

a tuberculous cavity. With subsequent opacification of the cyst the diagnosis becomes obvious but where a cystic lesion persists, further investigation may be necessary to exclude tuberculosis. A cavitating bronchial carcinoma may sometimes have to be excluded.

If the patient does not present at the time of the trauma, the presence of a cyst or 'coin' lesion in the lung may pose diagnostic problems unless the history of injury is elicited.

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# Generalized Surgical Emphysema as an Early Complication of Facial Fracture

## A Case Report

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### SUMMARY

A case of multiple facial fractures complicated by subcutaneous emphysema, pneumomediastinum and pneumoretroperitoneum, in the absence of intra-abdominal, neck or chest injuries, is described.

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The more common early complications (i.e. within the first 24-48 hours) of facial fractures are airway obstruction and haemorrhage; infection usually occurs later. In our experience these early complications are more likely to occur after multiple major facial fractures.

In 100 consecutive patients with facial fractures of all types and severity, admitted to our unit over a 5-month

period, facial fractures did not cause haemorrhage which required blood transfusion or surgical intervention. There were 3 patients with airway obstruction who required tracheostomy. All 3 had multiple major fractures involving the maxilla and mandible.

In these 100 patients surgical emphysema, confined to the lower eyelid and cheek, was observed in 1 patient with an isolated malar fracture. Two patients with multiple fractures of the mandible and maxilla had surgical emphysema involving the face and neck. In one of these there was extension of the process subcutaneously to the chest and abdominal wall, and in addition a pneumomediastinum and pneumoretroperitoneum developed.

We wish to report the development of this latter complication, since we have never seen this phenomenon after facial fractures and have not found a published report of a similar occurrence.

### CASE REPORT

A 25-year-old man who had been assaulted with a blunt instrument in June 1976 was seen at his local hospital, where supportive and symptomatic therapy was started. He was then transferred to Tygerberg Hospital, arriving some 18 hours after injury. At that time he was fully

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conscious and co-operative. There was gross facial swelling with clinical evidence of facial fractures involving the maxilla and mandible. The facial swelling was due in part to oedema and haematoma. The most striking feature was subcutaneous emphysema which extended from his eyebrows to just below his clavicles. The patient drooled saliva and there was cerebrospinal fluid rhinorrhoea. His airway was well maintained without any assistance. Sys-

tematic examination revealed no abnormality, his pulse and blood pressure were within normal limits and there was no evidence of shock. There were no signs of intra-abdominal, chest or neck injuries and no abnormality was found on neurological examination. Preliminary X-ray films taken on admission only confirmed the surgical emphysema.

Supportive, symptomatic and prophylactic therapy was started. Regular clinical examination confirmed the absence of intra-abdominal, chest and neck injuries and the pulse rate, blood pressure, level of consciousness, etc. remained normal. His respiratory rate, however, gradually increased and progressive airway obstruction occurred. Some 12 hours after admission and 30 hours after injury, the subcutaneous emphysema extended from the face and neck down over his chest and abdomen to his symphysis pubis. The heart sounds were distant but no Hamman's sign was elicited. There was no clinical evidence of a developing pneumothorax.

Detailed X-ray investigation now revealed multiple facial fractures of the mandible and maxilla (Figs 1 and 2). X-ray films of the cervical spine demonstrated retropharyngeal air and chest X-ray films revealed a pneumomediastinum (Fig. 3). There was no evidence of fractured ribs or a pneumothorax. Abdominal X-ray films demonstrated the presence of a pneumoretroperitoneum (Fig. 4).

Results of haematological examination, blood chemistry, and estimations of blood gases were all normal.

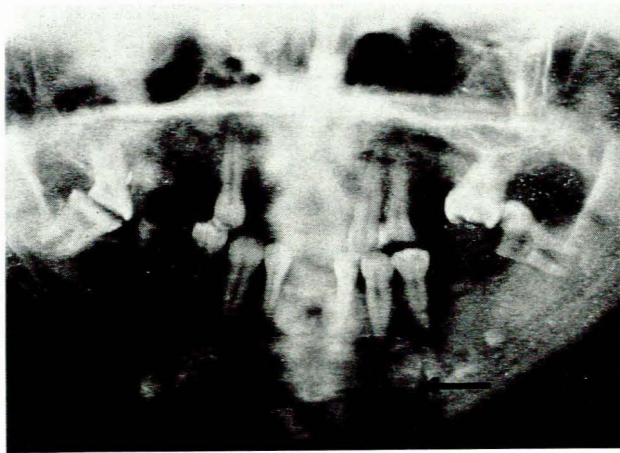


Fig. 1. Radiograph of the mandible, showing the fracture (arrow).

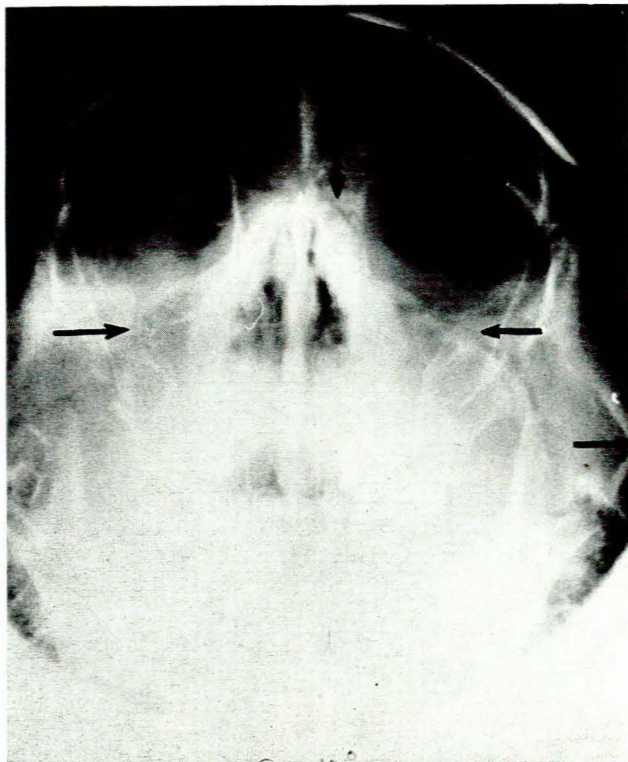


Fig. 2. Radiograph of the maxilla and the malar, showing the fractures (arrows).

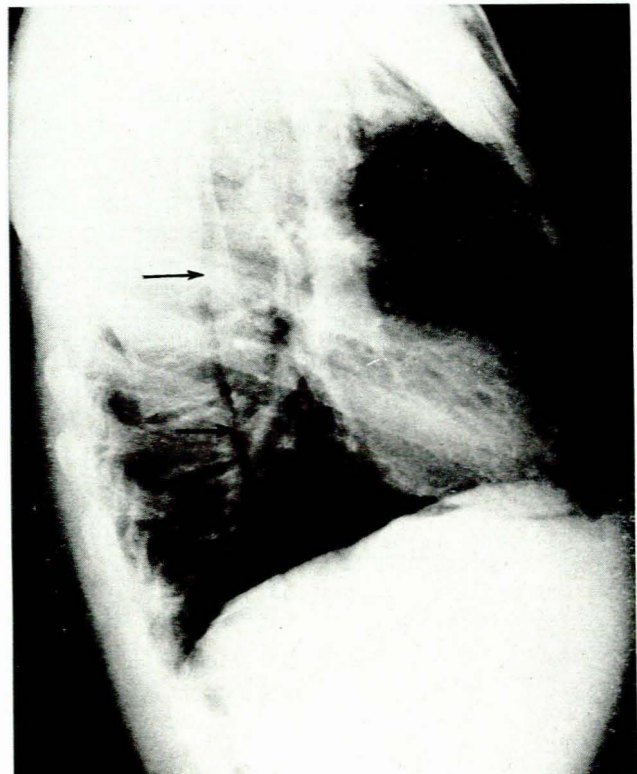


Fig. 3. Lateral view of the chest, confirming mediastinal emphysema (arrows).



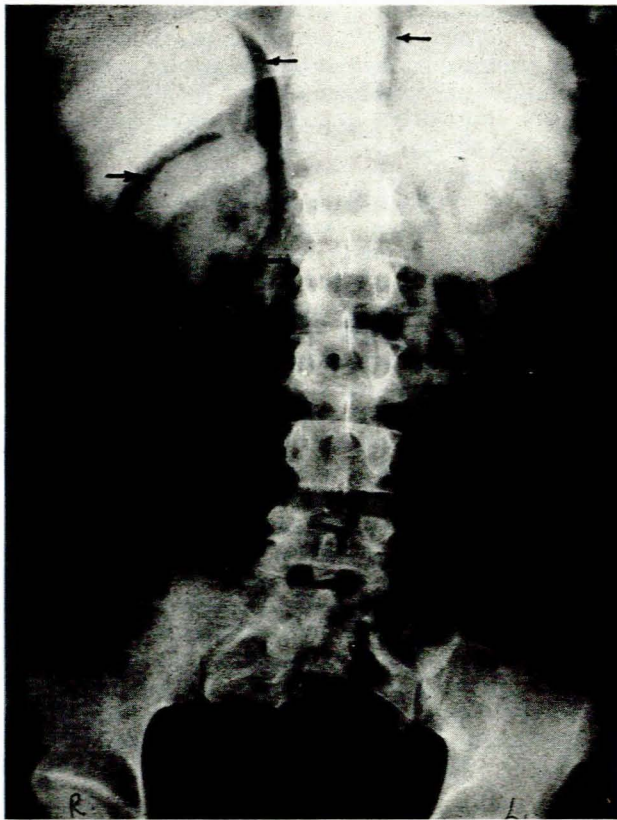


Fig. 4. Radiograph of the abdomen, showing pneumoretroperitoneum (arrows).

In the absence of any intra-abdominal, chest or neck injury, a diagnosis was made of severe facial fractures complicated by airway obstruction, subcutaneous emphysema, pneumomediastinum and pneumoretroperitoneum. In view of the progressive airway obstruction, laryngoscopy and bronchoscopy were performed under general anaesthesia, but revealed no injury to the pharynx, trachea or major bronchi. Oral examination revealed the mandibular fracture compound into the mouth and a small laceration of the upper buccal sulcus mucosa on the left. A tracheostomy was performed.

The patient's condition thereafter improved remarkably. Two days later there was no evidence of the subcutaneous emphysema, and X-ray films done 1 week after tracheostomy revealed no evidence of pneumomediastinum or pneumoretroperitoneum. Eighteen days after injury, when most of the facial swelling had subsided, the patient's fractures were reduced and immobilized. The tracheostomy tube was removed 24 hours after this procedure and the subsequent postoperative course was uneventful.

## DISCUSSION

Pneumomediastinum and pneumoretroperitoneum have been reported after a number of conditions, injuries and operative procedures.<sup>1-6</sup>

A study of the manner in which air from the pharynx extends into the subcutaneous tissues, retropharyngeal, mediastinal and retroperitoneal areas, requires a consideration of the fascial spaces of these areas. Much confusion exists about these fascial spaces but Hollingshead<sup>7</sup> has given an excellent account of them. In the case reported here, air probably gained entry to the fascial spaces as a result of the facial fractures. Further extension of this air was possible owing to a ball-valve effect.

Pneumomediastinum and pneumoretroperitoneum may be thought to be relatively benign conditions. However, they may cause serious problems. Pneumomediastinum may result in a pneumothorax, a pneumopericardium with cardiac tamponade, or obstruction of the great vessels. Communication with a contaminated area, such as the mouth, carries the very real risk of mediastinitis. A pneumoretroperitoneum may rupture through the peritoneum, resulting in a pneumoperitoneum.<sup>6</sup> Infection and an ileus may occur, further complicating the clinical picture.

We feel that management of a patient with facial fractures and extensive surgical emphysema requires the following steps:

1. The maintenance of an adequate airway. The presence of subcutaneous emphysema and retropharyngeal air may well contribute to airway obstruction. Whether a tracheostomy should be performed without airway obstruction being present, to prevent further extension of the process, depends on the severity of the condition. In mild cases more conservative measures should be attempted, as indicated below.
2. Further extension of the process should be prevented, if possible, by wound closure and fracture reduction.
3. The administration of 40-70% oxygen by mask may help to prevent further extension and to reduce the amount of air present.
4. Prophylactic antibiotics.
5. Careful monitoring and appropriate treatment of any complications.
6. Regular assessment of the patient is mandatory to exclude all other more common causes of generalized surgical emphysema.

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