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Magnitude of Soluble ST2 as a Novel Biomarker for Acute Aortic Dissection

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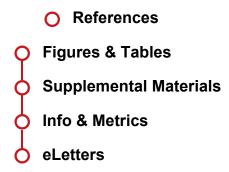
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Article Figures & Tables Supplemental Materials Info & Metrics eLetters

Jump to

Article
Abstract
Introduction
Methods
Results
Discussion
Sources of Funding
Disclosures
Footnotes



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Abstract

Background: Misdiagnosis of acute aortic dissection (AAD) can lead to significant morbidity and death. Soluble ST2 (sST2) is a cardiovascular injury–related biomarker. The extent to which sST2 is elevated in AAD and whether sST2 can discriminate AAD from other causes of sudden-onset severe chest pain are unknown.

Methods: We measured plasma concentrations of sST2 (R&D Systems assay) in 1360 patients, including 1027 participants in the retrospective discovery set and 333 patients with initial suspicion of AAD enrolled in the prospective validation cohort. Measures of discrimination for differentiating AAD from other causes of chest pain were calculated.

Results: In the acute phase, sST2 levels were higher in patients with AAD than those with either acute myocardial infarction in the first case-control discovery set within 24 hours of symptom onset or with patients with pulmonary embolism in the second discovery set (medians of 129.2 ng/mL versus 14.7 with *P*<0.001 for AAD versus acute myocardial infarction and 88.6 versus 9.3 with *P*<0.001 for AAD versus pulmonary embolism). In the prospective validation set, sST2 was most elevated in patients with AAD (median [25th, 75th percentile]: 76.4 [49.6, 130.3]) and modestly elevated in acute myocardial infarction (25.0 [15.5, 37.2]), pulmonary embolism (14.9 [10.2, 30.1]), and angina patients (21.5 [13.1, 27.6], all *P*<0.001 versus AAD). The area under receiver operating characteristic curve for patients with AAD versus all control patients within 24 hours of presenting at the emergency department was 0.97 (0.95, 0.98) for sST2, 0.91 (0.88, 0.94) for D-dimer, and 0.50 (0.44, 0.56) for cardiac troponin I, respectively. At a cutoff level of 34.6 ng/mL, sST2 had a sensitivity of 99.1%, specificity of 84.9%, positive predictive value of 68.7%, negative predictive value of 99.7%, positive likelihood ratio of 6.6, and negative likelihood ratio of 0.01.

Conclusions: Among patients with suspected aortic dissection in the emergency department, sST2 showed superior overall diagnostic performance to D-dimer or cardiac troponin I. Additional study is needed to determine whether sST2 might be a useful rule-out marker for AAD in the emergency room.

acute myocardial infarction aortic dissection diagnosis pulmonary embolism soluble ST2

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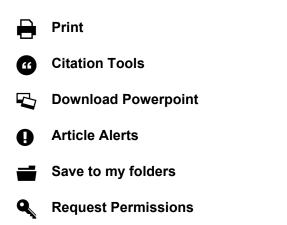
Circulation January 16, 2018, Volume 137, Issue 3

≔ Table of Contents

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