

Does a negative D-dimer test rule out aortic dissection?

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Background

Early and accurate diagnosis is crucial for the management of patients with acute aortic dissection (AD). Recent studies [1-6] claimed that the D-dimer test may be a valuable addition to the diagnostic work-up in patients with suspicion of the disease.

Methods

The objective was to assess the value of the D-dimer test to rule out AD (sensitivity) using a generally accepted cut-off value of <500 mg/l. We performed a retrospective analysis of all patients with AD at the University Hospital in Basel between January 2000 and October 2005, who had a D-dimer immunoassay (LiaTest[®]) available [11]. Diagnosis was confirmed by TEE, angiography, CT-scanning or histopathological findings.

The sensitivity of the D-dimer test was calculated and a potential association of time from symptom onset until collection of the D-dimer blood sample was assessed.

Results

Twenty-five cases with confirmed AD and a D-dimer test were identified. The baseline characteristics are shown in table 1. Twenty-two patients had a true-positive and three patients had a false-negative D-dimer

test result (cut-off <500 mg/l), resulting in a sensitivity of 88.0% (70.0% to 95.8%). There was no association between the level of the D-dimer reading and time of symptom onset or the extent of dissection (figure 1).

We observed no particular characteristics in the three patients with a negative D-dimer test concerning age, gender, extent of dissection, outcome or histological features compared to the remaining cases.

Discussion

In contrast to earlier studies reporting an excellent sensitivity of the D-dimer test in patients with AD (table 2), we found a substantial number of false negative test readings in our retrospective case-series. Twelve percent false-negative test readings using a <500 mg/l cut-off puts the usefulness of the D-dimer test to rule out AD in question. Until the results of large studies including consecutive series of patients with suspicion of AD and a rationale for an optimal cut-off value become available, we believe that D-dimer tests are not safe enough to rule out AD.

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References

- Weber T, Hogler S, Auer J, et al. D-dimer in acute aortic dissection. *Chest*. 2003;123:1375-8.
- Perez A, Abbet P, Drescher MJ. D-dimers in the emergency department evaluation of aortic dissection. *Acad Emerg Med*. 2004;11:397-400.
- Eggebrecht H, Naber CK, Bruch C, et al. Value of plasma fibrin D-dimers for detection of acute aortic dissection. *J Am Coll Cardiol*. 2004;44:804-9.
- Akutsu K, Sato N, Yamamoto T, et al. A rapid bedside D-dimer assay (cardiac D-dimer) for screening of clinically suspected acute aortic dissection. *Circ J*. 2005;69:397-403.
- Hazui H, Fukumoto H, Negoro N, et al. Simple and useful tests for discriminating between acute aortic dissection of the ascending aorta and acute myocardial infarction in the emergency setting. *Circ J*. 2005;69:677-82.

6 Ohlmann P, Faure A, Morel O, et al. Diagnostic and prognostic value of circulating D-Dimers in patients with acute aortic dissection. *Crit Care Med*. 2006;34(5):1358-64.

Figure 1

Scatter plot with locally weighted regression line of time from symptom onset and level of D-dimer reading.

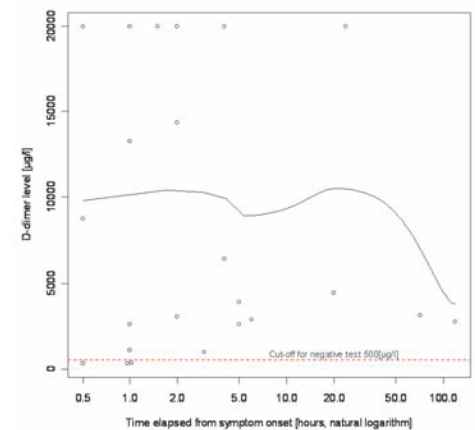


Table 1

Baseline characteristics of 25 patients with AD.

Sex (male/female)	22/3 (88/12%)
Age (yr)	62.7 (±15.4)
Arterial Hypertension	18 (72%)
Smoking	11 (44%)
Diabetes mellitus	4 (16%)
Hypercholesterolaemia	7 (28%)
Marfan's Syndrome	2 (8%)
Stanford type of dissection (A/B)	20/5 (80/20%)
Deaths (in-hospital)	8 (32%)
Cardiac tamponade	6 (24%)
D-dimer level (median)	4420 µg/l (300-20000)
Median time from symptom onset	2 hours (0.5-120h)

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Table 2

Recent studies evaluating D-dimers in AD.

Study	Number of patients	D-dimer neg.	Sensitivity	Cut-off (µg/l)	Mean (µg/l)	D-dimer assay	Mortality	Design
Weber et al. 2003 (1)	24	0	100%	500	9400 (630-54700)	Tina-quant assay (Roche)	42%	pro- and retrospective
Perez et al. 2004 (2)	7	0	100%	500	n.a.	Semiquantitative latex agglutination assay	n.a.	retrospective case series
Eggebrecht et al. 2004 (3)	16	0	100%	500	2238 (632-6,419)	Quantitative assay D-Dimer Plus, (Dade Behring)	50%	pro- and retrospective
Hazui et al. 2005 (4) (Roche)	29	2	93%	800	n.a.	Latex agglutination,	n.a.	pro- and retrospective
Akutsu et al. 2005 (5)	30	0	100%	500	1800 (<100->4000)	Rapid bedside assay Cardiac reader (Roche)	13%	prospective case control
Ohlman et al. 2006 (6)	94	1	99%	400	8610 (<300->20000)	Immunoassay (Sta-Lia Test)	23%	retrospective case series
Wiegand et al. 2007	25	3	88%	500	4420 (<300->20000)	Immunoassay (LiaTest [®])	32%	retrospective case series