A foreign body of a different kind: Pill aspiration

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"What we see depends mainly on what we look for," a famous quote by John Lubbock, an American philanthropist from the early 19th century. This quote may seem to be unrelated to the topic of a foreign body (FB) aspiration; however, aspiration of a medicinal pill represents a distinct clinical entity that is often overlooked. It requires a high degree of suspicion for its precise diagnosis in a timely fashion. Occasionally, serious complications involving the airways can occur as a result of a delay in its recognition. The purpose of our editorial is to increase the awareness of this entity among the pulmonologists.

Medicinal pills are prescribed over 3.7 billion times annually in the United States. It is considered as one of the most common forms of retail medical product in the country.[1] It is estimated that roughly 7% of all FB aspirated in the airways are medicinal pills. The pill aspiration in the airways, however, is under-recognized and the literature may not reflect the true incidence of this important entity. In addition, there are only limited numbers of articles that describe the unique reactions of each pill when aspirated into the tracheobronchial tree.

The diagnosis of pill aspiration is challenging. Although the patient may have a clear history of the nature and the timing of the pill aspiration, most pills are radiolucent on chest imaging and the pill itself may no longer be present at the time of bronchoscopic examination. It needs to be highlighted that if the aspirated pill dissolves in the tracheobronchial tree, the diagnosis of FB aspiration has to be established in the absence of the actual FB! Thus, in many of the instances, diagnosis of the pill aspiration is not even suspected. It remains unrecognized that aspiration of several types of pills can lead to significant inflammation and stenosis of the air passages as well as death.[2]

Küpeli *et al.* recently reviewed the clinical presentation, mechanism of injury, diagnosis and management of pill aspiration.[3] It pointed out that there are two major mechanisms of airway involvement with pill aspiration: Inflammation and obstruction. The former is based on the chemical nature of the pill, with $FeSO_4$ and KCl being the most common culprits. If the pill dissolved in the airway secretions, in selected cases diagnosis is established by either the endobronchial biopsy or by the bronchoalveolar lavage. Certain medications can also involve airways through their systemic side-effects without actual aspiration (e.g., Amiodarone and Clopidogrel).

Lastly, the air passages have been used as a novel route of drug delivery. Many of these medications can cause specific reactions to the airways [Tables 1 and 2]. An example of one such medication is inhaled corticosteroid (ICS). There are several articles demonstrating an increased risk of mycobacterial infection (both tuberculosis and non-tuberculosis) among ICS users.[4,5] These studies raise a possibility of the adverse effect of

Table 1: Pills causing airway inflammation*

Alendronate	Mineral oil
Aminophenazone	Meprobamate
Barium sulfate	Nifuroxazide
Bismuth subgallate	Nortriptyline
Charcoal	Phenobarbital
Cholestyramine	Phenytoin
Ferrous sulfate	Pomegranate pill
Gastrografin	Potassium chloride
Hytrast/Dionosil	Quinine
Kaolin-Pectin	Sevelamer (phosphate binder)
Mercury	Tetracyclin
Metformin	

*As reported in the literature

Table 2: Airway involvement with medicinal pills (other mechanisms)

Obstruction	Systemic effects	Local effects
Aspirin	ACE inhibitors	Acetylcysteine
Capsule endoscopy	Amiodarone	Insulin
Ciprofloxacin	Cocaine	Inhaled corticosteroid
Cocaine bag	Clopidogrel	Pentamidine
Sucralfate	Epinephrine	
	Heroine	
	Rapamycin	

Modified from reference 3

ICS and suggest that the dose of ICS should be reduced at the earliest opportunity.

An early bronchoscopic examination in a patient with clear history of pill aspiration may mitigate the detrimental effects of a partially dissolved pill. An extraction of the aspirated pill can be attempted with bronchoscopic tools such as forceps, baskets, snares and balloon catheters. Most of the case reports of pill aspiration highlight the importance of early bronchoscopic surveillance and intervention to promptly identify the extension of airway injury. Once the airway injury has taken place, frequent bronchoscopic interventions with balloon dilatation, cryotherapy, argon plasma coagulation, mitomycin C application and stent placement may be required to maintain airway patency. Ultimately, some of the patients with pill aspiration may require surgical interventions (lobectomy and/or pneumonectomy) for refractory stenosis and occlusion.

The most important issue to avoid the airway complications from pill aspiration is its prevention. In elderly patients with or without prior history of swallowing disorders, caregivers need to be extremely cautious while administering medications via the oral route. In high-risk patients, especially among infants and those with swallowing disorders, as far as possible medicinal pills should be avoided. Otherwise, the pill should be administered one at a time making sure that the patient has completely swallowed each pill before receiving the next pill.

Pulmonologists must be fully cognizant regarding the urgency of management in patients with aspiration of foreign body, especially the pill aspiration. The syndrome of "pill aspiration" is underrecognized, which should be included in the differential diagnosis of unexplained endobronchial findings. Diagnosis of the pill is often made in the absence of the actual foreign object. Flexible bronchoscopy is the best method in an evaluation of pill aspiration as most of the medicinal pills are radiolucent. Airways are also increasingly being used to deliver medications, which place the airways at a higher risk of localized complications. The long-term side-effects of aerosolized medication and metered dose inhaler remain unrecognized.

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