High fever (greater than 39°C) as a clinical manifestation of pulmonary embolism

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Summary: This is a review of seven patients with pulmonary emboli manifested as high fever (temperature greater than 39°C) seen over a 3 year period by an infectious disease consultant for unexplained fever. The patients’ ages ranged from 16 to 81 years. Bed confinement was the underlying condition of all but one patient. Fever resolved with intravenous heparin therapy in three patients and one patient recovered without heparin therapy. Three patients died. Regardless of the degree of fever, pulmonary emboli should be among the list of differential diagnoses in patients with unexplained fever, especially in those who are confined to bed.

Introduction

Fever as a clinical manifestation of pulmonary embolism has been mentioned in some current text-books but not in others. Pulmonary embolism should be among the differential diagnoses in hospitalized patients with unexplained fever. However, it is the general belief that high fever is not seen in patients with bland pulmonary embolism. In the current edition of a standard textbook of medicine, it is stated that if the temperature is greater than 39°C, the diagnosis of pulmonary embolism is unlikely, although pulmonary embolism associated with temperature greater than 39°C has been reported.

Seven patients with pulmonary embolism manifested as high fever (temperature greater than 39°C) are presented.

Materials and methods

Between 1983 and 1985, the senior author personally saw seven patients who met the following criteria for high fever with pulmonary embolism: (1) the patient had daily elevated temperature of greater than 38°C for at least 48 hours, and the highest temperature was greater than 39°C; (2) no infection or other cause of fever was detected from results of physical examination, appropriate cultures and other studies; (3) there was no underlying condition that might itself have caused a febrile state; (4) the chest films showed clear lung fields; (5) a lung scan showed perfusion defect or defects not explained by chest roentgenographic findings, or a pulmonary angiogram showed a filling defect. These patients were all seen in consultation for unexplained fever.

Results

The patients’ ages ranged from 16 to 79 years. Bed confinement was the most important common underlying condition, except one patient who had multiple pulmonary emboli secondary to non-bacterial vegetations on the right atrial wall (Table I). All patients had temperatures higher than 39°C at some time during their clinical course. The usual clinical manifestations of pulmonary emboli, namely pleuritic chest pain, dyspnoea, cough, haemoptysis, and evidence of deep vein thrombosis were absent. Six patients received intravenous heparin therapy and three became afebrile and recovered. The response to heparin was dramatic and patients usually became afebrile within 72 hours. One of the three patients who died had recurrent multiple pulmonary emboli secondary to non-bacterial vegetations on the right atrial wall. One young patient recovered without intravenous heparin.

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Discussion

Israel & Goldstein reported that 78.9% of 90 patients with pulmonary embolism had fever and 10% of these patients had temperature of 103°F (39.5°C) and above. Murray and his colleagues found that high fever (temperature greater than 39°C) due to pulmonary embolism may occur early and persist throughout the first few days. The pattern may be intermittent, sustained or even 'septic' type.

The mechanism of fever in patients with pulmonary embolism has not been clarified. It is probably due to acute inflammatory response from endogenously produced inflammatory mediators that trigger the apparent antipyretic and anti-inflammatory effects of heparin. All the patients reported here were referred to an infectious disease specialist because there was no apparent cause for the high fever. The usual symptoms and signs of pulmonary emboli were absent. Obviously patients with the usual clinical features of pulmonary emboli may also have high fever as part of their clinical manifestations.

Table 1  Selected clinical features of seven patients who had pulmonary embolism with temperature over 39°C

<table>
<thead>
<tr>
<th>Patient no.</th>
<th>Age/Sex</th>
<th>Underlying condition</th>
<th>Hospital day</th>
<th>Maximum temp (°C)</th>
<th>Pao₂ mmHg</th>
<th>Positive lung scan defects</th>
<th>Intravenous heparin</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>77/F</td>
<td>Bed confinement</td>
<td>16</td>
<td>40.4</td>
<td>50.3</td>
<td>Entire left lung</td>
<td>yes</td>
<td>recovered</td>
</tr>
<tr>
<td>2</td>
<td>19/M</td>
<td>Bed confinement</td>
<td>14</td>
<td>39.3</td>
<td>77.2</td>
<td>Complete cut-off of right main pulmonary artery</td>
<td>yes</td>
<td>recovered</td>
</tr>
<tr>
<td>3</td>
<td>16/M</td>
<td>Bed confinement</td>
<td>6</td>
<td>40.4</td>
<td>69.5</td>
<td>Superior segment of right lower lobe</td>
<td>yes</td>
<td>recovered</td>
</tr>
<tr>
<td>4</td>
<td>79/M</td>
<td>Bed confinement</td>
<td>16</td>
<td>39.7</td>
<td>48.5</td>
<td>Antero-lateral segment of right lower lobe and superior segment of lingula of left upper lobe</td>
<td>yes</td>
<td>died</td>
</tr>
<tr>
<td>5</td>
<td>81/F</td>
<td>Bed confinement</td>
<td>19</td>
<td>40.9</td>
<td>57.9</td>
<td>Entire left lung</td>
<td>yes</td>
<td>died</td>
</tr>
<tr>
<td>6</td>
<td>66/F</td>
<td>Right atrial wall vegetations (non-bacterial)</td>
<td>1</td>
<td>42.2</td>
<td>47.4</td>
<td>Several segmental and subsegmental defects over both lung fields</td>
<td>yes</td>
<td>died</td>
</tr>
<tr>
<td>7</td>
<td>23/M</td>
<td>Bed confinement</td>
<td>1</td>
<td>40.4</td>
<td>67.9</td>
<td>Lateral right mid-lung</td>
<td>no</td>
<td>recovered</td>
</tr>
</tbody>
</table>

* = Pulmonary angiogram; † = confirmed at autopsy
References


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