New Diagnostic Approach Using D-Dimer and Tomography Angiography in Patients Suspected Acute Aortic Dissection

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Acute aortic dissection (AAD) is a major diagnostic challenge for everyone working in emergency units. More often than not, this diagnosis is not remembered by the medical team and, consequently, patients with large lethality are discharged without adequate treatment.[1-3]

There is no specific biomarker of AAD. Troponin usually turns out to be negative because of myocardial involvement and because of early presentation of the clinical picture.[4]

The concept that D-dimer represents a fibrin degradation product is well-known in the literature. Thus, any disease that produces thrombi will have D-dimer elevation, a fact that is corroborated and widely used in pulmonary thromboembolism. In the context of thoracic pain, d-Dimer greater than 500 ng/L had been shown to have sensitivity around 100% and specificity of 54% in the diagnosis of AAD in a retrospective study. When associated with systolic blood pressure values greater or equal to 180 mmHg, sensitivity decreases to 40%, but its specificity reaches 96%. Therefore, it seemed to have high negative predictive value and when normal in low-risk patients, it might help to rule out the diagnosis.[4,5]

The ADVISED study was recently published in Circulation, a prospective multicenter study with the participation of Brazil. In this study, 1850 patients with chest pain were evaluated in emergency units. D-dimer was then measured and directly correlated with final diagnosis of AAD or not.[6] The D-dimer normality limit that was used was 500 ng/ml. Patients were assessed and scored by the aortic dissection detection risk score (ADD-RS, 0 to 3) established by the European cardiology guideline, which determined the pre-test probability for AAD (Table 1).[7] When the patient received another diagnosis or did not perform transesophageal echocardiography, aortic tomography angiography or aortography, the patient was followed for 14 days after the event.[6]

The most important result of the study was to show that when AAD-RS was 0 or 1 and D-dimer < 500 ng/ml, the negative predictive value for AAD was 99.7%. Thus, this strategy would be recommended by the authors as a safe possibility to rule out AAD in the emergency room. The proposal would be to apply AAD-RS and request D-dimer in all patients with suspected AAD. When AAD-RS is < 1 and D-dimer < 500 ng/dl, AAD is discarded. However, if AAD-RS > 1 or ≤ 1 + D-dimer ≥ 500 ng/dl, the patient should be routinely subjected to aortic tomography angiography.[6]

The publication of this study generates a different way of approaching chest pain in which the diagnosis of coronary artery disease was not immediate. From now on, the guidelines may change, and similar to the approach of pulmonary thromboembolism, the use of a pre-test probability score associated with D-dimer for AAD may become mandatory. This has great potential to reduce the indiscriminate demand for aortic tomography angiography in patients with no real need, avoiding exposure to iodinated contrast and radiation, as well as preventing patients with a real probability of AAD from being discharge without proper diagnosis and treatment. In the Brazilian reality, this is feasible only in a few centers with D-dimer and tomography angiography facilities in the emergency unit. There is even a potential cost reduction associated with reduced demand for tomography angiography without precise indication or solely motivated by subjective clinical suspicion.

Authors' contributions

Data analysis and interpretation: Soeiro AM; Manuscript drafting: Soeiro AM; Critical revision of the manuscript for important intellectual content: Soeiro AM.

Potential Conflicts of Interest

There are no relevant conflicts of interest.

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Table 1 – Aortic dissection detection risk score (Adapted from Erbel R et al.[7])

Personal history:
Marfan's syndrome
Family history of aorta disease
History of aortic valve disease
History of thoracic aortic aneurysm
Previous manipulation of thoracic aorta
Clinical presentation:
Abdominal, thoracic or back pain described as: abrupt onset; maximum intensity and/or; ripping pain.
Signs of poor perfusion:
Pulse asymmetry
Systolic blood pressure asymmetry
Neurological deficit
Diastolic aortic murmur
Shock or hypotension
Each finding described above = 1 point

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