

Aspiration of Thumbtack

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Abstract

Unintentional foreign body aspiration can be seen in all age groups. Common substances include both organic and non-organic material. However, sharp metal objects have the potential to cause significant cardiopulmonary pathology. A few dreaded adverse effects of ingested foreign bodies include pneumonia, pneumothorax, acute respiratory distress syndrome, and pneumomediastinum. This is a case report of a 19 year old Active Duty male who unintentionally aspirated a thumbtack while drinking from his canteen while playing a game which is popular among Sailors and Marines. Military Emergency Physicians should be aware of this high risk behavior and the complications of aspirated thumbtacks.

Keywords: Aspiration, Foreign, Body, Unintentional, Healthy

Introduction

Unintentional aspiration occurs in all ages. Both organic and inorganic foreign bodies are commonly lodged in the posterior oropharynx and upper airways. Many of these foreign bodies are expelled spontaneously or with traditional expulsion techniques. Some foreign bodies can be lodged in smaller bronchioles without causing respiratory distress. However, even small foreign bodies can lead to altered mental status, ARDS, and respiratory failure. High risk populations include patients with metabolic syndrome, vaso-occlusive disease, and neuromuscular motility disorders. It is important to remember that aspiration can also occur in young, healthy people without underlying pulmonary or neurovascular pathology.

Case Report

A 19 year old Active Duty male presented to the emergency department for a chief complaint of "Doc, I think I swallowed a tack". The patient states that he was playing a game which involved "chugging" his canteen with a metal tack at the bottom. During the process of drinking from the canteen, the patient accidentally aspirated the thumbtack. His symptoms consisted of pleuritic chest pain but no shortness of breath or cough. His exam was notable for clear breath sounds and his vital signs were within normal limits. His chest x-ray showed an aspirated tack in the right middle lung field (Figures 1 and 2). Discussion with Pulmonary resulted in admission and flexible bronchoscopy with successful removal of the tack the next day. The patient tolerated the procedure without complication.

Discussion

Most aspirated foreign bodies (FBs) are seen in children and are less common in adults. Food is the most commonly aspirated foreign body, and metal objects are generally not aspirated intentionally [1].

In pediatrics, aspiration had 24% mortality before the introduction of bronchoscopy [2]. In 2013, FB aspiration was the responsible cause of death in 4800 children [3]. Anatomical differences are responsible for children being more predisposed to FB aspiration when compared to adults due to their short necks, funnel shaped posterior oropharynx, and small diameter airways. The peak onset of FB ingestion in infants occurs between 1 and 2 years of age. In one retrospective study of over 111,000 pediatric patients with FB aspiration from ages 0-14 years, children <1 were responsible for 37.8% of cases and male children 55.4% of cases. Hard candy was the number one aspirated FB with 15.5% of cases, followed by non-hard candy 12.8%, meat at 12.2% and finally bone at 12.0% [4]. Additional common FB ingestion includes peanuts, seeds, and popcorn. Older children tend to aspirate solid, non-organic objects. In another

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Figure 1: AP CXR Tack in lung.



Figure 2: Lateral CXR Tack in lung.

retrospective study, 34 out of 1280 aspirated pen caps requiring rigid bronchoscopy removal [5].

The most common symptoms for both adults and pediatrics are cough, tachypnea, wheezing and/or stridor. Dyspnea is a less common chief complaint. FB aspiration can lead to rapid respiratory distress and possibly respiratory failure. Signs of respiratory distress include abdominal or chest wall retractions, cyanosis, tripodding, and altered mental status. The size and location of the FB will determine the degree of respiratory distress. In another study where FB were removed by bronchoscopy from 1068 children, the most common sites for FB aspiration in children are the right mainstem bronchus (52%), the left mainstem bronchus (18%), trachea/carina (13%), and larynx (3%) [6]. Left untreated, aspiration of organic material can lead to fever, persistent cough, ARDS, and pneumonia [7]. Non organic

material such as plastic or metal has not only the potential to cause infection, but also perforation leading to pneumothorax.

Adult FB ingestions are less common than children but have a higher percentage of inorganic aspiration. In one retrospective study from 1995 to 2009, 73 patients aspirated a headscarf pin. The mean age was 13.4 years and all of these FBs were identified on chest x-ray and removed by bronchoscopy [8]. Another example of ingested metal was seen in an individual with bipolar disease and schizophrenia who aspirated a fish hook into his right main stem bronchus [9]. High risk features to be kept in mind for non-organic aspiration include risk taking behavior and history of mental health disease.

Plain film is the first diagnostic intervention in determining whether a radiopaque FB is present. However, since the majority of aspirated FB in children are organic material, many of these are radiolucent. Up to 30% of chest xrays can be normal when evaluating for FB. In one study of 343 Chinese children with aspirated FB, 32 out of 40 children with laryngotracheal FB had normal X ray findings [10]. Other xray findings seen in aspiration include hyperinflated lungs, atelectasis, and mediastinum shift. Late xray findings include pneumonia, abscesses and bronchiectasis [11]. Computed tomography (CT) can detect FB with almost 100% sensitivity and specificity, but due to its ionizing radiation, this technique is not preferred in pediatrics. Rigid bronchoscopy is the preferred method of diagnosis and removal of FB. Bronchoscopy is successful in removing FB in 95% of cases with a concomitant 1% complication rate [12]. Complications include airway perforation, retrained FB, and worsening of distal obstructions.

Our patient's aspiration occurred as a result of playing a game with his friends. Patients may not present to the emergency department immediately after aspiration and plain films may not show the aspirated FB. Since the potential risks of aspiration are numerous and can be life threatening, awareness of this new high risk aspiration game being played in the active duty population is important for military medicine physicians to be aware of.

Conclusion

Aspiration of FB can lead to pneumothoraces, pneumonia, and abscess. Patients involved in high risk activities may not seek care immediately after aspiration and plain films may be negative. Military Emergency Medicine physicians should be aware of this dangerous game that is currently popular with Sailors and Marines and inquire about aspiration history for patients with pulmonary complaints.

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