

# INJURY

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## Blast injuries to the lungs: clinical presentation, management and course

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### Summary

Five patients with blast injuries to the lungs after bomb explosions are reported. In each patient radiological changes were apparent on the initial chest film taken within 4 hours of the explosions. Arterial hypoxaemia was also present. Four patients were actively treated with continuous positive-pressure ventilation, which was adjudged effective therapy. Two patients died, one owing to bilateral pneumothorax which occurred during anaesthesia, and the other owing to overwhelming infection. Hypoxaemia persisted for 4 months in one of the survivors. Lung function tests which were performed on the same patient 10 months after the blast injuries, however, were normal.

### INTRODUCTION

IN A recent article it was suggested that the clinical and radiological features of blast injuries to the lungs, and the changes which occur in the arterial blood gases, do not appear for 24–48 hours after an explosion (Gray and Coppel, 1975). This has not been our experience with 5 patients who sustained lung damage when 2 bombs went off almost simultaneously in 2 public houses in Birmingham on 21 November, 1974. These patients were admitted to hospital within 30 minutes of the incidents and were all conscious on arrival. Each patient had multiple lacerations and splinter wounds (which contained much debris), plus superficial burns, in addition to the injuries specified in the individual case histories.

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### CASE REPORTS

#### Case 1

This 34-year-old male was in severe respiratory distress and was deeply cyanosed. His systolic blood pressure (BP) was 100 mm Hg. Air entry to his right lung was diminished and diffuse crepitations were heard in this lung. He had many soft-tissue wounds of his right side including one particularly large wound of the chest (but without pleural perforation). A drain was promptly inserted in the right pleural cavity. Ten minutes later, because of continuing respiratory distress, the patient was intubated and positive-pressure ventilation (PPV) was started. Blood was aspirated from the tracheobronchial tree. A chest X-ray 60 minutes after the explosion revealed a large opacity in the right lower zone and a fracture of the right sixth rib (*Fig. 1*). Peritoneal lavage 30 minutes later indicated intra-abdominal bleeding. A large rent on the superior surface of the liver was found at laparotomy and this was sutured. Primary excision of his other wounds, without closure, was also carried out. By the end of the operation the patient had received 22 units of blood and 2 l of Hartmann's solution.

After the operation PPV was reinstated with an East-Freeman ventilator. A positive end-expiratory pressure (PEEP) of 10 cm H<sub>2</sub>O was added. For most of his ventilator therapy a fractional inspired oxygen concentration (*F*<sub>I</sub>O<sub>2</sub>) of 0.3 resulted in an arterial oxygen tension (*P*<sub>a</sub>O<sub>2</sub>) of between 9.3 and 10.65 kPa (70 and 80 mm Hg). The maximal inflation pressure reached on delivering a tidal volume (*V*<sub>T</sub>) of 1000 ml was 35 cm H<sub>2</sub>O. A left pneumothorax developed on the fourth day after the explosion and a drain was accordingly inserted in the pleural cavity. By the ninth day considerable clinical and radiological improvement in the pulmonary condition had occurred and, therefore, weaning from the ventilator was started.