

EM CASE OF THE WEEK

BROWARD HEALTH MEDICAL CENTER DEPARTMENT OF EMERGENCY MEDICINE



Chest pain is the most common presentation to the Emergency Department. It accounts for around 8 million ED visits a year in the US. It is important to understand what chest pain is benign and which is serious. Serious chest pain is found 15-25% of the time in patient's who present with chest pain.

EM CASE OF THE WEEK

EM Case of the Month is a monthly "pop quiz" for ED staff. The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.



Acute Coronary Syndrome

A 70-year-old white female presents to the ED with chief complaint of chest pain and shortness of breath that occurred 3 hours prior to arrival. She states that she was awoken in the middle of the night by severe left sided chest pain that felt like "someone was sitting on her chest". She had associated right arm numbness and tingling as well. The patient took 2 baby aspirin which didn't help. She states that the pain was 8/10 prior to arrival and was 3/10 when interviewed. The pain lasted 3 hours. She denied any sweating, nausea, vomiting or palpitations with the chest pain. Patient reports that over the past 3 months she has tried to exercise but would seem to get progressively more short of breath over the following weeks. EKG on presentation showed normal sinus rhythm. Which of the following is the most appropriate statement?

- A. Because the patient's symptoms are atypical, she can be sent home safely and told to follow up with her primary in 1-2 weeks.
- B. Because the patient's EKG was normal you can be assured that this patient doesn't have a serious condition.
- C. Because her pain is now 3/10 she is unlikely to have ACS(acute coronary syndrome).
- D. This patient should be admitted, a set of serial troponins and EKGs should be performed because this patient most likely has acute coronary syndrome.
- E. If this patient's physical exam is normal, you can be assured this isn't acute coronary syndrome.



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Acute Coronary Syndrome

Table 1. Baseline Characteristics Analyzed for Development of TIMI Risk Score for UA/NSTEMI*

Characteristic†	Univariate Analysis			Multivariate Analysis		
	β Coefficient	P Value	OR (95% CI)	β Coefficient	P Value	OR (95% CI)
Age, ≥65 y	0.4651	<.001	1.60 (1.25-2.04)	0.5575	<.001	1.75 (1.32-2.32)
At least 3 risk factors for CAD‡	0.3717	.009	1.45 (1.10-1.91)	0.4536	.003	1.54 (1.11-2.13)
Significant coronary stenosis (eg, prior coronary stenosis >50%)	0.5473	<.001	1.73 (1.34-2.23)	0.5284	<.001	1.70 (1.32-2.19)
Prior MI	0.2368	.06	1.27 (0.99-1.63)			
Prior CABG	0.3004	.07	1.35 (0.97-1.88)			
Prior PTCA	0.4628	.004	1.62 (1.18-2.20)			
ST deviation	0.3356	.02	1.40 (1.06-1.85)	0.4125	.005	1.51 (1.11-2.05)
Severe anginal symptoms (eg, ≥2 anginal events in last 24 h)	0.4521	<.001	1.57 (1.24-2.00)	0.4279	.001	1.53 (1.12-2.08)
Use of aspirin in last 7 days	0.6179	.002	1.86 (1.28-2.73)	0.5634	.006	1.74 (1.31-2.31)
Use of IV unfractionated heparin within 24 hours of enrollment	0.1665	.19	1.18 (0.92-1.51)			
Elevated serum cardiac markers§	0.3488	.004	1.42 (1.12-1.80)	0.4420	<.001	1.56 (1.12-2.17)
Prior history of CHF	-0.1058	.70	0.90 (0.53-1.53)			

*UA/NSTEMI indicates unstable angina/pain; ST elevation myocardial infarction; OR, odds ratio; CI, confidence interval; CAD, coronary artery disease; MI, myocardial infarction; CABG, coronary artery bypass graft surgery; PTCA, percutaneous transluminal coronary angioplasty; IV, intravenous; and CHF, congestive heart failure.
 †Risk factors included variables that remained statistically significant in the multivariate analysis and were used as the final set of predictor variables.
 ‡Risk factors included prior history of CAD, hypertension, hypercholesterolemia, diabetes, or being a current smoker.
 §Positive troponin I/II, creatine phosphokinase-MB fraction, and/or cardiac-specific troponin level.

The correct answer is D. Chest pain is associated with a wide differential. It is important to understand which chest pain is life threatening and which chest pain needs immediate attention. The history and physical is so important in these patients as it allows the emergency physician to decide if the patient can be discharged home or not. There is a wide differential for chest pain, which can be broken down into cardiac, vascular, pulmonary, gastrointestinal musculoskeletal, infectious and psychosocial disorders. The first thing an emergency physician needs to decide is if this condition is life threatening. Conditions such as acute coronary syndrome, aortic dissection, a pulmonary embolism can lead to devastating consequences.

Take Home Points

- There is a wide differential for chest pain. The first objective for an emergency physician is to decide if this condition is due to a life threatening condition such as ACS.
- Classic symptoms of ACS and risk factor assessment should aid the physician in assessing the patients risk profile but atypical presentations can make diagnosis difficult.
- Initial management should focus on the ABCs followed by specific pharmacotherapy outlined by AHA guidelines.
- Electrocardiogram, Troponin, and Chest X-ray should always be performed in patients with suspected ACS

Acute coronary syndrome consists of 3 types: Unstable Angina, Non-ST Elevation Myocardial Infarction, and acute Myocardial Infarction. The latter 2 types have associated EKG changes or troponin elevations. Acute chest pain can be defined as pain that is less than 24 hours, located on the anterior chest and is associated with a sensation of bothering the patient.

Discussion

Initial Approach:

The physician must first assess whether the patient is stable or unstable. Vital signs should be obtained, the patient should be placed on a cardiac monitor, EKG performed and intravenous lines placed. Initial history taking should focus on the history of present illness, associated symptoms, and pertinent past medical history. Once these factors are assessed, then the physician can precede to the secondary survey and a more complete history and physical. If the EKG is concerning for ACS, then the physician should take immediate action. This will be covered in greater detail in this issue.

For a list of educational lectures, grand rounds, workshops, and didactics please visit

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and click on the "Conference" link. All are welcome to attend!

History:

Classic angina pectoris presents as severe retrosternal left anterior CP described as pressure-like, crushing or squeezing. Presence of associated symptoms such as SOB, diaphoresis, nausea or vomiting increase the chance of acute coronary syndrome two-fold. Pain radiating from the chest to either shoulder, jaw, arm, or hand also increases chance of ACS. In contrast, Pain that is stabbing, pleuritic, or positional have less likelihood of being ACS. However the physician must be cautious that up to 22% of pts with an acute MI present w/ CP that is sharp/stabbing, up to 6% of pts w/ acute MI present as pleuritic pain and up to 15% of pts w/ acute MI present as reproducible chest pain. This is why the history, physical, lab findings, and ancillary tests are crucial. Surprisingly, up to 37.5% of women and 27.4% of men can present with painless acute coronary syndrome. Look for other angina-equivalent symptoms such as shortness of breath, dyspnea on exertion, jaw, shoulder or arm pain, weakness, altered mental status, or sweating.

Major risk factors for ACS include age older than 40, being male or post-menopausal woman, having high blood pressure, extensive smoking history, elevated cholesterol, diabetes mellitus, or a strong family history of coronary artery disease.

Physical exam is often normal in patient with acute coronary syndrome. Sometimes, abnormalities are seen in vitals such as tachycardia/bradycardia or hypo/hypertension. Patients may have diminished S1, paradoxically split S2, S3 or S4.

Ancillary Testing:

There are 3 important ancillary tests that should be performed in the emergency department if the clinician suspects ACS. These tests include electrocardiogram, troponins, and chest X-ray.

EKG: With patients where ACS is suspected an EKG should be performed ASAP. Half of acute MIs have diagnostic changes on initial EKG. EKGs have a positive predictive value for MI in >90% of cases. Ideally, an EKG should be obtained within 10 minutes of arrival.

Troponin: Troponin can be detected in the serum as early as 2 hours after MI. They may not be elevated in all patients until 6-12 hours. Levels peak at 12 hours and are elevated for up to 10 days. Troponin can be misleading at times, as they can be elevated in many other conditions; it is important for the physician to always use clinical correlation.

Chest X-ray: Are usually useful for discovering other causes of chest pain. Chest X-ray can show pulmonary edema, pneumonia, pneumothorax, etc...

Risk Stratification:

There are many risk stratification scores that can be used to determine if the patient has a high risk for ACS. Different risk calculators such as the TIMI Score, GRACE score, HEART score can all be used to risk stratify a patient for potential for ACS.

Treatment:

Treatment should be focused on the ABCs initially. Once stabilized, there are specific guidelines for medical therapy for ACS. Various heart associations have outlined guidelines for treatment and are beyond the scope of this article. It is important to note that patients with a ST-elevation MI should be reperfused with percutaneous intervention or fibrinolytic therapy as soon as possible per the AHA guidelines.

The bottom line is that chest pain accounts for many visits to the emergency department each year. It is important to note which patients have high risk for ACS and which patients can be safely discharged home without adverse outcomes.

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