

Suspicion of tooth aspiration during general anaesthesia in a paediatric patient – a case report

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Foreign body aspiration or suspicion of it is a serious medical condition, which can cause life-threatening complications, especially in paediatric population. More than 80% of foreign body aspirations occur in children under three years of age. Children are a particularly vulnerable group due to specific anatomy of the airway. Symptoms of aspiration vary from suffocation, coughing to complete absence of symptoms, which is why a differential diagnosis between aspiration and ingestion is sometimes very difficult. A six-year-old boy was admitted for elective surgery to correct vertical strabismus. At the pre-anaesthesia evaluation, the child was classified as an ASA II patient, due to frequent laryngitis and bronchitis. The Mallampati score was 1 with no wobbly teeth recorded. After anaesthesia induction, the airway was secured with a laryngeal mask size 3.0 without complications. Upon awakening of the patient and removal of the laryngeal mask, blood was observed in the lodge of the lower left incisor and a lack thereof. The patient was without signs of respiratory distress. An emergency chest X-ray ruled out a foreign body in the airway, and subsequent X-rays of the abdomen revealed the presence of teeth in the projection of the stomach. The child was discharged to home care without complications. The clinical picture of foreign body aspiration under anaesthesia may be atypical and asymptomatic. Therefore, even the slightest suspicion of aspiration, especially in anaesthesia procedures, should be ruled out or confirmed. Complications are most often the result of late-recognized aspiration.

Key words: FOREIGN BODY, ASPIRATION, TOOTH

INTRODUCTION

Foreign body aspiration, or suspicion of it, is a serious medical condition that requires early detection and intervention because it can cause complete or incomplete airway obstruction. In the paediatric population, complications can be life-threatening (1). Approximately 80% of foreign body aspirations occur in children younger than three years, with a peak incidence from the first to the second year of life (2). The most common type of foreign body in children, as they begin to walk independently, explore the environment orally and often put small objects in their mouths, are nuts, seeds, pieces of food, and parts of toys (2). Also, the anatomy of a child's airway with a highly positioned larynx and epiglottis, narrow airways, incompletely developed airway protective reflexes as well as immature coordination of

chewing and swallowing, put children at high risk for this type of adverse event (3).

There are three clinical phases of foreign body aspiration: the first phase, which is dominated by symptoms such as cough, inspiratory stridor, rapid breathing, nose flaring and the use of accessory muscles. This is followed by an asymptomatic phase, which can last up to several weeks. In the third, final stage, complications occur that may include the development of pneumonia, abscess, atelectasis, or asthma (4).

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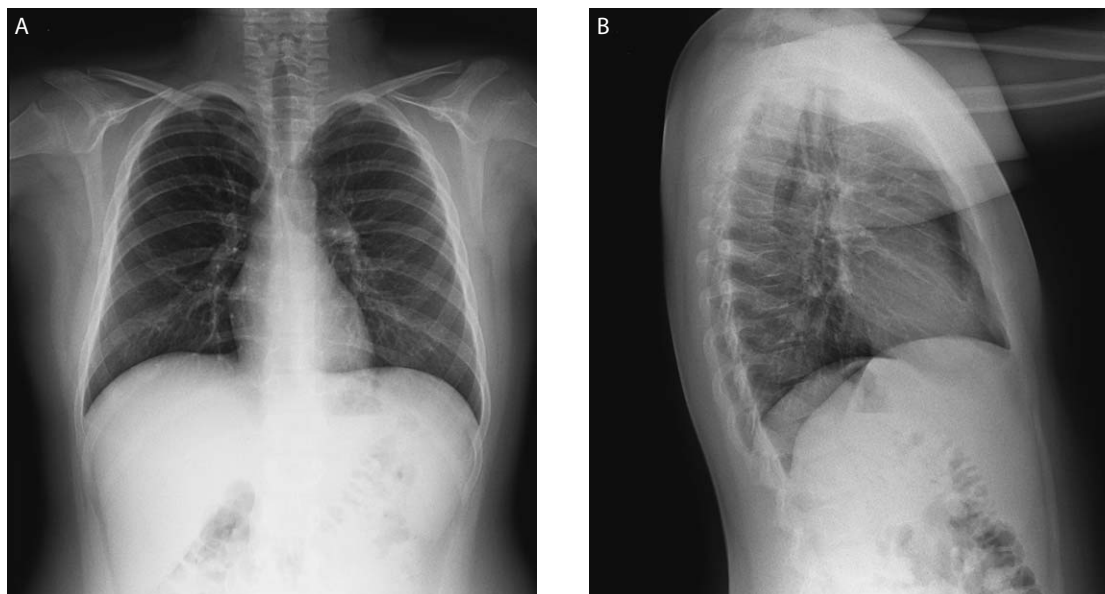


FIGURE 1. Emergency X-ray of the heart and lungs. Posterior - anterior (A) and lateral (B) chest view which excluded the presence of a foreign body in the airways.

However, sometimes the symptoms may be completely absent or very mild, or the episode of suffocation may have been out of sight of an adult, and the child may not be able to verbalize it.

Tooth aspiration or suspicion of it is most often seen in children, the elderly, as part of various neurological disorders and in the case of undergoing procedures that include sedation or general anaesthesia. According to literature, tooth aspiration comprises 0.4% of all foreign bodies found in the respiratory system (5).

The differential diagnosis between aspiration and foreign body ingestion may be difficult if symptoms such as choking or coughing are absent. Great suspicion is needed to make a diagnosis, and this should be especially thought of in children. In this sense, we present the case of a child in whom we had a high suspicion of tooth aspiration, which was ruled out by further diagnostic processing.

CASE REPORT

A six-year-old boy, weighing 51kg, was admitted to our facility for elective ophthalmic surgery - correction of vertical strabismus of the right eye. The day before the procedure, the child was examined by an anaesthesiologist, where it was noted that the child was born full-term following a normal pregnancy, had normal psychomotor development, and was vaccinated according to regular immunization schedule. Since a young age he is under treatment of a paediatric pulmonologist due to frequent episodes of laryngitis and bronchitis and still takes a leukotriene inhibitor regularly and salbutamol when rarely needed. He is allergic to

pollen and grass. There were no deviations in physical status. The laboratory findings were normal. The airway was classified as Mallampati I, no wobbly teeth were recorded. The child was assessed as an ASA II patient. It was recommended that the patient take the leukotriene inhibitor in the morning on the day of the procedure, and routine oral premedication with midazolam (Midazolam Kalceks, Kalcex) syrup was prescribed 30 minutes before the procedure.

Inhalation induction with a mixture of gases [sevoflurane (Sevorane, Abbvie), nitrous oxide, oxygen] was performed in order to establish a peripheral venous route. The airway was secured with a size 3.0 laryngeal mask. The placing of the mask was uneventful. Balanced anaesthesia was continued with a volume control mode of ventilation.

The surgical procedure continued without complications. Upon its completion, the patient was awoken and, as the spontaneous and sufficient breathing was established, the laryngeal mask was removed. Blood was then observed in the lodge of the lower left incisor that was missing. The patient did not show any signs of respiratory distress, he was breathing calmly and spontaneously, without coughing or wheezing. Aspiration of the tooth was suspected. An emergency chest X-ray was performed immediately in the operating room, which excluded the presence of a foreign body in the airways (Figure 1.). The child was hemodynamically and respiratory stable referred to the ward. To confirm the exclusion of the foreign body aspiration we performed an additional X-ray of the abdomen which revealed a triangular shadow of the tooth in the stomach (Figure 2.). The patient was subsequently discharged to home care.

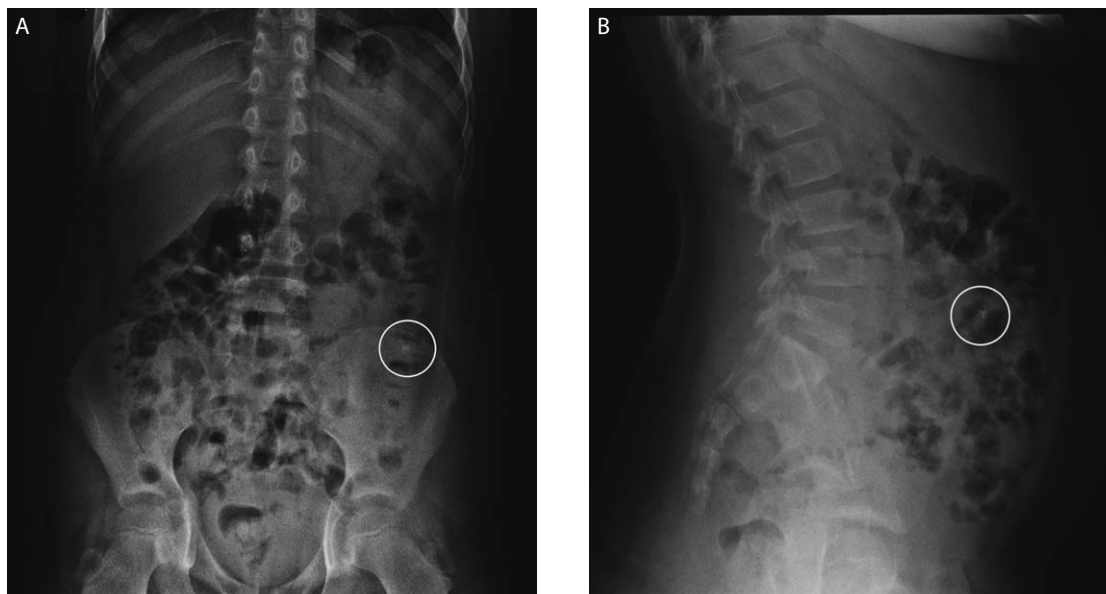


FIGURE 2. X-ray of the abdomen. Posterior - anterior (A) and lateral abdominal (B) view showing a triangular shadow of the tooth in the projection of the stomach (white circle).

DISCUSSION

In paediatric patients, the clinical picture of foreign body aspiration may be atypical with nonspecific symptoms (6). In our specific case, the suspicion of aspiration occurred during awakening from anaesthesia and removal of the laryngeal mask. We emphasize that the narrowed state of consciousness as well as reduced protective reflexes of the airway when waking up from anaesthesia are additional risk factors, due to which the absence of symptoms of respiratory distress must raise suspicion that aspiration may have occurred.

The algorithm of care in unclear cases or without pronounced symptoms is as follows: it is advisable to perform a chest X-ray, even if the radiogram is normal or unclear it is advisable to perform rigid bronchoscopy under general anaesthesia, as it is today the standard of care for children who have aspirated foreign bodies (7). The use of the rigid bronchoscope allows the patient to be ventilated throughout the procedure and provides a larger working area through which various instruments can be passed (8). Flexible bronchoscopy may be useful to examine for the possibility of foreign body but is rarely useful for removal (7). Rarely, some foreign bodies cannot be removed by bronchoscopy and then open thoracotomy is required (8). In our case, after the exclusion of aspiration, and due to a clear suspicion of foreign body ingestion, we decided to do an additional radiogram of the abdomen, which confirmed the diagnosis of foreign body ingestion.

The tooth is not an often-aspirated foreign body, especially in the paediatric population. Sporadic cases of aspiration

are mentioned in the literature, most often during tooth extraction dental procedures (9, 10, 11).

Dental injury is one of the most common adverse events associated with anaesthesia. Most of the literature is based on the adult population, while we have very little data on the paediatric population. According to one of the few retrospective paediatric studies, the incidence of adverse events related to dental injuries is 0.05% (12). Milk teeth, because of shorter roots, are injured more often when manipulating the airway than permanent teeth. Also, children aged 5-12 years undergoing a change in dentition are at a higher risk of adverse events. In the adult population, emergency surgery and difficult intubation have been identified as risk factors (13), while in the paediatric population this is not the case (12).

We emphasize the importance of a detailed history including a thorough assessment of the airway and repeated assessment of dental condition in order to prevent such events. If aspiration or ingestion of a foreign body is suspected during anaesthesia, despite the absence of symptoms, we advise to maintain a high level of suspicion until a definitive diagnosis, as complications are most often the result of late-recognized aspiration.

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SAŽETAK

Sumnja na aspiraciju zuba tijekom opće anestezije kod pedijatrijskog pacijenta - prikaz slučaja

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Aspiracija stranog tijela, ili sumnja na nju, ozbiljno je zdravstveno stanje koje posebice u pedijatrijskoj populaciji može uzrokovati komplikacije opasne za život. Više od 80% aspiracija stranog tijela događa se kod djece mlađe od tri godine, a najčešća vrsta stranog tijela su orašasti plodovi, sjemenke i komadi hrane. Djeca su posebno ugrožena skupina zbog specifične anatomije dišnog puta. Simptomi aspiracije variraju od gušenja, kašlja pa sve do potpunog izostanka simptoma, zbog čega je diferencijalna dijagnoza između aspiracije i ingestije katkad vrlo otežana. Šestogodišnji dječak primljen je na elektivni operativni zahvat korekcije vertikalnog strabizma. Na anesteziološkom pregledu dijete je klasificirano kao ASA II bolesnik, zbog češćih laringitisa i bronhitisa. Dišni put je ocijenjen kao Mallampati 1 te nisu zabilježeni klimavi zubi. Za potrebe zahvata dišni put je bez komplikacija zbrinut LMA-om No. 3,0. Nakon bolesnikova buđenja i vađenja LMA-a zamijećena je krv u loži donjeg lijevog sjekutića i nedostatak tog zuba. Bolesnik je cijelo vrijeme bez znakova respiratornog distresa. Učinjen je hitni RTG srca i pluća, kojim se isključilo strano tijelo u dišnom putu, te se pacijent uputio na RTG abdomena, kojim se dokazala prisutnost zuba u projekciji želuca. Dijete je otpušteno na kućnu njegu bez komplikacija. Klinička slika aspiracije stranog tijela može biti atipična i bez izraženih simptoma. Stoga i najmanja sumnja na aspiraciju, posebice kod anestezioloških postupaka, mora se ispitati do definitivne dijagnoze. Komplikacije su najčešće posljedica kasno prepoznate aspiracije.

Ključne riječi: STRANO TIJELO, ASPIRACIJA, ZUB