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D-dimers in the diagnosis of pulmonary embolism

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Keywords

D-dimers, latex agglutination, pulmonary angiography, pulmonary embolism

Comments

This is a well performed study that adds further evidence to support the routine use of D-dimer determination by LA to exclude the diagnosis of PE. However given the low specificity of the test, many patients will still require imaging to exclude the diagnosis of PE in the presence of a positive D-dimer test.

Introduction

Increasing evidence has been accumulating to support the use of D-dimer testing to exclude thromboembolic events. D-dimers are a degradation product of cross linked fibrin, whose level becomes elevated following clot formation. A low or normal level excludes the presence of a significant thrombus. A high level is, however, not specific, being present in a wide variety of conditions. Studies to date have shown a high negative predictive value (NPV ; 67-97%) for this test in patients with deep vein thrombosis (DVT) and pulmonary embolism (PE).D-dimers can be measured either by an ELISA technique or latex agglutination assay (LA). The former is a lengthy test which cannot easily be performed on demand, whereas the latter is straightforward. However, previous studies using the LA method have shown very variable results. The reason for this may be that not all patients underwent pulmonary angiography, the gold standard in PE diagnosis, thus relying on less accurate methods such as ventilation/perfusion scanning, leading to a significant number of misdiagnoses.

Aims

To determine the NPV of the five commercially available D-dimer, LA kits, in excluding the diagnosis of PE.

Methods

A total of 103 consecutive patients, who were undergoing pulmonary angiography for suspected acute PE, had a blood sample taken (within 24 h) for D-dimer estimation.

D-dimer levels were estimated (simultaneously) using all five commercially available LA kits and a quantitative ELISA method. One experienced technician performed all the tests, and was blinded to the puulmonary angiography result.

Results

Of the 103 patients 35 (34%) had PEs detected by pulmonary angiography. Of these, all bar one had a positive D-dimer test by all methods. The patient who had a negative result to all five LA kits was positive on the ELISA test. This sample was obtained very soon after the onset of symptoms, but when repeated 24 h later, all tests were positive. Overall, the sensitivity of the five LA assays was 97-100%, with a specificity of only 19-29%. Of the 68 patients with negative pulmonary angiograms, only 13 were negative to all LA tests.

Discussion

The results confirm that D-dimer determination by LA is a useful test to exclude the diagnosis of PE. The better results obtained in this study, in comparison to previous studies may reflect the use of pulmonary angiography in all patients. In addition, the simultaneous running of all five tests and an ELISA determination, performed by a senior technician, may have been a factor.The timing of this test is important. No one has established the time taken from thrombus formation to an elevated D-dimer level, but it would appear that a false negative test can occur if the test is performed immediately after onset of symptoms. The high level seems to persist for 7 to 12 days.

References

1. Quinn D, Fogel R, Smith C, Laposata M, Thompson B T, Johnson S, Waltman A, Hales C: D-dimers in the diagnosis of pulmonary embolism. Am J Respir Crit Care Med. 1999, 159: 1445-1449.