



Approach To The Chest Pain

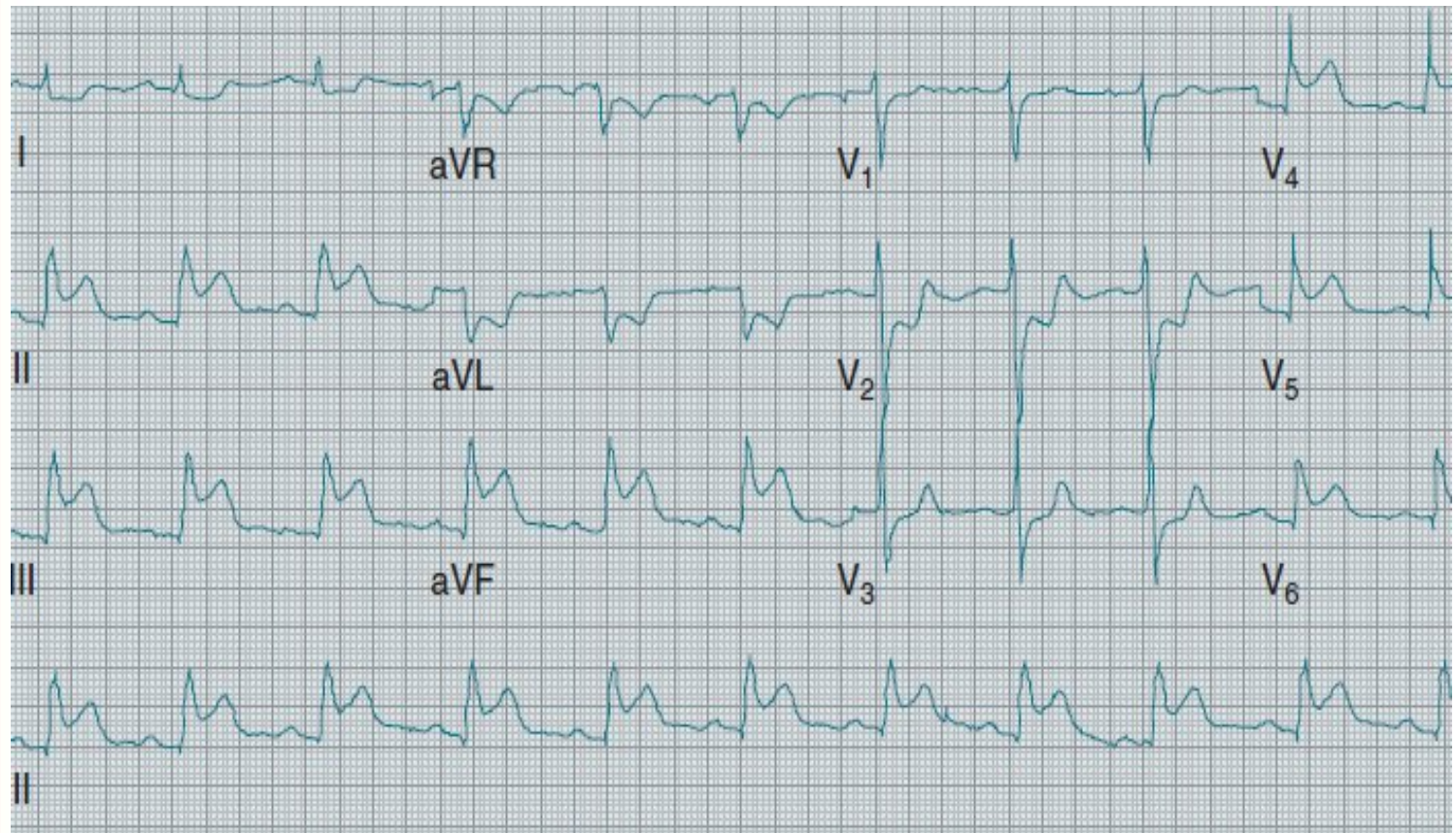
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Emergency Medicine Board
Al-Shifa Medical Complex

Case

A 58-year-old man arrives at the emergency department complaining of chest pain. The pain began 1 hour ago, during breakfast, and is described as severe, dull, and pressure-like. It is substernal in location, radiates to both shoulders, and is associated with shortness of breath. The patient vomited once. His wife adds that he was very sweaty when the pain began. The patient has diabetes and hypertension and takes hydrochlorothiazide and glyburide. His blood pressure is 150/100 mm Hg, pulse rate is 95 beats per minute, respiration is 20 breaths per minute, temperature 37.3°C, and oxygen saturation by pulse oximetry is 98%. The patient is diaphoretic and appears anxious. On auscultation, faint crackles are heard at both lung bases. The cardiac examination reveals an S4 gallop and is otherwise normal. The examination of the abdomen reveals no masses or tenderness.

Case



Chest Pain

In patients with chest pain, a focused history that includes characteristics and duration of symptoms relative to presentation as well as associated features, and cardiovascular risk factor assessment should be obtained.

Heart

- Myocardial infarction
- Cardiac angina
- Pericarditis
- Myocarditis
- Valvular diseases (especially aortic stenosis)

Lungs

- Pneumonia/other infections
- Pneumothorax
- Pulmonary embolism
- Chronic obstructive pulmonary disease exacerbation

Esophagus

- Esophagitis (e.g., candidal)
- Gastroesophageal reflux disease
- Spasm (nutcracker esophagus)
- Foreign body
- Rupture (Boerhaave's)

Aorta

- Dissection
- Aneurysm
- Aortitis

Upper abdomen

- Gallbladder disease (cholecystitis or cholelithiasis)
- Pancreatitis
- Duodenal or peptic ulcer
- Hepatic disease

Chest wall

- Costochondritis (Tietze's disease)
- Contusion
- Rib fracture
- Muscle strain or tear

Chest Pain

Nature

Anginal symptoms are perceived as retrosternal chest discomfort (e.g., pain, discomfort, heaviness, tightness, pressure, constriction, squeezing).

Sharp chest pain that increases with inspiration and lying supine is unlikely related to ischemic heart disease (e.g., these symptoms usually occur with acute pericarditis).

Onset and duration

Anginal symptoms gradually build in intensity over a few minutes.

Sudden onset of ripping chest pain (with radiation to the upper or lower back) is unlikely to be anginal and is suspicious of an acute aortic syndrome.

Fleeting chest pain—of few seconds' duration—is unlikely to be related to ischemic heart disease.

Location and radiation

Pain that can be localized to a very limited area and pain radiating to below the umbilicus or hip are unlikely related to myocardial ischemia.

Chest Pain

Severity

Ripping chest pain (“worse chest pain of my life”), especially when sudden in onset and occurring in a hypertensive patient, or with a known bicuspid aortic valve or aortic dilation, is suspicious of an acute aortic syndrome (e.g., aortic dissection).

Precipitating factors

Physical exercise or emotional stress are common triggers of anginal symptoms.

Occurrence at rest or with minimal exertion associated with anginal symptoms usually indicates ACS.

Positional chest pain is usually nonischemic (e.g., musculoskeletal).

Relieving factors

Relief with nitroglycerin is not necessarily diagnostic of myocardial ischemia and should not be used as a diagnostic criterion.

Associated symptoms

Common symptoms associated with myocardial ischemia include, but are not limited to, dyspnea, palpitations, diaphoresis, lightheadedness, presyncope or syncope, upper abdominal pain, or heartburn unrelated to meals and nausea or vomiting.

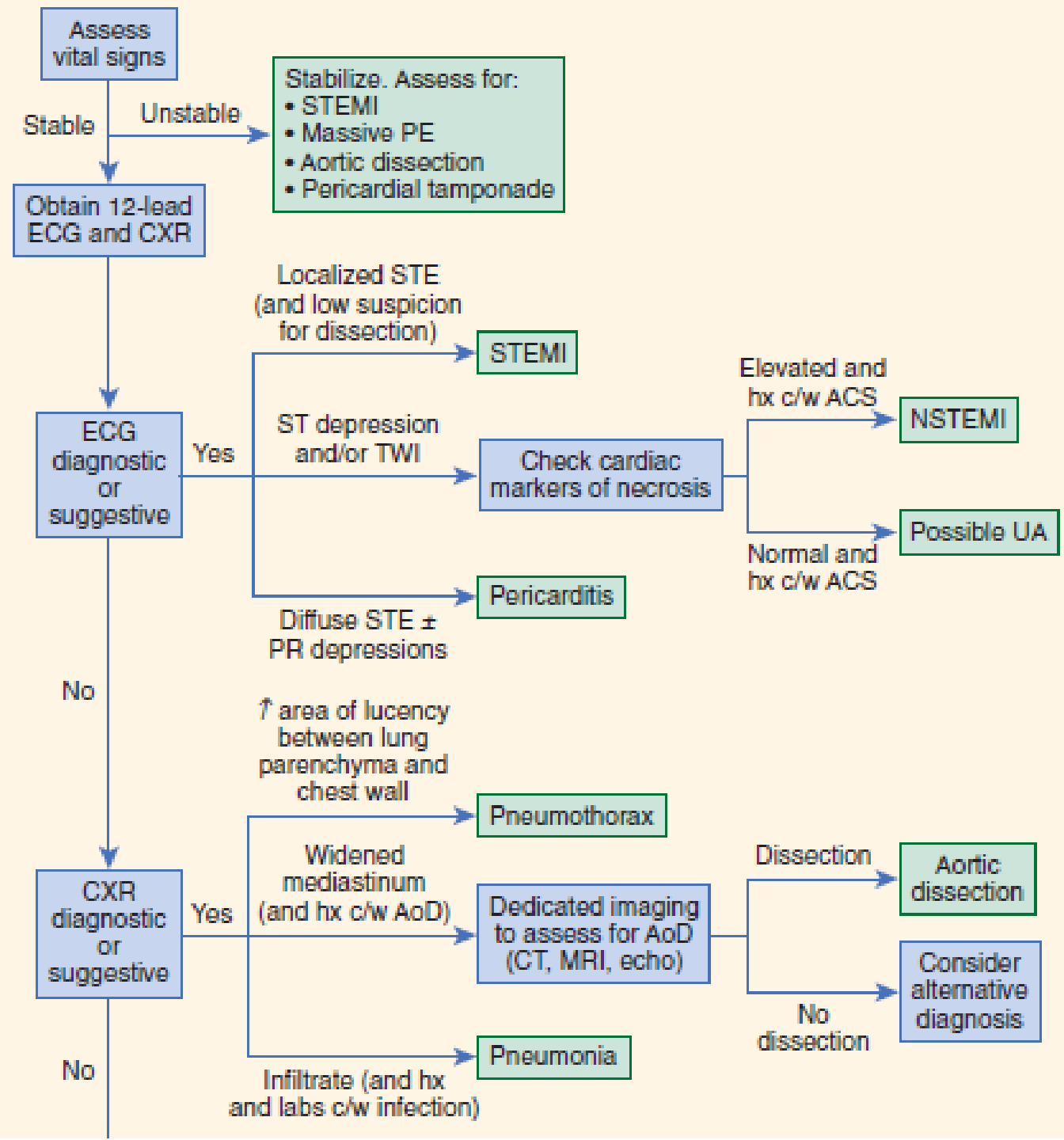
Symptoms on the left or right side of the chest, stabbing, sharp pain, or discomfort in the throat or abdomen may occur in patients with diabetes, women, and elderly patients.

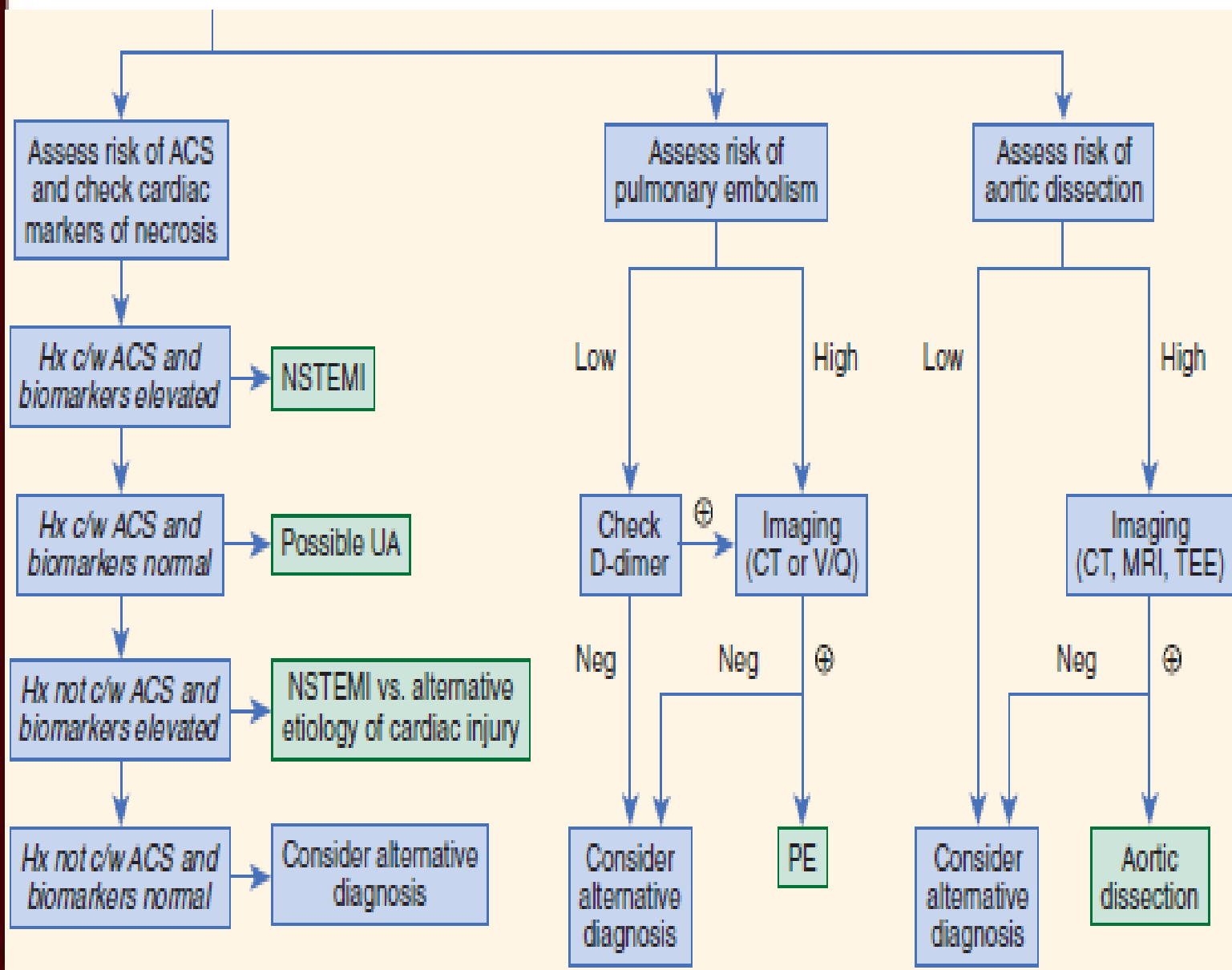
Chest Pain

Clinical Syndrome	Findings
Emergency	
ACS	Diaphoresis, tachypnea, tachycardia, hypotension, crackles, S3, MR murmur; examination may be normal in uncomplicated cases
PE	Tachycardia + dyspnea—>90% of patients; pain with inspiration
Aortic dissection	Connective tissue disorders (e.g., Marfan syndrome), extremity pulse differential (30% of patients, type A>B) Severe pain, abrupt onset + pulse differential + widened mediastinum on CXR >80% probability of dissection Frequency of syncope >10% (8), AR 40%–75% (type A)
Esophageal rupture	Emesis, subcutaneous emphysema, pneumothorax (20% patients), unilateral decreased or absent breath sounds

Other	
Noncoronary cardiac: AS, AR, HCM	AS: Characteristic systolic murmur, tardus or parvus carotid pulse AR: Diastolic murmur at right of sternum, rapid carotid upstroke HCM: Increased or displaced left ventricular impulse, prominent a wave in jugular venous pressure, systolic murmur
Pericarditis Myocarditis	Fever, pleuritic chest pain, increased in supine position, friction rub Fever, chest pain, heart failure, S3
Esophagitis, peptic ulcer disease, gall bladder disease	Epigastric tenderness Right upper quadrant tenderness, Murphy sign
Pneumonia	Fever, localized chest pain, may be pleuritic, friction rub may be present, regional dullness to percussion, egophony
Pneumothorax	Dyspnea and pain on inspiration, unilateral absence of breath sounds
Costochondritis, Tietze syndrome	Tenderness of costochondral joints
Herpes zoster	Pain in dermatomal distribution, triggered by touch; characteristic rash (unilateral and dermatomal distribution)

TABLE 17-2 Classic Symptoms of Potentially Life-Threatening Causes of Chest Pain*				
Disorder	Pain Location	Pain Character	Radiation	Associated Signs and Symptoms
Acute coronary syndrome	Retrosternal, L chest, or epigastric	Crushing, tightness, squeezing, pressure	R or L shoulder, R or L arm/hand, jaw	Dyspnea, diaphoresis, nausea
Pulmonary embolism	Focal chest	Pleuritic	None	Tachycardia, tachypnea, hypoxia, may have hemoptysis
Aortic dissection	Midline, substernal	Ripping, tearing	Intrascapular area of back	Secondary arterial branch occlusion
Pneumonia	Focal chest	Sharp, pleuritic	None	Fever, hypoxia, may see signs of sepsis
Esophageal rupture	Substernal	Sudden, sharp, after forceful vomiting	Back	Dyspnea, diaphoresis, may see signs of sepsis
Pneumothorax	One side of chest	Sudden, sharp, lancinating, pleuritic	Shoulder, back	Dyspnea
Pericarditis	Substernal	Sharp, constant or pleuritic	Back, neck, shoulder	Fever, pericardial friction rub
Perforated peptic ulcer	Epigastric	Severe, sharp	Back, up into chest	Acute distress, diaphoresis





The HEART Score for Chest Pain Patients in the ED

History	• Highly Suspicious • Moderately Suspicious • Slightly or Non-Suspicious	• 2 points • 1 point • 0 points
ECG	• Significant ST-Depression • Nonspecific Repolarization • Normal	• 2 points • 1 point • 0 points
Age	• ≥ 65 years • $> 45 - < 65$ years • ≤ 45 years	• 2 points • 1 point • 0 points
Risk Factors	• ≥ 3 Risk Factors or History of CAD • 1 or 2 Risk Factors • No Risk Factors	• 2 points • 1 point • 0 points
Troponin	• $\geq 3 \times$ Normal Limit • $> 1 - < 3 \times$ Normal Limit • $\leq$ Normal Limit	• 2 points • 1 point • 0 points

Risk Factors: DM, current or recent (<one month) smoker, HTN, HLP, family history of CAD, & obesity

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

Chest Pain

TIMI RISK SCORE for UA/NSTEMI

HISTORICAL	POINTS	RISK OF CARDIAC EVENTS (%) BY 14 DAYS IN TIMI 11B*		
		RISK SCORE	DEATH OR MI	DEATH, MI OR URGENT REVASC
Age ≥ 65	1	0/1	3	5
≥ 3 CAD risk factors (D/C, HTN, $\uparrow$ chol, DM, active smoker)	1		3	8
Known CAD (stenosis $\geq 50\%$)	1		3	13
ASA use in past 7 days	1	2	3	8
PRESENTATION		3	5	13
Recent (≤ 24 H) severe angina	1	4	7	20
$\uparrow$ cardiac markers	1	5	12	26
ST deviation ≥ 0.5 mm	1	6/7	19	41
RISK SCORE = Total Points (0 - 7)				

*Entry criteria: UA or NSTEMI defined as ischemic pain at rest within past 24H, with evidence of CAD (ST segment deviation or $\uparrow$ marker)

Chest Pain

TIMI RISK SCORE for STEMI

HISTORICAL	POINTS	RISK SCORE	30-DAY MORTALITY <u>IN InTIME II(%)</u> *
Age ≥ 75	3		
65-74	2	0	0.8
DM or HTN or angina	1	1	1.6
EXAM		2	2.2
SBP < 100 mmHg	3	3	4.4
HR > 100 bpm	2	4	7.3
Killip II-IV	2	5	12
Weight < 67 kg (150 lb)	1	6	16
		7	23
PRESENTATION		8	27
Anterior STE or LBBB	1	> 8	36
Time to Rx > 4 hrs	1		

RISK SCORE = Total points (0-14)

*Entry criteria: CP > 30 min, ST $\uparrow$, sx onset < 6 hrs, fibrinolytic-eligible



TAke A BREATH

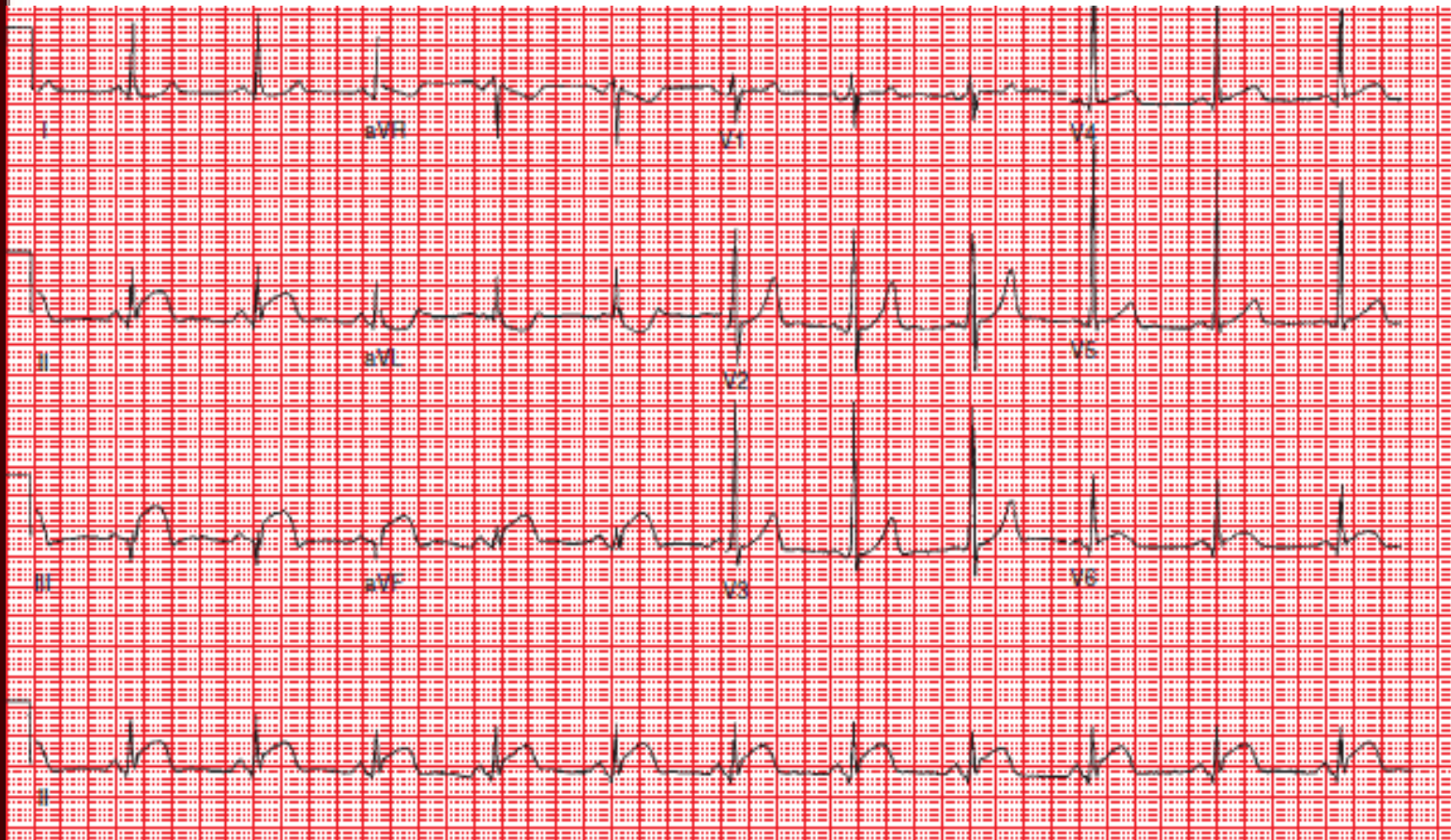
Case scenario

A 58-year-old man arrives at ER complaining of chest pain. The pain began 1 hour ago, and is described as severe, dull, and pressure-like. It is substernal in location, radiates to both shoulders, and is associated with shortness of breath. He was sweaty when the pain began. The patient has DM, HTN

His BP-150/100, P-95, RR-20, T-37.3°C, and O₂ Sat-98%.

The patient is diaphoretic and appears anxious. On auscultation, faint crackles are heard at both lung bases. The cardiac examination reveals an S4 gallop and is otherwise normal. The examination of the abdomen reveals no masses or tenderness.

Case scenario



Case scenario

55 y.o male patient presented with persistent vomiting presents with sudden onset of Chest Pain followed by hematemesis. The chest pain sudden onset, sharp in nature radiating to back it is associated with short of breath for 3 hours, past medical history DM, HTN, and smoker.

Initial assessment

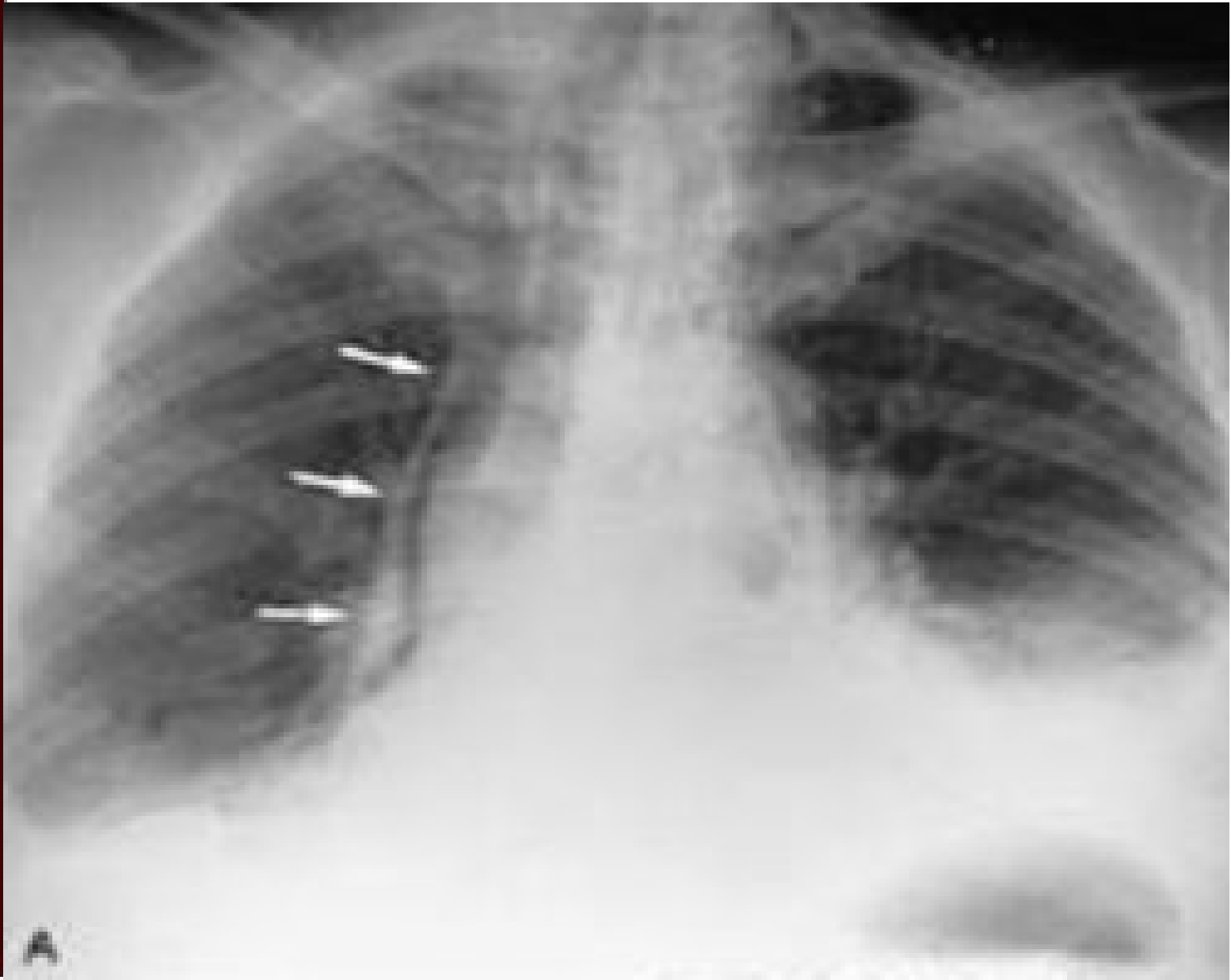
- ABC intact.
- BP 120/80 equal bilateral arm P 90 regular and equal 4 limbs no pulse deficit RR 40 T 38 O sat2 96% on room air.
- On examination there is decrease air entry in right side and there is subcutaneous emphysema in Right side of chest.

Case scenario

Critical bedside actions and general approach

- O2 Supply and monitor bed.
- ABC intact.
- Vitally stable except he is febrile (T 38)
- Quick history which suggested sudden onset of Chest Pain followed by hematemesis. The chest pain sudden onset, sharp in nature radiating to back it is associated with short of breath for 3 hours
- Physical examination shows:
 - Chest exam: decrease air entry in left side, and there is subcutaneous emphysema in left side of chest.
 - CVS exam: S1+S2. no additional sound, JVP was Normal pulses equal in four limb To do 12 lead ECG shows no ST, T wave changes, or ischemic changes.

Case scenario



Case scenario

A 34-year-old male with no significant past medical history presents to the emergency department with 10 hours of constant chest pain radiating into his back that started last night. The pain is increasing when he lies down. He had to sleep sitting up. He denies any fever, shortness of breath, cough, symptoms in his arms or legs or other complaints.

Vital signs are normal. The physical exam is completely normal including auscultation of the heart and lungs.



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Thank you

