Predicting Death in Massive Hemoptysis

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Massive hemoptysis is a terrifying problem for both the patient and the health care team. Acutely managing the airway to prevent asphyxiation is technically demanding. Sorting through the various diagnostic possibilities in a timely fashion is daunting. Mobilizing the resources needed to assess the patient, such as thoracic surgery, interventional radiology, and anesthesiology, is challenging. Perhaps the most difficult aspect, though, of managing massive hemoptysis is the relative lack of experience most institutions have with this problem. For instance, in my institution with 33 medical ICU beds and over 3,200 ICU admissions annually we see only 2–5 cases of massive hemoptysis per year. Similarly, the medical literature provides only scattered, relatively small case series describing management of massive hemoptysis [1–5].

Into this area of relatively little knowledge comes an extraordinarily important article. In this issue of *Respiration*, Fartoukh et al. [6] present ‘Early prediction of in-hospital mortality in patients with hemoptysis: an approach to defining severe hemoptysis’. Fartoukh et al. [6] describe a truly unique, single institution, 14-year experience of managing 1,087 consecutive patients with hemoptysis. Many of these patients were seriously ill: 717 were admitted to the ICU, 11% had acute respiratory and/or hemodynamic failure, and 10% had greater than 300 ml of hemoptysis. The overall in-hospital mortality was 6.5%. Causes of hemoptysis varied as would be expected, with in-hospital mortality predictably highest in cancer patients. The descriptive information of this data base is

fascinating. However, the authors take an especially important next step by developing a simple model for predicting in-hospital mortality for patients presenting with hemoptysis. The model developed by Fartoukh et al. [6] is an important step forward from our current approach to defining massive hemoptysis which is based only on the volume of blood expectorated. This model is multi-modal, is condition specific rather than a generic physiologic approach, has face validity in that the components are clinically relevant, and has internal validity as the derivation set findings were confirmed by a separate validation sample. Finally, a rational approach to defining prognosis in hemoptysis is now available to clinicians.

Although the size and breadth of the single institution experience with hemoptysis used by Fartoukh et al. [6] to develop their prognostic model is truly remarkable, readers must still exercise caution when applying this model to the individual patient. The outcomes in this model are based on a management approach apparently developed pragmatically by the authors [7]. Key elements of this approach, described as conservative measures, include strict bed rest, nothing by mouth, broad spectrum antibiotics, no cough suppressants, no use of medications which might increase the risk of bleeding, and early (within 24 h of admission) fiberoptic bronchoscopy. Bronchoscopy is apparently performed both to identify the source of bleeding and to attempt to control the bleeding. The authors describe using cold saline lavage, instillation of topical vasoconstrictive agents, and balloon

tamponade as measures of bleeding source control. Bronchial artery angiography and embolization is the authors' preferred next step over surgery. Although this approach seems generally reasonable, there are clinical situations which require different steps. In patients with cystic fibrosis who have previously had bronchial artery embolization to control hemoptysis, recurrent hemoptysis might originate from nonbronchial systemic collateral vessels [8]. Similarly, patients with hemoptysis and extensive pleural disease might also have nonbronchial systemic collateral vessels as the source of bleeding [9]. In these cases, especially when time is limited, clues from CT angiography might be useful in leading to angiography of the chest wall arterial system as the first step. In some patients who develop massive hemoptysis after use of either thrombolytics or antiplatelet agents [10, 11] diffuse alveolar hemorrhage might be expected and bronchial ar-

tery angiography deferred. In patients bleeding from a pulmonary artery pseudoaneurysm caused by a Swan-Ganz catheter [12] or from an overinflated tracheostomy cuff eroding through the trachea into an adjacent artery, urgent surgery should be considered.

'Early prediction of in-hospital mortality in patients with hemoptysis: an approach to defining severe hemoptysis' by Fartoukh et al. [6] should be required reading for all pulmonologists and critical care physicians. The extensive experience, both over time and in the volume of cases, described in this article dwarfs information from previous work. The scoring system developed by the authors provides a framework for understanding prognosis in this often terrifying problem. Clinicians should consider their approach to managing hemoptysis as guidance, adjusting as always to the individual clinical scenario.

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