Spontaneous pneumothorax: the sharp rib syndrome

S. F. Stephenson

Department of Thoracic Surgery, East Birmingham Hospital, Bordesley Green East, Birmingham B9 5ST

Stephenson, S. F. (1976). Thorax, 31, 369–372. Spontaneous pneumothorax: the sharp rib syndrome. Of 49 patients undergoing operation for benign spontaneous pneumothorax, 28 (57%) were found to have a sharp first or second rib. In a series of 100 patients undergoing thoracotomy for other conditions, only eight (8%) were found to have a sharp rib. The association between sharp ribs, apical scars and bullae, and spontaneous pneumothorax is discussed.

Spontaneous pneumothorax in patients without generalized lung disease occurs mainly in young people but may occur at any age. Some of these patients are treated by open operation and the operative findings are often characteristic. At or near the apex there is a flat scar on the surface of the lung, and adjacent to the scar may be one or more bullae or cysts, and an air leak from this area may be evident. The cause of these lesions has remained unknown despite much conjecture. Repeated trauma, caused by friction of the lung against the chest wall during breathing and coughing, is a possible factor. A finding which supports this is the frequent presence of a sharp inner border of the first or second rib, and this is often related to the site of the lung scar or cyst formation. This has not been previously reported, and to find out how often this occurs, the upper ribs have been regularly palpated at operation both in cases of spontaneous pneumothorax and at thoracotomy for other diseases.

Rib sharpness is difficult to define or measure, but the examining finger may appreciate three types of rib margin. Palpation within the normal chest reveals a smooth apex to the pleural cavity bounded by inferior rib surfaces and taut intercostal structures, and the inner borders of the first two ribs are palpable but not prominent or sharp. In some subjects, however, a rib border may be prominent but rounded, and in others it is prominent and sharp in the sense that the anterior border of the tibia is sharp as felt through the overlying skin.

To illustrate these types of rib margin, moulds of the apex of the pleural space have been made, using bone cement, and photographs of moulds are shown in Figures 1–3. The posterior surface of the mould is seen in profile on the left of each figure. In Fig. 1, the posterior surface is smooth; in Fig. 2, it shows a groove caused by a prominent but rounded second rib; and in Fig. 3, the indentation of a relatively sharp first rib is shown.

Fig. 1. Mould of apex of pleural cavity showing smooth posterior surface (on left).

MATERIAL

Between 1962 and 1976 inclusive, 62 patients underwent operation for spontaneous pneumothorax. Thirteen were found to have generalized lung disease and are excluded from further consideration. The remaining 49 patients were treated by suture of bullae and air leaks, if present, and
The findings at operation included 41 patients with flat scars at or near the apex, and 22 patients with single or multiple cysts adjacent to a scar in 17 and without a visible scar in five. Several patients had local emphysematous changes without sizeable bullae.

RESULTS

Forty-nine patients without generalized lung disease underwent operation for spontaneous pneumothorax. The upper ribs were palpated at operation in 34 patients, of whom 28 were found to have a sharp inner border to the first or second rib. In 15 patients, the state of the ribs is not known for a variety of reasons; four had a haemopneumothorax, the bleeding being probably due to the tearing of apical adhesions, six were over the age of 50 and were thought at the time to be outside the scope of this investigation, and in the other five, the rib palpation was either omitted or not noted in the operation report. However, these 15 patients all had a benign pneumothorax, and apical scars or bullae were present in 13 of them; they are, therefore, included in the survey and assumed not to have sharp ribs. Thus, at least 28 out of 49 patients undergoing operation for spontaneous pneumothorax had a sharp rib (57%) (Table I).

**TABLE I**

<table>
<thead>
<tr>
<th>No. of Cases</th>
<th>Patients with Sharp Ribs</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous pneumothorax</td>
<td>49</td>
<td>28</td>
</tr>
<tr>
<td>Other thoracotomies</td>
<td>100</td>
<td>8</td>
</tr>
</tbody>
</table>

The upper ribs were also palpated in 100 patients undergoing thoracotomy for conditions other than pneumothorax, and eight of these were found to have a sharp rib (Table I).

The sharpness was usually limited to the neck or posterior half of the rib. Of the pneumothorax cases, the first rib was sharp in 18 patients, the second rib was sharp in nine patients, and both ribs were sharp in one patient.

The sex and age distribution was as follows:

In the pneumothorax cases, there were 36 males and 13 females, and their ages ranged between 17 and 82, with an average of 37 years. In the other thoracotomies, which may loosely be called con-
controls, there were 75 males and 25 females, and their ages ranged between 16 and 74, with an average of 55 years (Table II).

<table>
<thead>
<tr>
<th>AGE AND SEX DISTRIBUTION</th>
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<tbody>
<tr>
<td>No. of Cases</td>
</tr>
<tr>
<td>----------------</td>
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<tr>
<td>Pneumothorax</td>
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<tr>
<td>Controls</td>
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</tbody>
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The results given here show an association between sharp ribs and spontaneous pneumothorax. They do not necessarily show an association between pneumothorax and apical scars and bullae,
the cause of which remains unproven. Scars may indeed be the result of the constant friction of respiration, and of coughing when the lung apex is pushed forcibly into the narrowing thoracic inlet. Jansveld and Dijkman (1975) have shown that patients with spontaneous pneumothorax smoke more on average than normal people, and they may, therefore, be expected to cough more. But scarring and cyst formation at the apex are so common in adult lungs and so variable in extent that other factors, such as local ischaemia and degeneration, may partake in their causation. Whatever the cause of these lesions, pneumothorax is a likely complication only when a rib margin is sharp.

REFERENCES


Requests for reprints to: S. F. Stephenson, FRCS, Department of Thoracic Surgery, East Birmingham Hospital, Bordesley Green East, Birmingham B9 5ST.