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C H E S T

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Syndrome of Iron Pill Aspiration*

Pyng Lee, MD; Daniel A. Culver, DO; Carol Farver, MD; and Atul C. Mehta, MBBS, FCCP

Bronchial stenosis (BS) consequent to iron pill aspiration (IPA) has been observed in few reported cases. This condition is often irreversible and may necessitate lobectomy in severe cases. Unlike most foreign bodies (FBs), the iron pill disintegrates in the airway and cannot be detected on bronchoscopy. However, bronchial biopsy and lung tissue may reveal iron deposits along with airway inflammation months after the aspiration. Thus, IPA can be diagnosed by a triad of aspiration, airway inflammation, and iron deposits on histology even in the absence of an FB. We report a case of IPA with BS in which the diagnosis was established by bronchial biopsy and was successfully managed with balloon bronchoplasty and therapy with topical mitomycin C.

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Key words: aspiration; bronchial stenosis; foreign body; iron pill; mitomycin

Abbreviations: BB = balloon bronchoplasty; BS = bronchial stenosis; FB = foreign body; IPA = iron pill aspiration; LLL = lower lower lobe; LLLB = left lower lobe bronchus; MC = mitomycin C

Tracheobronchial stenosis, as a result of granulomatous diseases¹⁻⁴ and mechanical causes such as prolonged endotracheal intubation or cuffed tube tracheostomy,⁵ has been well-documented in the literature. However, bronchial stenosis (BS) as a consequence of foreign body (FB) aspiration, and especially the aspiration of medicinal pills, is rare.⁶ We report a case of iron pill aspiration (IPA) with BS in which the diagnosis was established, in the absence of an FB, by bronchial biopsy of the stenosed airway. This was managed successfully with balloon bronchoplasty (BB) and therapy with topical mitomycin C (MC).

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CASE REPORT

A 69-year-old woman with hypothyroidism, hypertension, and previous multiple strokes, and who had undergone a partial gastrectomy, had been receiving daily doses of ferrous sulfate. She remembered aspirating an iron pill in October 1999 when she experienced choking, wheezing, and cough. The findings of a chest radiograph were normal. Two months later, she was hospitalized with pneumonia and required assisted ventilation. A bronchoscopy at that time revealed extensive inflammation of the truncus and left lower lobe bronchus (LLLb). No FB was detected, but the truncus was lined with a greenish brown necrotic material (Fig 1).

As she remained symptomatic, a repeat bronchoscopy 3 months later revealed near-total obstruction of the truncus and LLLb with purulent secretions from the left lower lobe. The respiratory cultures were negative for mycobacteria and fungi but were positive for methicillin-resistant *Staphylococcus aureus*. The patient was treated with IV vancomycin, and a BB was attempted without success. She was referred to our institution for further management.

The truncus and LLLb were found to be 90% and 70% stenosed, respectively, the etiology of which was unclear at that time. Near-total patency was established by BB, and endobronchial injection of methylprednisolone was carried out. The patient began receiving therapy with oral steroids and antibiotics after the procedure.

Despite treatment, she developed recurrent pneumonia from restenosis of the affected bronchi. Endobronchial biopsies of the truncus 1 year after the episode of aspiration revealed ferric iron

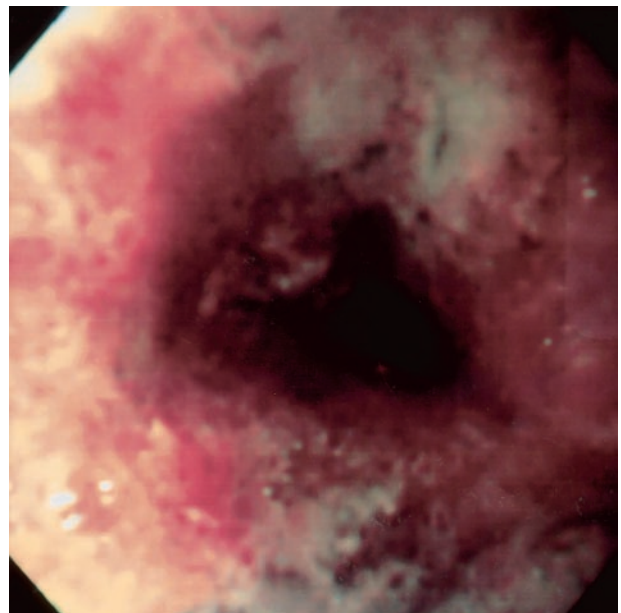


FIGURE 1. Bronchoscopy shows extensive inflammation of the truncus, which was lined with greenish brown necrotic material.

in the subepithelial connective tissue with foci of granulation tissue and fibrosis (Fig 2), which confirmed the patient's history of IPA. She underwent another BB, which was followed by a topical application of MC with informed consent. With the aid of flexible bronchoscopy, a single dose of 1 mL MC at 0.2 mg/mL was applied over the wall of each affected bronchus for 5 min (Fig 3).

On review 6 weeks after the procedure, the following results of ventilatory function tests were normal: FVC, 3.02 L (101% of predicted); and FEV₁, 3.02 L (92% of predicted). Good patency of the truncus and the LLLB was demonstrated on bronchoscopy.

DISCUSSION

The aspiration of an FB is a serious and potentially fatal problem. Over the past 25 years, the mean number of deaths from FB inhalation is 3,238 per year, making it the sixth leading cause of accidental death in the United States.⁷ In adults, the majority of episodes of FB aspiration occur in the sixth or seventh decade of life due to the failure of airway protective mechanisms.⁸

The diagnosis of FB aspiration continues to pose a challenge to clinicians as medical history and physical signs

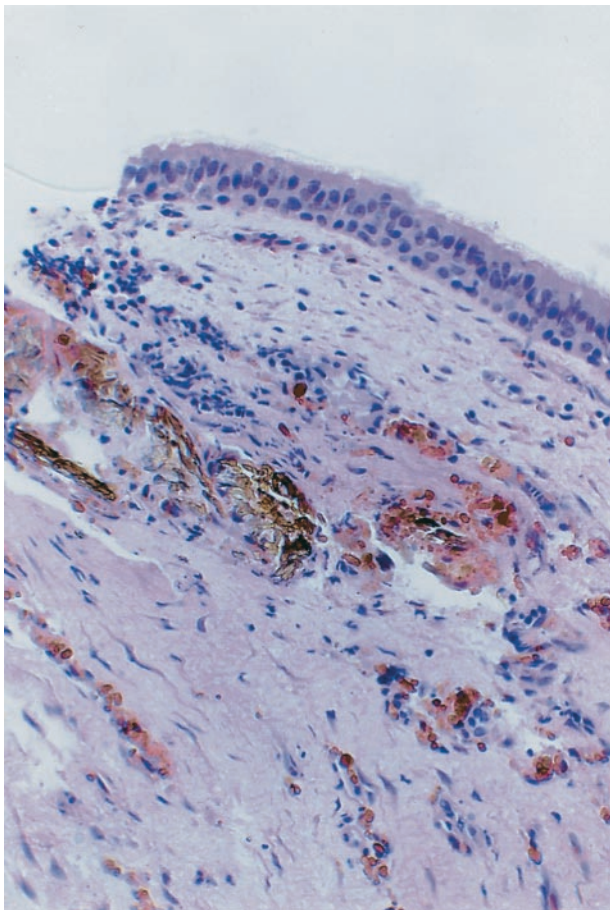


FIGURE 2. Bronchial wall with ciliated respiratory epithelium and underlying submucosal brown deposits of ferric iron is shown. Chronic inflammation and some fibrosis are present adjacent to the iron. A Prussian blue stain for iron confirmed the finding (hematoxylin-eosin, original $\times 200$).

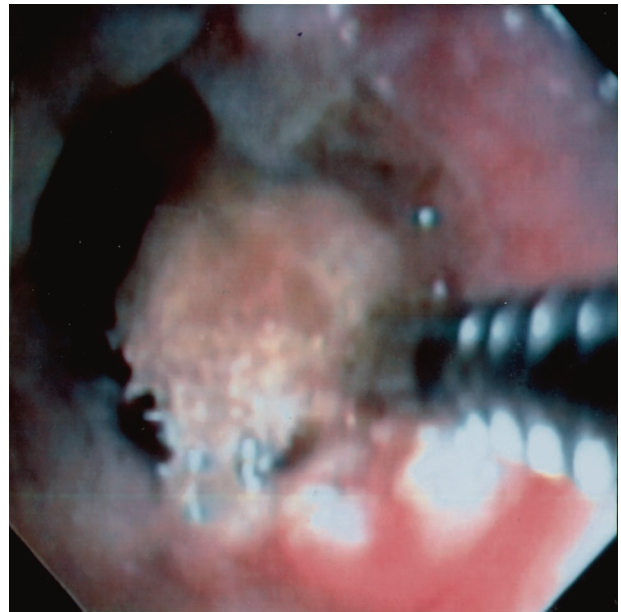


FIGURE 3. The method of topical mitomycin application following bronchoplasty is shown.

are often nonspecific and chest radiographs can be normal in one fourth of the cases. However, a symptom triad of cough, wheezing, and decreased air entry should alert the doctor to suspect FB aspiration.

Most FBs remain intact in the bronchial tree for a long time,⁹ although granulation tissue causing airway obstruction, atelectasis, and bronchiectasis can occur. Late sequelae of inhaled FBs such as BS and bronchiectasis can be avoided if an early bronchoscopy is performed. This is especially important for organic FB and drugs such as nortriptyline and iron pills in which the free iron eluted from the pill causes inflammation and fibrosis of the bronchial wall.^{10,11}

The iron pill was not detected on bronchoscopy 2 months after the aspiration in our patient, but the biopsy specimens obtained a year later stained positive for iron and the patient continued to experience airway inflammation and fibrosis. As she was not a candidate for surgical bronchoplasty, a repeat BB was performed.

To date, reports of IPA have been rare, but BS as a late occurrence has been consistently described.^{1,2,10} In two reports,^{1,2} BS was established at diagnosis and the specimens showed an FB granulomatous reaction with fibrosis, and in a third report, Godden et al¹¹ reported a spectrum of manifestations ranging from acute mucosal damage to scarring and granulation tissue. It is therefore not surprising that BS may be a late sequelae of IPA.

Topical MC, an antitumor antibiotic isolated from *Streptomyces caespitosus*, has been used notably in patients with glaucoma and after pterygium surgery.^{12,13} The high success rate of topical MC is attributable to its inhibitory effect on fibroblast proliferation while allowing for epithelial regrowth.¹⁴ This beneficial effect was

further demonstrated in five pediatric patients with recurrent tracheal cicatrix after tracheal reconstruction surgery.¹⁵

Topical MC at a relatively low concentration of 0.2 mg/mL was chosen because of its established efficacy and safety in ophthalmic surgery^{16,17} as well as its demonstrable success in preventing laryngotracheal stenosis following airway injury in dogs.¹⁸ Thus, it was used with analogous intent in our patient to prevent recurrent BS, and this novel method showed good results at 6 weeks.

CONCLUSION

Our case lends support to reports in the literature that show that IPA causes significant airway inflammation and BS due to iron deposition in the bronchial wall. As the pill disintegrates in the airway, it is usually not detected on bronchoscopy. Thus, a high degree of suspicion is necessary to make the diagnosis. We propose that a triad of symptoms (*ie*, aspiration, intense airway inflammation with BS, and iron particles in bronchial biopsy specimens) constitutes the syndrome of IPA, even in the absence of an FB. We would also recommend that the use of iron pills should be avoided in patients with swallowing disorders. However, if BS develops from IPA, it can be managed with BB. The role of MC remains to be studied.

REFERENCES

- 1 Tarkka M, Anttila S, Sutinen S. Bronchial stenosis after aspiration of an iron tablet. *Chest* 1988; 93:439–441
- 2 Mizuki M, Onizuki O, Aoki T, et al. A case of remarkable bronchial stenosis due to aspiration of delayed release iron tablet. *Nihon Kyobu Shikkan Gakkai Zasshi* 1989; 27: 234–239
- 3 Daum TE, Specks U, Colby TV, et al. Tracheobronchial involvement in Wegener's granulomatosis. *Am J Respir Crit Care Med* 1995; 151:522–526
- 4 Chung HS, Lee JH. Bronchoscopic assessment of the evolution of endobronchial tuberculosis. *Chest* 2000; 117:385–392
- 5 Andrews MJ, Pearson FG. Incidence and pathogenesis of tracheal stricture following cuffed tube tracheostomy with assisted ventilation. *Ann Surg* 1971; 173:249–263
- 6 Baharloo F, Veyckemans F, Francis C, et al. Tracheobronchial foreign bodies: presentation and management in children and adults. *Chest* 1999; 115:1357–1362
- 7 National Safety Council. Injury facts (formerly Accident Facts). Itasca, IL: National Safety Council, 1999; 9–12
- 8 Limper AH, Prakash UB. Tracheobronchial foreign bodies in adults. *Ann Intern Med* 1990; 112:604–609
- 9 Cunanan OS. The flexible fiberoptic bronchoscope in foreign body removal: experience in 300 cases. *Chest* 1978; 73: 725–726
- 10 Johnson DR, Yew D. Aspiration of nortriptyline. *Am J Emerg Med* 1994; 12:337–338
- 11 Godden DJ, Kerr KM, Watt SJ, et al. Iron lung: bronchoscopic and pathological consequences of aspiration of ferrous sulphate. *Thorax* 1991; 46:142–143
- 12 Lee DA. Antifibrosis agents in glaucoma surgery. *Invest Ophthalmol* 1994; 35:3789–3791
- 13 Rubinfeld RS, Stein RM. Topical mitomycin C for pterygia: is single application appropriate? *Ophthalmic Surg Lasers* 1997; 28:662–669

- 14 Khaw PT, Doyle JW, Sherwood MB. Prolonged localized tissue effects from 5 minute exposures to fluorouracil and mitomycin-C. *Arch Ophthalmol* 1993; 111:263–267
- 15 Ward RF, April MM. Mitomycin-C in the treatment of tracheal cicatrix after tracheal reconstruction. *Int J Pediatr Otorhinolaryngol* 1998; 44:221–226
- 16 Frutcht-Pery J, Siganos CS, Ilsar M. Intraoperative application of topical mitomycin C for pterygium surgery. *Ophthalmology* 1996; 103:674–677
- 17 Sugar A. Who should receive mitomycin C after pterygium surgery? *Ophthalmology* 1992; 99:1645–1646
- 18 Eliashar R, Eliashar I, Esclamado R, et al. Can topical mitomycin prevent laryngotracheal stenosis? *Laryngoscope* 1999; 109:1594–1600

Retroperitoneal Bronchogenic Cyst*

A Case Report

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A 46-year-old woman presented with a 1-year history of progressive left-arm numbness. A cyst below the left hemidiaphragm was discovered incidentally when a CT scan was performed to examine the thymus for a suspected tumor. A thymic mass was found. MRI indicated that the cyst contained proteinaceous fluid. The thymoma was approached through a median sternotomy and resected, but the cyst was found to be infra-diaphragmatic. A separate, left paraspinal incision was made to access the retroperitoneum, and the cyst was resected. Histologic examination showed that the cyst was bronchogenic in origin. Retroperitoneal bronchogenic cysts are very rare, and only four cases have been reported in the English-language literature.

(CHEST 2002; 121:1357–1359)

Key words: bronchogenic cyst; MRI

Bronchogenic cysts in the retroperitoneum are rare, and only four cases have been reported in the English-language literature.^{1–4} Making the correct diagnosis of heterotopic bronchogenic cyst preoperatively is very difficult. Previous reports^{5,6} suggest that MRI may be helpful. Bronchogenic cysts in the retroperitoneum can be excised either via a laparotomy incision or a flank incision. We report the case of a retroperitoneal bronchogenic cyst that was located near the aorta and was in contact with the left

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