy performed under general anesthesia remains the gold standard for foreign body removal from the airway (1).

If FBA is not promptly recognized, the size of the aspirated object and the site of obstruction determine the risk of complications, which may include hyperinflation, atelectasis, pneumonia, bronchiectasis, and lung abscess (5,6).

In this report, we present a case of overlooked foreign body aspiration in a 15-year-old male adolescent with autism spectrum disorder (ASD).

CASE REPORT

A 15-year-old male adolescent with ASD was referred to the Institute for Child and Youth Healthcare of Vojvodina, Novi Sad, due to a persistent dry cough that had begun one month prior to admission. According to the parents, the father once heard the patient coughing, followed by shallow and audible breathing, although he was not present in the same room at the time. When asked whether he had placed anything in his mouth, the adolescent reported playing with a figurine from the board game "Ludo"; however, this information was considered unreliable. At that time, no additional symptoms were noted. Over the following weeks, the dry cough persisted, accompanied by several episodes of choking. Ten days prior to admission, he developed fever up to 38 °C. He was evaluated by his pediatrician and prescribed oral clarithromycin for seven days. During antibiotic therapy, he remained afebrile, but the cough persisted. After completing the course, his fever recurred (up to 38 °C), accompanied by sweating, and he was referred to a tertiary care center.

On admission, the patient was alert but agitated, with limited verbal communication, producing only a few words. He was afebrile, and vital signs were within normal limits. Physical examination revealed circular scars on the right forearm, consistent with repeated self-biting during episodes of agitation. Pulmonary auscultation revealed symmetric findings, with normal breath sounds and no adventitious phenomena. Examination of other systems was unremarkable. Laboratory testing showed no elevation of acute-phase reactants, and biochemical parameters were within normal limits. Both blood cultures and multiplex PCR performed on a nasopharyngeal swab were negative. Chest radiography (Figure 1) demonstrated basal right lung atelectasis and reduced transparency of the overlying pulmonary parenchyma.

Lung ultrasonography was subsequently performed, demonstrating a minimal pleural effusion, measuring up to 4 mm in depth.

As the patient was quite agitated due to the unfamiliar environment and medical procedures, even placement of an intravenous line proved challenging. Therefore, psychiatric consultation was obtained, and benzodiazepine therapy was prescribed. Considering this, together with his overall good clinical status and the likelihood that the foreign body had been present for a prolonged period, we decided to initiate conservative treatment with antibiotics and systemic corticosteroids, in order to prepare the patient for potential bronchoscopy and to prevent complications, followed by reassessment.

Dual parenteral antibiotic therapy with ceftriaxone and levofloxacin was initiated. The patient remained afebrile, and his cough decreased, though it persisted. On the sixth day of hospitalization, a follow-up chest radiograph (Figure 2) demonstrated persistence of the triangular opacity in the basal right lung parenchyma, although its appearance was less homogeneous.



Figure 1 Chest X-ray: Well-defined triangular opacity in the basal right lung parenchyma, obscuring the contour of the right hemidiaphragm, consistent with atelectasis (likely involving the lower lobe), with reduced transparency of the overlying pulmonary parenchyma and a shallow right costophrenic angle, attributable to a small pleural effusion.

Slika 1. RTG srca i pluća: bazalno desno jasno ograničeno trouglasto zasenčenje plućnog parenhima koje maskira konturu desne hemidijafagme i odgovara atelektazi (moguće donjeg lobusa), uz smanjenu transparentnost plućnog parenhima neposredno iznad opisane atelektaze i plići desni FC sinus zbog prisustva izliva.



Figure 2 Chest X-ray: Persistent triangular opacity in the basal right lung parenchyma, discretely less homogeneous compared to the previous radiograph.

Slika 2. RTG srca i pluća: persistira trouglasto zasenčenje plućnog parenhima desno bazalno, diskretno manje homogeno nego na prethodnom snimku.

On the seventh day of hospitalization, flexible bronchoscopy under general anesthesia was performed, revealing complete obstruction of the right intermediate bronchus by a yellow foreign body (Figure 3). The surrounding mucosa was hyperemic, and whitish secretions were aspirated immediately above the foreign body. An attempt to extract the foreign body using a flexible bronchoscope basket was unsuccessful. Subsequently, rigid

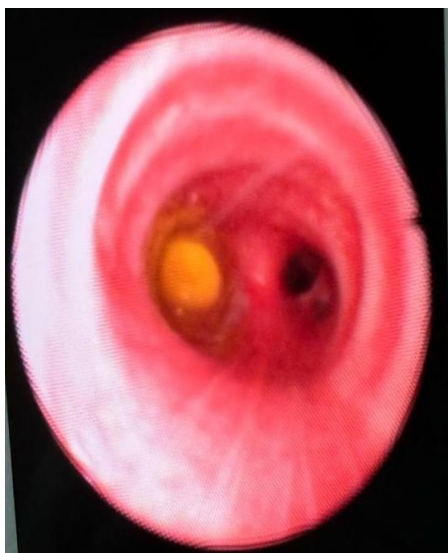


Figure 3 Foreign body in the right intermediate bronchus
Slika 3. Strano telo desnom intermedijarnom bronhu

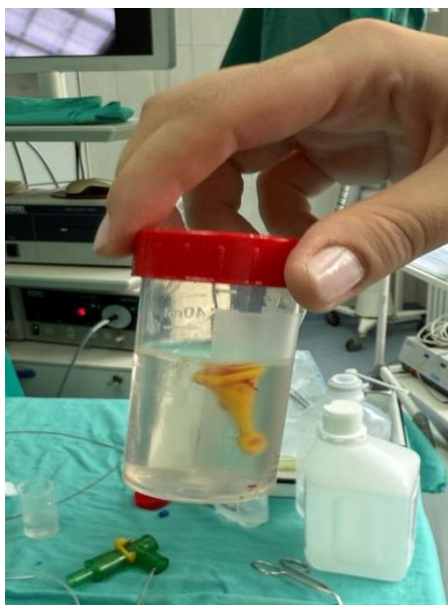


Figure 4 Foreign body extracted from the airway
Slika 4. Strano telo ekstrahovano iz disajnog puta



Figure 5 Chest X-ray: complete re-aeration of the right lung.
Slika 5. RTG srca i pluća: Potpuna reareacija desnog plućnog krila.

bronchoscopy was performed, and the foreign body—a yellow game piece from “Ludo”—was successfully removed (Figure 4). Following the procedure, bronchoalveolar lavage (BAL) was obtained for bacteriological and cytological analysis. Both bacteriological and mycological cultures were negative. Cytological examination revealed mucus and ciliated epithelial cells, with no lipid laden macrophages identified.

Following the procedure, a chest radiograph demonstrated re-aeration of the right lung (Figure 5). The patient’s dry cough resolved after bronchoscopy. The patient was discharged in good general condition after eight days of hospitalization.

DISCUSSION

FBA is a common and potentially life-threatening condition in the pediatric population, with the highest incidence observed in children under three years of age, occurring more frequently in boys than in girls (7). Although uncommon, aspiration can also occur in older children and adults, typically in individuals with neurological or psychiatric disorders, trauma, or intoxication (3,4). In the present case, aspiration occurred in a 15-year-old adolescent with ASD.

ASD is a neurodevelopmental condition characterized by deficits in social communication, restricted interests, and repetitive behaviors (8). Individuals with ASD frequently exhibit a tendency to place non-food objects in their mouths, which may result in aspiration or ingestion of foreign bodies (9). Most studies in this population describe ingestion rather than aspiration (10,11). Aykir et al. reported a case of a 17-year-old male with intellectual disability who aspirated a stone, leading to fatal laryngeal obstruction (9).

In our case, the adolescent placed a yellow game piece from “Ludo” in his mouth, leading to airway aspiration and subsequent symptoms of cough and choking. As the event was unwitnessed, the parents did not seek immediate medical attention. Most foreign bodies are small enough to enter the main, lobar, or even segmental bronchi, which can delay activation of rapidly adapting cough receptors, allowing aspiration to remain undetected for extended periods (7). Liu et al. reported a mean delay of 3.69 months from aspiration to hospital admission in occult FBA (7). Diagnosis is further complicated when aspiration occurs without witnesses, as symptoms such as cough, wheezing, or dyspnea are nonspecific (6,7). In the present case, one month elapsed between aspiration and hospital admission. The patient initially experienced intermittent cough, but medical evaluation was sought only after fever developed. Oral antibiotics were prescribed, but persistent symptoms prompted referral to a tertiary care center. Chest radiography revealed basal right lung atelectasis and consolidation, and then parenteral antibiotic therapy was initiated. Although the medical history was unreliable, due to the strong clinical suspicion of FBA, the patient underwent bronchoscopy under general anesthesia.

Bronchoscopy is both a diagnostic and therapeutic tool in FBA. Rigid bronchoscopy has long been considered the gold standard for extraction in pediatric patients (1). Recently, flexible bronchoscopy has gained popularity due to its less invasive nature, potentially lower complication risk, and ability to reach distal airways, expanding the diagnostic and therapeutic scope. Nevertheless, the choice between rigid and flexible bronchoscopy remains debated (12). Safia et al. demonstrated comparable efficacy and safety for both methods, with similar success rates and complication profiles (12). In our case, flexible bronchoscopy initially revealed complete ob-

struction of the right intermediate bronchus by a yellow foreign body. Extraction using a flexible bronchoscope basket was unsuccessful, necessitating rigid bronchoscopy, which successfully removed the foreign body. The characteristics of the object precluded flexible extraction, justifying the use of rigid bronchoscopy.

In children under 15 years, foreign bodies may lodge in the left or right bronchial tree with similar frequency due to the symmetrical branching angle of the trachea before development of a prominent aortic arch, which later displaces the trachea and left main bronchus, favoring the right main bronchus as the site of obstruction (4). In this 15-year-old adolescent, aspiration occurred in the right bronchial tree, as expected.

Delayed recognition of foreign body aspiration (FBA) may result in complications including recurrent pneumonia, bronchiectasis, lung abscess, atelectasis, and bronchial stenosis, with outcomes influenced by the size of the foreign body, the degree of airway obstruction, and the nature of the aspirated material (6,7,13,14). The incidence and severity of complications are directly proportional to the duration of foreign body retention in the airway (13,14). In our patient, complete obstruction of the intermediate bronchus resulted in atelectasis distal to the site of obstruction, while impaired ventilation and retention of bronchial secretions contributed to the development of pneumonia.

In cases of unsuccessful bronchoscopy, the problem is usually the presence of large foreign bodies that cannot pass through the lumen of the rigid bronchoscope, nor can they be extracted together with the bronchoscope through the upper airway structures. Repeated attempts often result in laryngeal edema. Difficult extraction may also be encountered with small foreign bodies located in the distal airways, which are challenging to grasp with forceps (e.g. pebbles, metal beads, or small screws). Additionally, foreign body removal may fail due to pronounced inflammation, the presence of granulomas, abundant secretions, or bronchospasm. In all of these situations, bronchoscopy may be postponed if the patient is respiratory stable. In the meantime, antibiotic and corticosteroid therapy should be administered, and a new attempt at foreign body extraction should be planned within 48–72 hours. An alternative option includes performing a tracheotomy for large foreign bodies, or thoracotomy in other unsuccessful cases (15–20). In case presented here, at admission FBA was suspected based on the patient's clinical symptoms and radiological findings. However, we initially opted for conservative management and focused on preparing the patient for subsequent intervention—both pulmonary and psychiatric—in order to minimize the risk of potential complications associated with prolonged retention of a foreign body in the bronchus.

FBA typically results in favorable outcomes when promptly recognized and the foreign body successfully removed. Reported mortality from FBA ranges from 0 to 8.3% (21). In a large retrospective study conducted in the United States including 11,793 patients aged 0–17 years with FBA, the overall mortality was 2.5%, with higher mortality rates observed in children with underlying chronic conditions, particularly neurological, cardiovascular, and pulmonary disorders (22). Our patient had a favorable outcome despite the overlooked aspiration and prolonged retention of a plastic foreign body. Following extraction, the cough resolved completely, and follow-up chest radiography demonstrated full re-aeration of the right lung.

CONCLUSION

FBA should be considered in older children and adolescents with ASD and other neurodevelopmental conditions who present with prolonged, nonspecific respiratory symptoms, such as persistent cough unresponsive to therapy. Due to difficulties in obtaining reliable history, resulting from impaired verbal and nonverbal communication skills, particularly when the aspiration event is unwitnessed, FBA is often overlooked. Therefore, in the presence of a high index of clinical suspicion, bronchoscopy should be performed without delay, as it provides both definitive diagnosis and therapeutic intervention.

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