

Background:

Cardiac risk factors including hyperlipidaemia, hypertension, diabetes mellitus, tobacco smoking and family history are known to be contributing factors to developing coronary artery disease (CAD).

Past evidence suggests that risk factors do not affect the probability of an acute myocardial infarction (AMI) in the Emergency Department (ED) population with suspected cardiac chest pain (Body *et al.* 2007<sup>[1]</sup>).

However, common decision aids including the HEART score<sup>[2]</sup> and Thrombolysis in Myocardial Infarction (TIMI)<sup>[3]</sup> risk score still use the presence of at least three risk factors to assign greater risk to patients.

Aim:

To determine the diagnostic value of cardiac risk factors in patients presenting to the ED with suspected acute coronary syndromes using data from a large, contemporary, multi-centre study.

Study Design:

A sub-study of the Bedside Evaluation of Sensitive Troponin (BEST) study, a prospective diagnostic test accuracy study conducted across 14 hospitals in England. Ethical approval from Health Research Authority (14/NW/1344).Written consent obtained from all participants. BEST was funded by Research grants from EU-H2020, Abbott Point of Care & RCEM.

Methods :

Clinicians were blinded to patient outcomes. Routine data from patient’s health records was recorded.

Participant recruitment

- patients presenting to ED
- symptoms suspicious of acute coronary syndrome

The presence or absence of risk factors was recorded at time of recruitment and initial presentation :

- Hypertension
- diabetes mellitus
- All participants underwent cardiac troponin testing on arrival and 3-12 hours later.
- The reference standard for AMI was serial cardiac troponin (cTn) testing over 3-6hr dependent on assay used.
- The **primary outcome** was a diagnosis of AMI, adjudicated by two independent investigators in accordance with the 3<sup>rd</sup> universal definition, without referring to cardiac risk factors.

Data & Demographics :

Table 1: Demographics	
Total participants	1613
Males	62%
Mean Age	56 years
Patients excluded (missing data)	217 (13.5%)
Patients with AMI	178 (14.3%)

Table 2: Prevalence of AMI in each risk factor group	
No of risk factors	Prevalence of AMI in each risk factor group
0	9.8%
1	12.2%
2	17.1 %
3	15.4%
4-5	23.1 %

Results :

The results show that the **prevalence of AMI in the absence of the said risk factors was 9.8%. While in presence of >4 risk factor, prevalence was 23.1%.** The test characteristics showed that the absence of risk factors had sensitivity of 84.27% (CI 78.07%-89.29%) and specificity of 23.95%(CI 21.43%-26.62%).

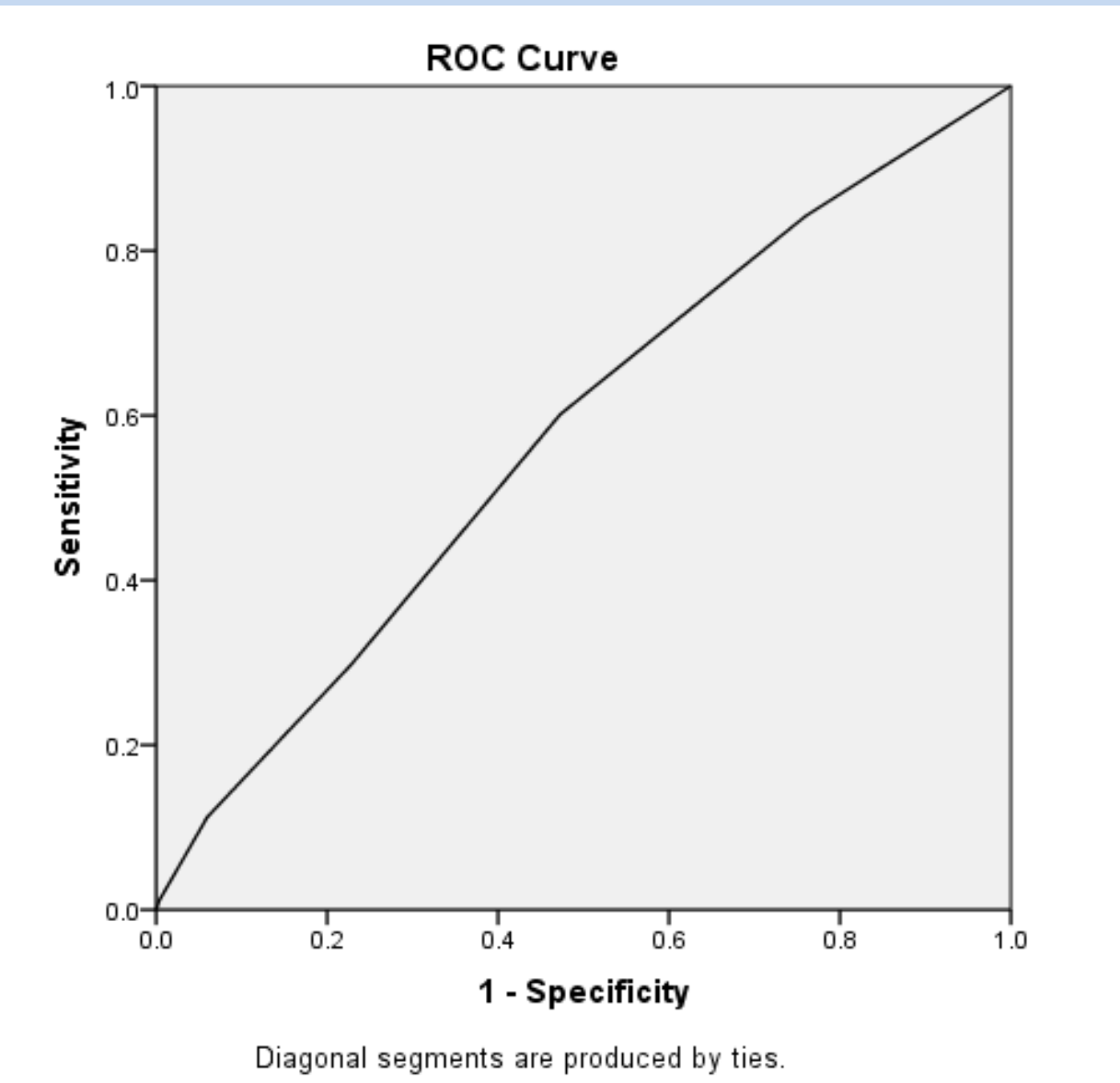


Fig 1: Association between the true positive vs false negative

The area under the receiver operating characteristic (ROC) curve (AUC) as seen in Fig. 1 was **0.58**. Therefore there is **no statistically significant correlation between cardiac risk factors and prevalence of AMI.**

Conclusion & perspectives :

Our findings show that cardiac risk factors influence the probability of AMI very little in the ED population. An AUC of 0.58 shows that cardiac risk factors have little value as a diagnostic test in this regard. Clinical tools and clinicians need to be wary in using cardiac risk factors to predict AMI in the acute care setting. This could be attributed to unknown risk factors increasing the risk most for AMI. Future research should focus on more consistent and accurate indicators of AMI in ED.

References:

1. Body R, McDowell G, Carley S, Mackway-Jones K. Do risk factors for chronic coronary heart disease help diagnose acute myocardial infarction in the Emergency Department?. Resuscitation. 2008;79(1):41-45.  
2. Six A, Backus B, Kelder J. Chest pain in the emergency room: value of the HEART score. Netherlands Heart Journal. 2008;16(6):191-196.  
3. Conway Morris A. TIMI risk score accurately risk stratifies patients with undifferentiated chest pain presenting to an emergency department. Heart. 2006;92(9):1333-1334.