EDITORIAL

Acute pulmonary embolism: the vulnerable scores

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A risk assessment model aims to provide a physician or a patient with an individual estimate of a risk of suffering an adverse event. In clinical practice, this may help to make a clinical decision based on a risk-benefit tradeoff, if both risks and benefits can be adequately estimated, and to inform the patient. A classifier also quantifies the patient's risk of developing an event, but it simplifies its interpretation by informing the physician about the risk class their patient falls into. Classifying a patient as "high-risk" or "low-risk" implies that treatment of patients from each class would be different. A description of methods by which risk assessment models and classifiers should be obtained and validated is beyond the scope of this editorial. However, it is worth mentioning how some of these have established themselves in clinical practice through very diverse and sometimes unconventional paths. In many fields, including that of acute pulmonary embolism (APE), the discussion is still ongoing and lively.

In 2005, Aujesky et al[1] developed the Pulmonary Embolism Severity Index (PESI) as an epidemiologic tool to categorize patients with APE into 5 classes according to their 30-day death risk. Eleven PESI items encompass some demographic characteristics, hemodynamic criteria of PE severity, vital parameters, and key comorbidities. Six years later, the PESI criteria in combination with a few clinical characteristics were proven safe to identify candidates suitable for early discharge and home treatment after APE.[2] As a consequence, PESI became a crucial tool for risk stratification of patients with APE. The use of similar clinical items ("Hestia criteria" or "modified Hestia criteria") was found to be safe to guide early discharge of patients with APE.[3-5] In 2010, Jimenez et al[6] simplified the original PESI by excluding some variables and dichotomizing others to enhance its usability. The resulting dichotomized and simplified PESI (sPESI) had slightly better discrimination and sensitivity than PESI with an aim of improving early PE management: a score of 0 would identify a low-risk population with a 30-day death risk equal to or below 1%, therefore potentially eligible for early discharge.[4,6]

In the study by Imiela et al,[7] published in this issue of *Polish Archives of Internal Medicine*, the authors compared 2 scores, the Vulnerable Elder Survey 13 (VES-13) and sPESI. What exactly is the VES-13? Developed in 2001, the VES-13 aims to predict a decline in daily living activities and death over a 2-year period in the elderly population. The VES-13 includes 13 items, mostly self-reported by patients or referring to their functional status, and was proven to be reliable in identification of elderly individuals with increased vulnerability. Imiela et al[7] studied the predictive value of a risk of death within 3 months in approximately 160 elderly patients after APE. Specifically, they calculated the sensitivity and specificity for both VES-13 and sPESI. By plotting the receiver operating characteristics, they found a greater area under the curve for VES-13 than for sPESI, and concluded that VES-13 is superior to sPESI in predicting a 3-month death risk.

There is a need for a holistic approach to PE patients, with a special focus on short- and long-term follow-up and its improvement. Key requirements in this process include predictive scores capable of forecasting both short- and long-term outcomes following APE, notably death. Both PESI and sPESI have been studied as potential indicators of frailty, therefore can be used to predict long-term death, but they were not designed with this purpose.[8,9] In light of some non-PE–specific items, sPESI was associated with adverse outcomes even in patients without PE. This did not appear surprising, as the index encompasses age, the presence of cancer or cardiopulmonary disease, and a few vital parameters, all factors that may indicate a higher risk of death independently of the baseline disease.[10,11]

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Received: April 14, 2024.
Accepted: April 15, 2024.
Published online: April 26, 2024.
Pol Arch Intern Med. 2024; 134 (4): 16742
doi:10.20452/pamw.16742
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Furthermore, there is a need for predictive tools to assess morbidity following APE, an aspect that neither PESI nor sPESI currently address. To fill this gap in the prediction of outcomes, both old and newly emerging scores must be investigated. Moreover, prospective studies are essential to validate the predictive values of these scores. It is now evident that various outcomes and outcome measurements need to be integrated into clinical practice. These can support clinical decision-making and help benchmark the quality of care beyond the recurrence of PE, hemodynamic decompensation, and death.[12]

In our opinion, there are 2 interpretations of the predictive data of VES-13 in PE patients concerning survival, and 2 different consequences. Firstly, a high VES-13 score can be interpreted and utilized as Imiela et al[7] suggested, serving as an indicator of frailty. Recognizing frailty can prompt more intensive patient care measures, potentially leading to a reduced risk of death. Importantly, these benefits might occur independently of PE. On the other hand, in contrast to the first explanation, a higher VES-13 score might also signal the presence of a pre-existing serious illness. This recognition could necessitate a de-escalation of care, focusing on the avoidance of aggressive or unnecessary treatments that may not benefit the patient's overall health condition.

PESI and sPESI are validated tools for early management of APE, but they do not assess patient fragility, which can be crucial for appropriate outpatient care. Adding the VES-13 tool may improve decisions about whether standard treatment guidelines are suitable for fragile patients or if adjustments in treatment intensity are necessary.

ARTICLE INFORMATION

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CONFLICT OF INTEREST None declared.

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HOW TO CITE Barco S, Wolf S. Acute pulmonary embolism: the vulnerable scores. Pol Arch Intern Med. 2024; 134: 16742. doi:10.20452/pamw.16742

REFERENCES

1 Aujesky D, Obrosky DS, Stone RA, et al. Derivation and validation of a prognostic model for pulmonary embolism. Am J Respir Crit Care Med. 2005; 172: 1041-1046.

2 Koltowski L. Commentary to the article: Swedberg K, Komajda M, Bohm M et al. Ivabradine and outcomes in chronic heart failure (SHIFT): a randomised placebo-controlled study. Lancet, 2010; 376: 875-885 [in Polish]. Kardiol Pol. 2010; 68: 1299-1302.

3 Zondag W, Mos IC, Creemers-Schild D, et al. Outpatient treatment in patients with acute pulmonary embolism: the Hestia Study. J Thromb Haemost. 2011; 9: 1500-1507.

4 Roy PM, Penaloza A, Hugli O, et al. Triaging acute pulmonary embolism for home treatment by Hestia or simplified PESI criteria: the HOME-PE randomized trial. Eur Heart J. 2021; 42: 3146-3157.

5 Barco S, Schmidtmann I, Ageno W, et al. Survival and quality of life after early discharge in low-risk pulmonary embolism. Eur Respir J. 2021; 57: 2002368.

6 Jimenez D, Aujesky D, Moores L, et al. Simplification of the pulmonary embolism severity index for prognostication in patients with acute symptomatic pulmonary embolism. Arch Intern Med. 2010; 170: 1383-1389.

7 Imiela AM, Kozak-Szkopek E, Szymanska M, et al. The Vulnerable Elders Survey-13 scale is superior to the simplified Pulmonary Embolism Score Index in predicting 3-month postdischarge mortality in elderly survivors of acute pulmonary embolism. Pol Arch Intern Med. 2024; 134: 16661.

8 Dentali F, Riva N, Turato S, et al. Pulmonary embolism severity index accurately predicts long-term mortality rate in patients hospitalized for acute pulmonary embolism. J Thromb Haemost. 2013; 11: 2103-2110.

9 Naderi Z, Tamizifar B, Sami R, Rostamiyan N. Comparing the „simplified revised Geneva score", the „original PESI", and the „simplified PESI" for mortality prediction for pulmonary embolism. A 10 years follow-up study. Am J Cardiovasc Dis. 2023; 13: 335-344.

10 Polo Friz H, Orenti A, Brambilla M, et al. Short and long-term mortality in elderly patients with suspected not confirmed pulmonary embolism. Eur J Intern Med. 2020; 73: 36-42.

11 Barco S, Sebastian T. Death from, with, and without pulmonary embolism. Eur J Intern Med. 2020; 73: 25-26.

12 Gwozdz AM, de Jong CMM, Fialho LS, et al. Development of an international standard set of outcome measures for patients with venous thromboembolism: an International Consortium for Health Outcomes Measurement consensus recommendation. Lancet Haematol. 2022; 9: e698-e706.