INTRAPLEURAL TETRACYCLINE FOR SPONTANEOUS PNEUMOTHORAX WITH PERSISTENT AIR LEAK

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SYNOPSIS

Six patients with spontaneous pneumothorax and persistent air leak were given intrapleural tetracycline. Tetracycline was unsuccessful in producing pleurodesis in all but one patient. Severe but self-limited painful reactions may accompany its use.

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INTRODUCTION

Spontaneous pneumothorax usually resolves within a few days of intercostal tube drainage. Occasionally one encounters patients with persistent gas leakage into the pleural space. In these patients, pleurodesis, surgical or medical, is considered. Many patients, however, are unwilling or unfit to undergo surgery. Chemical pleurodesis is then performed. Intrapleural tetracycline has been used with success in malignant effusions (1) and pneumothoraces (2). More recently, Macoviak et al (3) reported successful pleurodesis using tetracycline in experimental pneumothorax in rabbits.

We report our experience with intrapleural tetracycline in six patients with spontaneous pneumothorax and persistent air leak.

PATIENTS AND METHODS

From July 1982 to March 1983, 27 consecutive patients (24 males, 3 females) were seen by us for a total of 33 episodes of spontaneous pneumothorax. In four patients, intercostal tube drainage was deemed unnecessary. In the remaining 23 patients, portex intercostal tube drainage was employed on 29 occasions. Nine patients had persistent air leak (seven days or more) into the pleural space as evidenced by continual bubbling from the intercostal under suction. Patients whose postero-anterior chest radiographs showed more than 30% separation of visceral and parietal pleurae (diaphragmatic and costal reflections) were excluded because success with chemical pleurodesis was judged unlikely in view of insufficient apposition. Using this criterion, three of the nine patients were excluded. The six patients who were treated (study group) received intrapleural tetracycline at a dose of 35 mg/kg body weight, and at 25 mg/ml concentration (pH 2.7). The tetracycline solution was freshly prepared and used within four hours. Intramuscular pethidine 50–100 mg and intrapleural lignocaine 1% 20 ml were used for analgesia. Failure of effective tetracycline was defined as further air leakage or recurrent lung collapse.

RESULTS

The six patients were males, smokers, and their ages ranged from 26 to 68 years. All had radiographic evidence of underlying lung disease (three had chronic obstructive airways disease with hyprerinflation, two had apical cysts, and one had active pulmonary tuberculosis).

Following tetracycline instillation, two patients experienced severe ipsilateral chest pain lasting less than six hours. One further patient with a right pneumothorax developed severe diffuse abdominal pain mimicking an acute abdomen, but subsiding within 12 hours. None had febrile reactions.

Tetracycline pleurodesis was unsuccessful in five patients, with continued air leakage in all and recurrent lung collapse in four. Of these five, three required further suction for as long as two months before final resolution; one discharged himself; and one underwent successful surgical pleurodesis during which no evidence of pleural sclerosis was seen although histologically there was some pleural inflammation. Treatment was partially successful in the sixth patient (see Table, patient 6) who had bilateral persistent air leak. The left side resolved, but on the right, there was continued air leakage and lung collapse recurred. This patient died eventually.

DISCUSSION

Our study was prompted by the promising results of Goldszer et al (2) and Macoviak et al (3). Gas leakage ceased within 24 hours of tetracycline administration in Goldszer's two patients, as well as in all the rabbits with experimental pneumothorax. The cause of failure to effect pleurodesis in our group of patients is uncertain. Despite careful selection of the patients with adequate pleural apposition, it is possible, particularly in the presence of persistent air leakage, that intermittent but undetected pleural separation may have

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TABLE 1
CLINICAL PROFILES AND TREATMENT OUTCOMES

Patient	Age (years)	Diagnosis	Underlying Lung Disease	Pretreatment Duration of air leak	Pain From Tetracycline Treatment	Result	Outcome
1	26	Right pneumothorax	Apical cysts	7 days	Severe (abdominal)	Air leak and collapse	Surgical pleurodesis and resection of apical cysts
2	68	Left pneumothorax	Apical cysts	4 weeks	Severe	Air leak and collapse	Resolution after a further 8 weeks of suction
3	66	Left pneumothorax	Chronic obstructive airways disease	4 weeks	None None	Air leak and collapse	Absconded
4	59	Right pneumothorax	Chronic obstructive airways disease	4 weeks	Mild Mild	Air leak and collapse	Resolution after a further 3 weeks of suction
5	68	Right pneumothorax	Active pulmonary tuberculosis	5 weeks	Mild Mild	Air leak	Resolution after a further 10 days of suction
6	54	Bilateral pneumothorax	Chronic obstructive airways disease	Left 2 weeks Right 5 weeks	None Severe	Resolved Air leak and collapse	Died after a further 5 weeks of suction on right chest tube

occured whenever the rate of air drainage decreased for various reasons such as change in a patient's position and inadvertant variation of suction rate. This could then reduce the likelihood of chemical pleurodesis.

Severe pain occurred in three patients. The patients who developed severe abdominal pain had a right pneumothorax. We would like to speculate that tetracycline may have traversed the right hemidiaphragm into the abdomen. In Stephenson's experience (4), the pain was often described by his patients thus: "as if scalding water had been injected through the chest tube". Like us he found intrapleural lignocaine ineffective in preventing pain. Instead, he found intravenous ketamine effective. This would enable repeat applications of intrapleural tetracycline and increase the likelihood of successful pleurodesis.

We conclude that in patients with spontaneous pneumothorax and persistent air leak, therapy with a single application of intrapleural tetracycline to effect pleurodesis is unlikely to be successful. Further, severe but self-limited painful reactions may accompany its use. If these painful reactions can be controlled enabling repeat instillations of tetracycline, chemical pleurodesis may then be more successful.

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