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Strategical Paper

Pulmonary Embolism Diagnostic Strategy - The Medical Dilemma to Choose Between Individualism or Cooperation

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The diagnosis of pulmonary embolism (PE) provides a fascinating portrait of a challenging medical practice for doctors on care of patients since early times and also in the age of evidence-based medicine. The intrinsic diagnostic challenge is related to its non-specific clinical and laboratory caracteristics and also to the risks associated with the missing or equivocal diagnosis in the acute set of the disease [1].

Pulmonary embolism is a diagnostic category whose definition and treatment have both changed in the last decades. Initially, PE was recognizable only when massive emboli reached the lungs in a critical case presentation. Since the advent of computed tomography pulmonary angiography (CTPA) the diagnostic category of PE has been refined resulting in a raising incidence of the disease. The epidemiologic patterns of PE have changed since CTPA was introduced. Compared with the pre-CTPA era, PE incidence rose, mortality changed little, and case fatality decrease [2,3]. Other reasons could also explain this changing epidemiology like the efforts and campaings to prevention of venous thrombosis in hospitalized patients, also with new treatments modalities.

There are reasons, however, to suspect that incidence is actually underestimated and be falsely low. Pulmonary embolism is considered to be one of the most common missed diagnoses [2,4]. As a example, there are no strategies that allow us to capture emboli diagnosed and treated in outpatients and more than 90% of patients with known PE were those admitted to the hospital [5,6]. Hence, the overall rise in PE incidence may be even greater than what we captured among inpatients.

CTPA is now the most-often used imaging diagnostic test for PE. In contrast with the $\dot{V}/\dot{Q}$ scan, it allows direct visualization of pulmonary arterial circulation after intravenous injection of an iodinated contrast agent. National Quality Programs endorse its use to increase imaging efficiency for the evaluation of pulmonary embolism (PE) in the emergency department (ED). Nowadays, the problem to discuss is its underuse and overuse. One-third of imaging performed for suspected PE may be categorized as avoidable [2,7]. Overuse however is not without some risks of adverse events like high radiation exposure, contrast induced nephropaty and obviously custs. Improving adherence to established diagnostic protocols is likely to result in significantly fewer patients receiving unnecessary exposure to these risks events and also custs savings.

The more practical way to reach PE diagnosis is the doctors thinking model ("Gestalt") to presume the possibility/probability of PE in his atual patient, given value to the elements of clinical presentation [8,9]. In this way, actual Guidelines give us more help and recommend to follow algorithms like the internationaly validaded Well´s score [10,11,12,14] to stablish the low or high risk of PE. This model is called the probabilistic reasoning method, using clinical features to stablish the pretest clinical probability of a diagnostic, as endorsed since the semiology classes of the medical course. In the old days of 1948, John Ryle an Oxford Professor of Medicine [13] wisely said:

"The three tasks of the clinician are diagnosis, prognosis and treatment. Of these, diagnosis is by far the most important for upon it the success of the other two depend"

Nowadays, besides the technological improving era of medicine the challenging diagnose of PE fits well in this aphoristic model, regarding the significant risk of morbidity/mortality in patients with a missed or delayed diagnosis.

The correct use for CTPA in this scenario must be done using this strategy, avoiding the exam mainly in those with low pretest probability of PE or a negative D-dimer test. So easy it seems to apply the guidelines, it is not a feasible question to be observed in the "real world", as shown in the article of Schauer C. and colaborators in this issue of EC Pulmonology and Respiratory Medicine [15]. They conduct one retrospective audit and compare it with other similar ones in New Zealand hospitals to demonstrate the poor medical compliance (as low as 3 - 12%) in the use of diagnostic prediction scores, as the Wells one, to estimate the PE probability in several hospital departments and on ED. As consequence there was a inapropriate overutilization of CTPA (and of the D- dimer test) for confirm or rule-out PE. Only 26% of scans done were PE positive and alternatives pulmonary diagnosis was seen in 66% of PE negative patients, that was also shown in the regular chest-X-rays. The Chest XR is not specific for PE, but it has been highlighted as an effective adjunct in the clinical decision-making process of the diagnosis process. The authors also notify that 38% of patients retrospectively classified as high risk patients did not start early anticoagulation treatment as recommeded in guidelines, waiting to the CTPA results.

It is very uncommon that clinicians are prone to document any pre-test probability assessment in medical records, but what the audit suggest is that expertise was probably not used prior to referral for CTPA or to decide to start anticoagulants in high risk patients. In the same way the audit revealed that the D-dimer test was unnecessarily ordered in 88% (51/58) of patients at a high risk.

What strategies could be adopted to modify this reality? Schauer and his colleagues [15] correctly propose the improvement of medical education and standardize medical practice in respect to order exams and the use of prophylaxis. More pragmatically, some strategies have been successful implemented in hospitals as those directed to disseminate venous thrombosis prophylaxis, adding to electronic medical records regular reminders and alerts all time before begining a new prescription. In the same way it could be implemented decision support tools like algorithms to presume PE probability and patient selection before prescribing CTPA. Prompt reminders and mandatory risk assessment forms could help medical doctors also in their daily activities about identification of high risk PE patients who require immediate empirical anticoagulant therapy [16,17]. All this migh be integrated with continuous educational sessions about medical protocols.

Quality Programs Iniciatives success in hospitals depends on reliable leadership, training programs and motivational team work. The future of the medical practice will not be dependent only of the binary relationship between the doctor and his patient, but mainly on a structure of multidisciplinar well trained team-works to deal with the progressive complexity of disease in special hospitals sectors as are the ED, ICUs, surgical and oncology departments [18-21]. Some diseases where evidence of good practices results in better outcomes will require its prompt implementation on the daily routine by the encharged team, non dependent only of individual choices [21]. Combining to this view, the promotion of intermitent audits, like this experience of Schauer and his collegues in New Zealand, with the objective to review aderence to guidelines and to measure performance indicators could ensure critical reviews and education to the staff about their medical activities. Medical doctors are sensitive to change their practices when they receive (during periodical staff meetings) the results of internal seriously conducted audits and services indicators statistics as a strategy to reduce variability.

The dilemma to choose between medical freedom to decide their actions or more "coercitive" protocolized clinical practices is now the great challenge to hospital managers. For one point of view, freedom is a human being atribute that incentivate creativity, essential to promote innovation by individual contribution, but great variability is frequently the rule. On the other side, the "managed care" strategy act following rules through quantitative, more than qualitative, arguments to justify its predesigned objectives, tasks and desired effectiveness. Working with the medical science, only best and strong evidences derived from well conducted clinical trials and a "open" critical appraisal environment could help medical teams to choose their efficacy more wisely.

Bibliography

1. Vinay Prasad., *et al*. "The Diagnosis and Treatment of Pulmonary Embolism A Metaphor for Medicine in the Evidence-Based Medicine Era". *Archives of Internal Medicine* 172.12 (2012): 955-958.

2. Wiener RS., *et al*. "Time trends in pulmonary embolism in the United States". *Archives of Internal Medicine* 171.9 (2011): 831-837.

3. Stein PD., *et al*. "Multidetector computed tomography for acute pulmonary embolism". *New England Journal of Medicine* 354.22 (2006): 2317-2327.

4. Winer-Muram HT., *et al*. "Suspected acute pulmonary embolism". *Radiology* 233.3 (2004): 806-815.

5. van Beek EJ., *et al*. "Clinical validity of a normal pulmonary angiogram in patients with suspected pulmonary embolism". *Clinical Radiology* 56.10 (2001): 838-842.

6. Anderson DR., *et al*. "Computed tomographic pulmonary angiography vs ventilation-perfusion lung scanning in patients with suspected pulmonary embolism". *Journal of the American Medical Association* 298.23 (2007): 2743-2753.

7. Arjun K Venkatesh. "Evaluation of Pulmonary Embolism in the Emergency Department and Consistency With a National Quality Measure Quantifying the Opportunity for Improvement". *Archives of Internal Medicine* 172.13 (2012): 1028-1032.

8. Penaloza A., *et al*. "Comparison of the unstructured clinician gestalt, the wells score, and the revised Geneva score to estimate pretest probability for suspected pulmonary embolism". *Annals of Emergency Medicine* 62.2 (2013): 117-124.e2.

9. Kabrhel C., *et al*. "Clinical gestalt and the diagnosis of pulmonary embolism: does experience matter?" *Chest* 127.5 (2005): 1627-1630.

10. Torbicki A., *et al*. "Guidelines on the diagnosis and management of acute pulmonary embolism: the Task Force for the Diagnosis and Management of Acute Pulmonary Embolism of the European Society of Cardiology (ESC)". *European Heart Journal* 29.18 (2008): 2276-2315.

11. Le Gal G., *et al*. "D-dimer for pulmonary embolism". *Journal of the American Medical Association* 313.16 (2015): 1668-1669.

12. Lucassen W., *et al*. "Clinical decision rules for excluding pulmonary embolism". *Annals of Internal Medicine* 155.7 (2011): 448-460.

13. Ryle JA. "The natural history of disease. 2nd edition". London: Oxford University Press (1948).

14. Chunilal SD., *et al*. "Does this patient have pulmonary embolism?" *Journal of the American Medical Association* 290.21 (2003): 2849-2858.

15. Schauer CKMW., *et al*. "A Review of Adherence to Guidelines for the Use of Computed Tomography Pulmonary Angiography (CTPA) for the Diagnosis of Pulmonary Embolism". *EC Pulmonology and Respiratory Medicine* 2.5 (2016): 172-180.

16. Roy PM., *et al*. "A computerized handheld decision-support system to improve pulmonary embolism diagnosis: a randomized trial". *Annals of Internal Medicine* 151.10 (2009): 677-686.

17. Smith SB., *et al*. "Early anticoagulation is associated with reduced mortality for acute pulmonary embolism". *Chest* 137.6 (2010): 1382-1390.

18. Blumenthal D., *et al*. "Innovation in health care leadership". *New England Journal of Medicine* 371.18 (2014): e26.

19. Lee TH and Cosgrove T. "Engaging doctors in the health care revolution". *Harvard Business Review* 92.6 (2014): 104-111, 138.

20. Lee TH. "Turning doctors into leaders". *Harvard Business Review* 88.4 (2010): 50-58.

21. Cabana MD., *et al*. "Why don't physicians follow clinical practice guidelines? A framework for improvement". *Journal of the American Medical Association* 282.15 (1999): 1458-1465.

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