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Airway Obstruction Caused By Iron Pill Aspiration: An Interventional Pulmonology Approach To Prevent Surgery

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Iron Pill Aspiration (IPA) is a challenging medical condition that requires prompt management to prevent detrimental outcomes. One of the most serious complications of IPA is airway inflammation which commonly leads to severe obstruction. Airway complications may require surgical intervention including the resection of the affected lung. Prompt recognition and management of IPA can reduce the risk of airway complications and may prevent the need of a surgical intervention. Bronchoscopic management entails the use of flexible and rigid bronchoscopes along with balloon bronchoplasty, ablation of the inflammatory tissue causing obstruction and airway stenting. In this report, we describe a case of severe airway obstruction secondary to iron pill aspiration with favourable outcome following bronchoscopic multimodalities intervention including temporary airway stenting.

Keywords

Iron pill aspiration • Airway obstruction • Bronchoscopy

Introduction

Q7 Foreign body aspiration is common and older adults are at a higher risk. Seven per cent of the aspirated foreign bodies are medicinal pills [1]. Besides causing typical aspiration symptoms, pills may induce localised airway inflammation. Some pills like iron and nortriptyline disintegrate very rapidly while others like calcium and ciprofloxacin stay intact and cause mechanical obstruction [2–6].

Some aspirated pills, such as ferrous sulfate, potassium chloride, alendronate, metformin, nortriptyline and barium sulfate, can cause an acute inflammatory reaction and long-term sequelae such as stenosis [1,7]. Iron pill aspiration (IPA) is a distinctive entity that results in severe local airway injury as well as airway stenosis [6,8–10]. In this report, we present a case of IPA-related severe airway obstruction managed by an advanced bronchoscopic approach. Q8

Abbreviations: IPA, Iron pill aspiration; CT, computed tomography; BI, bronchus intermedius; PET, Positron emission, tomography; CRE, Controlled radial expansion

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Case Report

A 70-year-old woman presented to us with 3 months of worsening dyspnoea and cough. Her symptoms started after accidental aspiration of two pills, one of which was an iron pill. She underwent a workup that included a chest radiograph, which revealed right supra-hilar prominence. Chest computed tomography (CT) scan subsequently showed a narrowed bronchus intermedius (BI) (Figure 1A). The initial bronchoscopy revealed an endobronchial lesion in the BI. Endobronchial biopsies and washings were non-revealing. Positron emission tomography (PET) scan revealed a focal area of wall thickness and mild hypermetabolic uptake involving the right BI. The patient continued to have symptoms despite two courses of antibiotics. Therefore, she was referred to our interventional pulmonology service for evaluation. Flexible bronchoscopy was performed under general anaesthesia. The BI was almost completely obstructed due to the presence of a pearly ovoid lesion (Figure 2A). Endobronchial biopsies were performed and a small lumen was identified (Figure 2B). A 4-French Fogarty balloon catheter was advanced into the small lumen of the BI followed by balloon inflation to achieve some dilatation (Figure 2C). Once a lumen was visible, a size 8-9-10 controlled radial expansion (CRE™) balloon (Boston Scientific, Natick, MA) was used to further dilate the airway followed by sequential dilation with the Bryan-Dumon™ rigid bronchoscopes up to a diameter of 10 mm (Figure 2D). Given the severe airway inflammation and the complex nature of the stenosis (half the length of the BI), a silicone stent (Hood Laboratories, Pembroke, MA) stent was deployed in the BI (Figure 2E and F). Pathologic examination revealed subepithelial bronchial metaplasia, acute on chronic inflammation and subepithelial foreign body giant cell reaction. The Prussian blue stain of the endobronchial biopsies was positive (Figure 1B). These findings were consistent with the diagnosis of an IPA-induced bronchial stricture. Upon follow-up bronchoscopy, the stent was complicated with granulation growth proximally and was

treated with ablation using argon plasma coagulation, and the stent was at once replaced by a longer one to cover the granulation tissue. The stent remained in place for a year and was subsequently removed. There was 50% narrowing of the BI after stent removal due to scarring and fibrosis, while right middle lobe and right lower lobe bronchus remained patent. There was no significant acute inflammation of the airway after stent removal, and thus we elected to follow up the patient clinically. She remains asymptomatic after a year of stent removal without the need for any additional interventions.

Discussion

The diagnosis of foreign body aspiration can be challenging. In some cases, the condition is not recognised and mis-diagnosed as pneumonia. A retrospective review showed that about 8.5% of patients did not recall an episode of choking and 62% of patients had aspiration more than 1 month before seeking medical attention [11].

Iron pill aspiration usually occurs in elderly patients. Its manifestations range from mild airway injury to severe airway changes such as stenosis and fatal pulmonary bleeding [12–14]. After aspiration, the iron pill disintegrates and an immediate chemical reaction starts in the airways. In acidic milieu, the oxidation of ferrous form of iron to ferric form occurs with formation of free radicals, which are responsible for severe tissue damage [7,15,16]. IPA syndrome refers to a triad of aspiration, airway inflammation with bronchial stenosis and iron deposits on bronchial biopsy specimen even in the absence of an iron tablet [16]. Given that the pill has often disintegrated at the time of bronchoscopy, the diagnosis is usually by a history of aspiration and evidence of iron deposition in mucosal layers stained by Prussian blue [7,14]. The location of IPA in the airway can be suggested by airway mucosal pigmentation [10]. Chest radiographs can be normal in 28% of patients and delay the diagnosis [17]. Computed

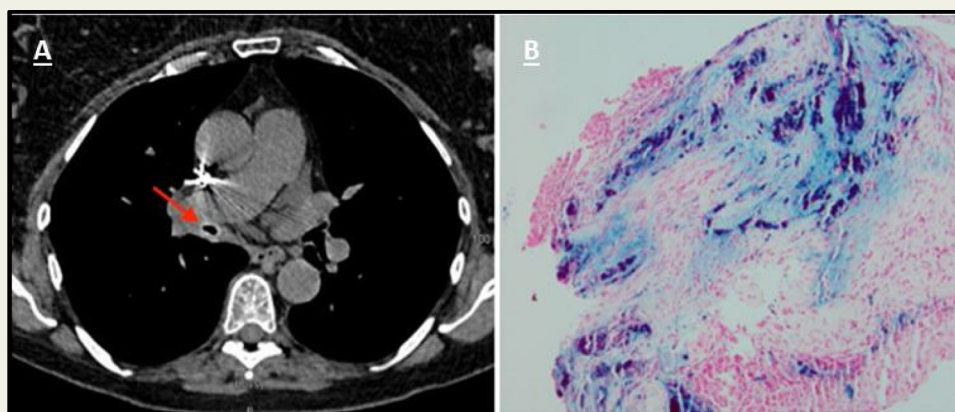


Figure 1 (A) Chest CT showing the focal narrowing (arrow) of the right bronchus intermedius with circumferential wall thickening. (B) Histopathology positive for Prussian stain. Abbreviation: CT = computed tomograph.

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