Pre-Hospital identification of STEMI

An evaluation of independent ECG interpretation by trained paramedics

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Background

Accurate pre-hospital interpretation of 12 lead ECGs is essential to ensure timely reperfusion therapy for patients with STEMI.

Study Objective

To determine the agreement and accuracy of paramedics independently interpreting ECGs for STEMI, compared to independent reports from propriatary software, and expert physician readings as the gold standard.

Methods

- In an urban center, 1266 consecutive ambulance call reports (ACRs) from June 2007 to February 2008, were reviewed for patients with symptoms consistent with cardiac ischemia.
- 350 Primary Care (BLS) and Advanced Care (ALS) STEMI trained paramedics participated in data gathering.
- Paramedics were blinded to ECG interpretations by software.
- A panel of physicians independently reviewed each ECG, blinded to the paramedic and software interpretations.
- Software interpretation was considered positive if the phrase "acute AMI" was on the report.
- Paramedic decision was considered positive if bypass destination was Cath Lab Facility, and / or if STEMI positive was documented. All other cases were considered negative.
- Paramedic and physician interpretation for STEMI positive or STEMI negative was consistent with standardized STEMI criteria.

Inclusion and Exclusion Criteria

Inclusion Criteria (N=560)

Presenting problem is consistent with myocardial ischemia (ACR documentation)

and
12-lead ECG recording

and / or
ASA administration

and / or
Nitro administration

Exclusion Criteria (N=706)

- Interfacility transfers (n=81)
- Incomplete or missing data (n=401)
- Patient's symptoms inconsistent with myocardial ischemia (n=224)

Results

Study Population

Total number of cases:	560
Mean Age:	67 years
Male gender:	54%
STEMI identified on ECG:	13%
PCP crew:	33%
ACP crew:	67%
Kappa value:	0.72

Accuracy of Paramedic Interpretations vs Physician

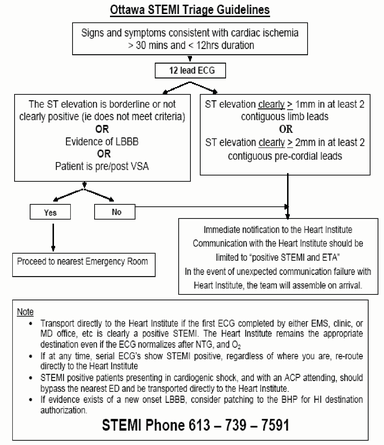
	STEMI + ve (Physician)	STEMI - ve (Physician)
STEMI + ve (Paramedic)	61	12
STEMI - ve (Paramedic)	13	474

Sensitivity	82%
Specificity	98%
Pos PV	84%
Neg PV	97%

Accuracy of Software Interpretations vs Physician

	STEMI + ve (Physician)	STEMI - ve (Physician)
STEMI + ve (Software)	58	14
STEMI - ve (Software)	16	472

Sensitivity	78%
Specificity	97%
Pos PV	81%
Neg PV	97%



Limitations

- Retrospective observational study.
- Hospital outcomes not retrieved.
- Results from this mature STEMI re-direct system may not be transferrable.
- Lost/missing/inaccessible data

Discussion

- Paramedics and software showed very good agreement with each other for identifying STEMI in the field.

- Both showed good sensitivity and specificity with the gold standard (physician agreement) for STEMI.
- A combination of the ECG software (78.4%) with the paramedic interpretation (82.4%) improves the sensitivity (90.5%).

Conclusion

Independent pre-hospital interpretation by trained paramedics or ECG software, separately or combined, can consistently identify acute STEMI patients.

This study challenges the need for ECG transmission for physician consultation.

References

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