Spontaneous pneumothorax: use of aspiration and outcomes of management by respiratory and general physicians

S Packham, P Jaiswal

Background: Spontaneous pneumothorax is a common problem in hospital practice. Despite the publication of guidelines controversy over its initial management still exists, particularly over the use of simple aspiration.

Methods: The management of spontaneous pneumothorax by respiratory and general physicians at our hospital was analysed by retrospective case note review. Eighty five patients were identified over the study period (36 managed by respiratory and 49 by general physicians).

Results: There was a significantly greater use of simple aspiration by respiratory (81%) than general physicians (47%, p<0.001) and a higher rate of success in this group. As a result those patients managed by respiratory physicians had fewer intercostal drains inserted and significantly shorter length of stays (mean 5.6 (3.8) days respiratory group and 9.5 (6.8) days in general physicians group, p<0.05).

Conclusions: The greater and more successful use of simple aspiration by respiratory physicians as an initial treatment for spontaneous pneumothorax resulted in improved outcomes and reduced length of hospital stays.

Patient characteristics

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (n=36)</th>
<th>Group 2 (n=49)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No [%] male</td>
<td>24 [67]</td>
<td>42 [86]</td>
</tr>
<tr>
<td>Mean (SD) age (years)</td>
<td>40.6 (18.0)</td>
<td>38.9 (21.4)</td>
</tr>
<tr>
<td>No [%] current or ex-smokers</td>
<td>8 [22]</td>
<td>12 [25]</td>
</tr>
<tr>
<td>No [%] with small pneumothorax</td>
<td>3 [8]</td>
<td>3 [6]</td>
</tr>
<tr>
<td>No [%] with large pneumothorax</td>
<td>28 [78]</td>
<td>38 [78]</td>
</tr>
<tr>
<td>No [%] with complete pneumothorax</td>
<td>5 [14]</td>
<td>8 [16]</td>
</tr>
</tbody>
</table>

RESULTS

During the study period 89 patients with primary spontaneous pneumothorax were identified of which records were available in 85 (66 male, 19 female). Thirty six were managed by respiratory physicians (group 1) and 49 by general physicians (group 2). There was no significant difference in age of patient or size of pneumothorax at presentation between the groups (table 1).

Results are summarised in table 2. A significantly greater use of aspiration and a higher success rate of aspiration by respiratory physicians (group 1) was seen. Success of aspiration was defined as complete resolution of pneumothorax or reduction in size sufficient not to require any further intervention and to have relieved patients’ symptoms. All patients who did not undergo aspiration or in whom aspiration was unsuccessful had an intercostal drain inserted.
Those managed by respiratory physicians had fewer complications. Length of stay was significantly less in the group managed by respiratory physicians. When length of stay of those with successful aspiration was examined there was no significant difference between the two groups suggesting the greater and more successful use of aspiration by the respiratory physicians accounted for their shorter length of stays.

**DISCUSSION**

This is one of the largest studies to examine the role of aspiration in the treatment of spontaneous pneumothorax in medical inpatients. It is the first to directly compare outcomes of patients with pneumothorax managed by specialist respiratory and general physicians. It demonstrates that the use of simple aspiration as the initial treatment of choice in patients with pneumothorax reduces the need for intercostal drains and significantly shortens length of hospital stay independent of the initial size of the pneumothorax.

Previous studies have used length of stay as a primary endpoint. In a prospective randomised trial Harvey and Prescott found a significantly shorter mean length of stay of 3.2 days in the group treated with aspiration compared with 5.3 days in the group that had an intercostal drain. Andrivet et al found no difference in length of hospital stay mainly because there was a mean delay of 48 hours before aspiration was undertaken. In the study by Noppen et al only 52% of those that underwent manual aspiration required admission largely because they needed an intercostal tube for failed aspiration. Not surprisingly therefore the length of stay of the two groups did not differ. In our study when length of stay of only those who had undergone aspiration successfully was examined there was no significant difference between the two groups, suggesting it is the greater and more successful use of aspiration by the respiratory physicians that accounted for their reduced lengths of stay.

The success rate of aspiration of 63% in the respiratory group is similar to previous series (45%–83%), even though all the aspirations were done by junior medical staff and not by research staff. Respiratory physicians were more likely to follow up patients in the outpatient department and document that patients had been advised to return should they develop a recurrence of symptoms in accordance with British Thoracic Society guidelines. Documentation about advice given on flying was poor in both groups.

This is the first study examining the management of spontaneous pneumothorax by specialists and generalists. It demonstrates better outcomes of care when patients are managed by respiratory physicians. A questionnaire survey of physicians in Wales showed a non-significant trend towards respiratory physicians following British Thoracic Society guidelines more than general physicians, but this is the first to show this happens in practice and that it affects patient outcomes.

Studies of other respiratory diseases such as asthma and chronic obstructive pulmonary disease have shown similar benefits when patients are managed by specialist respiratory teams. There is also a growing body of literature from other medical disciplines demonstrating improved outcomes with specialist care. This study showed a higher complication rate of intercostal drains in patients managed by general physicians. There was a trend towards greater use of clamping by general physicians despite guidelines indicating this practice should not be followed due to its associated risks. Inserting intercostal drains is probably the commonest invasive respiratory procedure undertaken by junior medical staff, is often done un supervised, yet can be associated with significant morbidity.

The respiratory physicians’ greater use and increased success of aspiration coupled with the reduced complication rate when intercostal drains were required led to significantly shorter length of stays. If these findings are confirmed in prospective multicentre studies the process of provision of respiratory healthcare in the United Kingdom may require review, in the way for example cardiologists are looking at temporary pacemaker insertion, to provide safer more cost effective management of pneumothorax.

**Table 2** Results of management by respiratory physicians (group 1) and general physicians (group 2)

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>asymptomatic aspiration</td>
<td>29 (81)</td>
<td>23 (47)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>asymptomatic successful</td>
<td>18 (62)</td>
<td>8 (35)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>with intercostal drain complications</td>
<td>2 (11)</td>
<td>13 (32)</td>
<td>0.01</td>
</tr>
<tr>
<td>with intercostal drain</td>
<td>2 (11)</td>
<td>7 (17)</td>
<td>NS</td>
</tr>
<tr>
<td>with outpatient follow up</td>
<td>31 (86)</td>
<td>30 (61)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>asymptomatic pneumothorax</td>
<td>8 (22)</td>
<td>4 (8)</td>
<td>0.05</td>
</tr>
<tr>
<td>flying</td>
<td>6 (17)</td>
<td>4 (8)</td>
<td>NS</td>
</tr>
<tr>
<td>Mean (SD) length of stay (days)</td>
<td>5.6 (3.8)</td>
<td>9.5 (6.8)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>All patients</td>
<td>5.6 (3.8)</td>
<td>9.5 (6.8)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Patients with successful aspiration</td>
<td>1.6 (1.2)</td>
<td>3.2 (2.9)</td>
<td>NS</td>
</tr>
</tbody>
</table>

NS, not significant.

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