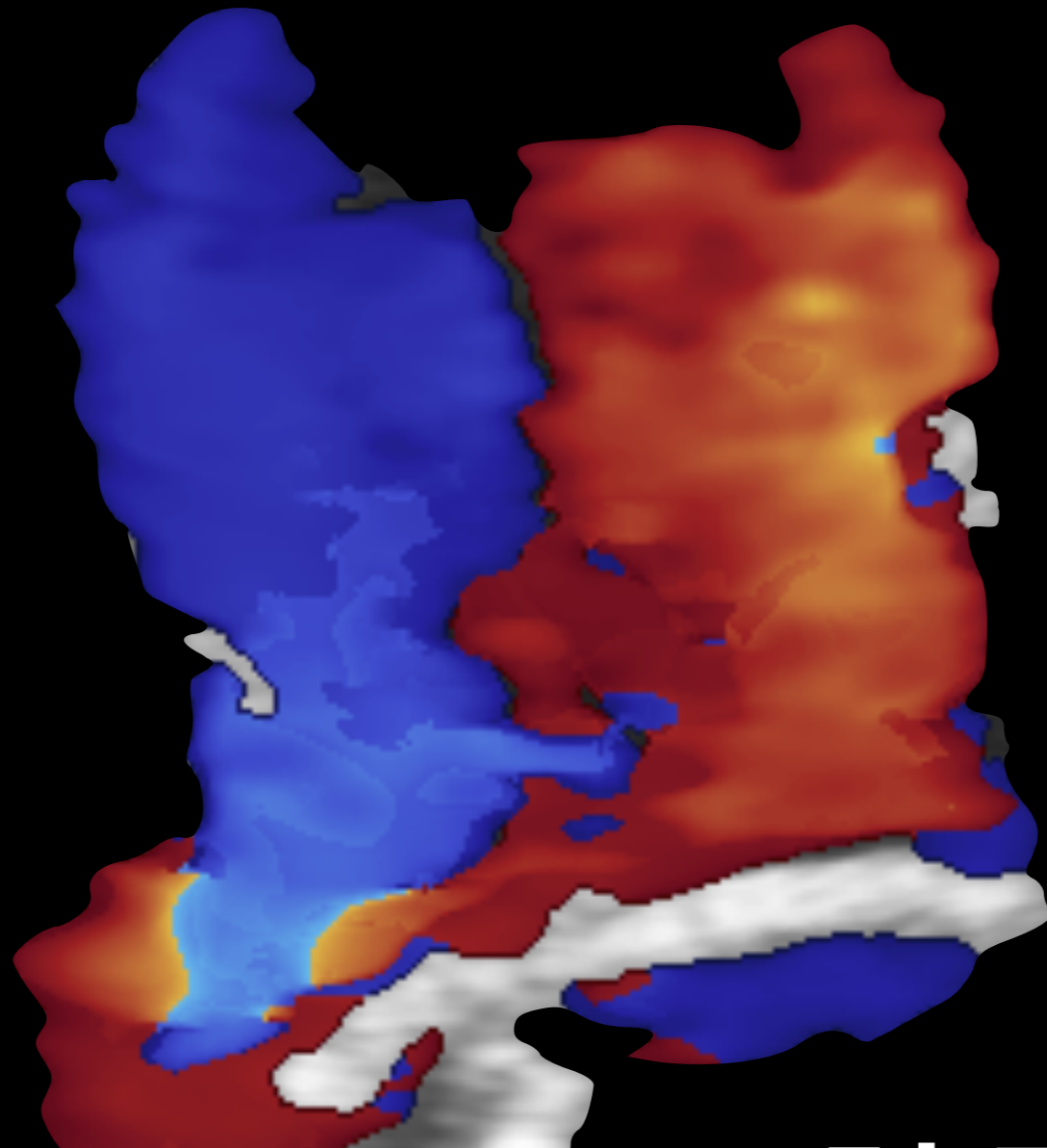
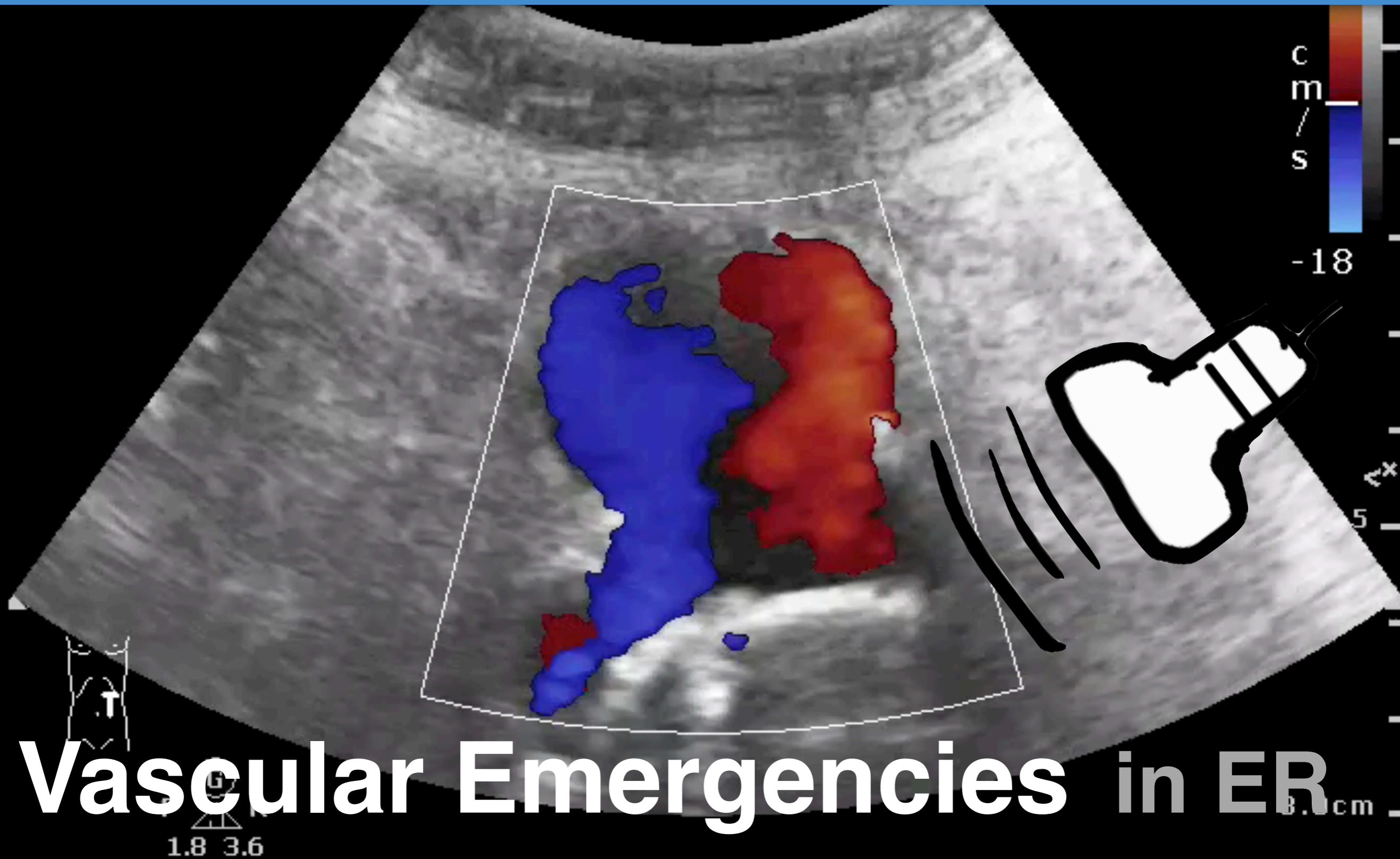


# Role of POCUS for Vascular Emergencies in ER

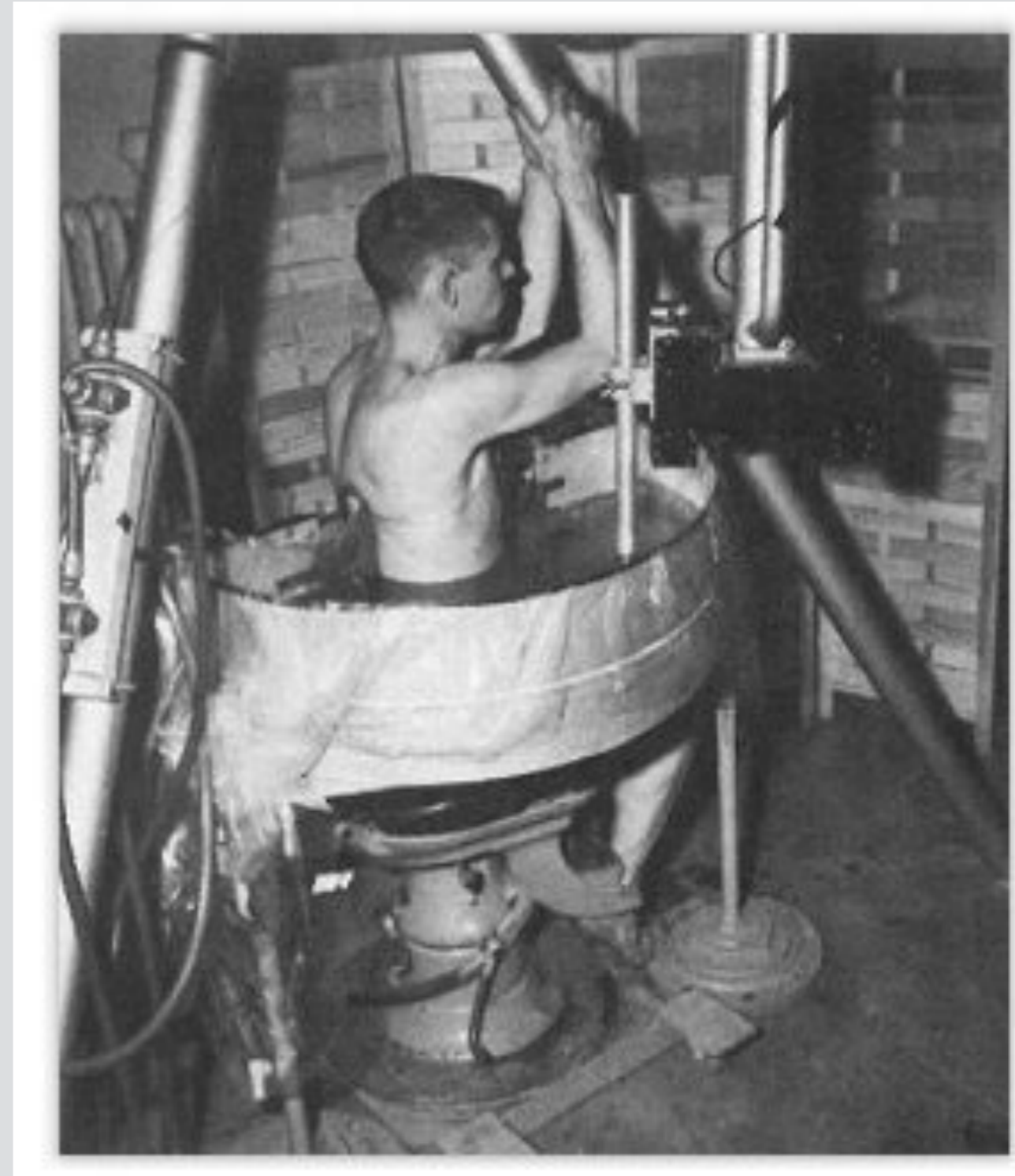
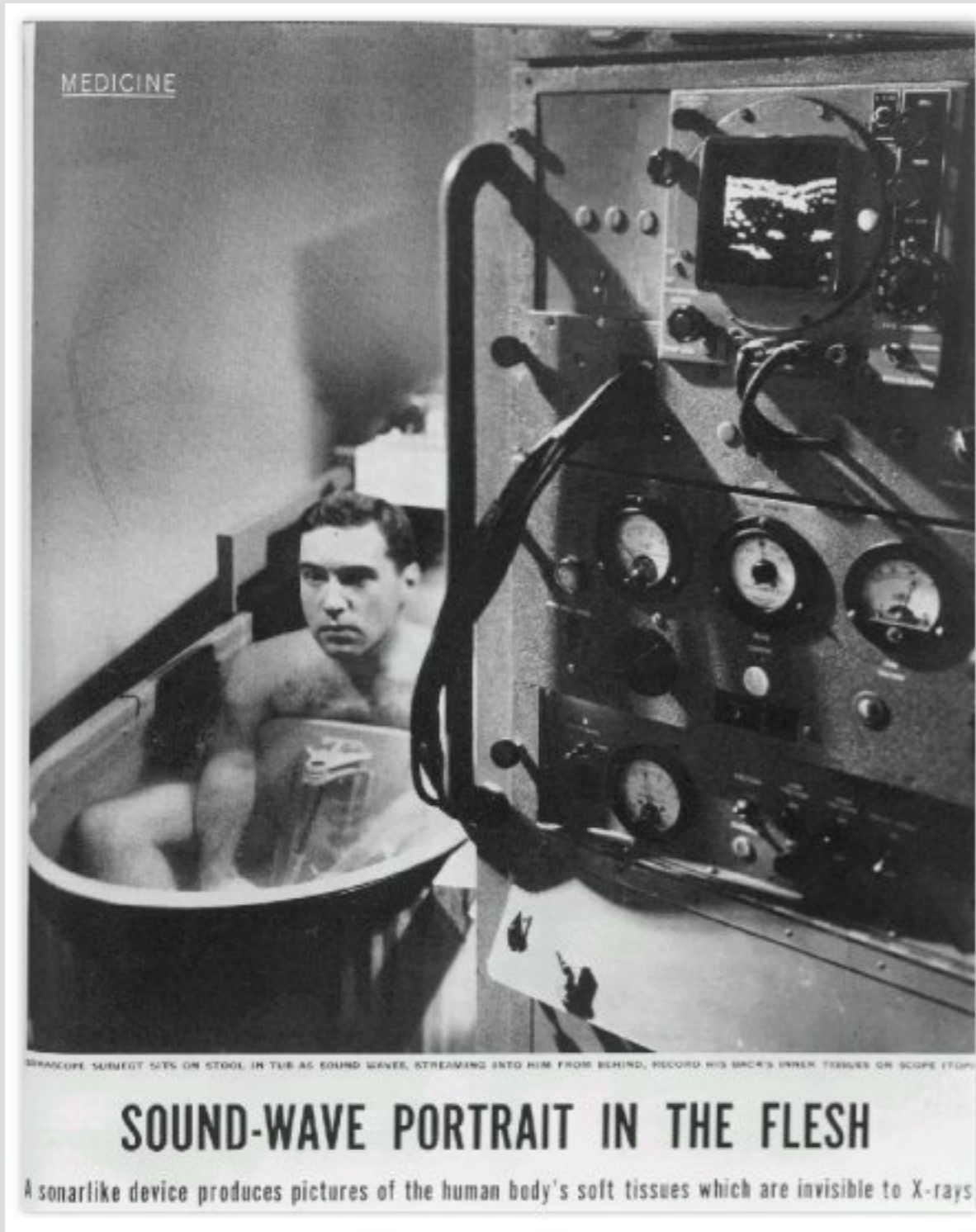


**陳國智 醫師**  
西園醫院急重症醫學科

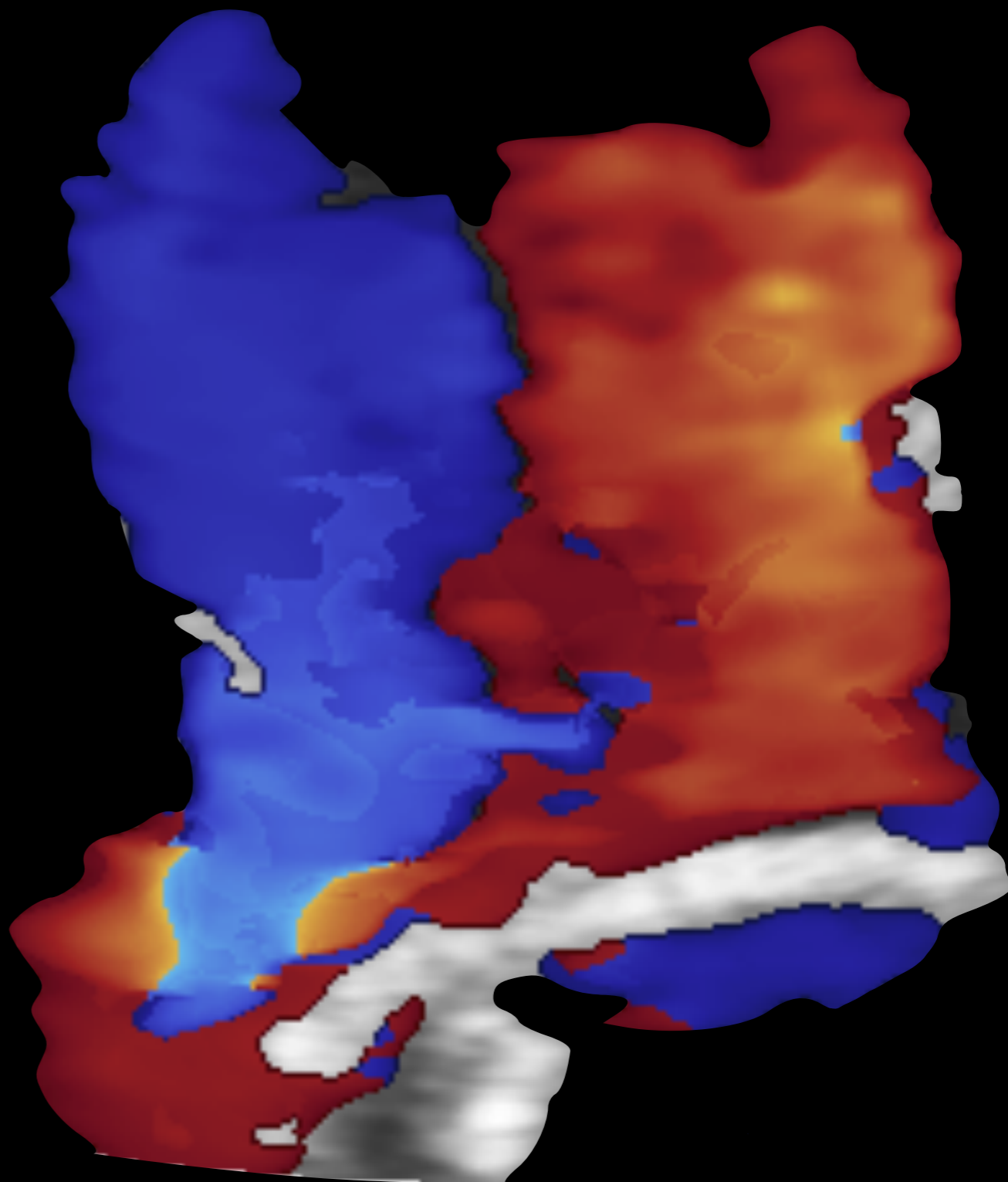
# Transform EM Practice



# 1954







**Visualist**



**Visualist**



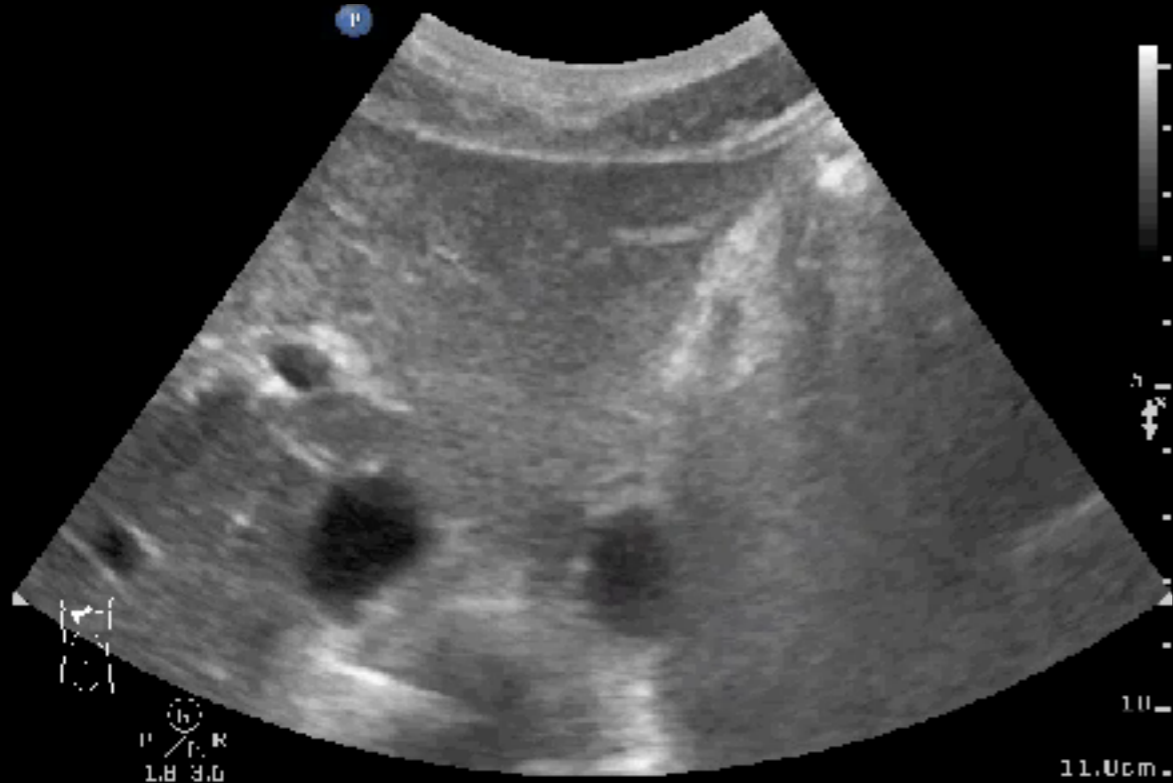
**Disruptive Innovation**

# Conflict of Interest None





Abd Gen  
05 1  
42 Hz  
11.0cm  
2D  
11Gen  
Gn 100  
0:56  
3/3/3



Abd Gen  
05 1  
42 Hz  
11.0cm  
2D  
11Gen  
Gn 100  
0:56  
3/3/3



Superficial  
L12-3  
24 Hz  
4.0cm

2D  
Res  
Lin 76  
F: 56  
3/2/2

CPA  
5.0 MHz  
Lin 60  
1/5/5  
Fltr Med  
Baseln 3



H  
P R  
3.0 12.0

0.8 Adult Echo  
SS 1  
31 Hz  
17.0cm

2D  
11Gen  
Lin 50  
F: 50  
3/2/0

2  
4.0cm



H  
P R  
1.0 3.2



Abd Gen  
05 1  
42 Hz  
11.0cm

2D  
II Gen  
Lin 100  
0:56  
3/3/3



Abd Gen  
05 1  
36 Hz  
14.0cm

2D  
II Gen  
Lin 61  
0:56  
3/3/3

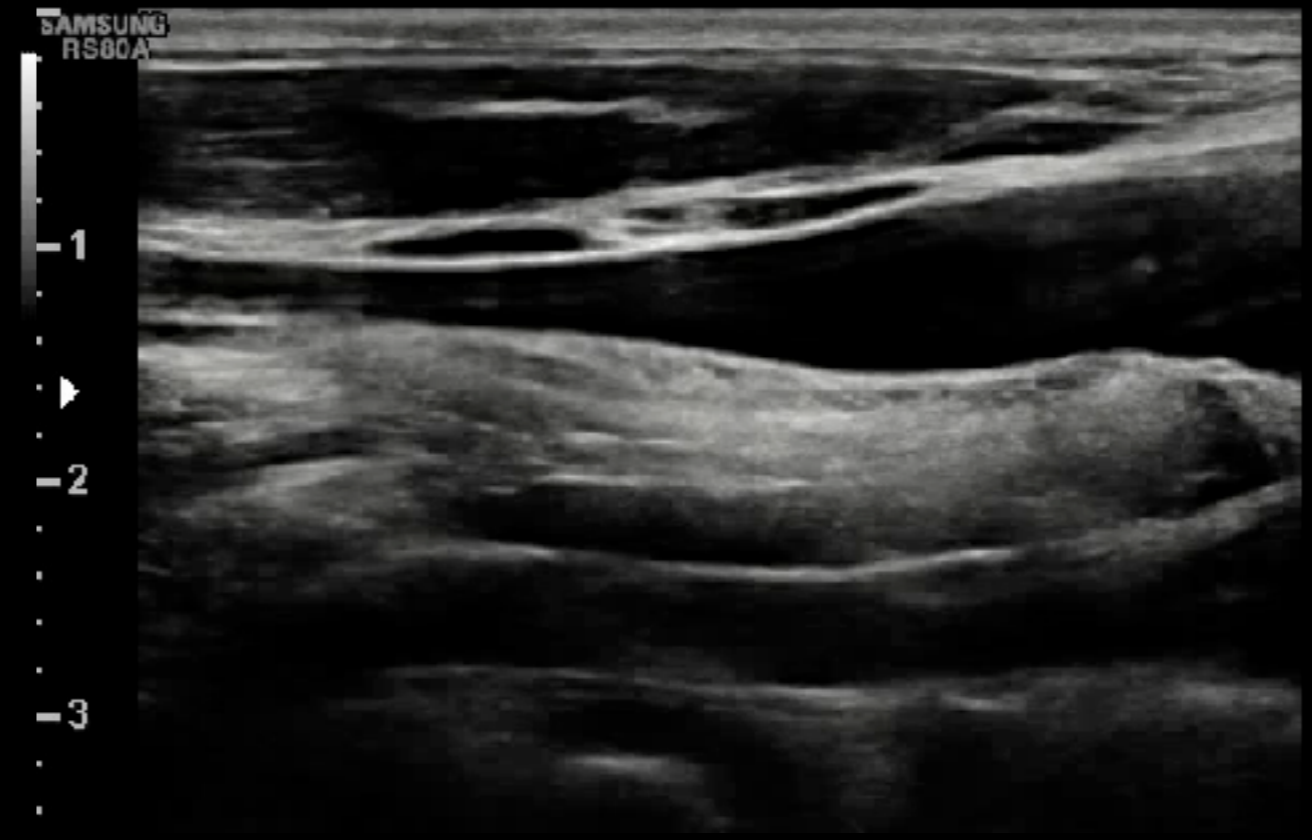
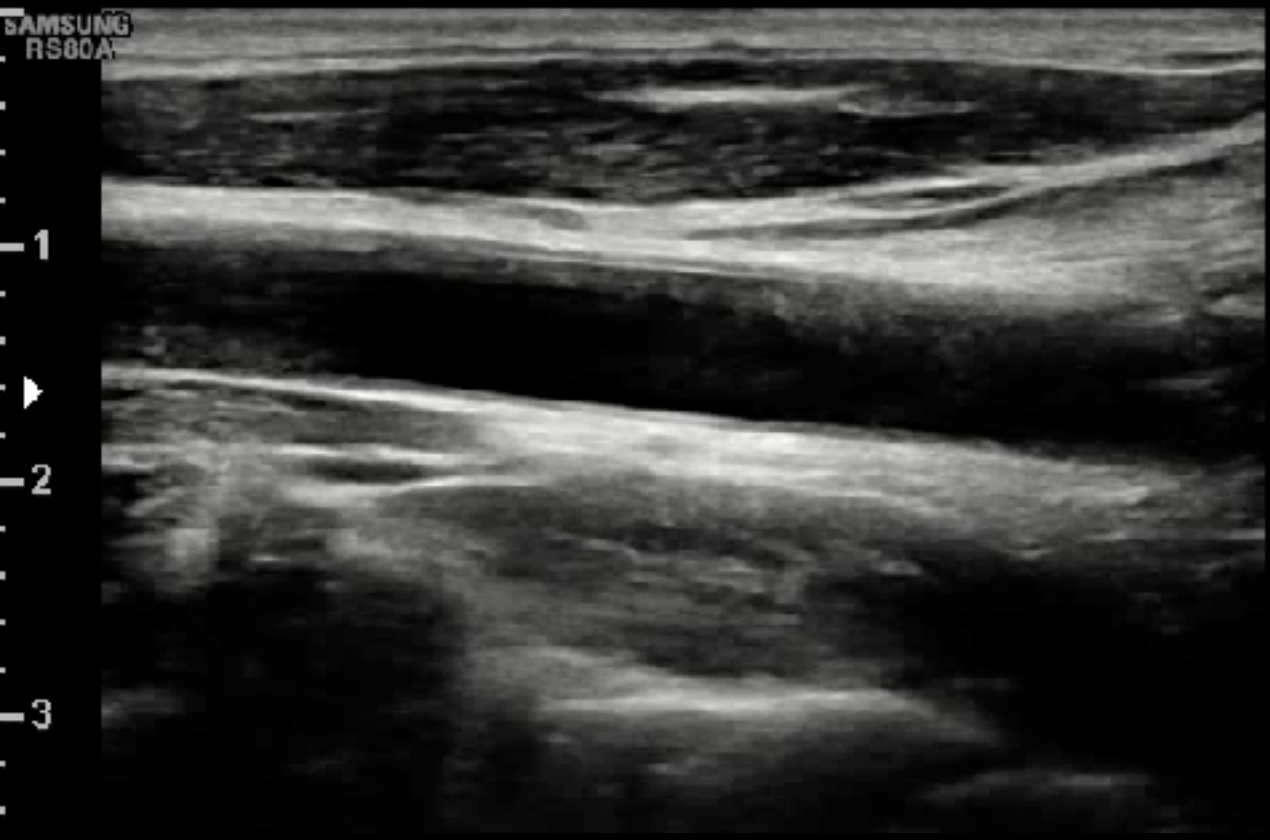


L3-12A / SmallParts / FPS40 / MID.96 / Ts0.1 / 01-09-2010 10:32:33 AM

2D G53/DR53/FA4/P90/2.7/Frq Pen./3.5cm

L3-12A / SmallParts / FPS40 / MID.96 / Ts0.1 / 01-09-2010 10:32:51 AM

2D G53/DR53/FA4/P90/2.7/Frq Pen./3.5cm



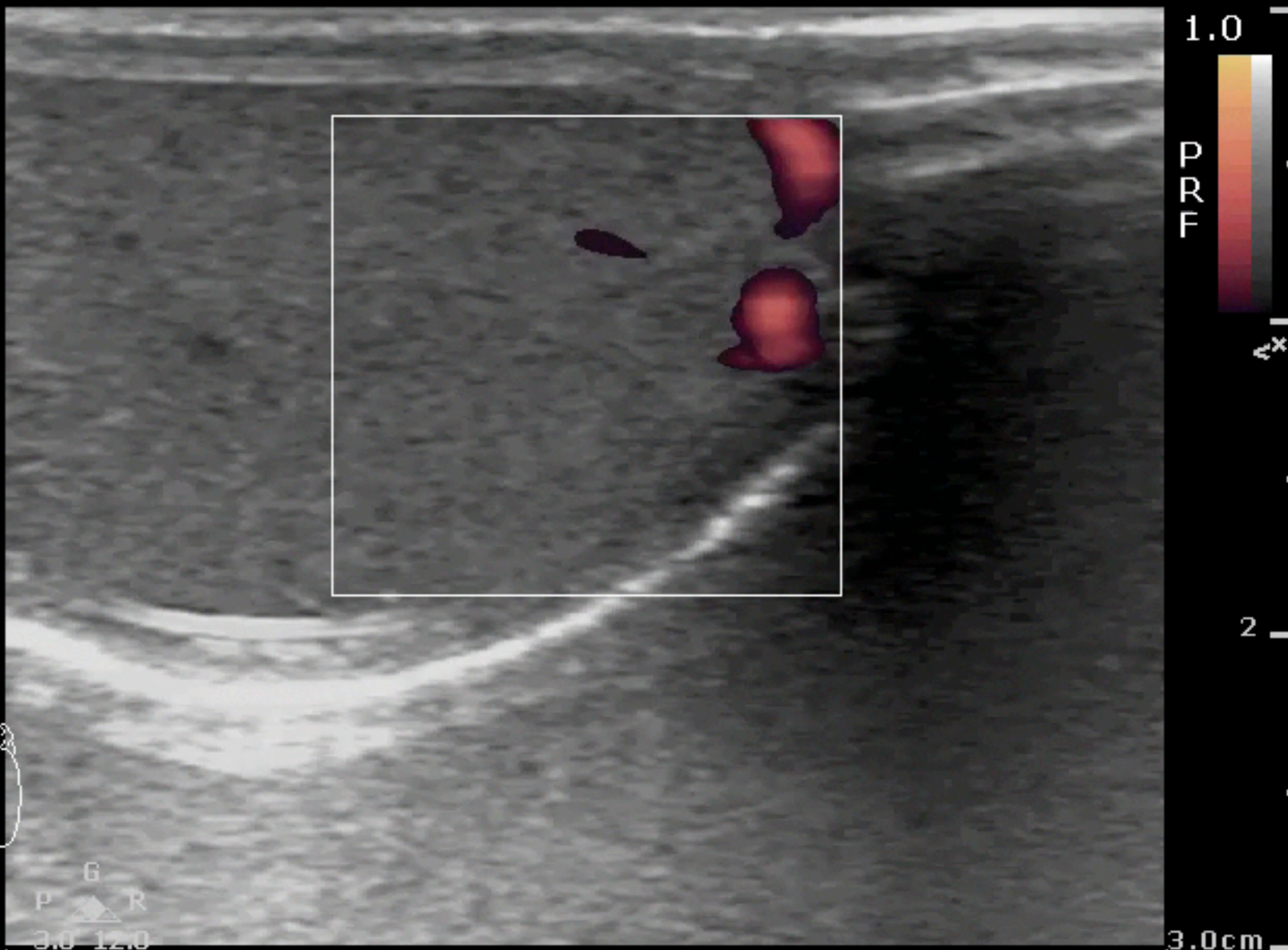
# Power Doppler for Low flow

Superficial  
L12-3  
42 Hz  
3.0cm

P

2D  
Gen  
Gn 100  
C 52  
4/3/2

CPA  
5.0 MHz  
Gn 57  
1/5/4  
Filtr Med  
BaseIn 3



# Color Doppler for Directions

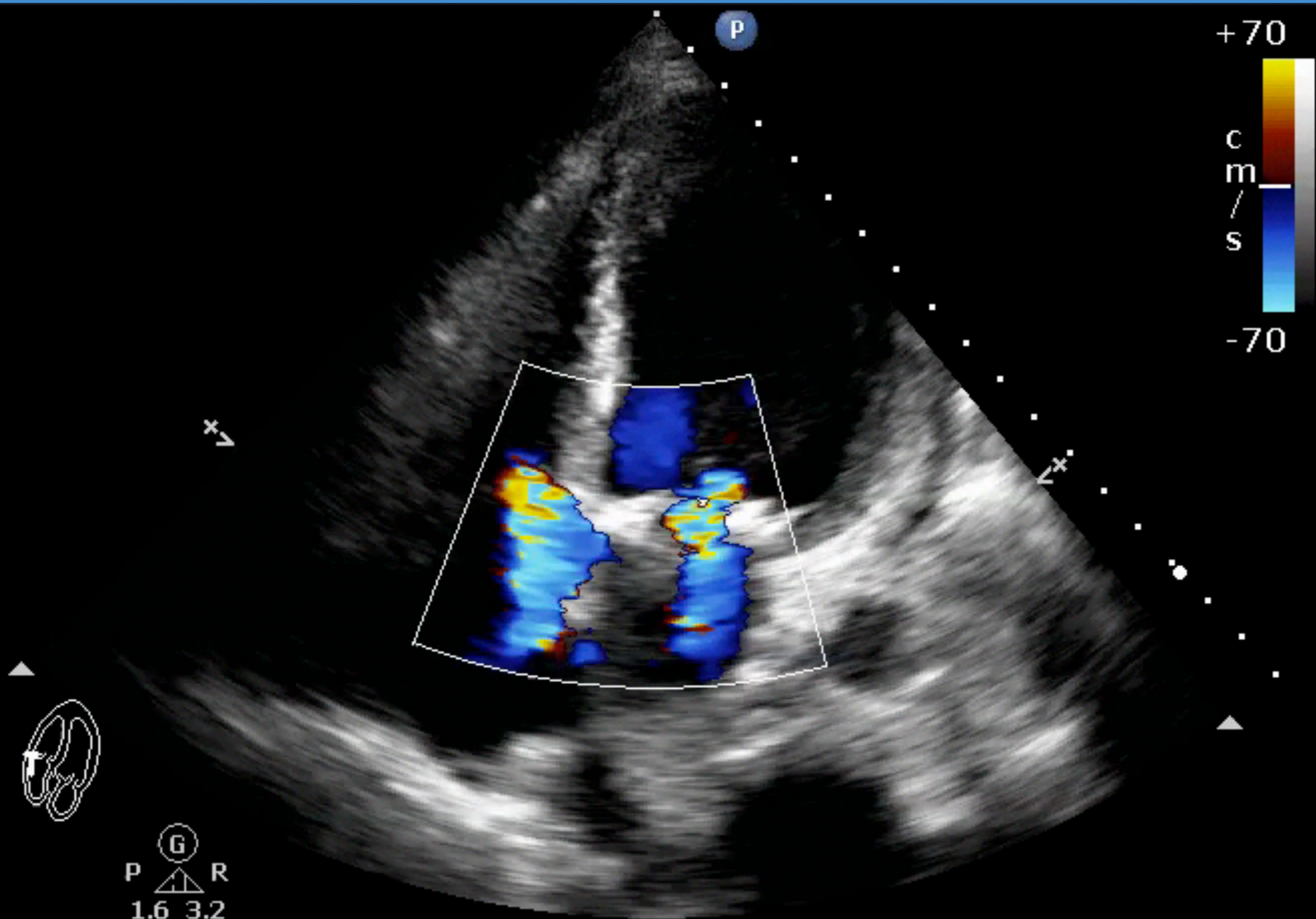
Adult Echo  
S5-1  
18 Hz  
18.0cm

2D

HGen  
Gn 34  
C 50  
3 / 2 / 0

Color

2.5 MHz  
Gn 60  
4 / 5 / 0  
Fltr High

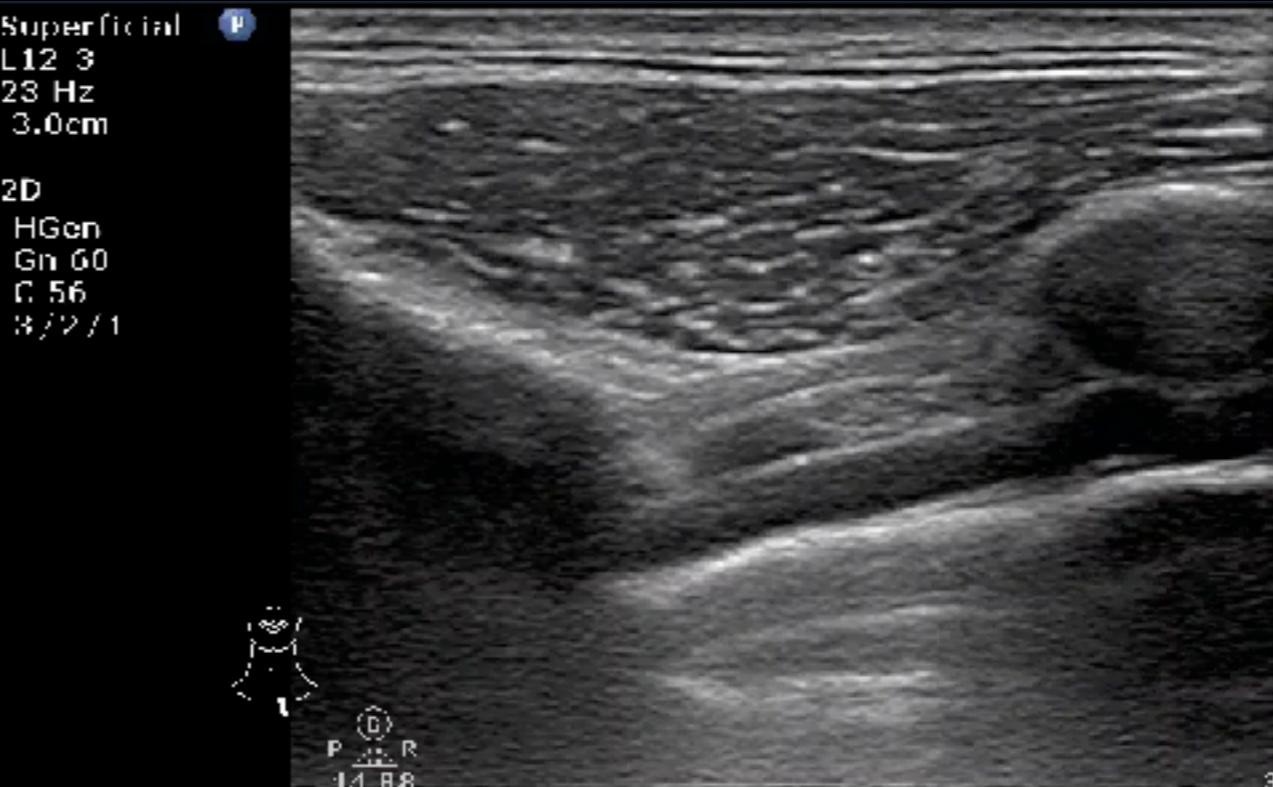


G  
P R  
1.6 3.2

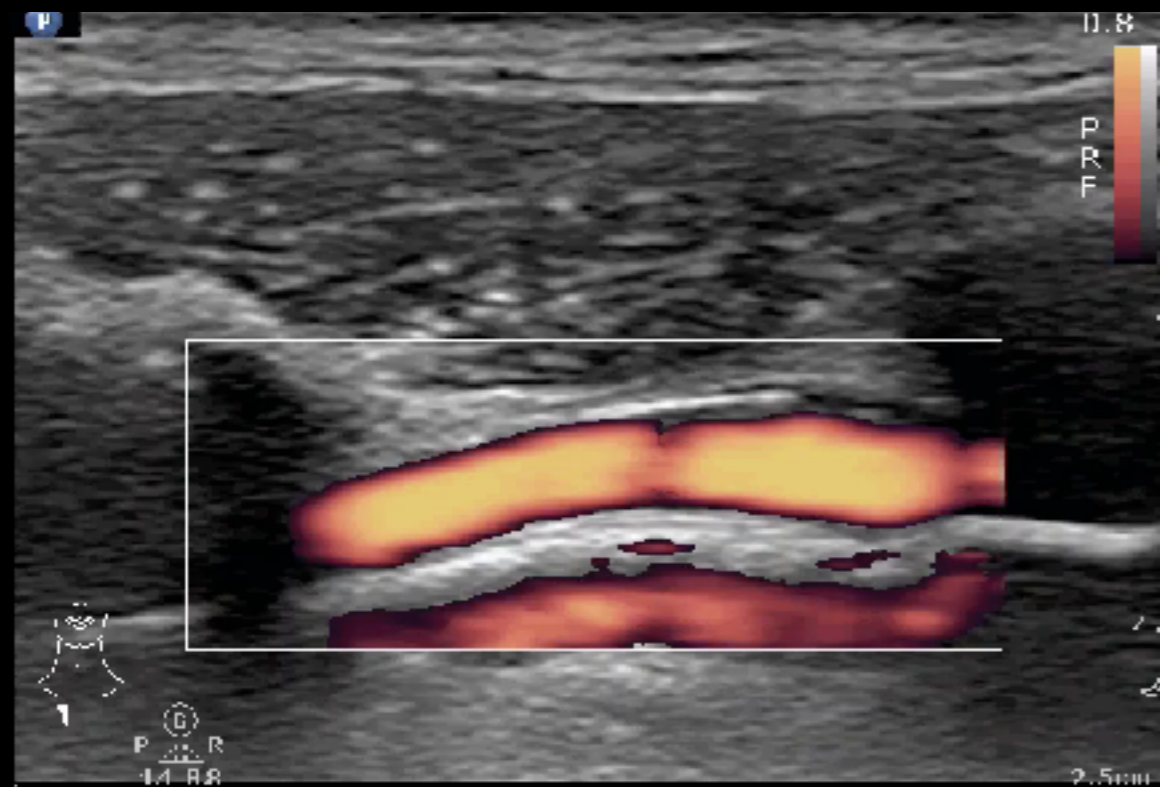
Superficial  
L12 3  
21 Hz  
2.5cm



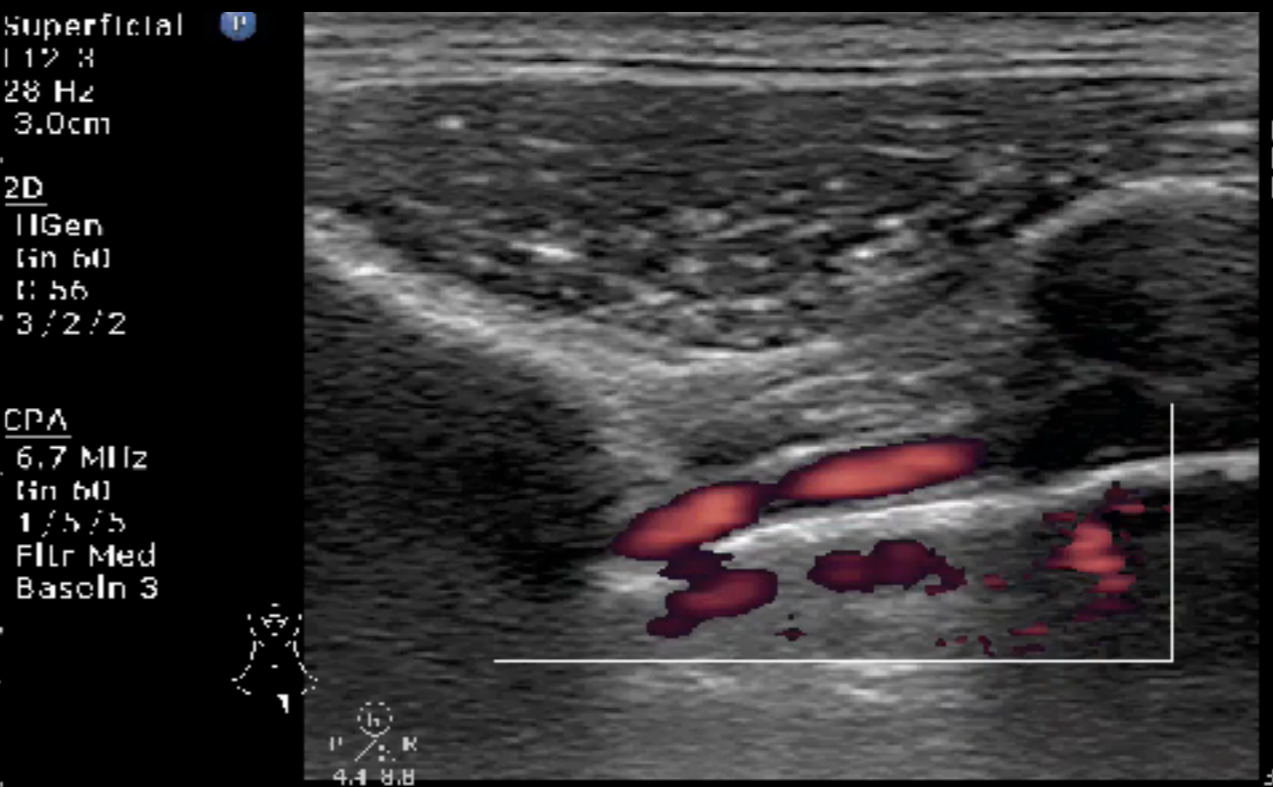
Superficial  
L12 3  
23 Hz  
3.0cm



Superficial  
L12 3  
20 Hz  
2.5cm

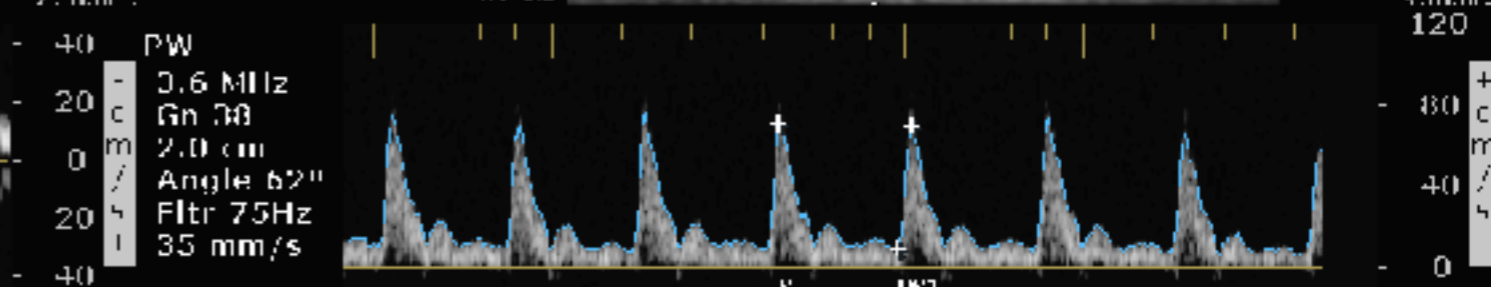
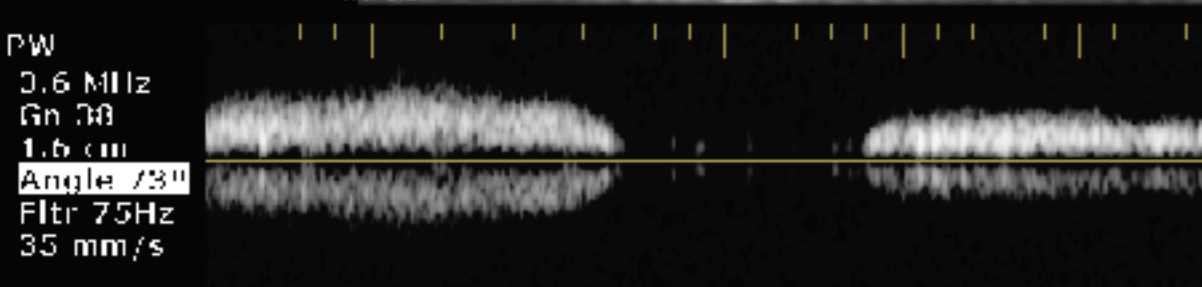
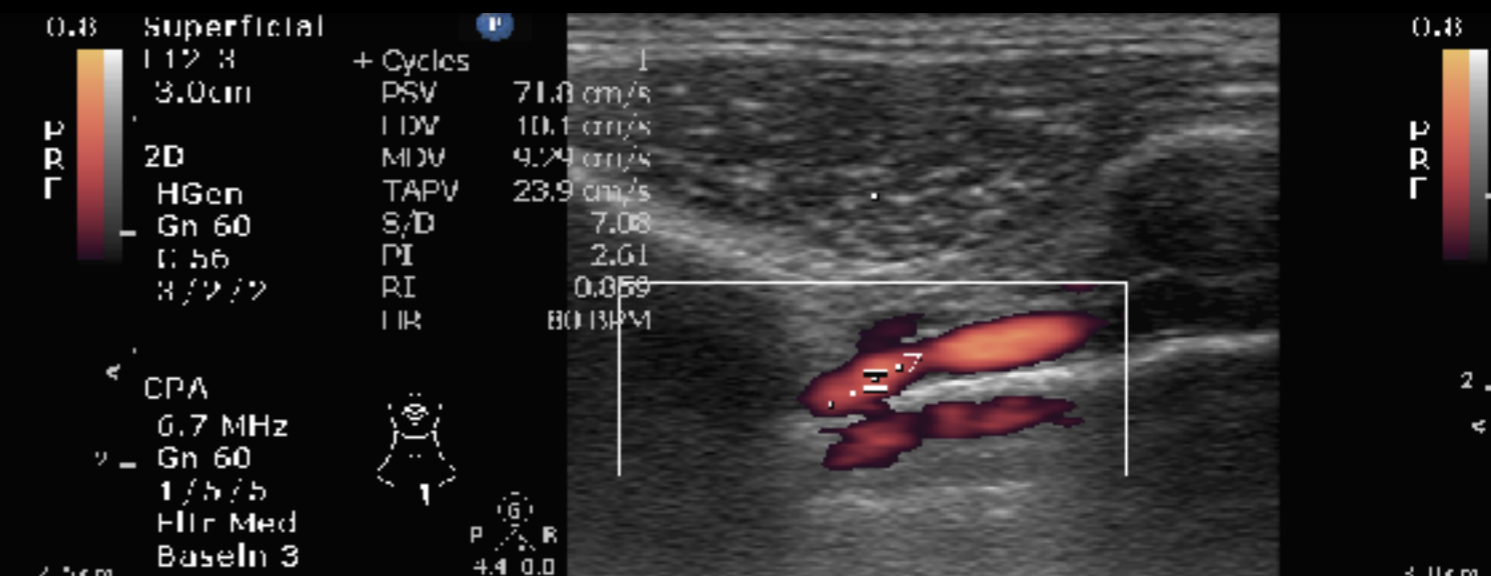
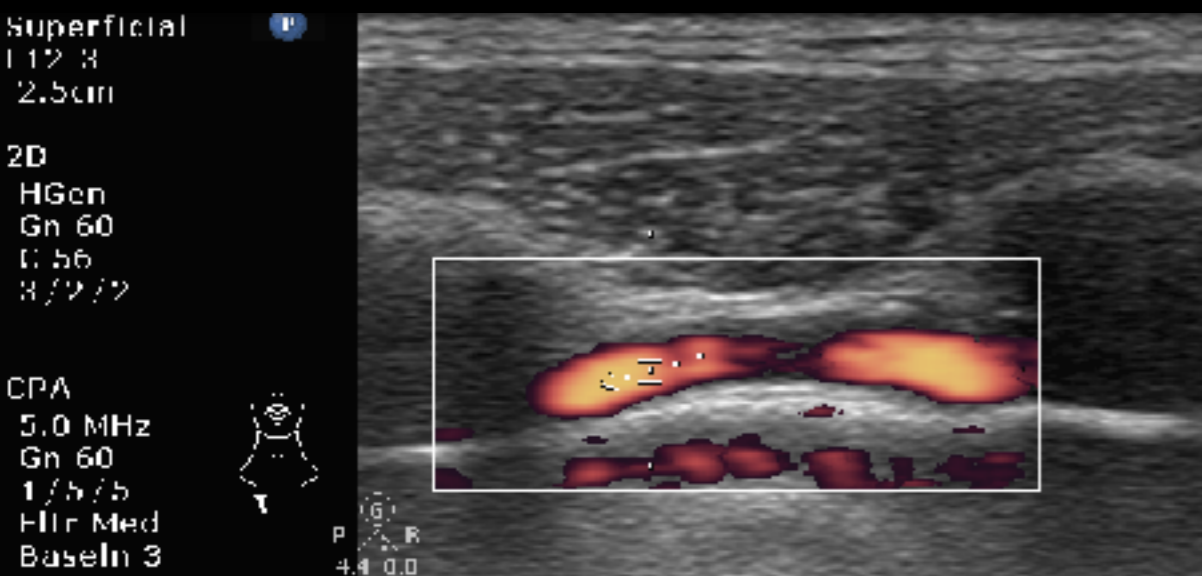


Superficial  
L12 3  
28 Hz  
3.0cm

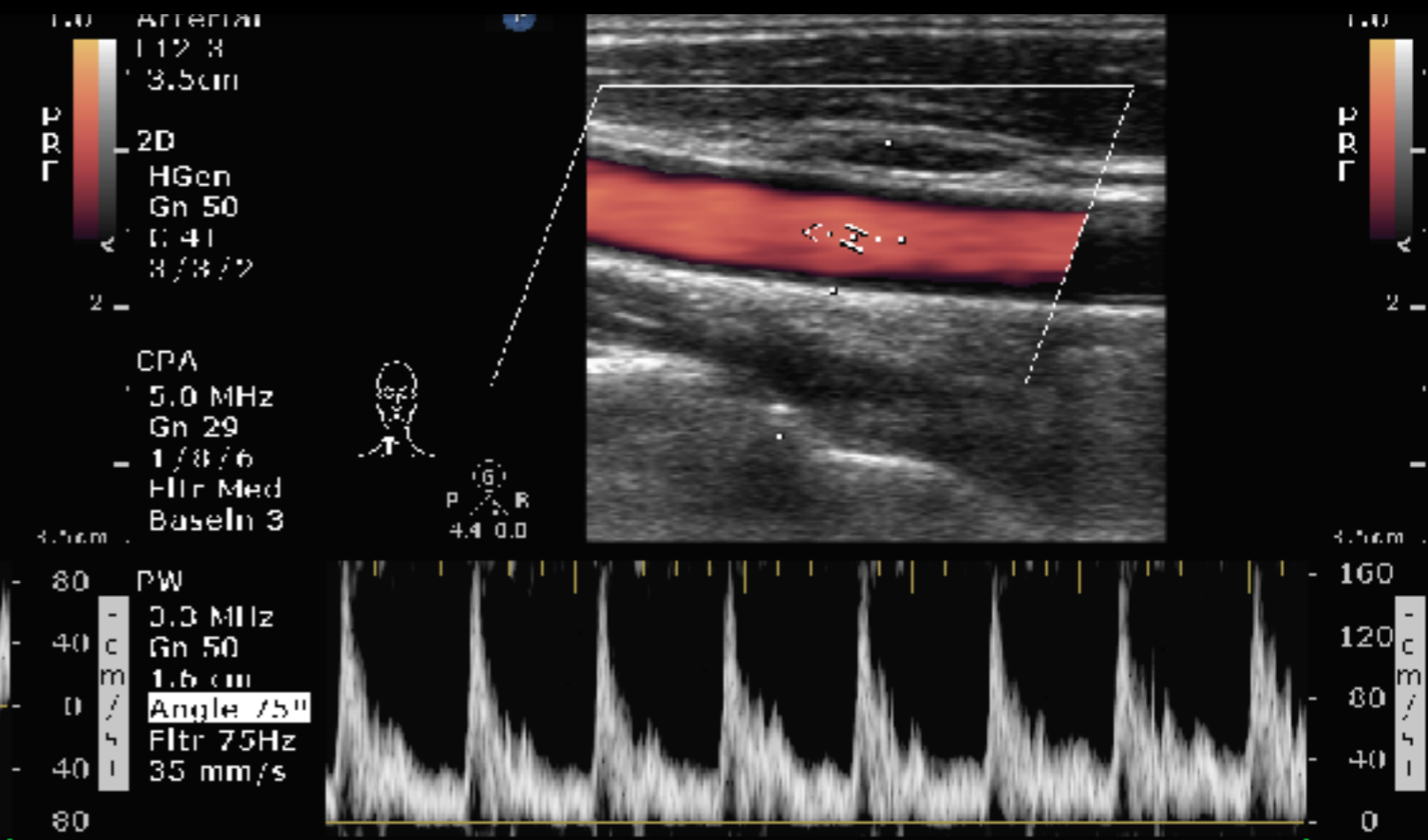
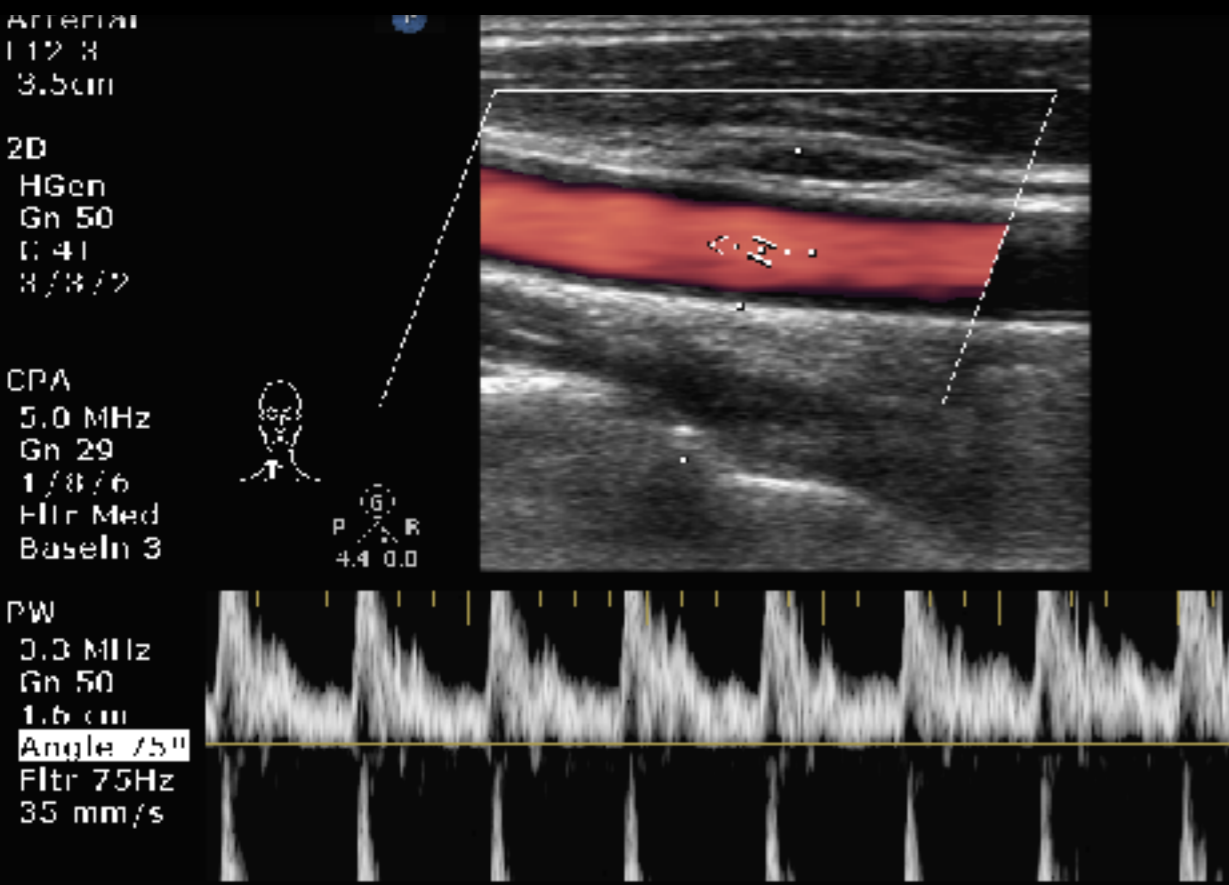


# Vein

# Artery

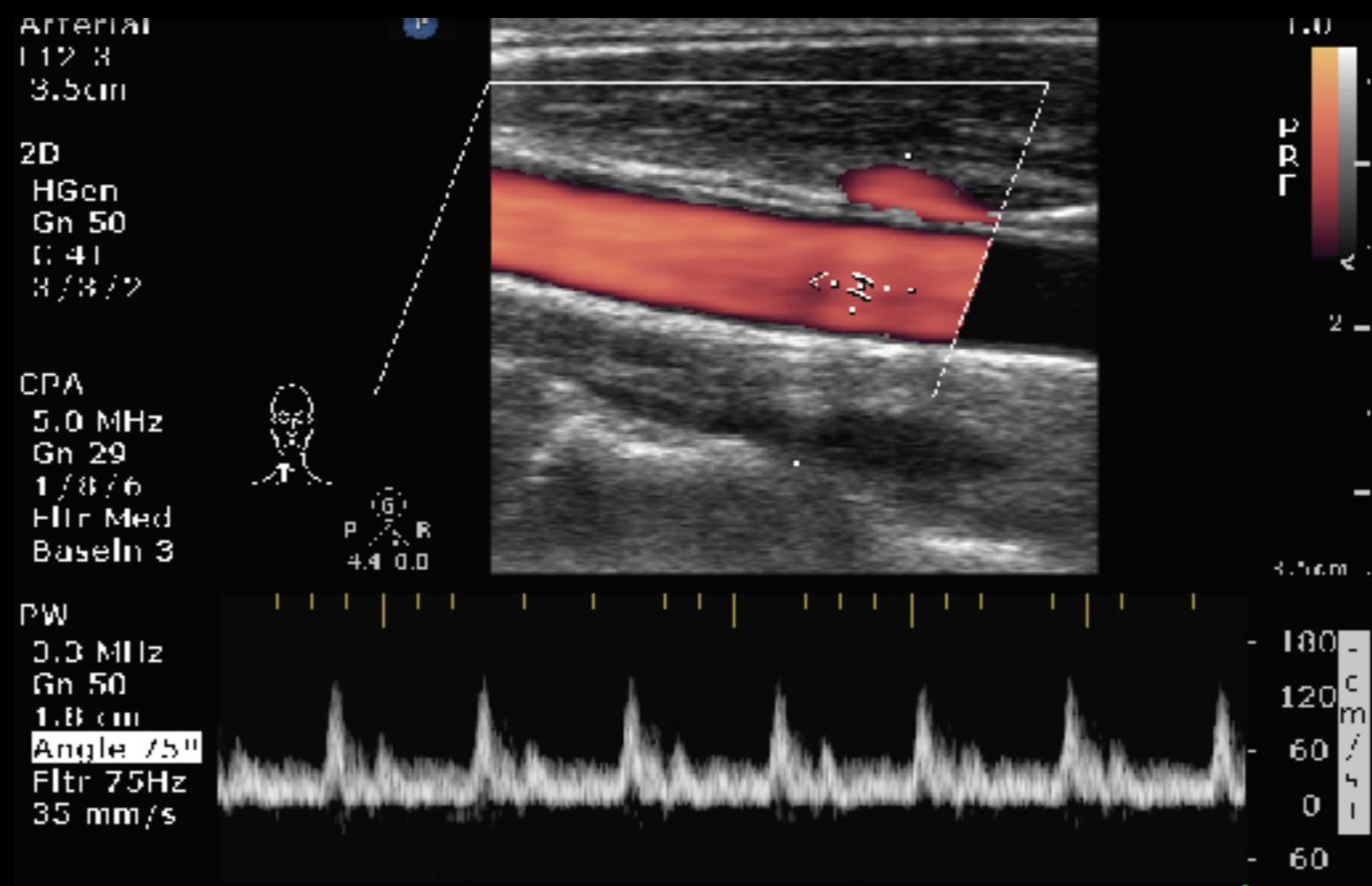


# Spectral analysis



**Aliasing**

**Scale**



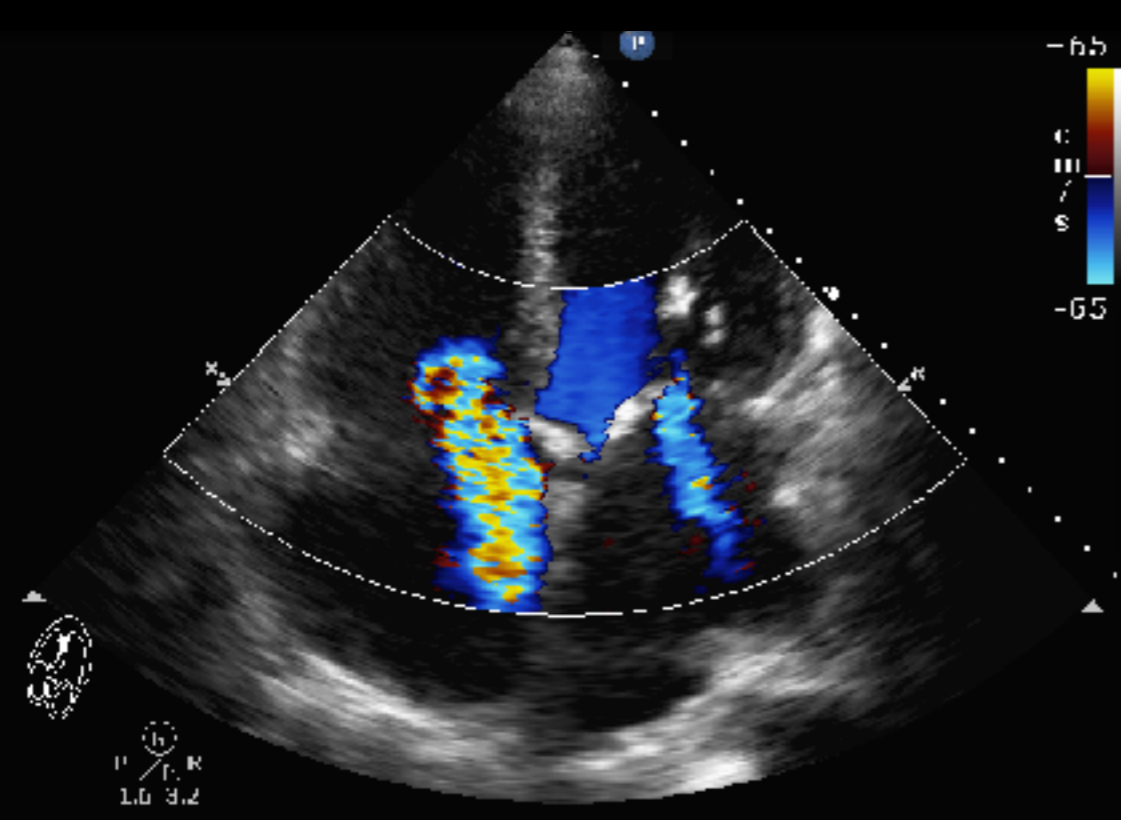
**Baseline**



Adult Echo  
SS 1  
9 Hz  
19.0cm

2D  
HGen  
Gn 50  
I: 50  
3/2/0

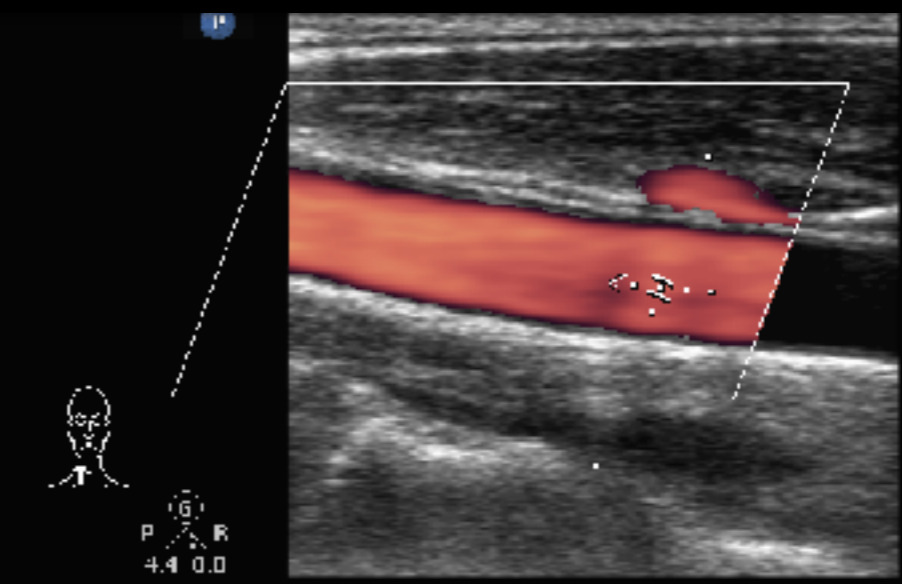
Color  
2.5 MHz  
Gn 60  
4/5/0  
Filt High



Arterial  
112.3  
3.5cm

2D  
HGen  
Gn 50  
I: 41  
3/3/2

CPA  
5.0 MHz  
Gn 29  
1/8/6  
Filt Med  
Baseln 3



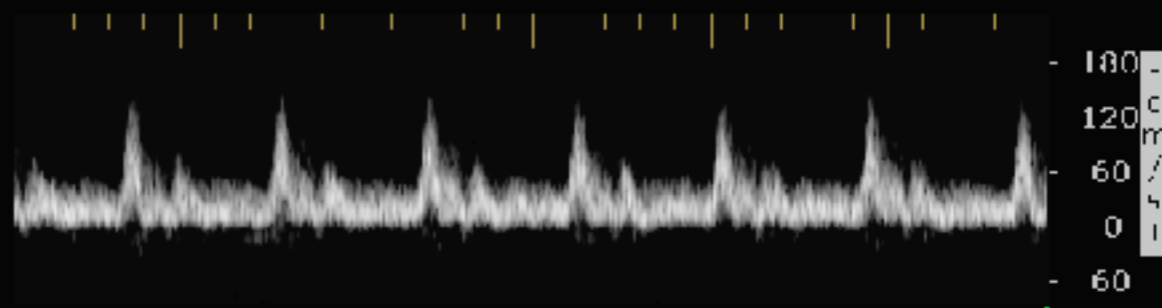
# Continuous-Wave

Adult Echo  
SS 1  
19.0cm

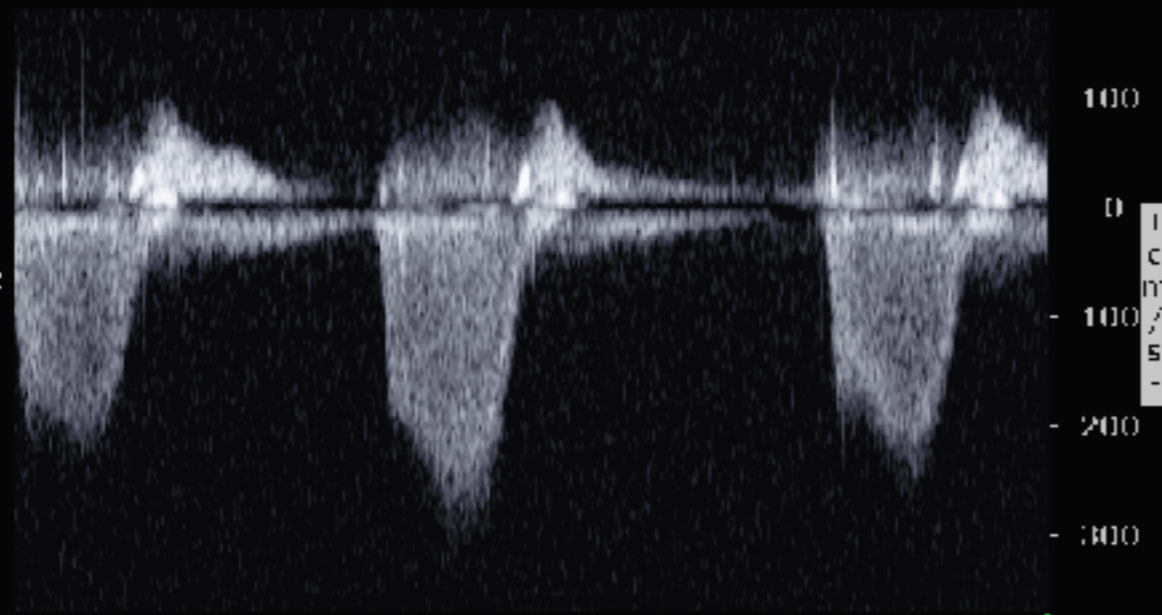
2D  
HGen  
Gn 50  
I: 50  
3/2/0



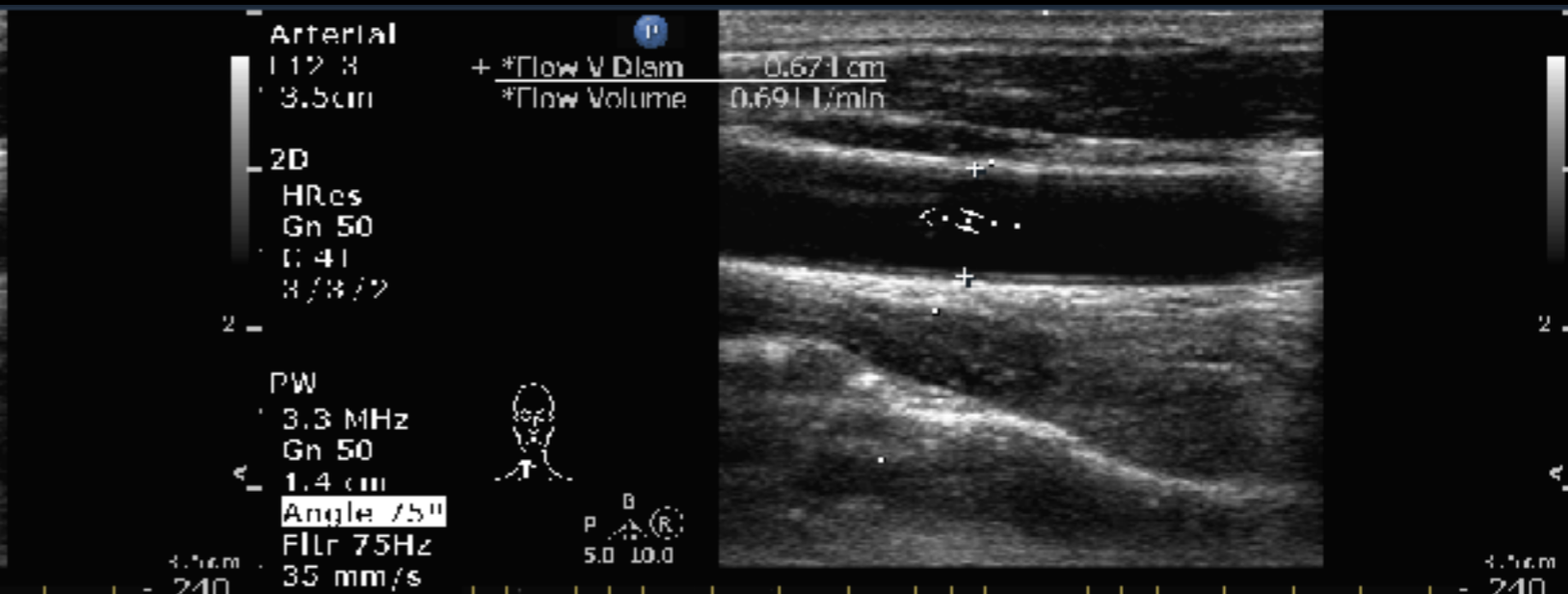
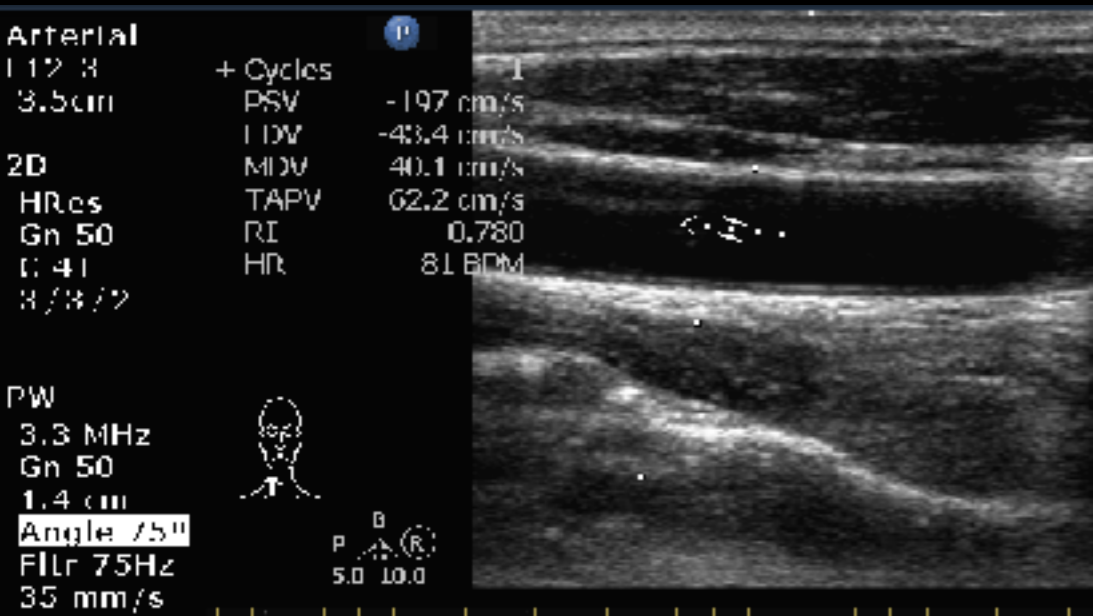
PW  
3.3 MHz  
Gn 50  
1.8 cm  
Angle 75°  
Filt 75Hz  
35 mm/s



CW  
1.7 MHz  
Gn 56  
11.8 cm  
Angle 0°  
Filt 400Hz  
75 mm/s



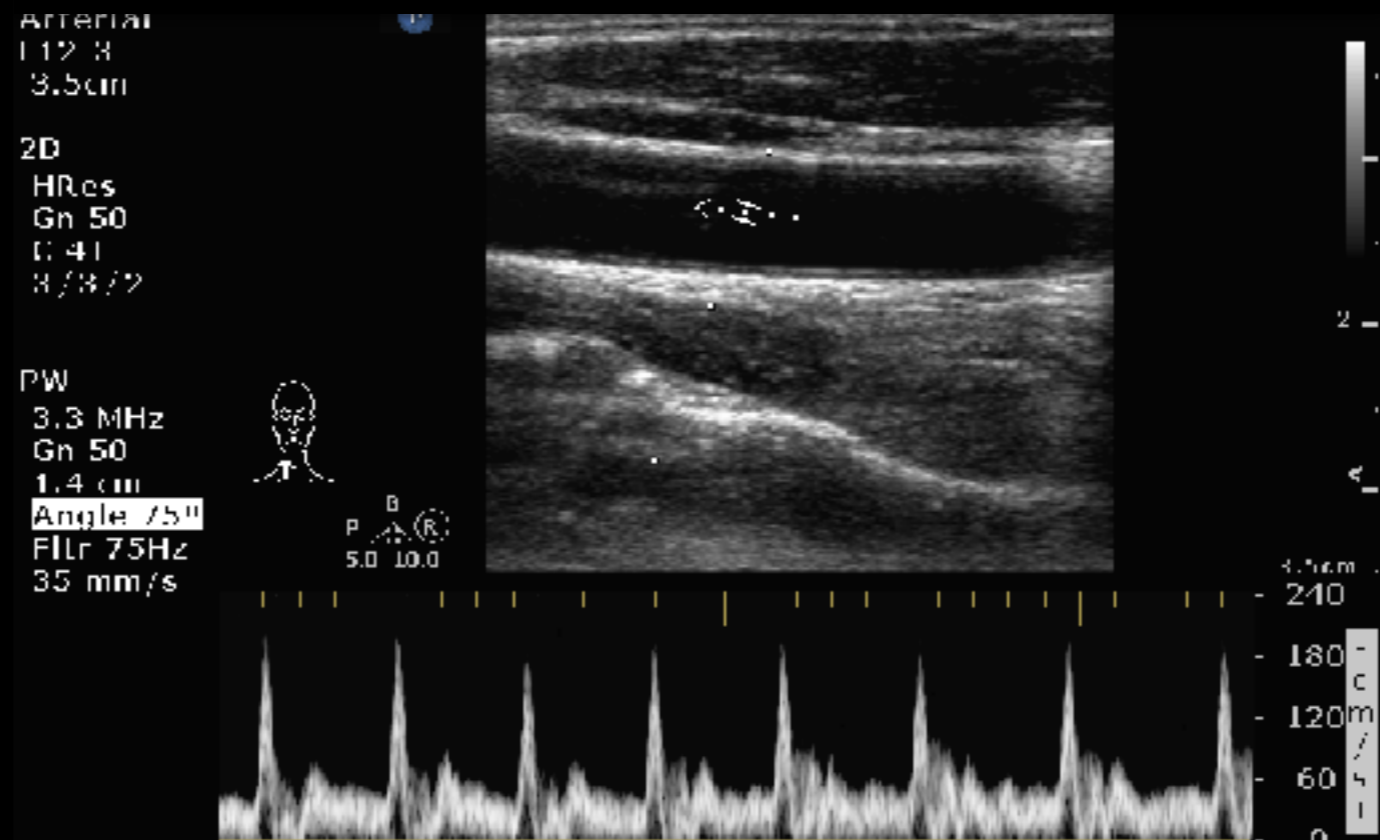
# Pulsed-Wave



Velocity

# Flow Volume

Diameter



# I-AIM

## Indication

**Acquisition**

**Interpretation**

**Making  
decision**

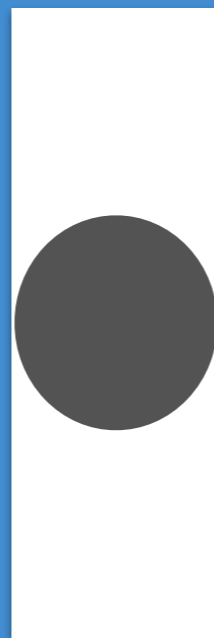
# I-AIM

**Dilatation**

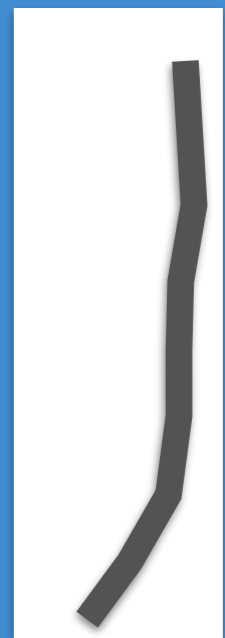


**Rupture**

**Obstruction**



**Dissection**



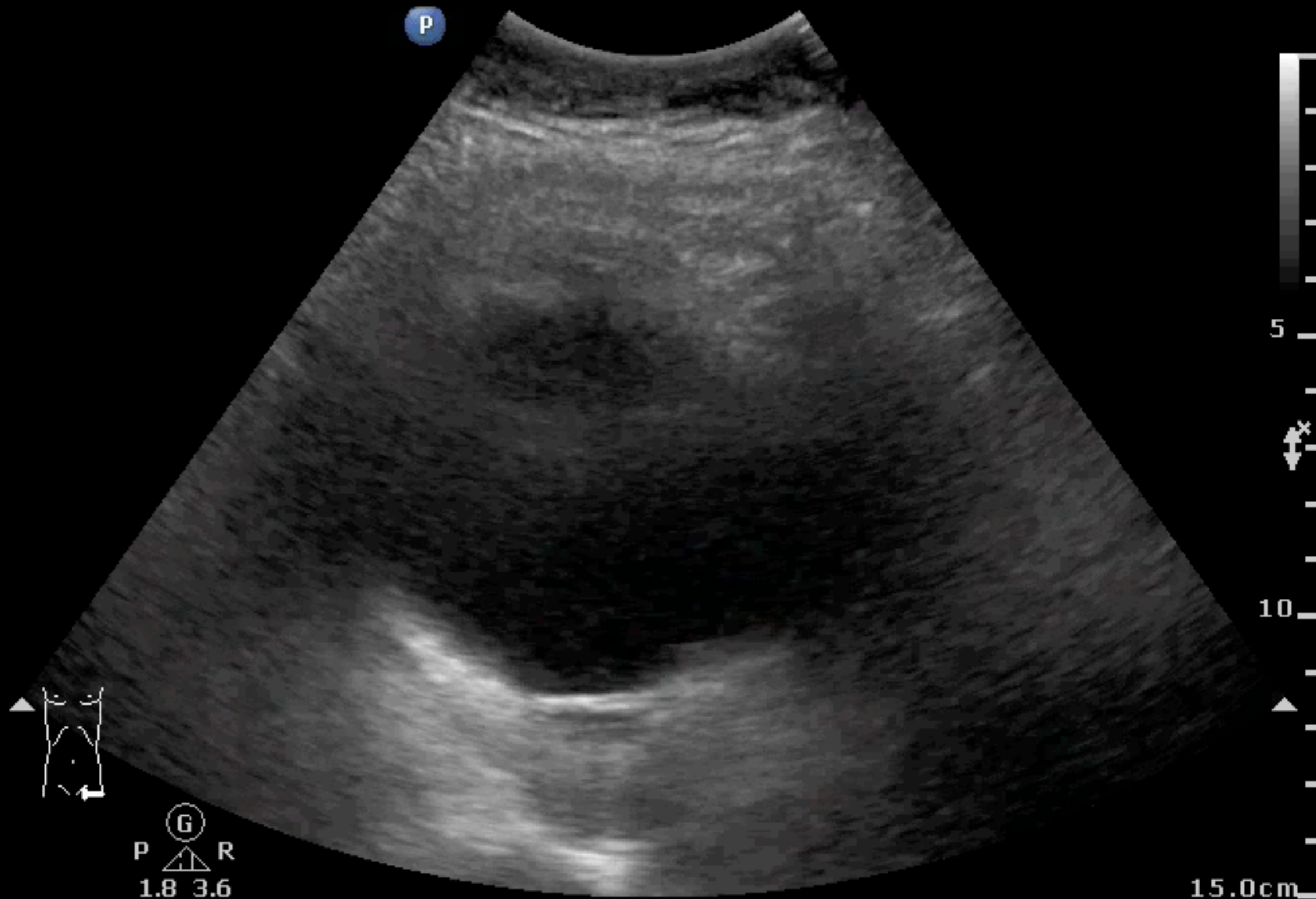
I-AIM



Abd Gen  
C5-1  
34 Hz  
15.0cm

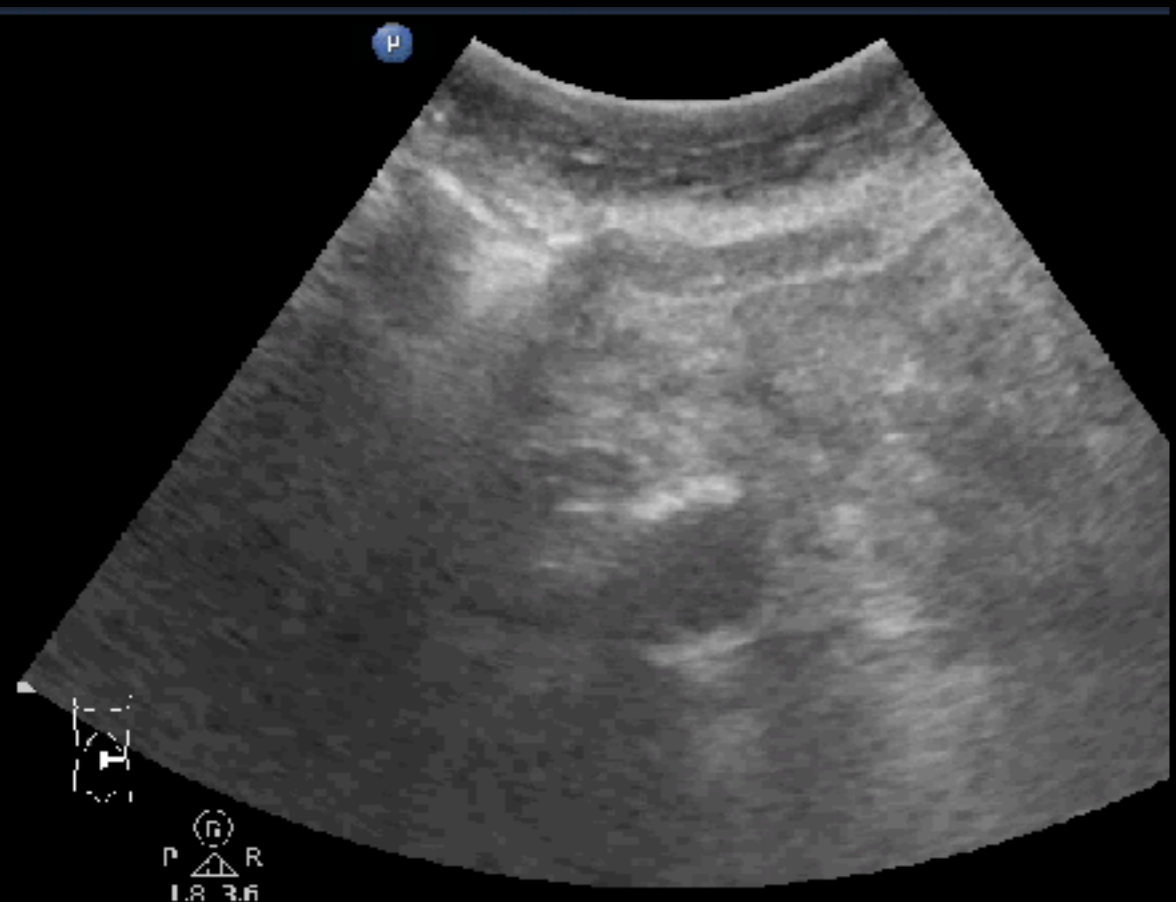
2D

HGen  
Gn 58  
C 56  
3 / 3 / 3



15.0cm

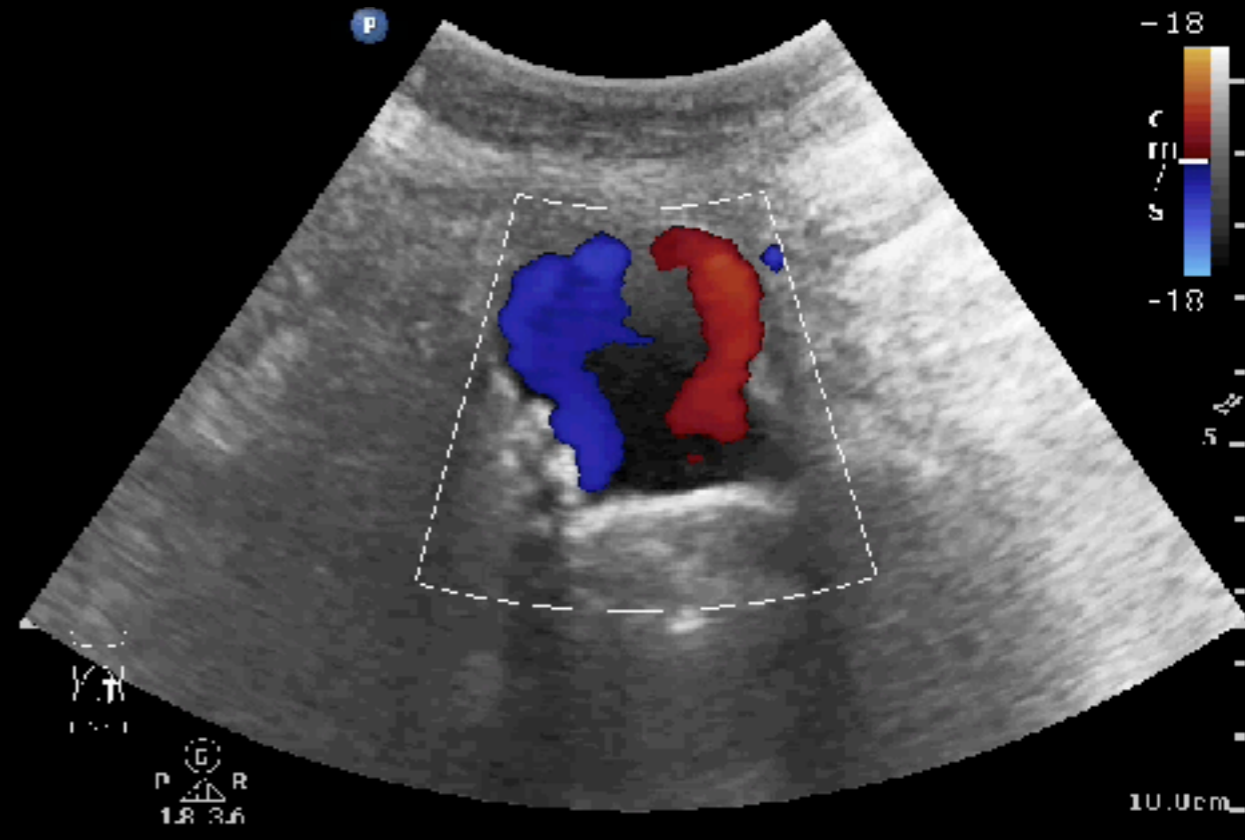
Gen  
m  
5  
/3



Abd Gen  
C5-1  
12 Hz  
10.0cm

2D  
HGen  
Gn 85  
C 56  
3/3/3

Color  
2.5 MHz  
Gn 60  
3/1/3  
Htr Med



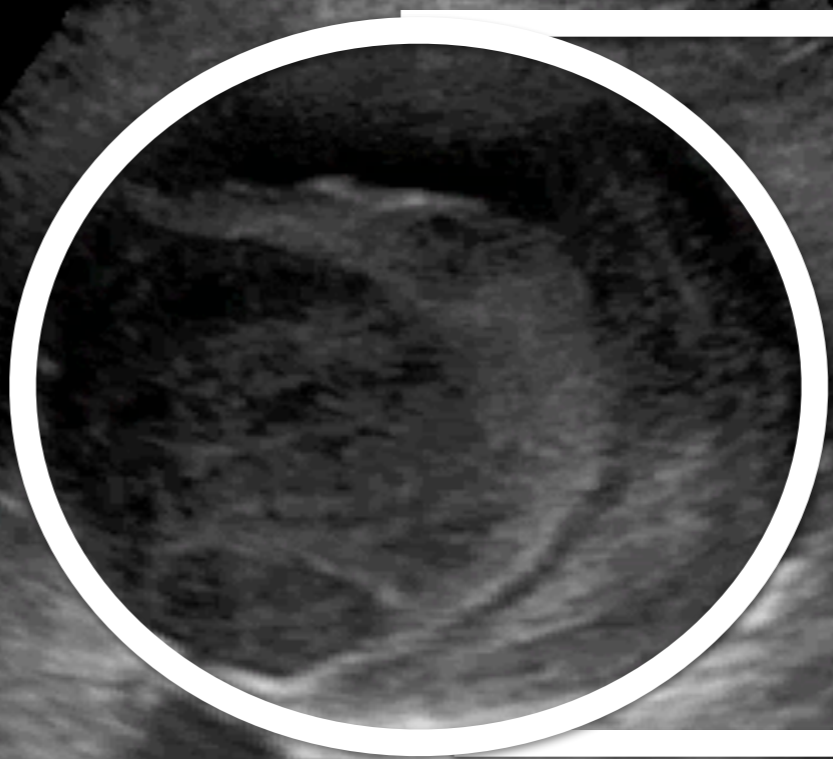
-18  
cm/s  
-18

10.0cm

Abd Gen  
C5-1  
34 Hz  
15.0cm

2D  
HGen  
Gn 57  
C 56  
3 / 3 / 3

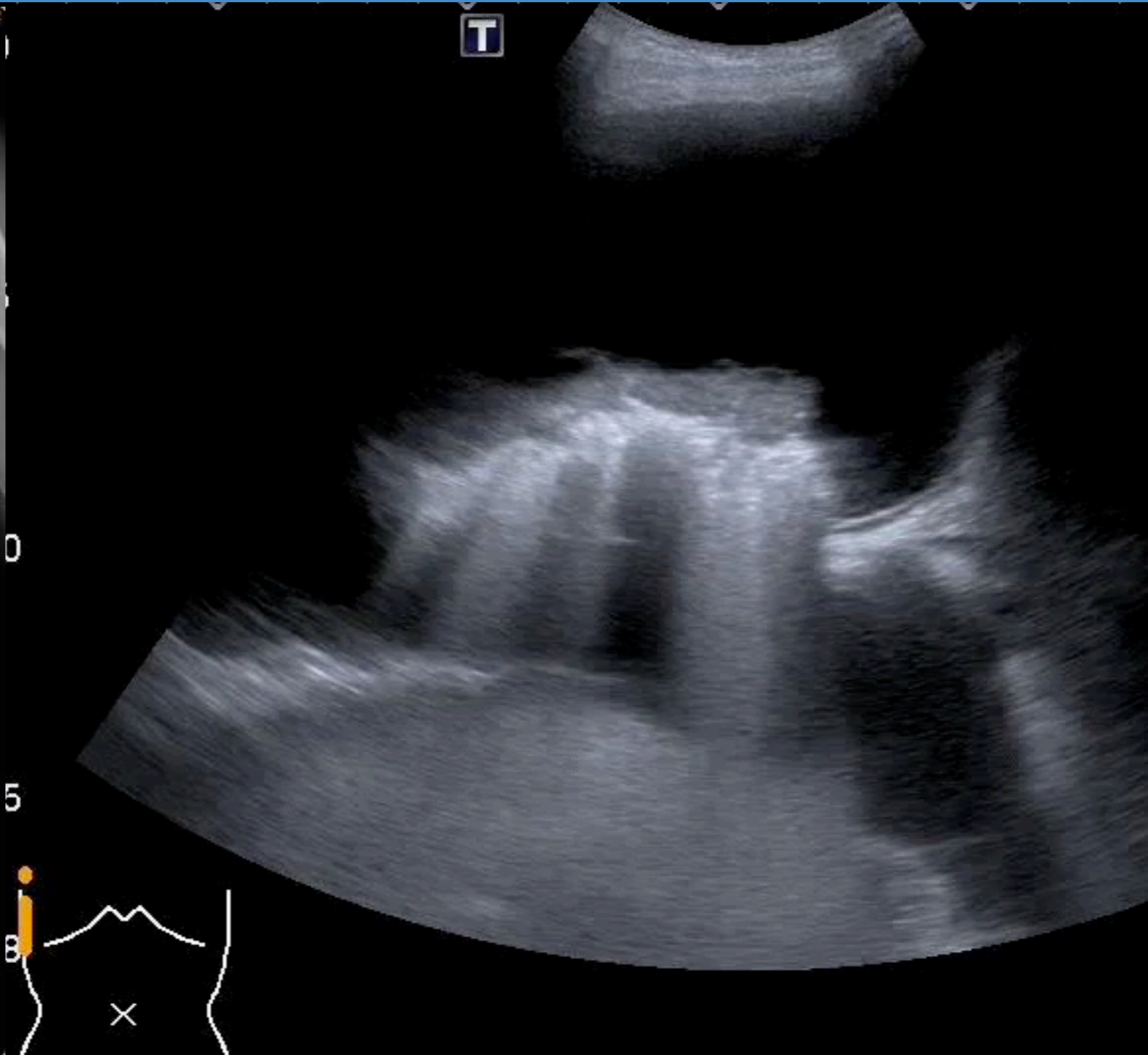
P

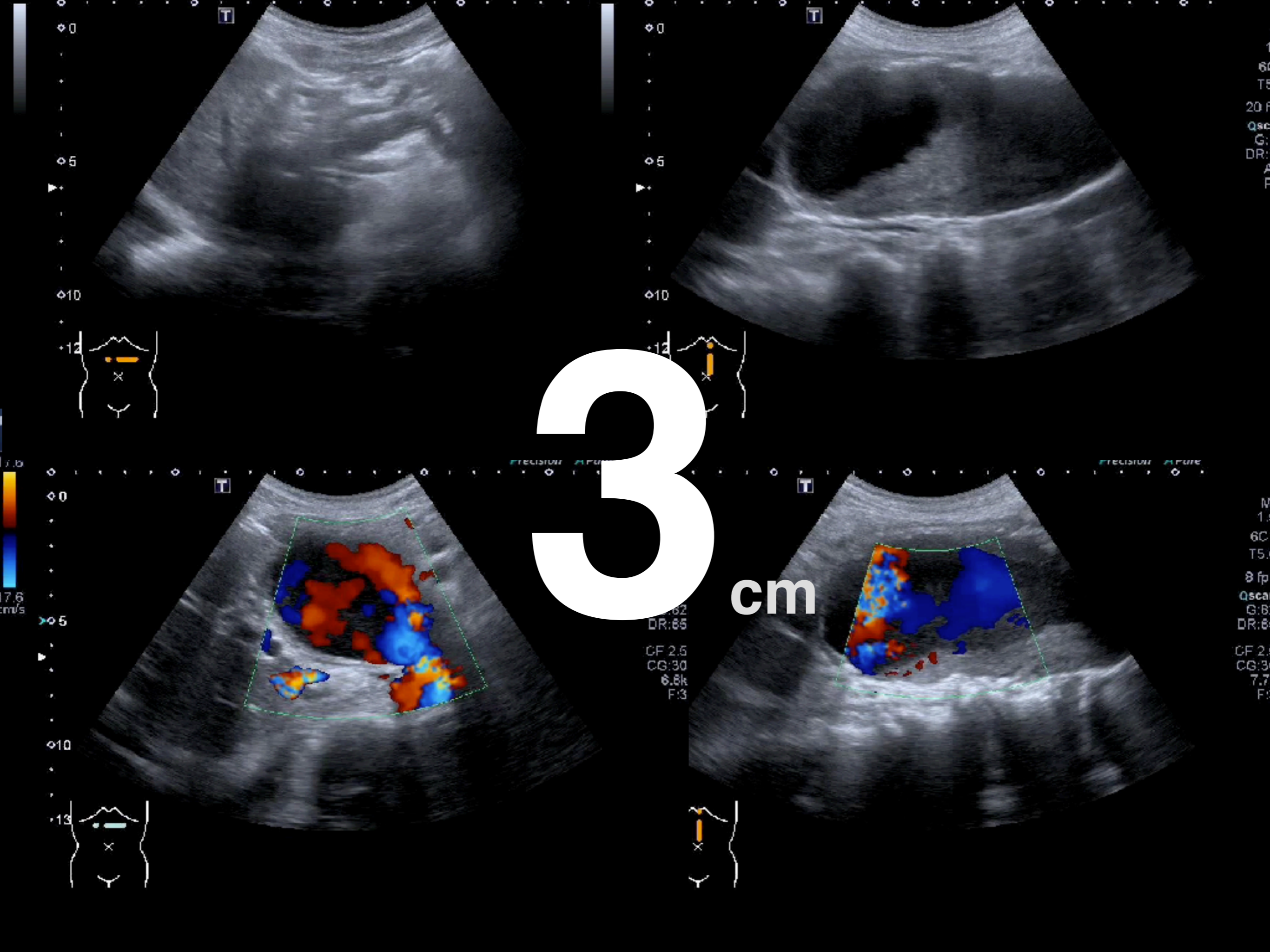


15.0cm



# 86M, fever for 1wk

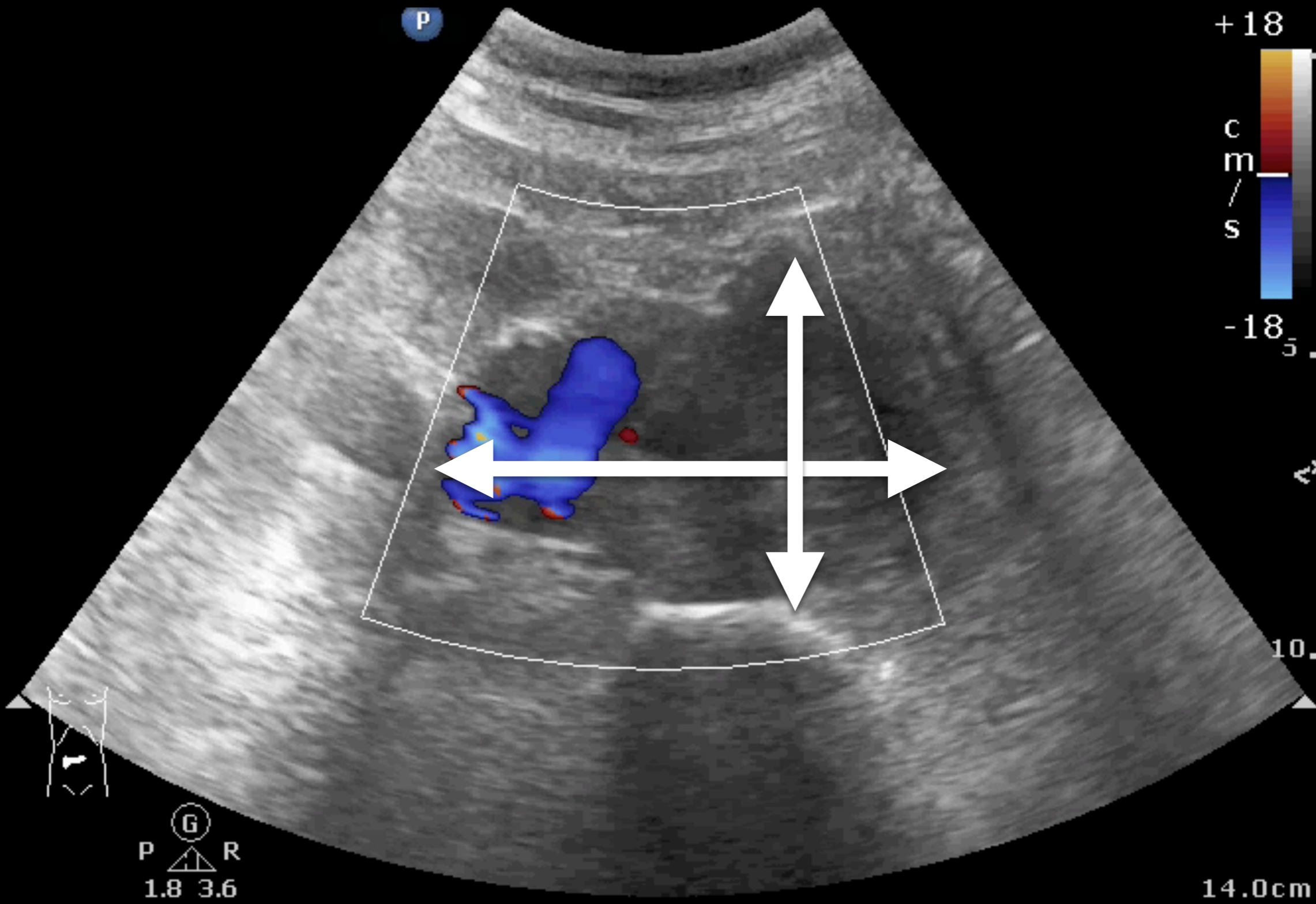




Abd Gen  
C5-1  
9 Hz  
14.0cm

2D  
HGen  
Gn 78  
C 56  
3/3/3

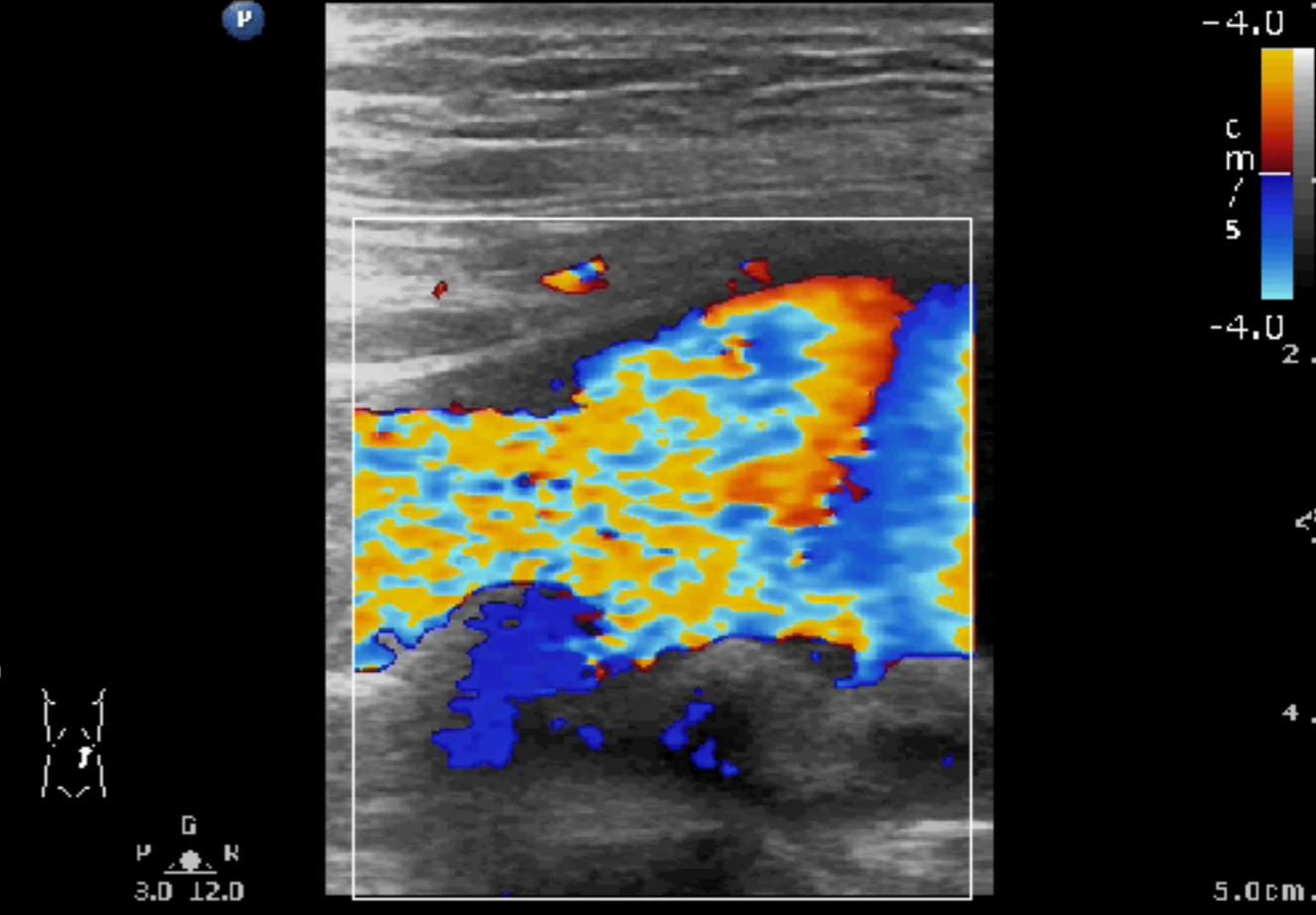
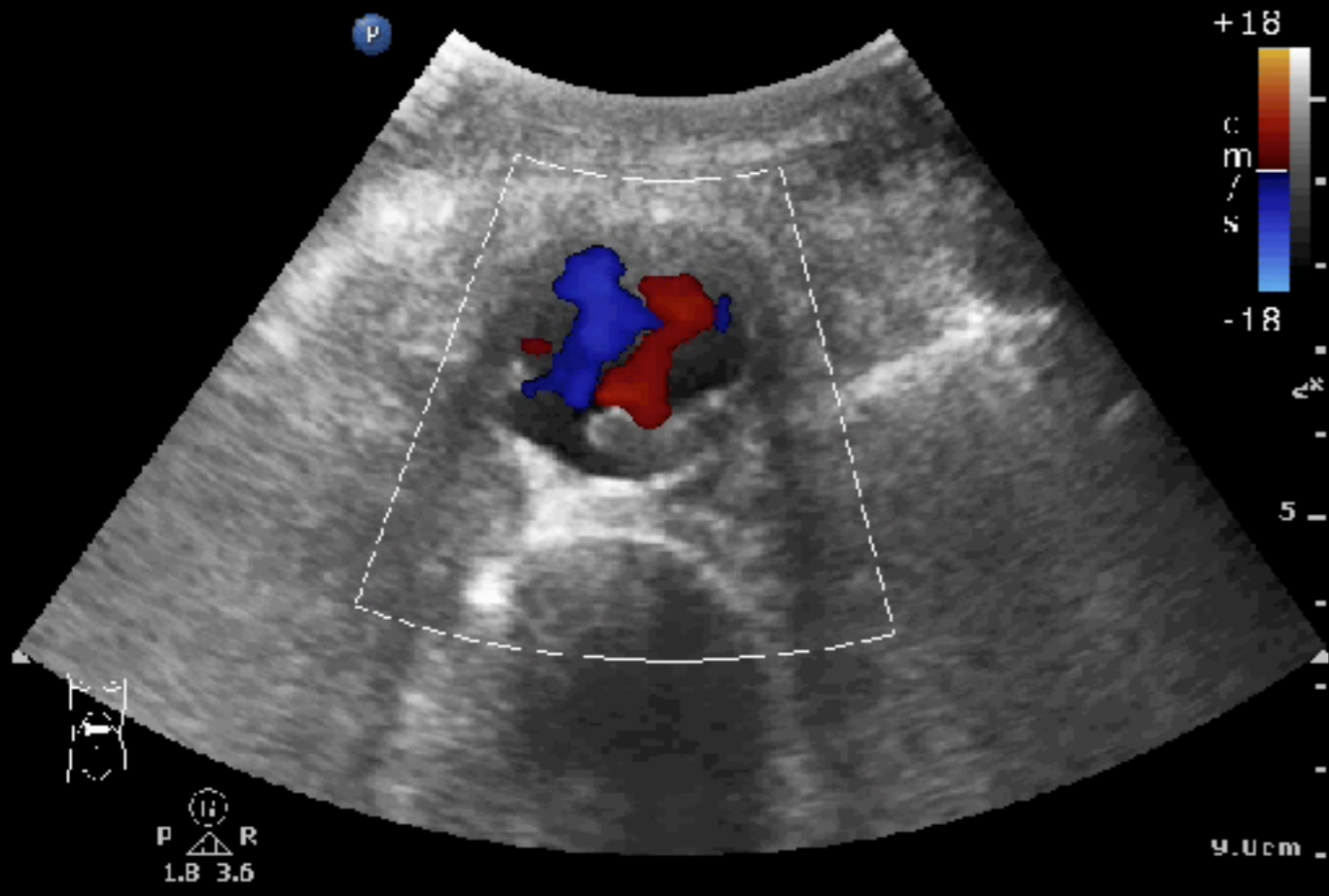
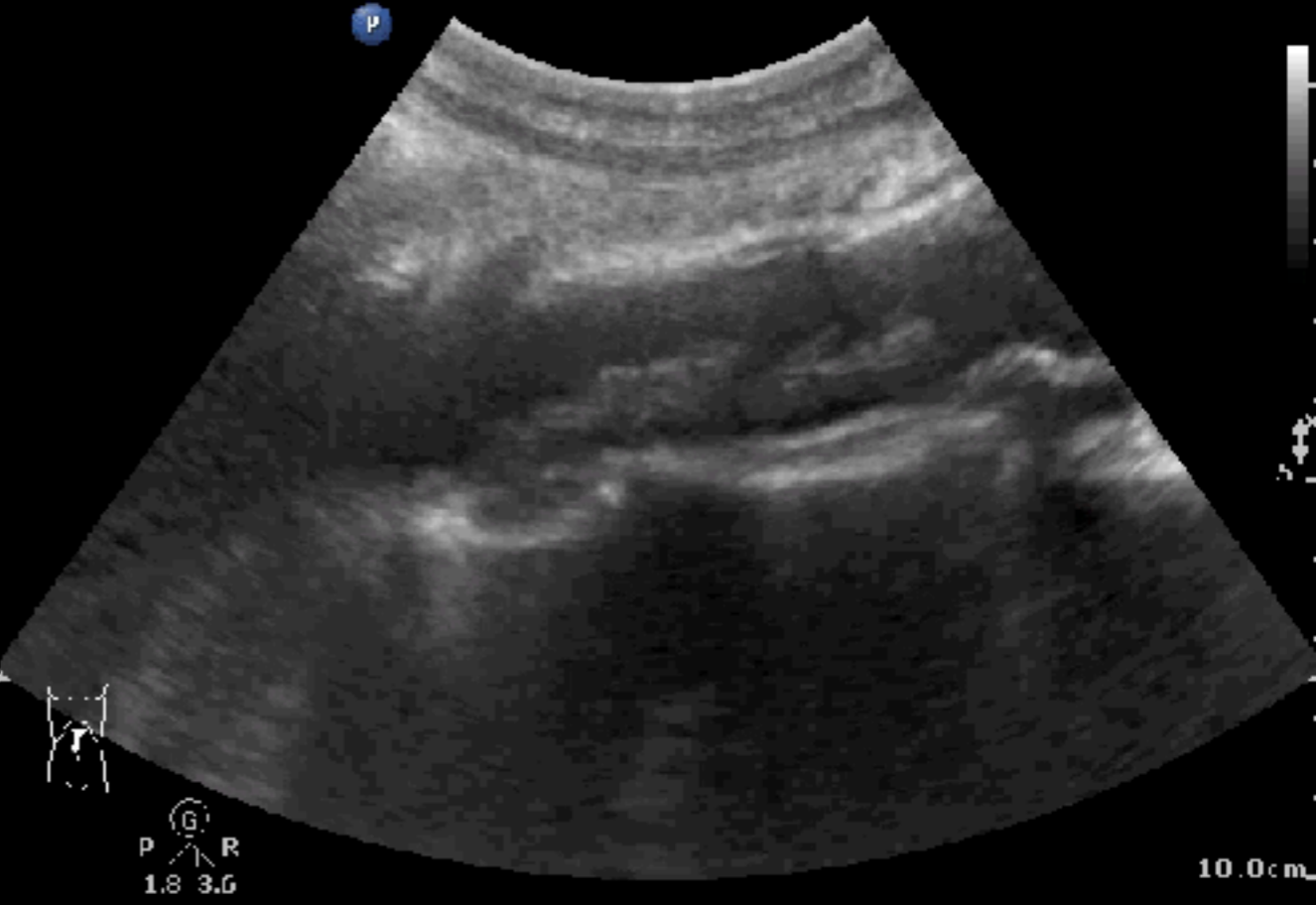
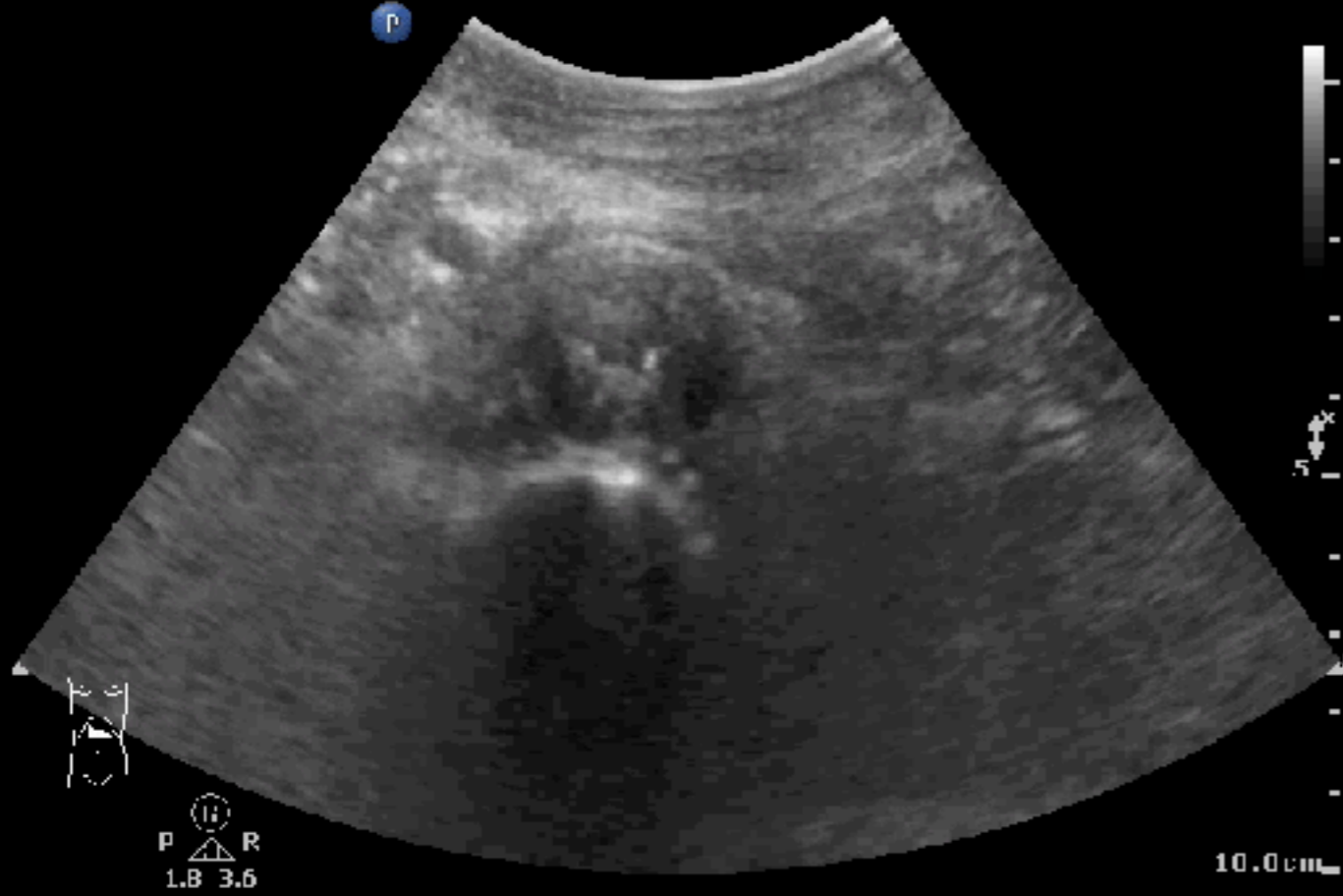
Color  
2.5 MHz  
Gn 60  
3/7/3  
Fltr Med



+18  
cm/s  
-18

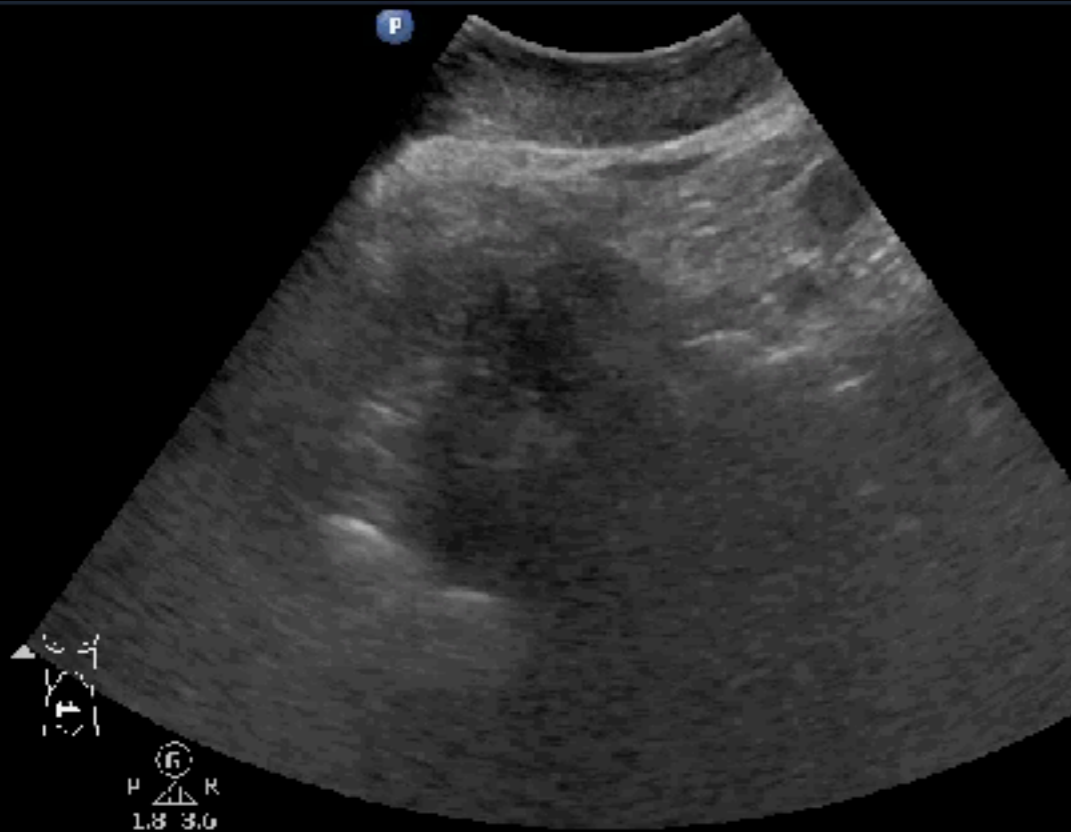
G  
P R  
1.8 3.6

14.0cm



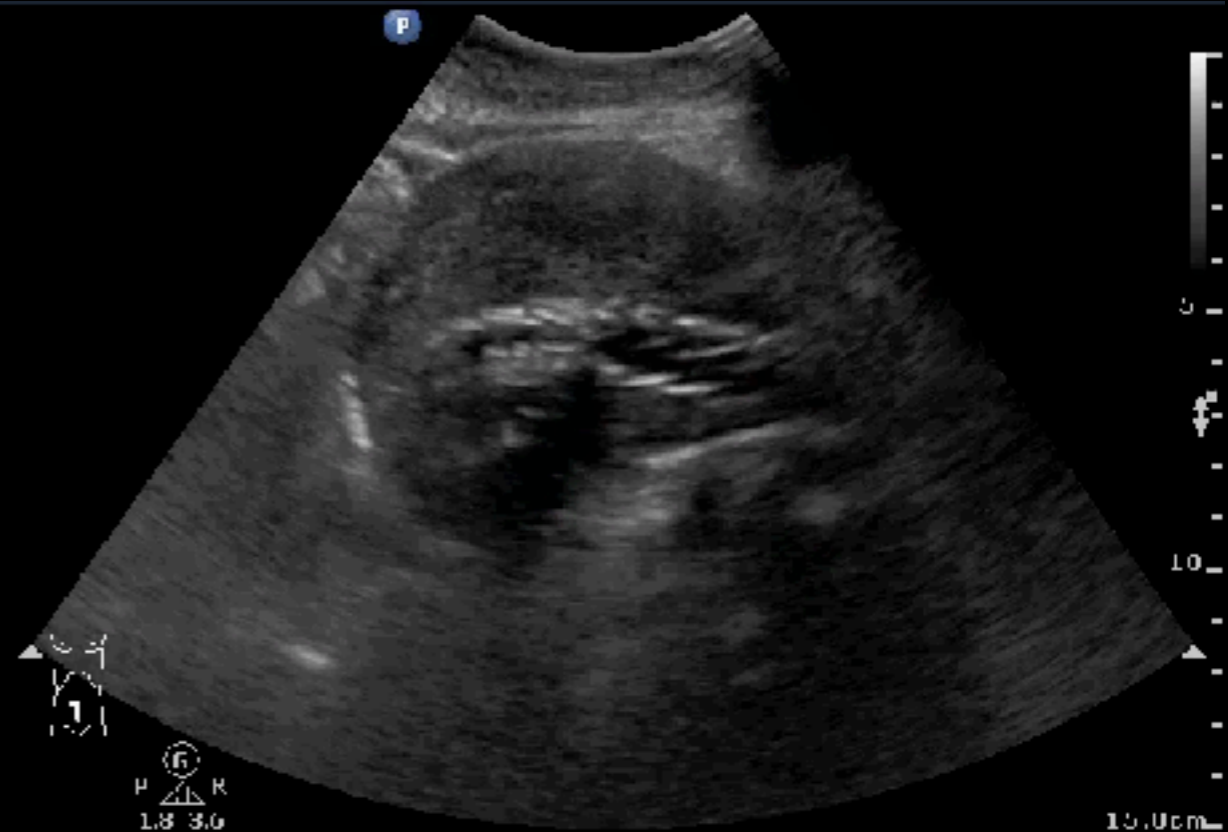
Abd Gen  
C5 1  
34 Hz  
15.0cm

2D  
HGen  
Gn 60  
C 56  
3/3/3

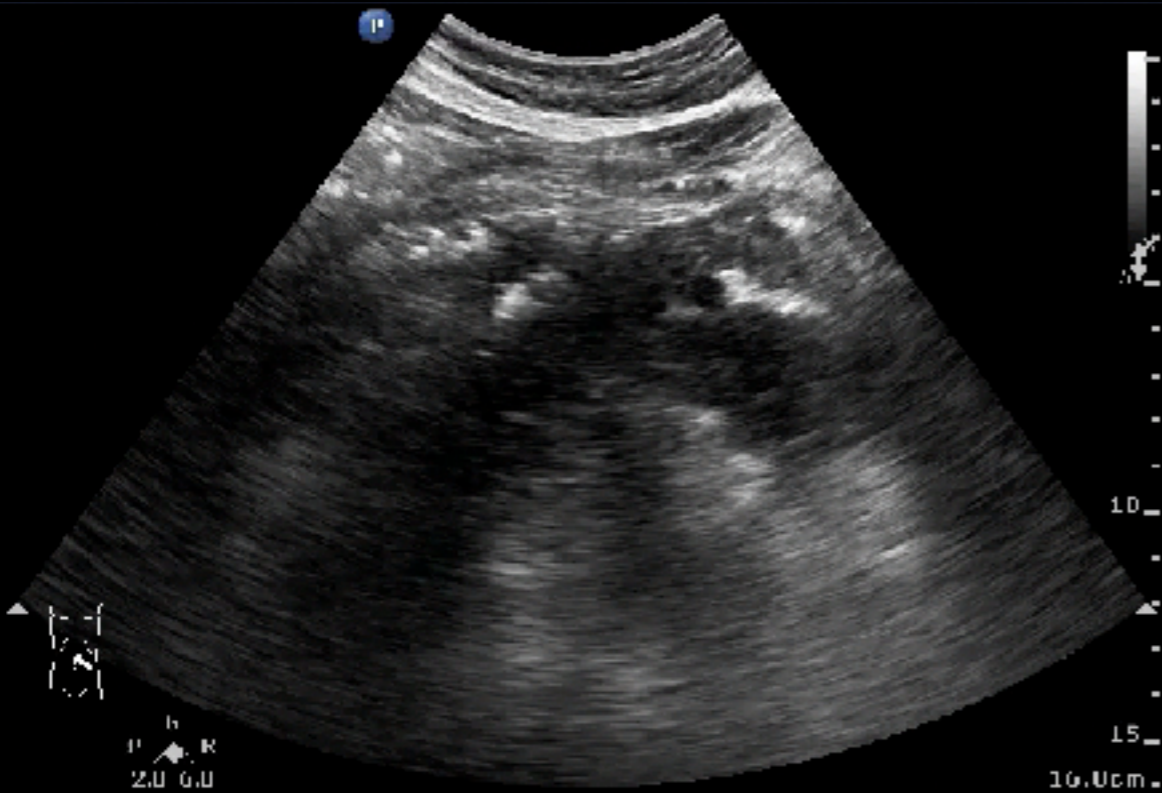


Abd Gen  
C5 1  
34 Hz  
15.0cm

2D  
HGen  
Gn 60  
C 56  
3/3/3

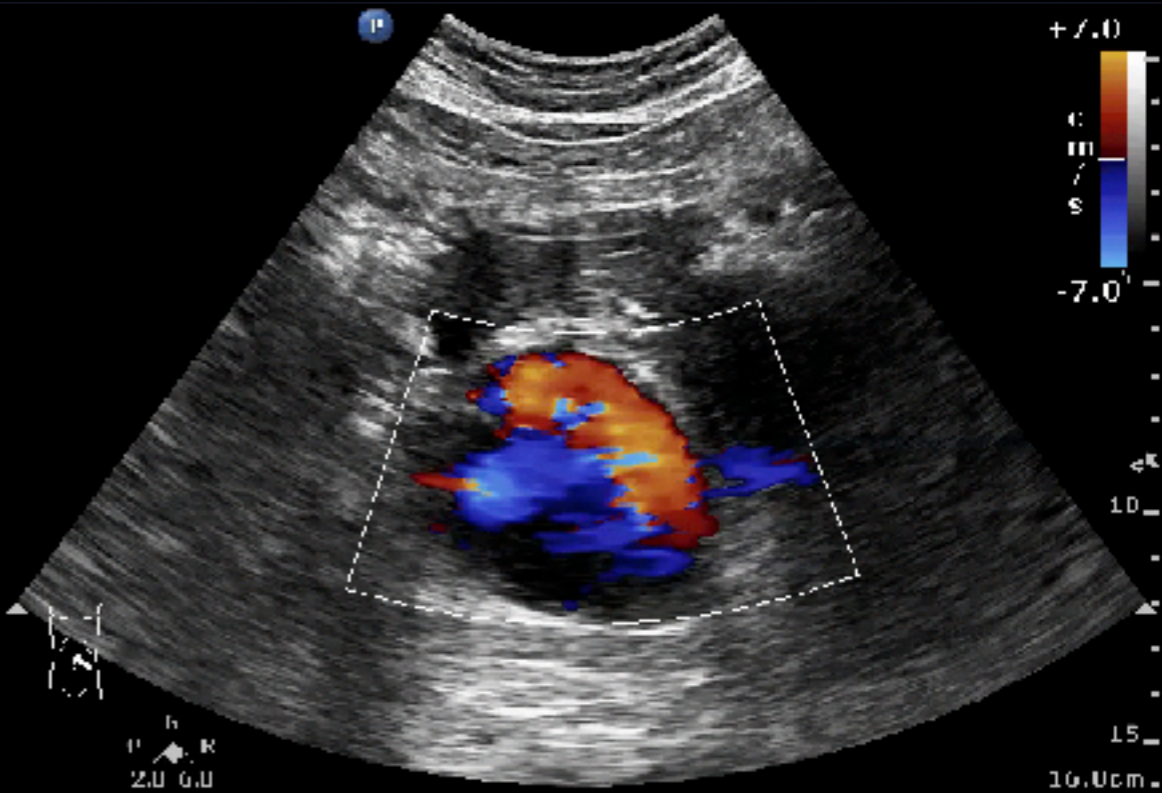


D: Nerve  
0.6 7  
22 Hz  
16.0cm  
2D  
Gen  
0n 60  
0: 58  
2/3/4

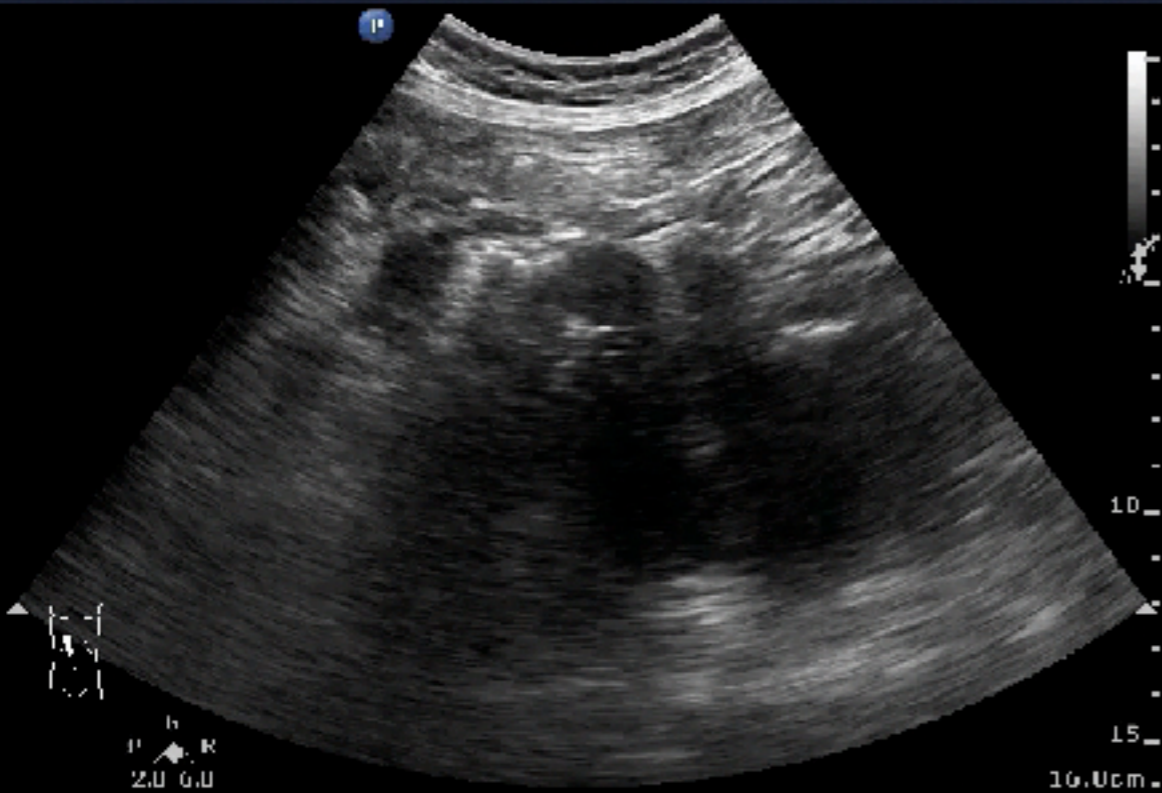


D: Nerve  
0.6 7  
11 Hz  
16.0cm  
2D  
Gen  
0n 60  
0: 58  
2/3/3

-Color  
- 2.5 MHz  
0n 66  
3/5/4  
- Filr Med

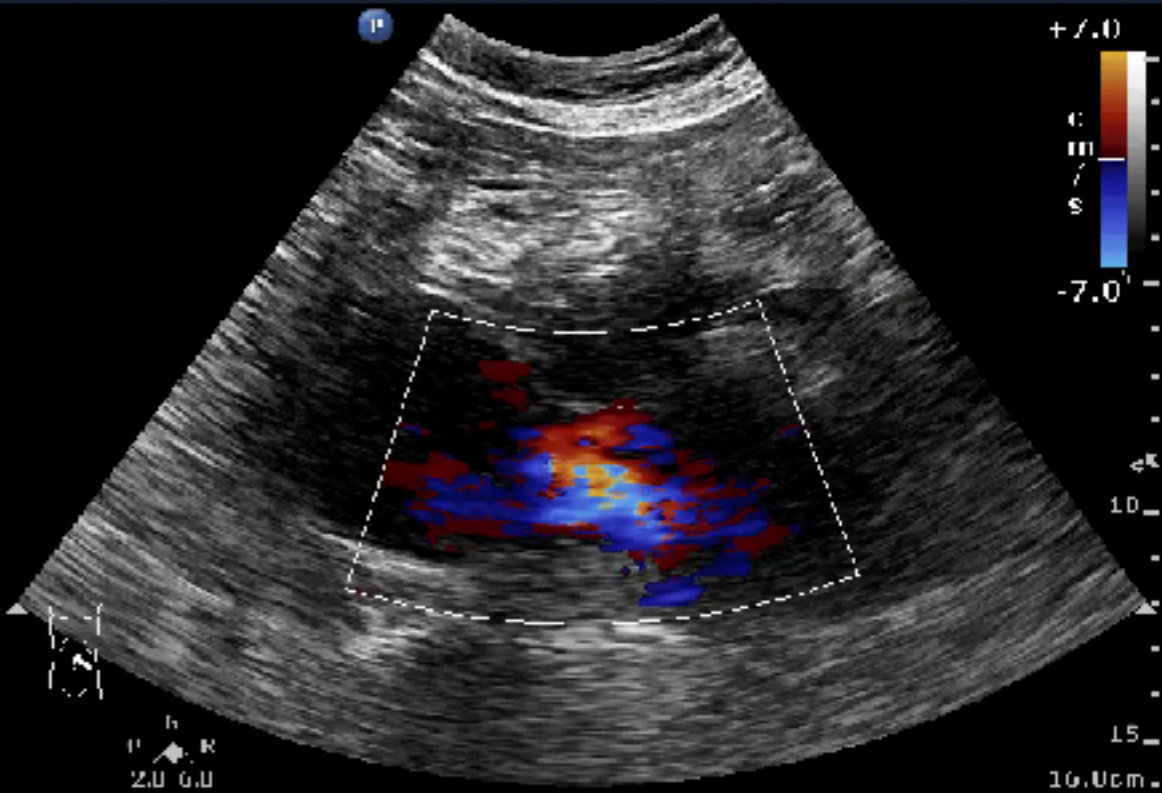


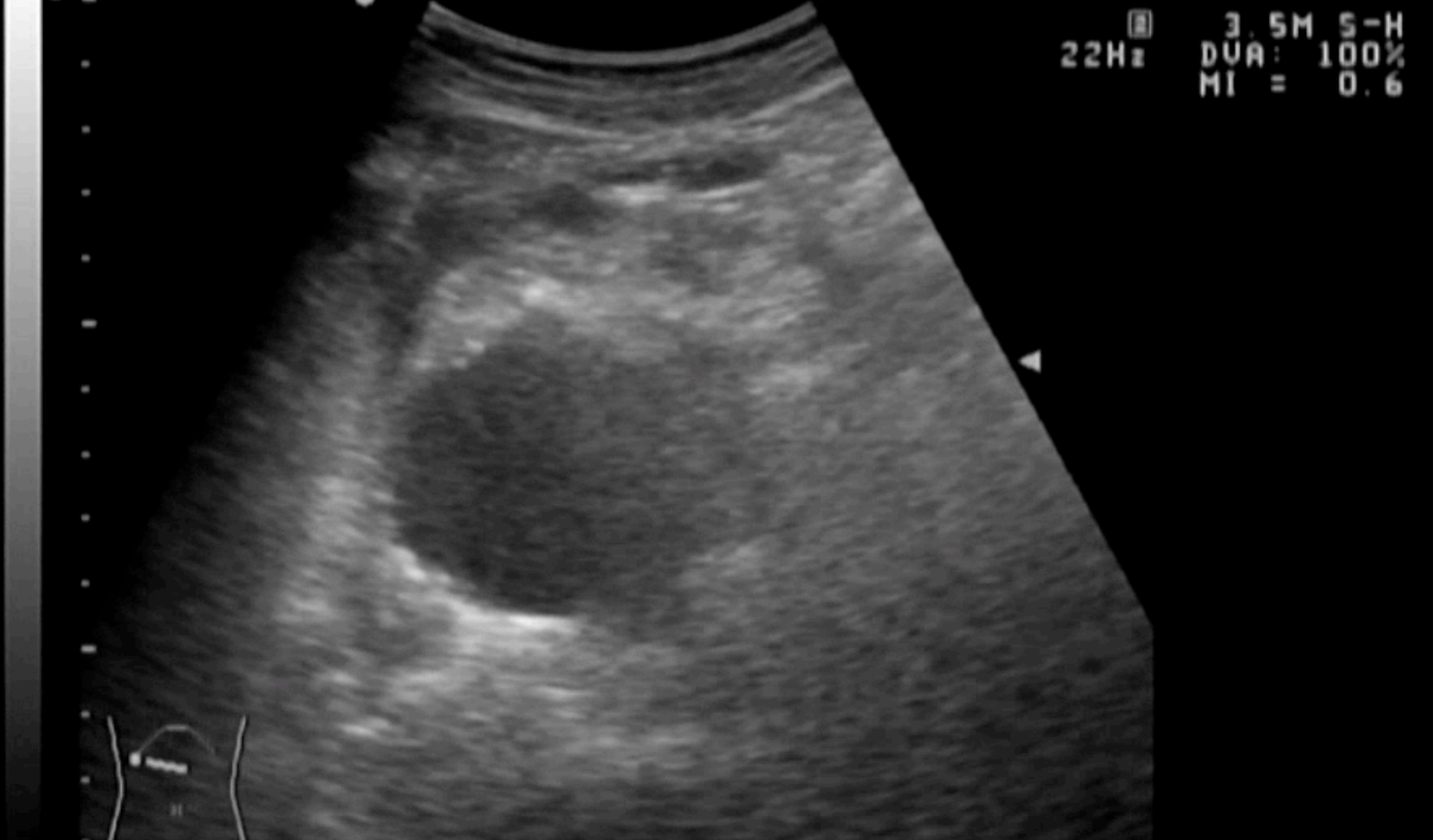
D: Nerve  
0.6 7  
22 Hz  
16.0cm  
2D  
Gen  
0n 60  
0: 58  
2/3/4



D: Nerve  
0.6 7  
11 Hz  
16.0cm  
2D  
Gen  
0n 60  
0: 58  
2/3/3

-Color  
- 2.5 MHz  
0n 66  
3/5/4  
- Filr Med





**AAA protocol**

**3<sub>cm</sub>**

**Not for rupture**

# I-**AIM**

**Dilatation**



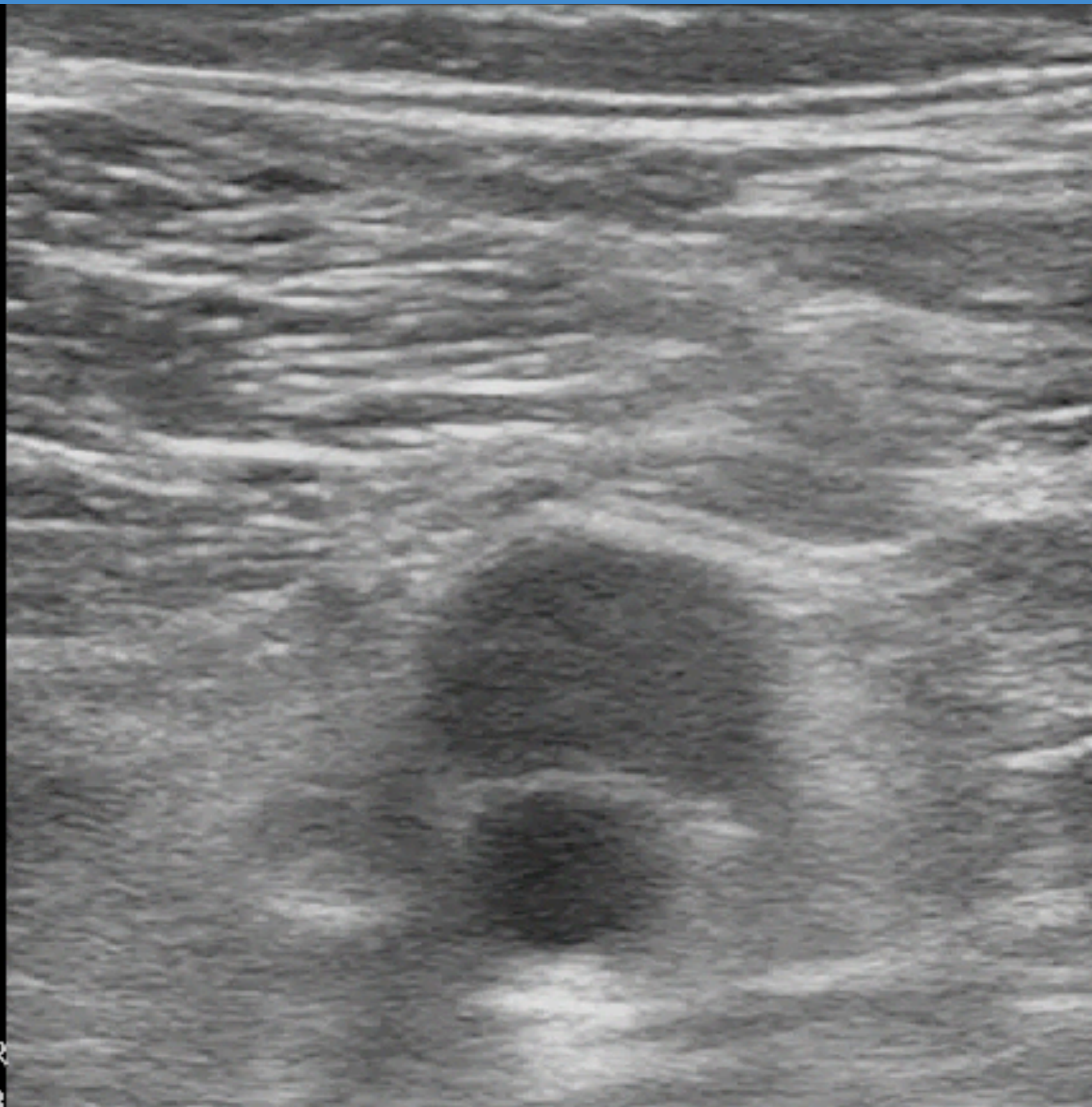


# Middle-aged man

## Right leg pain for 2-3 weeks



# Popliteal fossa



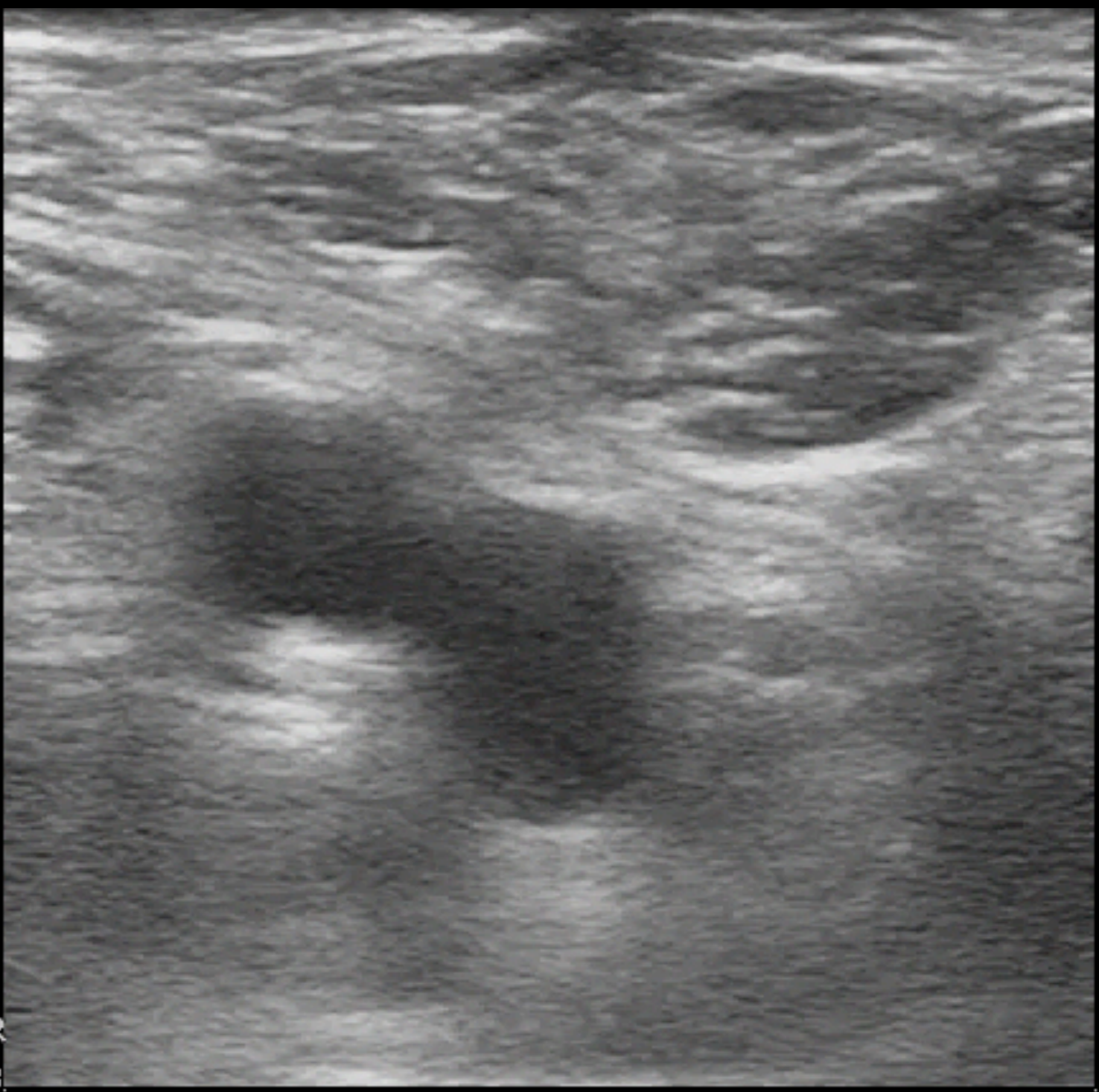
2



4 0cm

L1273  
37 Hz  
4.0cm

2D  
HGen  
Gn 96  
C 41  
3/3/2



G  
P R  
4.4 8.8

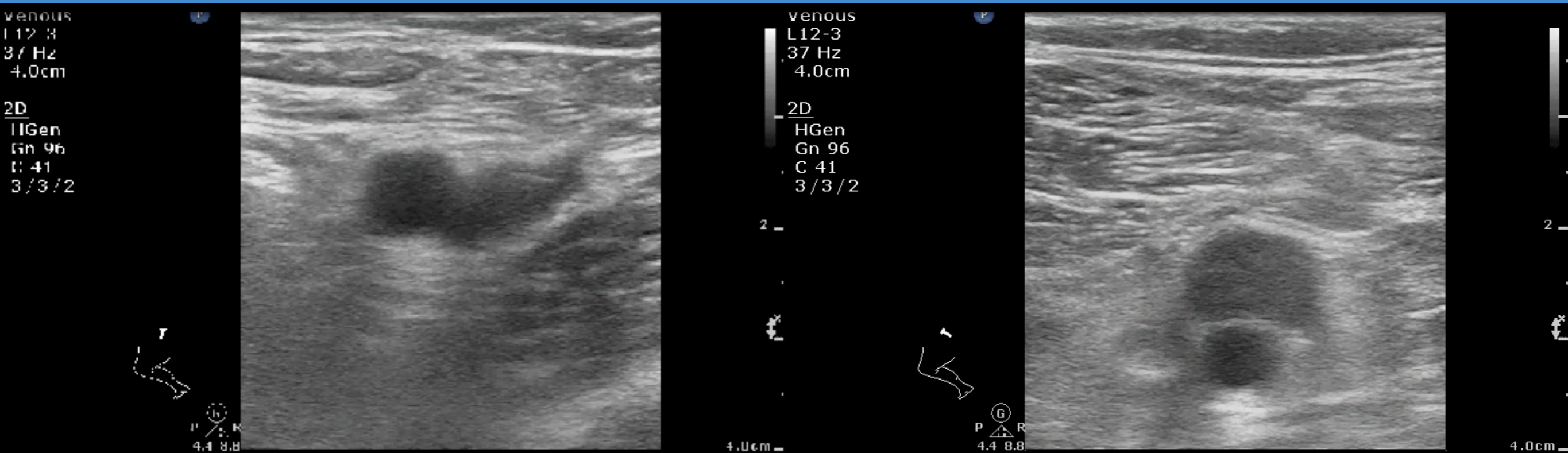


2



4.0cm

# DVT

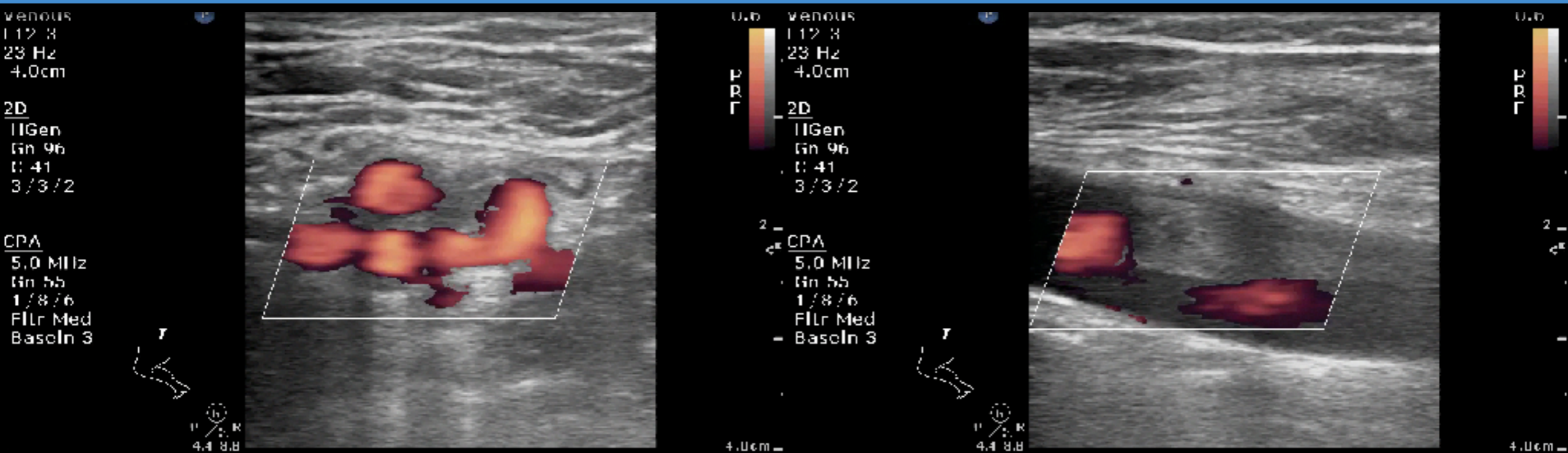


**Linear  
3 points**

**Not  
compressible**

**Anticoagulant**

# DVT



**Linear  
2 points**

**Not  
compressible**

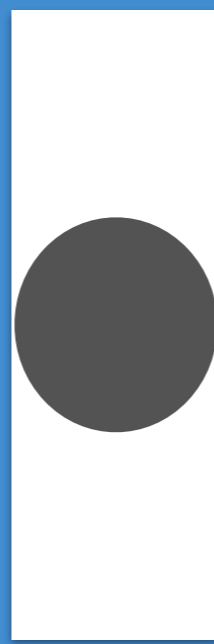
**Anticoagulant**

# I-AIM

**Dilatation**

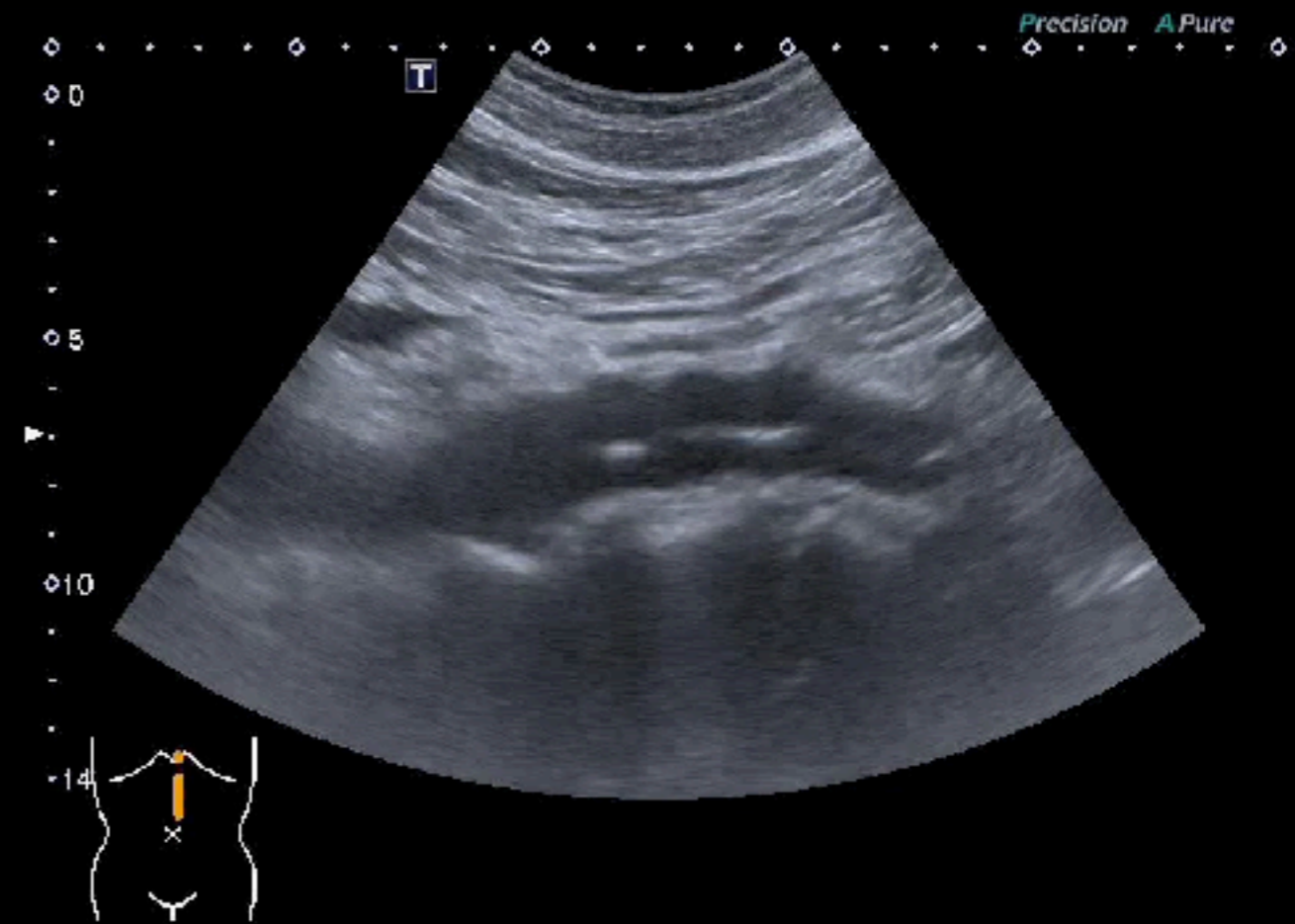
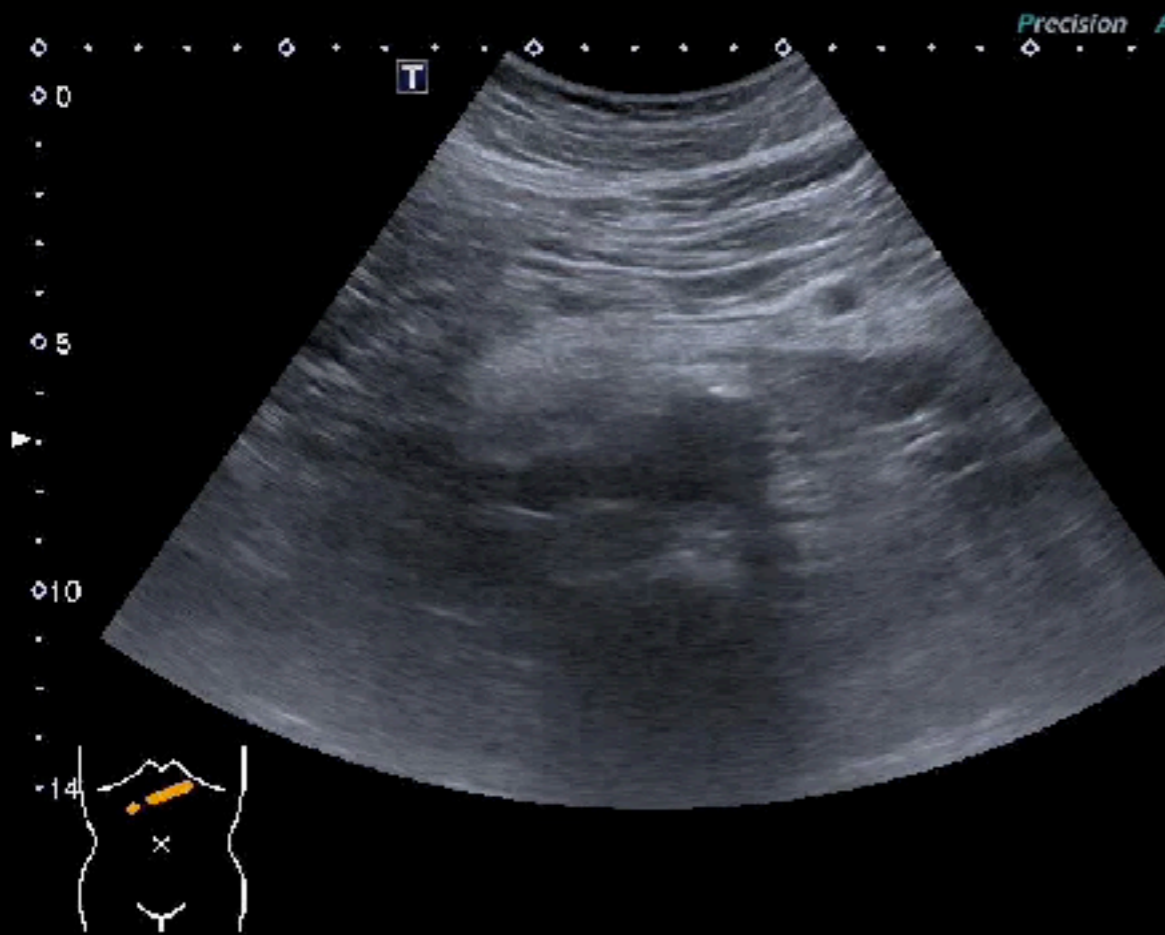


**Obstruction**



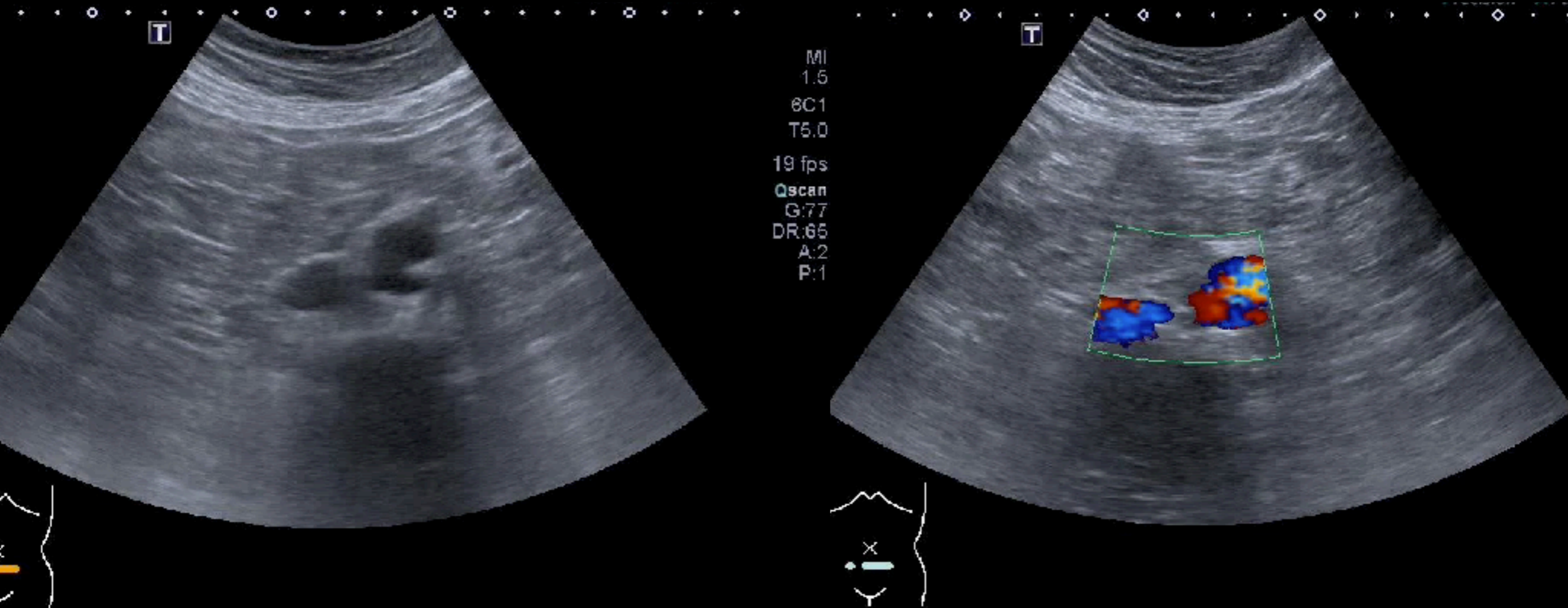
# 71M, ABD pain/V/D

## Cold sweating at home



MI  
1.3  
6C1  
T5.0  
18 fps  
Qscan  
G:79  
DR:65  
A:2  
P:1

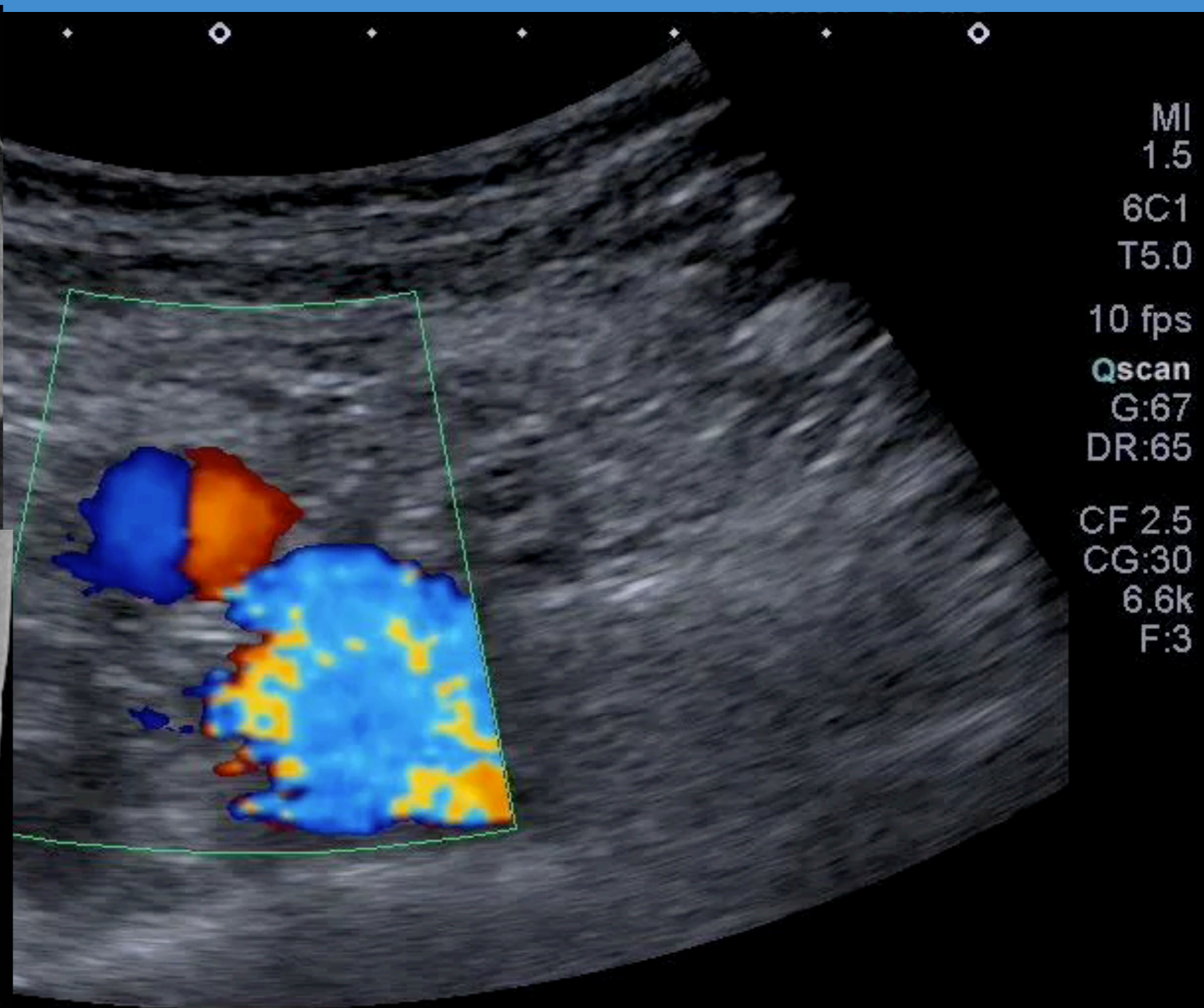
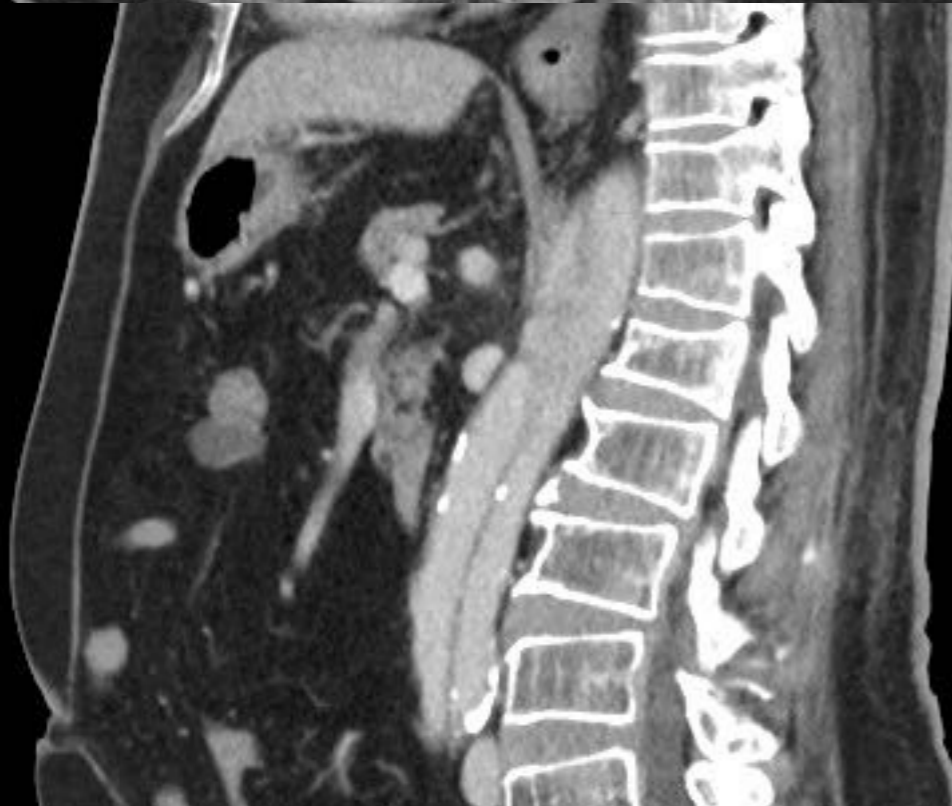
# 71M, ABD pain/V/D/ Cold sweating at home





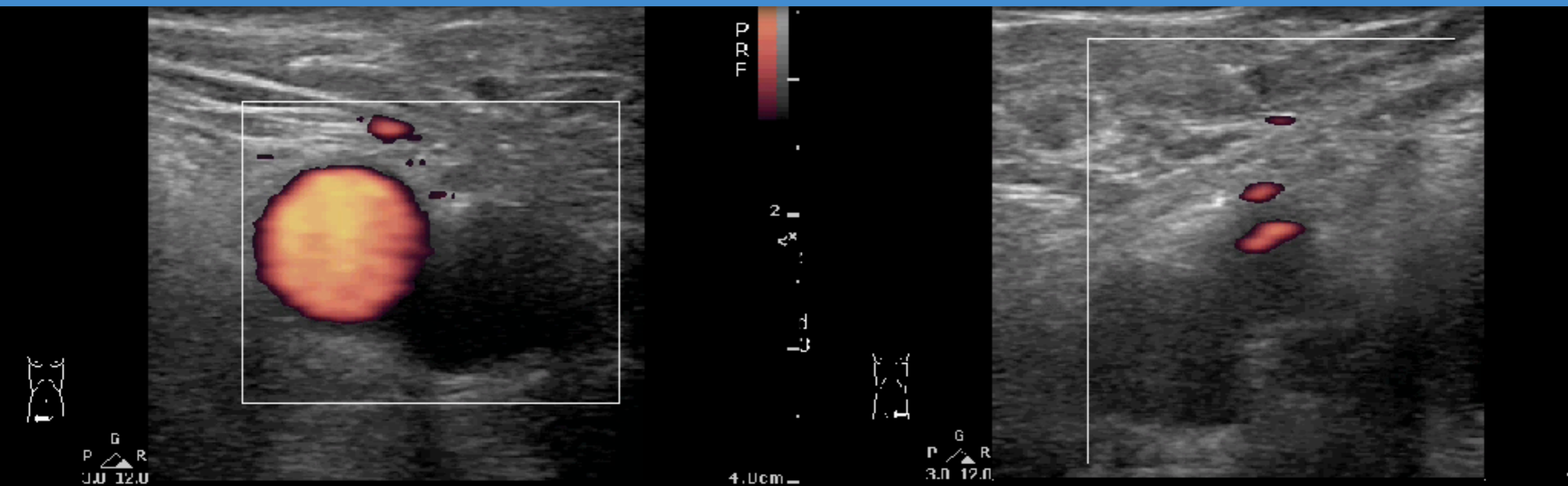
# Aortic dissection

## Ying-yang sign



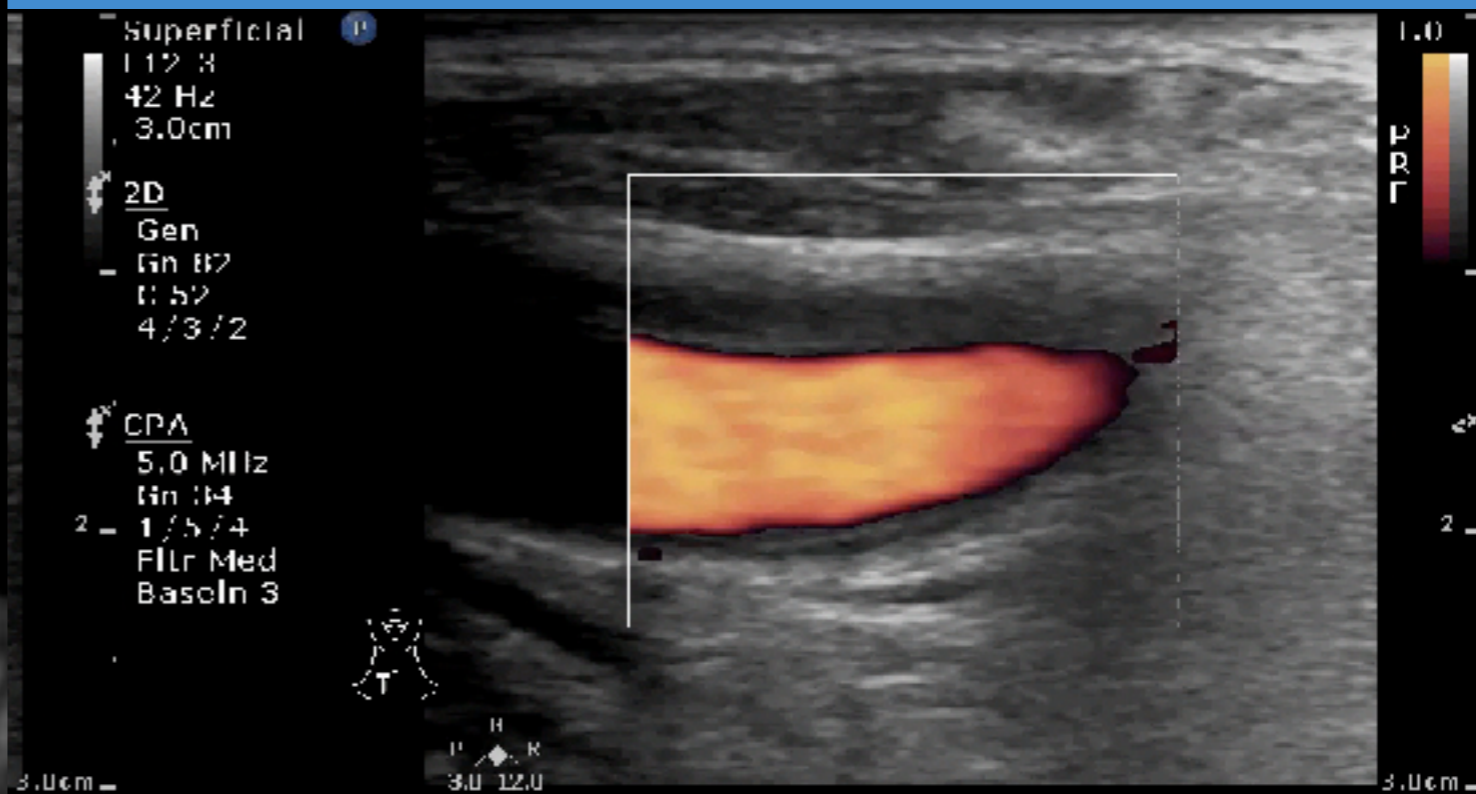
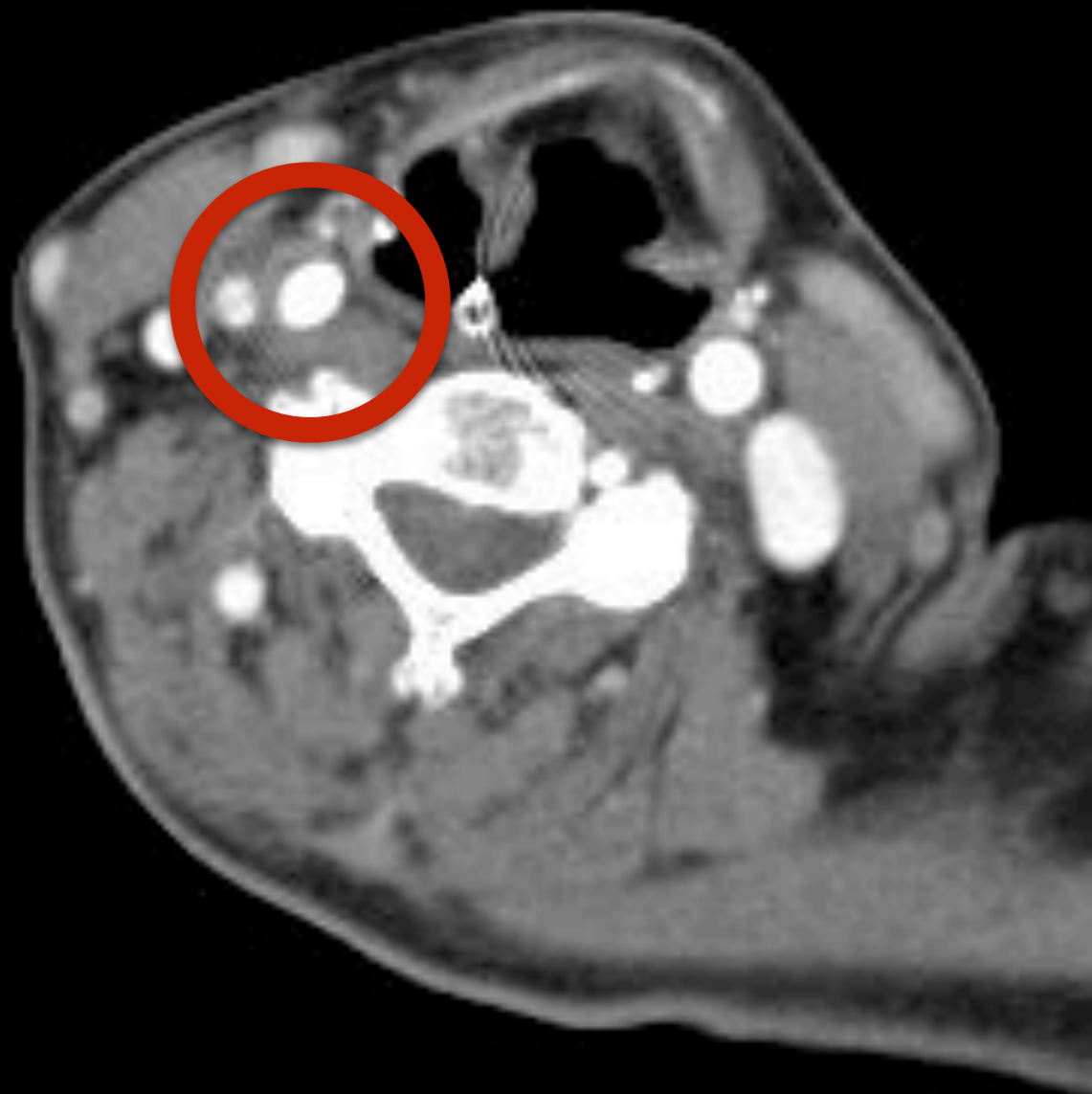


# Chest pain & L leg pain



# Stroke & L hemiplegia

## NIHSS 26



# Stroke & L hemiplegia

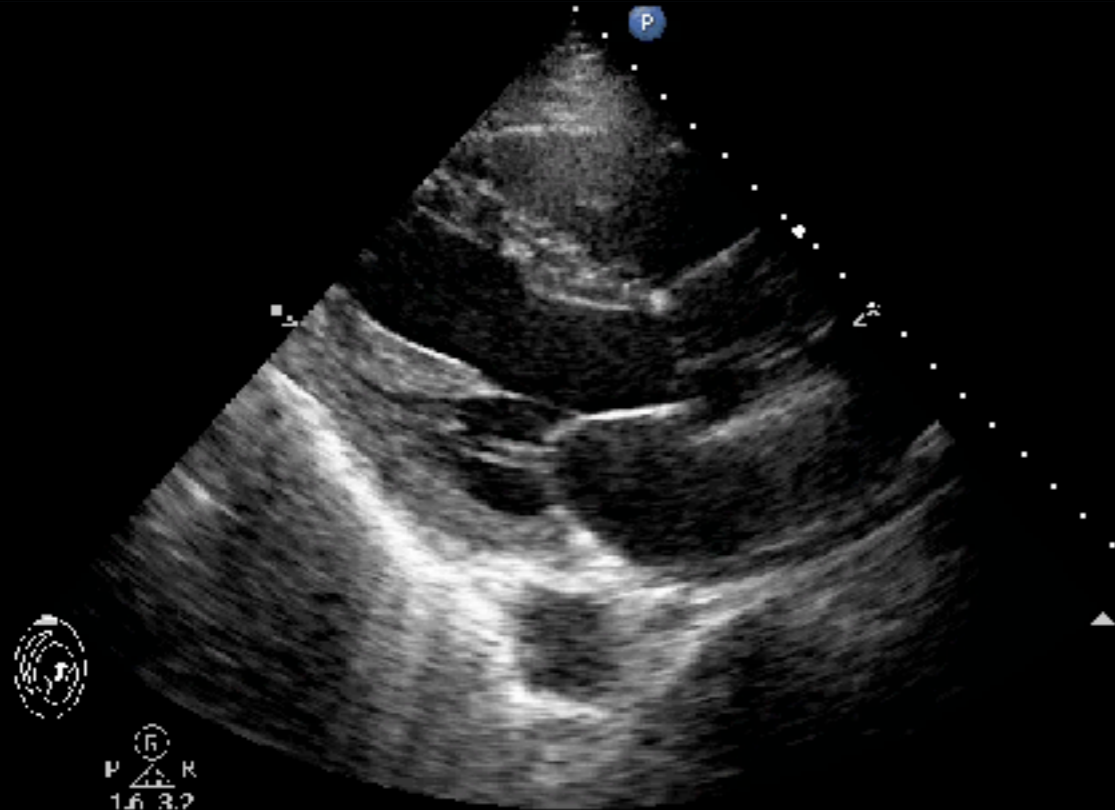
## NIHSS 26



# Do you see flap ?

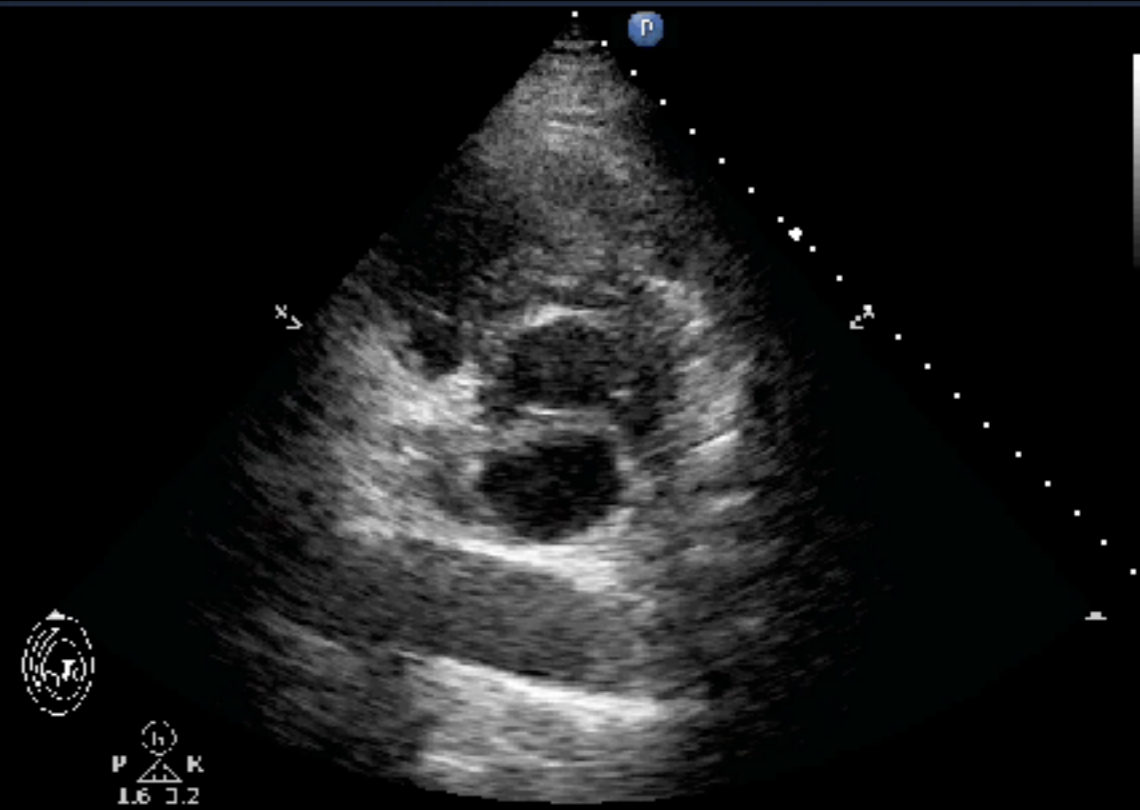
It Echo  
1  
17  
0cm

en  
12  
0  
2/0



Adult Echo  
55 1  
28 Hz  
19.0cm

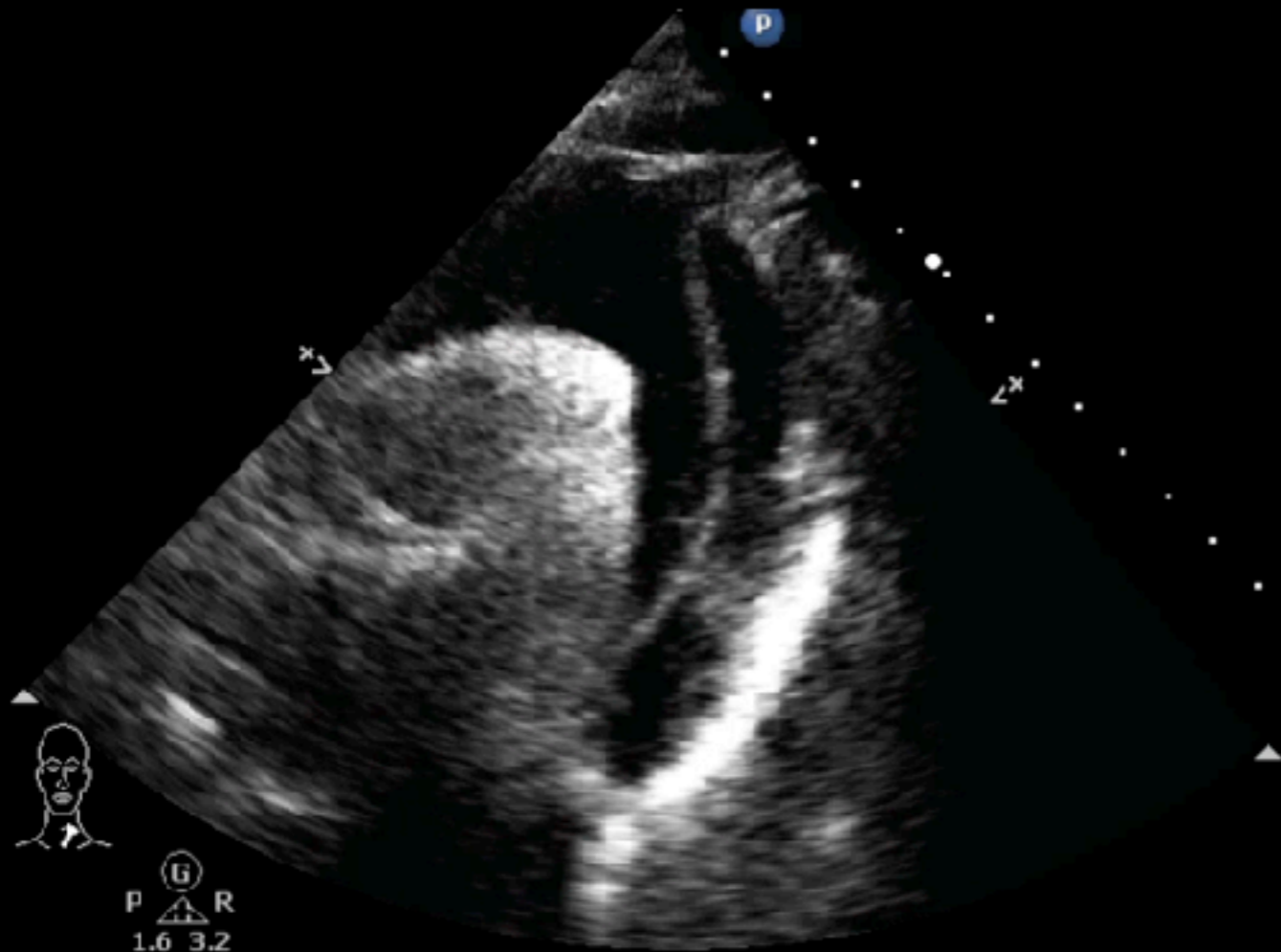
2D  
HGen  
Gn 12  
0:50  
3/2/0



t Echo2

z  
cm

en  
34  
4  
2/0

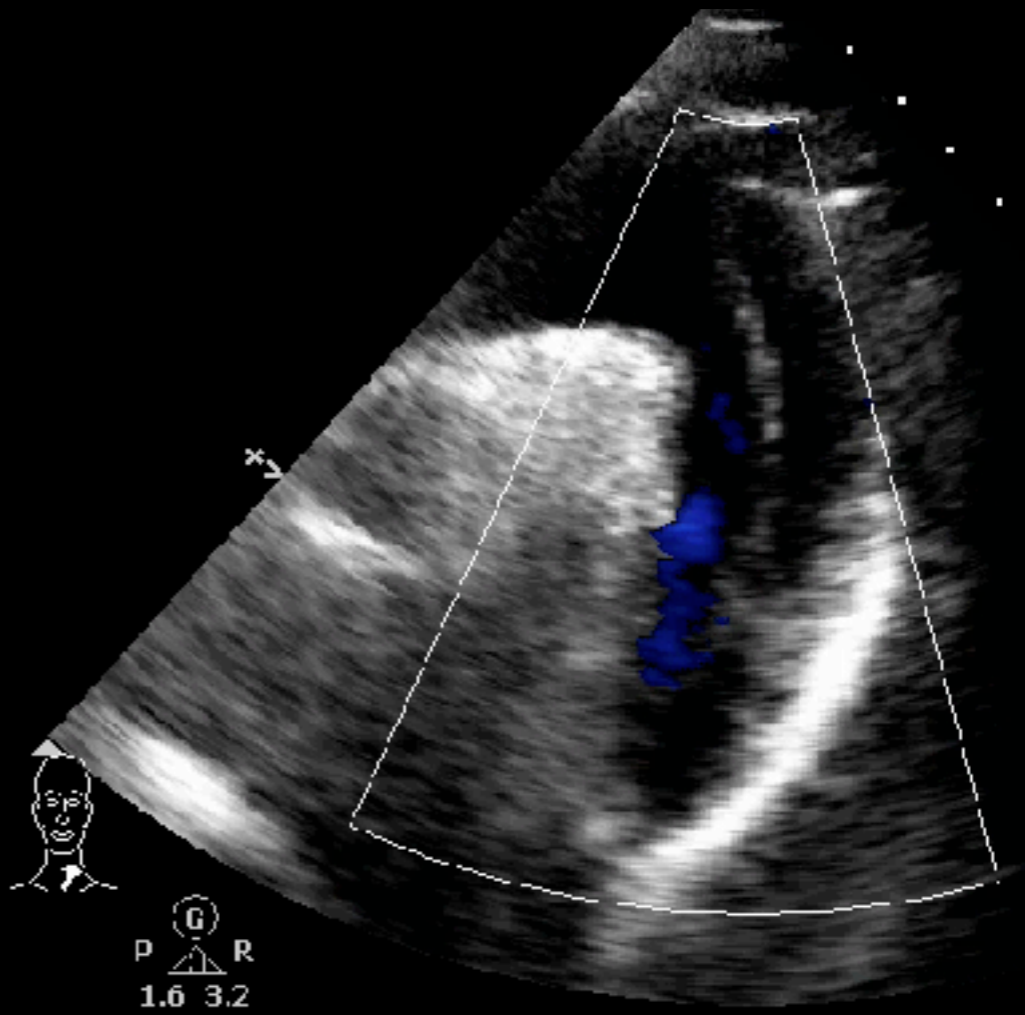


Flap ?

Easy ?

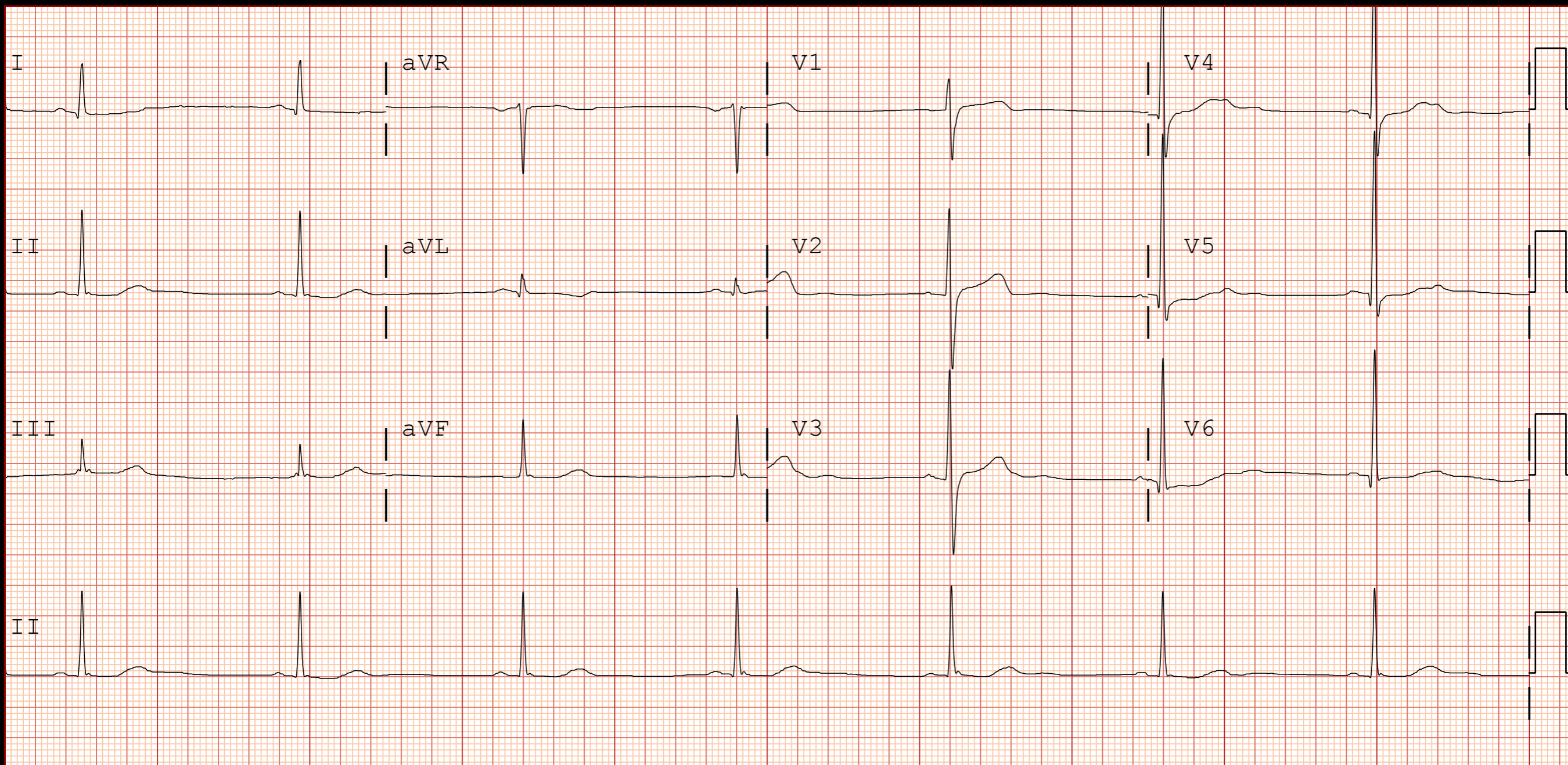
C 44  
3/2/0

Color  
2.5 Mhz  
Gn 60  
4/5/0  
Fltr High



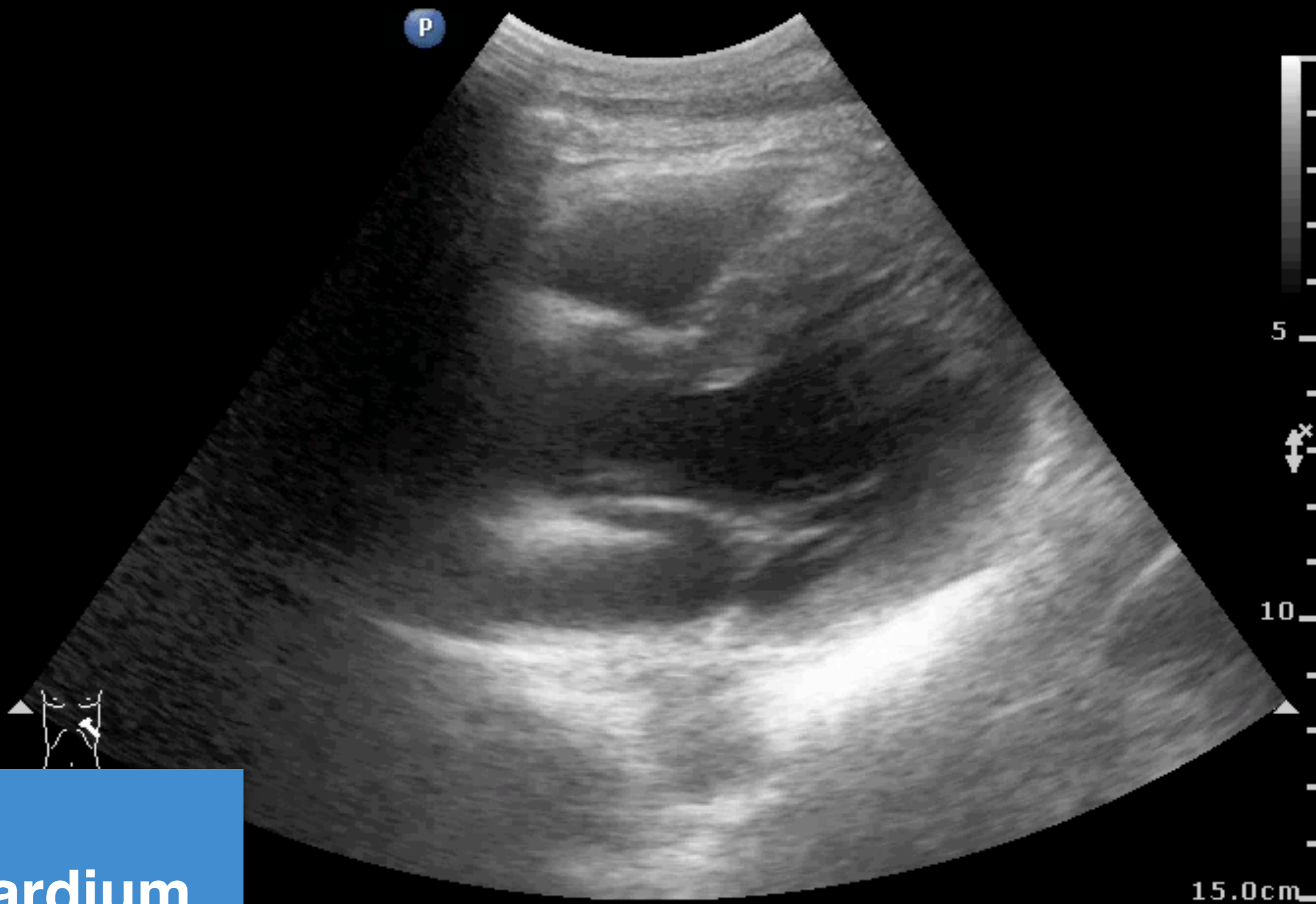
P G R  
1.6 3.2

# 63M, Chest pain & cold sweating & low BP



Abd Gen2  
C5-1  
34 Hz  
15.0cm

2D  
HGen  
Gn 100  
C 56  
3 / 3 / 3



**Pericardium**

15.0cm



Abd Gen2  
C5-1  
34 Hz  
15.0cm

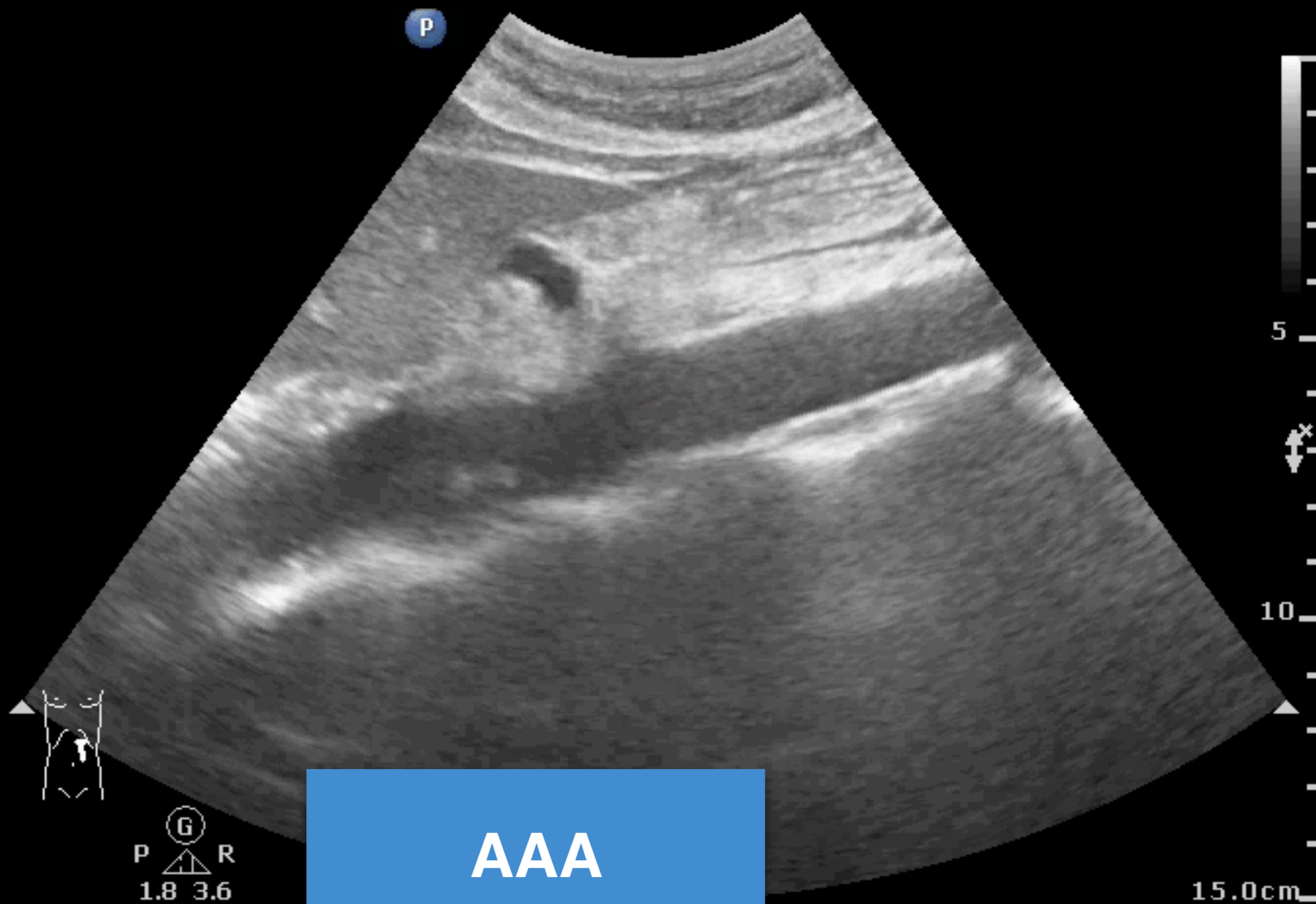
2D  
HGen  
Gn 100  
C 56  
3 / 3 / 3



**ABD aorta**

Abd Gen2  
C5-1  
34 Hz  
15.0cm

2D  
HGen  
Gn 100  
C 56  
3 / 3 / 3



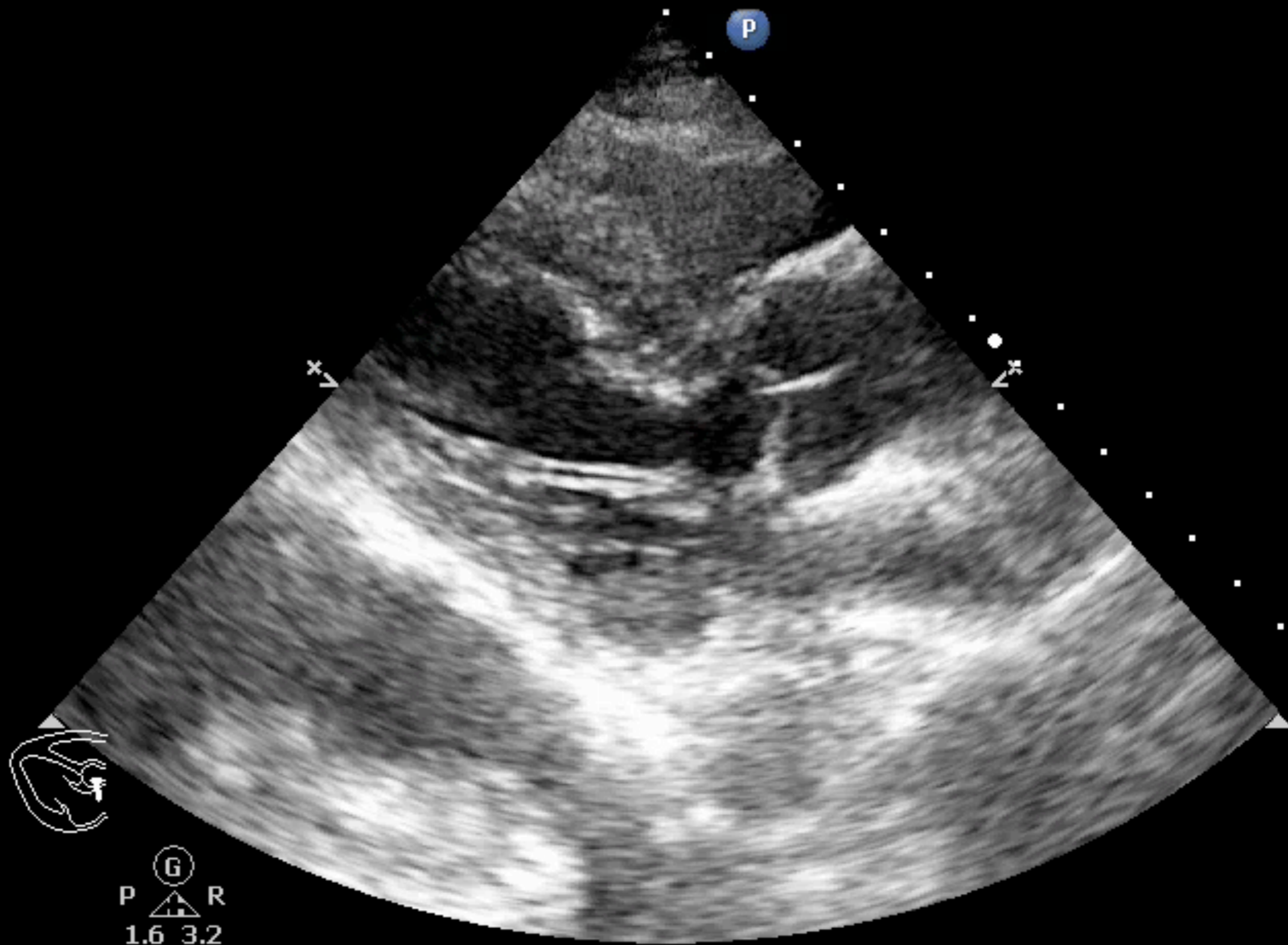
**AAA**  
**Flap**

P  R  
1.8 3.6

15.0cm

Adult Echo2  
S5-1  
34 Hz  
15.0cm

2D  
HGen  
Gn 50  
C 50  
3/2/0

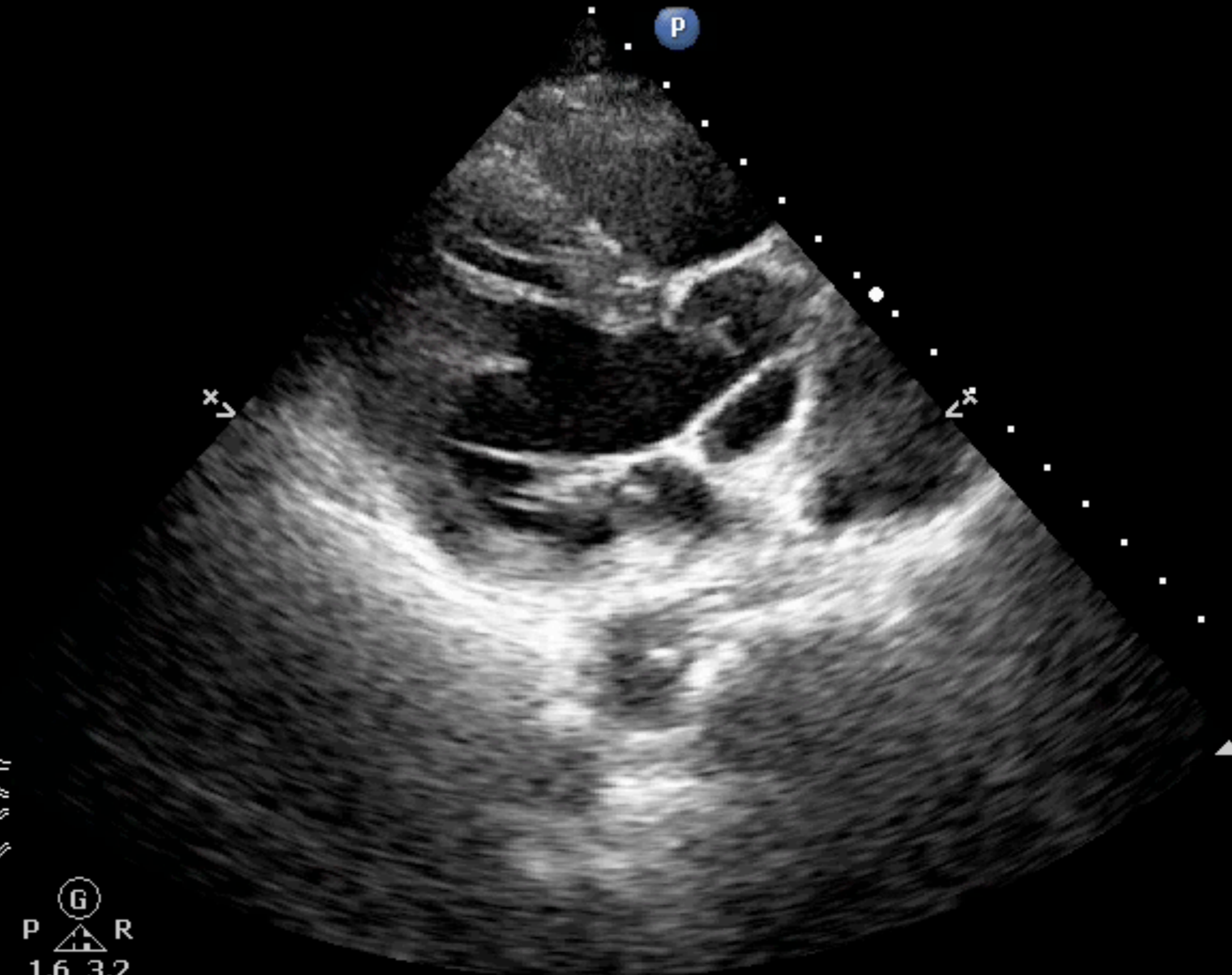


Adult Echo2  
S5-1  
30 Hz  
18.0cm

2D  
HGen  
Gn 34  
C 50  
3/2/0



G  
P R  
1.6 3.2

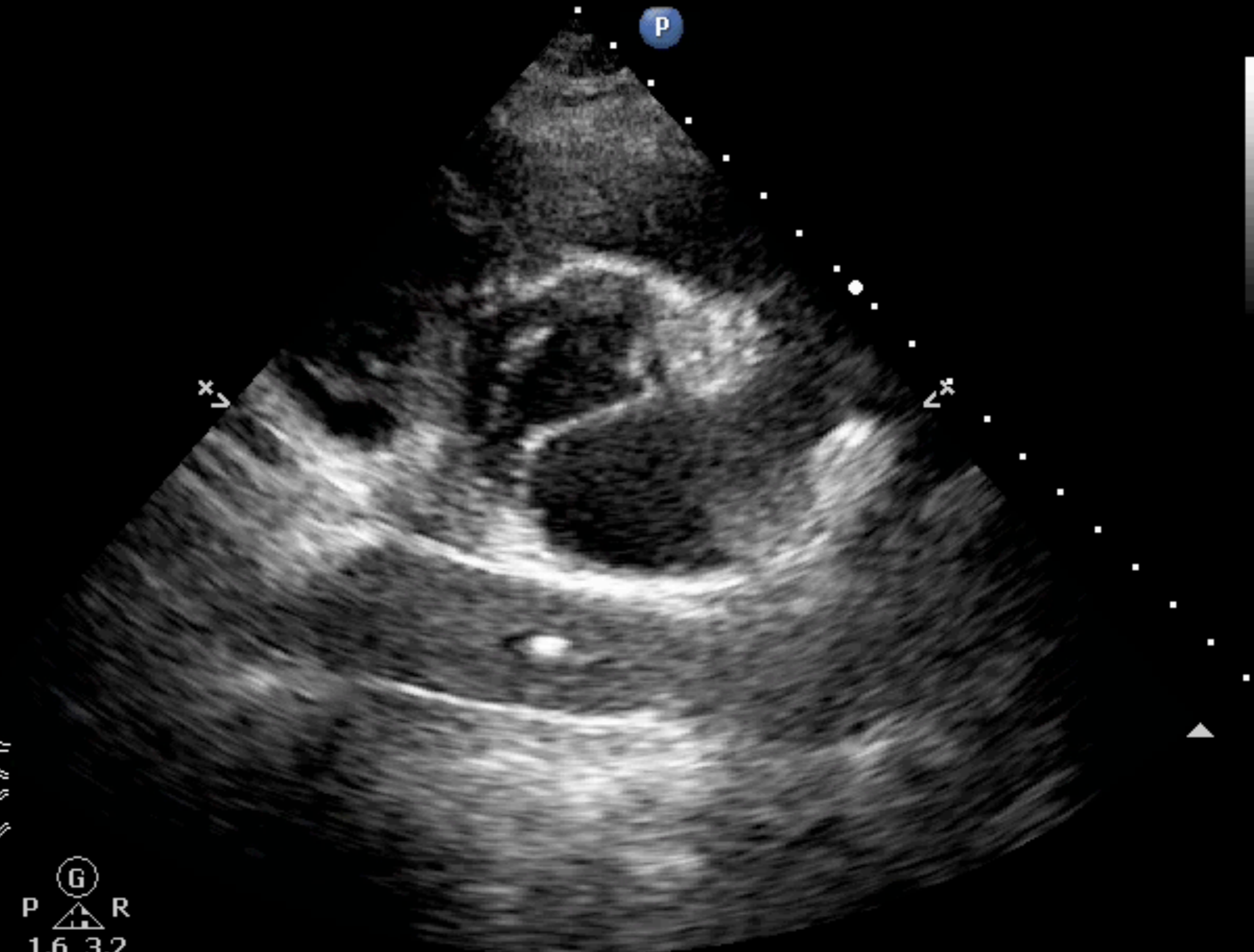


Adult Echo2  
S5-1  
30 Hz  
18.0cm

2D  
HGen  
Gn 34  
C 50  
3/2/0



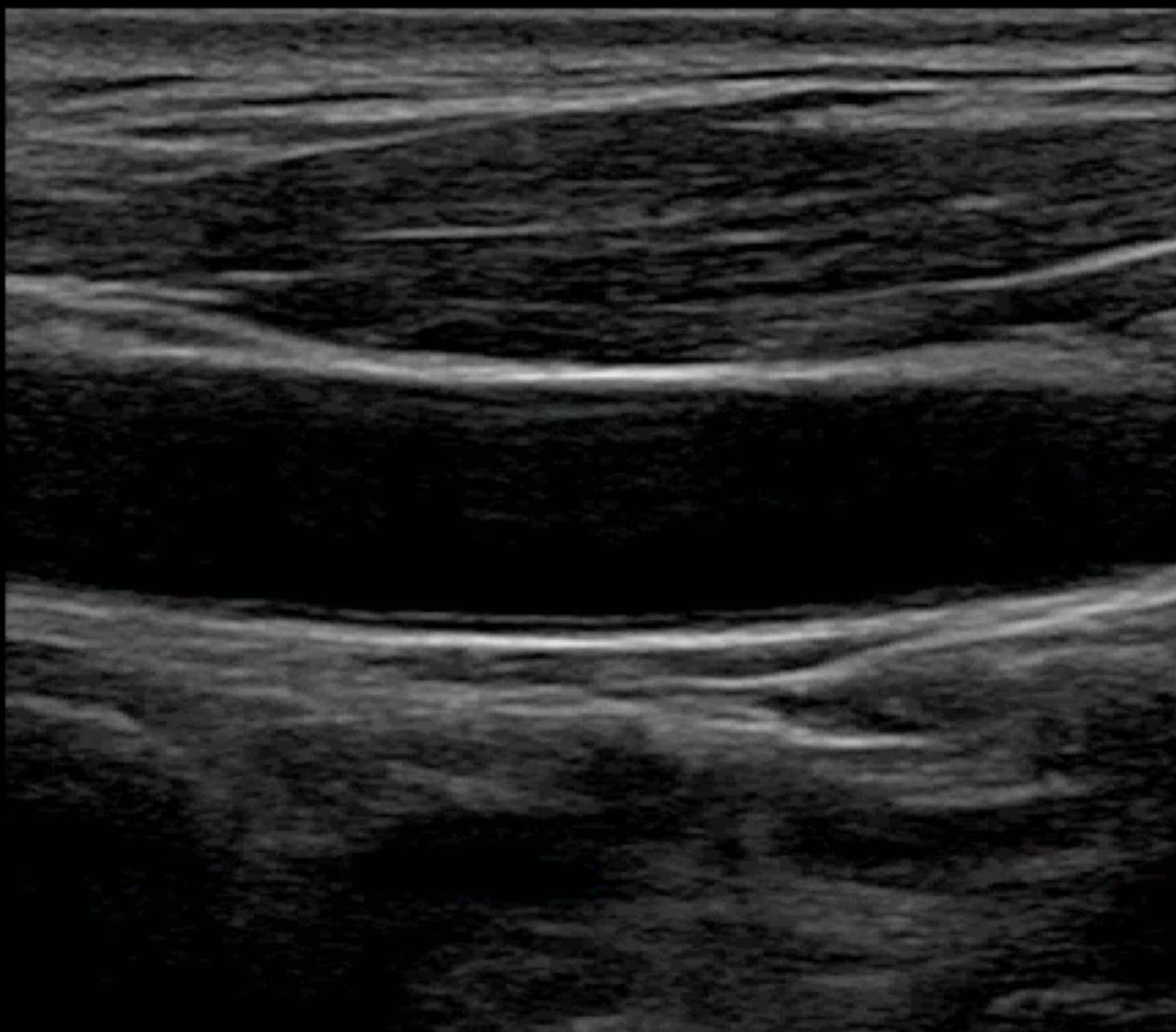
G  
P R  
1.6 3.2



Superficial :  
L12-3  
43 Hz  
4.0cm

P

2D  
Res  
Gn 60  
C 56  
3 / 2 / 1



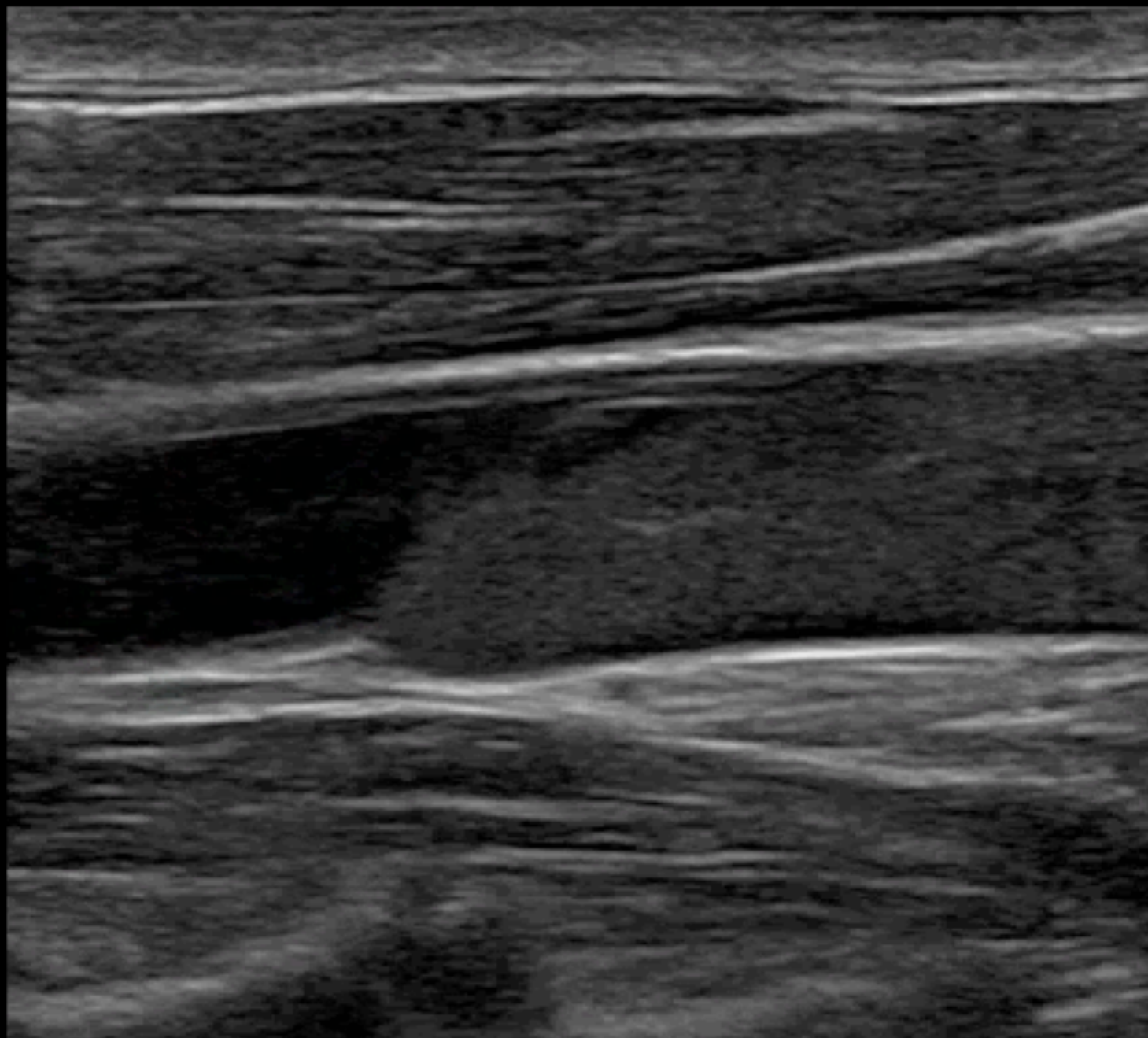
G  
P R  
3.0 12.0

CCA

Superficial :  
L12-3  
43 Hz  
4.0cm

P

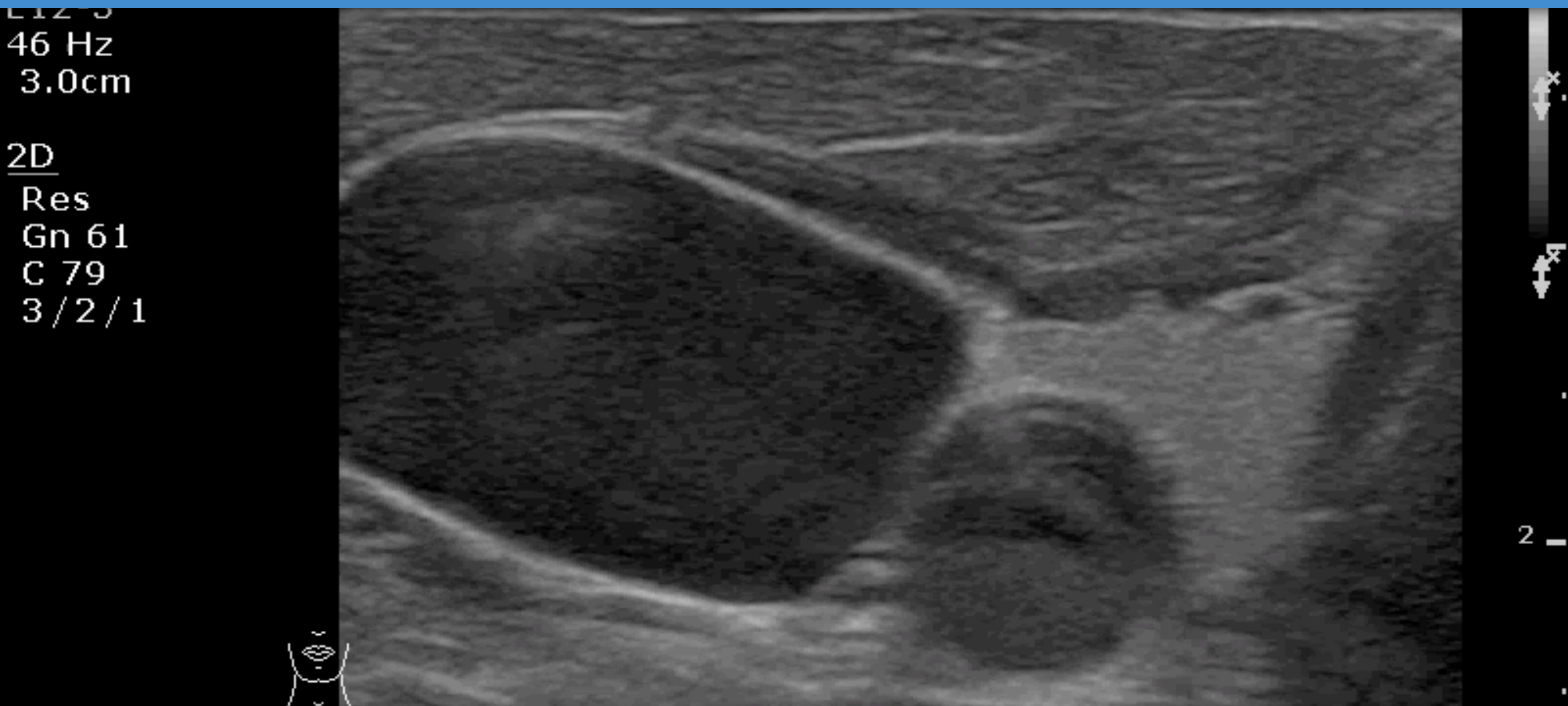
2D  
Res  
Gn 60  
C 56  
3 / 2 / 1



G  
P R  
3.0 12.0

CCA

# AD or tPA



**Pericardium**  
**Aortic root**

**ABD aorta**  
**Flap**

**CCA**

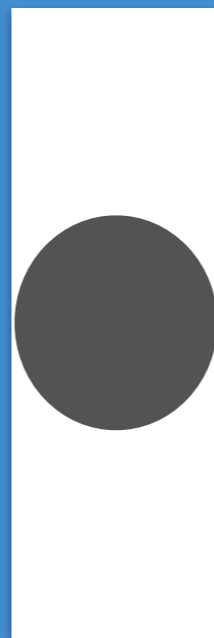


# I-AIM

**Dilatation**



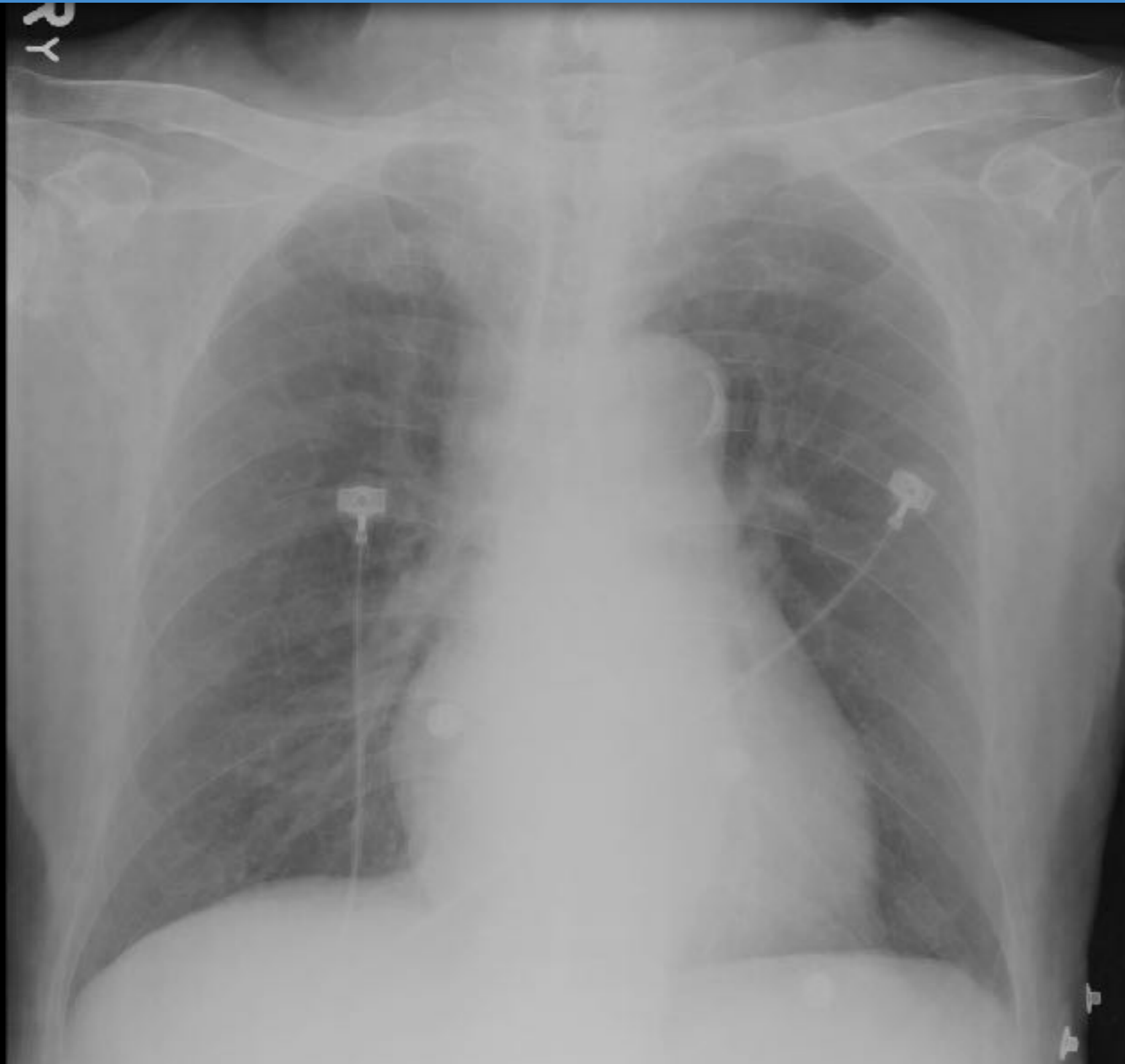
**Obstruction**



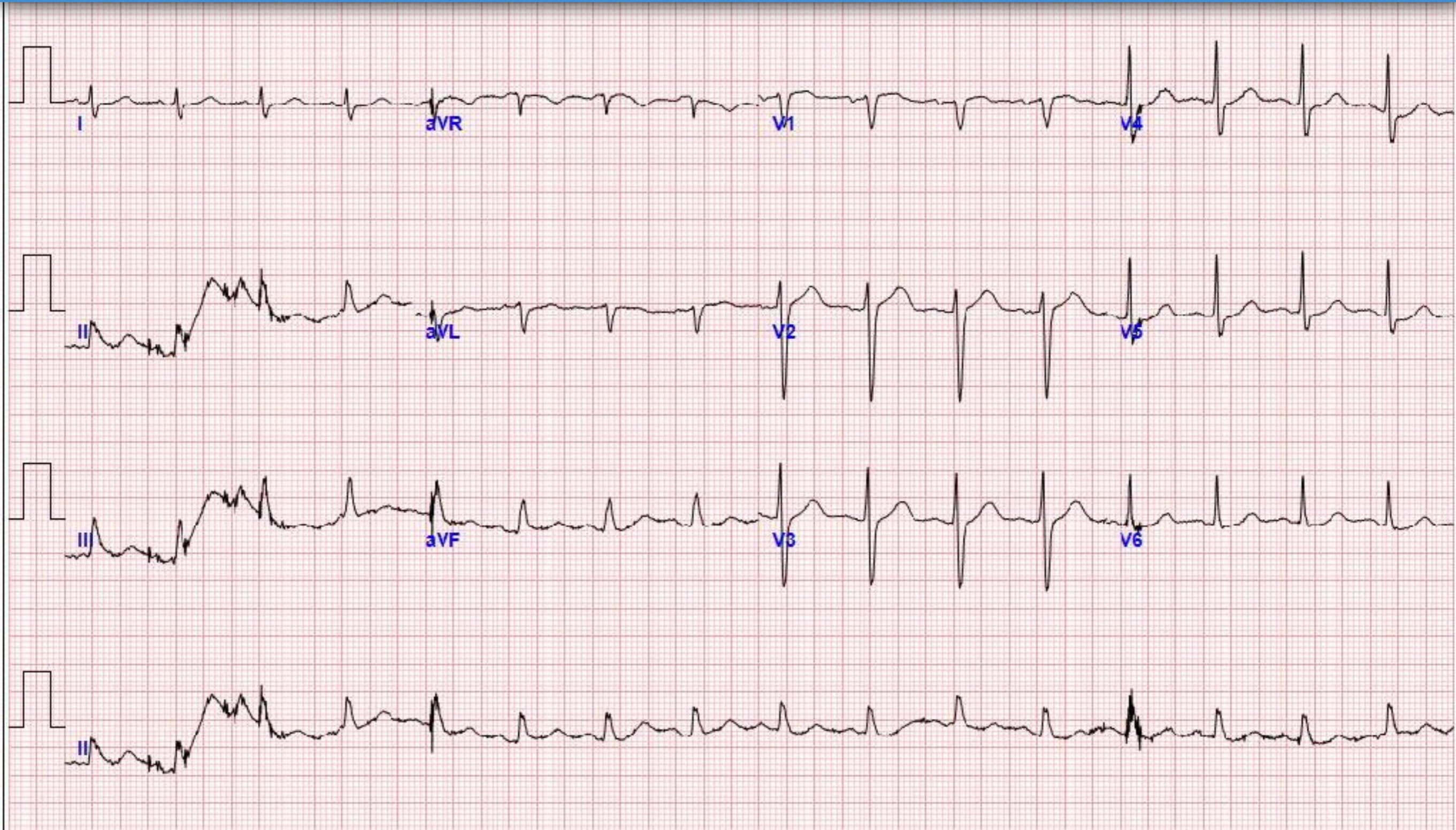
**Dissection**



# 76M, Dyspnea & desaturation



# 76M, Dyspnea & desaturation



# 76M, Dyspnea & desaturation



Lung

# 76M, Dyspnea & desaturation

Superficial  
L12-3  
31 Hz  
3.5cm

2D  
Gen  
Gn 100  
C 52  
4/3/2



P G R  
3.0 12.0

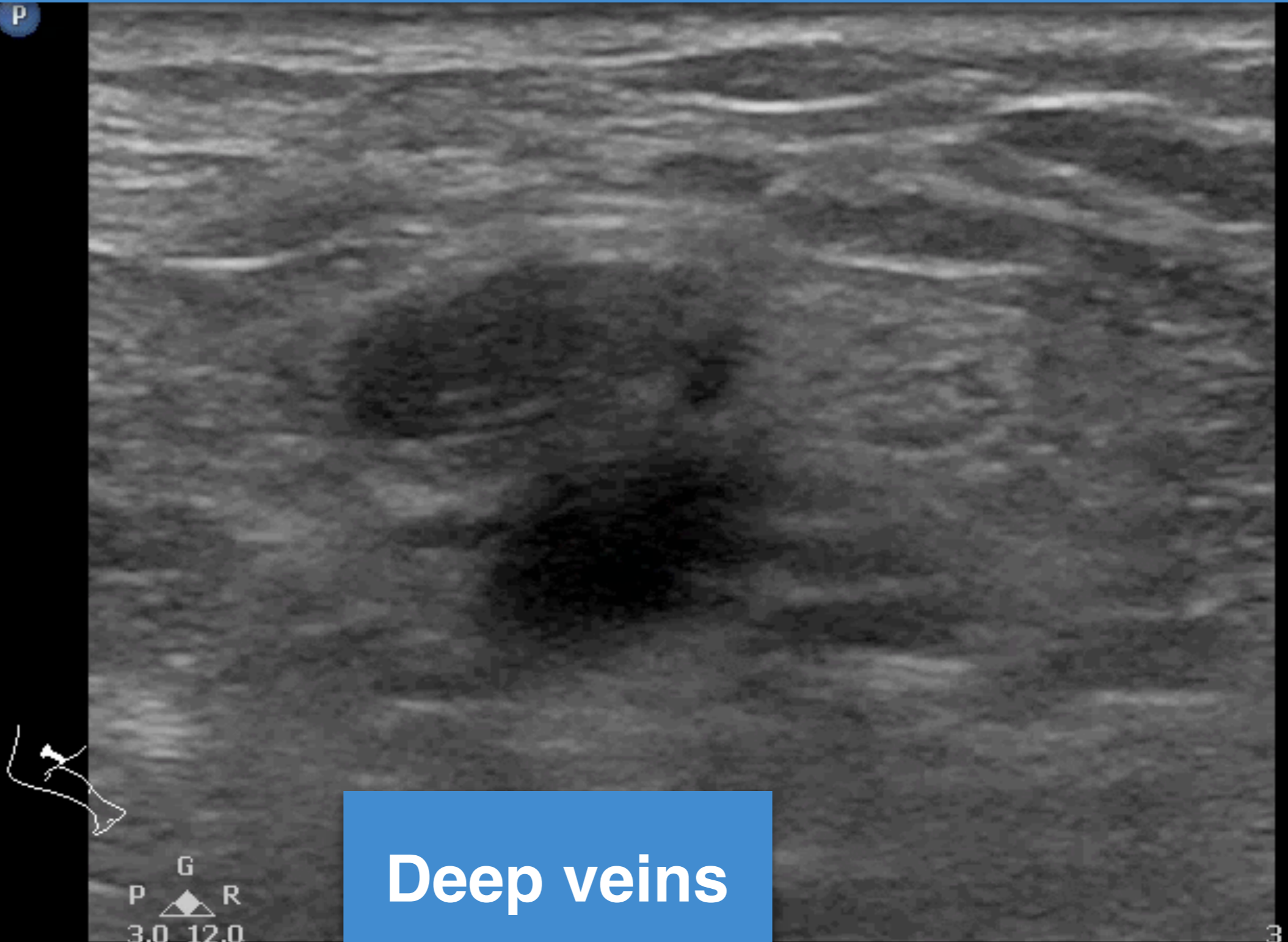
Deep veins

3.5cm

# 76M, Dyspnea & desaturation

Superficial  
L12-3  
31 Hz  
3.0cm

2D  
Gen  
Gn 88  
C 52  
4/3/2



Deep veins

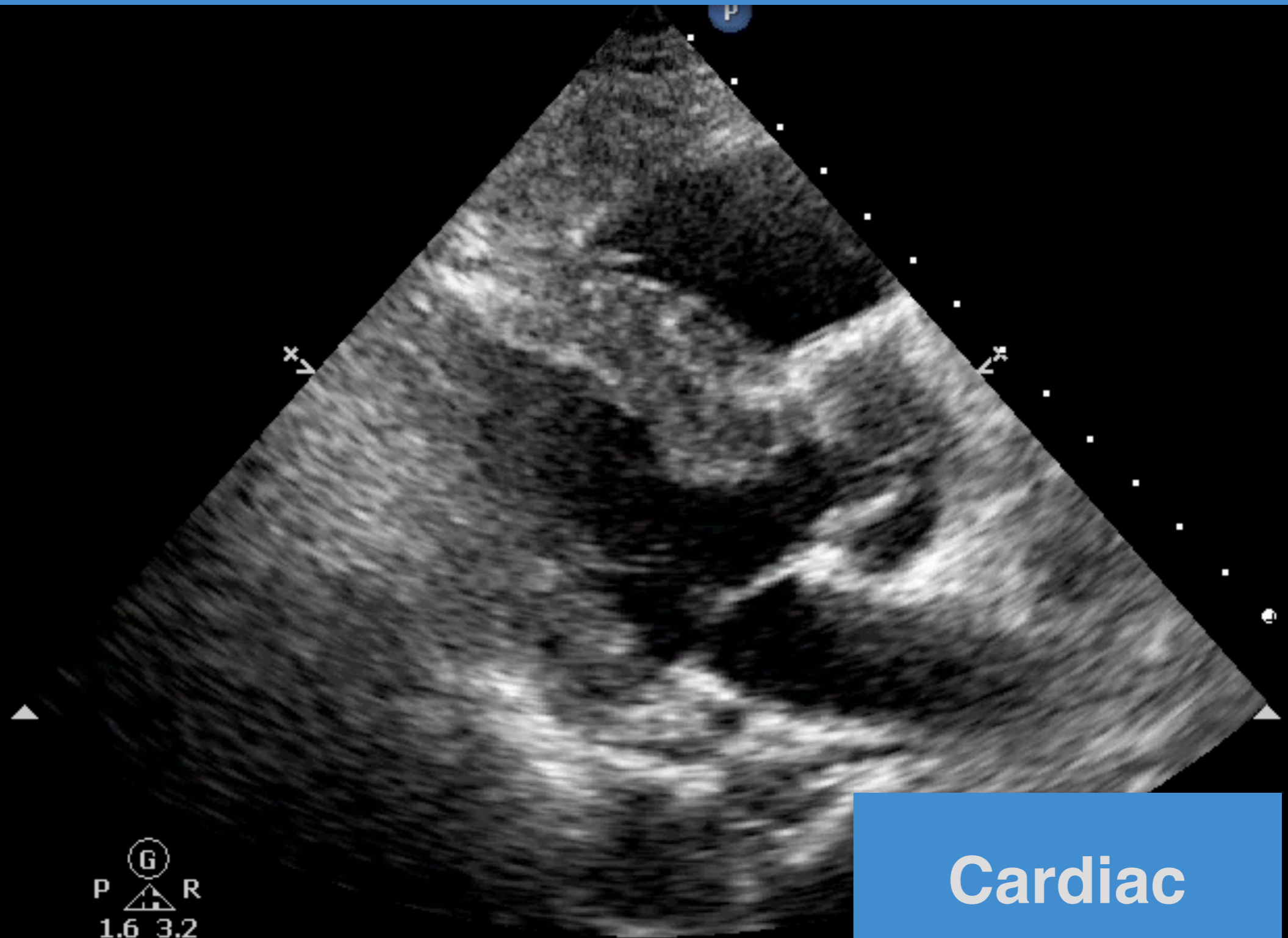
P G R  
3.0 12.0

3.0cm

# 76M, Dyspnea & desaturation

Adult Echo2  
S5-1  
34 Hz  
15.0cm

2D  
HGen  
Gn 9  
C 50  
3/2/0

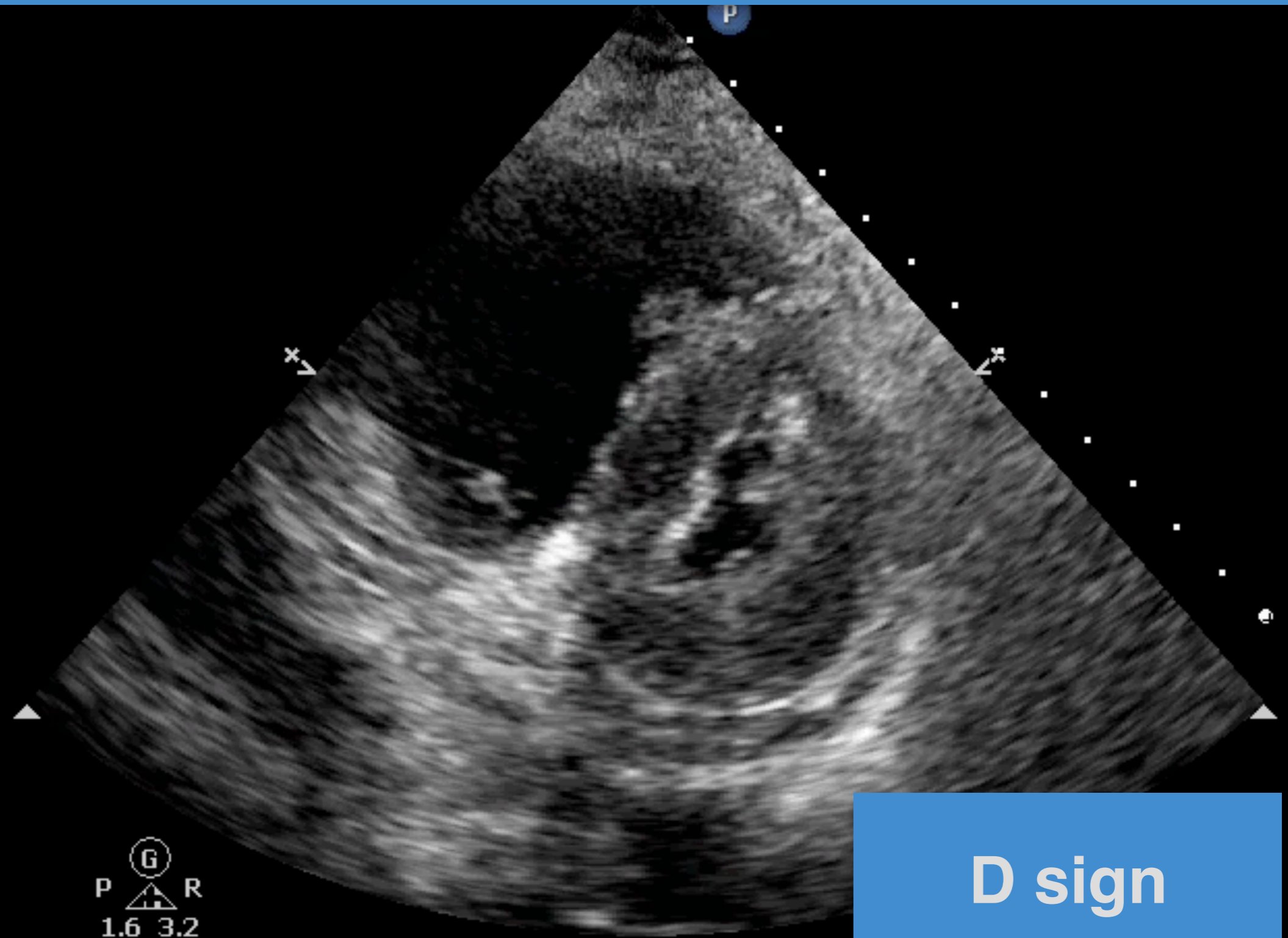


Cardiac

# 76M, Dyspnea & desaturation

Adult Echo2  
S5-1  
34 Hz  
15.0cm

2D  
HGen  
Gn 9  
C 50  
3 / 2 / 0

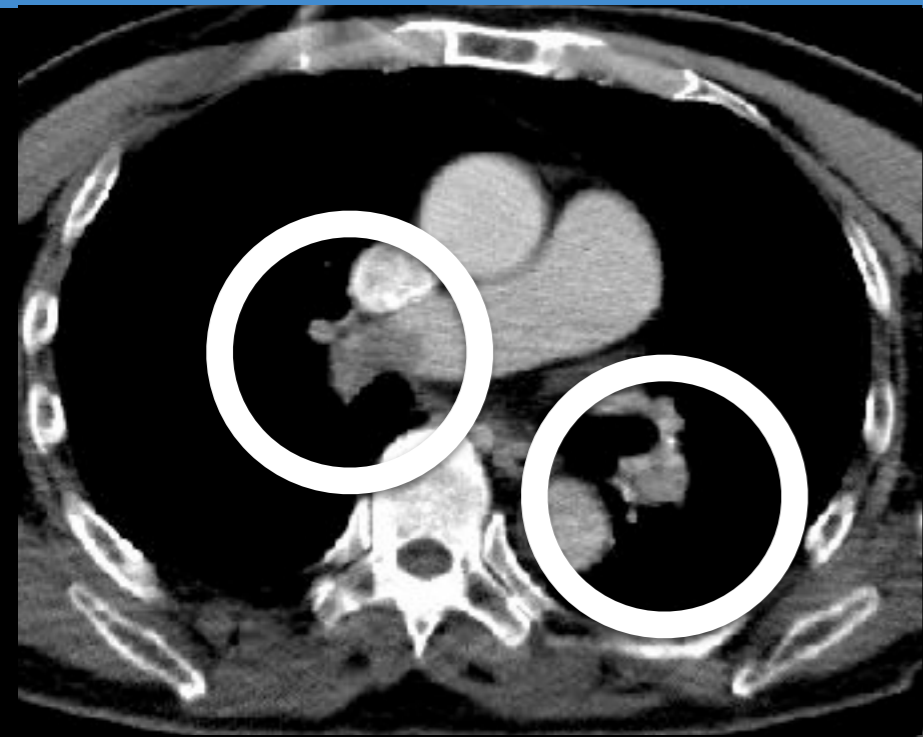


D sign





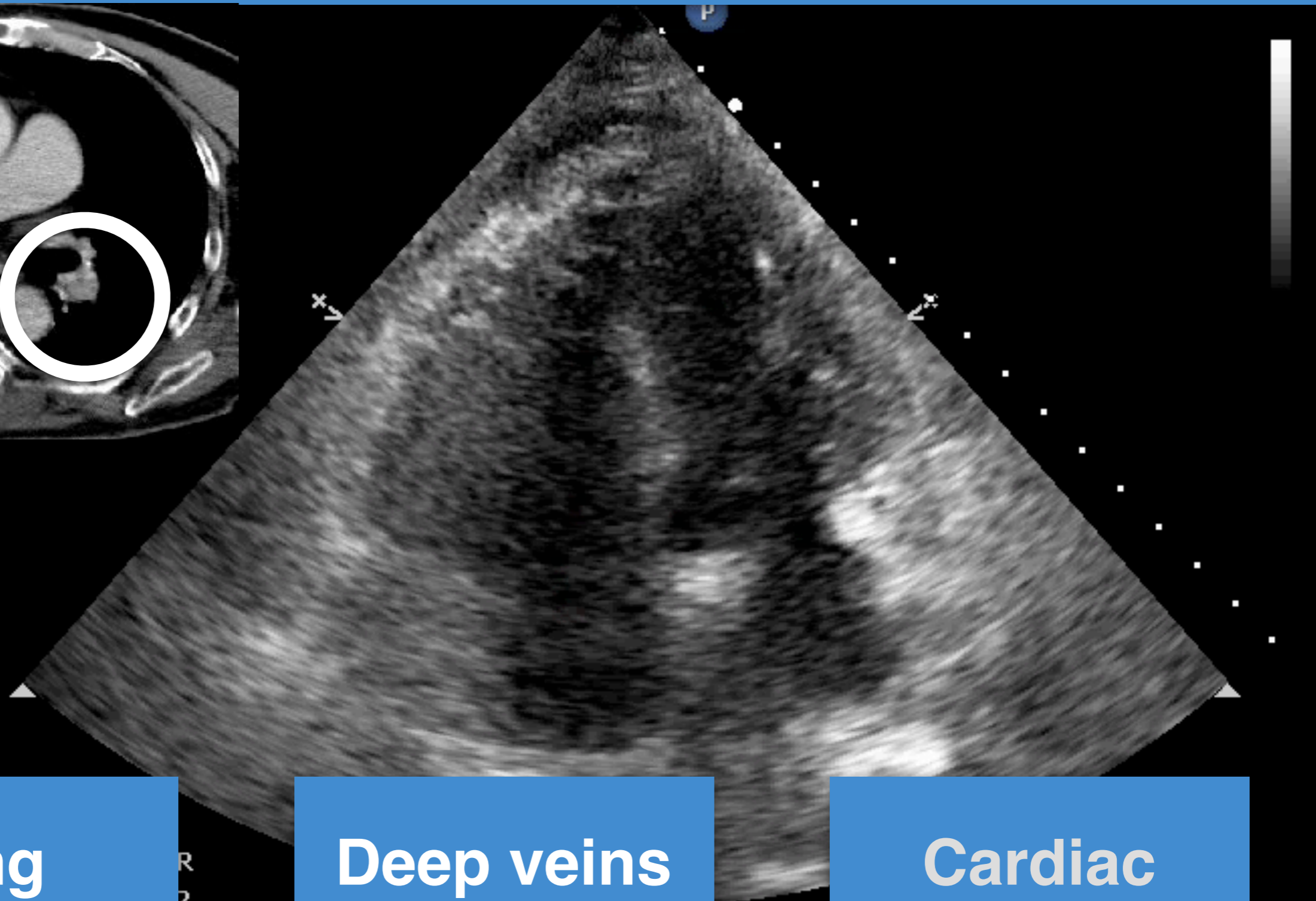
# Pulmonary embolism



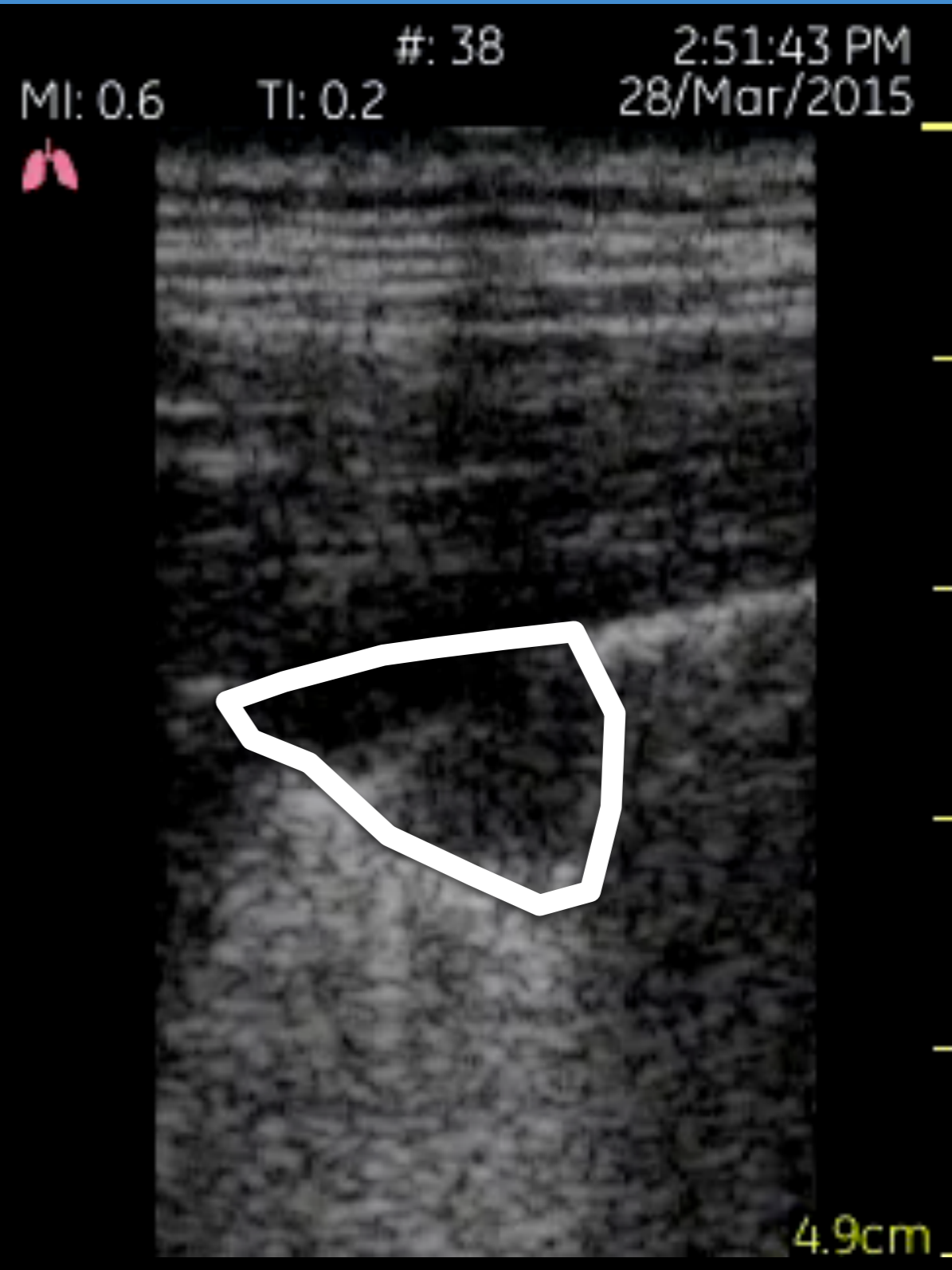
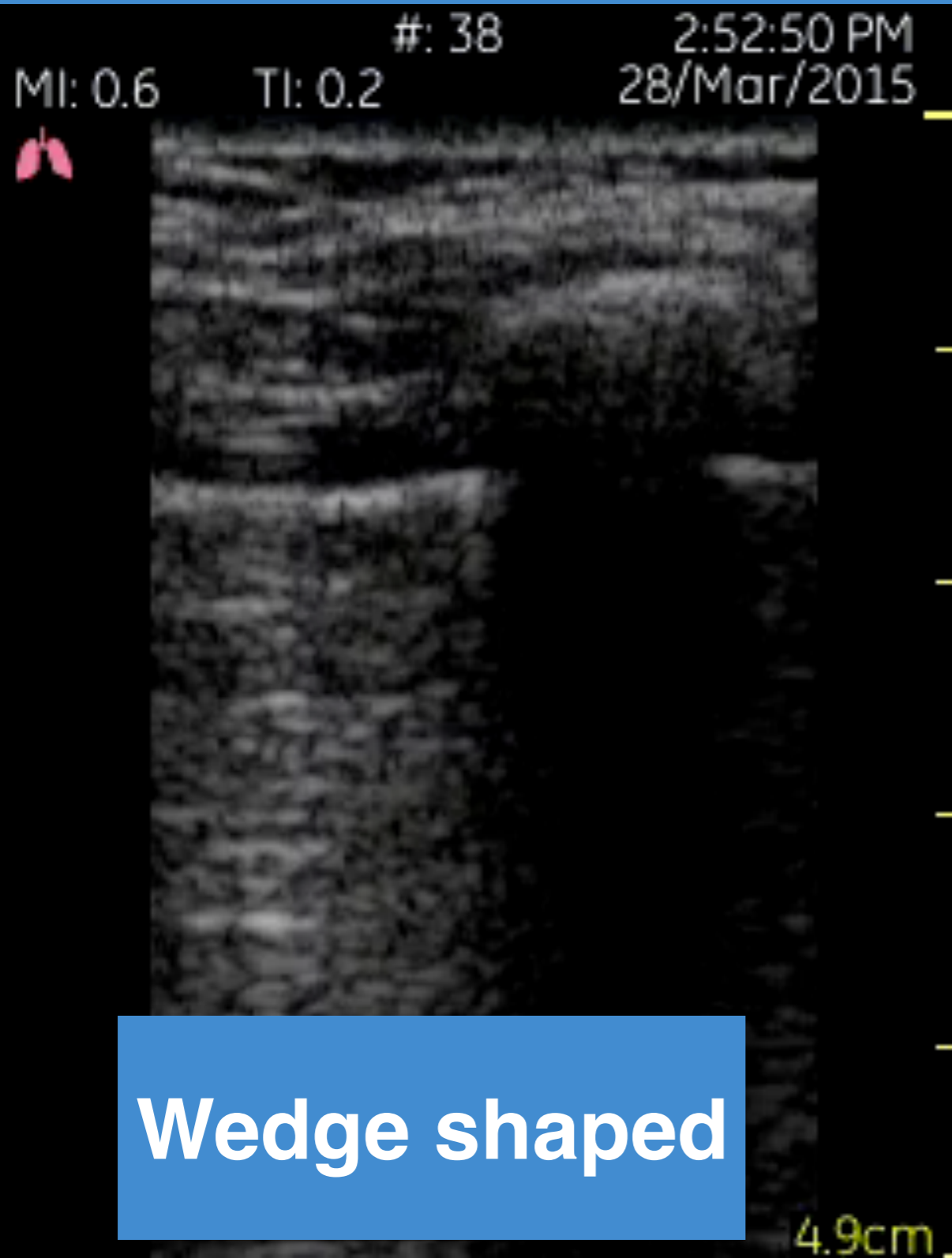
**Lung**

**Deep veins**

**Cardiac**



# Pulmonary infarction

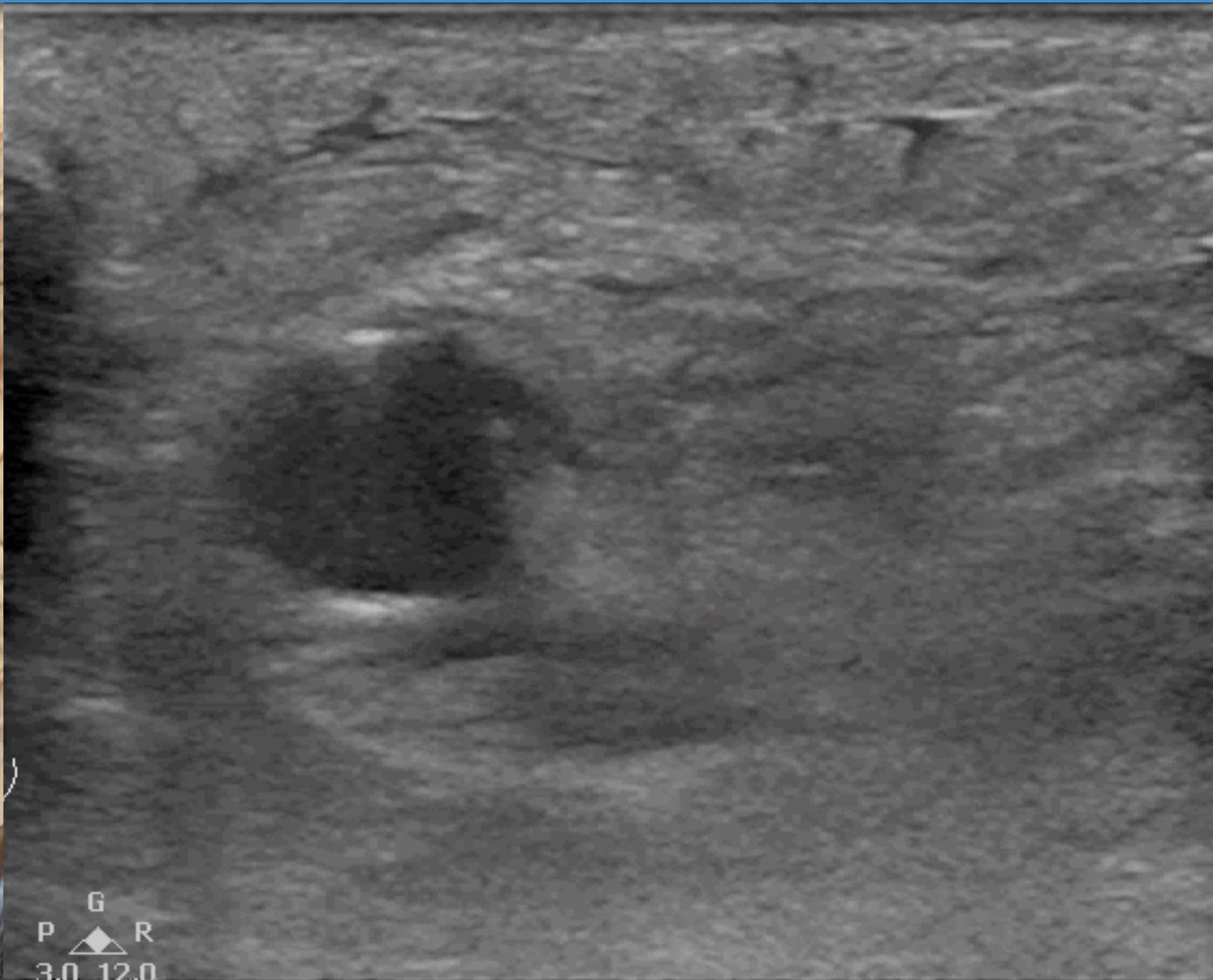


**Wedge shaped**

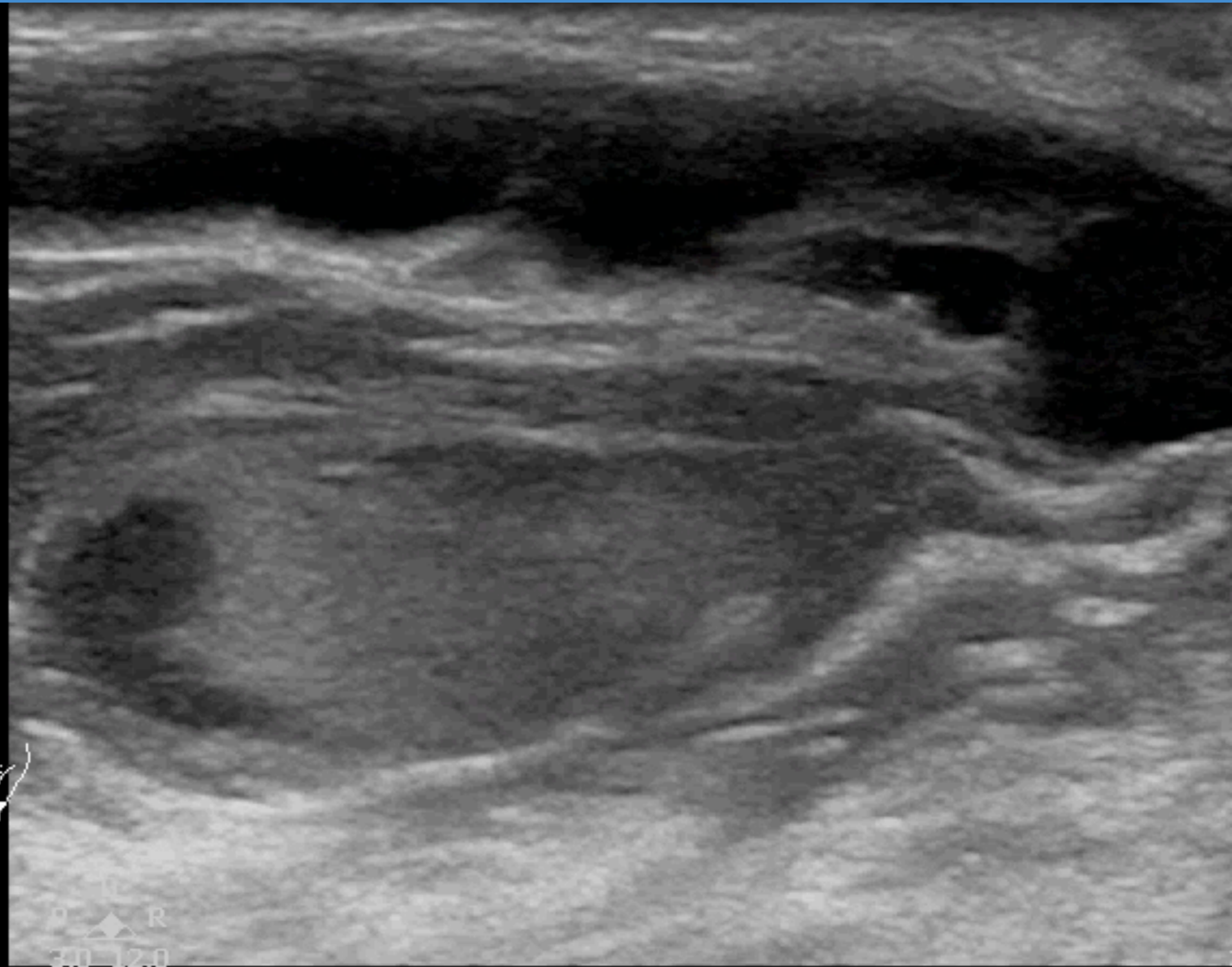
**91 F, right thigh pain for 3 d**



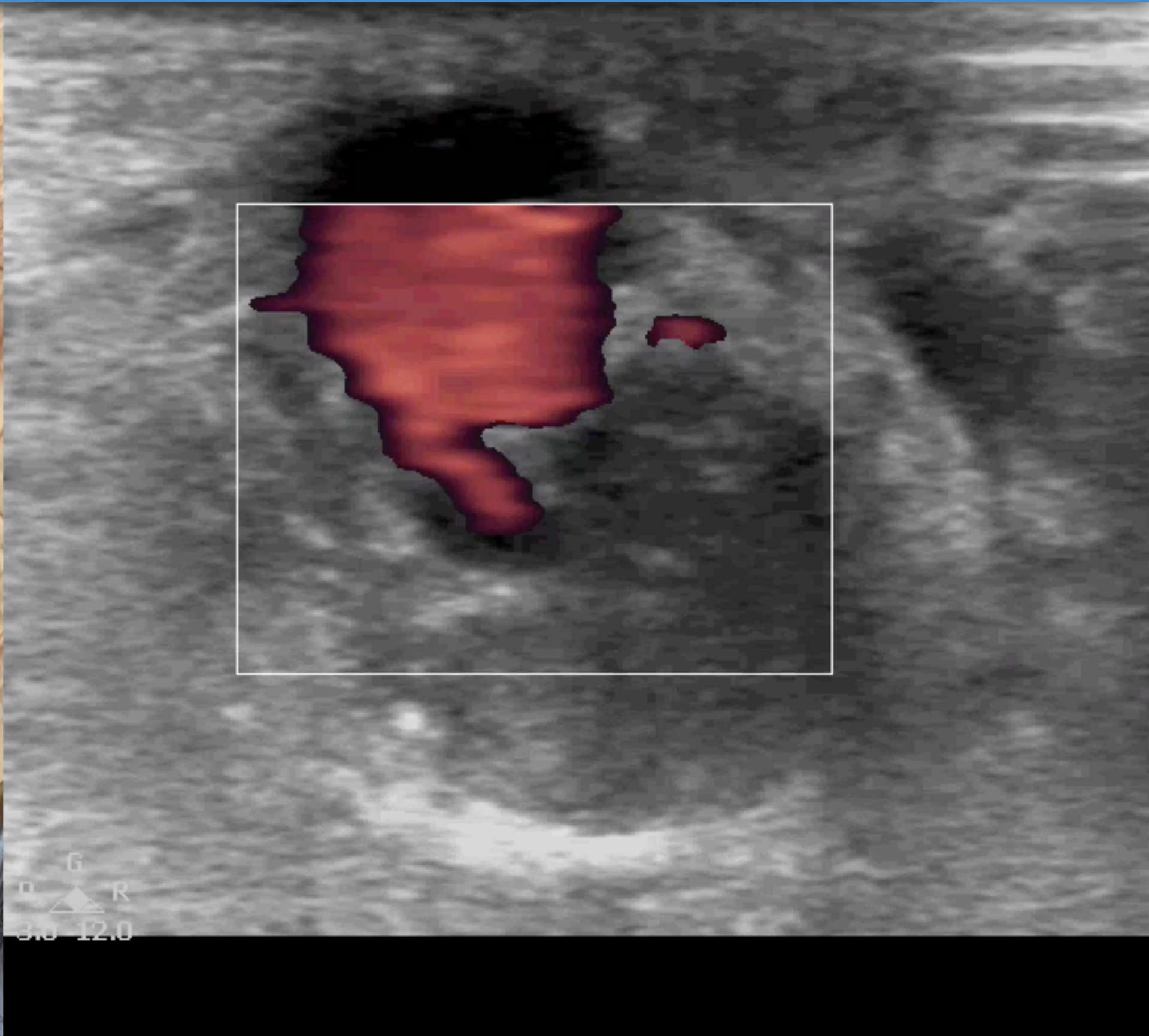
# 57F, ESRD on HD



# 57F, ESRD on HD



# 57F, ESRD on HD



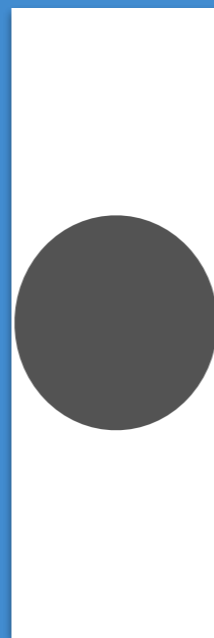
# I-AIM

**Dilatation**



**Rupture**

**Obstruction**

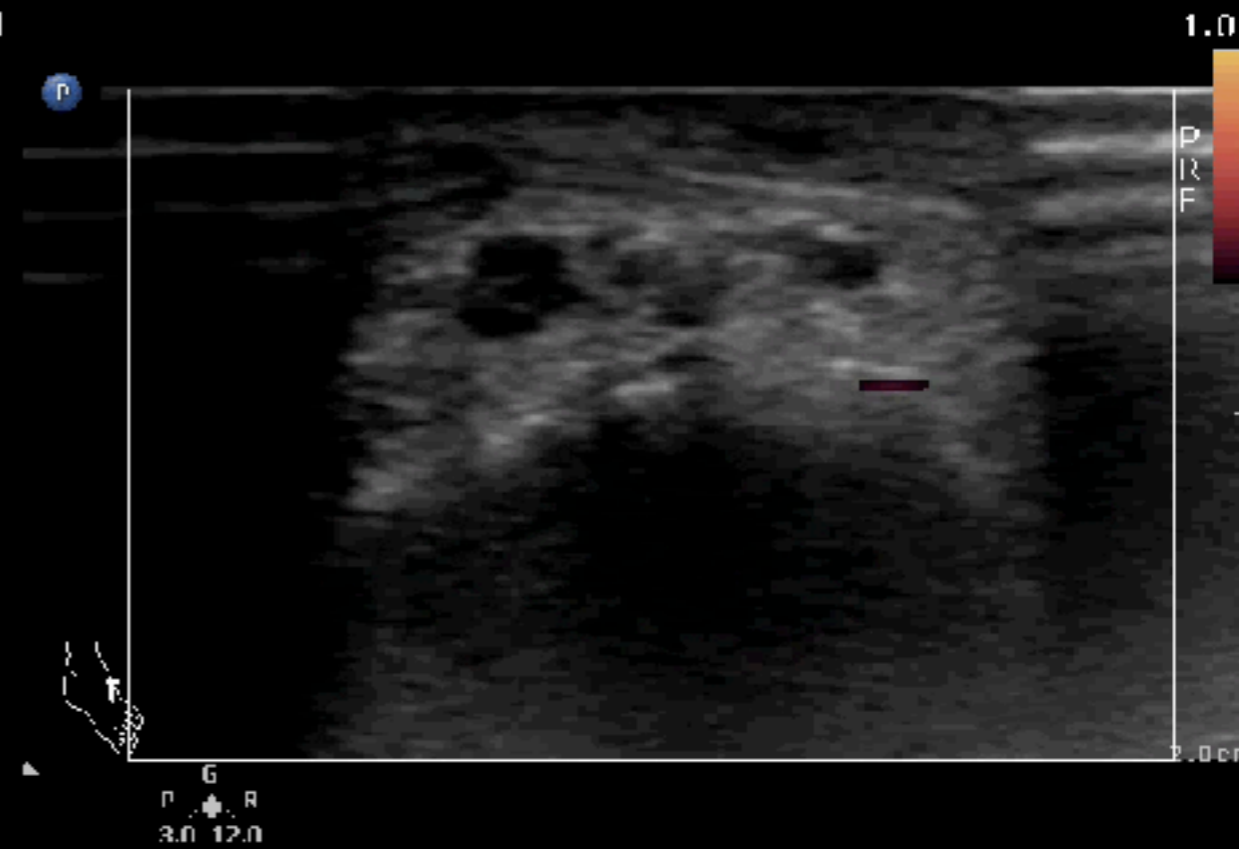
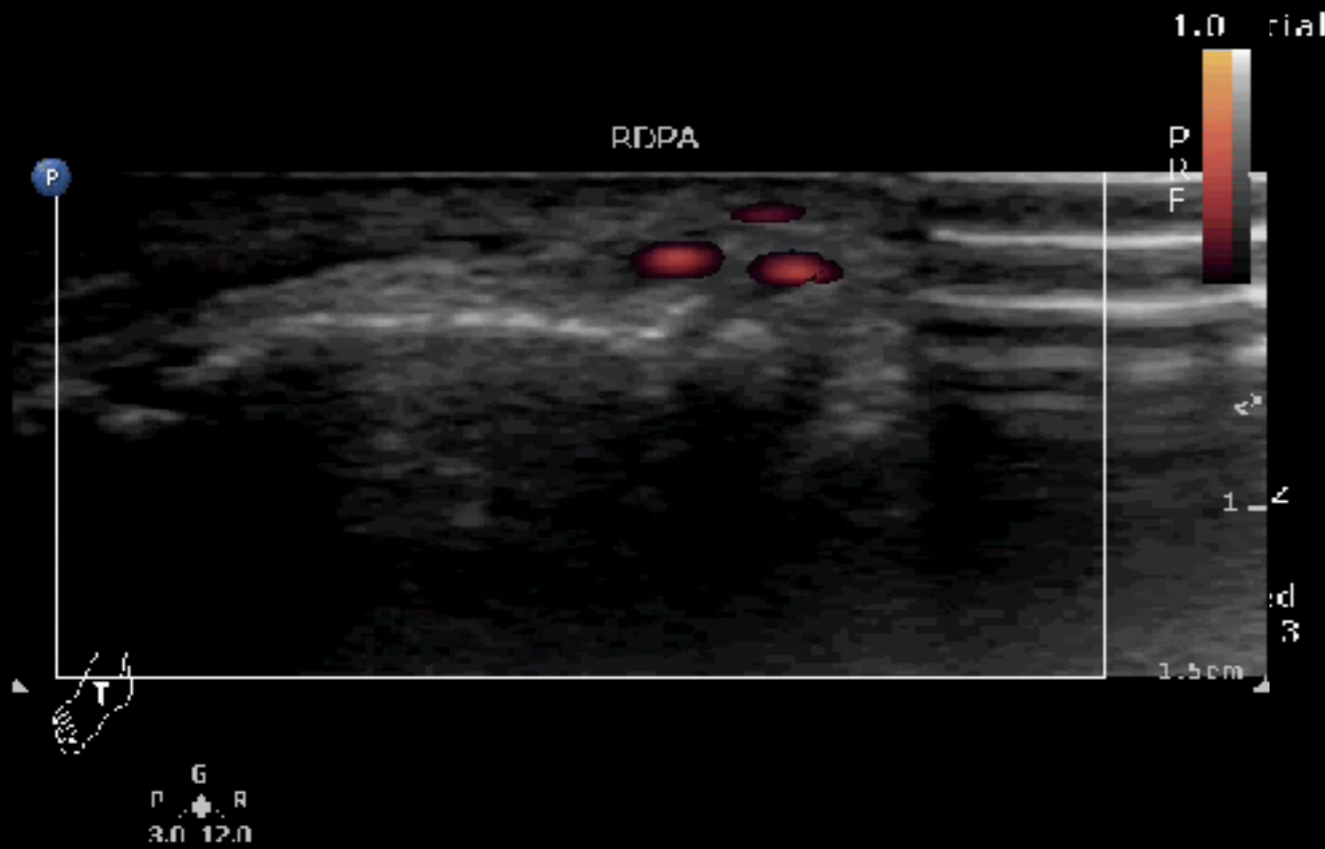


**Dissection**



# 71F, Leg pain & cold

Superficial  
2-3  
117  
1.5cm  
Gen  
in 74  
52  
13/7  
PA  
0.0 MHz  
in 53  
15/1  
lter Med  
aseln 3





# Y

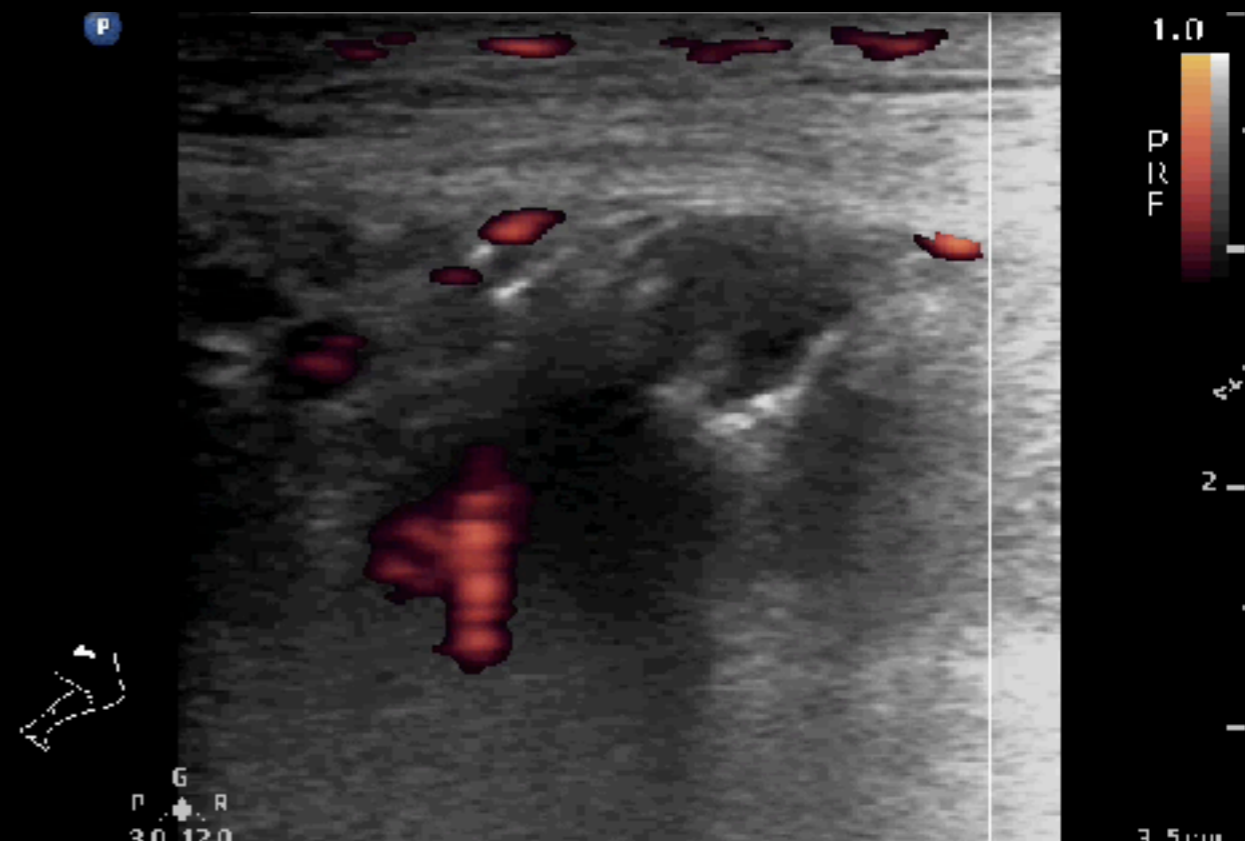
# PAOD

# N

Superficial  
12-3  
10 Hz  
3.0cm

D  
Gen  
5n 100  
C 52  
1/3/7

PA  
5.0 MHz  
5n 54  
L/5/1  
Filtr Med  
Baseln 3



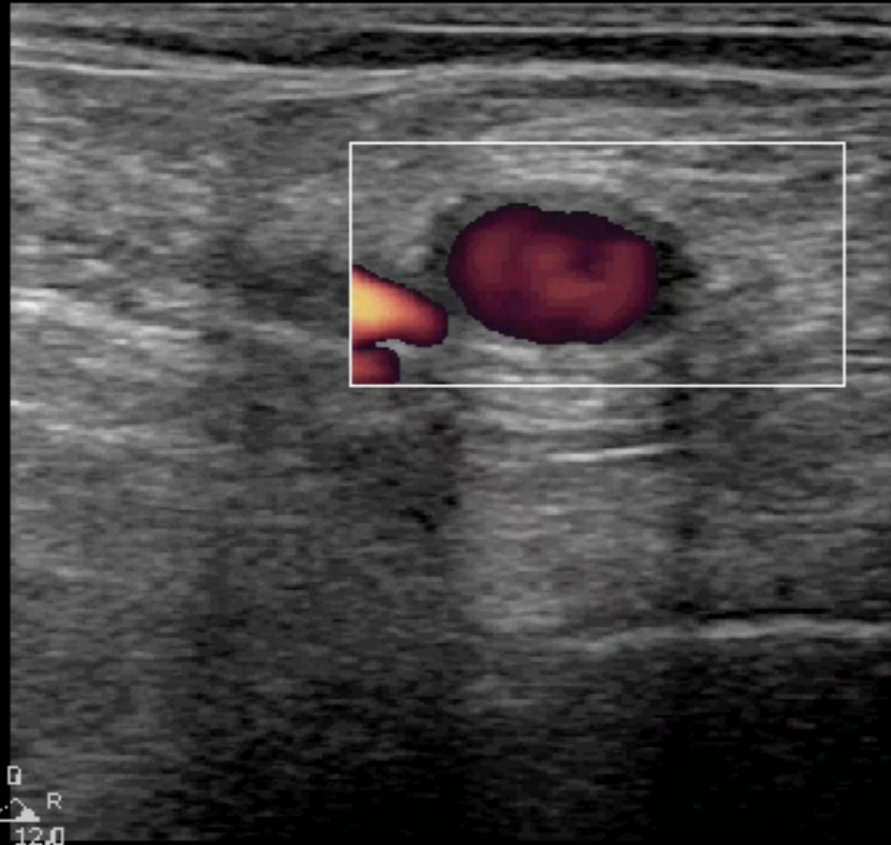
# 86F, Leg pain

Superficial  
12 3  
4 Hz  
3.5cm

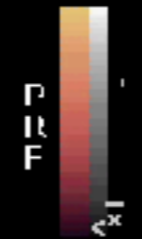
D  
tes  
Gn 67  
C 56  
3/2/2

PA  
5.0 MHz  
Gn 51  
1/5/5  
Ftr Med  
Baseln 3

P



0.8



2

3.5cm

P



0.8



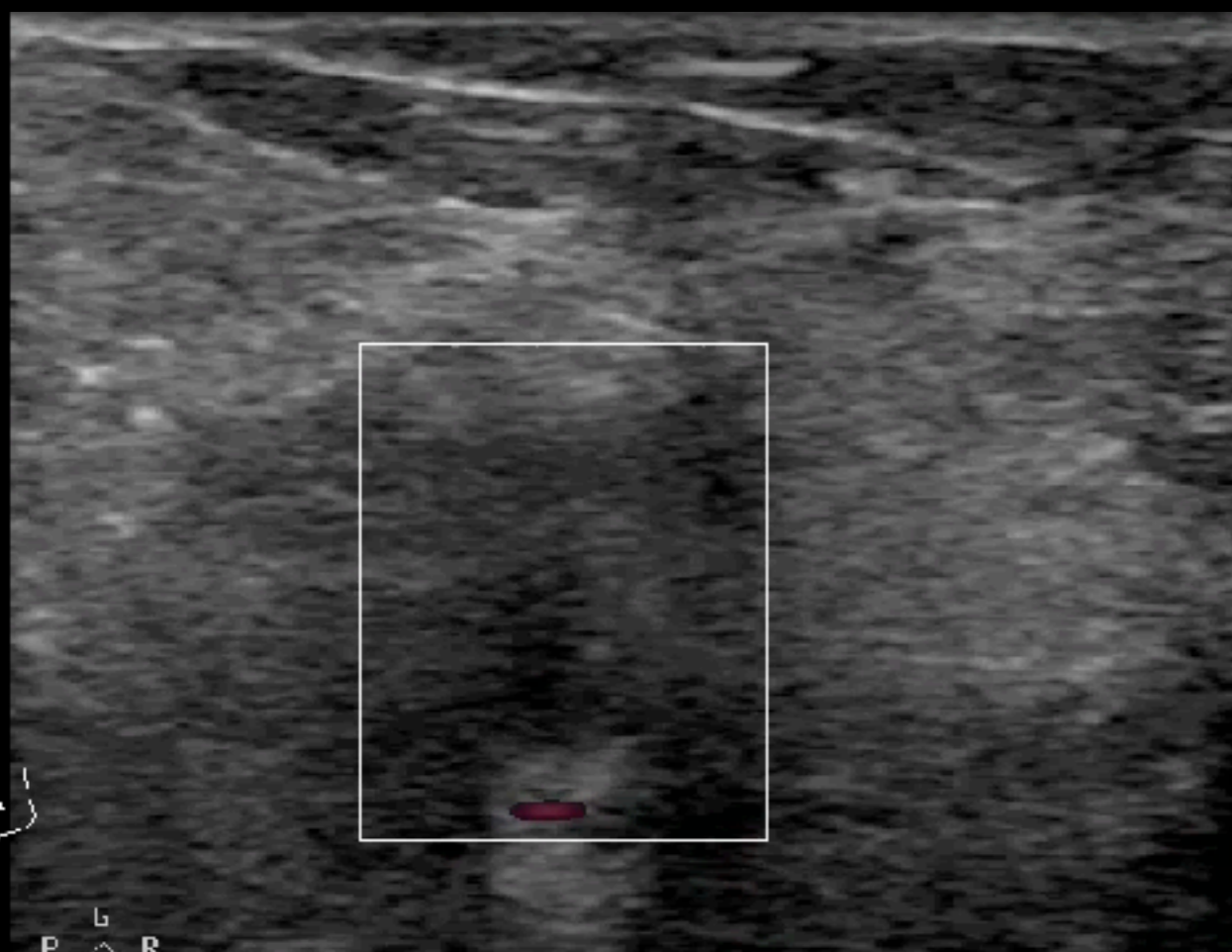
2

3.0cm

# Y

# PAOD

# N



**DP/PTA**

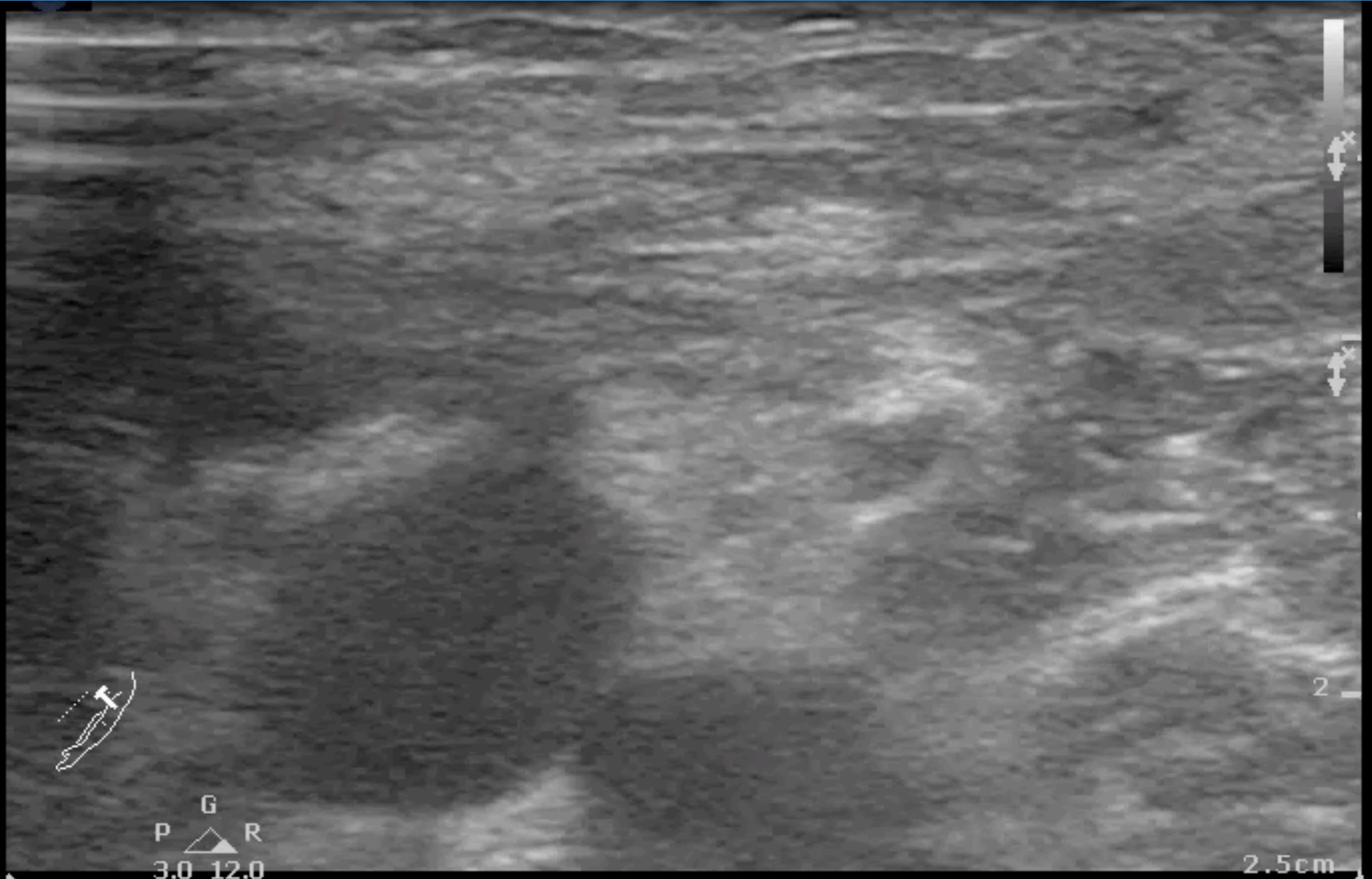
**PA**

**FA**

# 72M, ESRD on HD

L12-3  
50 Hz  
2.5cm

2D  
Res  
Gn 100  
C 56  
3 / 2 / 1



# 76F, Leg pain

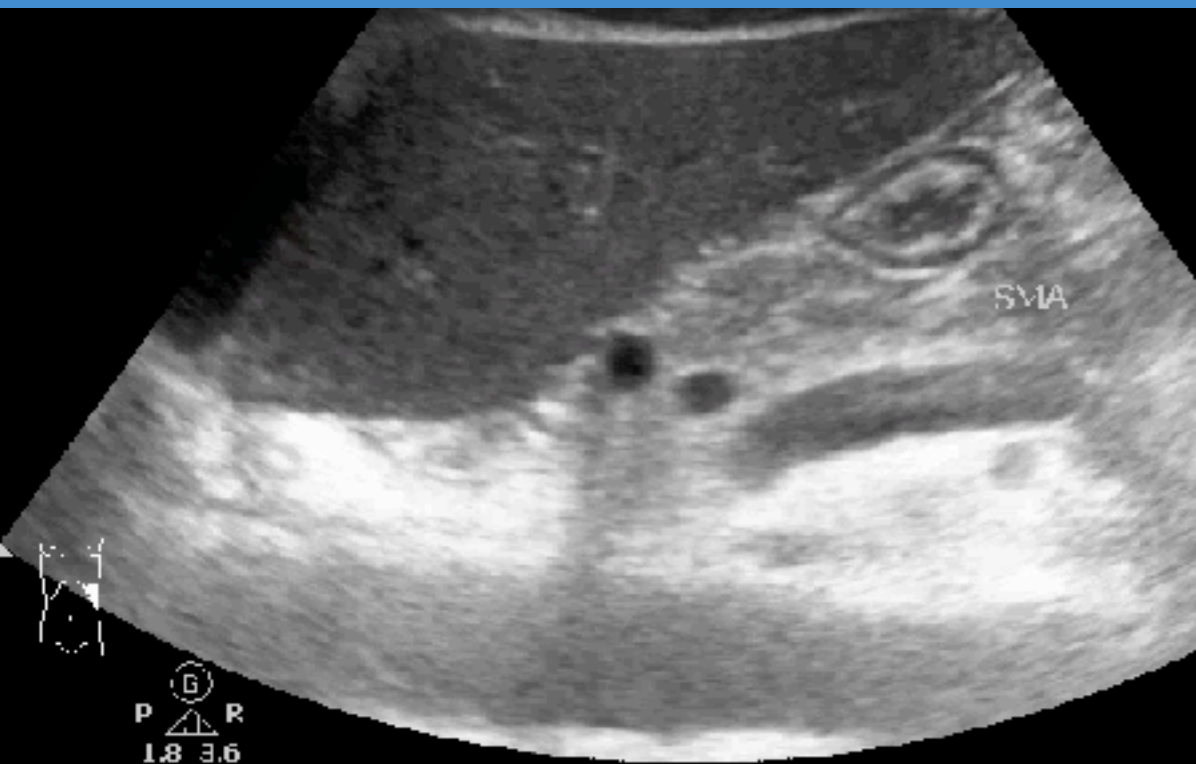
Superficial  
L12-3  
50 Hz  
2.5cm

2D

Res  
Gn 77  
C 56  
3 / 2 / 1

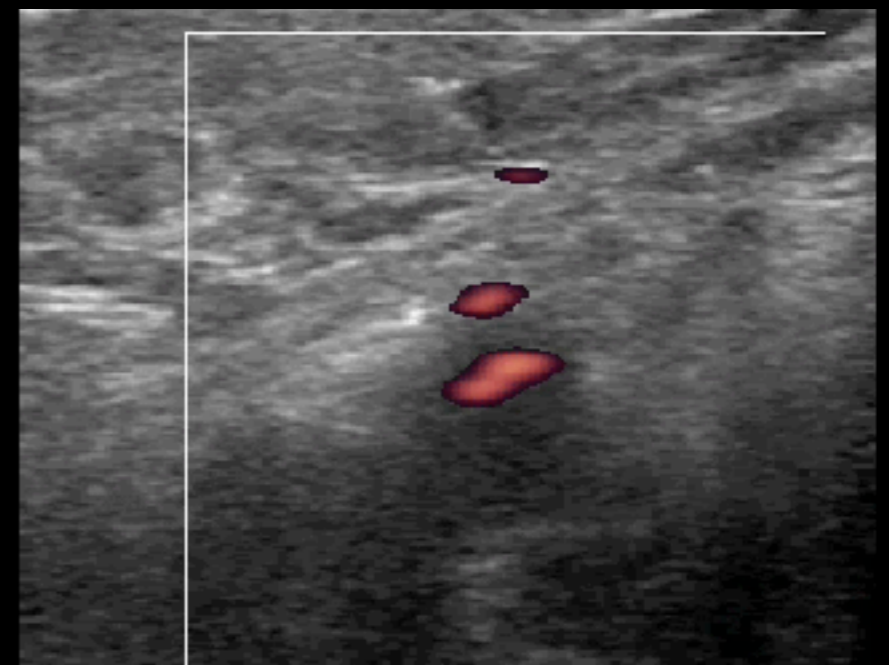
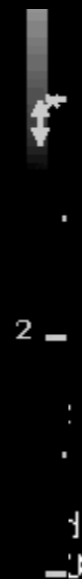
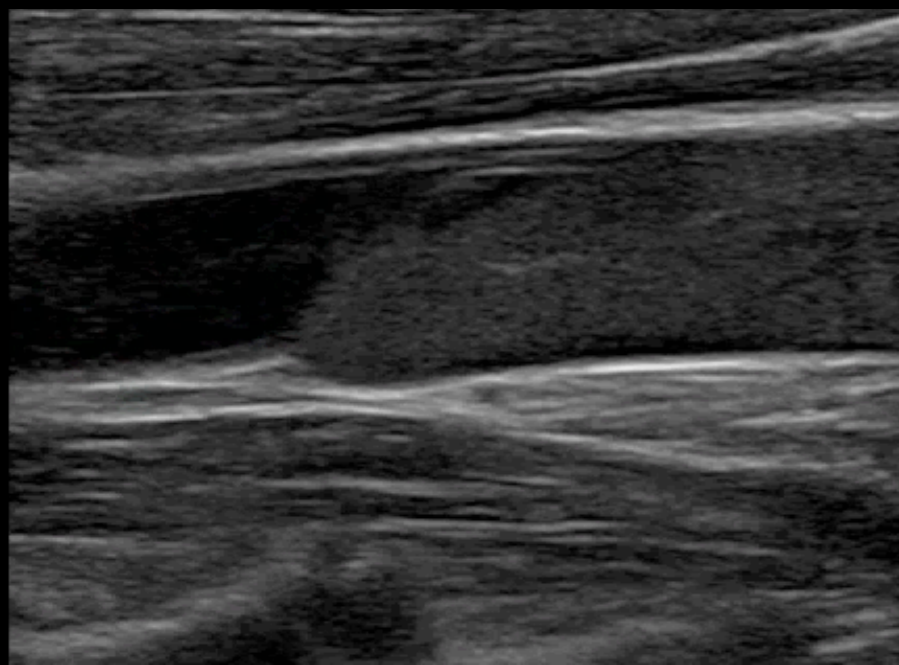
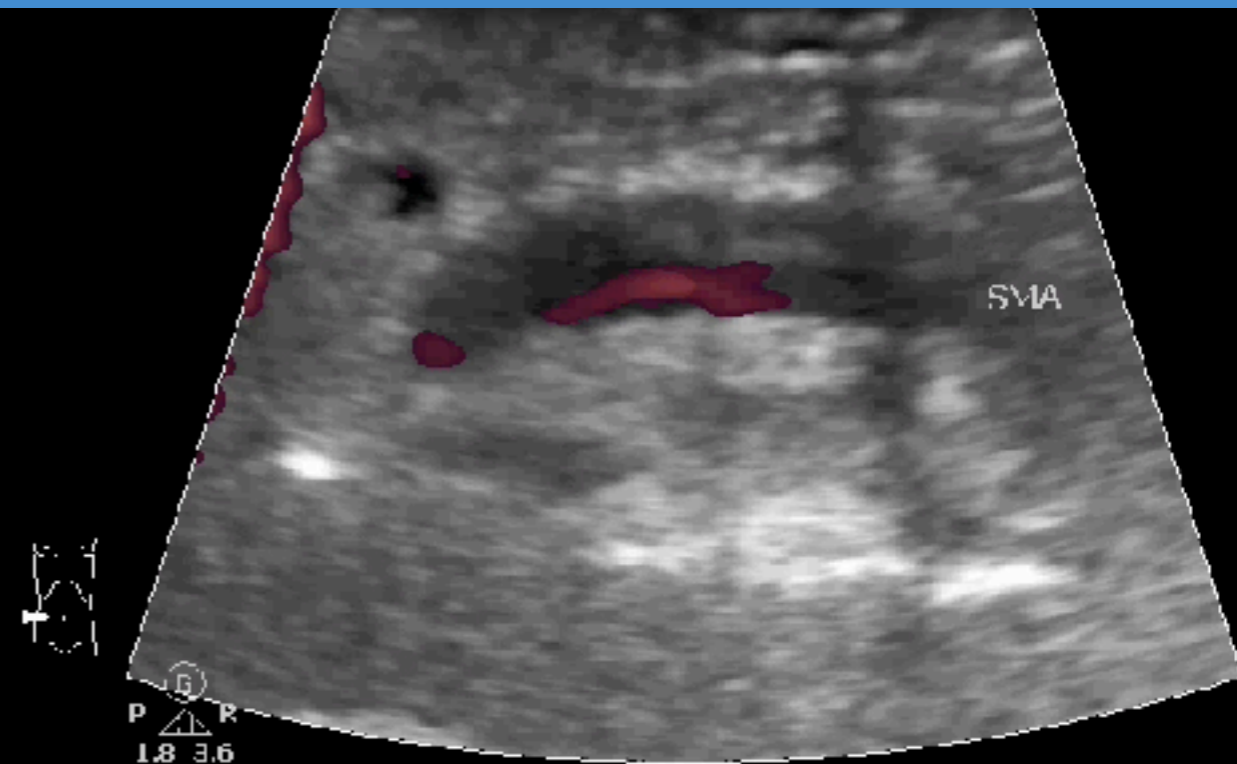


# Complication of AD



2D  
II Gen  
Gn 34  
C 56  
3/3/3

CPA  
2.5 MHz  
Gn 66  
1/8/4  
Filtr High  
Baseln 8



# 45M, Severe ABD pain



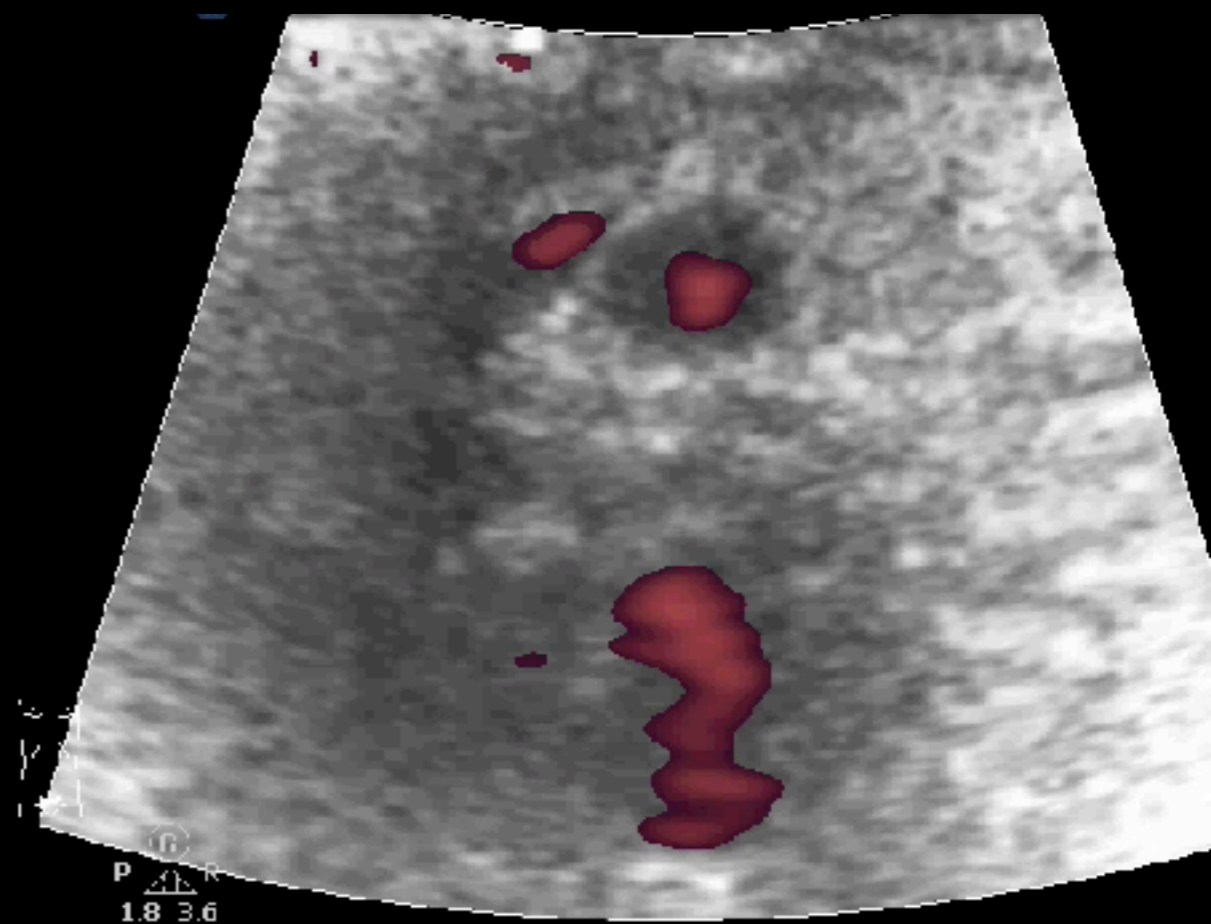
C5-1  
12 Hz  
HD 700m

2D  
HGen  
Gn 58  
C 40  
3/3/3

CDA  
2.5 MHz  
Gn 66  
1/8/4  
Filtr High  
Baseln 8

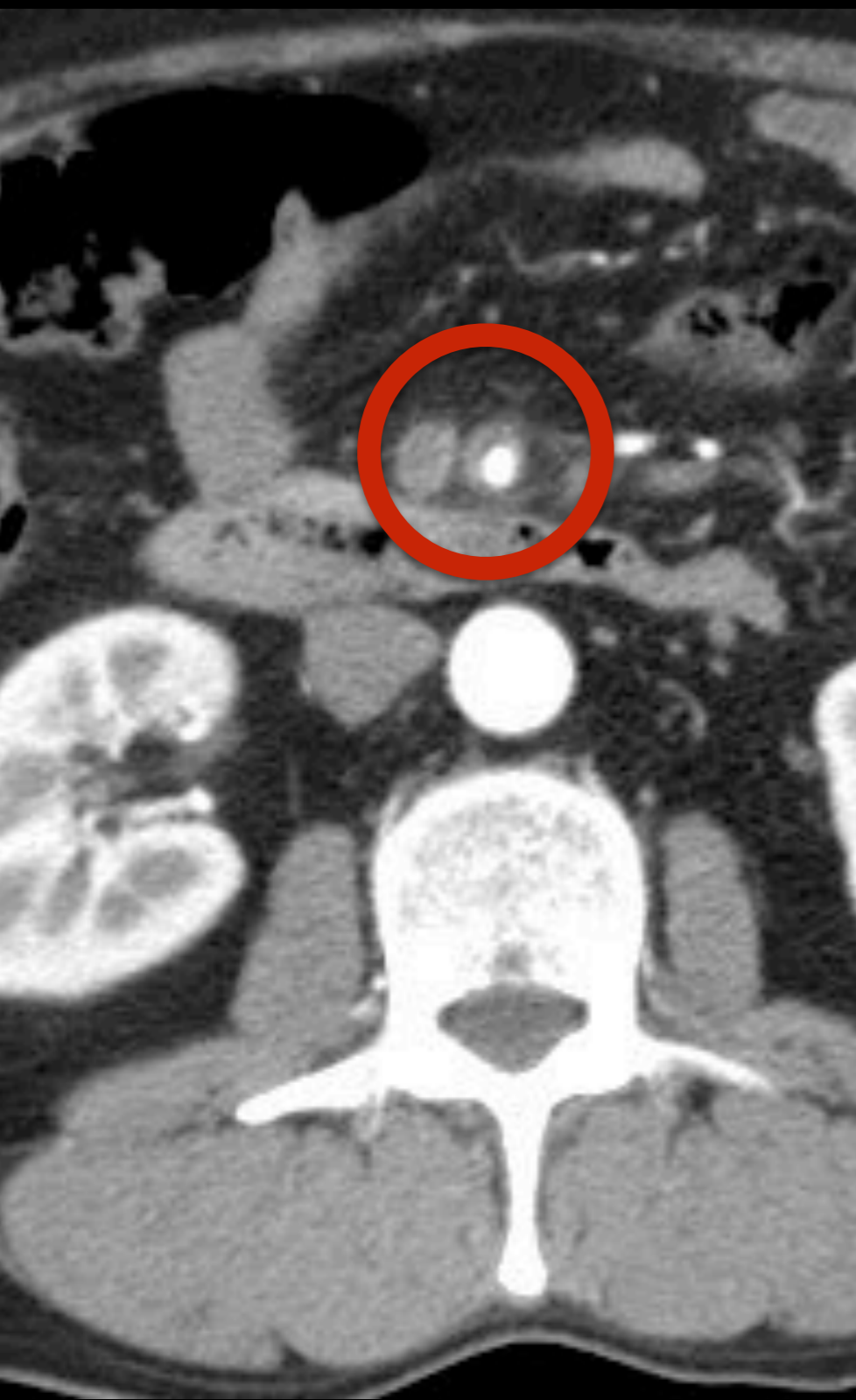
P R  
1.8 3.6

1:



P R  
1.8 3.6

# out of portion pain



Abd Gen2  
Cb-1  
14 Hz  
HD Zoom

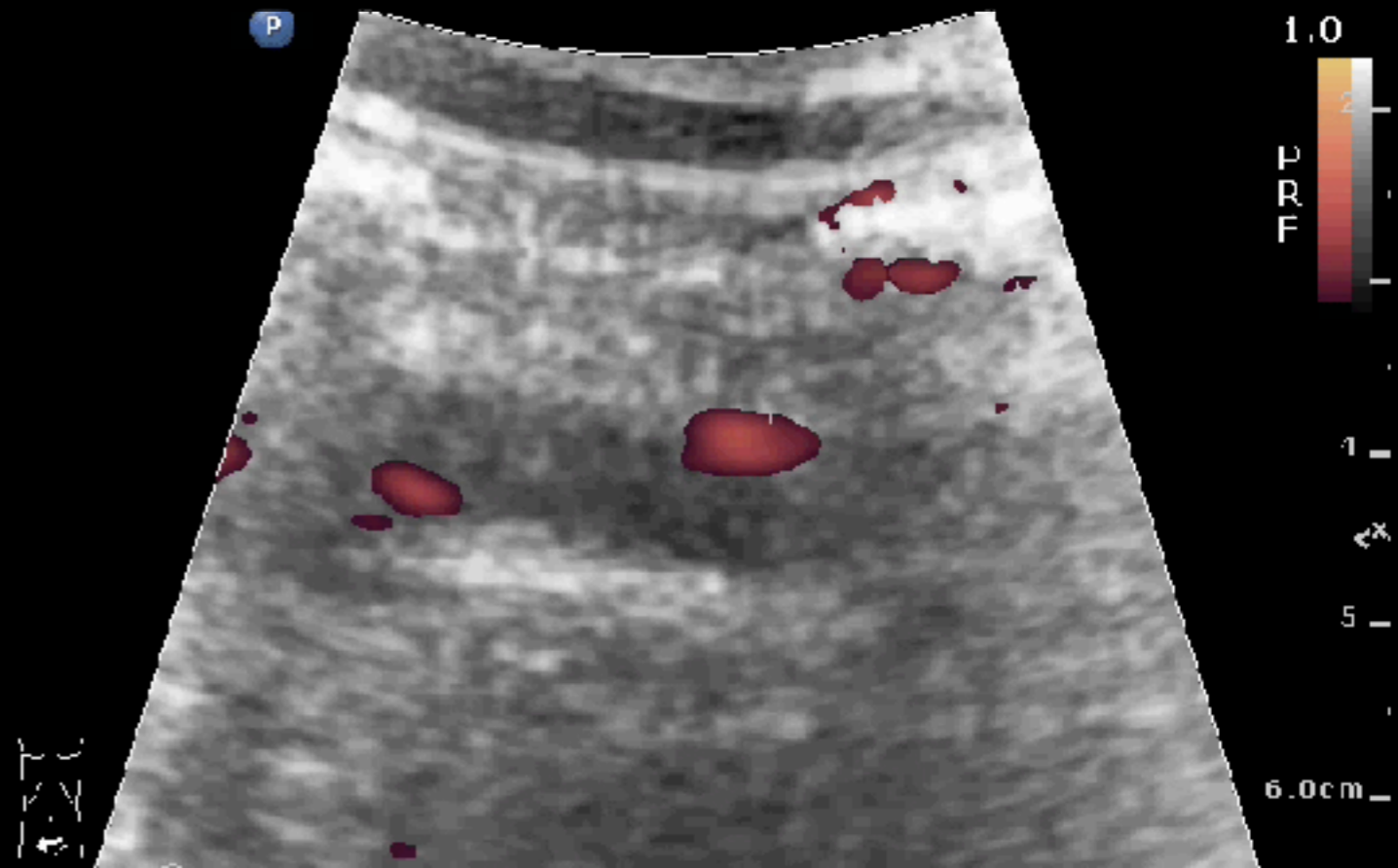
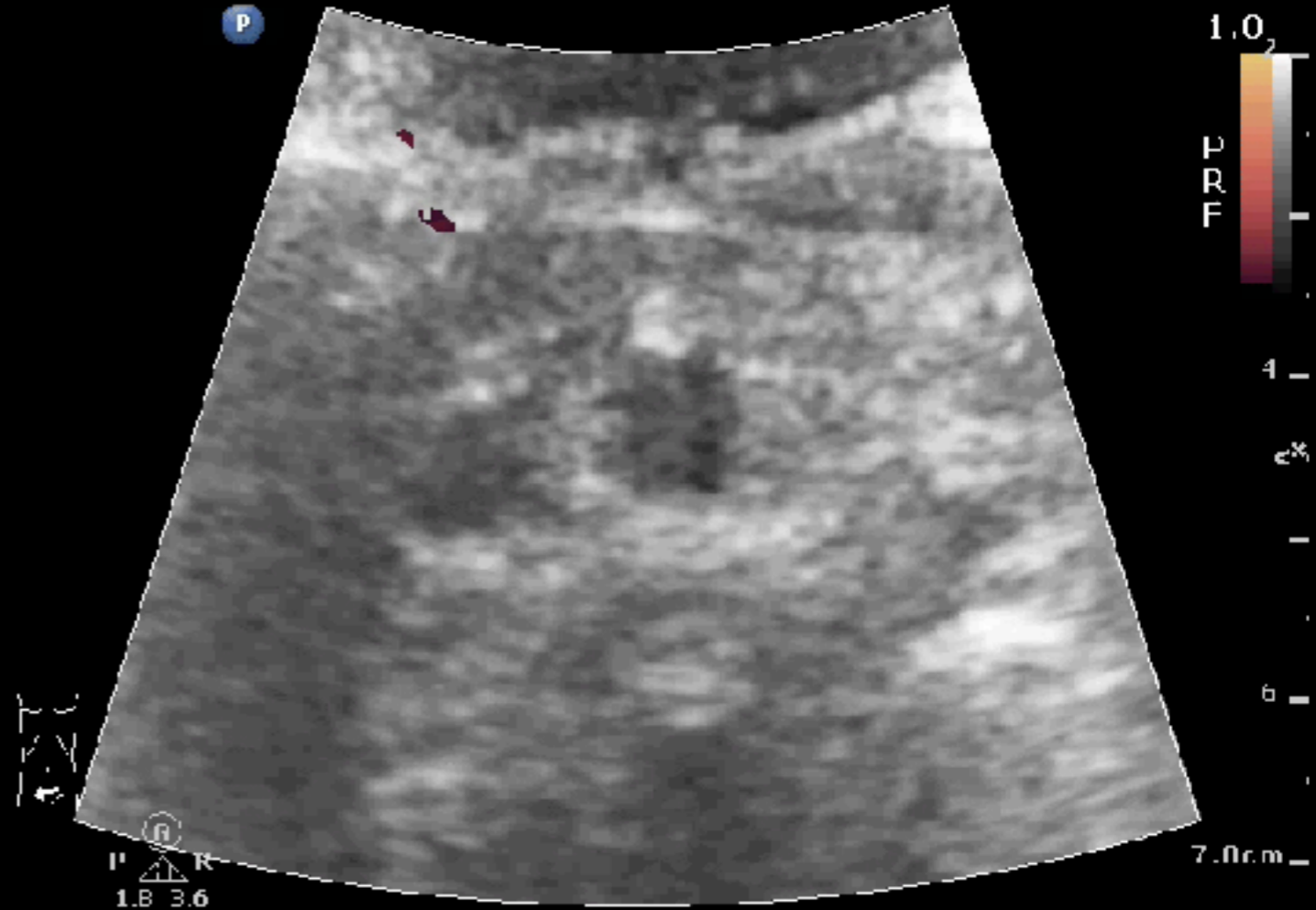
2D  
HGen  
Gn 60  
C 56  
3/3/3

CPA  
2.5 MHz  
Gn 66  
1/8/4  
Filtr High  
Baseln 8

Abd Gen2  
Cb-1  
14 Hz  
HD Zoom

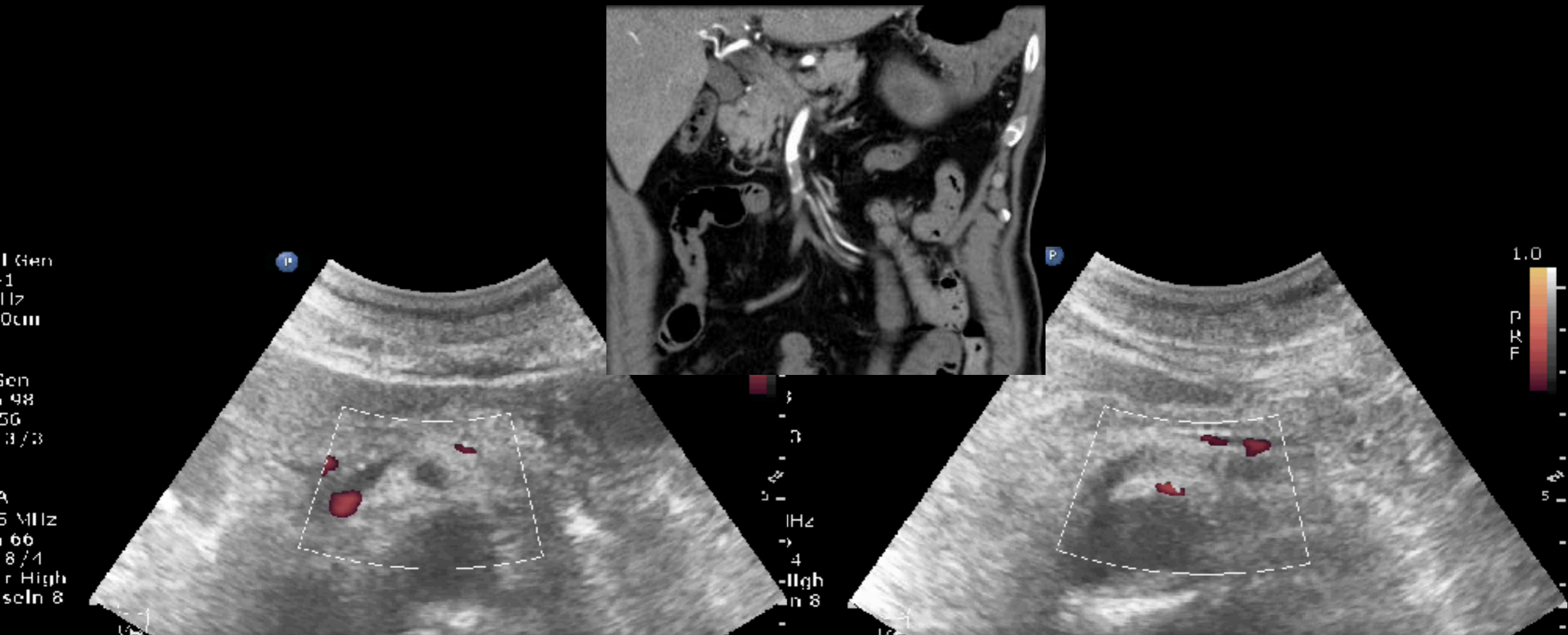
2D  
HGen  
Gn 58  
C 49  
3/3/3

CPA  
2.5 MHz  
Gn 66  
1/8/4  
Filtr High  
Baseln 8



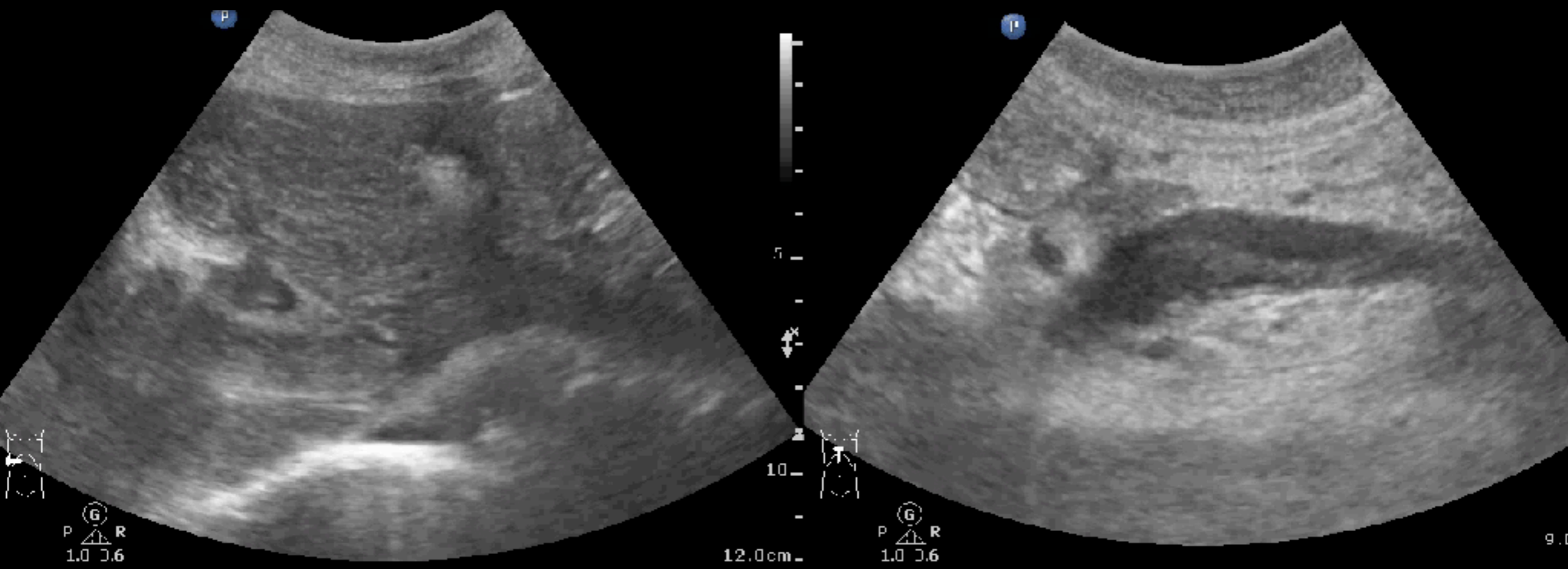


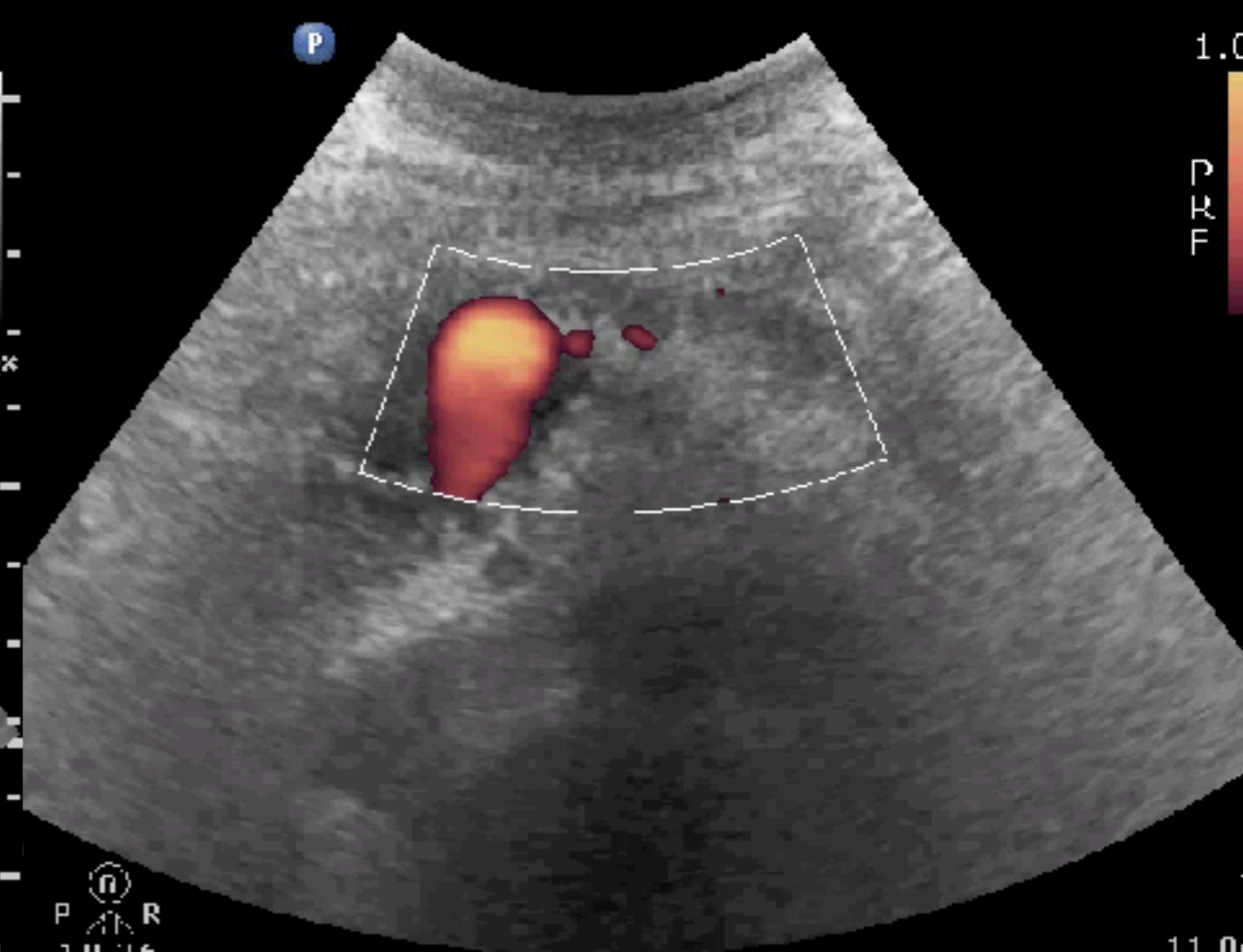
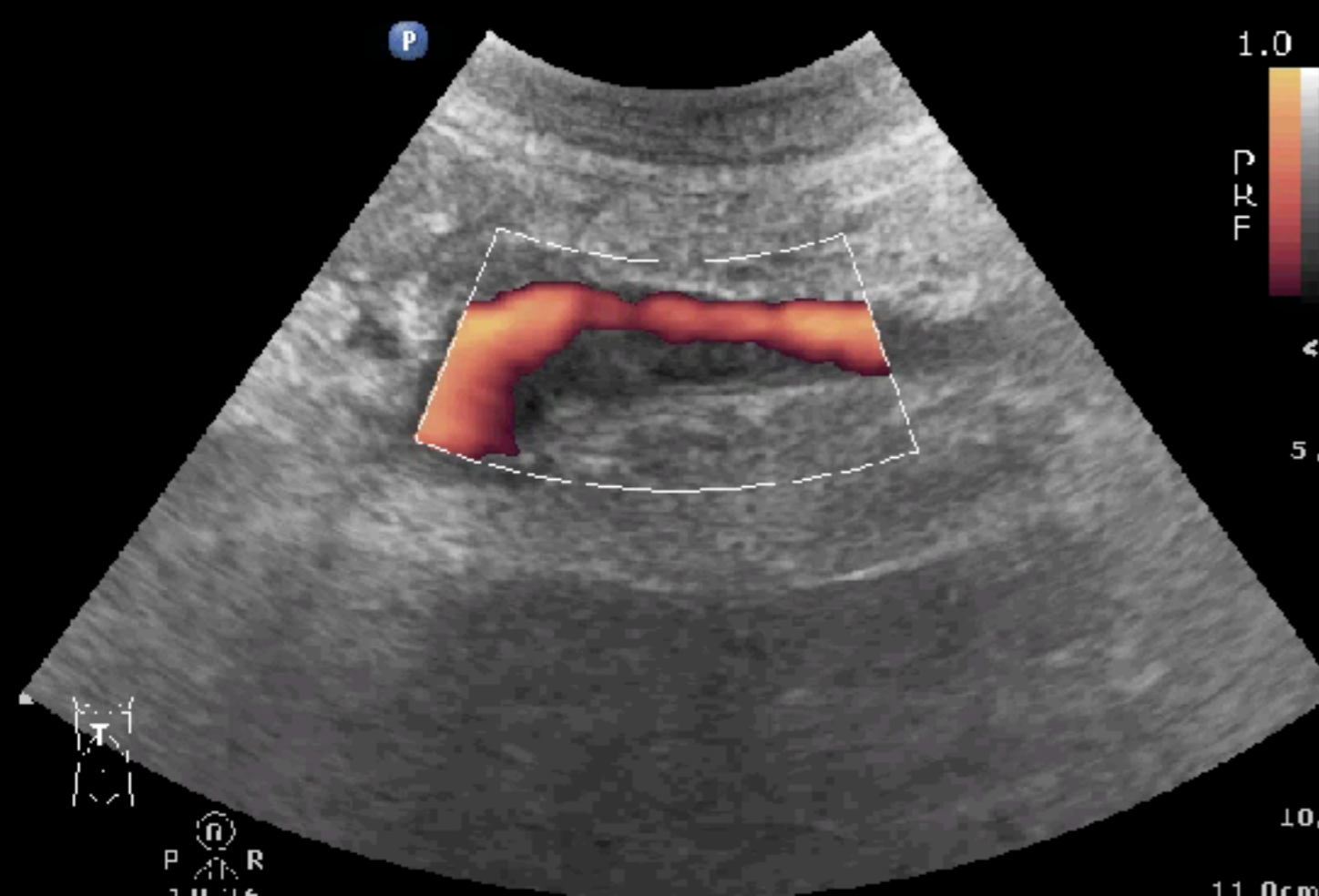
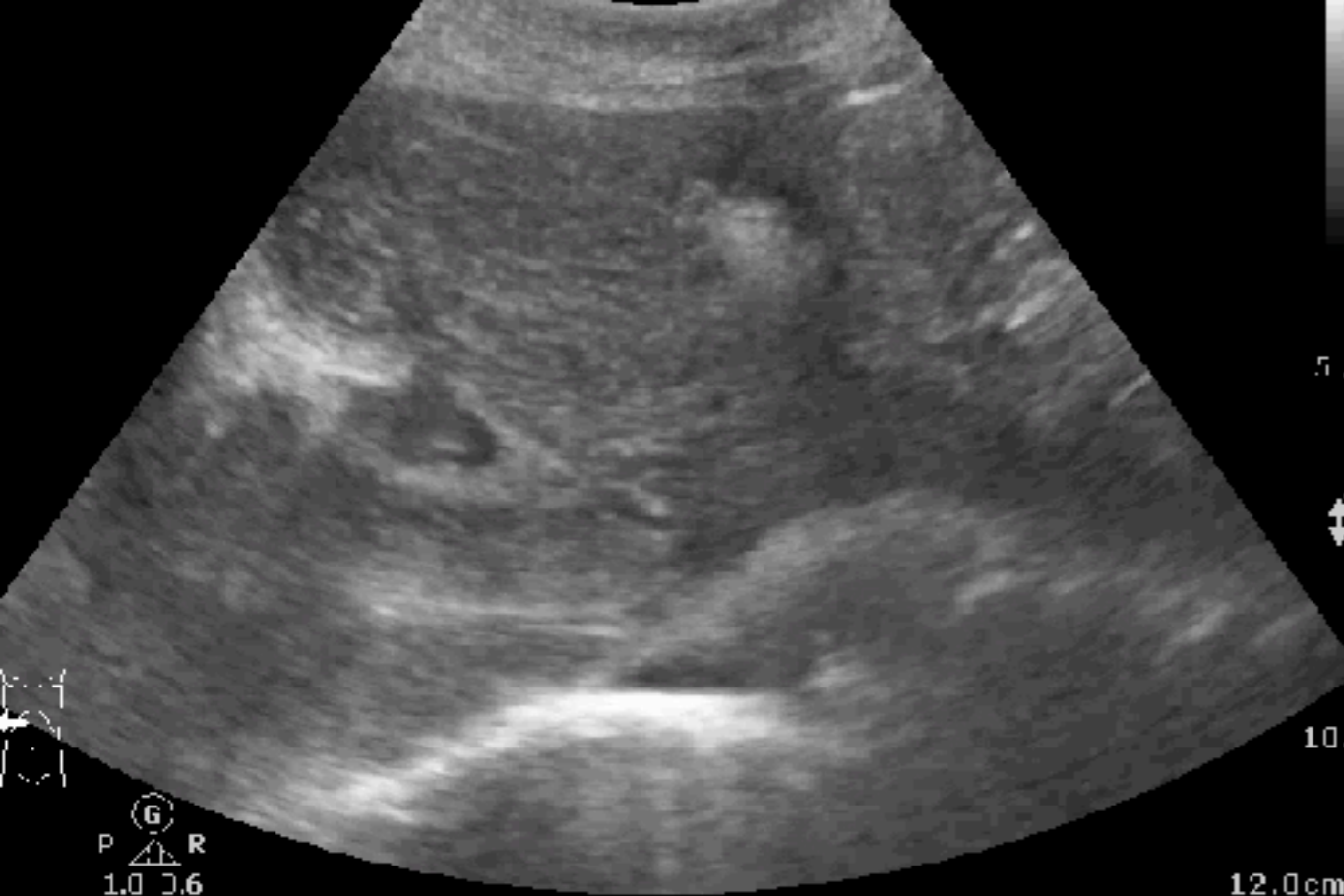
# 77M, Severe ABD pain



# out of portion pain

# 68F, Cirrhosis, ABD pain





# Volvulus

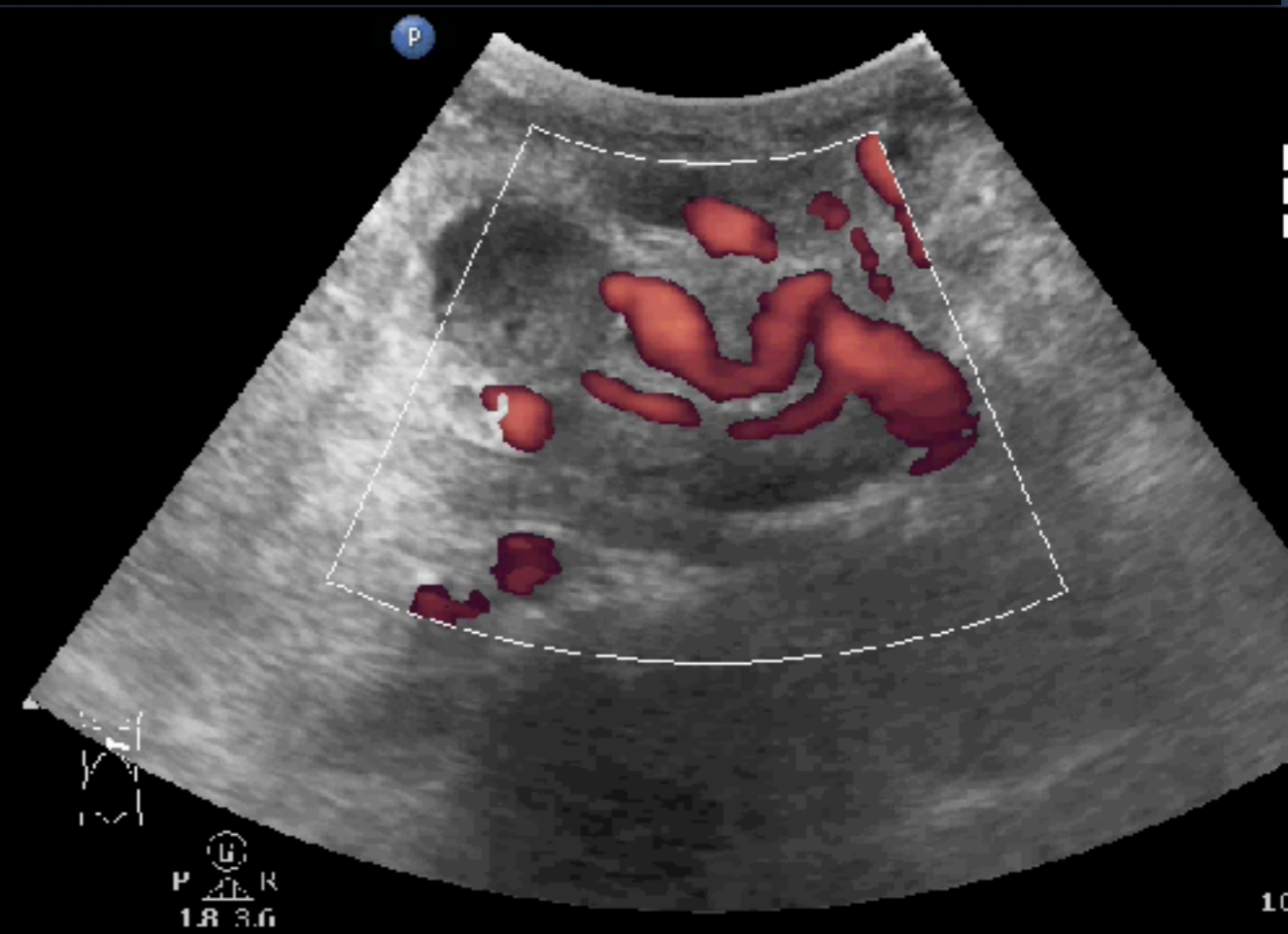
## Whirlpool sign



Abd Gen  
C5-1  
10 Hz  
10.0cm

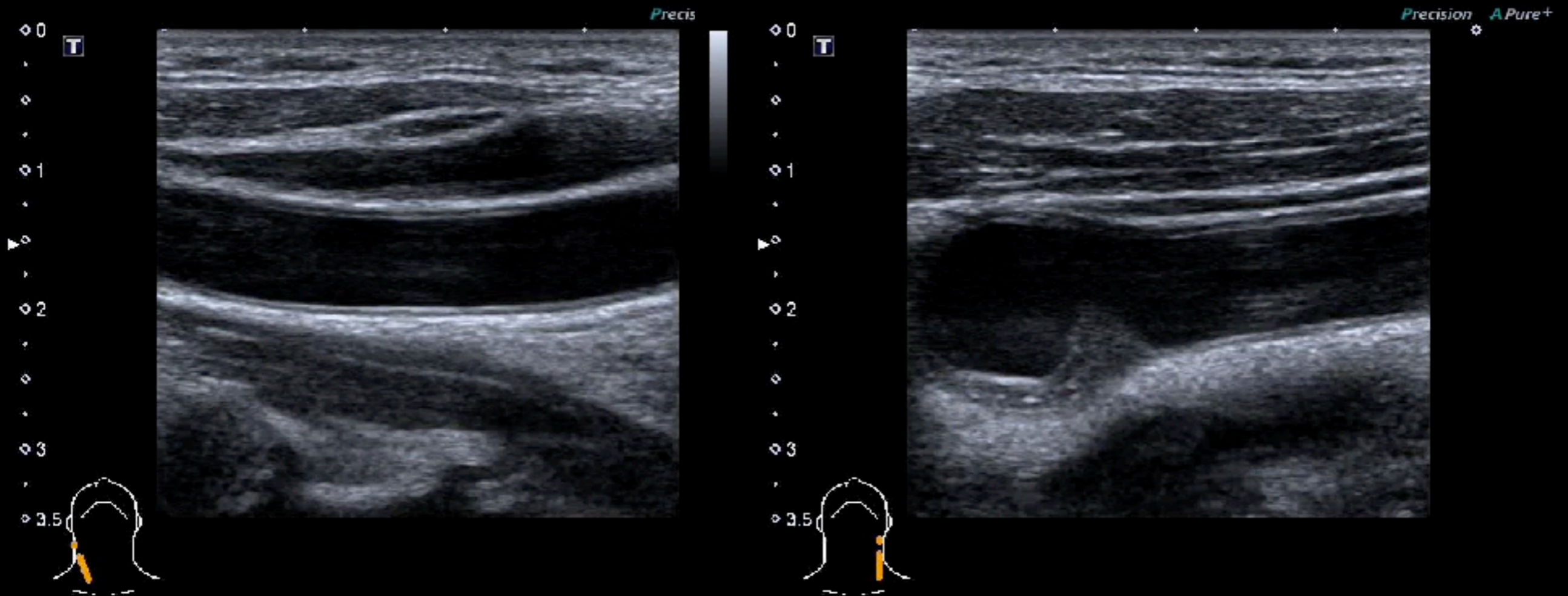
2D  
IIGen  
Gn 70  
C 56  
3/3/3

CPA  
2.5 MHz  
Gn 66  
1/8/4  
Filtr High  
Baseln 8

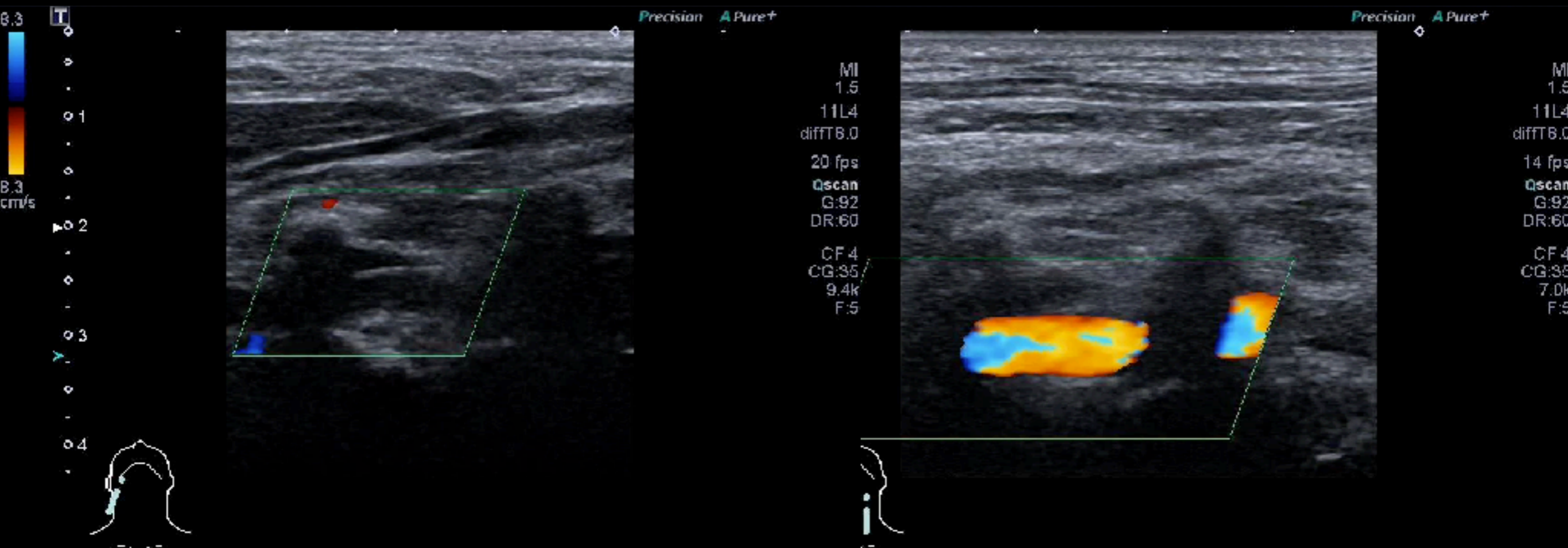


P R  
1.8 3.6

# 51 M, Headache (VAS 10) sleep-soreness-pain-dizziness

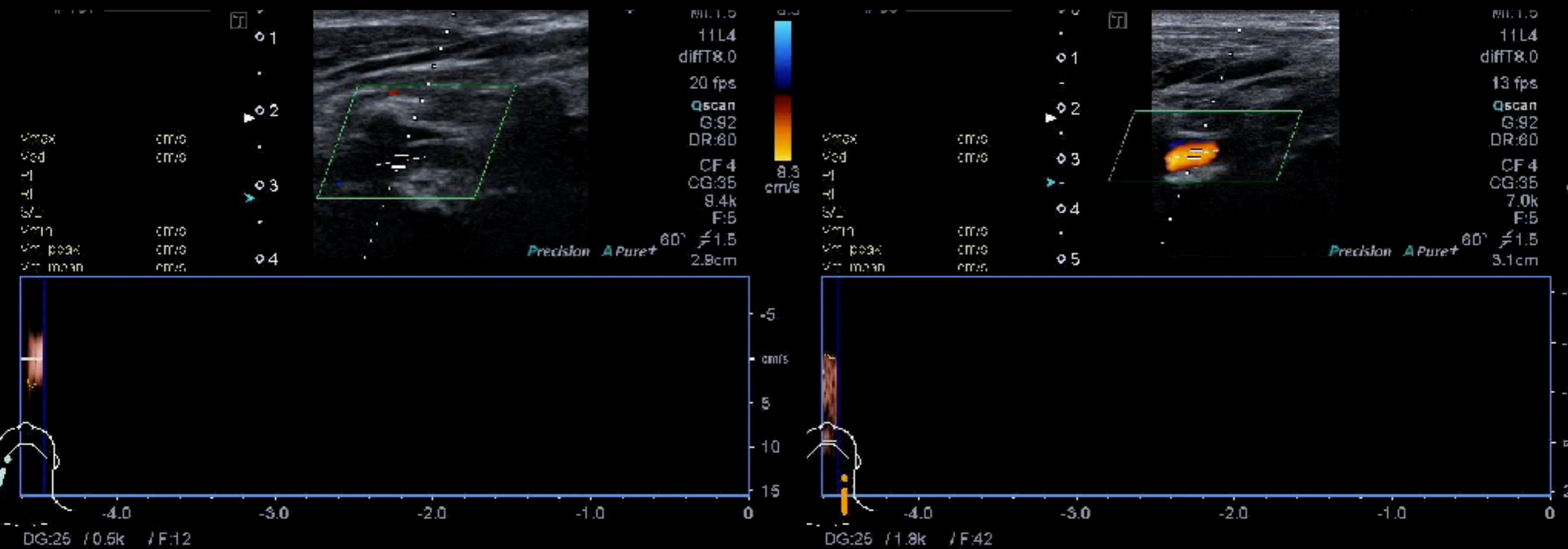


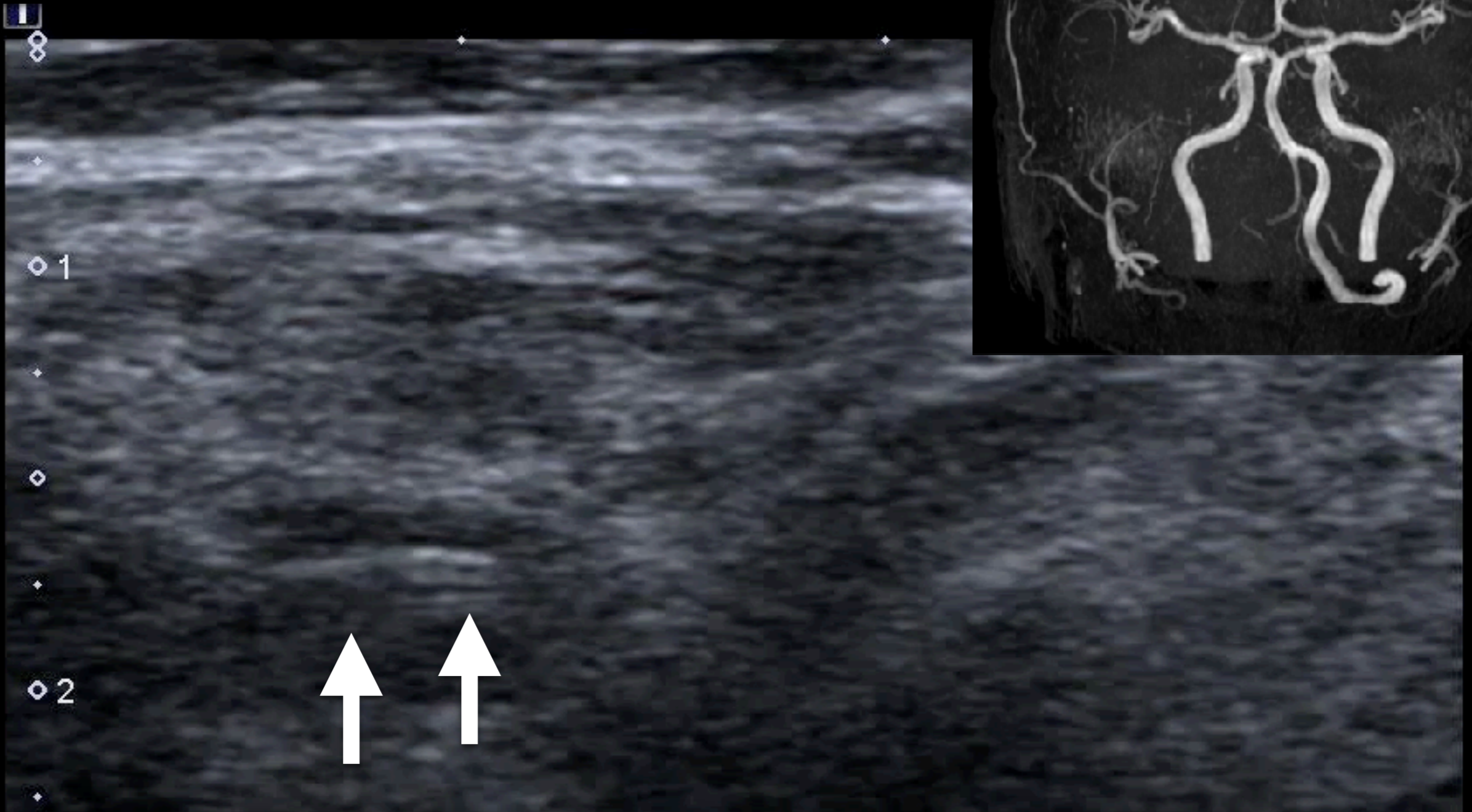
# 51 M, Headache (VAS 10) sleep-soreness-pain-dizziness



# 51 M, Headache (VAS 10)

## sleep-soreness-pain-dizziness





# VA dissection



# I-AIM

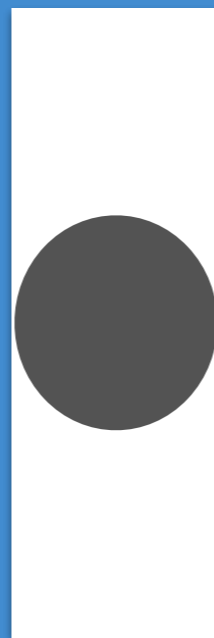
## Vascular Emergencies

**Dilatation**



**Rupture**

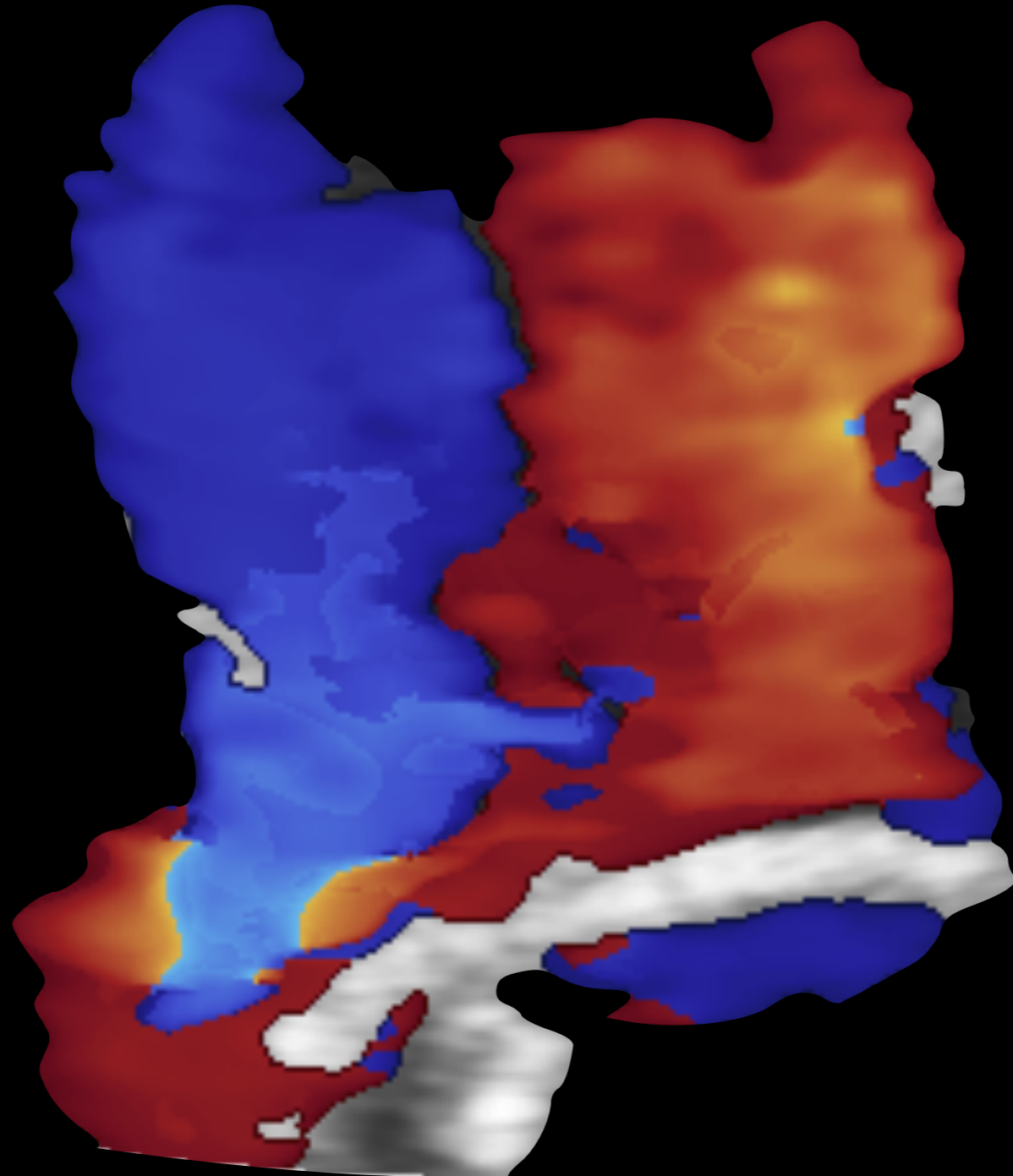
**Obstruction**



**Dissection**



The best way to earn respect is to  
consult for **definite treatment !!**



POCUS Academy

Let's transform EM practice



[juice119@gmail.com](mailto:juice119@gmail.com)

FB: Emergency Ultrasound Training Center

