The Aorta…The Clinical Chameleon.

Angie Carrick, DO, FACOEP, FACEP
APD Norman Regional EM Residency
Co-Director Stroke Program

No disclosures.

I just like to teach!

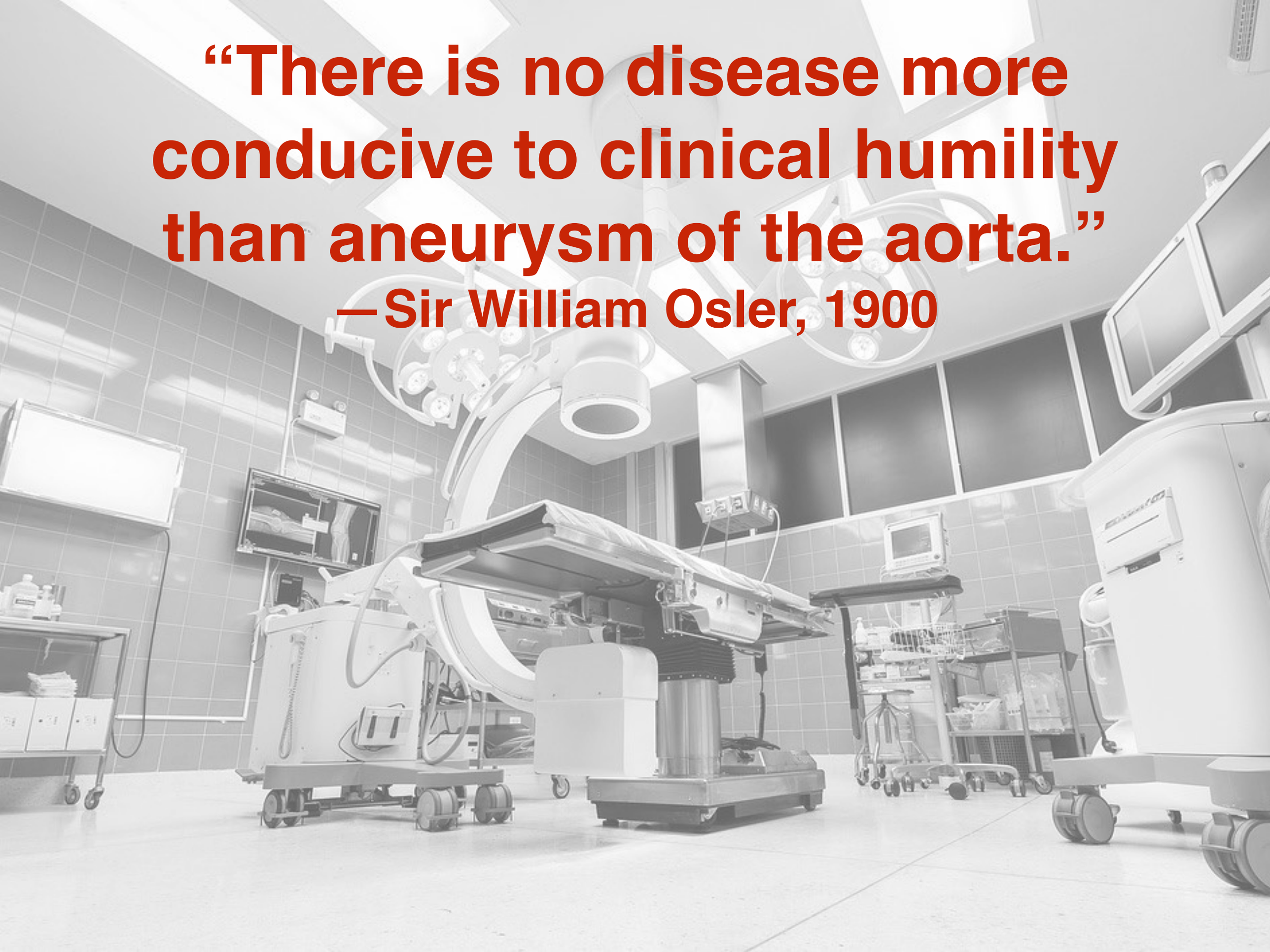
Objectives

1. **Confront the diagnostic challenge that is Aortic Dissection.**

2. **Identify key historical points that should raise your suspicion for dissection.**

3. **Discuss essential exam components in your patients with probable dissection.**

4. **Examine important risk factors to ask these patients.**

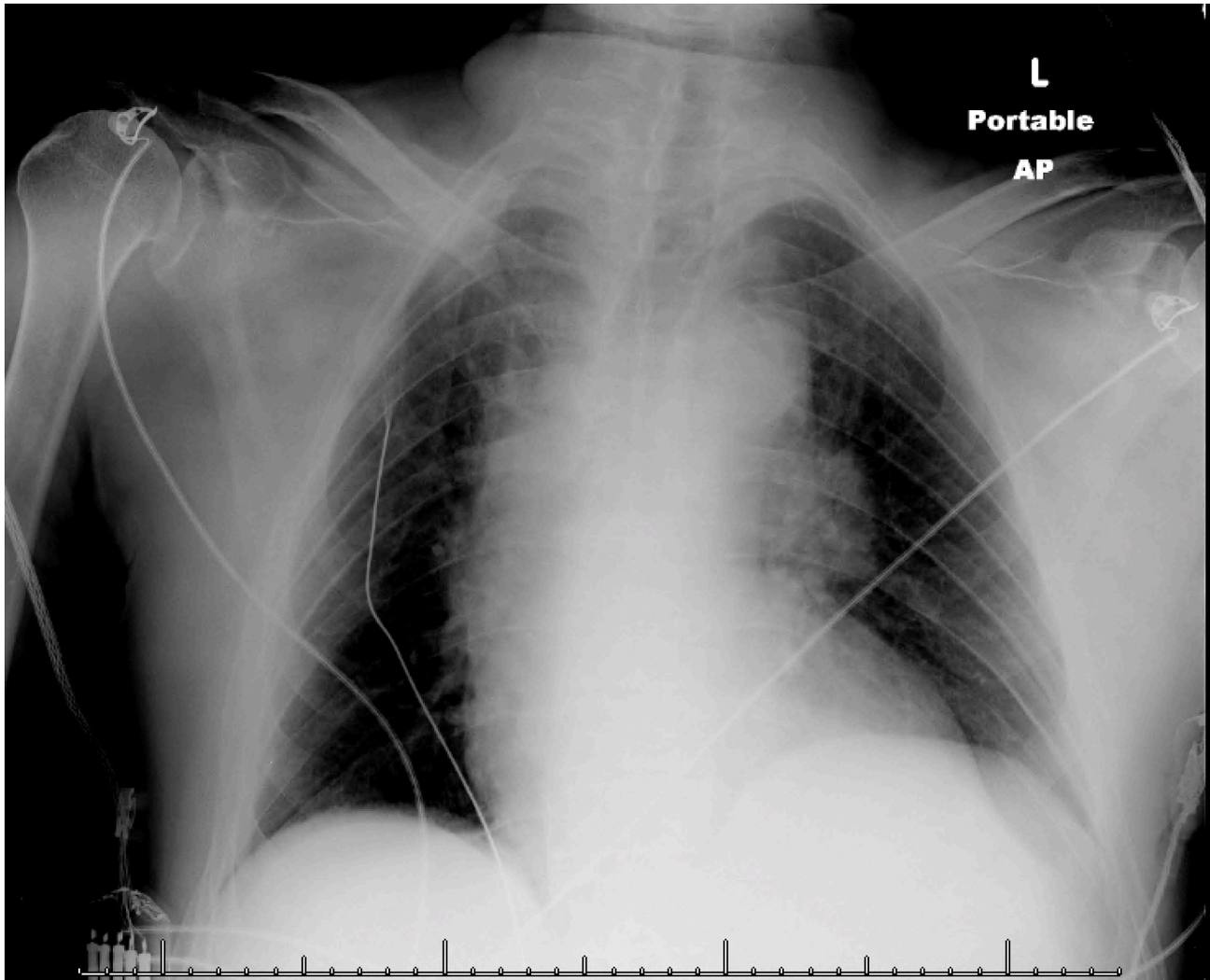


“There is no disease more conducive to clinical humility than aneurysm of the aorta.”

—Sir William Osler, 1900

15-43%

Classic Triad in only 1/4



4/100,000

"Listen to your patient, he is telling you the diagnosis."
—Sir William Osler

Lesson #1
The History

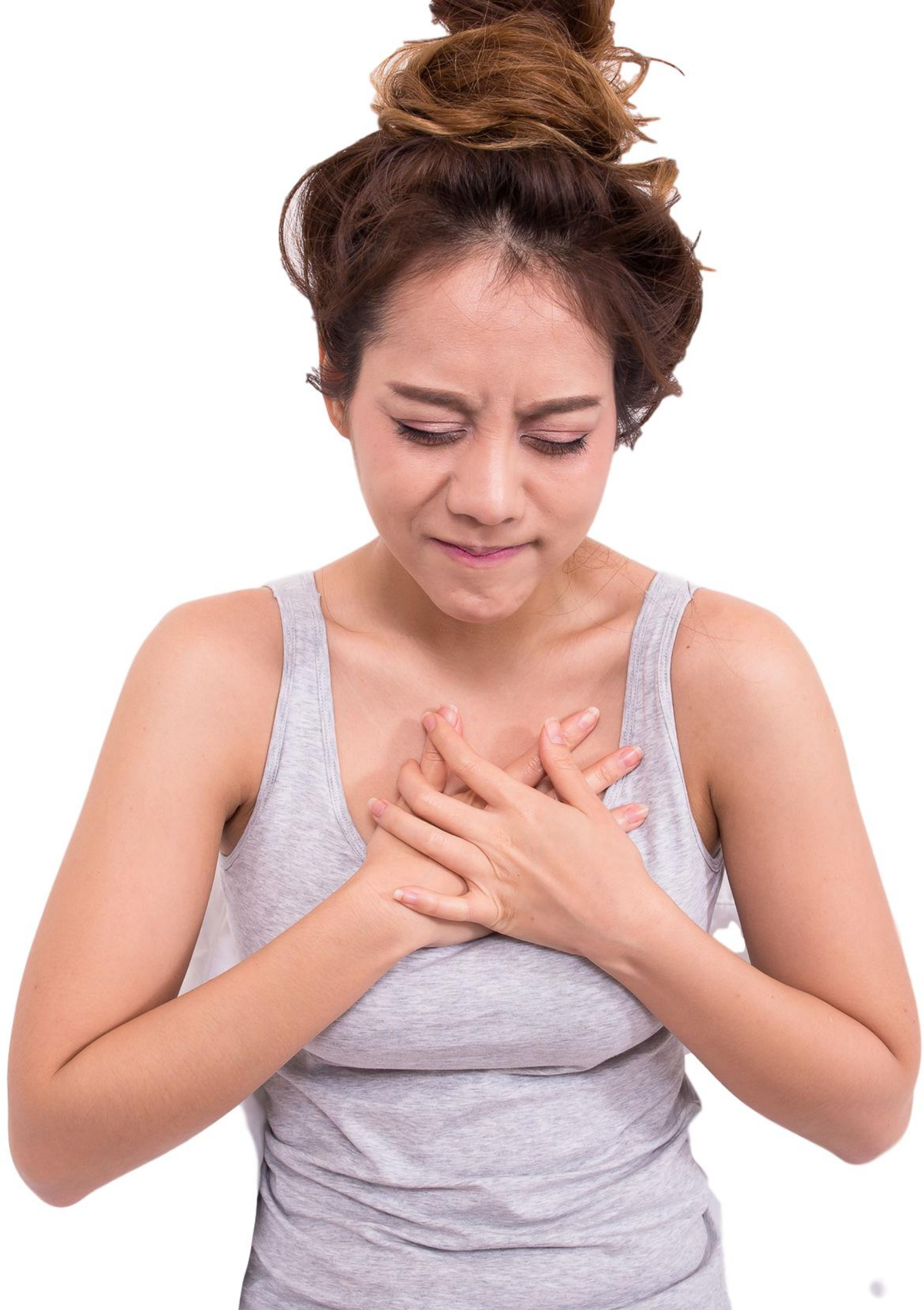
41 yo F

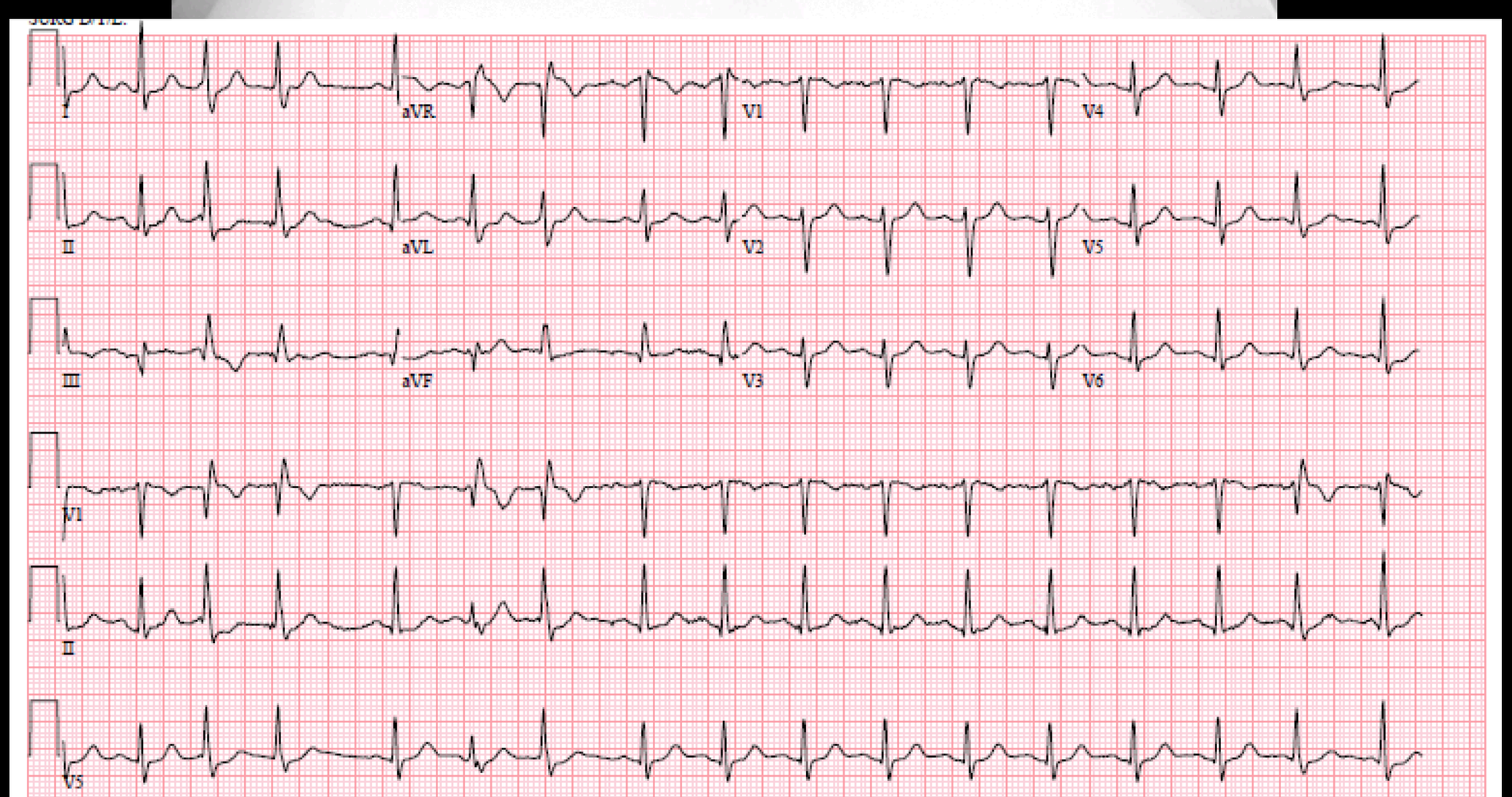
CC: CP, confused

PMH: HTN, GERD

VS: T 36.7 P 107 BP 140/90 RR 14, Sat 99%

Notes: onset 10 min. PTA
CP: severe, rad to neck
L arm numb
“using words inapp.
not making sense”

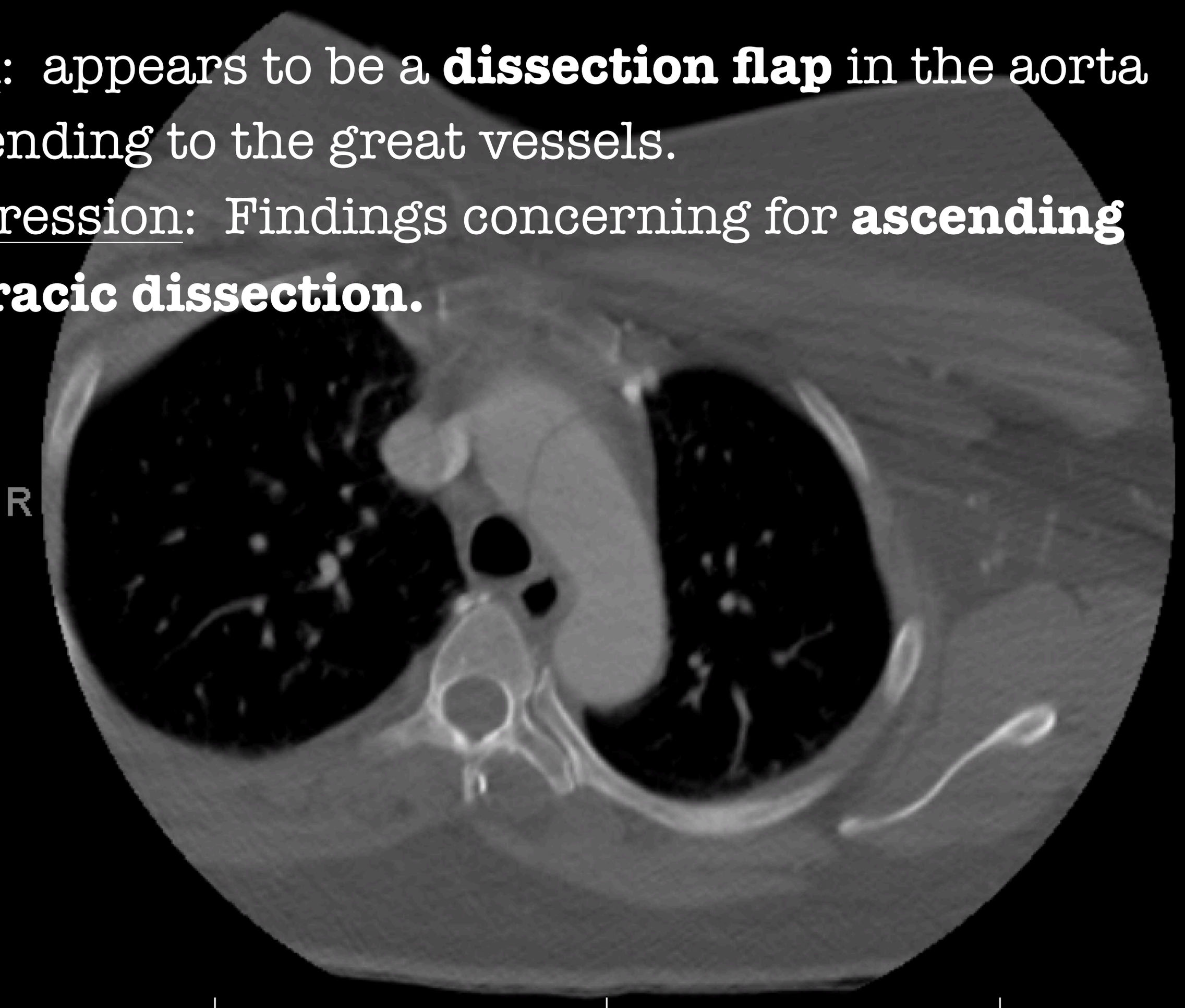



I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
II
V5

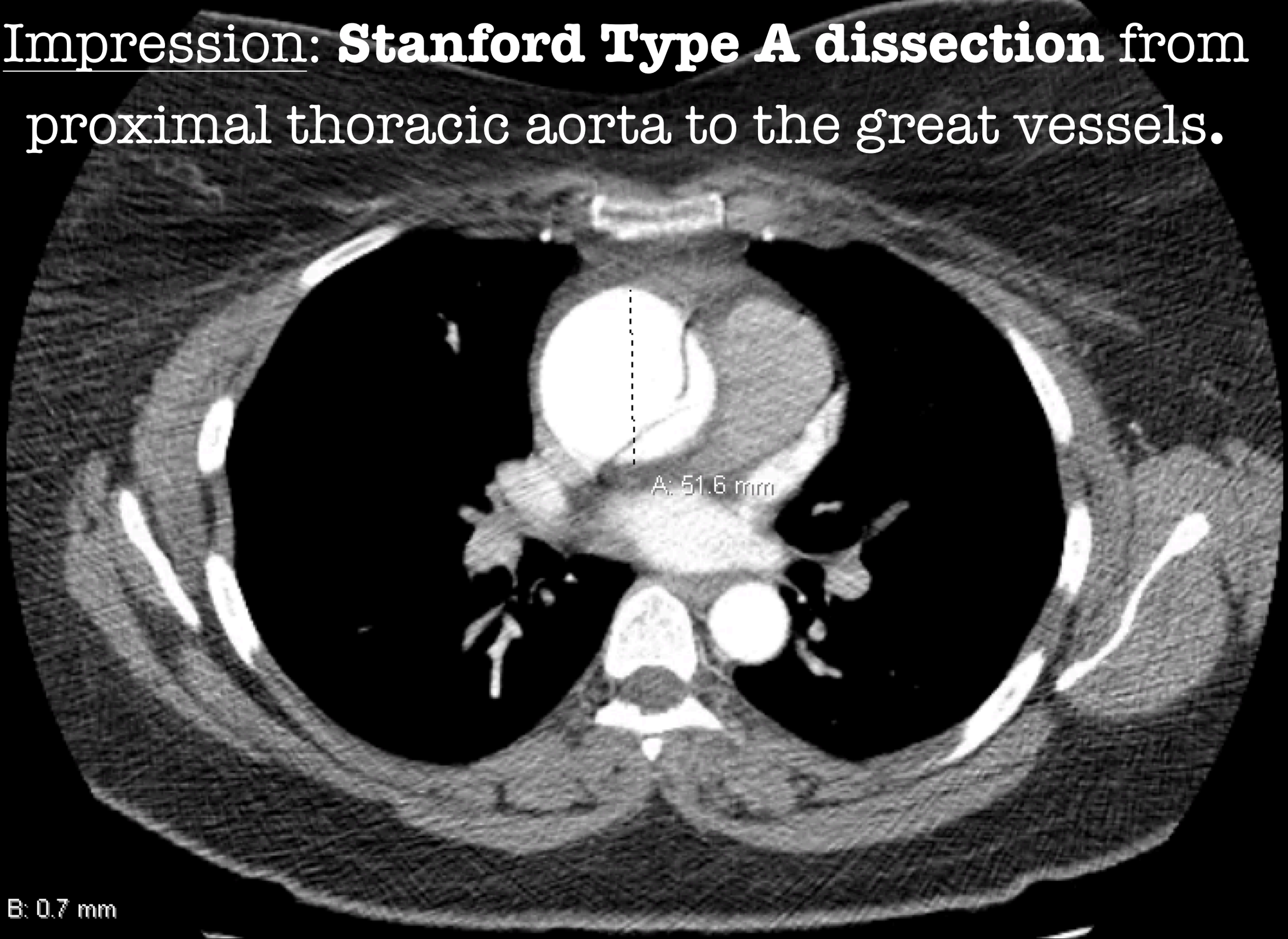
CT Head: No acute changes

CTA: appears to be a **dissection flap** in the aorta extending to the great vessels.

Impression: Findings concerning for **ascending thoracic dissection.**



CTA: ascending aorta dilated up to 5.2 cm.
Impression: **Stanford Type A dissection** from proximal thoracic aorta to the great vessels.



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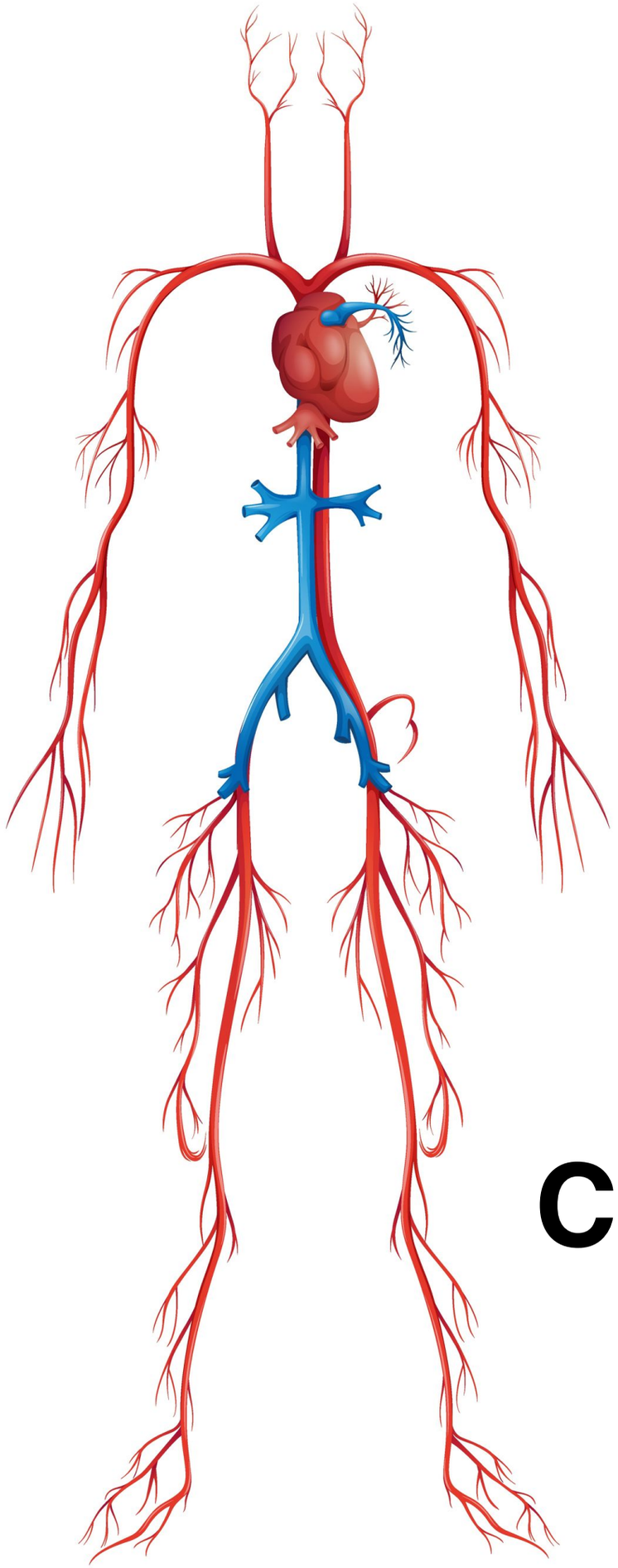


5% **present as CVA**

CP + neuro deficit = LR 33

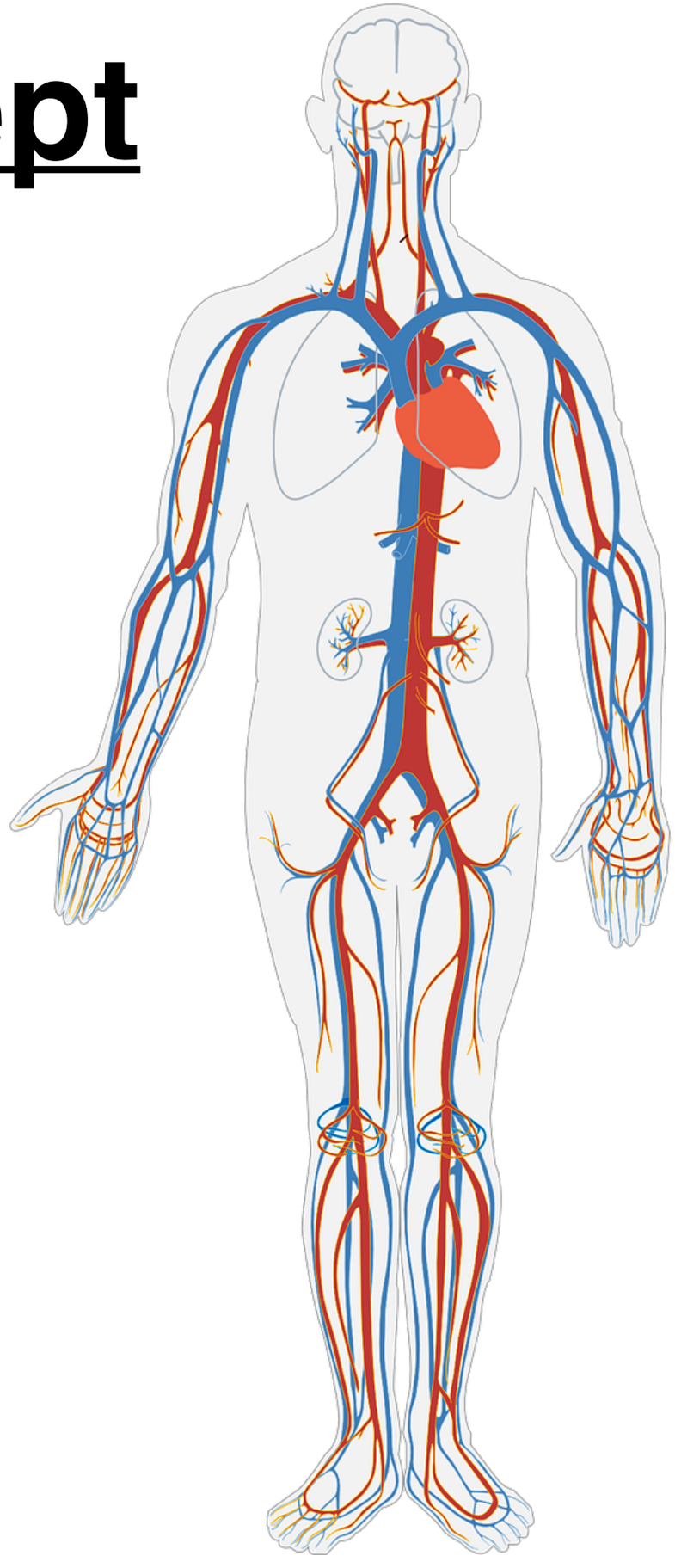
“CP + 1” Concept

CP + CVA

CP + Paralysis

CP + Limb ischemia

CP + Syncope



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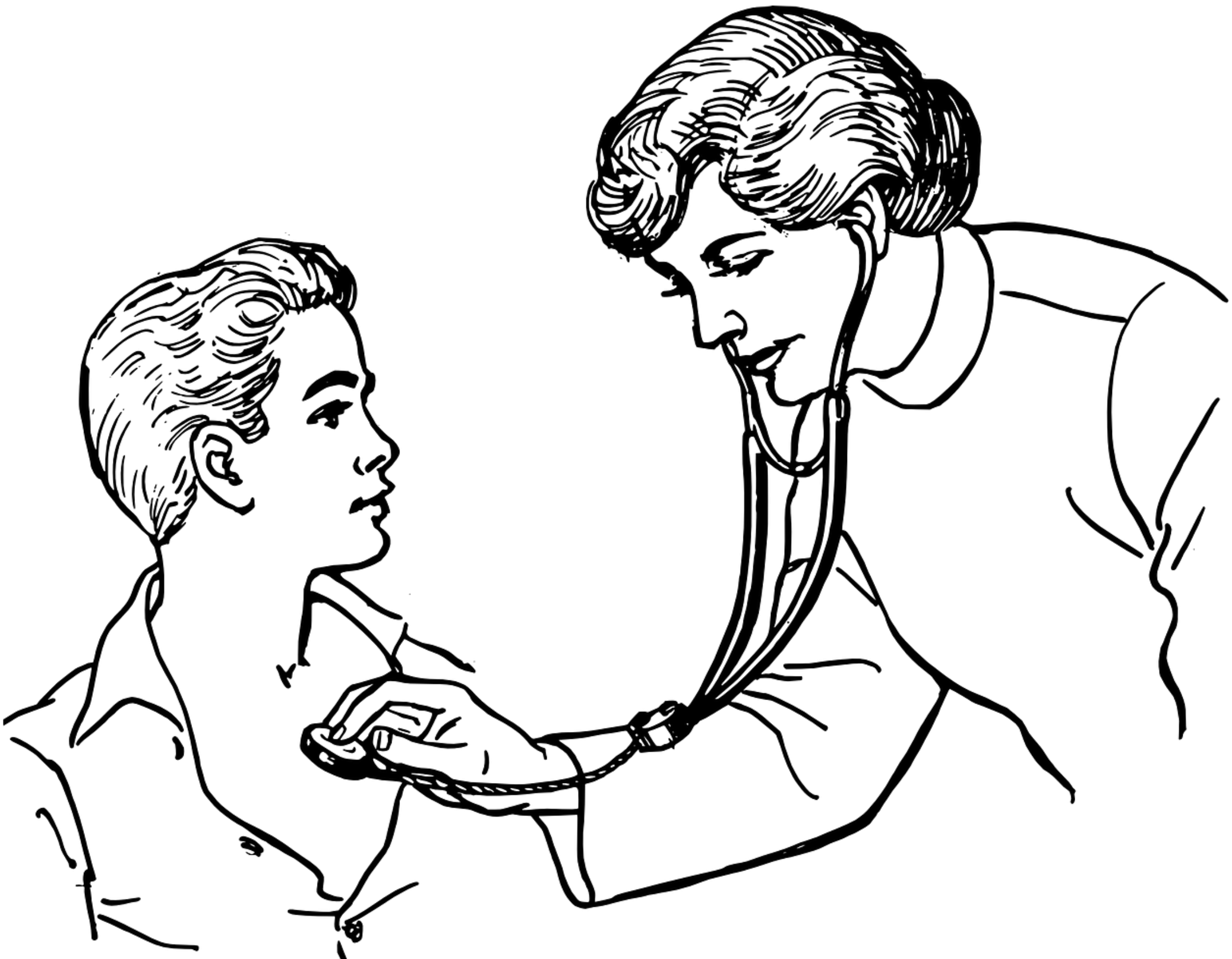
Lesson #2: The Exam



73 yo M

CC: CP

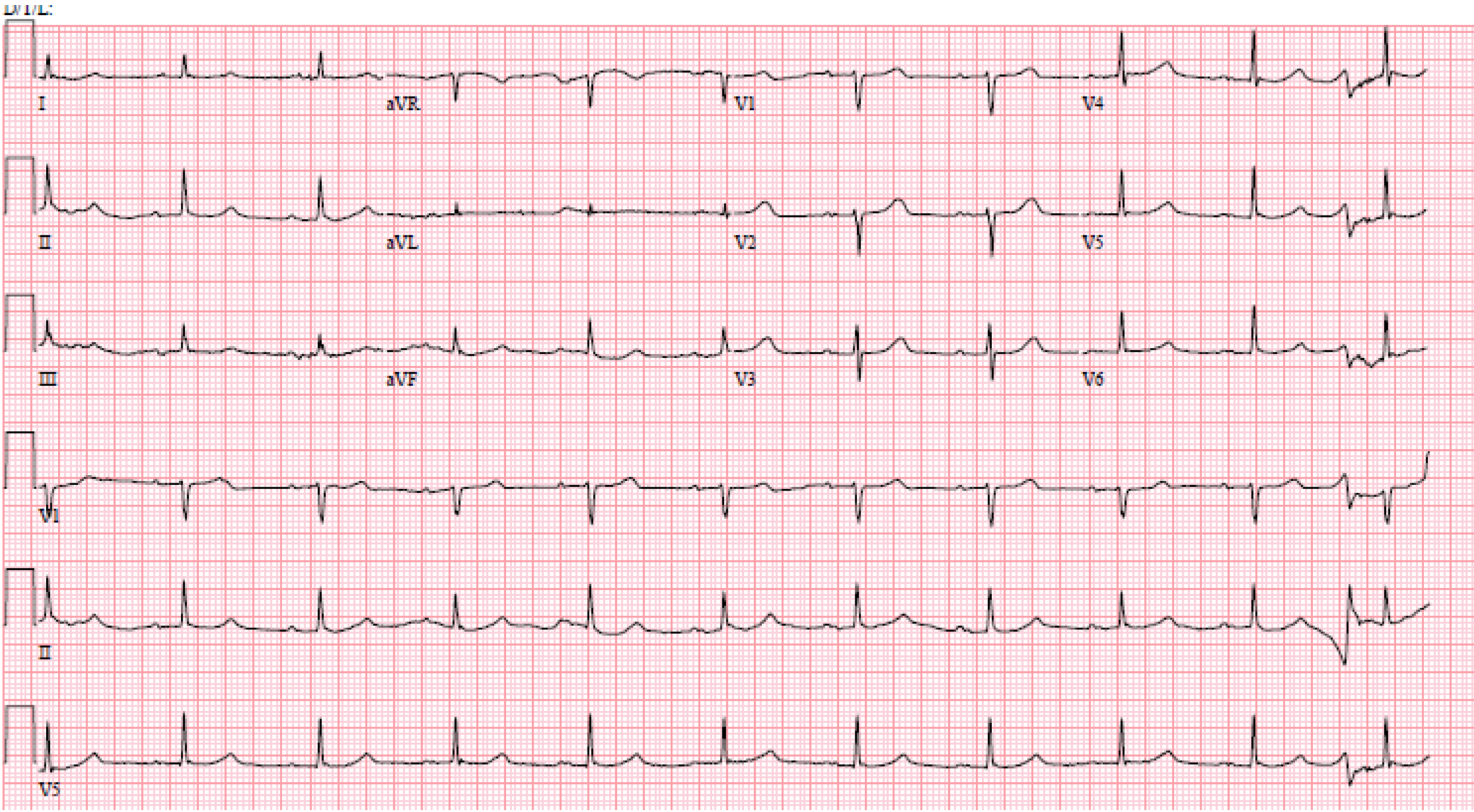
PMH: HTN

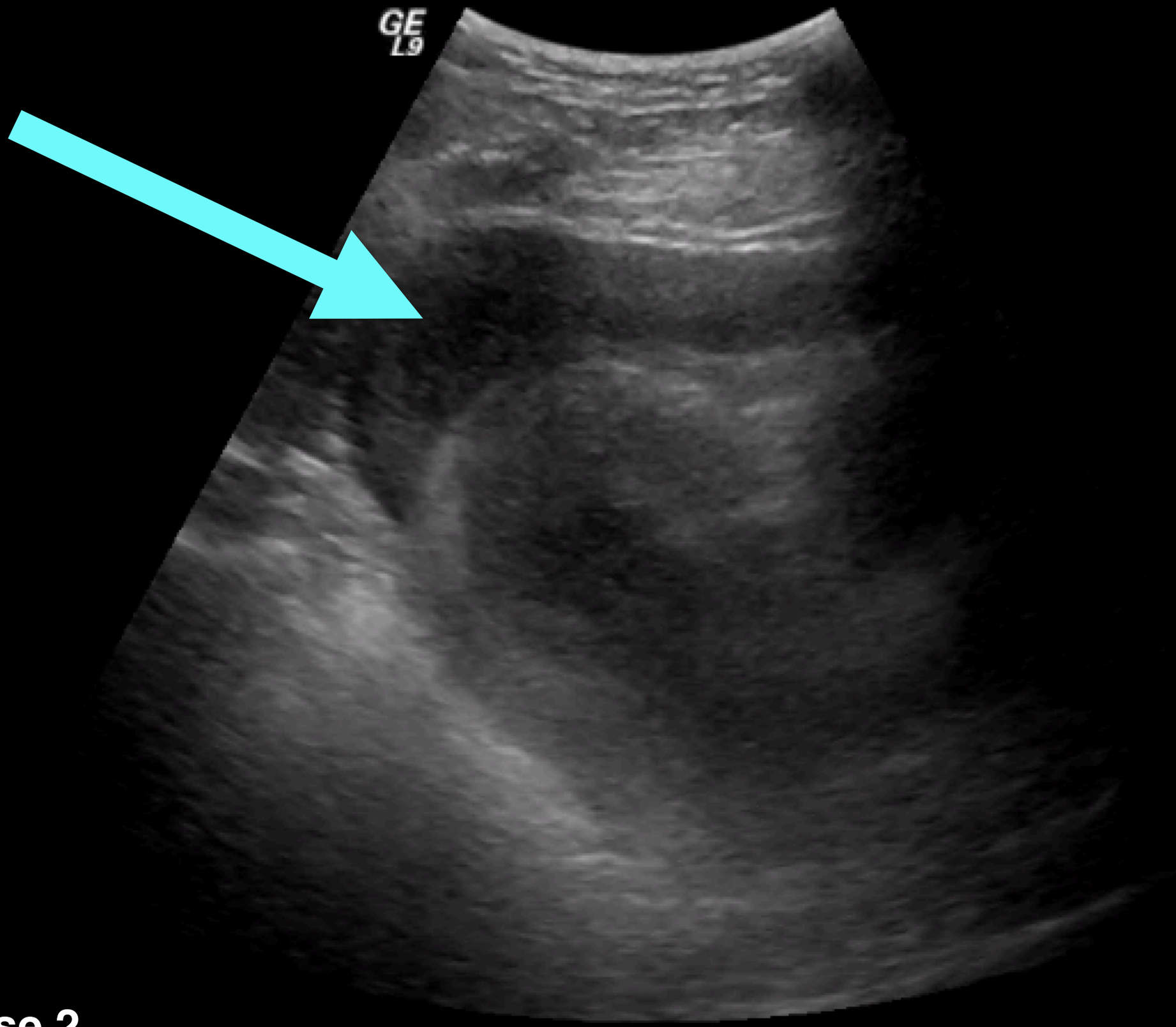
VS: T 98 P 62 BP 98/38
RR 16, Sat 97%

Notes: acute pain sitting @ breakfast 90 min. PTA
near syncope
EMS: confused
bradycardia 40s
given atropine

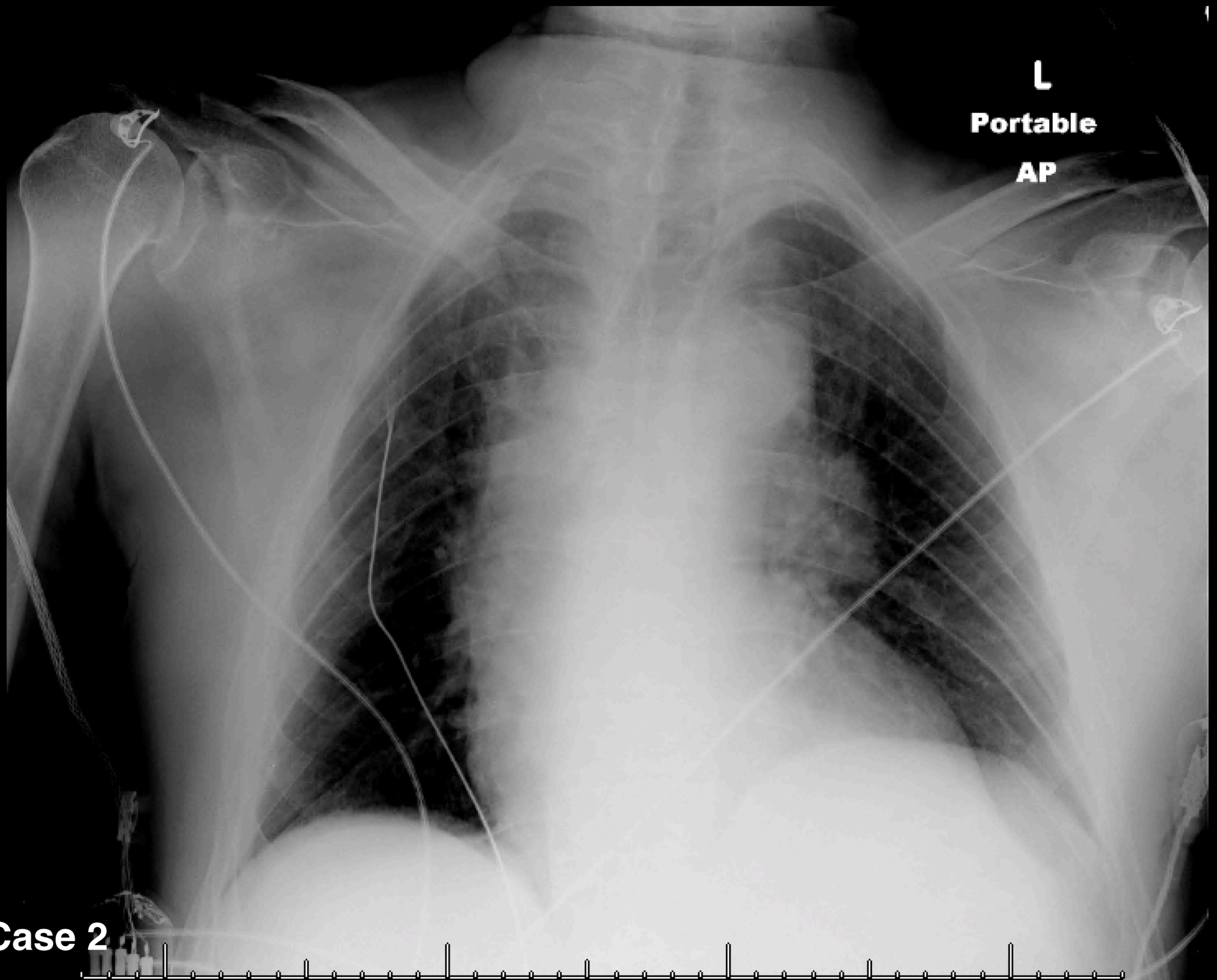

CPR

Case 2





Case 2

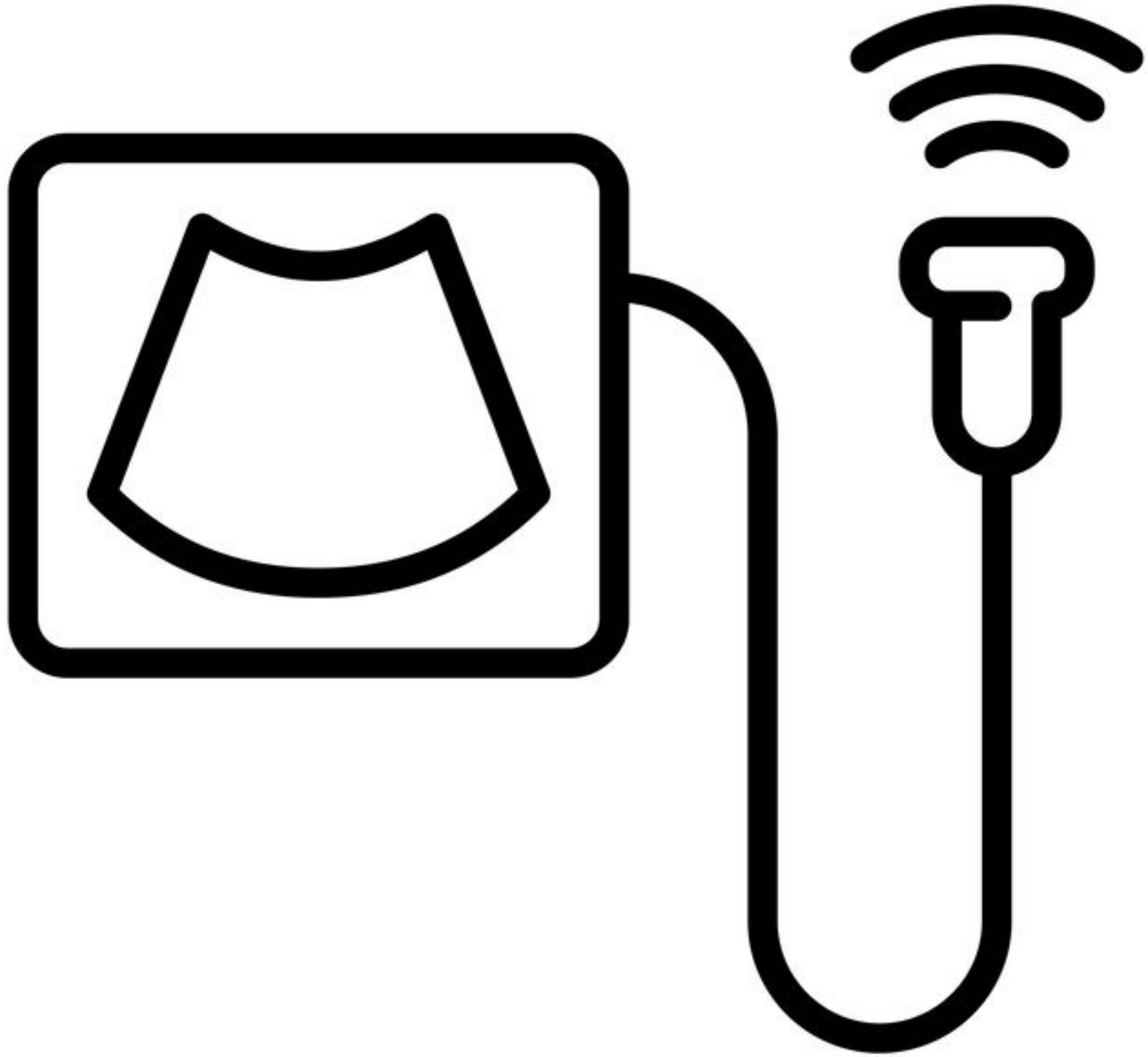


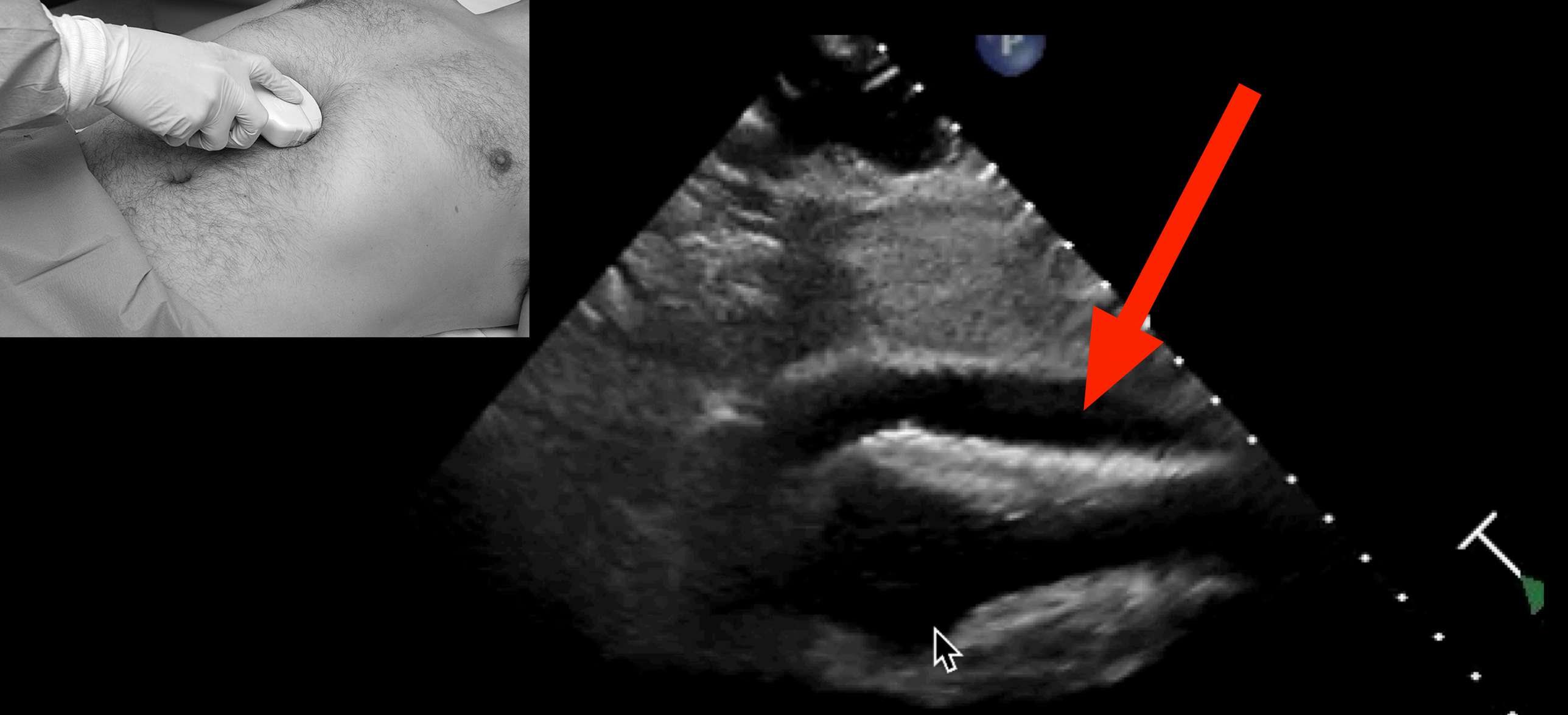
Case 2

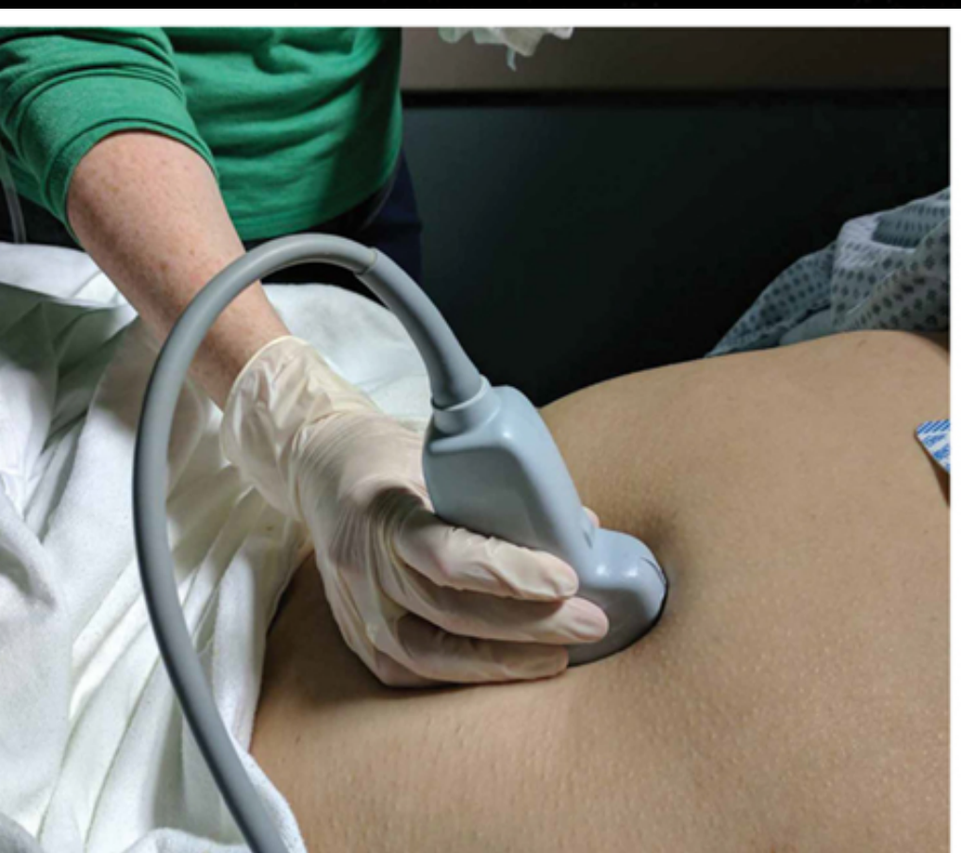
Case 2

POCUS

- **Bedside**
- **Unstable patients**
- **Rapid Diagnosis**



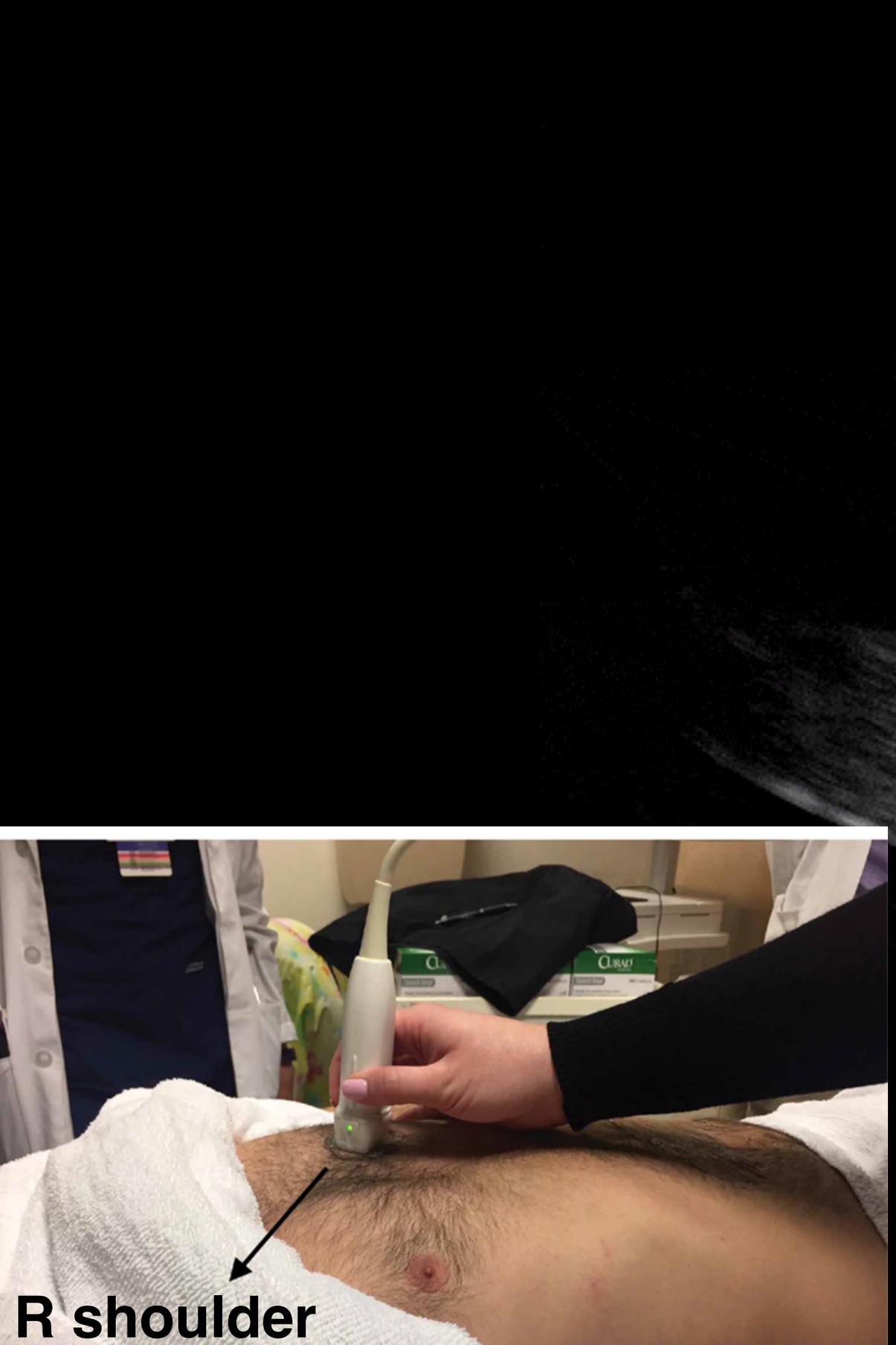




domen

16.2 cm

G: 50
DR: 0
MB
THI

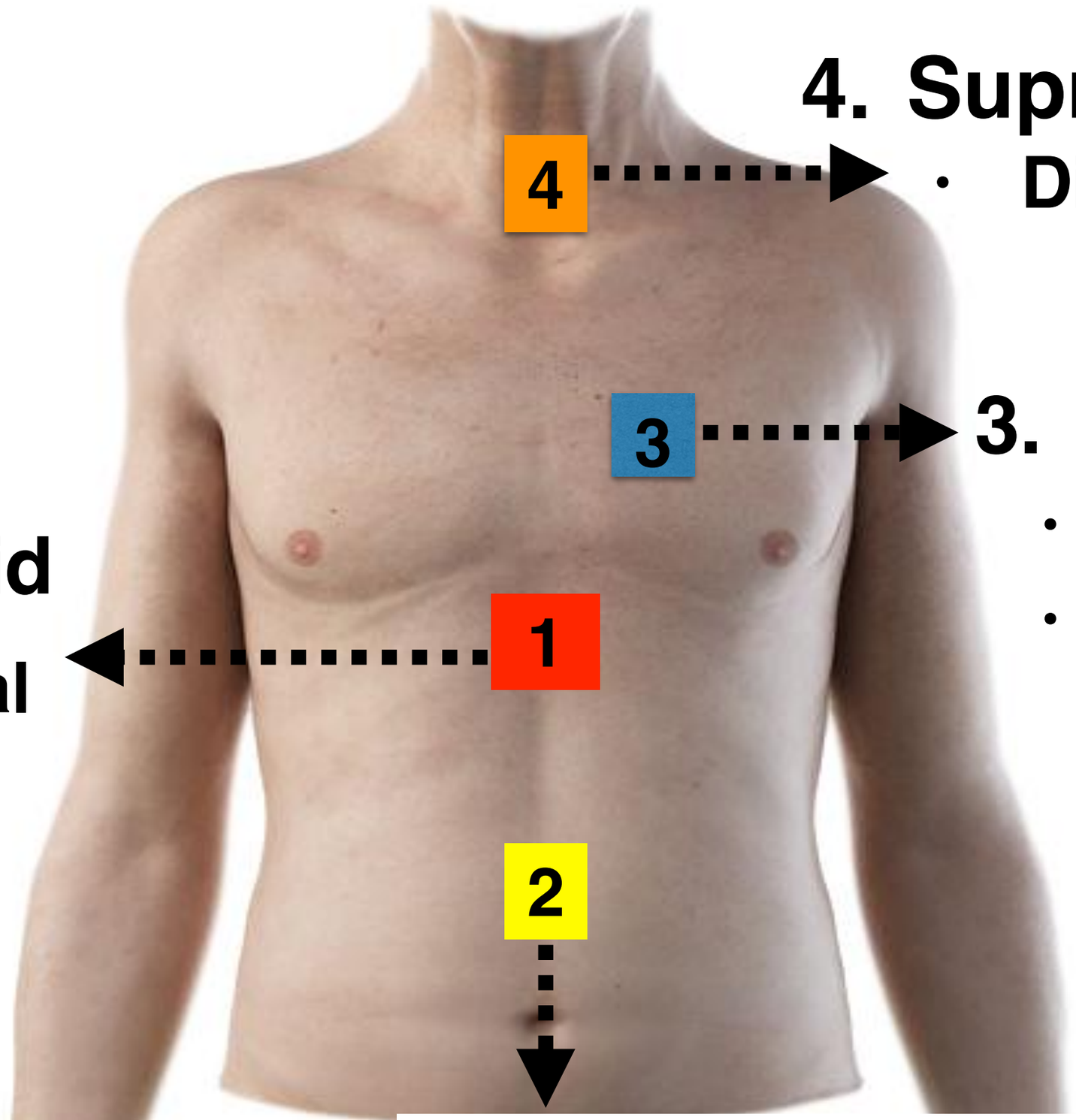


15.0 cm

2D: G: 50
Gen


Cardiac
: 0.6
15.0 cm
2D:
Gen
THI

POCUS



4. Suprasternal
   - Dilated arch

3. PSL
   - Flap
   - Dilated arch

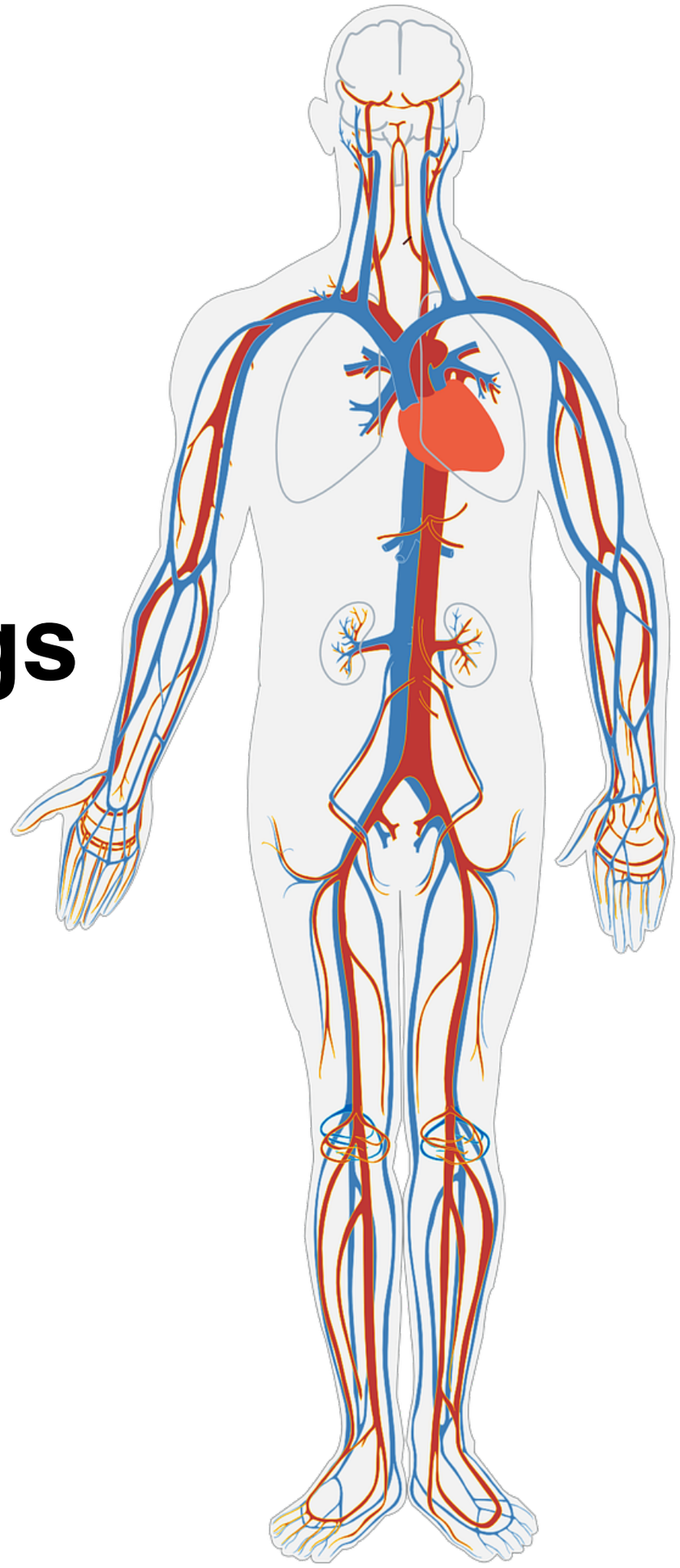
1. Subxiphoid
   - Pericardial effusion

3. Abd Aorta: Dilation & Flap

ACEP Policy Statement

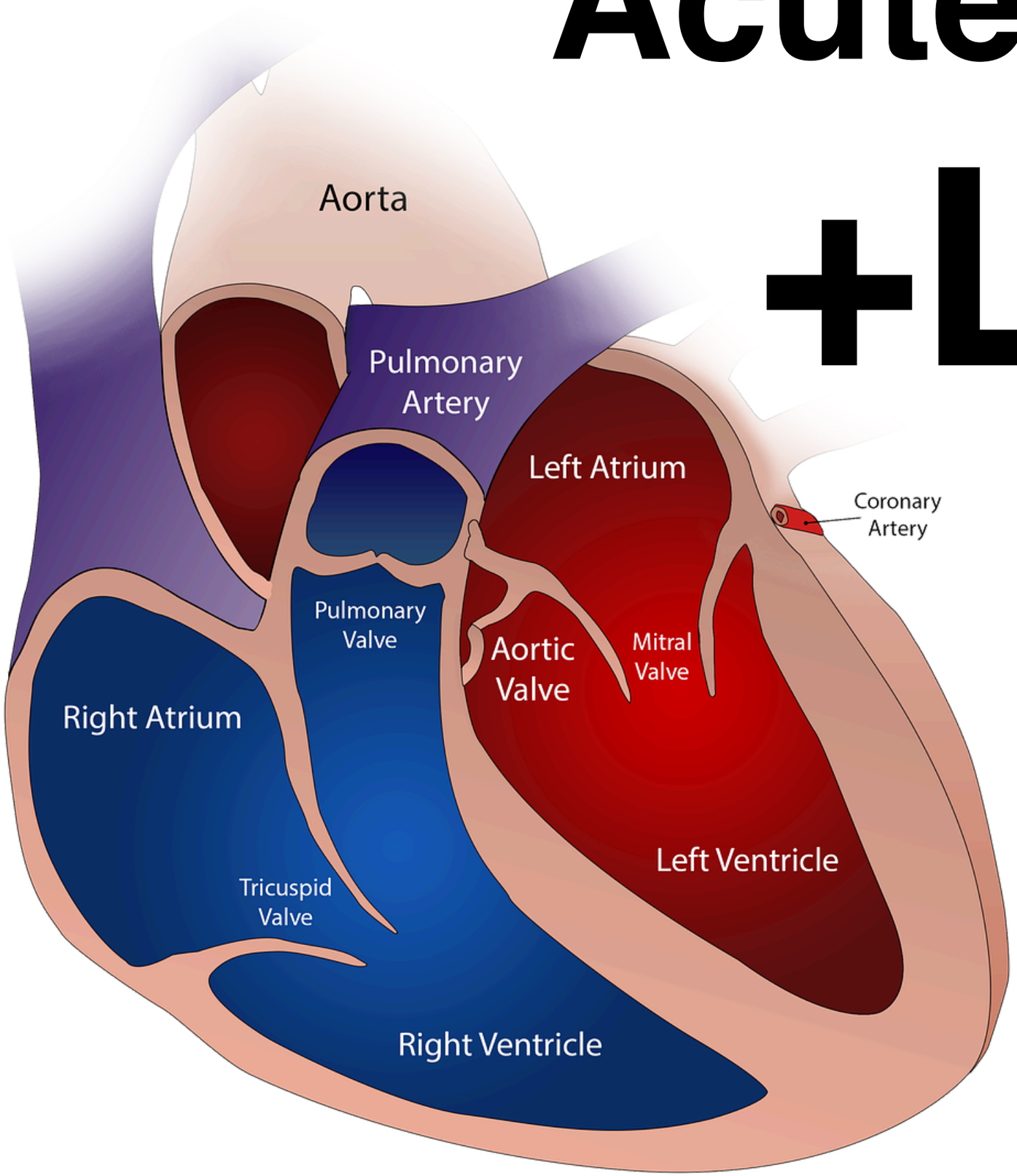
- **Level C: "In adult patients with suspected dissection, immediate surgical consultation or transfer to a higher level of care should be considered if a TTE is suggestive of aortic dissection."**

Additional exam findings



Acute AR 30%

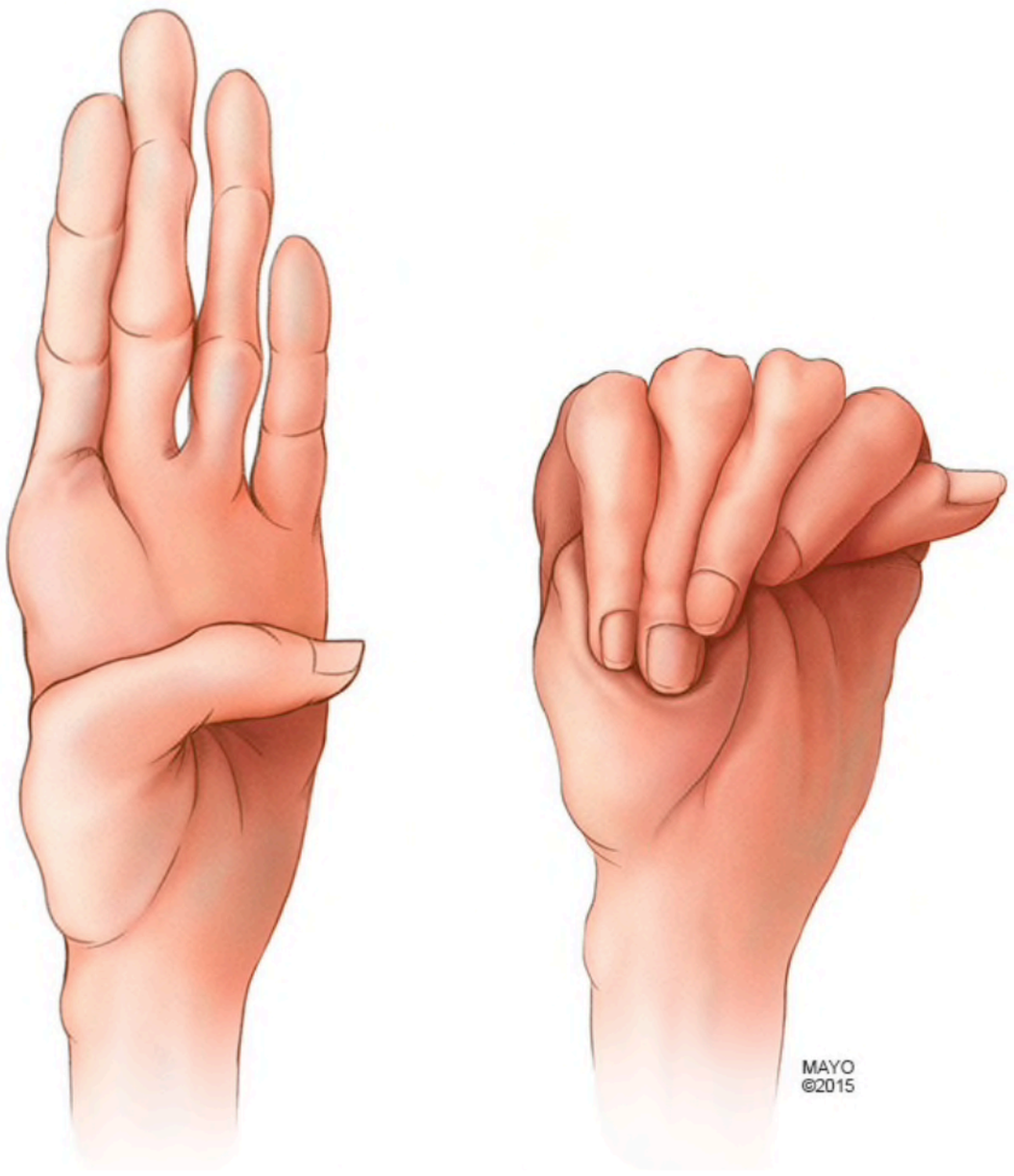
+LR=5



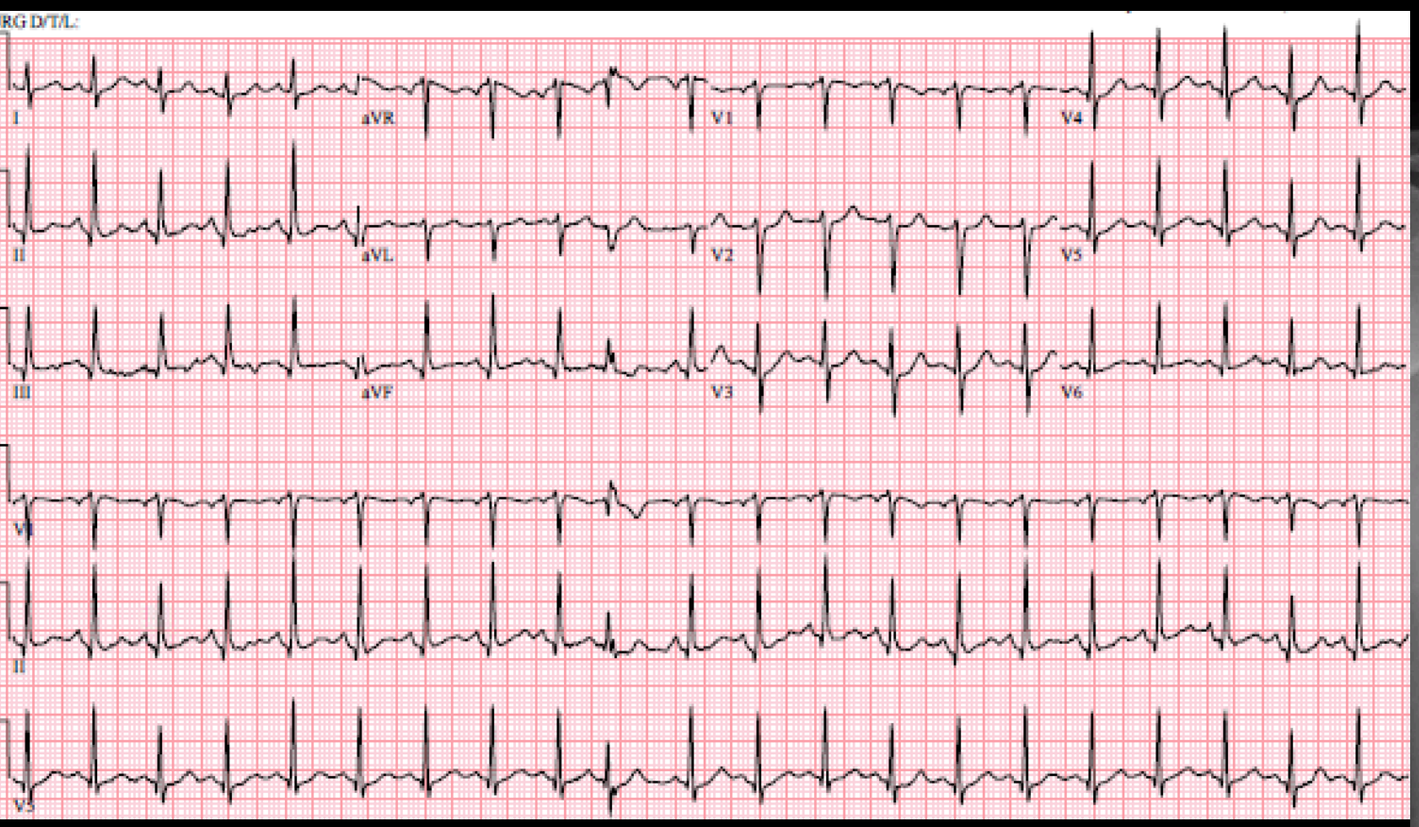
15%

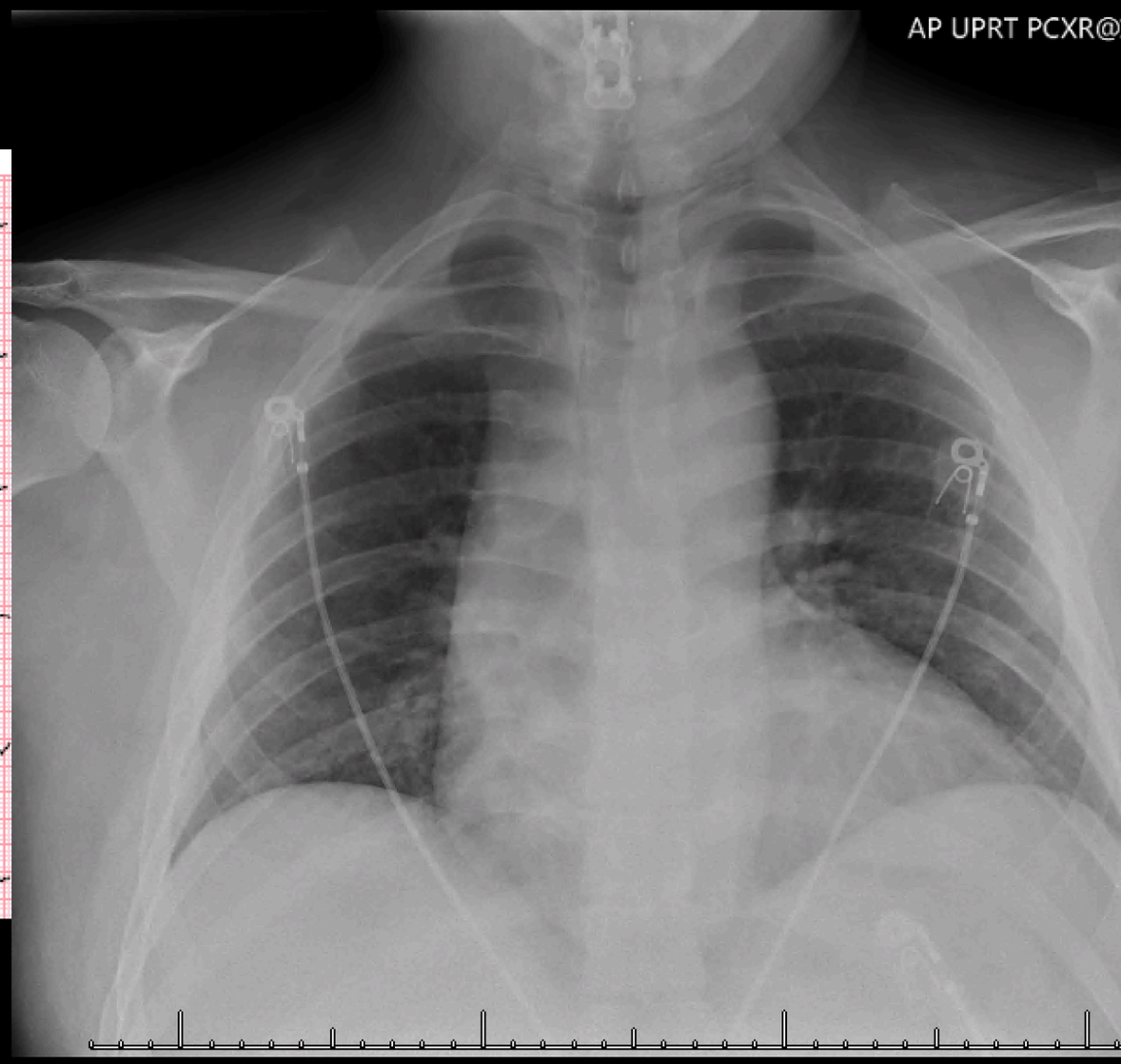
+LR=2.7

Marfan's

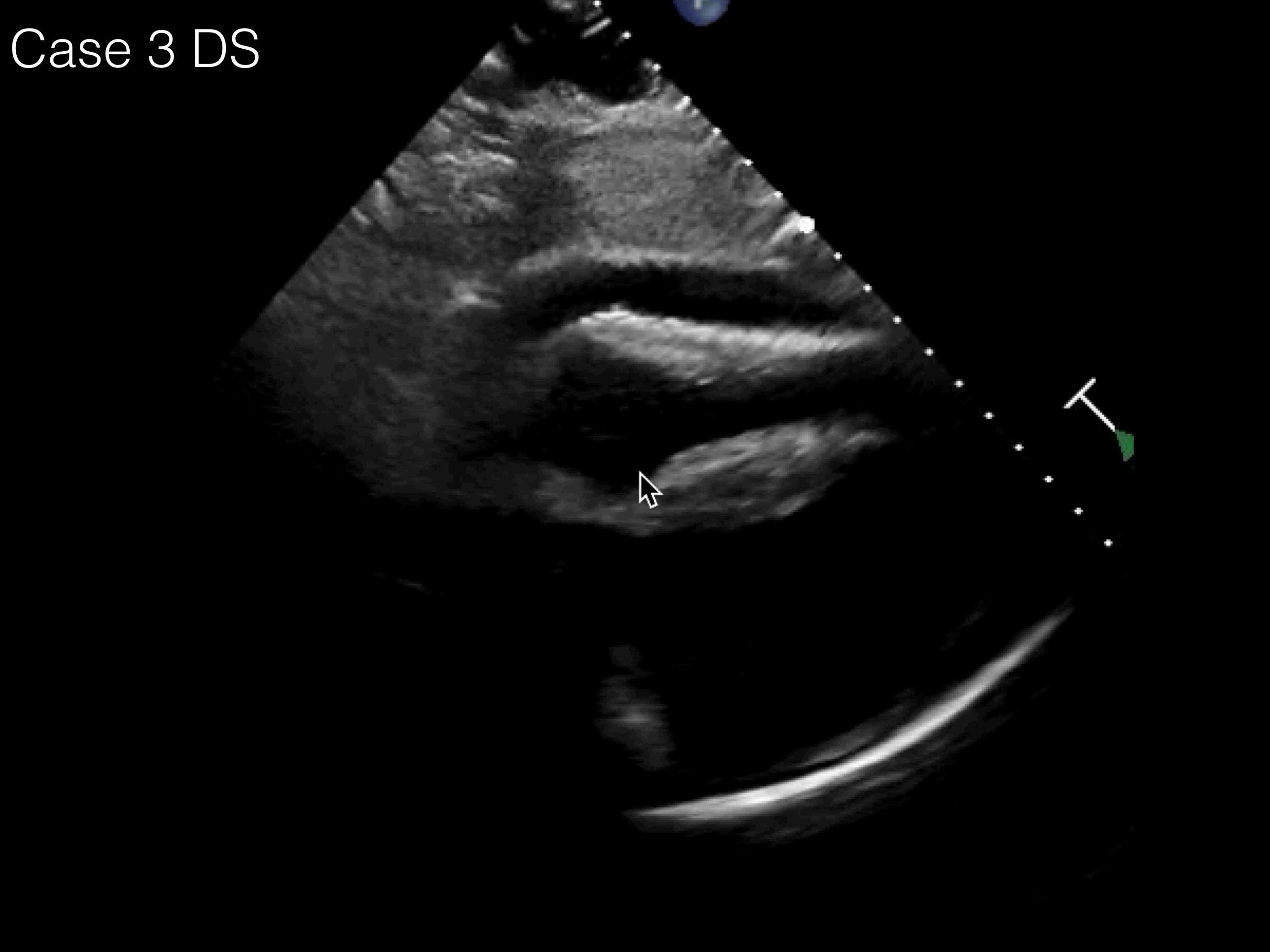


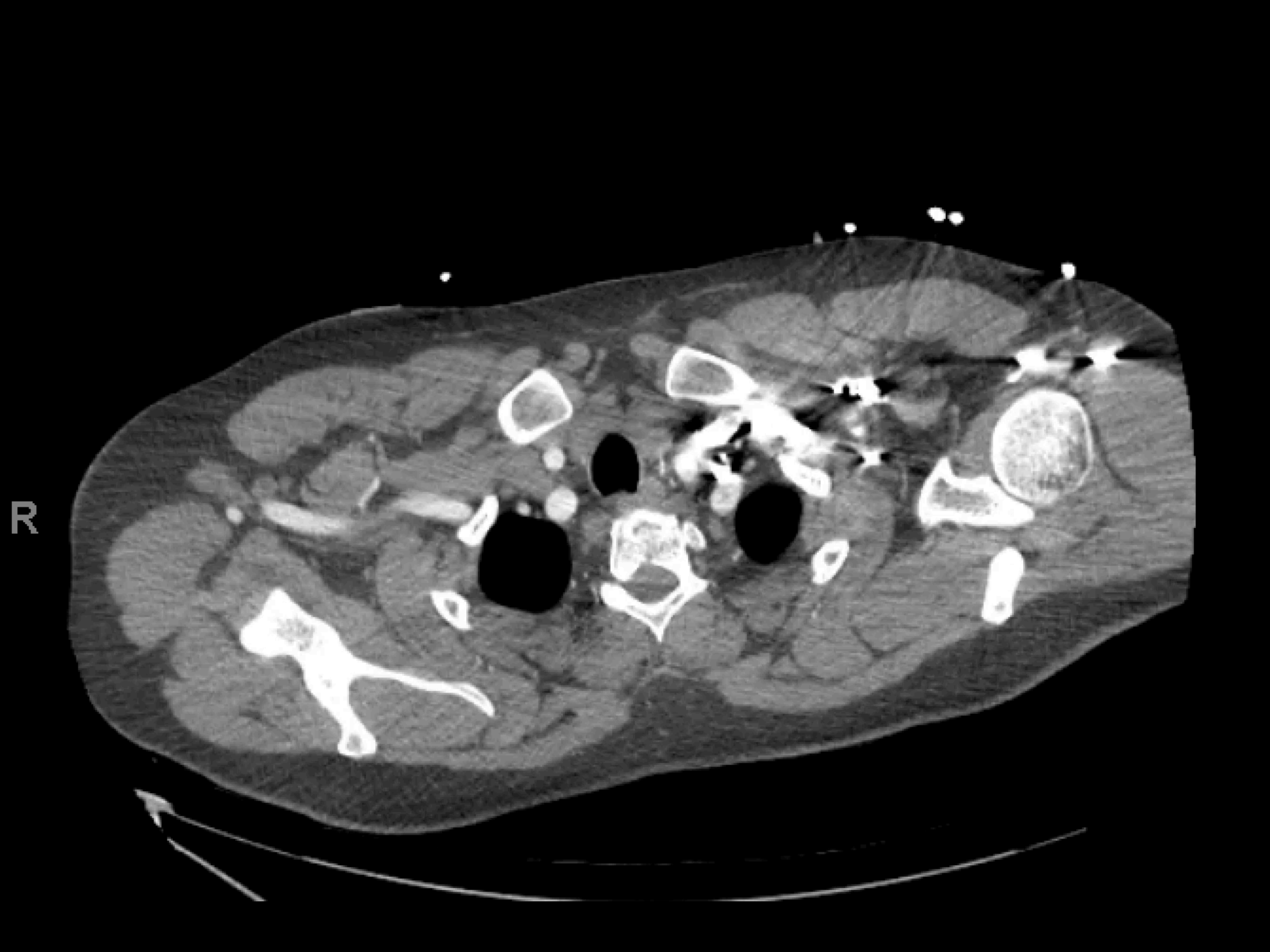
Lesson #3: Risk Factors

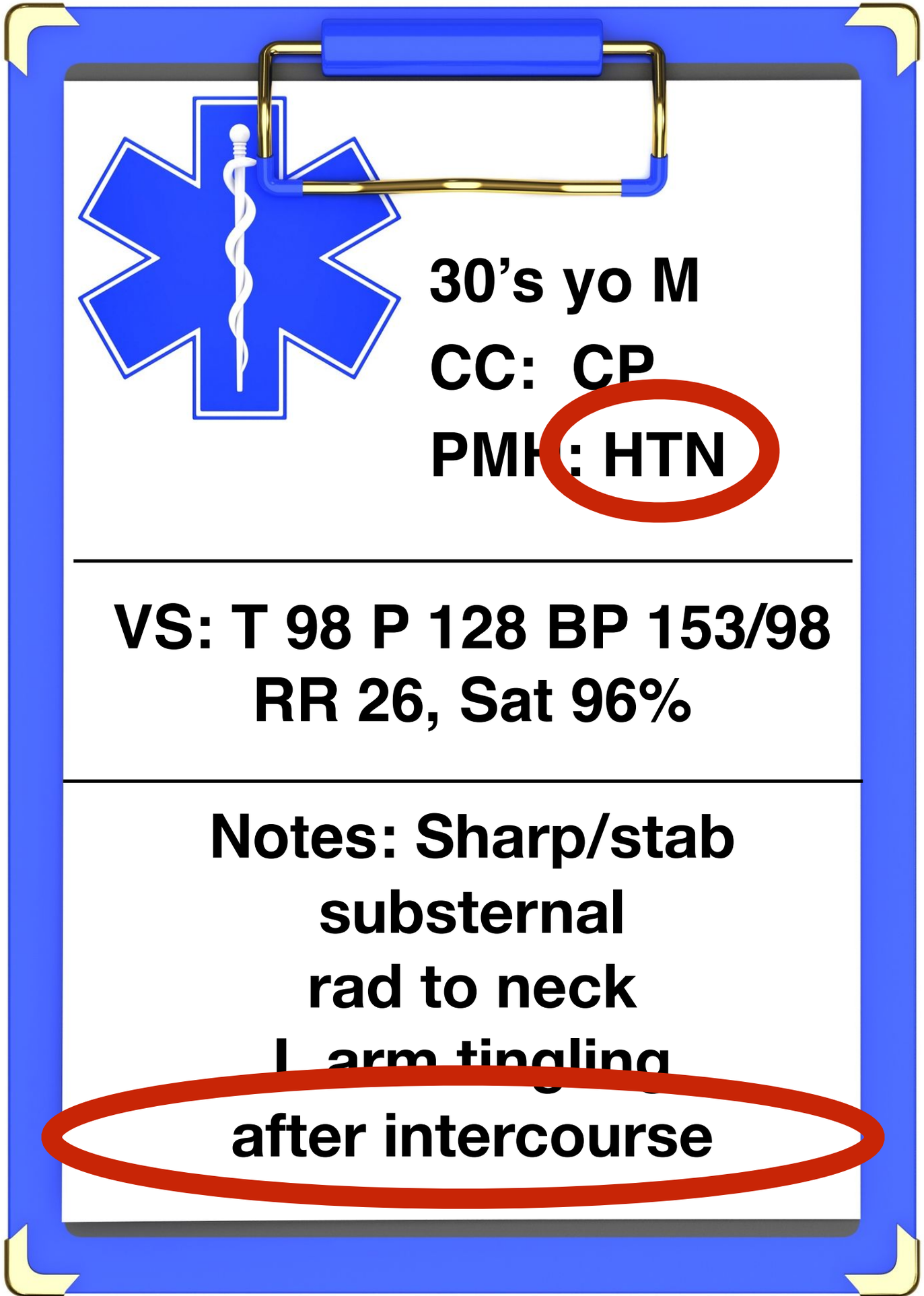

RG D/T/L:
I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V
II
V2


AP UPRT PCXR@

Case 3 DS




R


30’s yo M
CC: CP
PMH: HTN
VS: T 98 P 128 BP 153/98
RR 26, Sat 96%
Notes: Sharp/stab
substernal
rad to neck
L arm tingling
after intercourse

“WALL WEAKENERS”

- Marfan’s
- Bicuspid Aortic Valve
- Turner Syndrome
- HTN 72%
- Inflammatory Diseases
- Pregnancy
- Aortic instrumentation/ surgery
- FH of aneurysm

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Oral Fluoroquinolone and the Risk of Aortic Dissection

2.5X ⬆ Risk

Chien-Chang Lee, MD, ScD,[a] Meng-tse Gabriel Lee, PhD,[a] Ronan Hsieh, MD,[b] Lorenzo Porta, MD,[c] Wan-Chien Lee, MS,[a] Si-Huei Lee, MD,[d,e] Shy-Shin Chang, MD, PhD[f]

The BMJ
BMJ. 360: k678

Fluoroquinolone use and risk of aortic aneurysm and dissection: nationwide cohort study

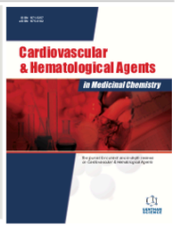
Björn Pasternak, senior researcher[12], Malin Inghammar, consultant[23], Henrik Svanström, senior researcher[2]

1.66X ⬆ Risk

Cardiovascular & Hematological Agents in Medicinal Chemistry, 2019, *17*, 3-10

SYSTEMATIC REVIEW ARTICLE

Fluoroquinolones and the Risk of Aortic Aneurysm or Aortic Dissection: A Systematic Review and Meta-Analysis



2.14X ⬆ Risk

Catecholamine Surge

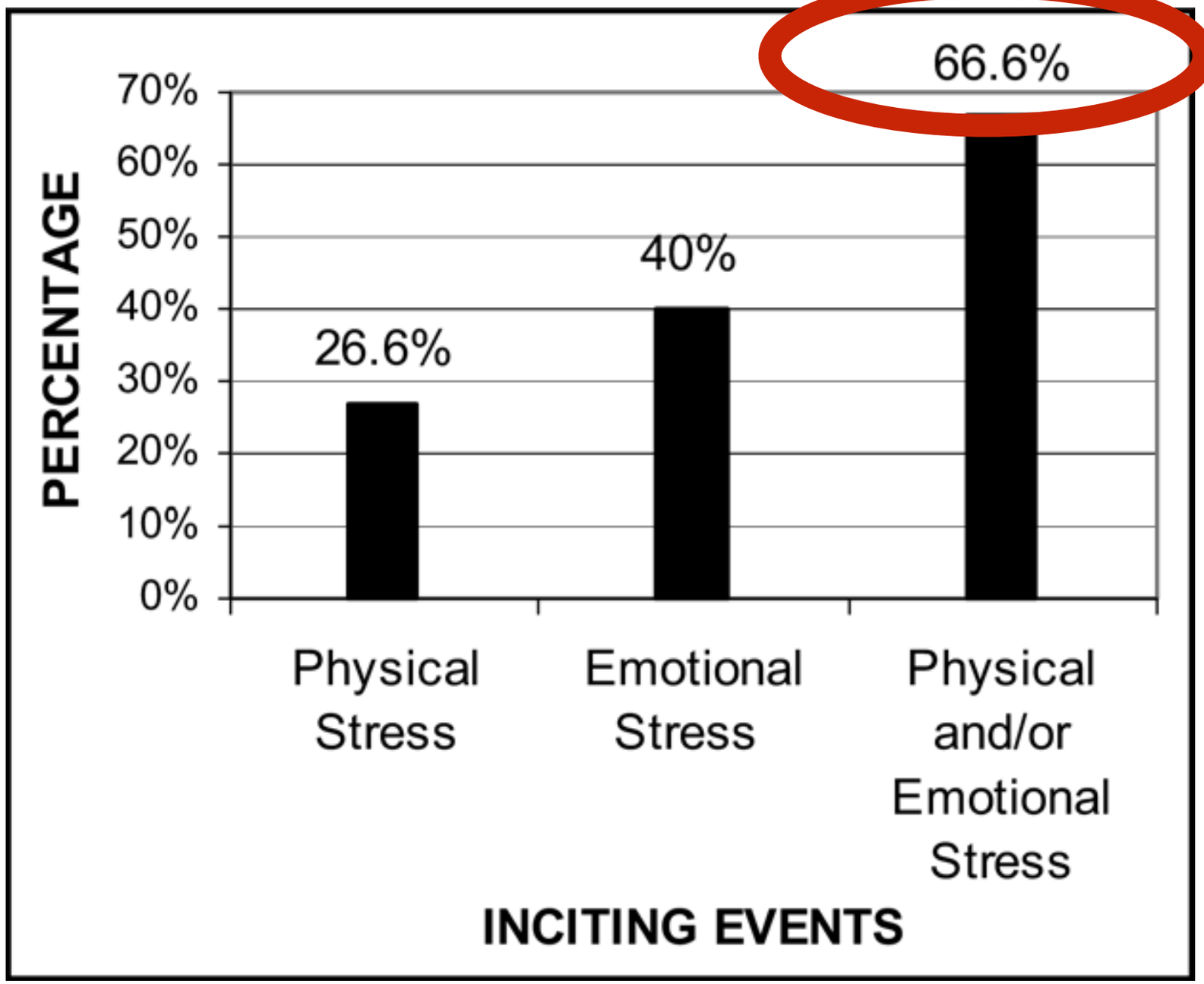
Abrupt increase in BP

- Heavy weight lifting
- Sexual intercourse
- Energy drinks
- Cocaine

Role of Exertion or Emotion as Inciting Events for Acute Aortic Dissection

Ioannis S. Hatzaras, MD, Jesse E. Bible, MD, George J. Koullias, MD, Maryann Tranquilli, RN, Mansher Singh, MD, and John A. Elefteriades, MD*

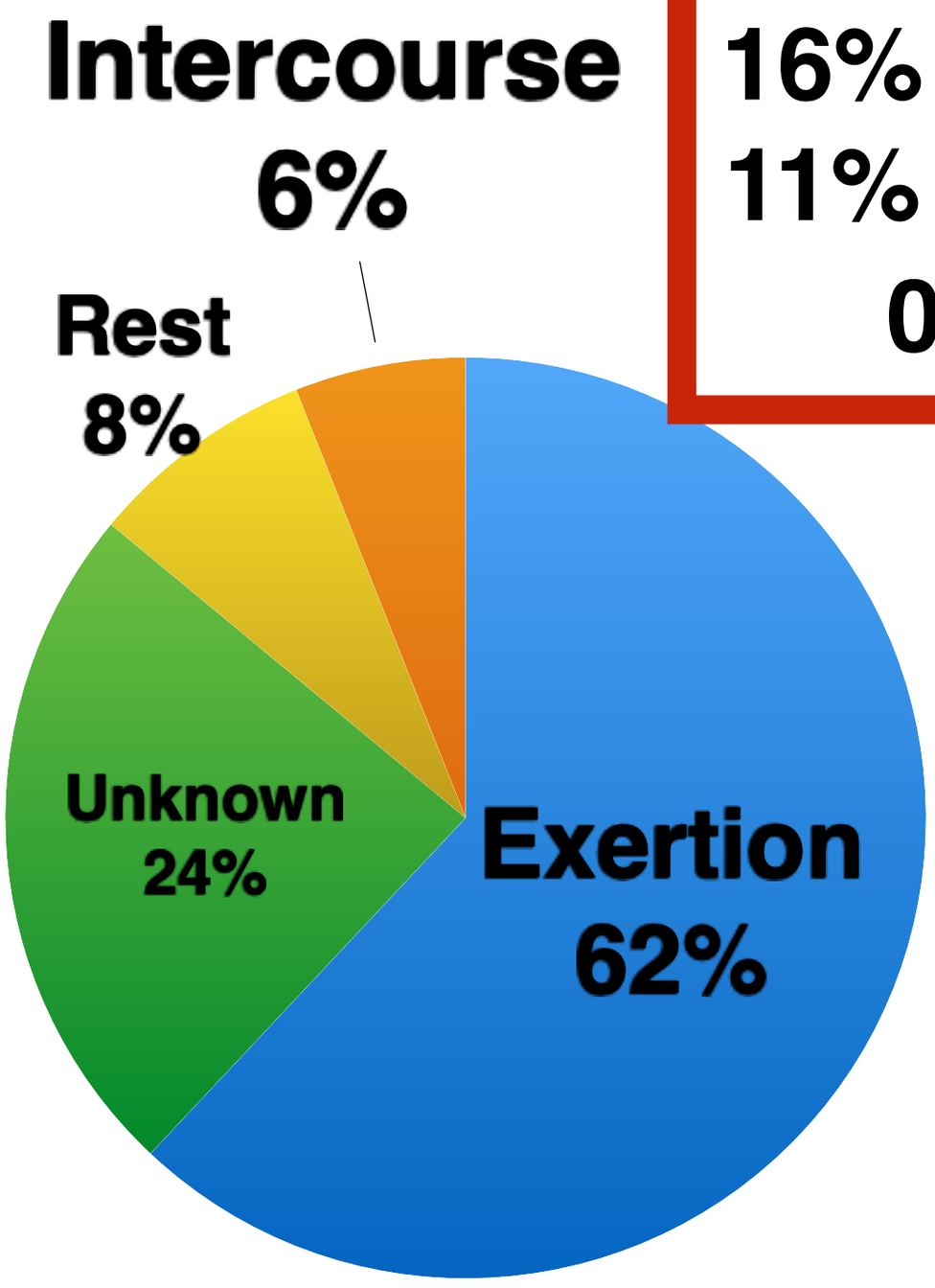
- **“shoveling show”**
- **“doing push-ups”**
- **“bad business lunch”**
- **“big losses at casino”**
- **“hard cough”**



Aortic Dissections Type A during Sexual Intercourse in Male Patients: Accident or Systematic Coincidence? Examination of 365 Patients with Acute Aortic Dissection within 20 Years

Thorac CV Surg 2016

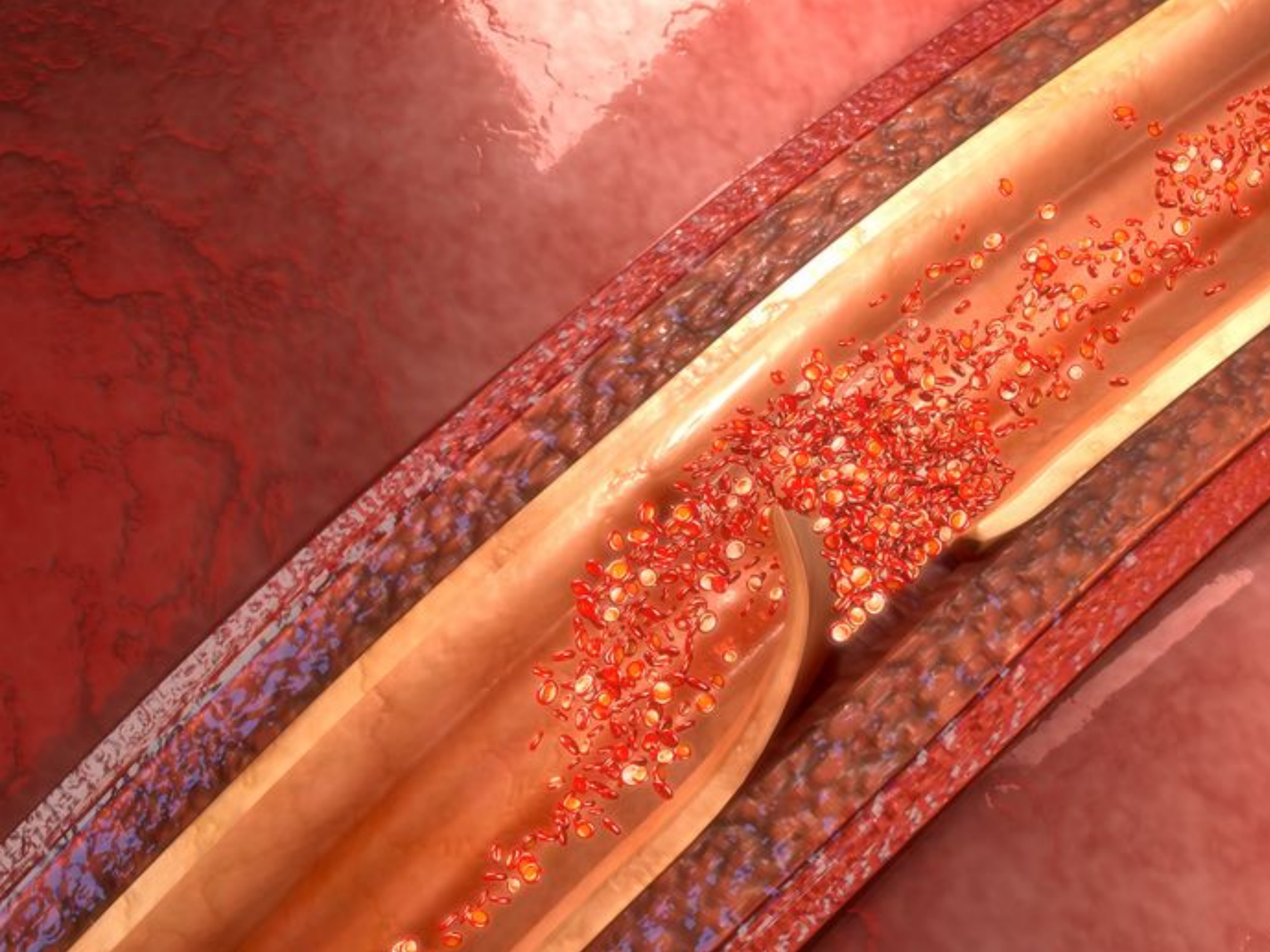
270 patients
age <60

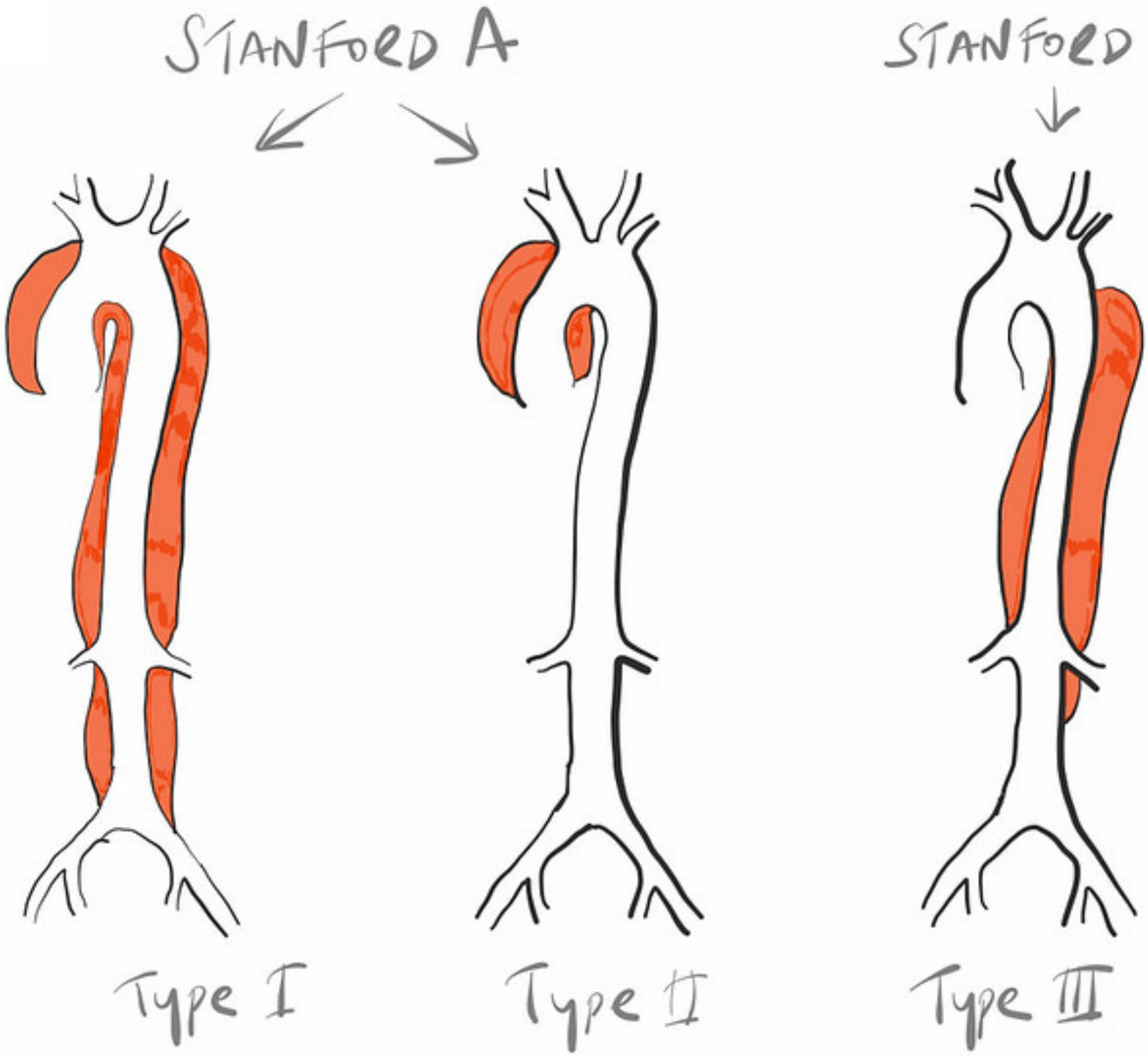


16% age <50
11% age <60
0% ♀

Abrupt
85%

Worst
91%



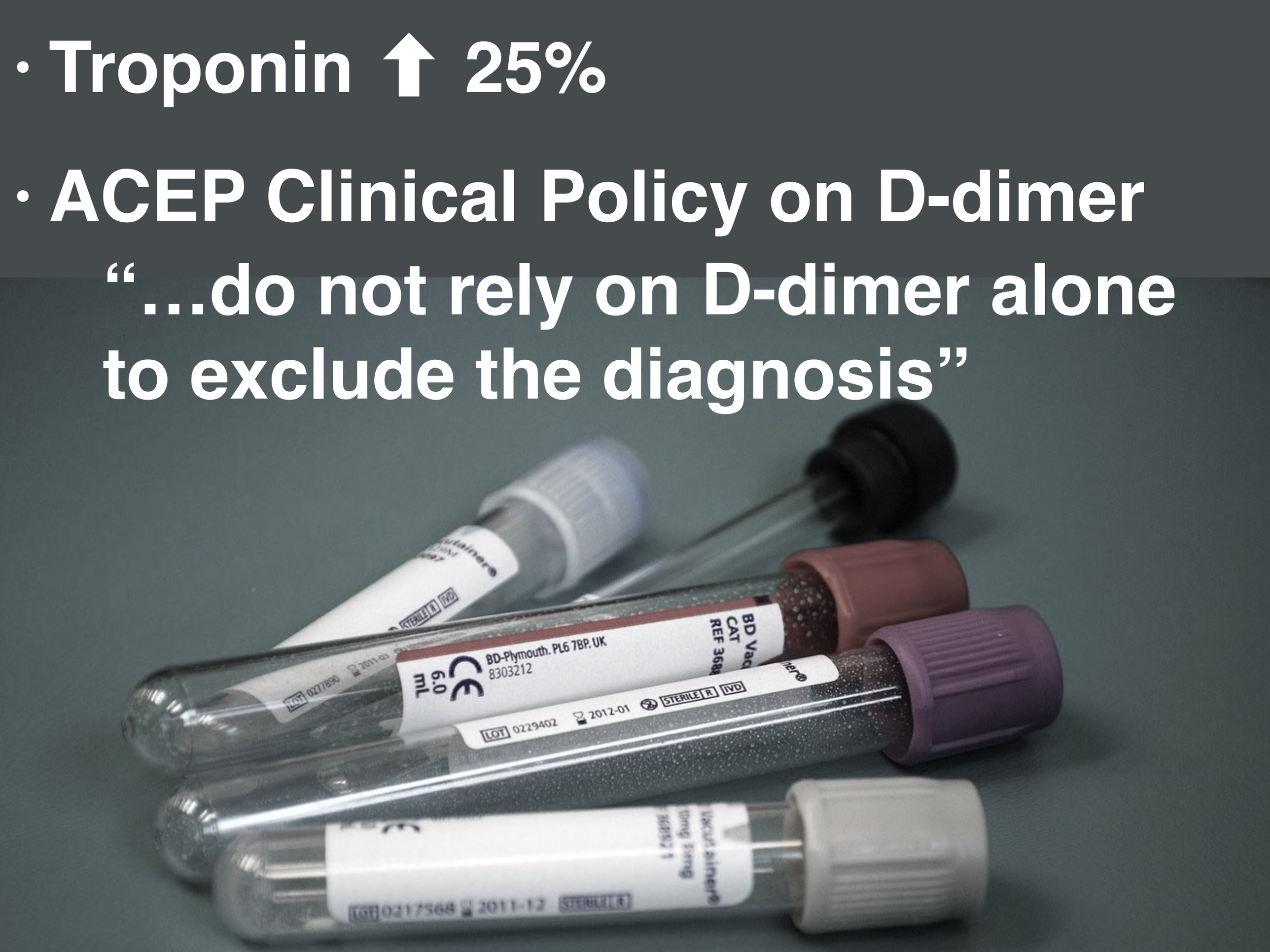


DEBAKEY

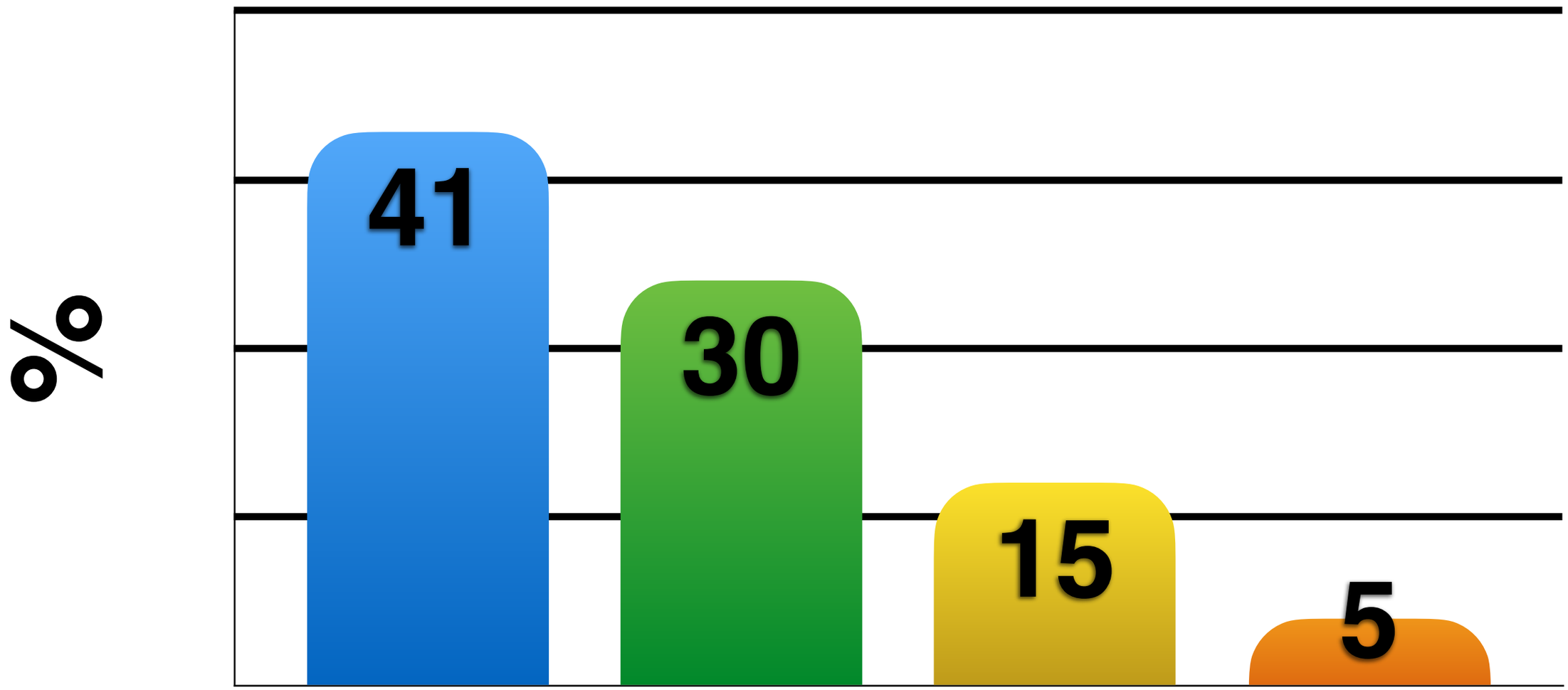
Evaluation

- [x] History/Risk Factors
- [x] Examination: Pulses, Murmur, Neuro
- [x] POCUS
- [ ] Labs
- [ ] EKG
- [ ] CXR

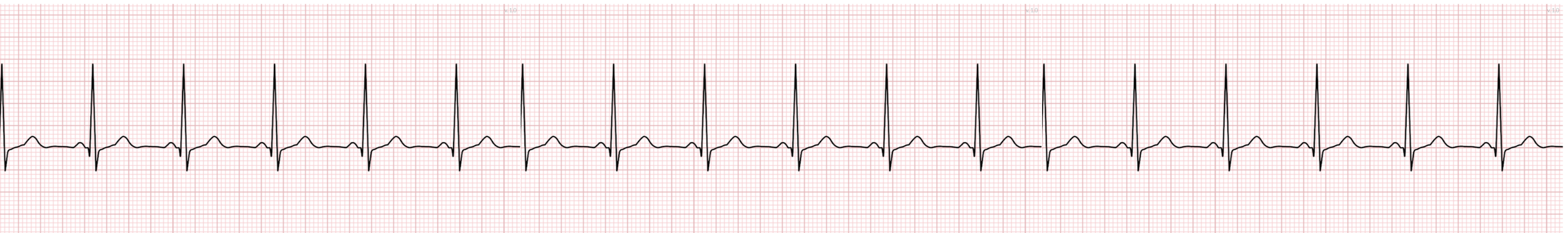
- **Troponin ⬆ 25%**
- **ACEP Clinical Policy on D-dimer**
  "…do not rely on D-dimer alone to exclude the diagnosis"



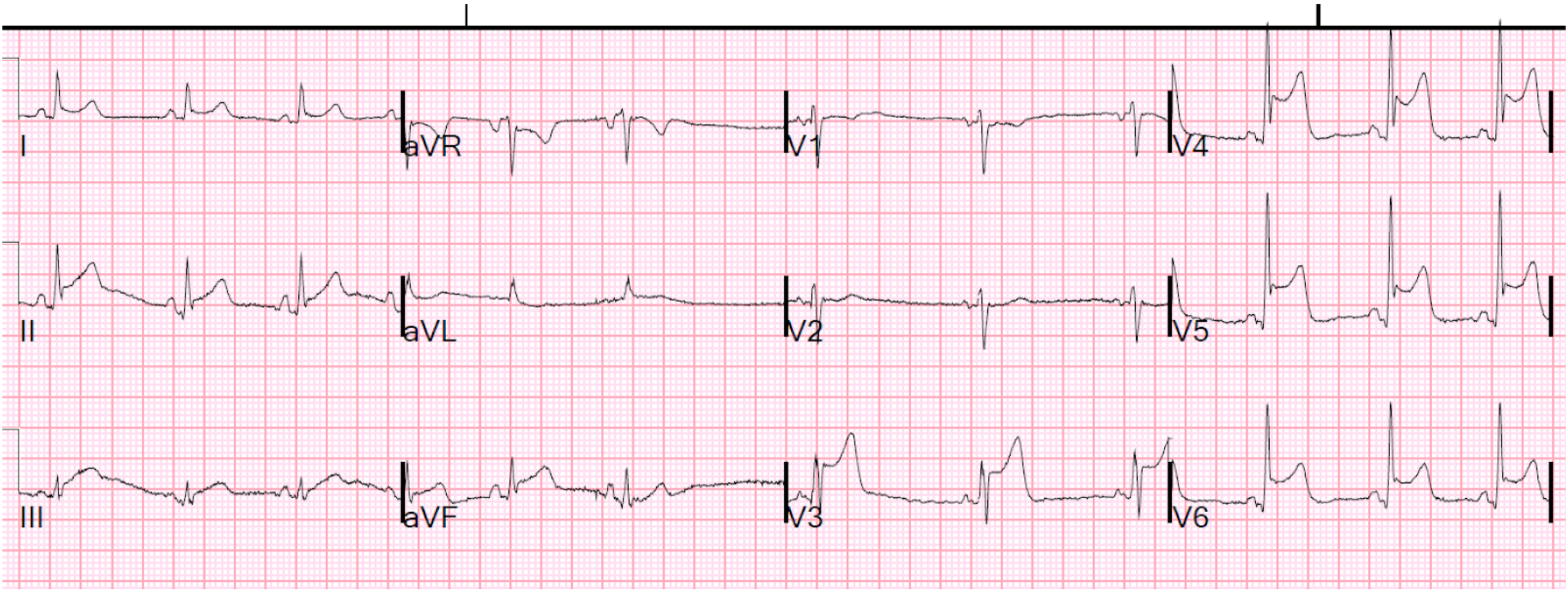
EKG findings in Aortic Dissection



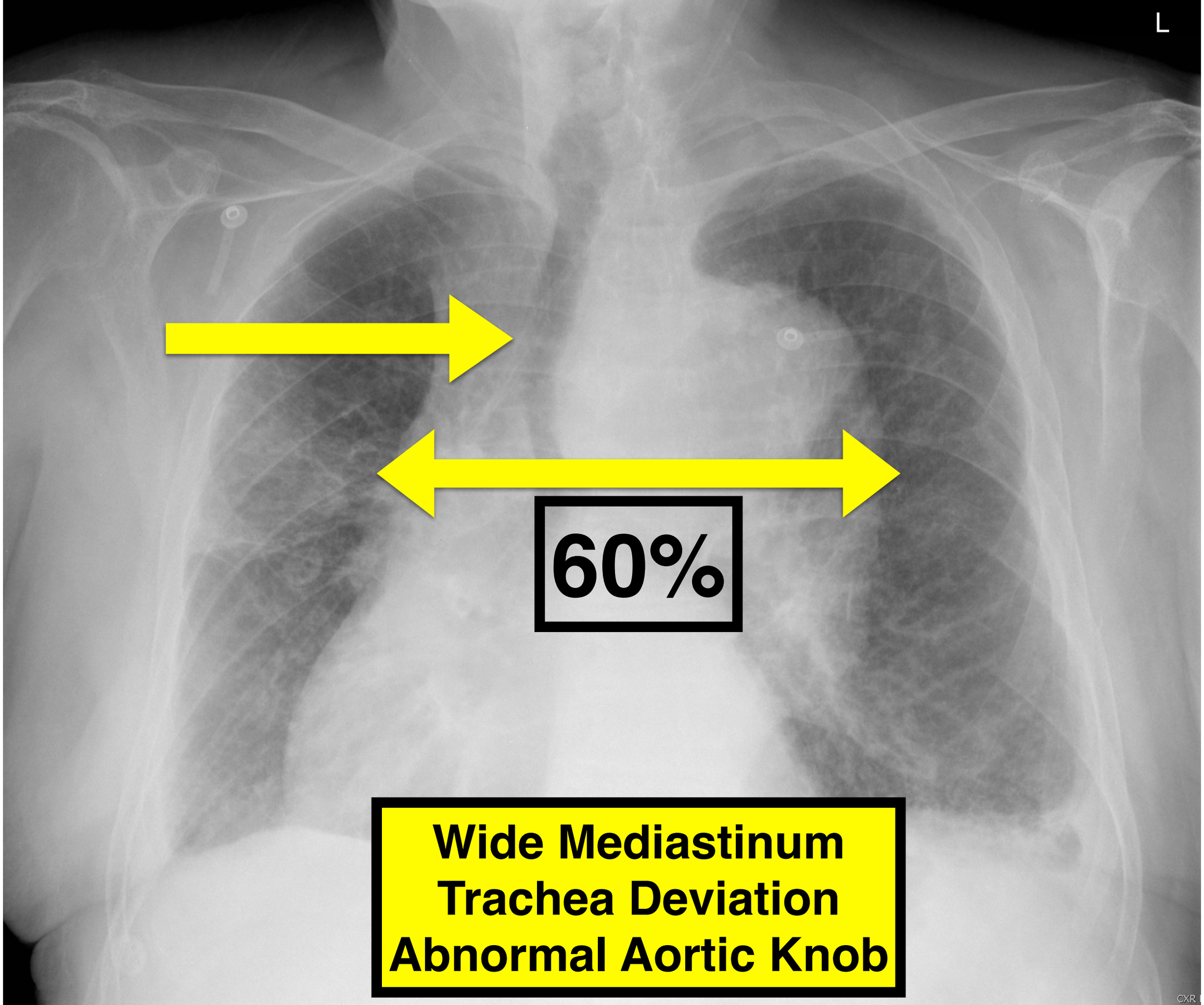
EKG findings in Aortic Dissection

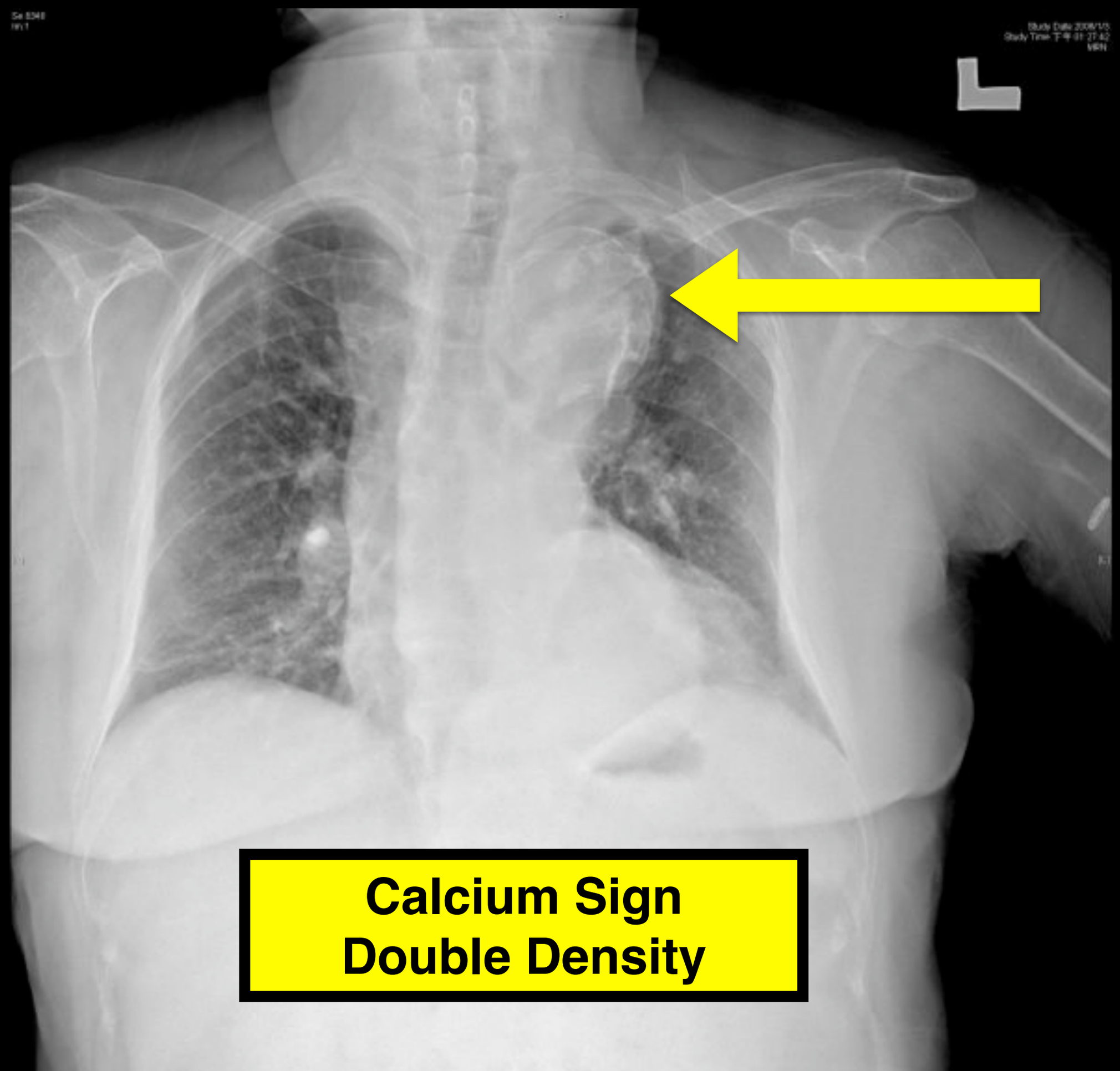


What do you do?



AMI 1000X more common than AD


L
60%
Wide Mediastinum
Trachea Deviation
Abnormal Aortic Knob


Calcium Sign
Double Density

Management

Call Surgeon

Pain Control

Heart Rate Control

Blood Pressure Control

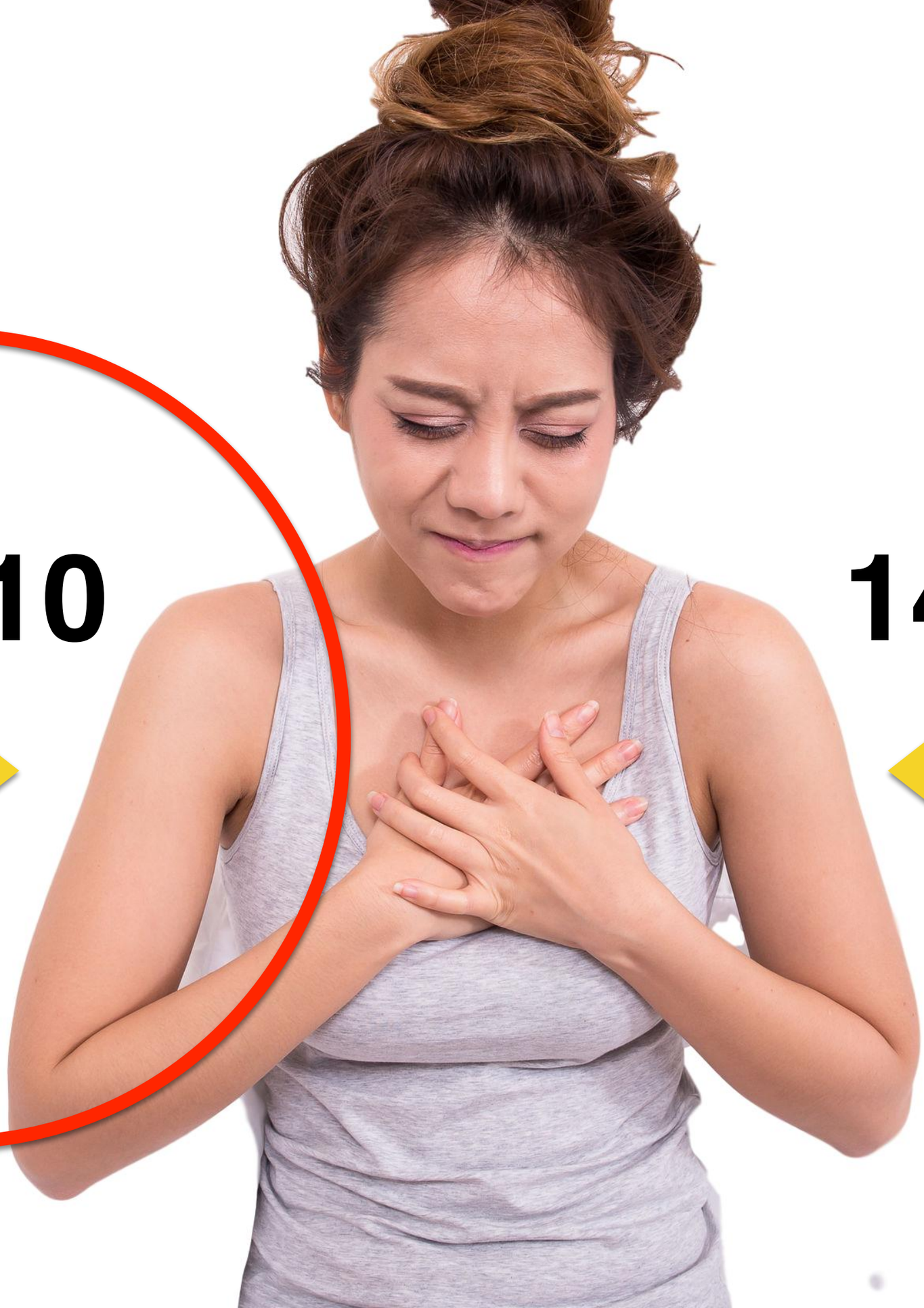

MINIMUM
TOLERABLE
A LOT OF
PAIN
MAXIMUM
Level


Ultraview SL
SPACELABS Healthcare
V RUN ALARM
ST= ?.?? *
II VE/MIN=0
160
VRUN 5
140
70
HELP
Check connection at patient
14:45 99/ 68(
15:00 55/ 41(
15:15 95/ 60(
15:30 97/ 55(
16:56 87/ 52(
CO2 SENSORS
Check sensor
--- MULTIPLE ALARMS ---
SPO2 MENU
ALARM LIMITS
??? 100 88
RECORD
PREVIOUS MENU
NORMAL SCREEN
MODE SIDE
GAS ALM OFF
ALARM HISTORY
17:08
NIBP
NO
22 JUL 17
Goal 60 bpm
Esmolol
Labetalol
.....
Diltiazem
Verapamil

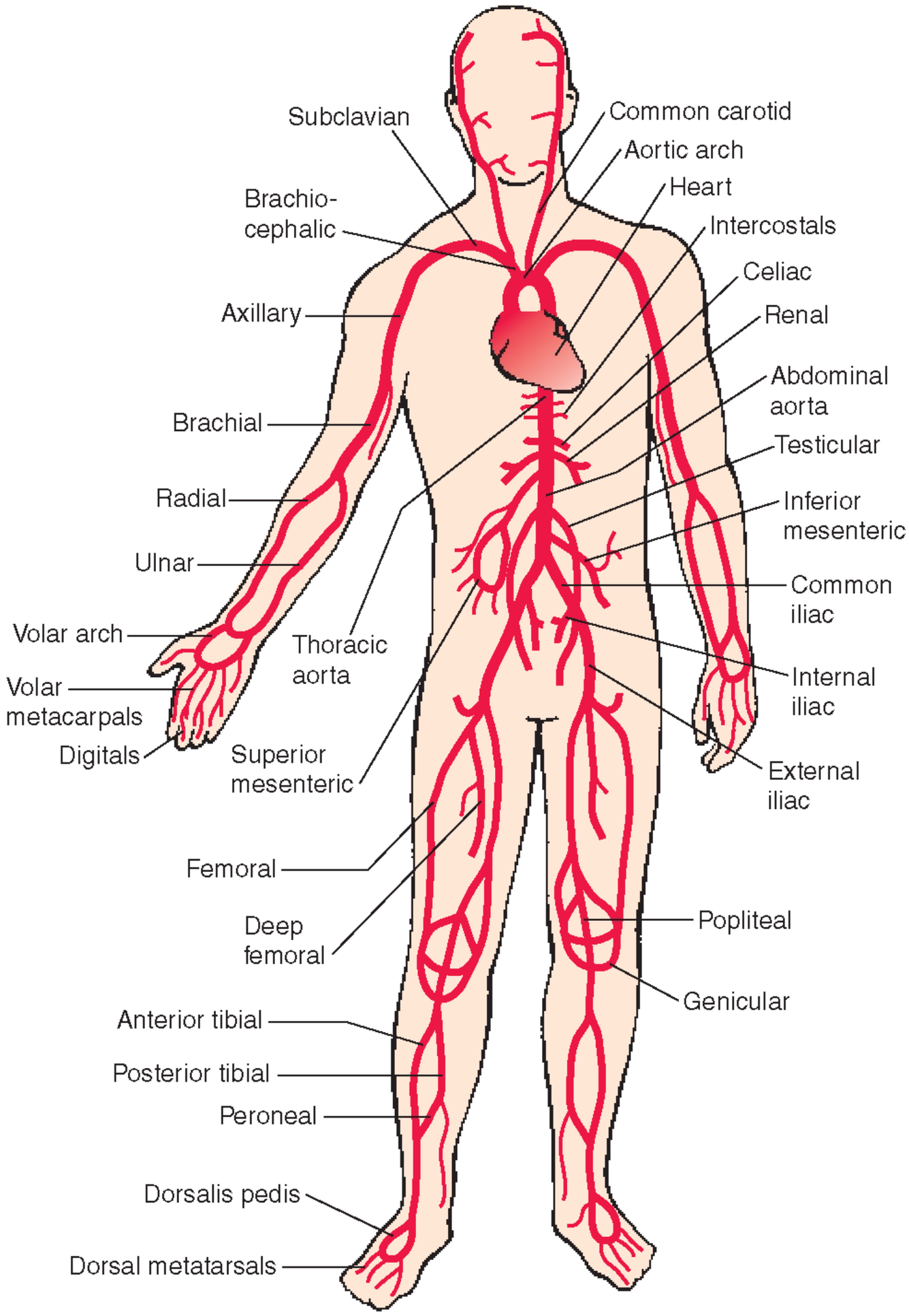
Goal SBP 110

Nicardipine
Clevidipine
Nitroprusside

180/110



140/85


Subclavian
Common carotid
Aortic arch
Heart
Brachio-
cephalic
Intercostals
Celiac
Axillary
Renal
Abdominal
aorta
Brachial
Testicular
Radial
Inferior
mesenteric
Ulnar
Common
iliac
Volar arch
Thoracic
aorta
Internal
iliac
Volar
metacarpals
Digitals
Superior
mesenteric
External
iliac
Femoral
Deep
femoral
Popliteal
Genicular
Anterior tibial
Posterior tibial
Peroneal
Dorsalis pedis
Dorsal metatarsals

Summary

1. **Aortic dissection is time sensitive.**
2. **AD can masquerade itself.**
3. **Consider this in Chest Pain PLUS 1.**
4. **Exam findings of new murmur, Marfan's signs or pulse/neuro deficits could help clinch the diagnosis.**
5. **Use POCUS to identify tamponade or a flap.**
6. **Listen for history of "wall weakeners" or BP "surgers".**

References

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2. Rosman MD, Howard, et al. Quality of History Taking in Patients with Aortic Dissection. Chest, 114, 3, September, 1998.
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7. Colla, J S MD, et al. Emergency Ultrasound: Identification of Aortic Dissection Using Limited Bedside Ultrasound. *Emergency Medicine*. 2017 March;49(3):135-137
8. Kosuge, M. MD, PhD. Clinical Implications of Electrocardiograms for Patients With Type A Acute Aortic Dissection. Circ J 2017; 81: 1254–1260.
9. https://emergencymedicinecases.com/aortic-dissection-em-cases-course/
10. http://www.emdocs.net/acute-aortic-dissection-3/
11. https://coreem.net/core/aortic-dissection/
12. https://www-uptodate-com.ezproxy.chs.okstate.edu/contents/clinical-features-and-diagnosis-of-acute-aortic-dissection?search=aortic%20dissection&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1#H27023034
13. https://vimeo.com/391548110 (5 minute sono of Aortic Dissection)
14. http://www.thepocusatlas.com/aorta-1
15. https://images.app.goo.gl/yBLNeb1fN5myTSh97
16. Case courtesy of Assoc Prof Craig Hacking, Radiopaedia.org, rID: 73356
17. https://images.app.goo.gl/yBLNeb1fN5myTSh97
18. http://hqmeded-ecg.blogspot.com/2018/10/is-this-stemi-no-not-by-definition-why.html
19. https://www.openpediatrics.org/assets/image/rhythm-strip-normal-sinus-rhythm

Handout

- **Great websites for review on Aortic Dissection**

1. https://youtu.be/Ivrw3M2uJFI (EM:RAP aorta US) video
2. https://vimeo.com/391548110 (5 minute sono of Aortic Dissection)
3. Esmolol drip sheet: https://emcrit.org/wp-content/uploads/2013/01/esmolol-drip-sheet.pdf
4. https://coreem.net/core/aortic-dissection/
5. https://emergencymedicinecases.com/aortic-dissection-em-cases-course/
6. http://www.emdocs.net/acute-aortic-dissection-3/

Blood Pressure