EDITORIAL

Diagnosing pulmonary tromboembolism: always a challenge for the emergency physician

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The clinical presentation of pulmonary embolism (PE) is sometimes subtle and may mimic and be masked by other diseases. Emergency physicians have endured their own and other specialists' criticisms when the diagnosis has not been established in the emergency department (ED)[1]. This is largely because the consequences of not initiating anticoagulation can be fatal. In recent decades, strategies to safely rule out the presence of this silent killer have been developed. The first step is the assessment of clinical probability, either by empirical clinical judgment or through the use of so-called clinical decision rules (CDR).

Although not exclusive to venous thromboembolism (VTE), this is an entity that is inundated (and nearly drowned) by CDR, whether they be scales, rules or models of clinical decision. There are CDR to calculate the risk of a future venous thromboembolic event (risk assessment scales), to evaluate the probability of an immediate event (clinical probability scales), to estimate the risk of death once the diagnosis has been established (prognostic scales) and to assess the risk of recurrence, after treatment (recurrence probability scales).

What are CDR? They are decision support tools that use the combination of simple and available clinical predictors to establish the likelihood of a parameter in the present (diagnosis or probability of disease) or future (prognosis) in order to initiate a preventive strategy or course of action. What do they allow? To standardize the diagnosis and prognostic evaluation of the entity. The aim is to reduce variability in clinical practice and improve the quality of care. One dimension of quality in which CDR have a direct impact is efficiency by limiting the number of additional tests to rule out the diagnosis or to prevent the development of future events after initiating preventive action.

How are CDR developed? The development of valid, accurate and reproducible CDR follows a strict methodology. The standards for development and validation were published over 20 years ago and subsequently updated[2]. There are three stages. The derivation phase (obtaining the factors independently associated with the presence of the event), the validation phase (finding that the CDR "served" in different scenarios to reduce both prevalence and consequences of the disease) and the impact analysis phase, in which evidence is sought to show that CDR has caused changes in the behavior of physicians, improving patient outcomes and reducing costs.

For the purposes of ruling out the diagnosis or clinical probability of PE, at least six CDR have been developed: the Wells scale, simplified Wells scale, the Geneva scale, revised Geneva scale, PERC (Pulmonary Embolism Rule-out Criteria), the Pisa scale and the Charlotte scale. In our setting, the Geneva and Wells scales have succeeded in demonstrating their impact. Using the Wells scales, the probability of PE can be categorized in 3 levels (low, intermediate or high) or two levels (unlikely or probable); with the Geneva scale, the probability is categorized in three levels: low, intermediate and high. These levels correspond to categories of PE prevalence: 10% for low probability, 25% for intermediate and 60% for high.

D-dimer measurement should be considered the second step in the strategy of ruling out PE for those patients without high clinical probability[3]. Such highly sensitive techniques allow ruling out the diagnosis in patients with low-intermediate risk or clinically improbability, which accounts

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for approximately one third of ED patients with suspected PE. In patients with a high probability, one should not request the determination of D-dimer, because a concentration below the diagnostic threshold is rare in this category of patients and therefore not cost-effective; pulmonary imaging should be requested.

Lekerika et al., in this issue of the Journal[4], show that the combined use of clinical probability scales for PE and D-dimer measurement can safely exclude the diagnosis. The specificity found also indicates that it is a highly efficient strategy. The scenario is one that we can find in any Spanish ED, with a low prevalence of PE (about 15%), so a strategy with low sensitivity and high specificity is appropriate. In their work, the authors find that Wells scale may be more useful than the Geneva scale; however, this could have been different if the comparison had been made with the revised Geneva scale. As they indicate, the main limitation of this study is the lack of data from additional tests that are required for the Geneva scale (arterial blood gases and chest radiography). This was the reason the authors of the Geneva scale developed a revised version in which only clinical criteria are incorporated[5]. The Wells scale has been criticized, despite its simplicity, precisely for the using clinical judgment as one of its criteria. However, it is still recommended in widely recognized clinical practice guidelines such as NICE[6].

A recent meta-analysis has shown that the error rate of the proposed strategy is low, 0.7 (0.5-1.0) and efficiency (measured as the ratio between the number of patients with negative results by the total number of patients) 35%[7]. Despite this evidence, today these strategies are not widely used in our setting. Some studies have shown that the request for D-dimer measurement is often made indiscriminately (we have all seen "shotgun" requests which include the determination of a battery of biomarkers), regardless of clinical probability based on CDR[8]. Other studies have found that failure to apply the evaluation and diagnostic strategy can have significant effects on final results in patients[9].

The diagnosis of PE may be an ongoing challenge for the emergency physician, but less and less so. The use of scientific evidence and showing that it is also applicable and useful in our setting, as in the article Lekerika et al., ensures that anticoagulation therapy is not established if the diagnosis has been excluded, and makes the request for complementary tests more efficient. The aim is to standardize our clinical practice, to decrease variability and increase efficiency, not only for the benefit of our patients but also for the health system which, as we all know, is in critical condition.

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