Emergency Department Chest Pain Evaluation Pathway

Atraumatic Chest Pain in Hemodynamically Stable Adult Patient

Shortness of breath **OR**
Upper abdominal pain **OR**
Upper back pain

History & Physical
ECG if indicated

CXR if indicated

- PTX
- Pneumonia

Further testing for dangerous conditions **not excluded by history and physical**

- Esophageal Rupture[5]
  - CT Chest with oral & IV contrast
- Aortic Dissection
  - ADD Risk Score
    - High Risk
    - Moderate Risk[4]
      - CT Aortic Angiography[2]
      - Alternate diagnosis confirmed?
        - \- CT Aortic Angiography[2]
        - \+ Treatment
- Acute Coronary Syndrome
  - \+ Cardiology
  - Very High Risk / Active Ischemia
  - − HEART Score
    - Low Risk — HEART 0-3 ***and*** Neg Trop at 0 and 3 hours[1] — Discharge with physician f/u
    - Moderate Risk — HEART 4-6 — Admit to Observation ***or*** if Neg Trop x 2, discharge with cardiology f/u
    - High Risk — HEART 7-10 — Admit for Inpatient Cardiology
- Pulmonary Embolism
  - Physician gestalt or score (Wells or Geneva)
    - Low Risk
      - PERC
      - \+ Age-adjusted D-dimer[3]
      - \+ CTPA or VQ
    - Moderate Risk
      - Age-adjusted D-dimer[3]
      - \+ CTPA or VQ
    - High Risk
      - CTPA or VQ
- Perimyocarditis Pericardial Effusion
  - Troponin Echocardiography[6]

Modified AHA Aortic Dissection Detection Risk Score

High-Risk Conditions	High-Risk Pain Features	High-Risk Exam Features
Marfan Syndrome	Chest, back, or abdominal pain described as abrupt in onset, severe in intensity **and** ripping, tearing, sharp or stabbing in quality	Pulse deficit
Connective tissue disease		Systolic BP differential
Family history aortic disease		Focal neurologic deficit
Known aortic valve disease		Hypotension/shock state
Recent aortic manipulation		Murmur of aortic insufficiency
Known thoracic aortic aneurysm		

Low risk No high risk features, reassuring CXR

Intermediate risk 1 high risk feature or widened mediastinum on CXR

High risk 2 or more high risk features

Notes

1. Single troponin may be considered if symptoms > 6 hours

2. TEE and MRI can be used to exclude aortic dissection in place of CT aorta

3. For assays with cutoff of 500 FEUs, age-adjusted is age x 10; for assays with cutoff of 250 DDUs, age-adjustment is age x 5

4. Patients who are low risk for aortic dissection by Aortic Dissection Detection (ADD) score but have widened mediastinum on CXR or other clinical features that concern the clinician should be considered for advanced imaging

5. Patients with profuse vomiting preceding chest pain, esophageal disease, or recent esophageal instrumentation should be considered for advanced chest imaging to exclude esophageal rupture

6. Patients with unexplained hypotension should have pericardial effusion excluded by sonography

7. Known atherosclerotic disease (CAD, PAD, CVA) garners 2 points; if no known disease, calculate score according to vascular risk factors

Modified HEART Score

Patient Assessment	
History	
Mostly high-risk symptoms	2
Mix of high and low-risk symptoms	1
Mostly low-risk symptoms	0
ECG	
New ischemic change	2
Non-specific change	1
Normal	0
Age	
≥65 years	2
45-64 years	1
< 45 years	0
Vascular Disease–Max 2 points[7]	
Known CAD *or*	
Prior Stroke *or*	2
Peripheral Artery Disease	
If No Known Vascular Disease	
≥3 Vascular risk factors	2
1-2 Vascular risk factors	1
0 Vascular risk factors	0
Troponin	
>0.12 ng/mL	2
.041-0.120 ng/mL	1
0-0.040 ng/mL	0

High-Risk Symptoms	Low-Risk Symptoms
Middle or left sided pain	Well localized pain
Heavy chest pain	Sharp pain
Diaphoresis	Non-exertional
Symptoms relieved by nitrates	No diaphoresis
Nausea or vomiting	No nausea or vomiting
Radiation of pain	
Exertional pain	

ECG New ischemic changes	ECG Non-specific changes
Ischemic ST depression	Repolarization abnormalities
New ischemic T wave	Non-specific T-wave changes
	Bundle branch blocks
Vascular Risk Factors	Digoxin effect
Obesity (BMI ≥ 30)	Pacemaker rhythms
Smoker within 90 days	LVH
Diabetes currently being treated	Early repolarization
1st degree relative with ACS < age 55	Non-specific ST changes
Diagnosed or treated hypertension	
Hypercholesterolemia	

PERC Score

- Age ≥ 50 years
- HR ≥ 100 bpm
- SpO2 on room air ≤ 94%
- Unilateral leg swelling
- Hemoptysis
- Recent surgery or trauma
- Prior PE/DVT
- Exogenous hormone use

If one or more criteria is present, patient is PERC-positive. If none of these 7 elements are present and clinician's pre-test probability is <15%, patient is PERC-negative; no need for further workup, as <2% chance of pulmonary embolism.

Wells Score

Signs/symptoms of DVT	3
PE is #1 Dx or equally likely	3
Heart rate > 100 bpm	1.5
Immobilization ≥ 3 days or surgery within 4 weeks	1.5
Previous DVT/PE	1.5
Hemoptysis	1
Malignancy within 6 months	1

Low risk < 2

Intermediate risk 2-6

High risk > 6

Geneva Score

Age > 65 years	1
Previous DVT/PE	3
Surgery/lower limb fracture in past month	2
Active malignancy	2
Unilateral lower limb pain	3
Hemoptysis	2
HR 75-94 bpm	3
HR > 94 bpm	5
Pain on lower limb deep venous palpation + unilateral edema	4

Low risk < 4

Intermediate risk 4-10

High risk > 10

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