required steroid therapy. Our patient required minimal treatment and showed spontaneous resolution. It is unclear at this point if there will be any long-term effects to our patient. Our patient displayed an isolated reduction of diffusion capacity, which could relate to his prior cigarette consumption and/or the recent eosinophilic lung infiltration. Further follow-up with our patient will help to elucidate any reversibility of this diffusion block. Previous reviews have reported reduced diffusion capacities as being the most prevalent pulmonary function abnormality in cocaine addicts.

Eosinophilic infiltration of the lungs with peripheral eosinophilia is an uncommon presentation of pulmonary complications of cocaine. However, as awareness of this syndrome increases, more cases may be recognized. The importance of early recognition lies in the fact that while the syndrome may result in severe pulmonary symptoms, these may be reversed by judicious use of steroids and/or abstinence from cocaine. Moreover, as in the case reported by Kissner et al., repeated exposure to cocaine may result in recurrent episodes that could result in permanent tissue damage.

ACKNOWLEDGMENTS: The authors thank Ms. Kim Rybke for her secretarial assistance in the preparation of this manuscript.

REFERENCES


Table 1—Crack-Induced Eosinophilic Pulmonary Infiltration

<table>
<thead>
<tr>
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<th>Murray et al</th>
<th>Kissner et al</th>
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Acute Occlusion of a Mainstem Bronchus by a Rapidly Expanding Foreign Body*

Michael C. Overdael, M.D., and Mark D. Wewers, M.D., F.C.C.P.

We report a case of an 85-year-old woman who presented with acute respiratory failure, caused by aspirating a sucralfate tablet that totally occluded her left main-stem bronchus. Acute respiratory failure resolved after bronchoscopic removal of the markedly expanded tablet. To our knowledge, the acute obstruction of a main-stem bronchus by an aspirated foreign body has not been previously described in adults. We believe that the unusual properties of sucralfate tablets (rapid expansion and mucosal binding) were contributing factors in this patient.

*(Chest 1994; 105:1600-02)

Foreign body aspiration occurs infrequently in adults. When it does occur, it can lead to acute respiratory discomfort, but it is unlikely to lead to acute respiratory failure. The reason for this is primarily based on anatomy: objects small enough to pass through the vocal cords are generally too small to obstruct an airway as large as a main-stem bronchus. To our knowledge, acute total obstruction of a main-stem bronchus by a foreign object has not been described in adults. We report such a case in a patient who aspirated a commonly prescribed drug.

CASE REPORT

An 85-year-old woman presented to our Emergency Department after the sudden onset of dyspnea. On arrival, she appeared acutely distressed, and was tachypneic, tachycardic, and moderately hypertensive. Her lung sounds were normal on the right, but decreased on the left, accompanied by focal left anterior wheezing. Her chest radiograph was normal. Her arterial PO2 was 70 mm Hg with 88 percent O2 saturation on a high-flow non-rebreather oxygen mask. Soon after arrival, a ventilation-perfusion lung scan was ordered to screen for a suspected pulmonary embolism. The scan showed complete absence of ventilation to the left lung (Fig. 1), consistent with an acute obstruction of the left

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main-stem bronchus. Urgent bronchoscopy found the proximal left main-stem bronchus occluded by a markedly expanded sucralfate tablet, positively identified by its imprint. This proved to be putty-like, gritty, and refractory to suctioning. After washings and vigorous prodding with biopsy forceps, the patient was able to expel the macerated tablet by coughing. Subsequent inspection of the airways revealed normal airway anatomy with pink discoloration of the mucosa at the site of obstruction. Within minutes, the patient reported relief of her dyspnea. Her O₂ saturation rose to 97 percent, which was maintained as her supplemental oxygen was tapered to room air. Careful questioning of the patient's caretaker revealed that the patient had taken a sucralfate tablet just prior to the onset of dyspnea.

**DISCUSSION**

Compared with the pediatric population, aspiration of foreign bodies occurs infrequently in adults.¹⁻³ While the medical literature describing foreign body aspiration in adults has focused largely on acute laryngeal obstruction (the "Café coronary" syndrome),₄ aspiration into the tracheobronchial tree has received relatively little attention. Unlike the pediatric population, adults presenting with respiratory symptoms are usually evaluated for alternate diagnoses unless they provide a clear history of aspiration.¹ In many instances, foreign bodies have remained undetected for years despite chronic respiratory symptoms.²⁻⁵

At bronchoscopy, the distribution of objects found within the adult airways favors the right lower lobe bronchus,¹ although involvement in all airway sites has been reported. While these reports have included the main-stem bronchi as sites for foreign bodies, the acute total obstruction of a mainstem bronchus by a foreign body has not been described previously in adults (to our knowledge).

It is not difficult to speculate why such an event is rare. The mean diameter of the right main-stem bronchus is 13 mm, and that of the left is 11 mm.⁷ However, foreign bodies entering the tracheobronchial tree must first pass through the narrower opening in the larynx. Since the glottic width is typically between 6 and 9 mm in adults,⁸ the diameter of a foreign object entering the tracheobronchial tree would likely be smaller than either main-stem bronchus. Therefore, in a patient with normal upper airway anatomy, foreign body aspiration would not be expected to cause acute obstruction in a main-stem bronchus. One important exception to this would be an aspirated foreign body that expands to a larger size after it has passed beyond the vocal cords.

Our patient had normal airway anatomy, yet she experienced the acute obstruction of her left main-stem bronchus after aspirating a foreign body. She happened to aspirate a sucralfate tablet, which has the unusual physical property of expanding rapidly when wet. Sucralfate has a well-deserved reputation as a safe and effective drug in the

**FIGURE 1.** Posterior views of ventilation scan (left, A) and perfusion scan (right, B) showing complete absence of ventilation to the left lung, consistent with acute obstruction of the left main-stem bronchus.

**FIGURE 2.** Rapid expansion of a sucralfate tablet is seen 30 s after placing it on a wet surface (left), compared with a dry tablet (right).
treatment of duodenal ulcers, gastritis, and esophagitis. However, unlike most other drugs, sucralfate tablets dissolve to form a viscous, gel-like suspension that binds with high affinity to both defective and normal mucosa. While these actions contribute to its well-documented beneficial effects of protecting gastric and esophageal mucosa, it is accompanied by a rapid increase in size (Fig 2). This helps explain the bronchoscopic observation of a markedly swollen sucralfate tablet obstructing our patient's left main-stem bronchus.

Other aspirated materials have been observed to increase in diameter, but not in the short-term observation. Vegetable matter (commonly a peanut) has been observed to gradually swell within the tracheobronchial tree, causing airway obstruction after several weeks. Interestingly, the only previous report of a foreign body causing total obstruction of an adult main-stem bronchus occurred only after a chicken bone had gone unnoticed for more than 3 years. The importance of the present case is that total main-stem obstruction occurred immediately with sudden respiratory compromise. This is particularly noteworthy in that aspiration, as in most adult cases, was not immediately suspected as the cause.

The present case demonstrates that a rapidly expanding foreign body can cause respiratory compromise by acutely obstructing a main-stem bronchus. While we expect this event to be rare in most adults, patients who may be at increased risk include those with identifiable risks for aspiration and they should use caution when taking medicines that share this physical property. If such drugs are required in these patients, prescribing them in liquid or suspension form may decrease the likelihood of acute bronchial obstruction in the event aspiration occurs.

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Severe Diffuse Interstitial Pneumonitis Induced by Carmustine (BCNU)*

Herè Lena, M.D.; Benoit Desrues, M.D.; Alain Le Coz, M.D.; Marie Line Quinquenel, M.D.; and Philippe Delaval, M.D., F.C.C.P.

We report a fatal case of acute interstitial pneumonitis in a patient treated with carmustine (BCNU) for a brain tumor. Bronchoalveolar lavage (BAL) revealed lymphocyte alveolitis with a low CD4/CD8 ratio (0.36), consistent with an immunologic phenomenon, rather than the most often evoked toxic hypothesis.

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BCNU=carmustine

Bischloroethylnitrosourea (BCNU [carmustine]) is a chemotherapeutic agent used to treat various types of tumors, cerebral in particular. The first pulmonary adverse event related to this drug was reported in 1976, and several cases of pulmonary fibrosis secondary to BCNU treatment have since been reported and published. A toxic mechanism has generally been evoked. We report a case of acute pulmonary fibrosis in a 23-year-old patient with cerebral trunk tumor treated with BCNU and vincristine, the origin of which appears to be linked to an immunologic mechanism, considering the characteristics of bronchoalveolar lavage (BAL).

CASE REPORT

A 21-year-old man was hospitalized in July 1986 for headache, diplopia, and balance disorders. Cranial computed tomographic

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FIGURE 1. Thoracic radiography showing diffuse infiltrative process.