Prognosis of patients with abnormal ECGs in a Tanzanian Emergency Department

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BACKGROUND

Kilimanjaro Christian Medical Centre (KCMC) in Moshi, Tanzania

- Burden of cardiovascular disease (CVD) in Sub-Saharan Africa (SSA) is rising rapidly

- Chest pain and shortness of breath are two of the most common reasons for ED visits in both high and low-income settings

- Existing international guidelines for the management of patients with chest pain and shortness of breath are of limited utility in low-resource settings

- Limited access to diagnostic tests for patients in SSA

- Electrocardiograms (ECGs) may play an outsize role in medical decision-making and risk stratification in low-resource settings

OBJECTIVE

- To determine the association between non-specific ECG findings (T-wave inversions, Q waves, ST depressions, bundle branch blocks, resting tachycardia, non-sinus rhythm) and 30-day mortality among Tanzanian ED patients with chest pain or shortness of breath

METHODOLOGY

- Data was collected from two surveillance studies in the ED at Kilimanjaro Christian Medical Centre (KCMC) in Moshi, Tanzania

- Patients ≥ 18 years old with chest pain or shortness of breath as the primary or secondary complaint were enrolled

- ECG was obtained at time of enrollment

- 30-day follow up was conducted via telephone or home visit to assess mortality

- ECGs were interpreted by two physician adjudicators, with a third resolving any disagreements

Table 1. Study definitions of ECG findings

Guideline or Criteria	ECG Finding	Definition
Fourth Universal Definition of Myocardial Infarction	T-wave inversion	≥ 1 mm of inversion of the T wave in ≥ 2 contiguous leads
	Q wave	Presence of pathologic Q waves in ≥ 2 contiguous leads
	ST depression	≥ 0.5 mm of horizontal or down-sloping ST-depression in ≥ 2 contiguous leads
Sokolow Lyon Criteria	LVH	The sum of the S wave in V_1 and the R wave in V_5 or V_6 is > 35 mm
Minnesota Code Manual for Electrographic Findings	Bundle branch block	- <u>Complete Left BBB:</u> QRS duration ≥ 0.12 seconds in a majority of beats in any leads I, II, III, aVL, aVF, and R peak duration ≥ 0.06 seconds in a majority of beats of the same QRS pattern in any of leads I, II, aVL, V5, V6 - <u>Complete Right BBB:</u> QRS duration ≥ 0.12 seconds in a majority of beats in any leads I, II, III, aVL, aVF, and R' > R in V1 or V2; or QRS mainly upright, with peak duration ≥ 0.06 seconds in V1 or V2; or S duration > R duration in all beats in lead I or II
ECG Machine	Resting tachycardia	Ventricular rate ≥ 100 beats per minute, as automatically calculated by the ECG machine
Adjudicator	Non-sinus rhythm	Adjudicator discretion

INITIAL RESULTS

- 1249 patients enrolled
- Patient demographics and characteristics:

  1) 675 (54.0%) female
  2) Median age: 61 (IQR 47 - 75) years
  3) Median BMI: 24.3 (IQR 21.3 - 28.0) kg/m^2

- 265 (21.4%) of patients presenting to the KCMC ED with chest pain or shortness of breath died within 30 days of enrollment

NEXT STEPS

- Finish summary statistics of patient characteristics and demographics

- Create 2 x 2 contingency tables showing the proportion of participants with each ECG finding and calculate the odds ratio with 95% confidence intervals

- Conduct a Pearson's chi-squared test to assess the association of 30-day mortality and each ECG finding

Members of the research team at KCMC in Moshi, Tanzania