

APPROACH TO A CASE OF CHEST PAIN

Initial management at outpatient level

SUMMARY

- ‘Severe acute chest pains’ mostly land up in Emergency departments
- At the outpatient level non cardiac causes are common.
- But serious causes of chest pain are not to be overlooked
- Conditions to be r/o :
 - acute coronary syndrome,
 - pulmonary embolism,
 - Aortic dissection or
 - Tension pneumothorax
 - Ruptured esophagus
 - pneumonia

Common Causes of chest pain classified

Cardiovascular

- Ischemic heart disease
- Pericarditis
- Aortic aneurysm dissection

Respiratory

- Pleurisy
- Tracheitis

- Neoplasms-pleura/ribs
- Pneumothorax
- Pulmonary embolism

Gastro intestinal

- Peptic ulcer
- Hiatus hernia
- Biliary tract disease

- Pancreatitis

Miscellaneous

- anxiety states
- root pain
- chest trauma
- Chest wall diseases
- Costochondritis

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Epidemiology

Cardiac causes are commoner in emergency departments

Non cardiac causes are common in outpatient department

Still evaluation must be thorough to R/o serious conditions ACS,PE,Pneumonia and others

OUT PATIENT MANAGEMENT

NEW CASE:

History:

Exertional pain: relieved by rest/nitroglycerine – Cardiac ischemia

Aggravated on inspiration: pleural ,less commonly pericardial

Alters with posture; pericarditis; eases when sitting up and leaning forward

Worsening on swallowing: Oesophageal

GERD,peptic ulcer: Epigasrtic pain ,retro sterna burning

Changes with movement; musculo skeletal pain

aggrevated by pressing site of pain or
putting the muscle into contraction

Chest pain,dyspnea+fever: pneumonia/bronchitis

Routine Procedure:

History taking as above

Physical examination

Examination should *include the abdomen.*

Routine *ECG and Xray chest* is required in most cases

Inference and follow up:

- Chestpain+ECG changes+cardiac risk factors when present:
Troponin measurement and Stress test (if not contraindicated)
- *Pulmonary embolism:*
Go by simple prediction rule +D-dimer assay
then Helical CT and venous ultra sound as indicated
- *Pneumonia :*
- *h/o fever, dullness /egophony-confirm by X-ray*
- *Heart failure :*
Chest pain with dyspnea; suggests Heart failure
Clarify by Brain natriuretic peptide level
- *Musculoskeletal pain :*
Pain reproducible by palpation and by putting the muscle into action
- *Chest pain with panic disorder*
History taking with 2 item questionare

Also apply clinical prediction rules

Clinical Decision rules

Considerable overlap occurs in the signs and symptoms amongst these various clinical conditions

Several validated clinical Decision rules –available conditions based on key symptoms and clinical findings

- Rouan decision Rule for Myocardial infarction
- Wells Model for clinical diagnosis of pulmonary embolism
- Diehr rule ofor diagnosing pneumonia in adults with acute cough
- Dukes treadmill score for predicting prognosis
- Reader is requested to refer Cardiac text books /journal for details of these'

Table1. Diagnosis using history, physical examination and probability of accuracy

Diagnosis with Overall out patient probability	Clinical finding	Probability of diagnosis
Myocardial Infarction	Chest pain radiating to both arms, dyspnea, hypotension sweating S3 ,Age above 65. prior MI, HF+ presence of Other Risk factors like DM, hyperlipidemia, ECG-ST elevation Q wave, conduction defect compare with previous ECG	Highly probable Refer ROUAN decision rule of MI Test-troponin level stress ECG as indicated
	Chest pain - if Ecg is normal or non specific with negative cardiac evaluation	Less probable case Even then - <i>Close follow up</i> is must. 3% go for MI/death in 30 days Further test with stress ECG, Perfusion scan ,angiography – depending upon level of risk
Anginal pain	To predict long term prognosis for patients under going stress test All 3 criteria plus i.e. Substernal pain Evoked by exertion Relieved by rest /Nitro glycerine	Duke treadmill score High risk for CAD in all age groups
Atypical Anginal pain	2 of the above 3 criteria	Intermediate risk for CAD in women > 50 yrs & in all men
Non angina pain	Only one of the above 3 criteria	Intermediate risk for women > 60 yrs & men > 40 yrs.
Pneumonia	Egophony Dullness on percussion Fever	Highly Probable (Absence does not rule out the diagnosis)
Cardiac failure	Exertional dyspnea Displaced apex	Positive likely hood
Chest wall pain	Palpation of tender area reproduces chest pain	Positive likely hood h/o rheumatic arthritis/osteo arthritis increases likely hood.
Panic disorder	“Yes” on at least one item of autonomic nervous system questionnaire	

Learning points from the above Table:

Typical features of MI are:

Chest pain radiating to both sides, with giddiness sweating, hypotension and S₃ gallop in male above 65 with prior history of MI

Rouan Decision rule reasonably predicts possibility of IHD

But 3% of cases diagnosed as non cardiac may suffer MI or death within 30 days

If there are cardiac risk factors present they must be closely followed up

Acute coronary syndrome and CAD

Important diagnostic tests to be done:

- 12 lead ECG, serum markers of myocardial damage, stress ECG, nuclear imaging,
- Strongly suggestive ECG findings:
- Newly developed ST elevation, Q waves, conduction defects new T wave inversion
- But absence of these ECG changes does not r/o MI.
- Markers of myocardial damage: CK-MB, troponinT, troponin I

Supportive Diagnostic Values

CK-MB >6mcg/L with 9 hrs of presentation (Likely hood of MI)

TroponinT > 2mcg/L atleast 8 hrs from presentation

Troponin > 1 mcg /L atleast 6 hrs from presentation

These levels indicate likelihood of MI, death or recurrent MI within 30 days

Cases with chest pain with no high risk history, normal or near normal ECG, and with no elevated troponin can be safely evaluated as **outpatient**.

A normal ECG alone does not exclude Probability of MI

Action to be taken after history, examination and basic investigations:

Low risk for CAD:

No further testing unless medical history/ family history of risk is present

Intermediate risk:

In patient capable of exercising and with no LBBB, No preexcitation, no significant resting ST depression further evaluate by Exercise stress ECG

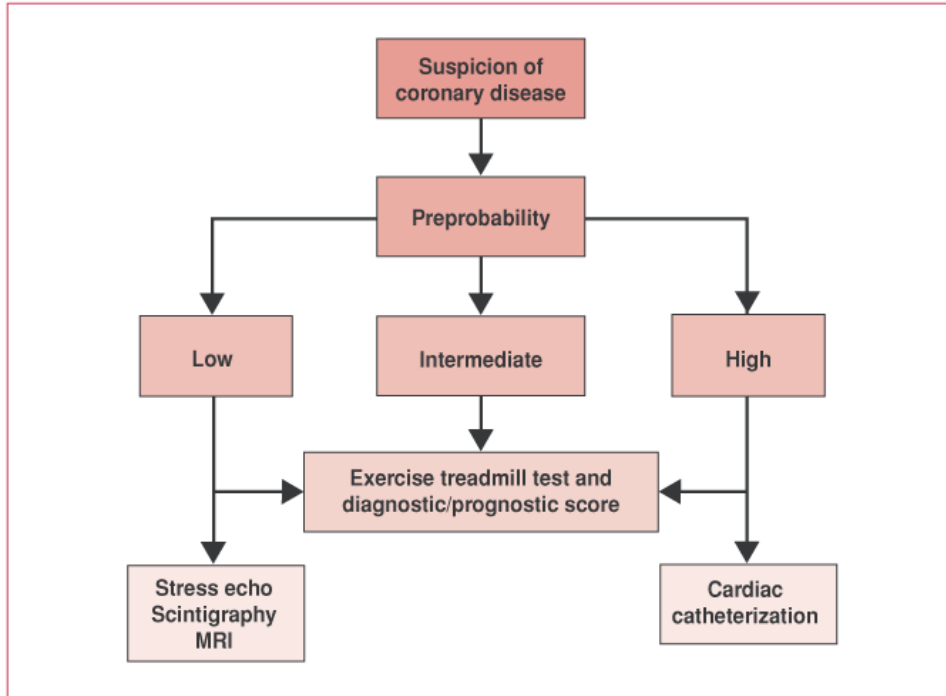
If baseline ECG is abnormal perfusion imaging done along with stress ECG

If patient cannot exercise-evaluate with pharmacological stress or vasodilator test

High risk patients:

Proceed directly to Angio cardiography especially if other tests are non diagnostic

And cases who would benefit from revascularization



Duke treadmill Score and Prognosis

In cases undergoing Stress test, prognosis can be assessed by Duke Treadmill score

Pulmonary Embolism:

Low clinical suspicion

D-dimer testing especially Quantitative Elisa D-Dimer assay is very valuable
Normal Elisa D-Dimer and low clinical suspicion – safely rules out P.E 99.5%

Follow up if symptoms progress or change

In Moderate clinical suspicion:

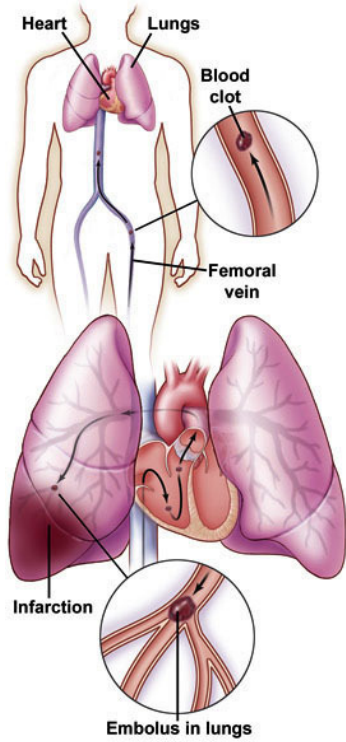
Elisa D-Dimer assay plus
Helical CT and
Lower limb venous ultra sound

In moderate/high clinical suspicion

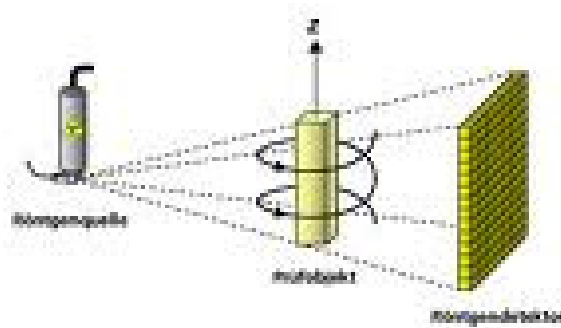
If CT scan and Venous ultra sound abnormal,
Treat for PE /DVT irrespective D-Dimer value

In moderate/high clinical suspicion

Abnormal D-Dimer plus normal CT and normal ultra sound of lower limb Veins
Consider Serial ultrasound in moderately suspect cases
If clinical suspicion high consider pulmonary angiography



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Pneumonia and heart failure

For *Pneumonia* –

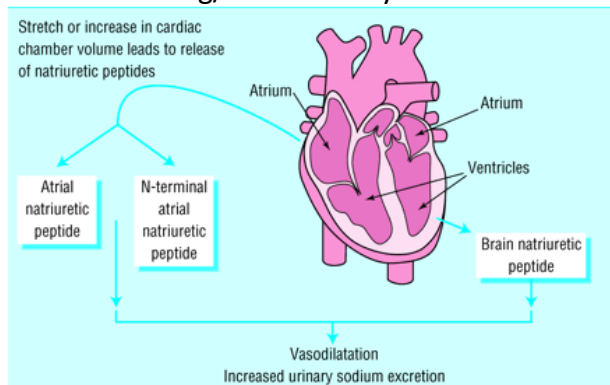
Chest X-ray is reference standard

Heart failure

Acute dyspnea + chest pain + Cardiomegaly in CXR, + Abnormal ECG – likely H.F

B-type Natriuretic peptide level reliable clinching test (if $>500\text{ngm/L}$); if

Less than 100ng/L can reliably rule out



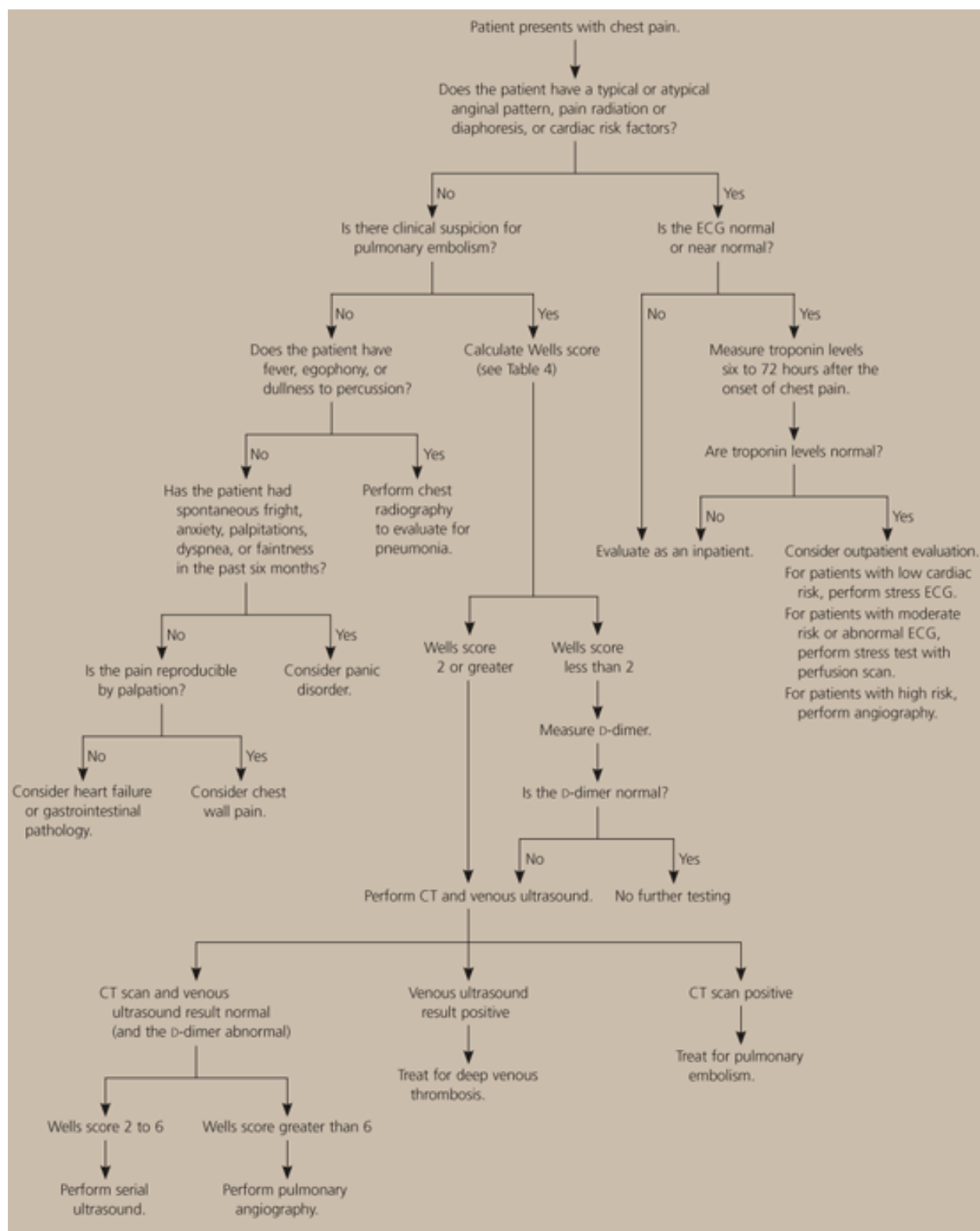
Chest wall pain

Diagnosis by history and clinical exam after r/o other conditions

Sometimes radiology is helpful

ESR does not help.

Diagnostic algorithm given in next page;



An Algorithm for out patient diagnosis of causes of chest pain

Reference :*Am fam physician* 2005 15;72 ,Pub med data base