Pulmonary embolism in patients attending the accident and emergency department with pleuritic chest pain

L. THOMAS & M. REICHL

SUMMARY

A series of 92 patients presenting to an accident and emergency department with pleuritic chest pain is described. Only one of the patients had a diagnosis of pulmonary embolus. All the patients were followed up over a period of 3 months. During this time none of them suffered from mortality or morbidity which could be related to pulmonary embolism. No evidence was obtained during this study that a more aggressive approach to such patients is required in order to achieve the diagnosis.

INTRODUCTION

Two recent publications from North America analysed the incidence of pulmonary embolism (PE) in patients presenting to emergency departments with pleuritic chest pain. Both showed that 21% of such patients had a diagnosis of PE confirmed by angiography (Branch & McNeil 1983; Hull *et al.*, 1988). The incidence of PE in the non-hospitalized population in the United Kingdom is not known. On ethical and financial grounds it would be rather difficult to perform a study in this country where every patient presenting to an accident and emergency department (A&E) with pleuritic chest pain, had an immediate pulmonary angiogram. An alternative strategy is to investigate the outcome over a period of time, of patients discharged from A&E with pleuritic chest pain, to see if they were suffering from emboli related mortality or morbidity. This should give a strong indication whether the original diagnosis was correct. Until it is known whether the current approach to the diagnosis of patients with pleuritic chest pain results in increased mortality or

Correspondence: M. Reichl FRCS(Ed), Accident and Emergency Department Southampton General Hospital, Southampton SO9 4XY, U.K.

morbidity it would be inappropriate to aggressively investigate each patient to exclude PE. In order to answer this question we have conducted a prospective study of patients presenting to an A&E department with pleuritic chest pain.

METHOD

Over a period of 4 months all patients presenting to an A&E department with a principal complaint of pleuritic chest pain were included in the study. Demographic data, clinical features, investigations and discharge diagnosis were recorded. The diagnoses on patients admitted to hospital were obtained from the inpatient notes. At least 1 month after the initial episode of chest pain, follow up information was obtained by sending a questionnaire to the patient's general practitioner requesting information about any recurrence of pleuritic chest pain, episodes of deep venous thrombosis, PE, or any other acute medical problems. At least 3 months after the initial presentation information about any subsequent hospitalization was obtained by checking admissions to the two local district general hospitals. At the same time the Register of Deaths for the district was reviewed to determine if any of the study patients died since seen and if so the cause of death was noted.

RESULTS

During the study period 92 patients with pleuritic chest pain were seen. Their mean age was 35 years (range 14–78). Fifty-four (59%) were male and 38 (41%) female. Additional symptoms experienced by the patients included, dyspnoea (43%), cough (32%) and haemoptysis (7%). Initial examination revealed chest wall tenderness in 36% of the patients, respiratory rate greater than 22/min in 34%, pyrexia of 38°C or more in 6%, pleuritic friction rub was heard in 1% and calf tenderness in a similar number. Investigations undertaken and their results are listed in Table 1. Sixty-three patients (69%) were discharged directly from the A&E department to their general practitioners and 39 (31%) were admitted to

Table 1 Investigations undertaken and their results.

Investigation	No. (%) pts having it	% normal	% abnormal	
			compatible with PE	not compatible with PE
Chest radiograph	84 (91)	78	4	18
ECG	55 (60)	76	2	22
Blood gases	21 (23)	90		
Doppler scan	4 (3)	100	0	0
V./Q. scan	16 (17)	82	1	17

hospital. The final clinical diagnosis in the whole group of patients was musculoskeletal pain in 41 (45%) patients, chest infection in 21 (22%), pleurisy in 5 (6%), pneumothorax in 6 (7%), nonspecified conditions in 6 (7%) and pulmonary embolism only in 1 (1%) patient. Sixteen patients had a ventilation-perfusion scan, but in 15 this was normal and this was used to exclude the diagnosis of PE.

Follow-up information was received from general practitioners of 76% of all the patients. Of these, 10 complained of further pleuritic chest pain. Five of them settled spontaneously, 4 were diagnosed as having respiratory tract infection and one was still under active outpatient investigation at the end of the study. A single patient returned to the A&E department with a further episode of pleuritic chest pain. Although no specific diagnosis was made, no action was taken and he was discharged. No patient required admission into hospital once they have been discharged from the ward or from the A&E department. Of the 92 patients only one died in the 3 months follow-up period. The cause of death was due to metastatic carcinoma of bronchus. This was diagnosed following his initial presentation to the A&E department with pleuritic chest pain.

DISCUSSION

The incidence of pulmonary embolism (PE) in the general population is not known. The majority of current epidemiological studies state the incidence of mortality due to PE to be 15% (Dalen, 1975). However the data for such studies are based on hospitalized patients. Several authors have pointed out that it is wrong to extrapolate the incidence of PE in out-patients on the basis of in-patient data (Breckinridge & Ratnoff, 1964; Robin, 1977). Recently two groups in North America (Branch & McNeill, 1983; Hull *et al.*, 1988) attempted to estimate the incidence of PE in patients presenting to emergency departments. Both the studies found that 21% of patients presenting to their emergency rooms with pleuritic chest pain had PE proven by pulmonary angiography.

In contrast in our study we only found one case of PE (1%). No patient had a lung angiogram which is the definitive test for the diagnosis of PE (Windebank, 1987). On follow-up no patient had complications associated with PE. The few that were not followed up were all local residents and death, had it occurred, would have been notified to the local Registrar of Deaths. As there was no such record on any of the patients it can be assumed that there has not been any mortality due to PE. On this basis we concluded that apart from the one patient known to us, no other patient in this series had a significant PE. There is thus a markedly lower incidence of PE in our population than in those from North America. Several factors could account for this. Firstly, patients presenting to emergency departments in Canada and USA may differ from those presenting to A&E department in this country. There is some evidence that this may be so. In Hull's study 68% of patients had one or more of the three clinical variables found to be important indicators of PE, compared with only 23% of those in the present study. Secondly, as opposed to the studies from North America which obtained a definitive diagnosis

by the use of pulmonary angiograms our study was designed to detect only clinically significant pulmonary emboli, that is, those causing morbidity or mortality. It is known that the clinical syndrome and prognosis in PE depends on the volume of embolic material. Miller (1988) states that minor PE's may well resolve rapidly without any sequele. Kipper *et al.*, (1982) concluded that small PE's may be of pathological and epidemiological interest, but of no clinical significance. Our study may have missed small pulmonary emboli, however this did not seem to cause any mortality or morbidity.

The results of this study indicate that the incidence of clinically significant PE in an outpatient population is relatively low. In our sample there was no mortality or morbidity due to PE in the discharged patients it would be very difficult to justify the expenditure as well as discomfort to the patient of investigating them more rigorously. To support this statement it would be very useful to audit a much larger series of patients.

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