Spontaneous Pneumothorax - Management By Tube Thoracostomy and Suction*

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SPONTANEOUS PNEUMOTHORAX IS A frequent entity and is occasionally fatal. The prolonged morbidity seen in the expectant treatment of extensive collapse can be economically disastrous to the patient. Open thoracostomy with partial pleurectomy or the instillation of t alc, while occasionally indicated, is not often justified in view of the morbidity involved and impairment of lung function resulting from these procedures. The purpose of this report is to emphasize the low posterior-lateral tube thoracostomy with suction as a method of management.

MATERIAL

The 65 patients reported were treated by the authors in three hospitals. These were consecutive cases of extensive collapse. In 33, the right lung was involved and in 32 the left. All were men. Twenty-nine per cent of the total had the first episode of collapse after age 50 and 47.6 per cent were 40 or older. The ages ranged from 21 to 72 years (Table 1). All but two were moderate to heavy smokers. One played a wind instrument and one was a skin diving enthusiast. Occupations of the rest were not felt to be of significance. Patients with collapse of 20 per cent or less were treated expectantly and do not constitute a part of this series. Previous collapse had occurred in 12 (18.5 per cent of the patients prior to admission to our service (Table 2); all others were in their first episode.

METHOD OF MANAGEMENT

Management consisted of closed tube thoracostomy with immediate mild suction. A No. 18-22 French rubber catheter was introduced into the chest in the ninth or tenth interspace in the posterior axillary line. Introduction was through a trocar under local anesthesia at the bedside. Suction of 4-10 cm. of water was applied immediately to the catheter using a Stedman pump connected to an underwater seal bottle. A second tube was placed in the second anterior interspace and connected through a "Y" connector to the suction bottle when expansion was not complete in 12-24 hours. By this method, the lung could be re-expanded promptly in the majority of patients. A mild pleuritis occurs as a result of the presence of air within the chest cavity. Prompt re-expansion of the lung takes advantage of this mild inflammatory reaction and allows adherence of the lung to the parietal pleura. Any pleural fluid drains through the tube placed as it is in the ninth or tenth interspace.

RESULTS

In most cases the suction was maintained for two to three days after all air leaks had stopped. The majority of the patients

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<th>Incidence</th>
<th>Number of Patients</th>
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<tr>
<td>0</td>
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<tr>
<td>1</td>
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<td>3</td>
<td>1</td>
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<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
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had immediate full re-expansion; the air leak stopped, the tube was removed in five days or less (Fig. 1), and the patient was discharged after an additional 48 hours' observation. There was no case of iatrogenic pleural infection even after prolonged drainage. There was no case of hemothorax as a result of closed thoracotomy.

Subsequent collapse following tube thoracotomy occurred in 11 patients (Table 3). Open thoracotomy with pleurectomy and excision of bullae was necessary in six. One open thoracotomy was required to evacuate clots which occurred as a result of tearing of a vascular adhesion at the time of collapse. One case of pneumothorax, previously treated elsewhere by needle aspiration, was admitted with empyema; open thoracotomy was required for drainage. Five of our patients had associated pulmonary tuberculosis. In only one could tuberculosis be considered the primary cause of the pneumothorax.

Thoracoplasty was necessary because of prolonged air leak and failure of complete expansion in three patients. Two with old far advanced tuberculosis and one with severe pulmonary emphysema, were considered to be unsuitable for more extensive procedures. All made satisfactory recovery. There was no case associated with or caused by pulmonary malignancy. There were two deaths, one in a patient with severe pulmonary emphysema and extensive pneumothorax who also developed gangrene of his right leg three days after tube thoracostomy was instituted and when he was beginning to stabilize his pneumothorax. The other died of pulmonary insufficiency even though his pneumothorax had been re-expanded for three days.

**DISCUSSION**

There is general agreement today that the most common cause of spontaneous pneumothorax is rupture of a bleb or a weak point at the periphery of the lung. Tuberculosis is now considered a coinci-
dental and not an etiologic factor except in a small percentage of patients. Heavy lifting or other strenuous activity does not usually precipitate collapse.\textsuperscript{1,3,4,6} In our experience, onset on first arising in the morning was a peculiarly frequent event. In most reported series, no mention of associated disease such as emphysema or bronchitis is made. In our series, however, emphysema and/or chronic bronchitis was frequent. The reason for this may be that this series with 47.6 per cent over 40 years of age is quite different from other reported series which have a high percentage of cases under 30 years. The role of smoking as an etiologic factor cannot be evaluated; however, all but five in our series were moderate to heavy smokers.

A unilateral pneumothorax of 50-60 per cent may not cause symptoms; however, most patients will complain of sharp pain followed by some dyspnea at the onset. Tension pneumothorax universally produces chest pain, often of a crushing substernal nature and is associated with severe symptoms of dyspnea, pallor, and cyanosis. A minimal collapse of 10-20 per cent in a severely emphysematous patient may cause equally marked distress. Hemothorax associated with pneumothorax is a serious complication and mortality of 20 per cent has been reported.\textsuperscript{5} Only one of our series had this problem and required open thoracotomy for evacuation of clots. The cause was tear of a previously present adhesive band which is believed to be the usual cause.

Management of this disease is variable. A 10-20 per cent collapse, unless causing symptoms, is probably best handled by expectant treatment of rest and observation. Expansion takes place in 10-30 days. Needle aspiration of massive collapse is of limited usefulness because of the necessity of repeated aspiration and the risk of tearing lung parenchyma.\textsuperscript{1,4} One of our cases treated elsewhere by needle aspiration developed an iatrogenic empyema requiring drainage on admission. We further feel that needle aspiration fails to take advantage of prompt re-expansion and adherence of lung to parietal pleura so important in prevention of recurrence.

Closed thoracostomy with tubes introduced through various intercostal spaces is used by most thoracic surgeons today.\textsuperscript{1,3,4,6,7} Thoracoscopy, with introduction of talc, silver nitrate, hypertonic dextrose or other irritants is rarely advocated. Use of such irritants through thoracoscope followed by tube thoracostomy with active suction has been recommended by Managoni.\textsuperscript{4} Open thoracotomy with excision of blebs with or without partial pleurectomy is advocated by many after repeated collapse.\textsuperscript{1,3,4,5}

A conservative approach of tube thoracostomy with rapid re-expansion using mild suction has proved successful in our hands. We are quite willing to accept the occasional recurrence and retreat by the same technique. We feel the morbidity and economic loss associated with open thoracotomy is considerable and can be justified only occasionally in repeated recurrent cases or those with associated hemothorax.

The use of irritants, we believe, is unnecessary and ineffectual or if effectual as shown recently by Frankel\textsuperscript{6} is so intense that pulmonary function is impaired. Subsequent surgery on such a lung would be unduly complicated by dense adhesions.

**Summary**

Management of 65 patients with spontaneous pneumothorax by tube thoracostomy with low suction is reported. Open thoracotomy was necessary in only six. Conservative management is urged as it has yielded good results with minimal loss of time and disability.

**Resumen**

Se relata el tratamiento de 65 enfermos con neumotórax espontáneo por la toracotomía y colocación de un tubo con succión moderada. La toracotomía abierta fue necesaria solamente en seis. Se recomienda el tratamiento conservador, puesto que ha dado buenos resultados con mínima pérdida de tiempo y de incapacidad.

**Résumé**

L'auteur rapporte la conduite thérapeutique de 65 malades atteints de pneumothorax spon-
SPONTANEOUS PNEUMOTHORAX

ZUSAMMENFASSUNG


References

THE HILUM IN PULMONARY VENOUS HYPERTENSION

The pulmonary artery was shown to be enlarged in those cases of mitral stenosis having pulmonary arterial hypertension and a similar enlargement in over 50 per cent of the cases of left ventricular failure suggests the existence of pulmonary arterial hypertension in these patients. In the majority of both mitral and left ventricular failure cases, the lateral border of the hilum was straightened or convex, a change shown to be due to enlarged upper lobe veins. This sign, together with a clearly defined, oblique lower border of the superior pulmonary vein, are of value in analyzing the hilum in states of pulmonary venous hypertension.


EPIDEMIOLOGY OF AN OUTBREAK OF TUBERCULOSIS AMONG SCHOOL CHILDREN

The results of bronchoscopies made in 1948-1960 in children with lymph node pulmonary tuberculosis are discussed. In 103 bronchoscopies in 75 cases, bronchial lesions of lymph node origin were found, i.e. in 77.2 per cent of the cases, including 20 cases of active fistulae (22.3 per cent). The therapeutic results are related to the early bronchoscopy. The drugs dilating the bronchi are helpful in the treatment, as well as corticotherapy which should be instituted after granulation has been removed.