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# **Chest Pain and Suspected Acute Coronary Syndrome: A Risk Stratification Guide**

**Lamont Mitchell, DO**

**Attending Physician Emergency Medicine**

**Board Certified Emergency Medicine**

**Board Certified Family Medicine**

# Disclosures

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None to disclose

# Goals

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Identify low risk chest pain cases suspicious for possible acute coronary syndrome

Utilize clinical decision tools to triage low risk chest pain cases

Identify pitfalls in clinical decision making in low risk chest pain cases suspicious for acute coronary syndrome

# What is Acute Coronary Syndrome?

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Spectrum of conditions compatible with acute myocardial ischemia and/or infarction that are usually due to an abrupt reduction in coronary blood flow

# Clinical Features/History

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## TYPICAL (VISCERAL)

- Angina: deep, poorly localized chest and/or arm pain that is reproducibly associated with exertion or emotional stress
- Angina is relieved promptly with rest and/or short acting nitroglycerin
- ACS (NSTEMI/UA): typical or atypical anginal symptoms, but episodes are more severe and prolonged, may occur at rest, or may be precipitated by less exertion than the patient previously experienced
  - Some patients have no chest pain but present solely with dyspnea or with arm, shoulder, back, jaw, neck, epigastric, or ear discomfort

## ATYPICAL

Pleuritic

Middle or lower abdomen

Pain localized by the tip of 1 finger

Reproduced with movement or palpation of the chest wall or arms

Brief, episodic of pain lasting a few seconds or less

Max intensity at onset

Radiates into the lower extremities

# “Typical” Workup to Assess Risk

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## RISK ASSESSMENT

Clinical history

Physical examination

ECG

Troponin

## “TYPICAL” ORDERS

ECG

CXR

CBC

BMP

Troponin

± Lipid Profile (if status unknown)

± Hb A1C (if status unknown)

# What is Your Disposition?

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- Admission
- Observation
- Discharge home



# Risk Assessment

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Predict **M**ajor **A**dverse **C**ardiac **E**vent (**MACE**)

- myocardial infarction (MI)
- percutaneous coronary intervention (PCI)
- coronary artery bypass graft (CABG)
- all-cause death

Designed specifically for short-term risk stratification of patients with possible ACS in the emergency department.

- HEART score

# HEART SCORE

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H history

E ecg

A age

R risk factors

T troponin

# HEART SCORE: When to Use

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18 years old +

Undifferentiated chest pain

Acute coronary syndrome suspected

# HEART SCORE: When to Avoid

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Pediatric cases (less than 18 years old)

Non ST elevation myocardial infarction (NSTEMI)

Acute myocardial infarction (MI/ST elevation MI)

# HEART SCORE: How to Apply

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Build your clinical suspicion (history)

Collect data (ECG, risk factors, troponin)

Determine HEART score

Assess risk for MACE

Determine disposition

### The HEART Score for Chest Pain Patients in the ED

<b>HISTORY</b>	<ul style="list-style-type: none"> <li><input type="radio"/> Slightly suspicious</li> <li><input type="radio"/> Moderately suspicious</li> <li><input type="radio"/> Highly suspicious</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> 0 points</li> <li><input type="radio"/> 1 point</li> <li><input type="radio"/> 2 points</li> </ul>
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ECG: 1 point > No ST deviation but LBBB, LVH, repolarization changes (i.e. digoxin) ; 2 points: ST deviation not due to LBBB, LVH, or digoxin

Risk Factors: DM, current or recent smoker (<3 months), HTN, HLD, Obesity (BMI >30 kg/m<sup>2</sup>), peripheral arterial disease

Positive family history (parent or sibling with CVD before age 65), atherosclerotic disease: Hx MI, PCI/CABG, CVA/TIA

Score 0-3: 2.5% MACE over next 6 weeks ➤ Discharge Home

Score 4-6: 20.3% MACE over next 6 weeks ➤ Admit for Clinical Observation

Score 7-10: 72.7% MACE over next 6 weeks ➤ Early Invasive Strategies

# Disposition

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- Score 0-3: 2.5% MACE over next 6 weeks ⇒ Discharge Home
- Score 4-6: 20.3% MACE over next 6 weeks ⇒ Admit for Clinical Observation ± provocative testing
- Score 7-10: 72.7% MACE over next 6 weeks ⇒ Early Invasive Strategies

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# Disposition Critical Considerations

Risk factors elements

No established relationship with PCP

Abnormal ECG

Negative vs undetectable troponin

Hospital protocols

Observation vs admission

Clinical judgment



Cases



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# Case 1

53 M with PMHx HTN presents to the emergency department complaining of lower mid-sternal chest pain that began yesterday while lifting light crates at work. Patient reports discomfort with exhalation and initially describes it as a tightness sensation, localized, non-radiating. Pain occurred once and lasted a few seconds. Chest pain free upon presentation.

PMHx: HTN (BP 154/82)

PSHx: none

Meds: none

FHx: none

SoChx: never smoker

ECG: normal

Labs: Troponin: negative, Cholesterol 236, LDL 152, glucose 88

CXR: normal

HEART Score = 2 or 3

Disposition

The HEART Score for Chest Pain Patients in the ED		
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# Case 2

69 F with hx CAD s/p PTCA with stent presents to the ED with intermittent exertional chest pains for the past 3 days. Patient states she was walking at regular pace and began to experience bilateral upper chest pain that radiated into her neck and jaw. Patient states the pain subsided when she slowed down her physical exertion. Patient denies any associated dizziness, no associated SOB or nausea. Patient had another episode this morning of the same which prompted her to come to the emergency department.

PMHx: CAD with stent, HTN, HLD, Anxiety Disorder, Cervical Radiculopathy

PSHx: L5-S1 laminectomy

Meds: Aspirin, Plavix, Lipitor, Lisinipril/HCTZ, Xanax

FHx: HTN, HLD, DM2

Soc HX: former 35 pack year smoking history, Social alcohol

ECG: nonspecific ST-T wave abnormality

Troponin: 0.48

HEART score

Disposition

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Meds: Aspirin, Plavix, Lipitor, Lisinipril/HCTZ, Xanax

FHx: HTN, HLD, DM2

Soc HX: former 35 pack year smoking history, Social alcohol

ECG: nonspecific st-t wave abnormality

Troponin: 0.48

HEART score

Disposition

## TIMI Score

Age  $\geq 65$ ? 1 point

$\geq 3$  CAD risk factors (HTN, HLD, DM, +FHx, current smoker?) 1 point

Known CAD? 1 point

Aspirin use in past 7 days? 1 point

Severe angina ( $\geq 2$  episodes in 24 hrs)? 1 point

ECG ST changes  $\geq 0.5$  mm? 1 point

Positive cardiac maker? 1 point

## Case 3

54 year old male with PMHx of osteoarthritis of the knee presents to the emergency department with left sided chest pressure, radiating down the left arm, associated with diaphoresis and nausea. Onset 3 minutes into walking on home treadmill, lasted 10 minutes, dissipated when he stepped off the treadmill.

PMHx: Osteoarthritis

PSHx: none

Meds: PRN Tylenol

FHx: Sibling with DM2

Soc HX: never smoker

ECG: nondiagnostic

Troponin: negative

Hospitalist called for admission. Hospitalist declines and asks, "What is the TIMI score?".

TIMI score = 0

Discharge home recommended by the Hospitalist.



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## Case 3 (revised approach)

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PMHx: OA

PSHx: none

Meds: PRN Tylenol

FHx: Sibling with DM

Soc HX: never smoker

**ECG: nondiagnostic (shows LVH)**

Troponin: negative

HEART score = 4

Admitted for observation by Hospitalist where exercise stress test was performed the following morning.



# References

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LLMITCHELLDO@GMAIL.COM

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