A 19-year-old man was referred to our hospital for chest trauma. He had suffered a blunt thoracic injury from a motor vehicle accident. He did not smoke. His medical history was irrelevant. He complained of dyspnea as well as left-sided chest pain. Physical examination on admission revealed a temperature of 36.5°C, a respiratory rate of 38 breaths per min, and a pulse rate of 98 beats per min. The blood pressure was 100/70 mm Hg. Inspiratory crackles were heard over the left lung. The remainder of the physical examination findings were normal. Laboratory studies disclosed a hematocrit of 33.0%. The white cell count was 98×10^9/L with 68% neutrophils, 19% lymphocytes, 7.8% monocytes, and 2.1% eosinophils. The erythrocyte sedimentation rate was elevated to 60 mm/h. A specimen of arterial blood, drawn while the patient was breathing room air, showed that the PO₂ was 42 mm Hg, PCO₂ 40.8 mm Hg, and pH 7.30. The remainder of the laboratory findings were unremarkable.

An anteroposterior chest radiograph of the patient (Fig 1) obtained in the emergency room showed a bilateral, diffused homogeneous lung density. Multiple left rib fractures were present, but there was no evidence of pneumothorax. Fracture of left clavicle was seen.

The patient was monitored and treated with assisted ventilation for 1 day. Oxygen requirements were noted to decrease after the first 24 h, with clinical improvement. Six days later, room-air arterial blood gas values were normal. Another chest radiograph was obtained (Fig 2).
Diagnosis: Bilateral pulmonary contusion and pulmonary laceration with hematomas

The posteroanterior chest radiograph (Fig 2) showed that most of the infiltrate cleared, revealing a cavity in the left upper lung. A computed tomographic scan of the thorax obtained the same day (Fig 3) disclosed a dense mass in the left upper lung, with an air fluid level, in direct opposition to the fractured ribs; another adjacent oval opacity was found. A follow-up chest radiograph 4 weeks later showed considerable clearing of the lesions.

Pulmonary contusion is the primary lung injury in nonpenetrating chest trauma. Contusion frequently occurs after blunt trauma, accounting for 30 to 75% of all pulmonary injuries; however, it is seen less commonly after penetrating trauma. Their pathologic findings include hemorrhage and edema formation in the alveoli and interstitium, resulting in disruption of alveolar-capillary integrity without accompanying major parenchymal disruption. Clinically, lung contusion is characterized by the development of hypoxemic respiratory failure.

Contusion appears on chest radiographs within 6 h of trauma. The radiologic findings may be as follows: irregular, coarse nodular densities that may be discrete or confluent; homogeneous consolidation; or diffused, often patchy, air space density. The radiopacities on the radiograph resulting from lung contusion are said to differ from those of incipient bronchopneumonia in that they are not confined within the anatomic limits of the various segments and lobes. There is usually rapid clearing of the infiltrate within 1 to 3 days, but complete resolution often requires 10 to 14 days. In 38% patients with pulmonary contusion there are no radiologically visible rib fractures associated with the contusion.

Severe blunt trauma may lead to pulmonary parenchymal laceration. Pulmonary laceration is primarily associated with penetrating injuries and is seen less commonly in blunt trauma. Most lacerations are filled with blood (pulmonary hematoma), although they may contain air instead (traumatic air cysts). Infrequently, the laceration may occur within the parenchyma and not communicate with the pleura.

Chest pain and hemoptysis are the principal symptoms, but in other patients symptoms are absent. For the first several days, the accompanying contusion may mask the laceration on the radiograph. As the opacification secondary to the contusion clears, the laceration becomes visible as a circular or elliptical radiolucent defect with or without an associated air fluid level. This cystic lesion may fill completely with blood and assume the appearance of a coin lesion. The hematoma will usually disappear within 3 to 5 weeks. In a few cases, resolution is much slower and the hematoma may persist as a focal nodular image.

Supportive management emphasizes oxygenation, titrated to achieve hemoglobin saturation, either with the patient breathing spontaneously or, if intubation and assisted-mechanical ventilation are required, with the addition of a distending airway pressure. Adequate analgesia for coexistent rib fractures and physiotherapy may moderate the course of patients with contusion. Prophylactic antibiotic therapy is not indicated in blunt chest injury.

REFERENCES