Risk Scoring in Cardiac Chest Pain: A Prospective Cohort Evaluation in Emergency Patients

Peter Reaney, Hamish Elliott
Jamie Cooper

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Chest Pain

- 5-10% of all ED attendances
- Often pain is “cardiac sounding”
- Effective risk stratification required
  - <20% will have suffered an ACS
- Typically low threshold for admission
Risk Stratification

• Clinical Gestalt
• ECG and cardiac biomarkers
• Risk scoring:
  • GRACE Score
    » 8 clinical variables
    » Computerised calculation
    » Score out of 372
  • TIMI Score
    » 7 clinical variables
    » Simple Yes/No answers
    » Easily calculated

• Developed to predict mortality in confirmed ACS
HEART Score

• Undifferentiated patients with cardiac sounding chest pain
  – History
  – ECG
  – Age
  – Risk Factors
  – Troponin
    • Each component 0, 1 or 2 (Total 10)
Aims

1. Compare the ability of GRACE, TIMI and HEART to predict Major Adverse Cardiac Event (MACE) at 30 days.

2. To determine the clinical implications of low and high risk grouped values.
Study Design

• Prospective cohort
  • Included: Chest pain with troponin request
    – Chest pain evaluation form completed
  • Excluded: Significant ST elevation on initial ECG

• Follow up: 30 day MACE
  – Death, MI, coronary revascularisation, cardiogenic shock etc.
    • Hospital and GP Computer Records
    • GP phone call if required
Results

• 823 patients
  – Mean age 62yrs (Range 20-97)
  – Male 58%

• 30 day follow up
  – Completed in 812 patients (98.7%)

• MACE at 30 days
  – 145 patients (17.9%)
Discriminative Capacity of Scores: ROC Curves

HEART
0.86
(0.83-0.90)

TIMI
0.78
(0.73-0.81)

GRACE
0.73
(0.68-0.78)
MACE/No MACE in GRACE Risk Groups

MACE/No MACE in TIMI Risk Groups
MACE/No MACE in HEART Risk Groups

Percentage of risk group

Low
0-3
N=219
(26.6%)

Moderate
4-6
N=449
(54.6%)

High
7-10
N=155
(18.8%)

MACE

No

Yes

99.5% 88.4% 59.4%

0.5% 11.6%
Conclusion

• HEART score outperforms TIMI and GRACE in predicting MACE at 30 days in a UK population.

• HEART identifies a low risk population:
  • Suitable for discharge
  • Greater efficiency of healthcare provision
Any Questions?

Thank You
Conclusion

• HEART score outperforms TIMI and GRACE in predicting MACE at 30 days in a UK population.

• HEART identifies a low risk population:
  • Suitable for discharge
  • Greater efficiency of healthcare provision
823 patients eligible for inclusion

Data collected allowing calculation of risk scores
- Chest pain evaluation forms
- C-Cube
- TRAK-ED

823 patients followed to hospital discharge

141 patients developed a MACE by time of discharge

812 patients followed up at 30 days and included in study population

Data Sources
- SCI Store
- C-Cube

11 patients lost to follow-up (1.3%)
- No SCI Store records
- Unable to contact GP

145 patients had developed a MACE by 30-day follow-up:
- Death (15)
- STEMI (5)
- NSTEMI (131)
- Percutaneous Coronary Intervention (67)
- Coronary Artery Bypass Graft (67)
- Cardiogenic Shock (w/o death) (3)

667 patients did not develop a MACE by 30 days