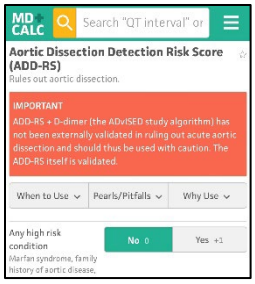
Calculated Decisions
POWERED BY MD+CALC
Clinical Decision Support for *Emergency Medicine Practice* Subscribers



Aortic Dissection Detection Risk Score (ADD-RS)

The ADD-RS rules out aortic dissection.

Calculator Review Author

Seth Crockford, MD
Department of Emergency Medicine, Mount Auburn Hospital, Cambridge, MA

About the Score

The Aortic Dissection Detection Risk Score (ADD-RS) should be used for low- to moderate-risk patients for whom acute aortic syndromes (AAS) are in the differential diagnosis. This tool, used in combination with a D-dimer test, has been proposed and internally validated as a diagnostic algorithm. There are significant caveats to the tool, including the following:

- The algorithm has not been externally validated.
- Half of the patients included in the original study did not have definitive imaging, and the study limitation of 14 days of follow-up raises the possibility of missed cases.
- The American College of Emergency Physicians' 2014 Clinical Policy on thoracic aortic dissection advises against using D-dimer alone to rule out AAS, though this recommendation is based on Level C evidence.
- ADD-RS and D-dimer are not meant to diagnose AAS, but rather to provide guidance in in risk stratifying patients for imaging.

The ADD-RS may reduce misdiagnosis and overtesting for AAS, thereby avoiding unnecessary radiation exposure and the cost associated with definitive imaging. Consider using this risk stratification algorithm in patients who are at low risk for aortic dissection but for whom the diagnosis cannot be ruled out. The ADD-RS has a scoring range of 0 to 3; patients can be given just 1 point for each category (predisposing conditions, pain features, and exam findings). Thus, the score does not account for a patient who meets multiple criteria within a category. Patients meeting multiple criteria in a given category may not be appropriate candidates for the algorithm.

Evidence Appraisal

In 2010, the American Heart Association and the American College of Cardiology released guidelines for the diagnosis and management of AAS, including a set of 12 clinical markers of the disease. Rogers et al (2011) used retrospective data from the International Registry of Acute Aortic Dissection to validate the

 ©2021 EB MEDICINE

sensitivity of these markers. Among 2538 patients with acute aortic dissection, 2430 patients (95.7%) were identified by 1 or more of the 12 proposed clinical risk markers.

The International Registry of Acute Aortic Dissection investigators (Suzuki 2009) also performed a prospective multicenter study of 220 patients with initial suspicion for acute aortic dissection. Eighty-seven of those patients were ultimately diagnosed with acute aortic dissection. The widely used D-dimer cutoff of <500 ng/mL showed promise for ruling out AAS, with a negative likelihood ratio of 0.07 through the first 24 hours and a sensitivity of 96.6%.

The authors of the ADvISED trial (Nazerian 2018) designed and tested the ADD-RS/D-dimer novel clinical pathway for ruling out acute aortic dissection, combining clinical risk stratification with D-dimer as a serum biomarker. This multicenter prospective observational trial enrolled 1850 consecutive chest pain patients, 241 (13%) of whom were diagnosed with AAS. An ADD-RS score of ≤1 and a negative D-dimer result demonstrated a sensitivity of 98.8%, a negative predictive value of 99.7%, and a negative likelihood ratio of 0.02. The shortcomings of this study included the following:

- Patients could receive only 1 point per category (eg, a patient with a new aortic insufficiency murmur, a focal neuro deficit, and no other high risk features would still be given just 1 point).
- The criteria for entry into the study were determined by the clinician.
- As with all of the studies described here, the prevalence of AAS found in this study was considerably higher than in previous studies. It is unclear how AAD-RS and D-dimer will perform in lower-risk groups.

Use the Calculator Now

https://www.mdcalc.com/aortic-dissection-detection-risk-score-add-rs

Calculator Creator

Peiman Nazerian, MD
Read more about Dr. Nazerian

References

Original/Primary Reference

- Rogers AM, Hermann LK, Booher AM, et al. Sensitivity of the aortic dissection detection risk score, a novel guideline-based tool for identification of acute aortic dissection at initial presentation: results from the International Registry of Acute Aortic Dissection. *Circulation*. 2011;123(20):2213-2218. **DOI: 10.1161/CIRCULATIONAHA.110.988568**
- Nazerian P, Mueller C, Soeiro AM, et al. Diagnostic accuracy of the aortic dissection detection risk score plus D-dimer for acute aortic syndromes: the ADvISED Prospective Multicenter Study. *Circulation*. 2018;137(3):250-258**. DOI: 10.1161/CIRCULATIONAHA.117.029457**

Additional References

- Suzuki T, Distante A, Zizza A, et al. Diagnosis of acute aortic dissection by D-dimer: the International Registry of Acute Aortic Dissection Substudy on Biomarkers (IRAD-Bio) experience. *Circulation*. 2009;119(20):2702-2707. **DOI: 10.1161/CIRCULATIONAHA.108.833004**
- Hiratzka LF, Bakris GL, Beckman JA, et al. 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM guidelines for the diagnosis and management of patients with thoracic aortic disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, American Association for Thoracic Surgery, American College of Radiology, American Stroke Association, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society of Interventional Radiology, Society of Thoracic Surgeons, and Society for Vascular Medicine. *Circulation*. 2010;121(13):e266-e369. **DOI: 10.1161/CIR.0b013e3181d4739e**

 ©2021 EB MEDICINE

- Diercks DB, Promes SB, Schuur JD, et al. Clinical policy: critical issues in the evaluation and management of adult patients with suspected acute nontraumatic thoracic aortic dissection. *Ann Emerg Med*. 2015;65(1):32-42. **DOI: 10.1016/j.annemergmed.2014.11.002**

This edition of *Calculated Decisions*, powered by MDCalc, is published as a supplement to *Emergency Medicine Practice* as an exclusive benefit to subscribers. *Calculated Decisions* is the result of a collaboration between EB Medicine, publisher of *Emergency Medicine Practice*, and MD Aware, developer of MDCalc. Both companies are dedicated to providing evidence-based clinical decision-making support for emergency medicine clinicians.

Emergency Medicine Practice (ISSN Print: 1524-1971, ISSN Online: 1559-3908, ACID-FREE) is published monthly (12 times per year) by EB Medicine (3475 Holcomb Bridge Rd, Suite 100, Peachtree Corners, GA 30092).Opinions expressed are not necessarily those of this publication. Mention of products or services does not constitute endorsement. This publication is intended as a general guide and is intended to supplement, rather than substitute, professional judgment. It covers a highly technical and complex subject and should not be used for making specific medical decisions. The materials contained herein are not intended to establish policy, procedure, or standard of care.

Copyright © 2021 EB Medicine. All rights reserved. No part of this publication may be reproduced in any format without written consent of EB Medicine. This publication is intended for the use of the individual subscriber only and may not be copied in whole or part or redistributed in any way without the publisher's prior written permission.