

The value of routine expiratory chest films in the diagnosis of pneumothorax

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INTRODUCTION

It is common clinical practice in some hospitals (Greene *et al.*, 1977; Fraser *et al.*, 1988) to request paired inspiratory and expiratory chest X-rays when there is the clinical suspicion of a pneumothorax, thus doubling the cost of the investigation and the radiation dose to the patient. It was our impression that little additional information is gained from an expiratory film over the routine inspiratory film. To study this further, a review of paired inspiratory and expiratory erect chest X-rays demonstrating a pneumothorax taken in this hospital between January 1985 and April 1988 was carried out.

PATIENTS AND METHODS

Patients who had had a pneumothorax demonstrated on paired erect chest X-rays between January 1985 and April 1988 formed the study population. Patient details, presumptive diagnosis, symptoms and method of treatment were recorded from the X-ray request form. If insufficient information was available, the patient's records were reviewed. All the paired films were reviewed by two radiologists, first independantly and then together. The presence of a pneumothorax, its size on each film, and any other relevant lesion was noted. A pneumothorax was defined as 'small' if it occupied less than 25% of the haemithorax as measured by the average intrapleural diameter. (Rhea *et al.*, 1982)

RESULTS

Seventy-nine patients with pneumothorax had had paired chest films at diagnosis over the study period (mean age 42 years, range 16–84 years), and 59 (75%) of these were males. Twenty-nine patients (41%) were aged over 50 years. Thirty-nine patients (50%) had a presumptive diagnosis of spontaneous pneumothorax, 16 (20%) were associated with an exacerbation of airways disease, and 24 (30%) were due to trauma. Forty-two pneumothoraces (53%) occurred in the right haemithorax, and the same proportion were classed as small. Fifty-two patients (66%) required some form of drainage for their pneumothorax (9 aspiration, 43 intubation).

At presentation, all pneumothoraces were clearly visible on both paired inspiratory and expiratory chest X-rays. Where follow up films were obtained, in only one case was the resolving pneumothorax visible on an expiratory film when it was not visible on the inspiratory film also. However, in two patients with traumatic pneumothoraces, a lung contusion was visible at presentation on the inspiratory film alone.

DISCUSSION

The aim of this study was to evaluate the use of a routine expiratory chest film in the diagnosis of a pneumothorax. The rationale for performing an expiratory film is that the volume of air in the pleural cavity is relatively greater in relation to the volume of lung, so that the pleural separation renders the visceral surface more clearly visible (Green, 1977). In addition, the change in position of overlying ribs may make the pleural line more obvious. However, an inspiratory film allows the maximum lung volume to be visualized, and therefore pulmonary lesions are more likely to be seen. In this study, in two cases lung contusions were visible in the inspiratory film alone. It is only the small pneumothorax which should cause diagnostic difficulty, and this is unlikely to be clinically significant unless associated with patient symptoms or trauma.

Our review has shown that all the pneumothoraces could reasonably be diagnosed on an inspiratory film alone, and expiratory film gave no further information. Since they double the cost of the investigation and the radiation dose to the patient, our results suggest that expiratory films should not routinely be performed in this condition. If doubt exists as to the presence of a pneumothorax then a radiological opinion should be sought. However, expiratory films may have a role to play in the clinical management of patients with a small respiratory reserve in whom a pneumothorax is suspected and not demonstrated on the inspiratory film.

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