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Venous lactate as a tool for the risk-stratification of patients with acute pulmonary embolism: a two-center retrospective cohort study

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Background: Current guidelines cite arterial lactate as a predictor of respiratory failure and death, but in the emergency department (ED), venous lactate is easier to obtain. There is limited data that guides interpretation of venous lactate values in ED patients with acute PE.
Aims: To determine optimal venous lactate cutoff for the risk-stratification of ED patients with acute PE.
Methods: We performed a two-center, retrospective cohort study of patients with imaging-confirmed PE and venous lactate measured clinically within 24 hours. Data collection was approved by institutional review boards at MGH and VUMC. MGH culled data from its PERT registry, and thus represented patients of greater concern. VUMC data included all patients in its medical record regardless of severity. We excluded hypotensive patients, for whom biomarker risk-stratification is unnecessary. Given differences in selection of patients across centers, we analyzed data from MGH and VUMC separately. Our outcome was acute deterioration, defined as a composite of death, catheter-based intervention, systemic thrombolysis, ECMO, and intubation within 7 days. A Receiver-Operating Characteristic (ROC) curve analysis was performed. Area-under-curve (AUC) reflects lactate performance, and optimal cutoff value was found via least distance from perfect classification point (0,1).
Results: We included 145 patients (MGH) and 1160 patients (VUMC). The mean age was 64 and 58 years. For the outcome, the AUC was 0.56 (95% CI: 0.44-0.67) for the MGH cohort and 0.69 (95%CI: 0.65-0.73) for the VUMC cohort. In MGH, the optimal cutoff was 1.8mmol/L, which corresponds to 58% sensitivity and 61% specificity. In VUMC, the optimal cutoff was 2.0mmol/L, which corresponds to 58% sensitivity and 72% specificity.
Conclusion(s): We observed an inter-cohort discordance in the analyzed AUC. The disagreement most likely arises from fundamental differences between the studied patient cohort. Nonetheless, our data indicates that on its own, venous lactate is a suboptimal tool for PE risk stratification.

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International expert consensus on criteria to assess the safety of home treatment of patients with acute pulmonary embolism

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Background: Several trials have evaluated the safety of home treatment of patients with acute pulmonary embolism (PE), with varying outcomes. The most common is the 3-month rate of recurrent venous thromboembolism (VTE) although other criteria and a different period of follow-up may be more appropriate.
Aims: To establish a consensus definition of serious adverse events and timeframes for their occurrence to be considered as safety outcomes in clinical trials assessing home treatment of PE patients.
Methods: An international panel of experts was asked their opinion using a Delphi method until consensus was reached (Figure). For each possible outcome, experts answered the question "Does the occurrence of this event after home discharge from the emergency department (ED) suggests that home treatment was an inappropriate disposition?". Responses were collected using Likert scales. The same method was used for the outcomes' timeframe.
Results: Fifty-five experts were invited and 35 participated (Table). Six adverse events were identified as outcomes: 1/ Confirmed new onset of hypoxemia (< 90%) requiring oxygen or ventilation support (retained in round 2); 2/ Confirmed new onset of severe hypotension (i.e., systolic blood pressure < 90 mmHg or 40 mmHg decrease from baseline) or shock index > 1 requiring specific treatment (round 2); 3/ New confirmed symptomatic cardiac arrhythmia requiring urgent treatment (round 4); 4/ Major bleeding (ISTH definition) (round 1); 5/ Symptomatic PE recurrence or proximal DVT requiring specific treatment (round 4); 6/ Death possibly or confirmed to be related to PE (round 4). The timeframe of occurrence was set at 7 days after ED discharge (round 3).
Conclusion(s): The expert panel identified the occurrence of six clinical deterioration criteria to be used as safety outcomes when determining if home treatment is an inappropriate disposition for PE patients. These outcomes should be considered in future trials and measured within 7 days from ED discharge.

Specialty	Number	Country	Number
Cardiology	2	Australia	1
Emergency medicine	15	Belgium	2
Hematology	1	Canada	4
Internal medicine	4	France	8
Patient-expert	1	Germany	2
Pharmacology	1	Netherlands	4
Primary-care	1	Principality of Monaco	1
Pulmonology	4	Spain	1
Vascular medicine	2	United Kingdom	2
Unknown	4	United States	6
		Unknown	4
TOTAL	35	TOTAL	35

Experts' characteristics