A 75-year-old woman underwent transthoracic CT-guided cutting-needle biopsy of a 5 × 5-cm mass of the superior segment of the left lower lobe and had an episode of recent hemoptysis. She had been ill for 3 months with dyspnea, cough, and intermittent sputum production. Chest radiographs revealed a persistent left lower lobe alveolar opacification believed to be pneumonia; however, the patient had no improvement with two courses of oral antibiotics. She had severe COPD and was receiving home oxygen at 2 L/min, with baseline dyspnea with minimal exertion.

Immediately following the CT-guided biopsy of the lung mass, she expectorated a large volume (approximately 500 mL) of bright red blood, and CT imaging revealed a pneumothorax. The pneumothorax was evacuated with a 12F chest tube placed under CT guidance. The patient remained hypoxic with an oxygen saturation of 85% on partial nonrebreather oxygen mask, and so was then intubated, with improvement in her arterial oxygen saturation to 90% but on fraction of inspired oxygen of 1.0. Suctioning through the endotracheal tube returned scant amounts of bloody secretions over the next several hours. After stabilization, she was transferred to an ICU. In the midst of the transport, her arterial oxygen saturation declined to 65%, followed soon thereafter by cardiac arrest. She was pulseless and had absent breath sounds over her entire left hemithorax. Cardiopulmonary resuscitation was initiated. Cardiac monitoring revealed electromechanical dissociation. The patient was administered epinephrine, 1 mg IV, and a 32F left-sided chest tube was placed emergently. The chest tube immediately drained 50 mL of blood, but no rush of air or air leak in the chest tube was appreciated, and subsequently the tube showed no respiratory variation. She had a return of spontaneous circulation shortly thereafter, with a total arrest time of 4 min. She was neurologically intact and following commands 30 min later. A chest radiograph was obtained (Fig 1).

What is the diagnosis?
Diagnosis: Endobronchial blood clot with left lung atelectasis

The patient was supported on mechanical ventilation for 2 days and received chest physiotherapy and bronchodilators. A subsequent chest radiograph later that day showed interval improvement in aeration of the left lung and a small residual left apical pneumothorax (Fig 2). She had progressive aeration of the left lung and was successfully extubated, but required a high flow rate of supplemental oxygen. Her left apical pneumothorax resolved. Her supplemental oxygen requirement was weaned to 5 L/min, and she was ambulating without assistance by the time of her discharge.

Her biopsy showed non-small cell lung cancer, and a staging positron emission tomography scan revealed enhancement of the corresponding lung mass and multiple separate intraparenchymal nodules, interpreted to be metastatic disease. She was discharged to home with plans for palliative radiotherapy to her lung mass.

DISCUSSION

Endobronchial obstruction due to blood clot is an infrequently observed cause of respiratory failure, but is especially worthy of consideration in a patient following an episode of massive hemoptysis.1 A substantial proportion of endobronchial blood clots, approximately 30%, however, occur without evidence of hemoptysis. These occult cases occur most frequently in patients receiving prolonged mechanical ventilation or long-term tracheostomy; patients with tracheobronchial mucosal damage from infection, tumor, tracheostomy, or endotracheal suctioning may also have unrecognized bleeding and clot formation.

The first confirmed case of endobronchial obstruction from blood clot was described by Wilson2 in 1929. The patient was a 23-year-old woman with tuberculosis and atelectasis. She had respiratory distress after 3 days of recurrent hemoptysis, and her chest radiograph revealed right middle and lower lobe collapse. Six days later, she expectorated a large bronchial cast composed of blood clot and her respiratory symptoms rapidly improved.

Airway obstruction by blood clot has been described in a variety of clinical scenarios, including bronchiectasis, tuberculosis, mitral stenosis, pulmonary infarction, pulmonary arteriovenous malformation, sarcoidosis, bronchial carcinoma, and intrathoracic trauma. Mucosal damage from suction catheter manipulation, BAL, transbronchial biopsy, tracheostomy placement, and as a complication of thoracentesis leading to airway obstruction from blood clots have also been reported.3,4

Chest radiographs may not reveal acute abnormalities, despite severe respiratory failure. Endotracheal tube or proximal airway involvement may not be radiographically evident. Typical findings, when present, show lobar or segmental collapse, or cutoff of the air column of the trachea or mainstem bronchi. Such a cutoff sign is visible on the initial chest radiograph in this case (Fig 1). A less common radiographic finding is ipsilateral hyperexpansion that can lead to tension pneumothorax, due to the clot operating as a ball-valve mechanism. With the exception of one case, this occurs in patients receiving positive pressure ventilation.4

Treatment for an endobronchial blood clot is usually supportive care until the clot resorbs, which usually occurs in 3 days, and was the course of management adopted for this patient. In more severe cases with inadequate oxygenation or ventilation, removal may be attempted with fiberoptic or rigid bronchoscopy. Flexible bronchoscopy with saline solution lavage and suctioning or forceps extraction, and occasionally removal of the forceps and bronchoscope together, may be required with an especially large clot. Authors have also described manipulation with a Fogarty arterial embolectomy catheter and topical thrombolysis with streptokinase or urokinase.5

REFERENCES

1 Arney KL, Judson MA, Sahn SA. Airway obstruction arising from blood clot: three reports and a review of the literature. Chest 1999; 115:293–300
2 Wilson JL. Hemoptysis is tuberculosis followed by massive pulmonary atelectasis. Am Rev Tuberc 1929; 19:310–313

Figure 2. Supine anteroposterior chest radiographs 48 h later, with substantial resolution of left lung atelectasis, residual left lower lobe alveolar opacity, and small apical pneumothorax.