

A sinister needle in an enormous haystack: A clinician survey regarding Acute Aortic Syndrome diagnostic practice in United Kingdom Emergency Departments

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Abstract

Acute Aortic Syndrome (AAS) is a life-threatening condition associated with high diagnostic uncertainty. This results in an unacceptable number of missed cases, which contributes to its high mortality. We designed and distributed a survey to Emergency Departments (EDs) across the United Kingdom to establish the standard practice for investigation and diagnosis of AAS across the UK. 56 EDs across the UK responded. The majority of these did not have a formal work-up pathway for AAS. The estimated CT scanning rates and missed cases of AAS were highly variable between departments. This suggests variation in practice and diagnostic uncertainty. Given its time sensitive nature, the need for a more standardised diagnostic pathway for AAS in EDs is evident. This may aid clinicians rule out AAS more safely and reduce the number of missed cases, which would in turn reduce the high morbidity and mortality associated with AAS.

Introduction

Acute Aortic Syndrome (AAS) is a life-threatening condition plagued with diagnostic uncertainty.¹ It constitutes Acute Aortic Dissection (AAD), intramural haematoma and penetrating aortic ulcer.^{2,3} The European Society of Cardiology definition also adds in aortic rupture and ruptured abdominal aortic aneurysms as part of the full scope of AAS.³ AAS accounts for 1 in 980 atraumatic chest pain attendances to the Emergency Department (ED).⁴ Up to 38% cases are missed during first ED presentation, and up to 25% are not diagnosed until 24 hours after ED presentation.⁵ This is concerning, considering mortality rises by up to 2% per hour delay in diagnosis.^{2,5} Lack of key clinical features and investigations suggesting other diagnoses are some of the reasons that AAS is missed.^{1,6} The Aortic Dissection Detection Risk Score (ADD-RS)⁷ and the Canadian Clinical Practice Guideline (CCPG)⁸ are two of the decision-making tools available to clinicians which can aid progression to the definitive investigation (Computed Tomography Angiography; CTA). D-Dimer has also been shown to be potentially discriminatory.⁸

Survey

We reached out to 177 Type 1 EDs (which provide a 24-hour consultant-led service with full resuscitation facilities) across the

United Kingdom (UK) to determine standard practice for investigation and diagnosis of AAS. A survey was designed and sent out to lead ED consultants across the UK using an existing WhatsApp group, asking for a response on behalf of their ED. After a reminder and following a two-week window, the survey was opened to other ED clinicians via Twitter for a further 2 weeks, asking for a response on behalf of their ED. Responses were collated and analysed and duplicate responses excluded.

Results

Sixty-eight responses were received. Of these, 11 were excluded due to site duplication (the first chronological response was used) and one did not state the ED site. This left 56 responses representative of 56 EDs across the UK with all four UK nations represented. Of the responding EDs, 12 (21%) managed type A AADs on site while 44 (79%) did not. 30 (54%) managed type B AADs on site while 26 (46%) did not. Only 7 (12%) responding EDs had a formal AAS work-up pathway and 49 (88%) did not (Figure 1). One ED (2%) routinely used CCPG, 10 (18%) used the ADD-RS score, and 45 (80%) did not use any decision-making tools as standard practice (Figure 2). Most EDs (31; 55%) do not use D-dimer to aid decision making for AAS. 10 (18%) use D-dimer as part of

a clinical decision-making tool and 15 (27%) use D-dimer outwith a clinical decision-making tool. Median estimated scanning rate for AAS was 1.7 (range 0.1-6.9; n=29) per 1000 ED attendances. A median 5% of CT scans performed for AAS were positive for AAS (IQR 1-7%; n=27) with 95% being normal or showing other findings. Only 4 EDs were able to provide data on known missed cases. These varied from 0, 2 and 3-5 missed cases in the last 10 years to 3 missed cases in the last year.

Conclusions

This survey has demonstrated variation in approach to this diagnostic challenge across UK EDs, with indication that no diagnostic algorithm has been widely adopted into practice. Only 1 in 8 EDs have a formal pathway to work-up a potential diagnosis of AAS and only 1 in 5 EDs use a clinical decision-making tool to help guide investigation. D-dimer is considered to have an important (yet unstandardised) role. Estimates of scan rates and missed cases show a large range suggesting diagnostic uncertainty and variable clinical practice. In such a time-critical condition, the need for standardised practice is clear. This could allow risk stratification of presentations to ED with common symptoms such as chest, abdominal or back pain, aiding clinicians to decide how far to investigate for AAS and also when it is safe to rule it out. This may help reduce the number of missed cases and improve morbidity and mortality due to AAS.

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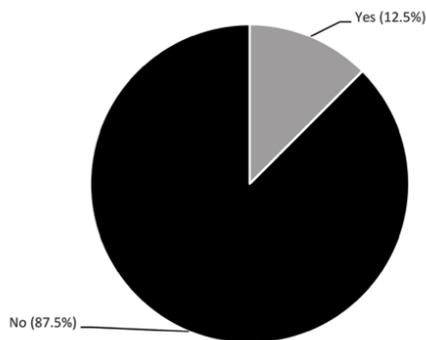


Figure 1. Response chart: Does your emergency department have a formal pathway for work-up of potential acute aortic syndrome?

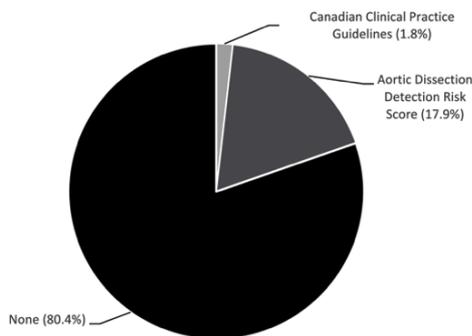


Figure 2. Response chart: Does your department routinely use any of these decision-making tools in your consideration of investigations for acute aortic syndrome?