

# “Pills” and the Air Passages

## A Continuum

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Recently, we reported a number of key, common medications that affect the air passages in a variety of fashions. The purpose of this article is to provide a comprehensive review of the literature on the subject, including supportive articles published in languages other than English. The presented information was gathered by a review of the English literature, by cross referencing, and by communication with other interventional pulmonologists. We identified several additional medications causing either direct or systemic effects on the air passages. In this review, we update the clinical presentation, mechanism of injury, diagnosis, and management of the airway complications related to these medications.

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**ABBREVIATIONS:** BSG = bismuth subgallate; ICS = inhaled corticosteroid; SPS = sodium polystyrene sulfonate; TEF = tracheoesophageal fistula

Aspiration of a pill in the air passages can occur even among adults with an intact swallowing mechanism. It is often difficult to establish the diagnosis, especially in the absence of a reliable history. Some pills may remain intact in the endobronchial tree for a number of years without causing much harm, whereas others may dissolve, making recognition of the foreign body aspiration difficult (Fig 1A). The clinical consequences may also vary, from an asymptomatic granuloma formation to a severe, life-threatening airway necrosis, depending upon the chemical characteristics of the “pill.” Thus, if the diagnosis is delayed, severe airway damage can occur. A high degree of suspicion is required to establish

the diagnosis, especially if the pill has dissolved.

Our previous review delineated the local and systemic reactions on the airways of some common medications, their diagnosis, and the management of the most common complications.<sup>1</sup> Since that publication, we have discussed with many experts their experiences with “pill aspiration,” prompting further review of the literature since the 1920s, including cross referencing for the articles that were published in languages other than English.<sup>1</sup> The following discussion deals with additional medications affecting the airways (Table 1). Moreover, we have compiled an appendix containing all the supportive articles related to “pill”-induced airway injury

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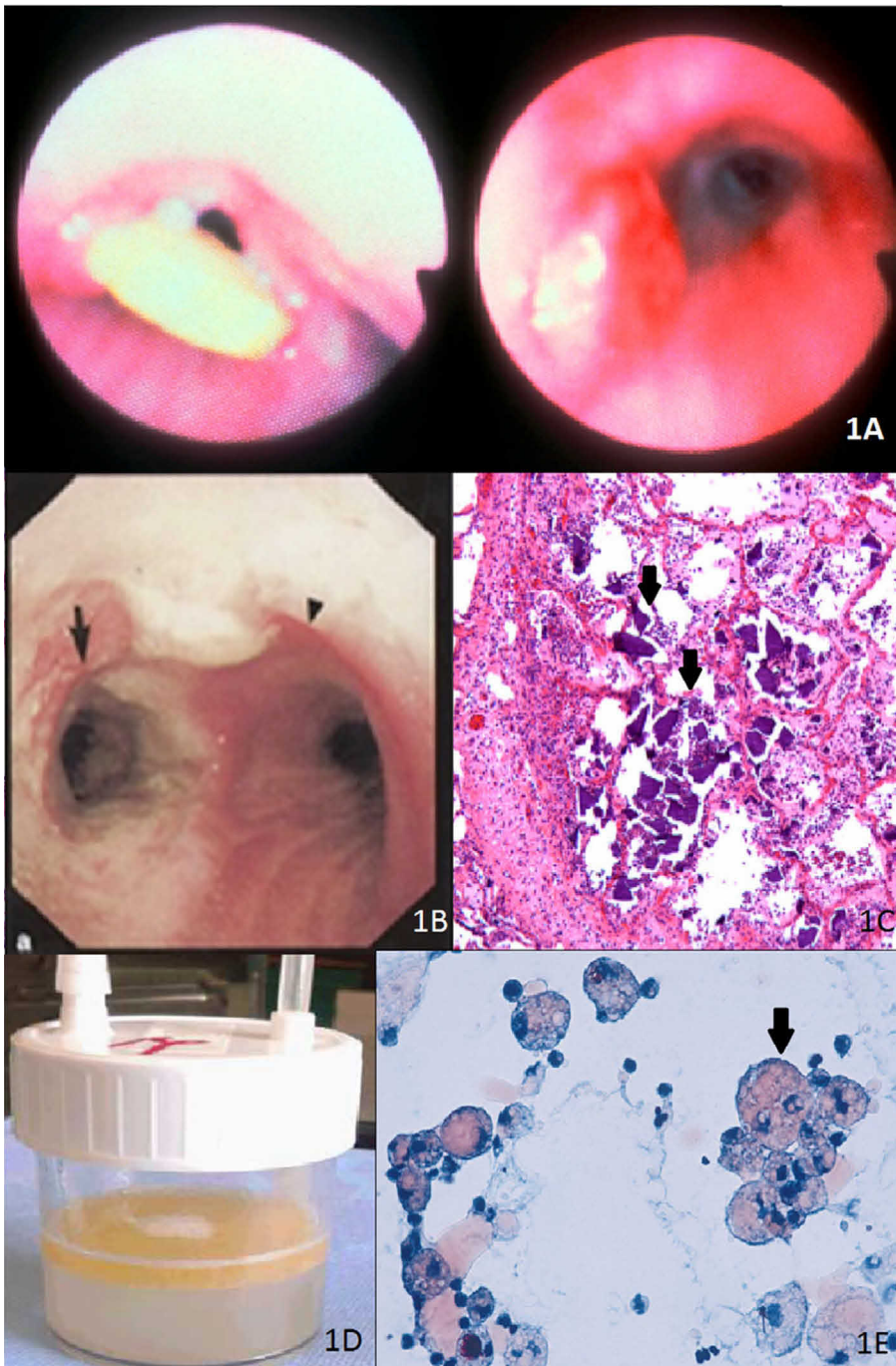


Figure 1 – A (left), An enteric-coated intact vitamin pill embedded in the trunchus intermedius for > 2 y. A (right), Minimal granulation at the site of the foreign body after its removal. B, A whitish adherent pseudomembrane over the left mainstem bronchus (arrow) and right mainstem bronchus (arrowhead). (Reprinted with permission from Sundar et al.<sup>4</sup>) C, Numerous foci of intra-alveolar large purple polygonal crystals (arrows) consistent with sodium polystyrene sulfonate aspiration (hematoxylin and eosin, original magnification  $\times 400$ ). D, BAL fluid in a patient with lipoid pneumonia. Note oil particles floating at the top. E, Microscopic examination with Oil Red O staining of BAL revealing lipid-laden macrophages (arrow) (Reprinted with permission from Majori et al.<sup>40</sup>)

that we could gather from the published literature but were unable to include in the main article (e-Appendix 1). As stated earlier, pills can affect the airways via their local inflammatory, obstructive, or systemic effects.

## Inflammation

### Aspirin

Aspirin is often prescribed as an analgesic or an antipyretic and also for antiplatelet aggregation. An uncoated

aspirin pill can adhere firmly to the mucous membrane. Upon contact with moisture, aspirin hydrolyzes into salicylic and acetic acids, which are irritants to the mucous membrane. There are four confirmed case reports of aspirin aspiration among toddlers, based strictly on the histories.<sup>2</sup> It was hypothesized that the mucosal irritation resulted in laryngeal spasm, which led to cardiopulmonary arrest in these cases. Two toddlers did survive; however, they had permanent anoxic

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