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Know the score: management of patients with a new diagnosis of acute pulmonary embolism

The National Confidential Enquiry into Patient Outcome and Death review into the quality of care provided to UK patients with a new diagnosis of acute pulmonary embolism highlights both clinical and organisational changes that should be made to improve patient care and outcomes.

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Introduction

Venous thromboembolism accounts for approximately 25 000 hospital deaths in the UK each year (House of Commons Health Committee Report, 2005). Acute pulmonary embolism remains a leading cause of morbidity and mortality despite advances in prevention, diagnostic investigations and treatments. Risk factors associated with pulmonary embolism include active cancer, air travel, hospitalisation and pregnancy. Pulmonary embolism can affect people of all ages. The British Thoracic Society recommended that patients with confirmed pulmonary embolism should be risk-stratified using a validated clinical risk score to estimate the risk of adverse outcomes, and to inform the rationale for whether patients can be safely managed in an ambulatory care setting or require inpatient care (Howard et al, 2018). In this potentially life-threatening condition, prompt diagnosis, appropriate treatment and recognising severity are important steps that need to be considered when treating patients.

Method

The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) undertook a study to highlight the remediable factors in the care of patients with a new diagnosis of acute pulmonary embolism (Srivastava et al, 2019). Patients aged 16 years and over, who presented to UK hospitals with a new diagnosis of acute pulmonary embolism or developed pulmonary embolism as an inpatient, were included in the study. The cohort was identified retrospectively using International Classification of Diseases-10 (ICD10) codes (I26.0 and I26.9), over 8 weeks in 2017, with up to six cases per participating hospital selected. Organisational data were collected regarding facilities, equipment and policies relevant to the management of pulmonary embolism. A retrospective clinical questionnaire was completed by the consultant caring for the patient at the time of admission and case note peer review of 526 patients was undertaken by a multidisciplinary group of healthcare professionals. The sample was deliberately biased to include patients at either end of the spectrum of pulmonary embolism severity. Patients with severe pulmonary embolism who were admitted to critical care or died were specifically sampled, to reinforce crucial learning points about management of this potentially fatal condition. Additionally, patients who had ambulatory care or short duration admissions (≤3 days) were included to focus on the use (and any underuse) of ambulatory care.

Results

The majority of patients (420/526; 79.8%) presented to hospital with a new symptomatic pulmonary embolism, with 9.9% (52/526) patients developing an inpatient pulmonary embolism as a complication of an admission for another reason. A further 54 patients were identified through incidental findings on imaging. The patients in this study had an age distribution of 20–100 years. The Rockwood Clinical Frailty score (Rockwood et al, 2005) was applied to the cohort and a score of 1–3 (very fit–managing well) was recorded in the majority of patients (295/521; 56.5%). This highlights that pulmonary embolism can affect both young and otherwise healthy patients and so clear management

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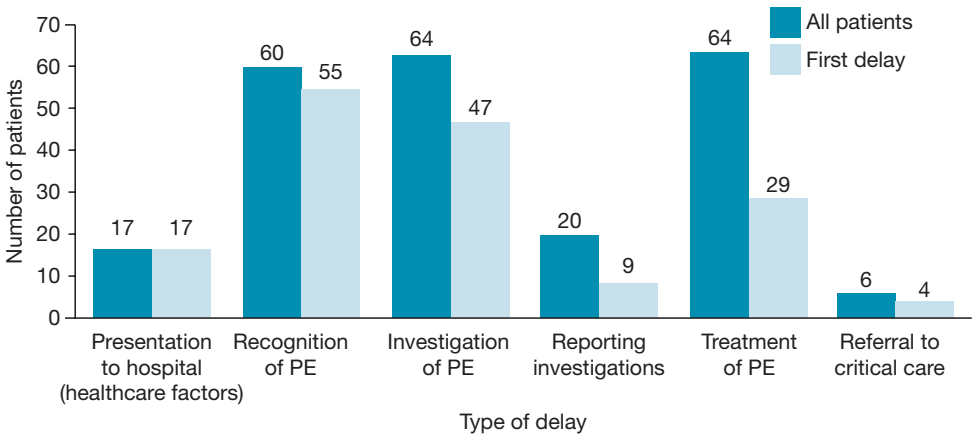

Figure 1. Type of delay (patient factors delaying presentation to hospital were not included) from case reviewer data. PE = pulmonary embolism.

plans are essential to prevent fatalities. Upon case note review, the overall quality of care was found to be good practice in 40.9% (215/526) of cases, while there was room for improvement in clinical, organisational or both aspects of care in 53.8% (283/526) of the sample. Delays were reported throughout the pathway of care for patients with pulmonary embolism; with 161/420 patients (38.3%) experiencing one or more delays in their care, and for some patients, delays occurred at multiple stages of their admission, as shown in Figure 1. Delays were commonest in recognition and investigation of pulmonary embolism.

Principal recommendations

Based on the report findings, 13 recommendations were agreed upon, with six principal recommendations listed as the primary focus for healthcare practitioners (Table 1).

Interim anticoagulant doses

Anticoagulation is the standard treatment for pulmonary embolism, unless contraindicated, as outlined in the combined recommendations from National Institute for Health and Care Excellence (2020) guideline 158 and National Institute for Health and Care Excellence (2013) quality standard 29. An interim dose should be administered to patients with suspected pulmonary embolism if there is a delay of over 1 hour in confirmation of diagnosis. Despite these widely available guidelines, the study found 18.7% (90/481) of patients had an avoidable delay in commencing treatment. The majority of avoidable delays (40/90) related to failures in administering or prescribing anticoagulation. In this potentially life-threatening condition it is important to prevent delays, and therefore initiate therapy as soon as possible.

Standardised computed tomography pulmonary angiography reporting

Computed tomography pulmonary angiography is a commonly used diagnostic investigation for pulmonary embolism. Organisational data showed that proformas and other structured reporting systems were only used in a minority of hospitals (14.1%, 22/156). This low number is reflected in the inconsistent quality of information available in the reports assessed by the case reviewers. No comment was made about the size of the pulmonary embolism in 50.7% (177/349) of computed tomography pulmonary angiography reports and no comment on the presence or absence of right ventricular strain in 37.5% (125/333) of the reports. Aside from confirming diagnosis, computed tomography pulmonary angiography tests are invaluable in guiding clinical management of pulmonary embolism and treatment escalation decisions. Computed tomography pulmonary angiography evidence of right ventricular strain usually prompts additional investigations. It is imperative that computed tomography pulmonary angiography reports should be standardised to include comment on right ventricular strain.

Table 1. Principal recommendations for healthcare professionals

Give an interim dose of anticoagulant to patients suspected of having an acute pulmonary embolism (unless contraindicated) when confirmation of the diagnosis is expected to be delayed by more than 1 hour. The anticoagulant selected, and its dose, should be personalised to the patient. This timing is in line with National Institute for Health and Care Excellence (2013) Quality Standard 29
Document the severity of the acute pulmonary embolism immediately after the confirmation of diagnosis. Severity should be assessed using a validated standardised tool, such as Pulmonary Embolism Severity Index (PESI) or Simplified Pulmonary Embolism Severity Index (sPESI). This score should then be considered when deciding on the level of inpatient or ambulatory care
Standardise computed tomography pulmonary angiogram reporting. The proforma should include the presence or absence of right ventricular strain. The completion of these proformas should be audited locally to monitor compliance and drive quality improvement
Look for indicators of massive (high risk) or sub-massive (intermediate risk) pulmonary embolism, in addition to calculating the severity of acute pulmonary embolism in the form of: ■ Haemodynamic instability (clinical) ■ Right heart strain (imaging) ■ Elevated levels of troponin or brain-type natriuretic peptide (biochemical) ■ Escalate promptly based on local guidance and document in the case notes
Assess patients suspected of having an acute pulmonary embolism for their suitability for ambulatory care and document the rationale for selecting or excluding it in the clinical notes
Provide every patient with an acute pulmonary embolism with a follow-up plan, patient information leaflet and, at discharge, a discharge letter which should include: ■ The likely cause of the pulmonary embolism ■ Whether it was provoked or unprovoked ■ Details of any follow-up appointment(s) ■ Any further investigations required ■ Details of anticoagulant prescribed and its duration, in line with National Institute for Health and Care Excellence (2020) guidance

Document pulmonary embolism severity

There are many pulmonary embolism severity scoring tools available to clinicians that can be used to estimate the risk of adverse pulmonary embolism outcomes. A total of 90.1% (128/142) of hospitals reported using validated scoring systems, such as the simplified Pulmonary Embolism Severity Index (sPESI) (Jiménez et al, 2010) and Pulmonary Embolism Severity Index (PESI) (Aujesky et al, 2005), to help to provide safe and effective treatment. In stark contrast to these organisational data, case reviewers found that there was no evidence of a formal assessment of pulmonary embolism severity in 90.3% (436/483) of cases. This indicates that despite the wide availability of scoring tools, they have not yet been widely accepted or incorporated into clinical practice. When used in conjunction with clinical judgement, the probability scores obtained from these tools should be considered when selecting the appropriateness of either inpatient or ambulatory care. This decision should be documented clearly in the case notes, alongside the rationale for the level of care. It is important for clinicians to calculate and document pulmonary embolism probability scores to guide appropriate and consistent clinical management.

Follow-up plan and patient information

In line with National Institute for Health and Care Excellence guidance, both written and verbal advice should be given, highlighting when to seek medical help and advice on future dental treatments, as anticoagulation may need to be stopped for dental treatment. On discharge patients should be provided with a clear follow-up plan and information leaflets with details of the prescribed anticoagulant, its dose and duration. The discharge letter should also include the likely cause of the pulmonary embolism and whether it was provoked or unprovoked.

Key points

- Acute pulmonary embolism is a potentially life-threatening condition that can affect fit and healthy people of all ages.
- In patients suspected of having an acute pulmonary embolism, an interim dose of anticoagulant should be given when confirmation of the diagnosis is expected to be delayed by over an hour, unless contraindicated.
- A validated standardised tool should be used to assess the severity of acute pulmonary embolism following the confirmation of diagnosis; this should be considered in the rationale for selecting either ambulatory or inpatient management.
- Computed tomography pulmonary angiography reporting should be standardised for acute pulmonary embolism and include comment on right ventricular strain.
- Written information about follow up and the continued anticoagulation treatment should be provided to all patients on discharge.

Conclusions

Organisations should ensure that there are protocols in place resulting in consistent and appropriate delivery of care to this patient group, with guidelines available for both ambulatory outpatient and inpatient management. The care of a patient with pulmonary embolism can be improved by timely diagnosis, effective treatment and a clear ongoing management plan based on pulmonary embolism severity.

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