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### Title

Real-World Validation of a Deep Learning AI-Based Detection Algorithm for Suspected Aortic Dissection

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Peer reviewed

# Real-world validation of a deep learning AI-based detection algorithm for suspected aortic dissection

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# Clinical significance

- Aortic dissection is associated with high rates of morbidity and mortality
  - Mortality rate of 1-2% per hour during first 48 hours
- Early diagnosis and prompt intervention greatly improve patient outcomes
- FDA 510k-approved software application **expedites detection, triage, and ultimately treatment** of patients with suspected aortic dissection
  - Viz Aortic Dissection algorithm, in collaboration with Avicenna.ai
- Objective to evaluate performance of AI algorithm across diverse clinical settings

### Healthcare Data



Viz ingests CT scans from worklist in emergency department

### A.I. Analysis



Cloud based AI algorithms automatically detect, measure and predict disease, highlighting positive findings

### Trigger Action



Application notifies all appropriate healthcare providers of findings, thereby expediting clinical care coordination and mobilizing healthcare providers

### Enable Therapy



Prompt, coordinated medical intervention and improved patient health outcomes

# AI-based detection algorithm can expedite patient care



# Study methods

- Large-scale, blinded algorithm validation study
- 1303 retrospectively collected chest and thoraco-abdominal CT angiography images
- Diverse representation of hospitals in 200+ U.S. cities
- Ground-truth consensus diagnosis determined by three board-certified radiologists

AAA



AI-Powered Type B Dissection



AI-Powered Type A Dissection



TAA



Rupture



## Study results

- 1166 (89.5%) dissection-negative exams, 137 (10.5%) dissection-positive exams
- Sensitivity: 94.2%
  - [95% CI: 88.8% - 97.5%]
- Specificity: 97.3%
  - [95% CI: 96.2% - 98.1%]
- PPV of 80.1%, NPV of 99.3%
- 8 false negatives, largely complex cases
- 32 false positives, largely result of imaging quality



# Clinical takeaways

- Real-world validation of a deep learning AI-based detection algorithm for suspected aortic dissection
- Allows for rapid patient triage → earlier diagnoses → accelerated care coordination → timely initiation of life-saving interventions → better patient outcomes



## Citations

- Gawinecka J, Schönrrath F, von Eckardstein A. Acute aortic dissection: pathogenesis, risk factors and diagnosis. *Swiss Med Wkly*. 2017 Aug 25;147:w14489. doi: 10.4414/smw.2017.14489. PMID: 28871571.
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