Acute Pleuritic Chest Pain

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CENTRE FOR
RURAL
EMERGENCY
MEDICINE

in partnership with

ALCOA

Victoria Department of Human Services

DEAKIN

Learning objectives

- To recognise two common myths about pleuritic chest pain
- To know when to order a D-dimer, CTPA, or V/Q scan
- To know when to doubt the result of a CTPA

Outline

- Pleuritic pain
- Myths
- Approach
- Cases

What is pleuritic pain like?

- Pain that is exacerbated during breathing, coughing, talking or sneezing
- Breath holding relieves pain
- Localised, shooting or stabbing
- Can be constant background pain

Is it really pleuritic?

- Poorly reliable - Kappa 0.4 (0.2 - 0.4 moderate agreement)
- Pain on breathing versus hard to breath or pain on movement
- Deep breath or cough only partially reproduces the pain

Pleuritic pain myths

Myth one: Pleuritic chest pain excludes acute coronary syndrome

Less likely, but not excluded

pretest odds x likelihood ratio = post test odds

Chance of Acute Myocardial Infarction

Pain Descriptor	Positive Likelihood Ratio (95% CI)
Described as pleuritic	0.2
Described as positional	0.3
Described as sharp	0.3
Reproducible with palpation	0.3
Inframammary location	0.8
Not associated with exertion	0.8

Swap, 2005, JAMA, 294(20):2623-9.

1 to 4 chance x 0.2 = 1 to 20 chance

(20 %) (5 %)

Pleuritic chest is unhelpful if

- There are other findings or risk factors that suggest a cardiac cause
- You are looking for unstable angina, not AMI
- Pain is only partially reproducible

Myth two:
Pleuritic pain ≡ Pulmonary embolus

Poor sensitivity

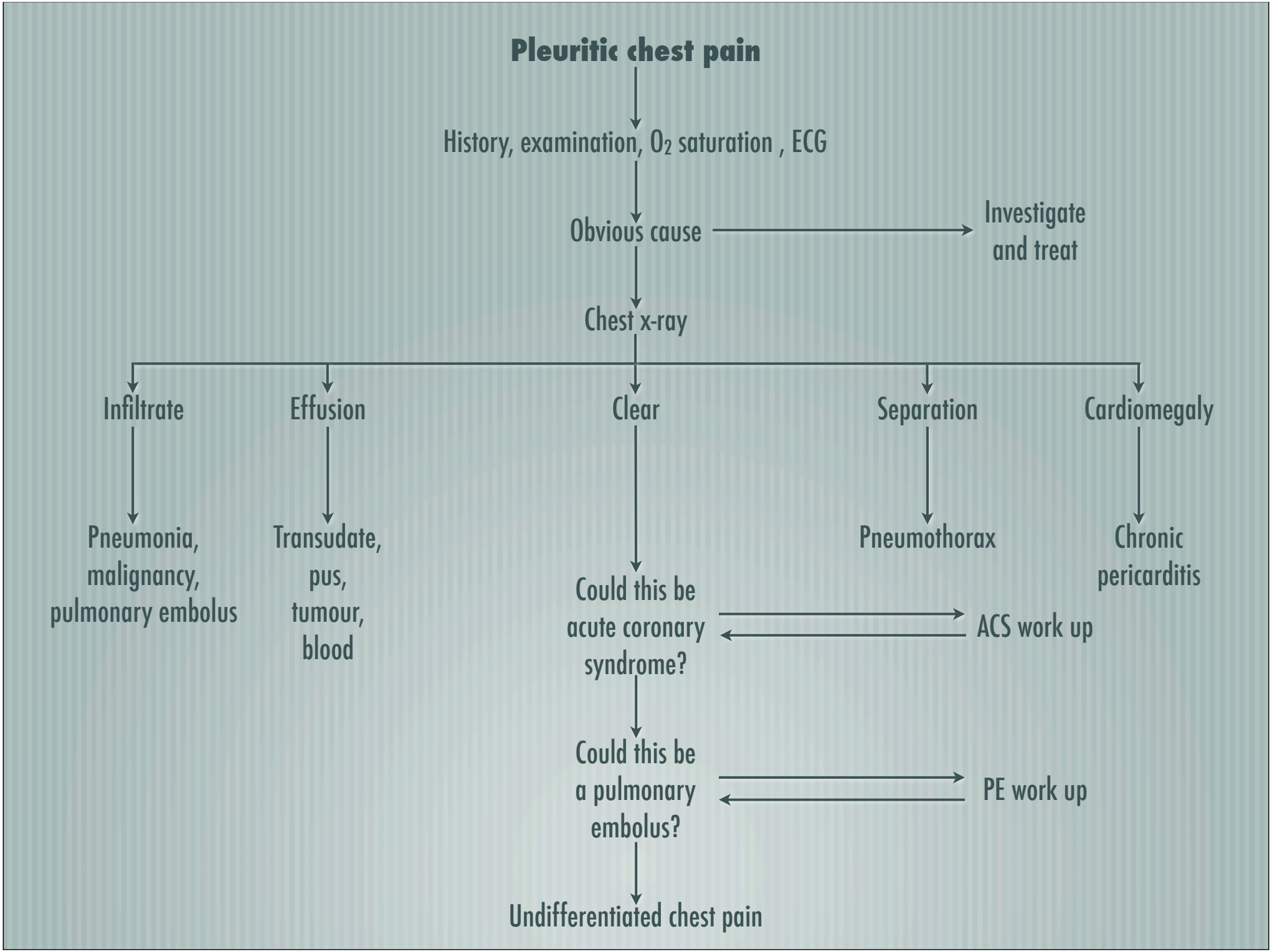
- Only 50 % of PE patients have pain

Demographic - Sign - Symptom	%
Age ≥ 60	63
Female	55
HR > 100/min	40.3
RR > 20/min	60.1
Dyspnea	82
Chest pain	49
Cough	20
Syncope	14
Hemoptysis	7
DVT on presentation	49.3
DVT prophylaxis	33
Previous DVT	24.9
No risk factors	19

Poor specificity

- Chest pain - 1 % has a pulmonary embolus
- Pleuritic chest pain - 5 % has a pulmonary embolus
- Frequency doubles each with decade of life
- We often worry in the young and fit, but should mainly worry in the old and unwell

Approach


Pleuritic chest pain
History, examination, O_2 saturation , ECG
Obvious cause
Investigate and treat
Chest x-ray
Infiltrate
Effusion
Clear
Separation
Cardiomegaly
Pneumonia, malignancy, pulmonary embolus
Transudate, pus, tumour, blood
Pneumothorax
Chronic pericarditis
Could this be acute coronary syndrome?
ACS work up
Could this be a pulmonary embolus?
PE work up
Undifferentiated chest pain

Cases

Case one - Mrs Gladys Notme

- A 71-year-old woman presents with one day pleuritic left posterior chest pain and shortnesss of breath. She was in hospital three weeks ago with an exacerbation of COPD. She has diabetes, hypertension, and had a DVT 10 years ago. Her temperature is 37.2°C, and her pulse is 105 beats per minute. Physical examination discloses occasional wheeze, but is otherwise unremarkable. An electrocardiogram and chest radiograph are both normal.
- Would a D-dimer be useful?

How useful is a D-dimer?

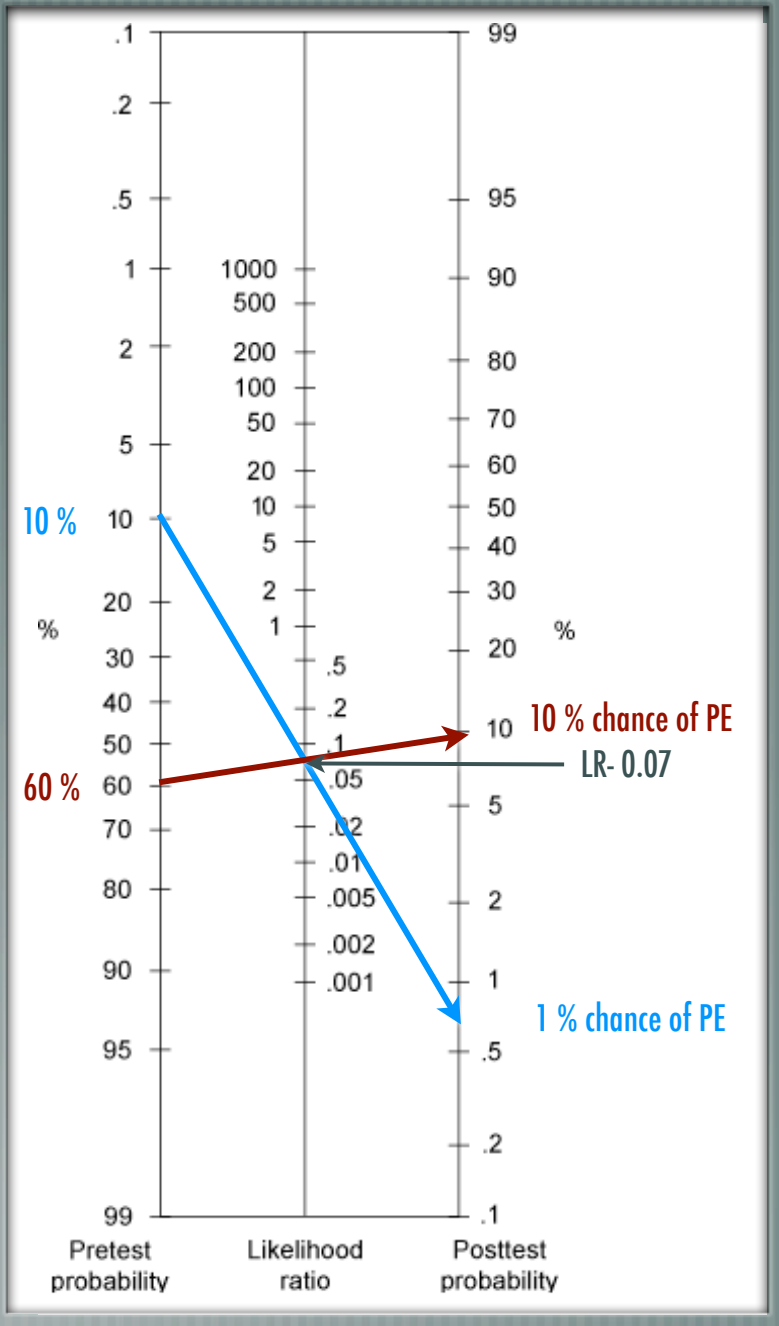
False positive = 48 %

Positive likelihood ratio = 2

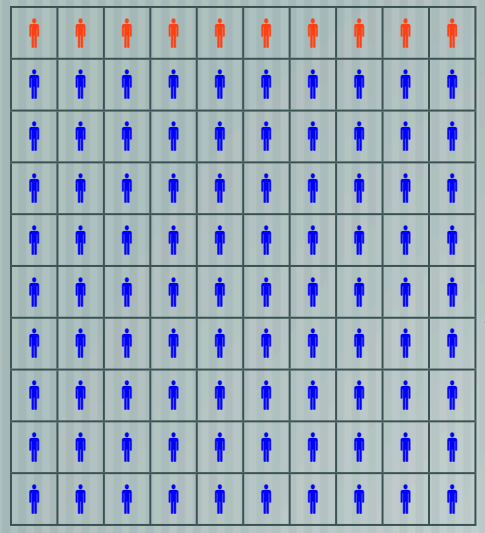
Negative likelihood ratio = 0.07

Low risk

High risk



Low clinical risk

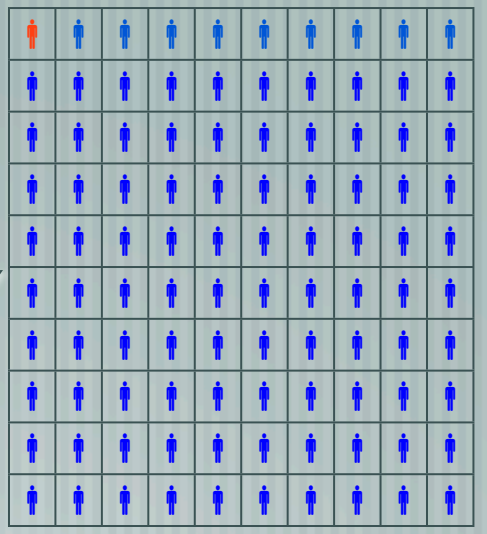


Chance of PE
(after history and exam)
10 %

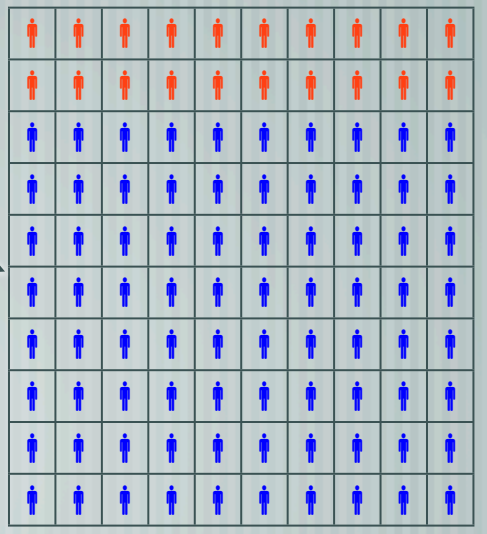
Negative
D-Dimer

LR- 0.07
LR+ 2.0

Positive
D-Dimer

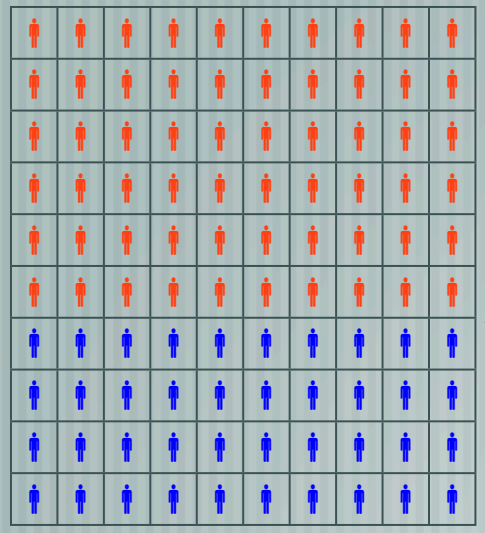


Chance of PE 1 %



Chance of PE 20 %

High clinical risk

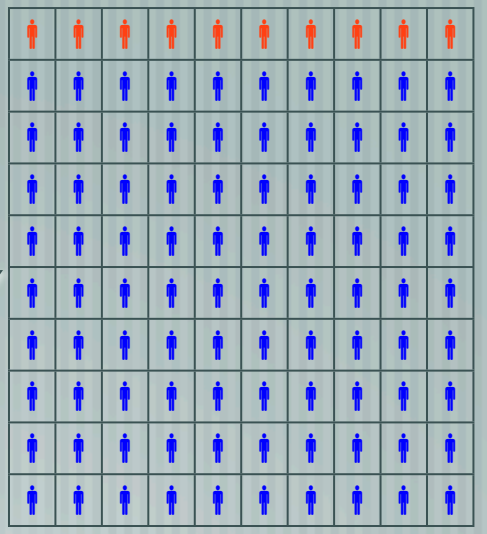


Chance of PE
(after history and exam)
60 %

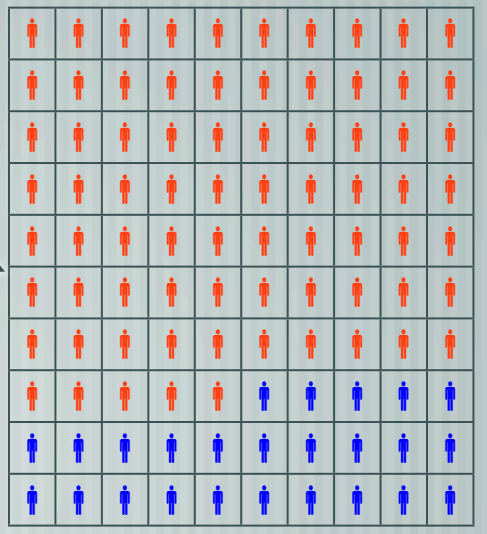
Negative
D-Dimer

LR- 0.07
LR+ 2.0

Positive
D-Dimer

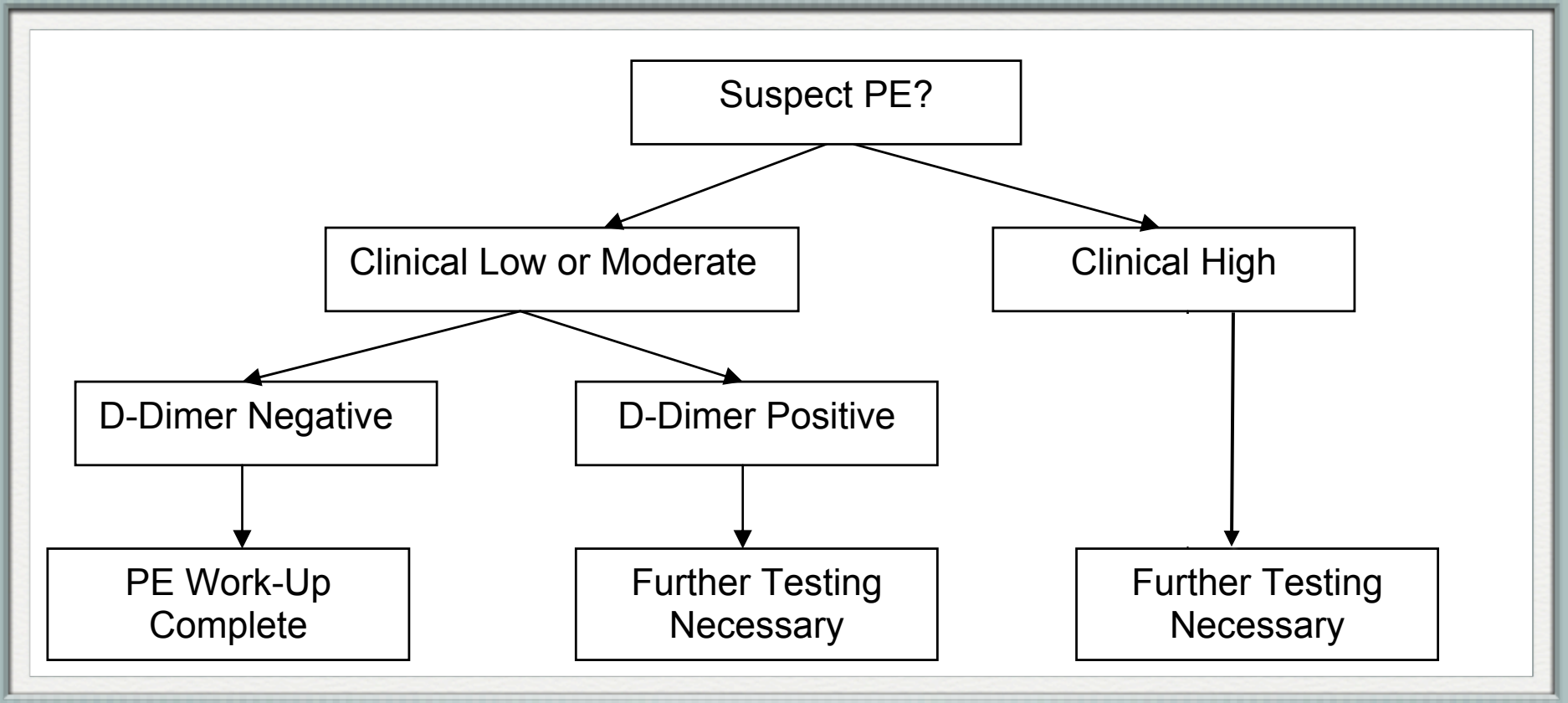


Chance of PE 10 %



Chance of PE 75 %

When is a D-dimer useful?



What is the clinical risk?

Well's criteria

Criteria	Points
Suspected DVT	3.0
An alternative diagnosis is less likely than PE	3.0
Heart rate >100 beats/min	1.5
Immobilization or surgery in the previous 4 wk	1.5
Previous DVT/PE	1.5
Hemoptysis	1.0
Malignancy (on treatment, treated in the past 6 mo or palliative)	1.0

Score Range	Mean Probability of PE, %	% With This Score	Interpretation of Risk
<2 points	3.6	40	Low
2–6 points	20.5	53	Moderate
>6 points	66.7	7	High

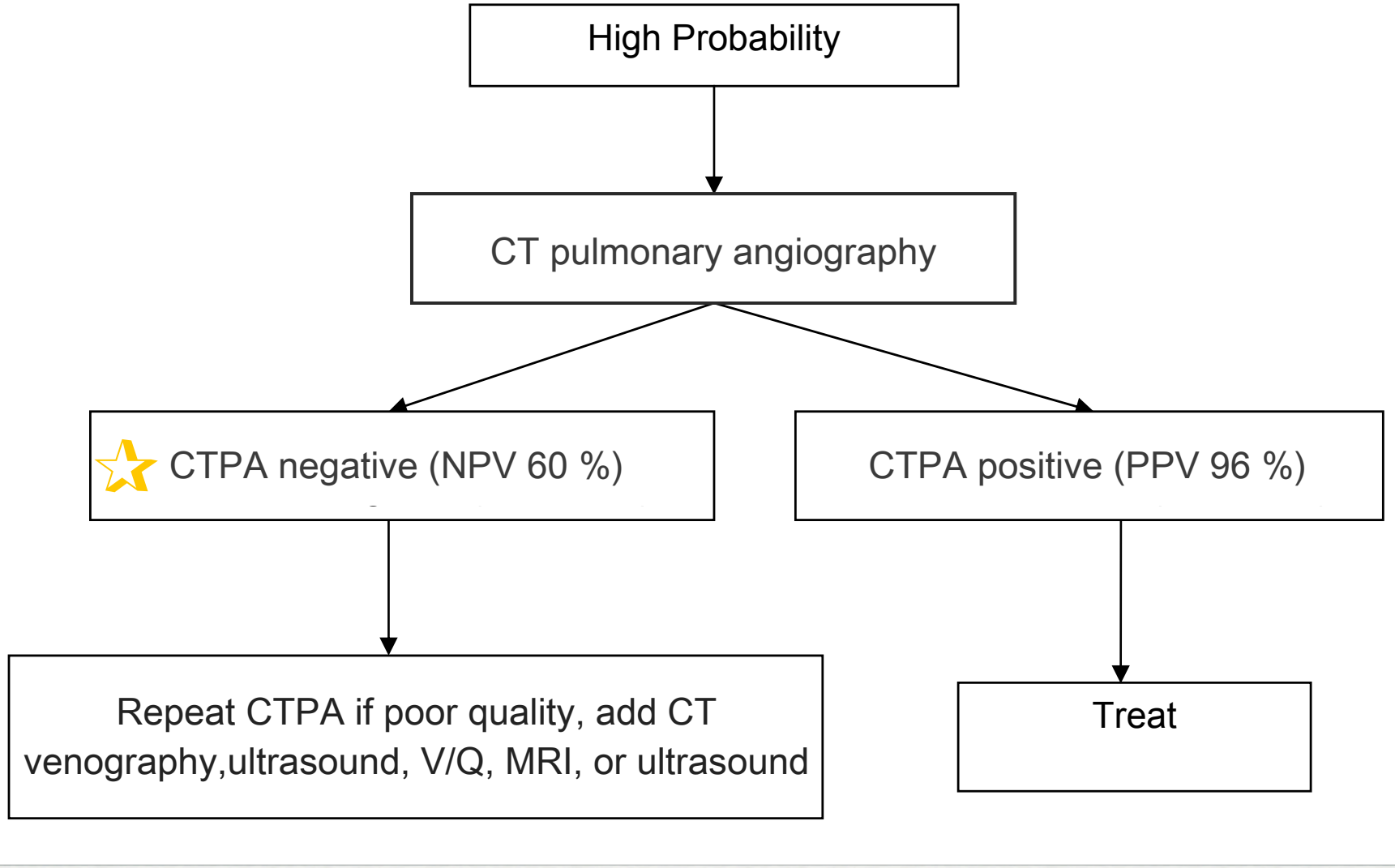
Case one - Mrs Gladys Notme

A 71-year-old woman presents with one day pleuritic left posterior chest pain, and shortnesss of breath. She was in hospital three weeks ago (1.5) with an exacerbation of COPD. She has diabetes, hypertension, and had a DVT (1.5) 10 years ago. Her temperature is 37.2°C, and her pulse is 105 beats per minute (1.5). Physical examination discloses occasional wheeze, but is otherwise unremarkable. An electrocardiogram and chest radiograph are both normal (3).

Criteria	Points
Suspected DVT	3.0
An alternative diagnosis is less likely than PE	3.0
Heart rate >100 beats/min	1.5
Immobilization or surgery in the previous 4 wk	1.5
Previous DVT/PE	1.5
Hemoptysis	1.0
Malignancy (on treatment, treated in the past 6 mo or palliative)	1.0

Score = 7.5
High risk

High risk imaging



Case two - Mr Justin Case

- A 66-year-old man presents with two days of dry cough and pleuritic right sided chest pain, one week after a flight from Peru. He is otherwise well, with no relevant past illness. His temperature is 37.2°C, and his pulse is 80 beats per minute. Physical examination, electrocardiogram and chest radiograph are all normal.
- What is your approach?

Case two - Mr Justin Case

A 66-year-old man presents with two days of dry cough and pleuritic right sided chest pain, one week after a flight from Mexico (1.5). He is otherwise well, with no relevant past illness. His temperature is 37.2°C, and his pulse is 80 beats per minute. Physical examination, electrocardiogram and chest radiograph are all normal.

Criteria	Points
Suspected DVT	3.0
An alternative diagnosis is less likely than PE	3.0
Heart rate >100 beats/min	1.5
Immobilization or surgery in the previous 4 wk	1.5
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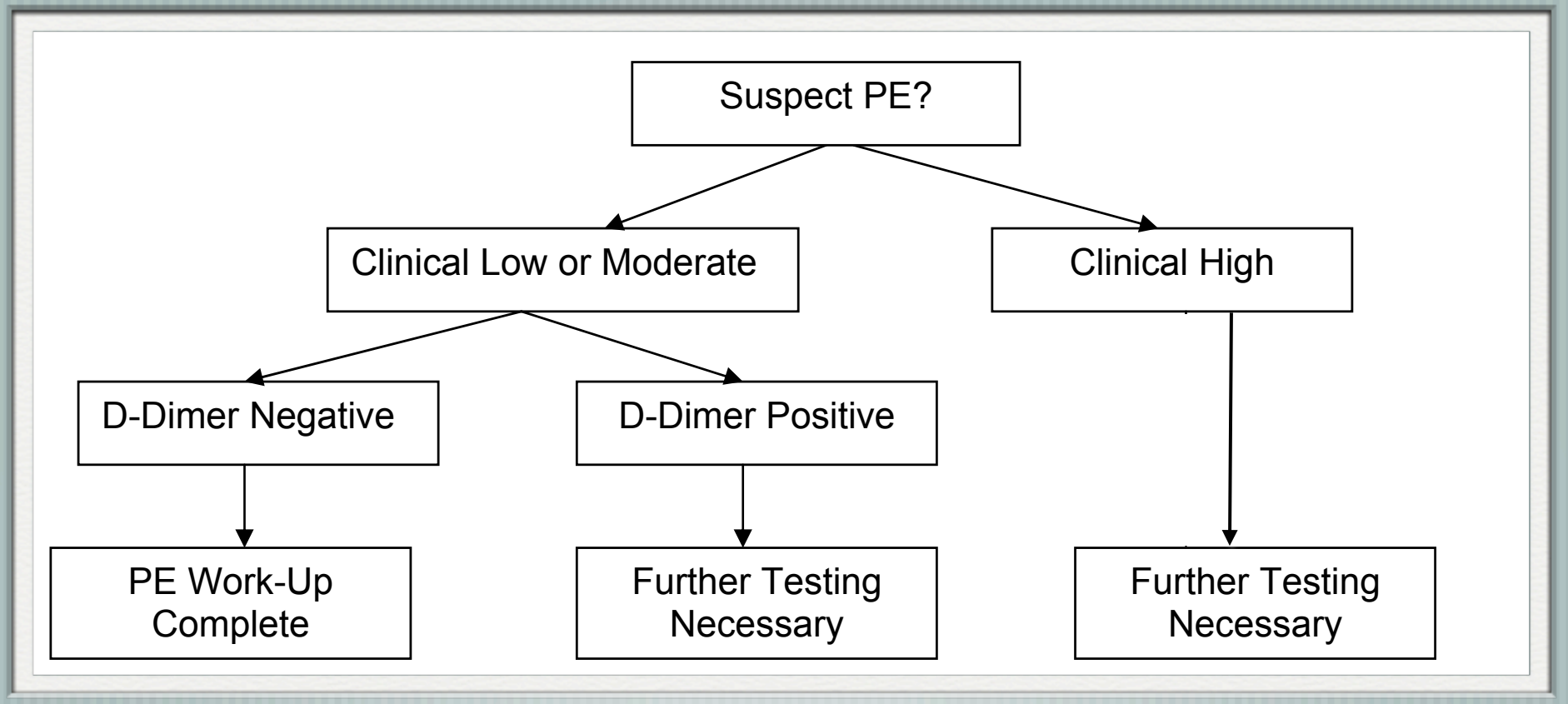
Hemoptysis	1.0
Malignancy (on treatment, treated in the past 6 mo or palliative)	1.0

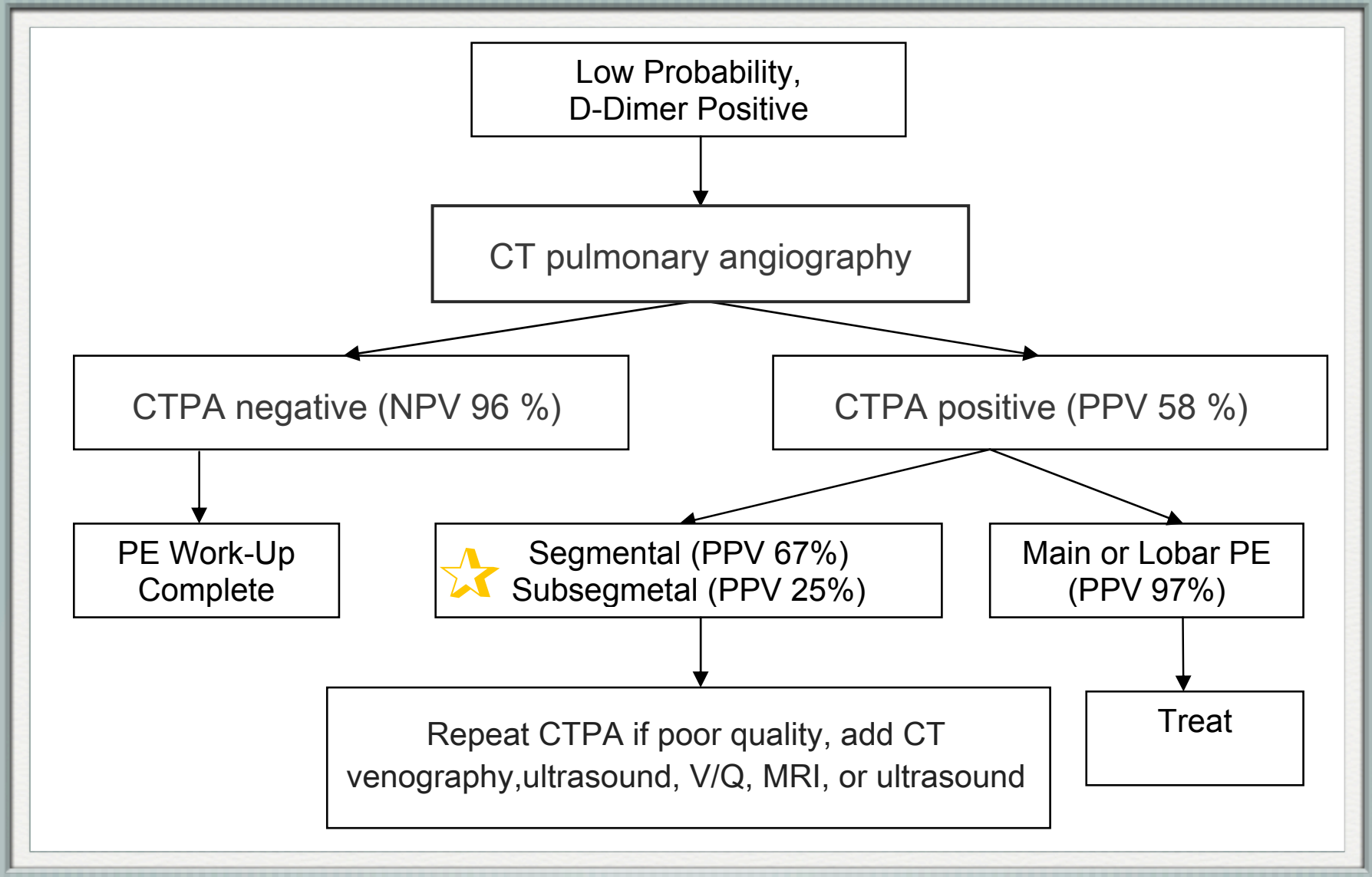
Score Range	Mean Probability of PE, %	% With This Score	Interpretation of Risk
<2 points	3.6	40	Low
2–6 points	20.5	53	Moderate
>6 points	66.7	7	High

Score = 1.5
Low risk

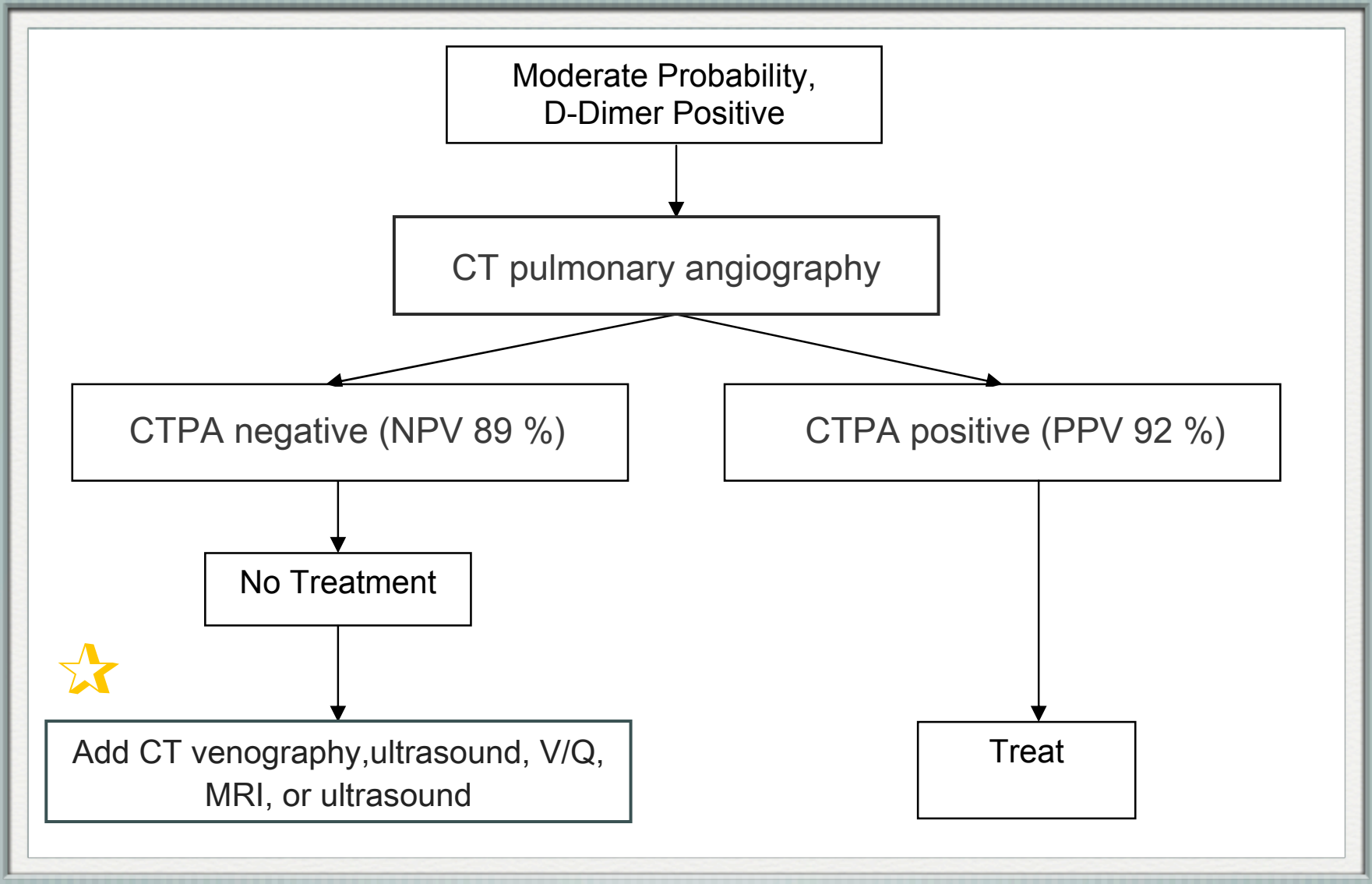
Rule out pulmonary embolism



Low risk imaging



Intermediate risk imaging



Case three - Mr Knut Tuscick

- A 34-year-old man woke today with pleuritic right sided chest pain, partially relieved with neurofen. He has no associated symptoms. He is otherwise well, but not very fit. The tree planting he attended yesterday was his first really hard physical exertion for months. He has no relevant past illness and takes no medications. His temperature is 36°C, and his pulse is 80 beats per minute. Physical examination, electrocardiogram and chest radiograph are all normal.

- What is your approach?

"No risk" of pulmonary embolism

- Pulmonary Embolism Rule-out Criteria (PERC)
- Likelihood ratio of 0.17
- No fatal PE in 1500 patients

PERC
(Workup if any one abnormal)
Age < 50
Pulse <100
Oxygen saturation > 94%
No unilateral leg swelling
No haemoptysis
No recent surgery or trauma
No prior PE or DVT
No hormone use

Case four - Ms Sophia Choice

- A 28-year-old woman who is 32 weeks pregnant presents with three days of severe pleuritic left chest pain and shortnesss of breath. The pregnancy has been unremarkable, and she has no relevant past illnesses. Her temperature is 37.2°C, and her pulse is 105 beats per minute. An electrocardiogram and chest radiograph are both normal. D-dimer is positive and lower limb doppler is negative.
- What is your approach

V/Q or CTPA?

V / Q scan

- 1 mSv radiation
  - 99mTc albumin 0.9 mSv
  - 133Xe <0.01 mSv
- Radiation reaches foetus in blood and from bladder
- Indeterminate scans common (but less so in the young)

CTPA

- 14 mSv radiation to mother
- Only 1 % scatters to embryo
- 0.14 mSv to foetus (T3)

Risks of radiation

- **For foetus**
  - Increased risk of childhood cancer
    - V/Q by 1 in 280,000
    - CTPA by 1 in 1,000,000
  - (100 mSv needed for CNS malformations)
- **For mother**
  - Increased risk of breast cancer
    - V/Q - practically no increase
    - CTPA 1 in 2000
    - From a background risk of 10 in 2000 to 11 in 2000

Conclusion

Summary

- ~~Pleuritic chest pain excludes acute coronary syndrome~~
- ~~Pleuritic chest pain = pulmonary embolus~~
- D-Dimer should be used in low and intermediate risk patients (not "no risk" or high risk patients)
  - negative excludes PE
  - positive requires further testing
- Consider further testing when CTPA disagrees with clinical picture
- Inform pregnant patients of radiation risks

Questions?

References

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