Prehospital Factors that Predict Emergency Department Discharge in Patients Presenting to EMS with Chest Pain

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Introduction

Chest pain represents 8.4% of calls for EMS. Emergency Medical Service (EMS) clinicians routinely transport patients suffering chest pain to Emergency Departments (ED) who are subsequently discharged directly from the ED. Diverting low-risk chest pain patients to alternative destinations may help to reduce the overcrowding burden on the ED.

Objective

To describe prehospital factors that predict safe ED discharge in patients with cardiac chest pain.

Methods

This retrospective evaluation included all 911 responses with a primary impression of acute coronary syndrome. Data was extracted from the ESO Data Collaborative from 2022. Inclusion criteria included cardiac chest pain and known ED disposition. Exclusion criteria included those under the age of 18, cardiac arrest, pregnancy, and ED disposition of AMA. The outcome of interest was ED discharge. Variables analyzed were demographic factors, vital signs, prehospital EKG interpretation, socioeconomic status, and Social Vulnerability Index (SVI) quartiles. Descriptive statistics and univariable odds ratios were calculated.

Demographic Factors Favoring ED Discharge	When Compared to:
Gender documented as male	Gender documented as female
Race documented as Black, Hispanic, or Other	Race documented as White
Clinical Factors Favoring ED Discharge	**When Compared to:**
Systolic Pressure > 140mmHg	Systolic Pressure of 100 – 140mmHg
Mean Arterial Pressure > 100mmHg	Mean Arterial Pressure of 60 – 100mmHg
Shock Index of 0.5 – 1.0	Shock Index of < 0.5
Clinical Factors Favoring ED Admission	**When Compared to:**
Bradycardia or Tachycardia	Heart Rate of 60 - 100
Diastolic Pressure < 50mmHg	Diastolic Pressure of 50 – 100mm Hg
Systolic Pressure < 100mmHg	Systolic Pressure of 100 – 140mmHg
Blood Glucose < 60mg/dl and > 120mg/dl	Blood Glucose of 60 – 120mg/dl
Shock Index > 1.0	Shock Index of < 0.5
Mean Arterial Pressure < 60 mmHg	Mean Arterial Pressure of 60 – 100mmHg
Prehospital ECG Interpretation favoring ED Admission	**When Compared to:**
Significant ST Deviation, STEMI/Intervention, Nonspecific	Normal

Results

- 103,358 patients were included, 46% admitted, 54% discharged.
- Females had a lower odds of discharge (OR:0.80, 95%CI:0.78-0.82).
- Blacks (OR:1.38, 95%CI:1.34-1.42), Hispanics (OR:1.48, 95%CI:1.41-1.55), and "other" races (OR:1.45, 95%CI:1.23-1.72) had increased odds of discharge than whites.
- There was no difference between SVI quartiles.

- Clinical findings favoring discharge included:
  - systolic pressure (SBP) >140mmHg (OR:1.13, 95%CI:1.10-1.16),
  - Mean Arterial Pressure (MAP) >100mmHg (OR 1.40, 95% 1.36-1.43),
  - shock index (SI) of 0.5-1.0 (OR:1.23, 95%CI:1.19-1.26).

- Clinical findings showing decreased odds of discharge included:
  - bradycardia or tachycardia (<60 or >100) (OR:0.44, 95%CI: 0.42-0.46), (OR:0.74, 95%CI:0.72-0.76), respectively;
  - diastolic hypotension(<50mmHg) (OR:0.36, 95%CI:0.33-0.39),
  - systolic hypotension (<100mmHg) (OR:0.42, 95%CI:0.39-0.44),
  - hypoglycemia (<60mg/dl) (OR:0.41, 95%CI:0.35-0.48), or
  - hyperglycemia(>120mg/dl) (OR:0.60, 95%CI:0.58-0.62),
  - SI greater than 1.0 (OR:0.63, 95%CI:0.60-0.65), and
  - MAP hypotension (<60mmHg) (OR:0.38, 95%CI:0.35-0.43).

- Prehospital ECG interpretation was available on 64,689 patients. All abnormal interpretations had lower odds of discharge; ST changes (OR:0.17, 95%CI:0.11-0.25), STEMI/Intervention (OR:0.32, 95%CI:0.30-0.34), and nonspecific (OR:0.42, 95%CI 0.41-0.44).

Conclusion

More than half of the patients transported by EMS for chest pain were subsequently discharged from the ED. Patient presentation, vital signs, and ECG interpretation provide support for down-triage to alternate destinations. Limitations include the use of retrospective records and the potential for residual confounding factors.

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