



# Know the Score

A review of the quality of care provided to patients aged over 16 years with a new diagnosis of pulmonary embolism

## Executive summary

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### Aim

The aim of this study was to highlight areas where care could be improved in patients with a new diagnosis of acute pulmonary embolism (PE).

### Method

A retrospective case note and questionnaire review was undertaken in 526 patients aged 16 and over who had a PE either presenting to hospital or who developed a PE whilst as an inpatient for another condition.

### Key messages

One delay or more in the process of care was identified in 161/420 (38.3%) patients, with recognition, investigations and treatment being the most common.

The primary treatment for PE is anticoagulation. It is imperative that this is started as soon as possible. Where there might be a delay to the diagnosis of acute PE anticoagulation should be commenced. In this study the case reviewers reported an avoidable delay in commencing treatment in 90/481 (18.7%) patients.

Once PE has been diagnosed an assessment of PE severity needs to be undertaken in order to treat patients effectively. In 144/179 (80.4%) hospitals their PE policy/guideline included the assessment of PE severity.

This severity assessment was based on a validated scoring system such as PESI or Hestia in 128/142 (90.1%) hospitals. Case reviewers found no evidence of a PE severity assessment in the majority of patients (436/483; 90.3%).

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Severe (massive) PE requires additional or alternative treatment. A guideline/protocol for the diagnosis and care of patients with PE was provided at 151/180 (83.9%) hospitals.

Ambulatory care has recently become a recognised pathway for PE management in those patients with low-risk of adverse outcomes. An ambulatory care pathway was used for all or part of the patient journey in 77/474 (16.2%) patients in this study. Wide variation in the selection of patients for ambulatory care was observed, with some high-risk patients being selected on this pathway and low-risk patients not being considered for it, resulting in unnecessary hospital admissions.

Patients should receive all the information they need to make an informed choice, particularly with respect to taking

anticoagulation. Treating clinicians were unable to determine if the patient was given verbal or written information regarding PE in 336/600 (56.0%) instances and specific information/ education regarding PE was not routinely provided to patients at 55/167 (32.9%) hospitals.

An outpatient follow-up was not routinely arranged following a PE diagnosis in 32/179 (17.9%) hospitals. Where routine outpatient follow-up was a standard arrangement, it included a decision on the duration of anticoagulation in 138/147 (93.9%) hospitals and an assessment of whether the PE was provoked or unprovoked in 135/143 (94.4%). Case reviewers were of the opinion that follow-up was inadequate for 50/308 (16.2%) patients where there was adequate information for them to make a determination.

## Principal recommendations

PRINCIPAL RECOMMENDATIONS		Key findings and guidelines that support the recommendation. The #number is the key finding number in the report	
1	<p>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 one hour. The anticoagulant selected, and its dose, should be personalised to the patient. This timing is in line with NICE QS29 2013.</p> <p><i>(All Clinicians, Quality Improvement Lead)</i></p>	<p><b>CHAPTER 8 – PAGE 58</b> #52. Case reviewers were of the opinion that there was an avoidable delay in commencing treatment in 90/481 (18.7%) patients</p> <p><b>CHAPTER 8 – PAGE 58</b> #53. More than half of the avoidable delays recorded were because an anticoagulant was not prescribed 44/90 (48.9%) and/or not administered 5/90 (5.5%)</p>	<p>NICE QS29 - Venous thromboembolism in adults: diagnosis and management</p>
2	<p>Document the severity of acute pulmonary embolism immediately after the confirmation of diagnosis. Severity should be assessed using a validated standardised tool, such as 'PESI' or 'sPESI'. This score should then be considered when deciding on the level of inpatient or ambulatory care.</p> <p><i>(All Clinicians)</i></p>	<p><b>CHAPTER 7 – PAGE 53</b> #45. Case reviewers found no evidence of a formal assessment of PE severity in 436/483 (90.3%) cases reviewed</p> <p><b>CHAPTER 7 – PAGE 53</b> #46. Data from clinician questionnaires revealed that PE severity was not recorded in 456/559 (81.6%) patients</p>	<p>Howard LSGE, Barden S, Condliffe R, et al British Thoracic Society Guideline for the initial outpatient management of pulmonary embolism (PE) Thorax 2018;73:ii1-ii29</p>
3	<p>Standardise CT 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.</p> <p><i>(At a national level, the Royal College of Radiologists with input from other clinical specialist societies such as the British Thoracic Society).</i></p> <p><i>(Clinical Lead for Radiology and Quality Improvement Lead)</i></p>	<p><b>CHAPTER 2 – PAGE 22</b> #7. Proformas or other structured reporting systems for CTPA were only used in 22/156 (14.1%) hospitals</p> <p><b>CHAPTER 5 – PAGE 47</b> #37. In 177/349 (50.7%) CTPA reports no comment was made on the thrombus burden</p> <p><b>CHAPTER 5 – PAGE 47</b> #38. Right heart strain was identified in 93/333 (27.9%) patients and 115/333 (34.5%) of reports commented on its absence. In 125/333 (37.5%) no comment was made on the right ventricle</p> <p><b>CHAPTER 5 – PAGE 49</b> #40. Case reviewers considered half of CTPA reports to be less than good (179/346; 51.7%), including 33/346 (9.5%) which were graded as poor; most commonly due to the lack of comment on the right heart (30/33; 90.9%)</p> <p><b>CHAPTER 5 – PAGE 49</b> #41. Where a CTPA report was only rated as adequate and a reason was given (99/146; 67.8%) the most common concerns were a failure to comment on the right ventricle in 55/99 (55.6%)</p>	

PRINCIPAL RECOMMENDATIONS	Key findings and guidelines that support the recommendation. The #number is the key finding number in the report	
<p>4</p> <p>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:</p> <ul style="list-style-type: none"> <li>i. Haemodynamic instability (clinical)</li> <li>ii. Right heart strain (imaging)</li> <li>iii. Elevated troponin or brain natriuretic peptide (biochemical).</li> </ul> <p>Escalate promptly based on local guidance and document in the case notes. <i>(All Clinicians)</i></p>	<p><b>CHAPTER 2 – PAGE 21</b></p> <p>#4. A guideline/protocol for the diagnosis and care of patients with massive PE was not provided in 29/180 (16.1%) hospitals. The corresponding figure for sub-massive PE diagnosis and management was 65/176 (36.9%)</p> <p><b>CHAPTER 4 – PAGE 43</b></p> <p>#31. Initial investigations which might have altered management were not performed in 143/486 (29.4%) patients in the opinion of the case reviewers and in 119/689 (17.3%) patients in the view of the clinicians at the hospital</p> <p><b>CHAPTER 4 – PAGE 43</b></p> <p>#32. In the opinion of the case reviewers, investigations which are usually used to diagnose sub-massive PE (point of care echocardiography) or assess the risk of sub-massive PE patients dying (troponin, BNP/ NT-pro-BNP) were omitted in 11/486 (2.3%), 41/486 (8.4%) and 15/486 (3.1%)</p>	
<p>5</p> <p>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. <i>(All Clinicians)</i></p>	<p><b>CHAPTER 6 – PAGE 51</b></p> <p>#42. 77/474 (16.2%) patients who presented to hospital with clinical suspicion of PE, were cared for on an ambulatory care pathway for all or part of their patient journey</p> <p><b>CHAPTER 6 – PAGE 51</b></p> <p>#43. Case reviewers were of the opinion that a further 43/366 (11.7%) patients could have benefitted from an ambulatory pathway</p> <p><b>CHAPTER 7 – PAGE 53</b></p> <p>#45. Case reviewers found no evidence of a formal assessment of PE severity in 436/483 (90.3%) cases reviewed</p> <p><b>CHAPTER 7 – PAGE 53</b></p> <p>#46. Data from clinician questionnaires revealed that PE severity was not recorded in 456/559 (81.6%) patients</p> <p><b>CHAPTER 7 – PAGE 54</b></p> <p>#47. Retrospective calculation of PE severity by the case reviewers identified 194 patients in the PESI low-risk groups (Class I and II), 133 patients in the intermediate risk group (Class III) and 162 patients in the higher risk groups (Class IV and V)</p> <p><b>CHAPTER 7 – PAGE 55</b></p> <p>#48. 43/188 (22.9%) low-risk patients were treated on an ambulatory pathway, suggesting potential missed opportunities for the remaining 145/188 (77.1%) low-risk patients</p> <p><b>CHAPTER 7 – PAGE 55</b></p> <p>#49. 24/214 (11.2%) with intermediate risk and 6/74 (8.1%) with high-risk scores were ambulated, suggesting excessive risk taking</p>	<p>Commissioning for Quality and Innovation (CQUIN) Guidance for 2019-2020</p>

<b>PRINCIPAL RECOMMENDATIONS</b>		Key findings and guidelines that support the recommendation. The #number is the key finding number in the report	
6	<p>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:</p> <ol style="list-style-type: none"> <li>i. The likely cause of the pulmonary embolism</li> <li>ii. Whether it was provoked or unprovoked</li> <li>iii. Details of follow-up appointment(s)</li> <li>iv. Any further investigations required</li> <li>v. Details of anticoagulant prescribed and its duration, in line with NICE CG144</li> </ol> <p><i>(All Clinicians, Service Users, General Practitioners)</i></p>	<p><b>CHAPTER 2 – PAGE 28</b> #17. Specific information/education regarding PE was not routinely provide to patients at 55/167 (32.9%) hospitals</p> <p><b>CHAPTER 2 – PAGE 29</b> #18. Outpatient follow-up was not routinely arranged following a PE diagnosis in 32/179 (17.9%) hospitals. Where routine outpatient follow-up was arranged it included a decision on the duration of anticoagulation in 138/147 (93.9%) hospitals and an assessment of whether the PE was provoked or unprovoked in 135/147 (91.8%)</p> <p><b>CHAPTER 9 – PAGE 65</b> #62. Treating clinicians were unable to determine if patients were given verbal and written information regarding PE in 336/600 (56.0%) cases</p> <p><b>CHAPTER 9 – PAGE 66</b> #63. Case reviewers were of the opinion that follow-up was inadequate for 50/308 (16.2%) patients where there was adequate information to make a determination</p>	<p>Howard LSGE, Barden S, Condliffe R, et al British Thoracic Society Guideline for the initial outpatient management of pulmonary embolism (PE) Thorax 2018;73:ii1-ii29</p> <p>NICE CG92 Venous thromboembolism: reducing the risk for patients in hospital</p> <p>NICE NG89 Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism</p> <p>NICE CG144 Venous thromboembolic diseases: diagnosis, management and thrombophilia testing</p>