Autopsy proven pulmonary embolism in hospital patients: are we detecting enough deep vein thrombosis?

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Summary
To investigate the present status of pulmonary embolism as a cause of death in a general hospital patient population, a 5-year retrospective study of all autopsy reports and associated hospital records was undertaken. Pulmonary embolism was thought to be the cause of death in 229 of 2385 autopsies performed (10%): 15% of these patients were aged less than 60 years and 68% did not have cancer. Of these patients, 88% had deep vein thrombosis (DVT) in the legs at autopsy, of whom only 19% had symptoms of DVT before death. Only 5% of patients who had DVT at autopsy had undergone an investigation for such before death. Twenty-four per cent of patients who died from pulmonary embolism had undergone surgery a mean of 6.9 days before. Screening tests for DVT should be applied widely in the hospital population.

Introduction
Pulmonary embolism (PE) is a serious cause of mortality in both surgical and non-surgical patients and most pulmonary emboli are associated with deep vein thrombosis (DVT) in the legs. X-ray venography for the diagnosis of DVT was established many years ago. Since then, many techniques have been developed for the diagnosis of DVT and these have been recently reviewed. During this same period, the prevention of DVT has been attempted using several therapeutic regimens. However, it is known that DVT can be difficult to diagnose and that death may be the first manifestation of PE.

We have, therefore, investigated the incidence of DVT and fatal PE in hospital patients to see if it remains a serious problem, and whether there is a need for the widespread use, in hospitals, of a non-invasive, inexpensive screening test.

Methods
The Royal Hallamshire Hospital, a teaching hospital in a city of approximately 650,000 residents, incorporates most general and specialist services, but not paediatric, obstetric and gynaecological nor special facilities for the health care of the elderly. Otherwise, its admission rates and policies are not thought to be different from any British district general hospital in a teaching area.

The reports of all autopsies performed in the Royal Hallamshire Hospital between 1973 and 1983 were reviewed. The records of all patients in whom pulmonary embolism was judged by the pathologist performing the autopsy to have contributed primarily to death were further investigated.

In each of these patients, DVT had been sought at autopsy either by dissection and examination of the femoral veins, or by removing and slicing blocks of calf muscle, or both.

Further information obtained about these patients from the hospital inpatient notes included whether DVT was suspected clinically before death, as indicated by the medical attendant's written notes (and whether or not the patient had been treated with anticoagulants or fibrinolytics), whether any objective investigation for suspected DVT had been performed (those available in this hospital included X-ray venography, doppler ultrasound and impedance plethysmography), and details of any surgical procedure performed.

The total number of admissions and deaths in the hospital during the study period were obtained from the Data Control Centre of the Sheffield Area Health Authority.

Results
During the period 1 January 1979 to 31 December 1983, there were 66,100 inpatient admissions to the Royal Hallamshire Hospital in Sheffield, and there were 6085 (9.2%) deaths. Autopsies were performed on 2837 deceased patients (47%) and the reports of 2388 autopsies (84%) were available for scrutiny. Of these, 315 patients were shown to have pulmonary embolism in 229 (10%) the pulmonary embolism (PE) was thought to have substantially contributed to the death. It was possible to review the case notes of 195 (82%) of those in whom PE was the cause of death. Of the 195 patients, only four had clinically suspected PE on admission to hospital and a further five had a clinical diagnosis of PE made whilst in hospital.

Table 1. Details of age, sex, whether deep vein thrombosis (DVT) was clinically suspected, objectively proven and later found at autopsy in 195 patients who died of pulmonary embolism.

<table>
<thead>
<tr>
<th>Description</th>
<th>Number</th>
<th>percentage</th>
</tr>
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<tbody>
<tr>
<td>Male (male)</td>
<td>195</td>
<td>86 : 109</td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>72</td>
<td>28-89</td>
</tr>
<tr>
<td>DVT suspected clinically before death?</td>
<td>yes</td>
<td>38 (19%)</td>
</tr>
<tr>
<td>DVT objectively diagnosed before death?</td>
<td>yes</td>
<td>162 (83%)</td>
</tr>
<tr>
<td>DVT found at autopsy?</td>
<td>yes</td>
<td>12</td>
</tr>
<tr>
<td>unknown</td>
<td>21</td>
<td></td>
</tr>
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