

# Gallbladder

Alice Chao, MD MS

Kaiser Santa Clara



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# Case

- 36yo F with epigastric pain, nausea/vomiting
- PMH: DM, obesity
- VS: HR 105, BP 110/60, T 37.8C, RR 16, SpO2 99% RA
- PEx: obese, ttp epigastrium

**Table 2.** Test characteristics of bedside ultrasonography and radiology ultrasonography for the detection of acute cholecystitis compared with the criterion standard.

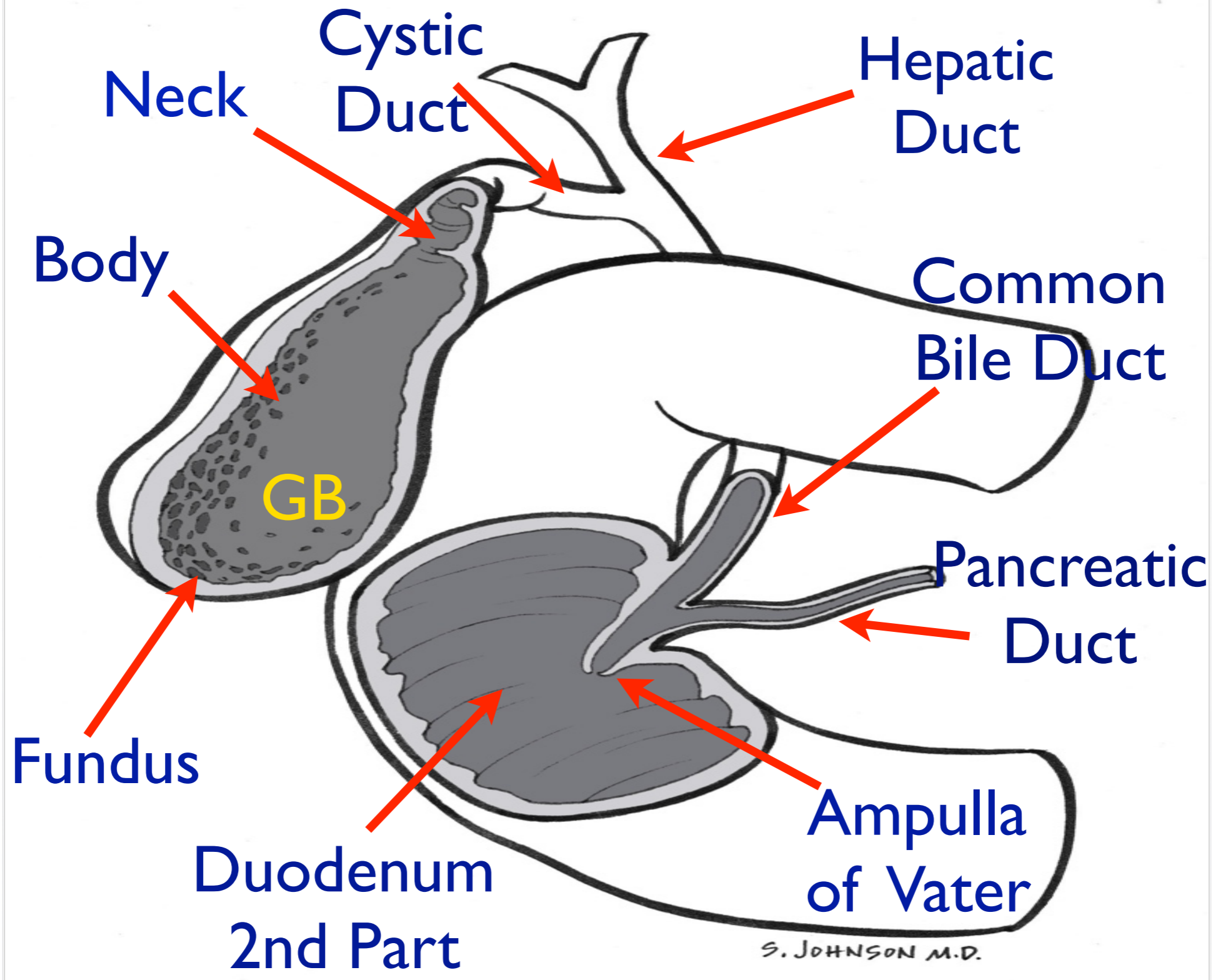
A	<b>Test Characteristics</b>	<b>Bedside Ultrasonography (95% CI)</b>	<b>Radiology Ultrasonography (95% CI)</b>
	Sensitivity, %	87 (66–97)	83 (61–95)
	Specificity, %	82 (74–88)	86 (77–92)
Shar Craig	LR+	4.7 (3.2–6.9)	5.7 (3.3–9.8)
	LR-	0.16 (0.06–0.46)	0.20 (0.08–0.5)
	Positive predictive value, %	44 (29–59)	59 (41–76)
	Negative predictive value, %	97 (93–99)	95 (88–99)

AS,  
DMS

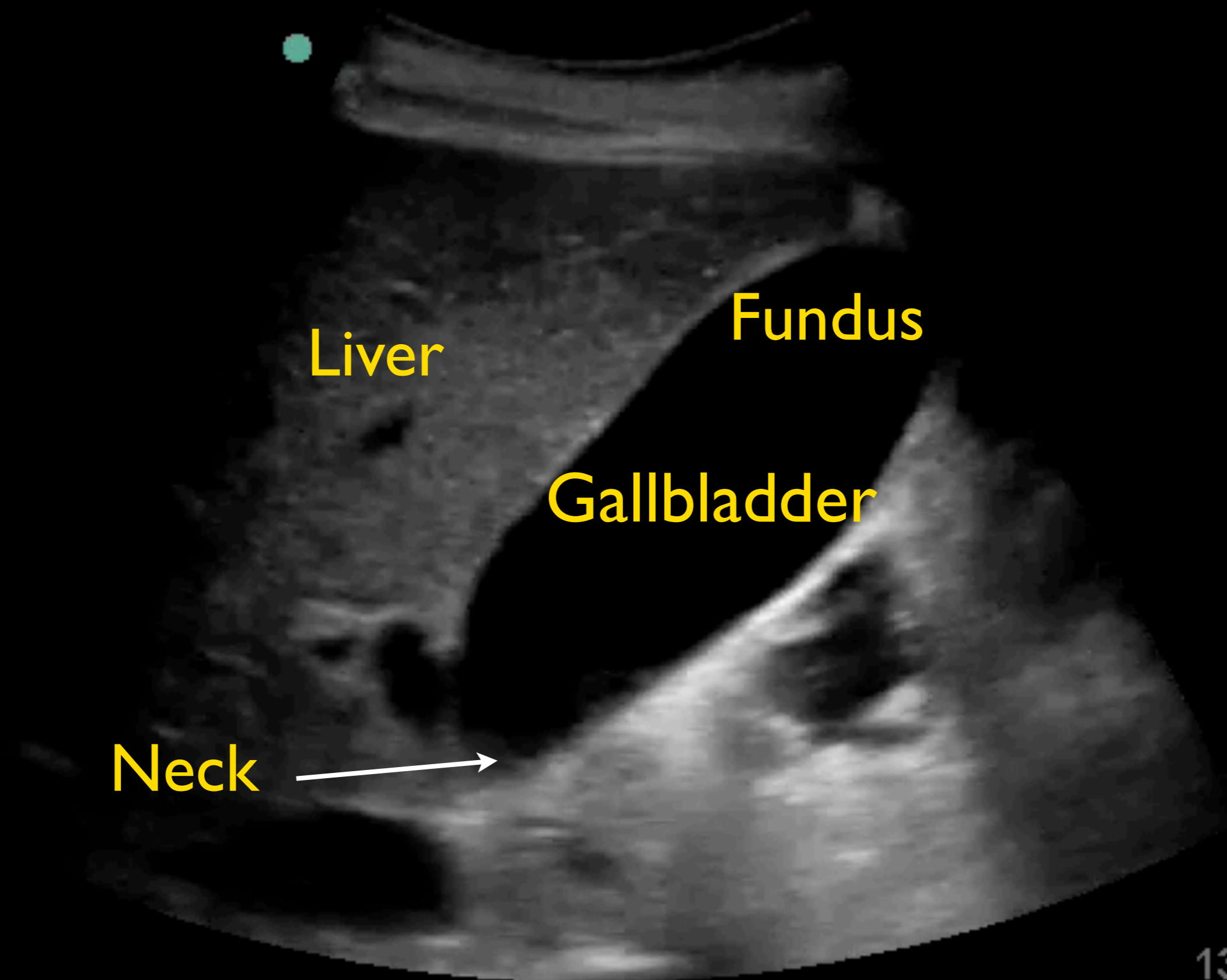
LR, Likelihood ratio.

# Indications

- RUQ/epigastric pain
- Biliary Colic
- Abnormal LFTs
- Jaundice



S. JOHNSON M.D.



Neck →

Liver

Fundus

Gallbladder

# Getting Started

- Patient positions:

- Supine

- Left Lateral Decubitus- reduces bowel gas

- Probe:

- Curvilinear

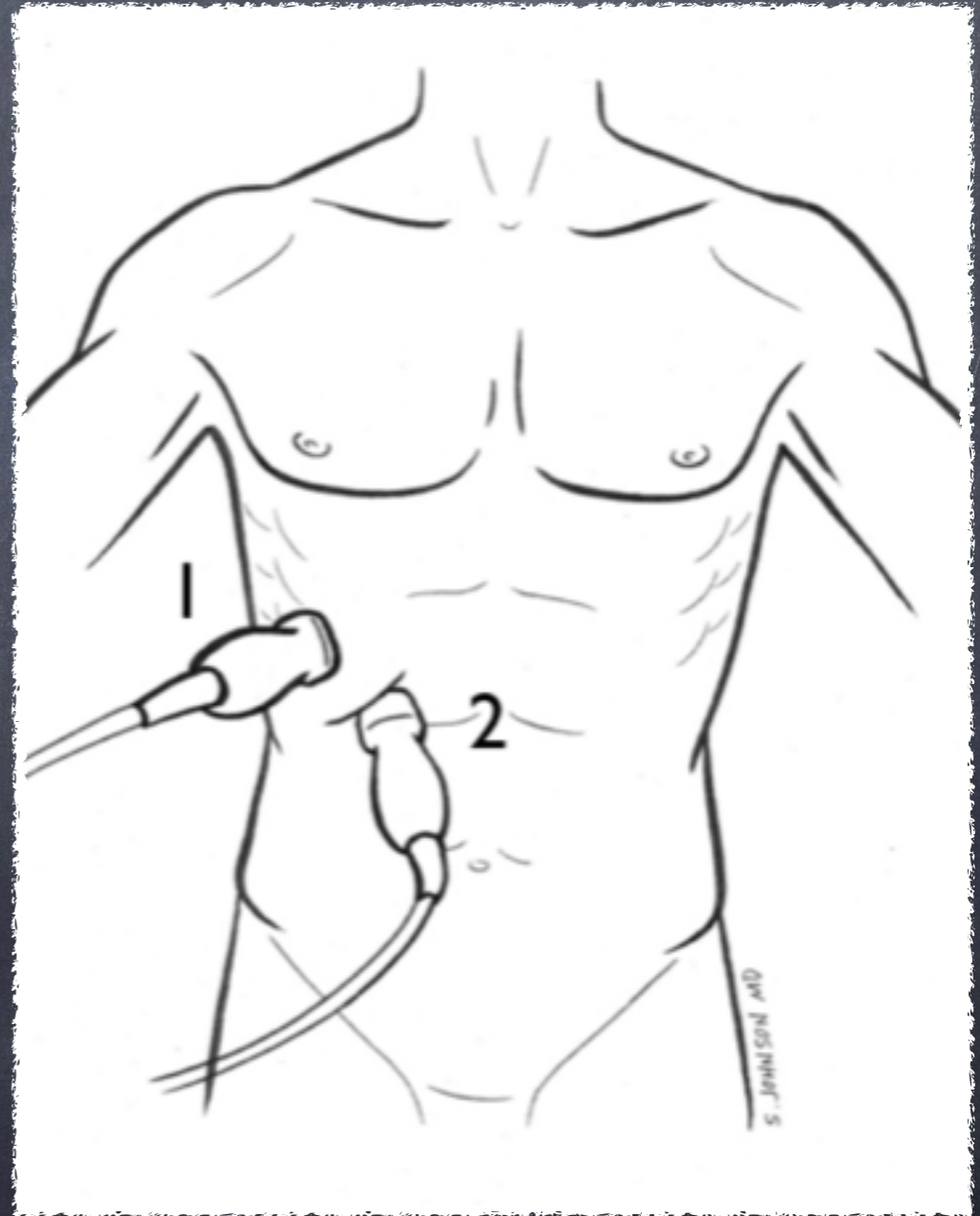
- Phased Array

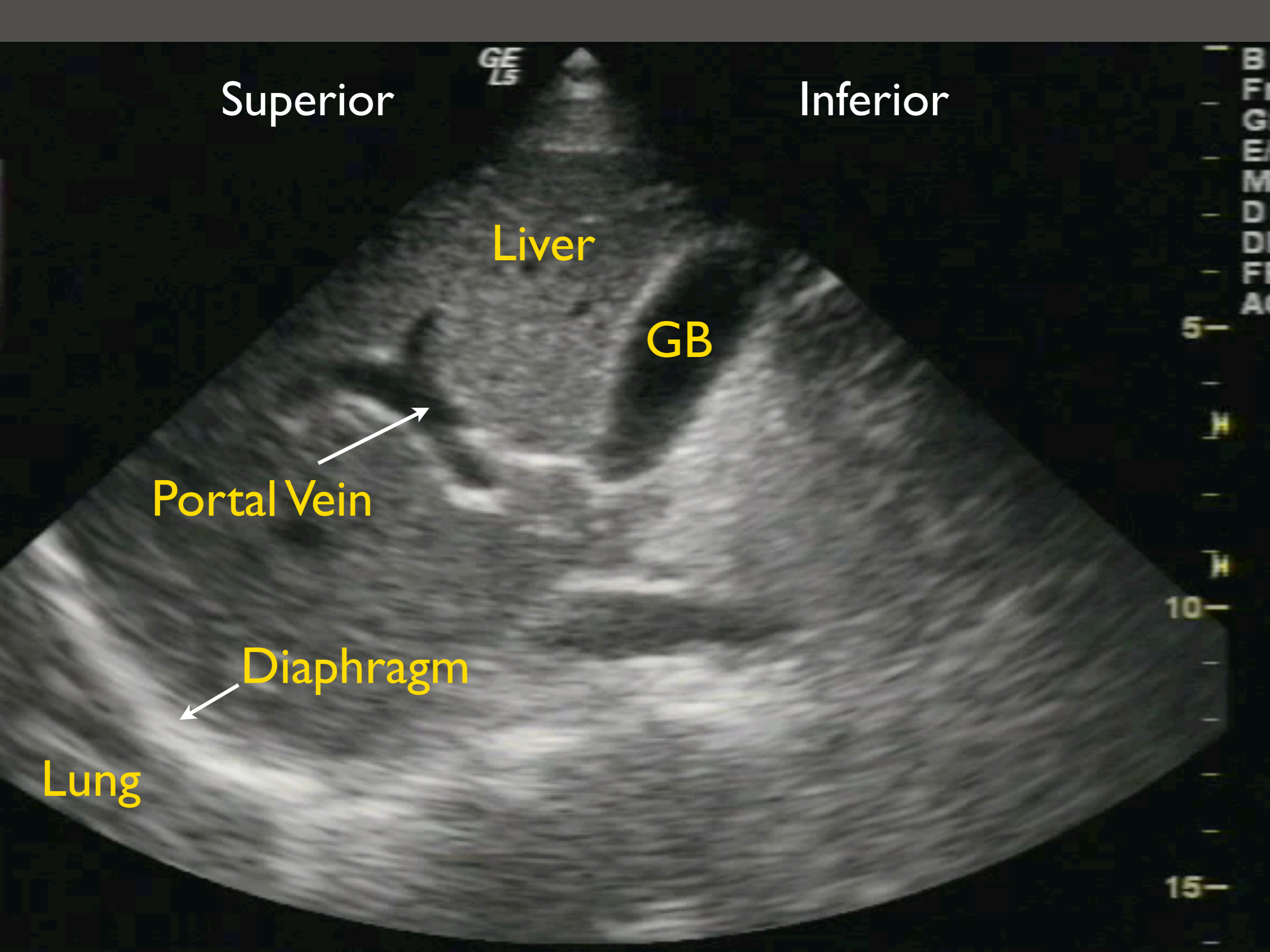




# Technique

1. Anterolateral-  
intercostal space
2. Subcostal





Superior

Inferior

GE  
L5

Liver

GB

Portal Vein

Diaphragm

Lung

5

10

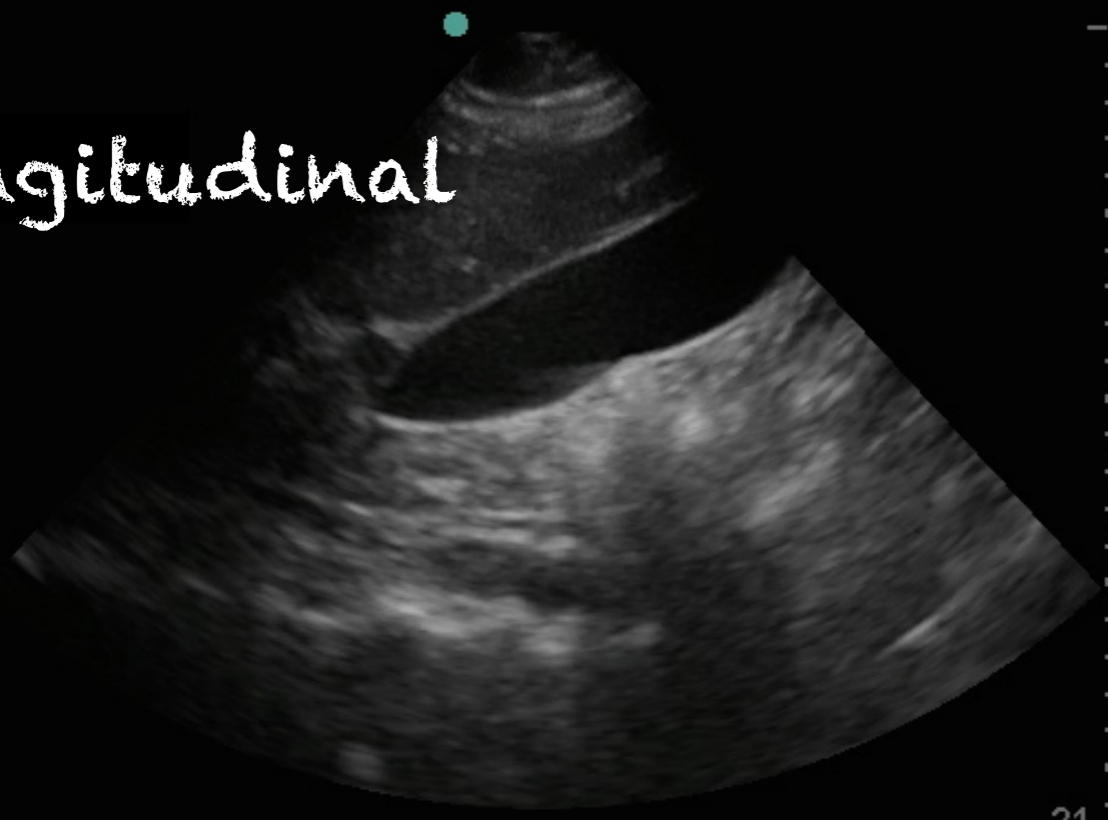
15

B  
F  
E  
M  
D  
D  
F  
A

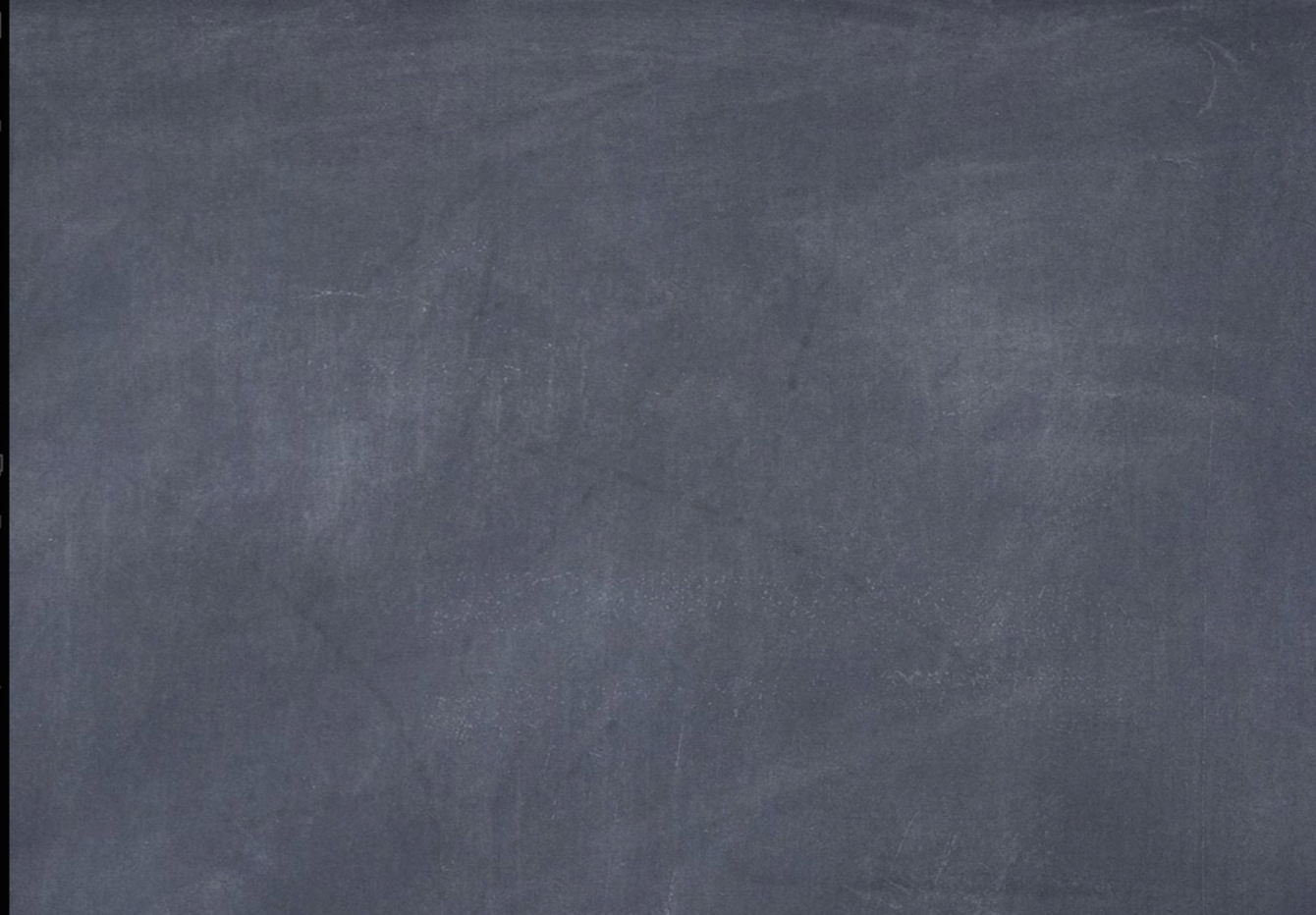
# Normal GB

- Length 7-10cm
- Width 2-3cm
- Anterior GB wall < 4mm
- CBD (inner to inner) < 6mm
  - up to +1mm for every decade > 60 yo

Longitudinal



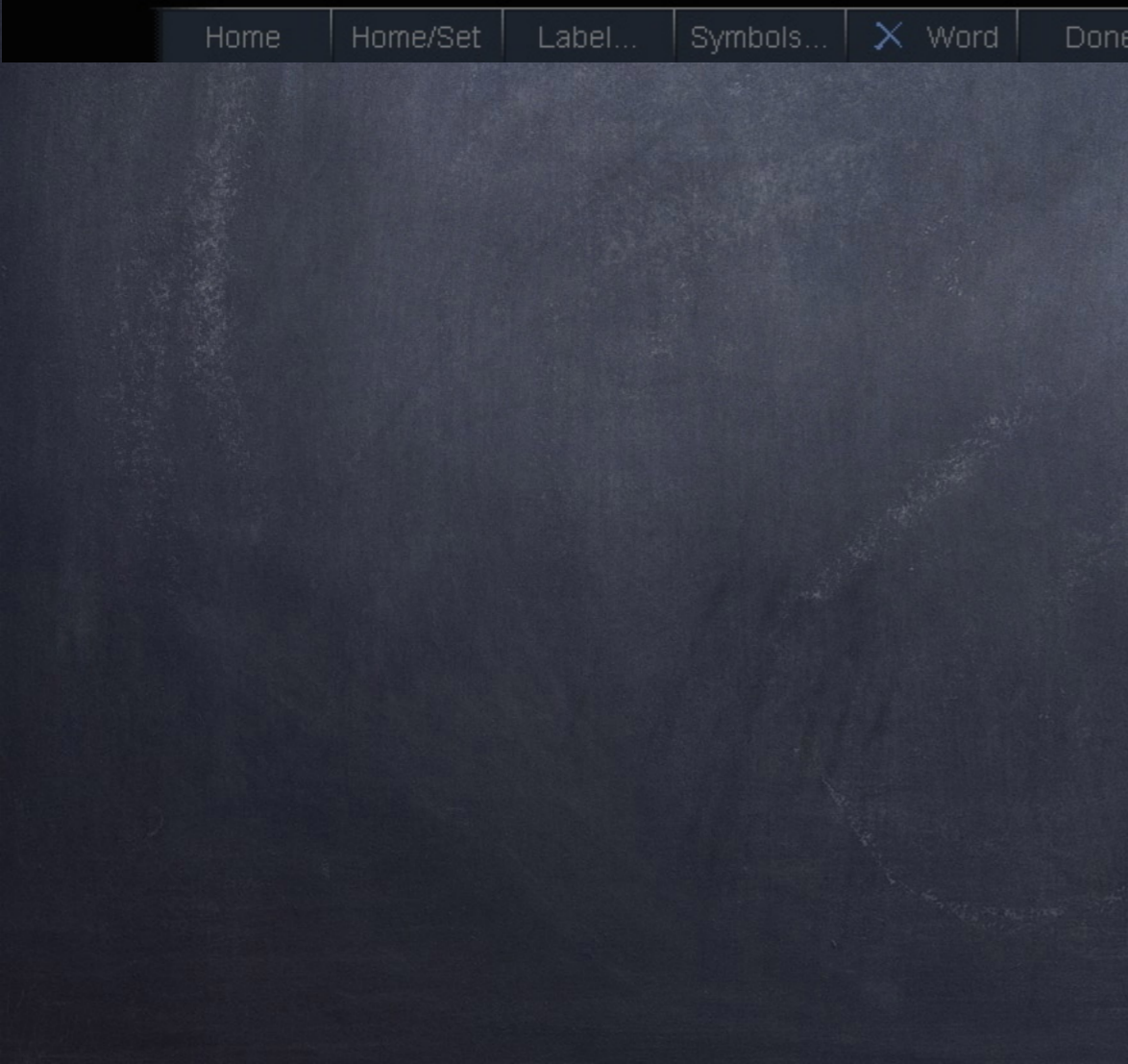
Abd  
P21  
89%  
MI  
1.2  
250  
A  
B  
21



Transverse



Abd  
P21  
89%  
MI  
1.2  
255  
A  
B  
21



Gen THI  
MB



Ab  
C6

6%

M

0.7

A

B

15

en THI  
MB



Ab  
- C6  
· [Icon]  
· [Icon]  
· 84  
· M  
· 0.  
· TI  
· 0.  
· A [Icon]  
· B [Icon]

15

# Biliary Colic

- Clinical symptoms
- Gallstones
- No other findings of acute cholecystitis



Ab  
P2  
41  
M  
1.3  
TI  
0.5  
A  
B

13



en THI  
MB

Abd  
P21

GB



95%

MI

1.3

TIS

0.8



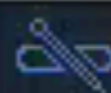
13



Gen



0



Guide



MB On



On

Page 1/2



76  
M  
1.  
A  
B

es THI  
MB



Abc  
- C60  
78%  
MI  
1.0  
TIS  
0.2  
A  
B

11

Gen THI  
MB

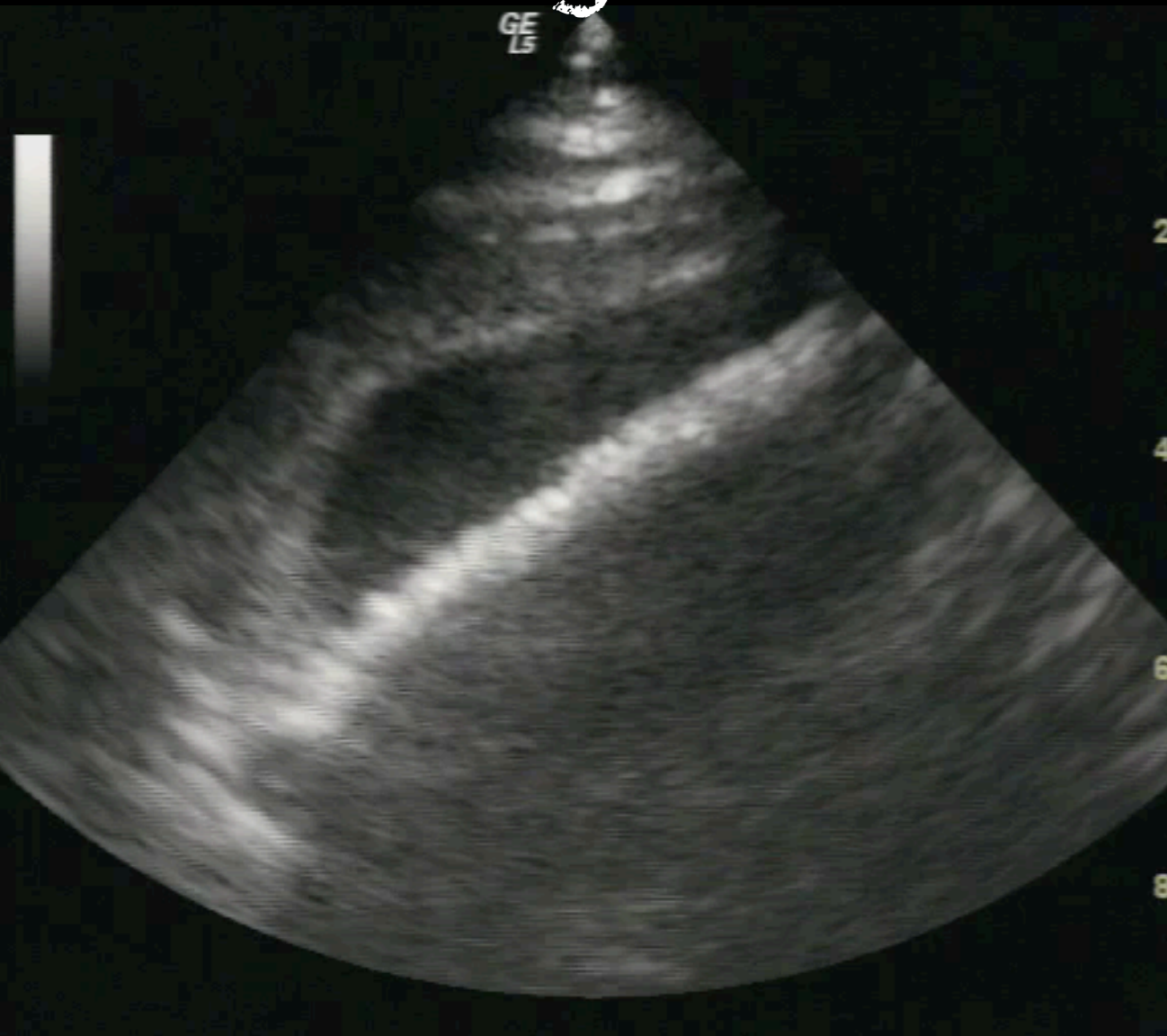


Ab  
- C6  
749  
M  
0.7  
TIS  
0.4  
A  
B

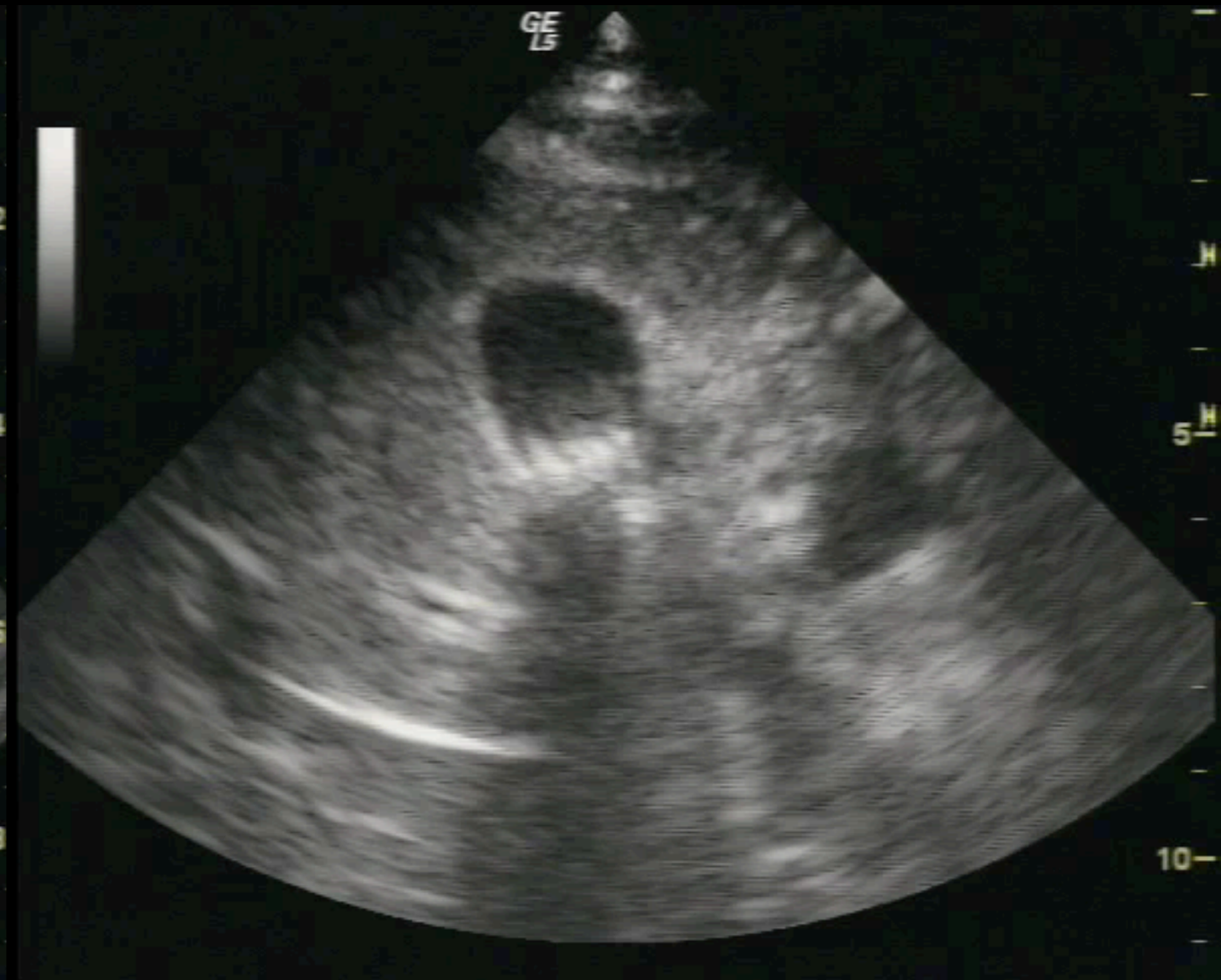
15

# Image in both planes

## Long Axis

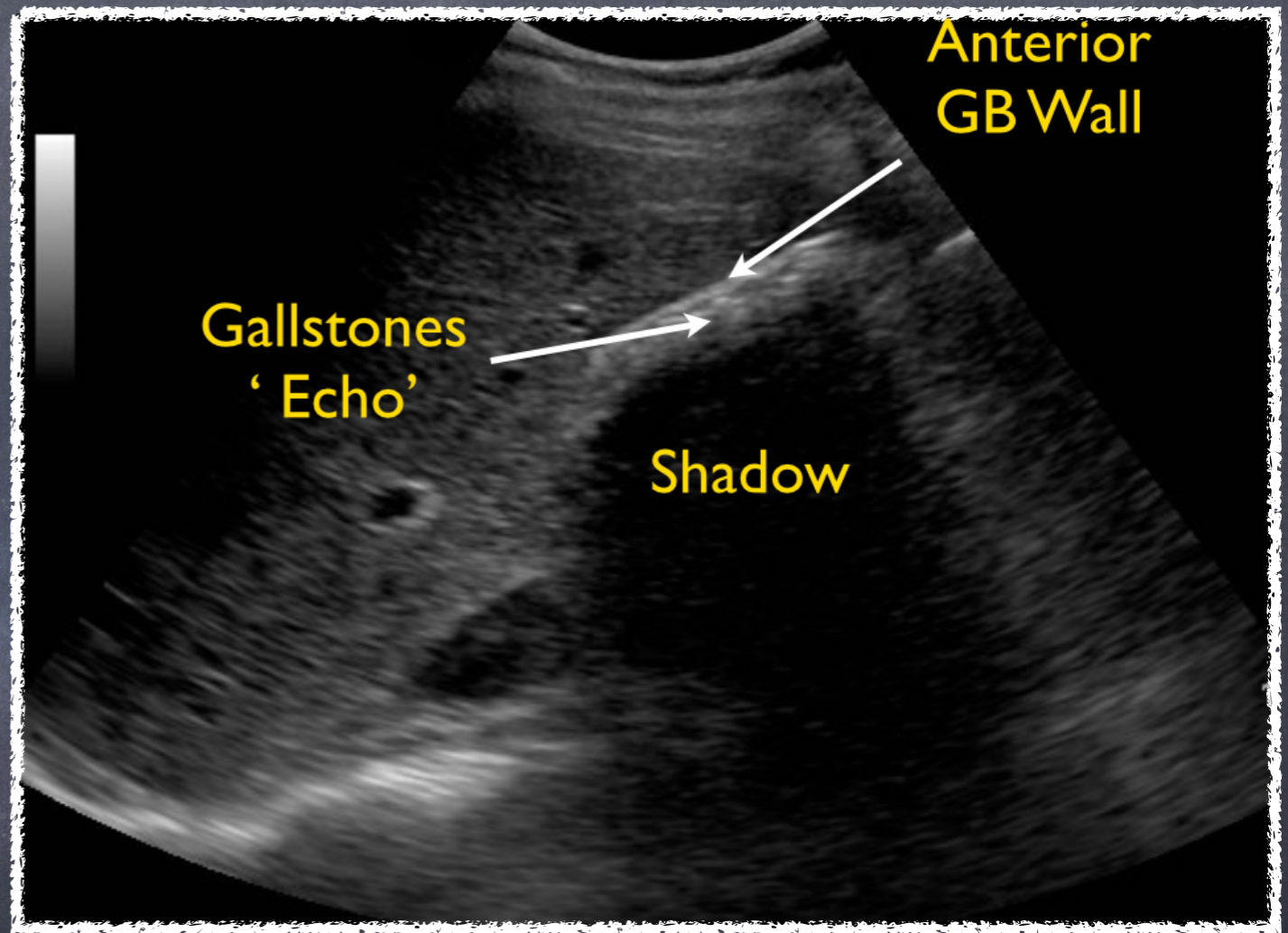


## Short Axis



# "WES" sign

- Wall
- Echo
- Shadow



- Contracted GB full of stones

en THI  
MB

GB TRANS|

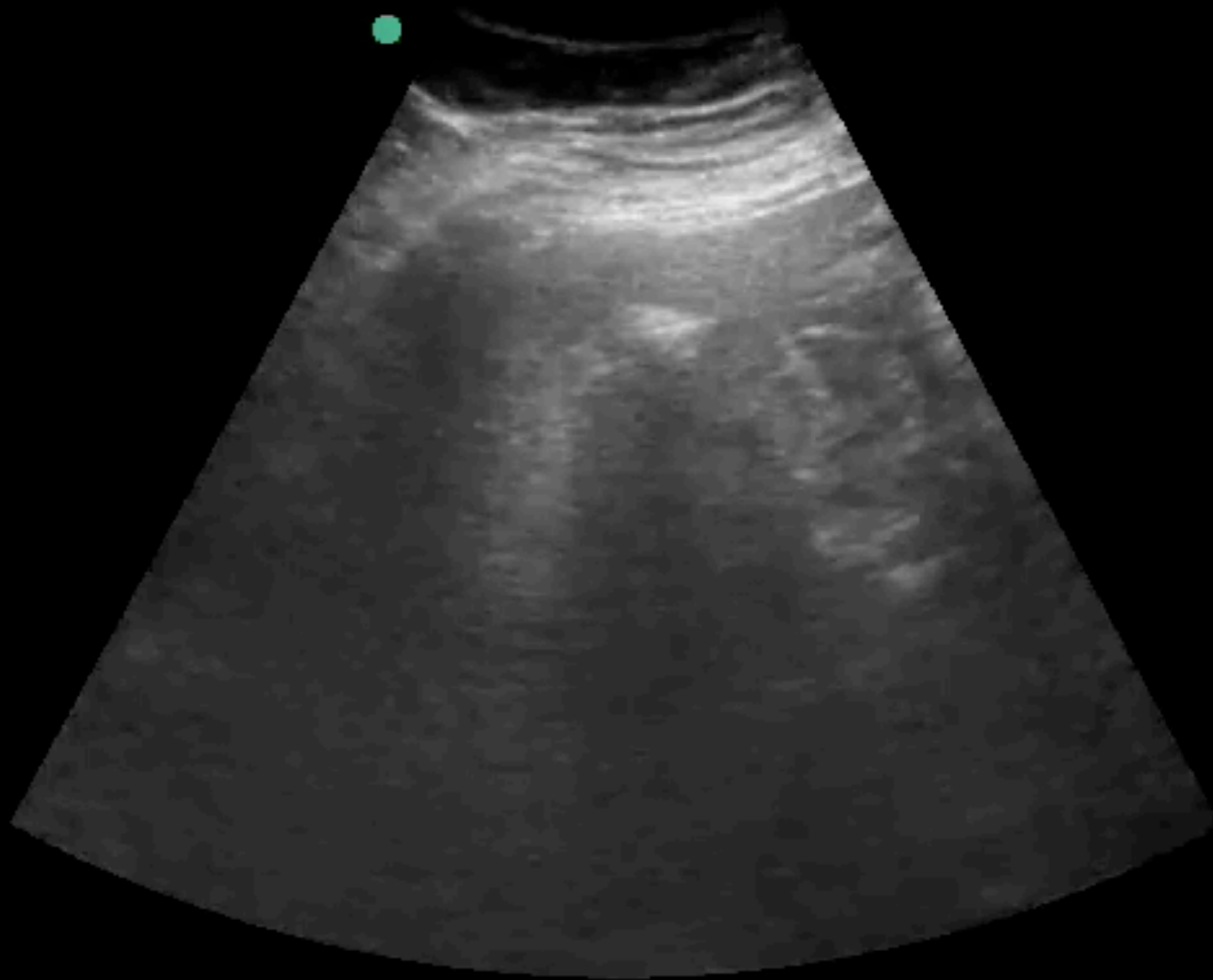


Abc  
P21  
62%  
MI  
1.1  
TIS  
0.8

A  
B

19

Gen THI  
MB

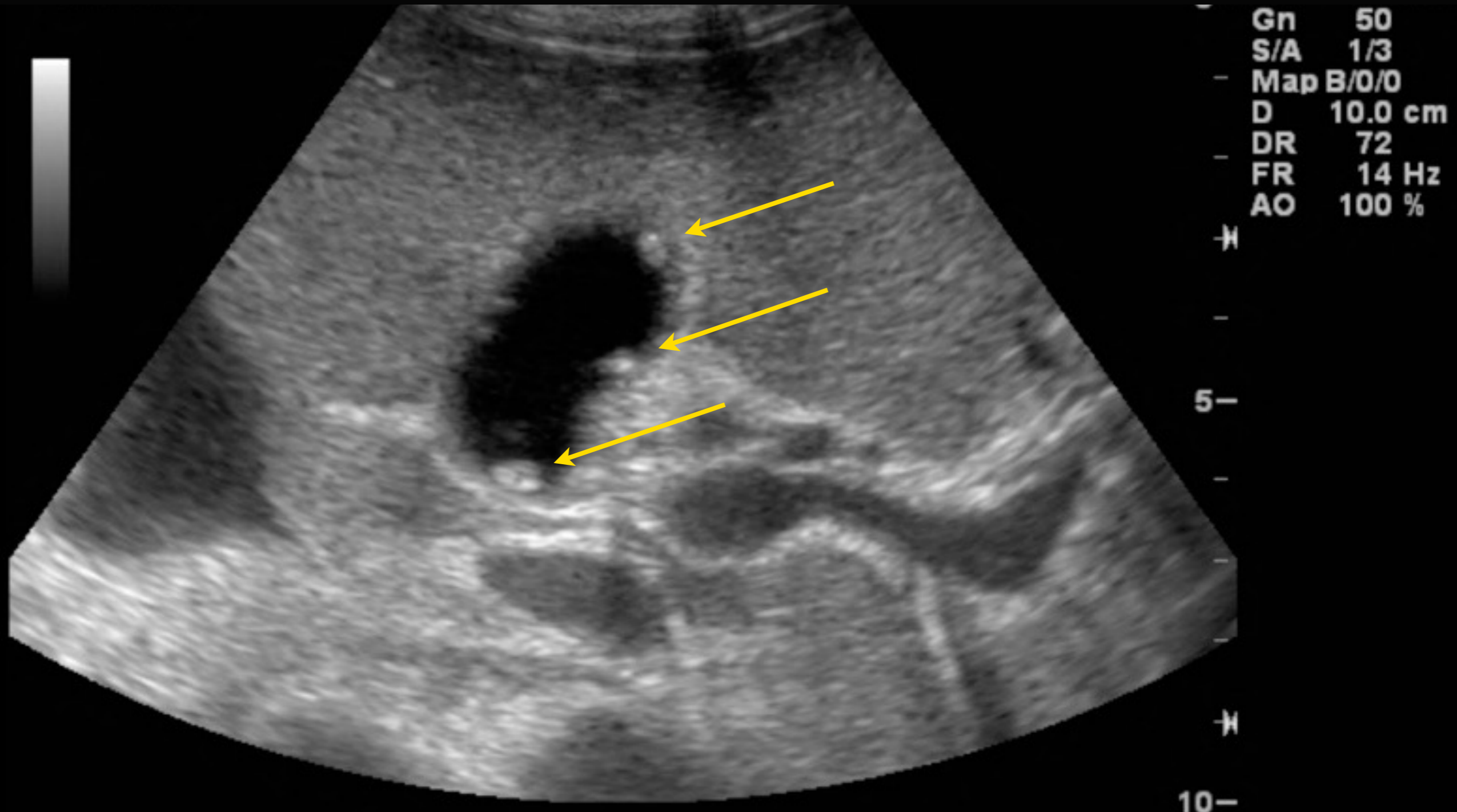


Ab  
C6  
28  
M  
0.1  
TI  
0.  
A  
B

18



# Gallbladder Polyps



Cling to wall    Defy gravity    No shadow

# Acute Cholecystitis

# Sonographic Signs

- Primary:
  - Presence of gallstones with positive sonographic murphy's sign (SMS)
  - 92% positive predictive value for acute cholecystitis

Ralls P, Colletti P, Lapin S et al. Real Time Sonography in Suspected Acute Cholecystitis. Radiology. 1985.

# Sonographic Signs

- ◉ Secondary:
  - ◉ Distended gallbladder > 10cm length
  - ◉ Thickened gallbladder wall > 3mm
  - ◉ Fluid in gallbladder wall
  - ◉ Pericholecystic fluid
- ◉ Presence of secondary signs improve diagnostic PPV from 92% → 95%

Ralls P, Colletti P, Lapin S et al. Real Time Sonography in Suspected Acute Cholecystitis. Radiology. 1985.

Gen

THI  
MB

GB



Ab  
- C6



39

M

0.

A

B



15



Gen



0



S On

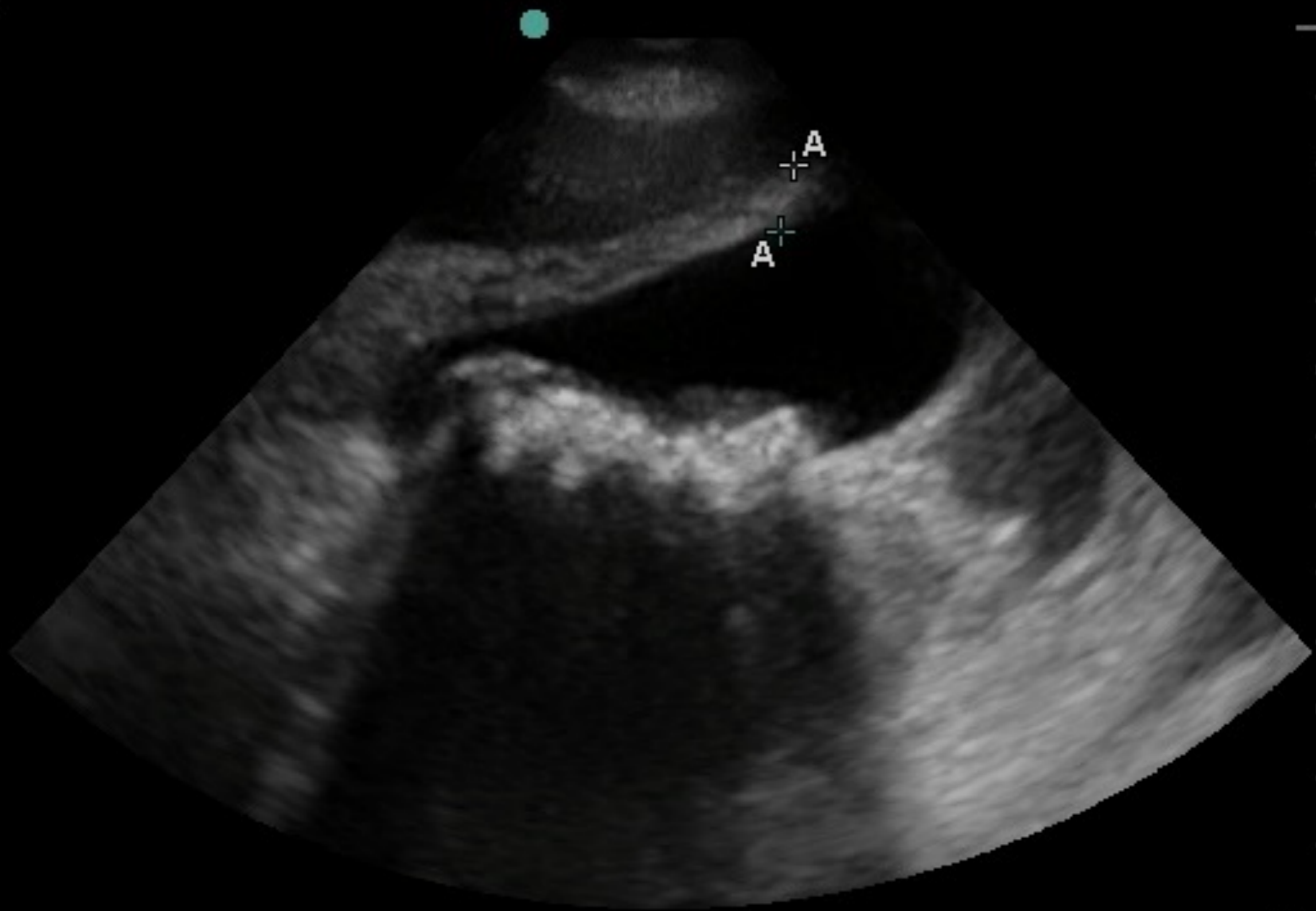


MB On



On

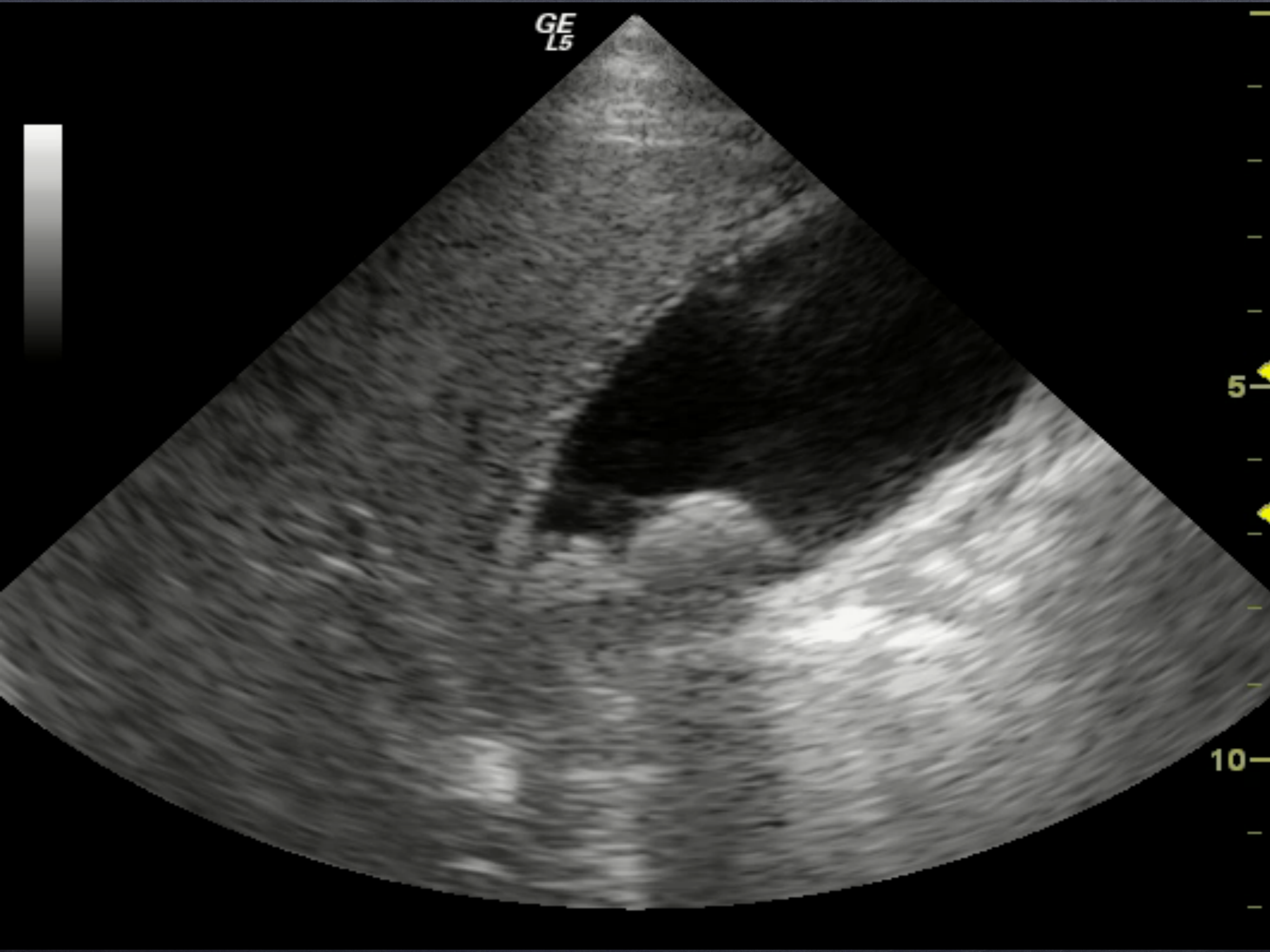
Page 1/2



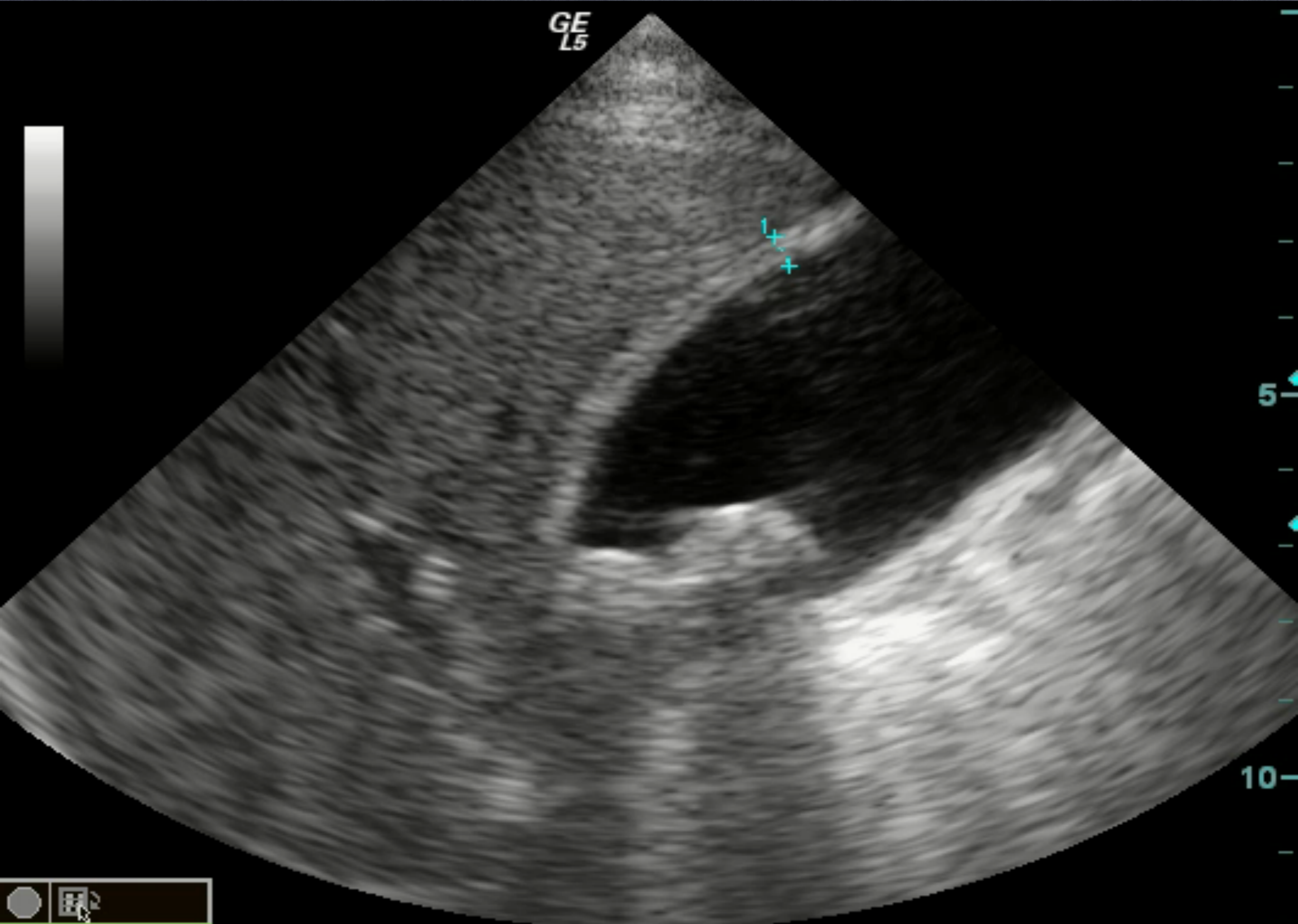
- [Icon]
- [Icon]
- 75
- M
- 1
- [Icon]
- 25
- A
- B
- [Icon]

A 1.00cm

GE  
L5



GE  
L5

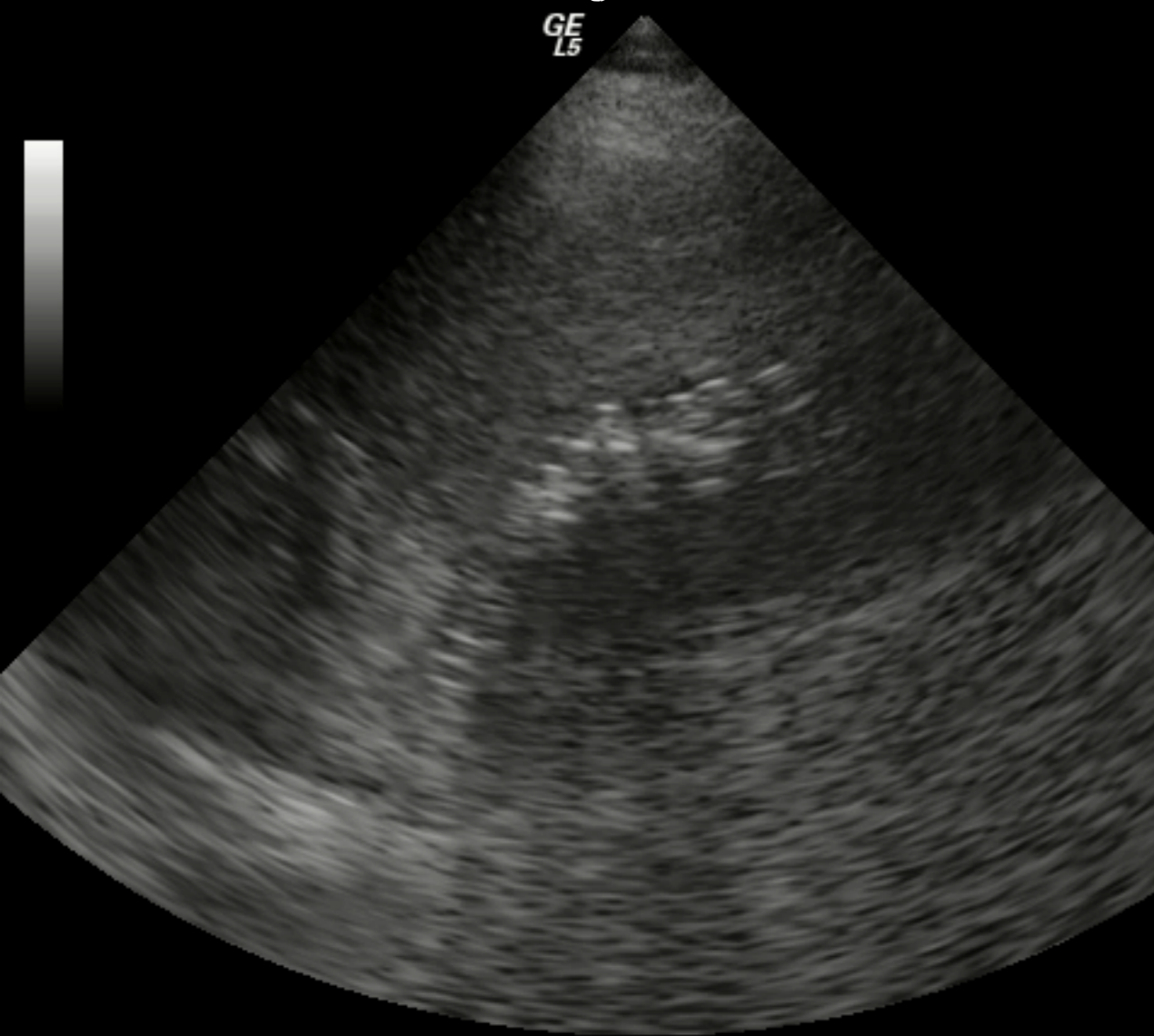


1 L 0.42 cm

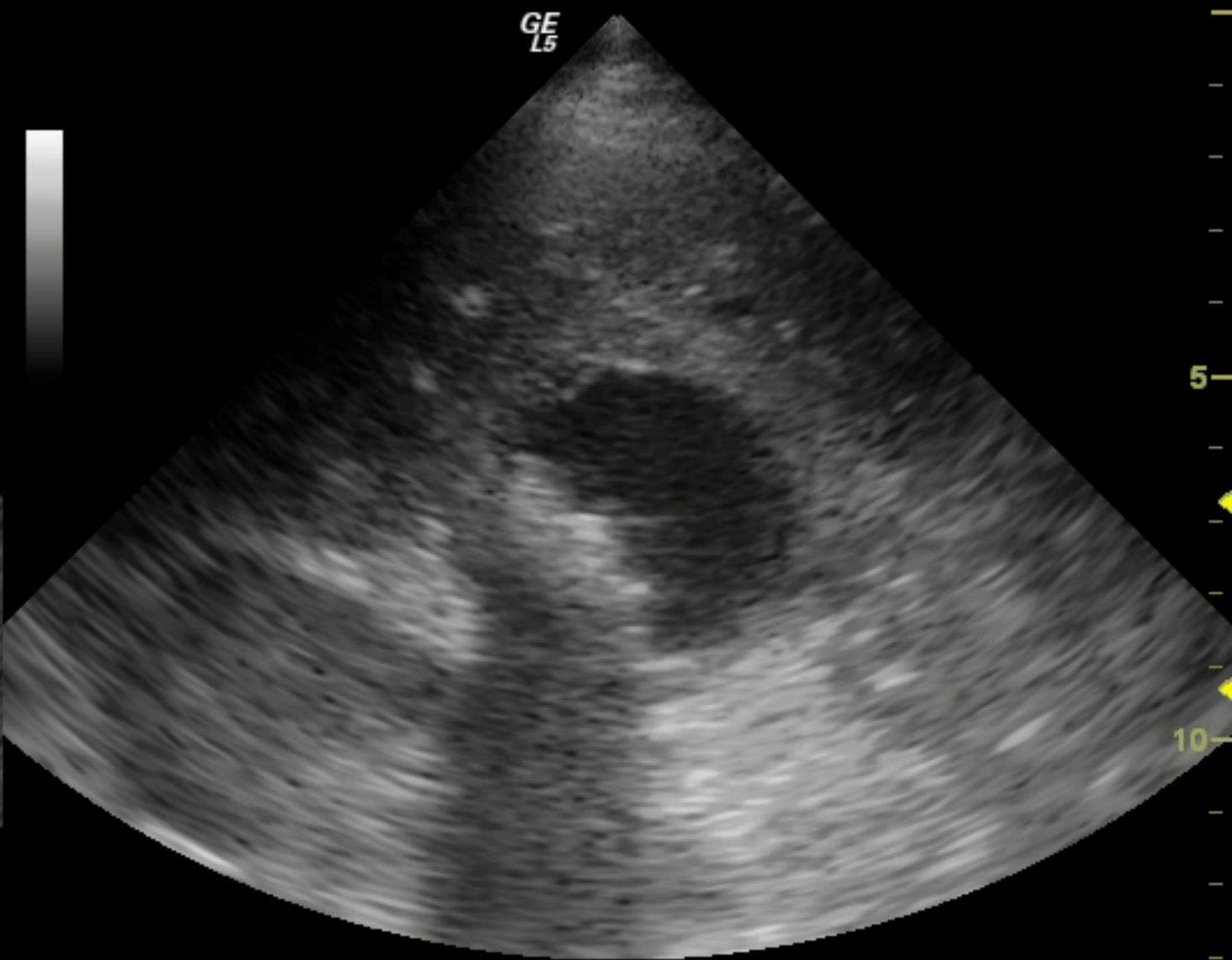


# Image in both planes

Long Axis



Short Axis



Res THI  
MB



Ab  
- C6  
80%  
M  
1.0  
TIS  
0.2  
A  
B

11

en THI  
MB



Abc  
- C60  
52%  
MI  
0.7  
TIS  
0.1  
A  
B

15.

# Pain Control?

- Does giving analgesia limit the ability to assess for SMS?
- Nelson BP et al. Opioid Analgesia and Assessment of the Sonographic Murphy Sign. J Emergency Med. May 2005.
  - 119 ED patients evaluated for SMS
  - 25 patients received opioids prior to ultrasound
  - No significant difference in sensitivity and specificity of SMS between 2 groups

# Other causes of GB wall thickening

- CHF
- Ascites
- Hepatitis

GE



10

20



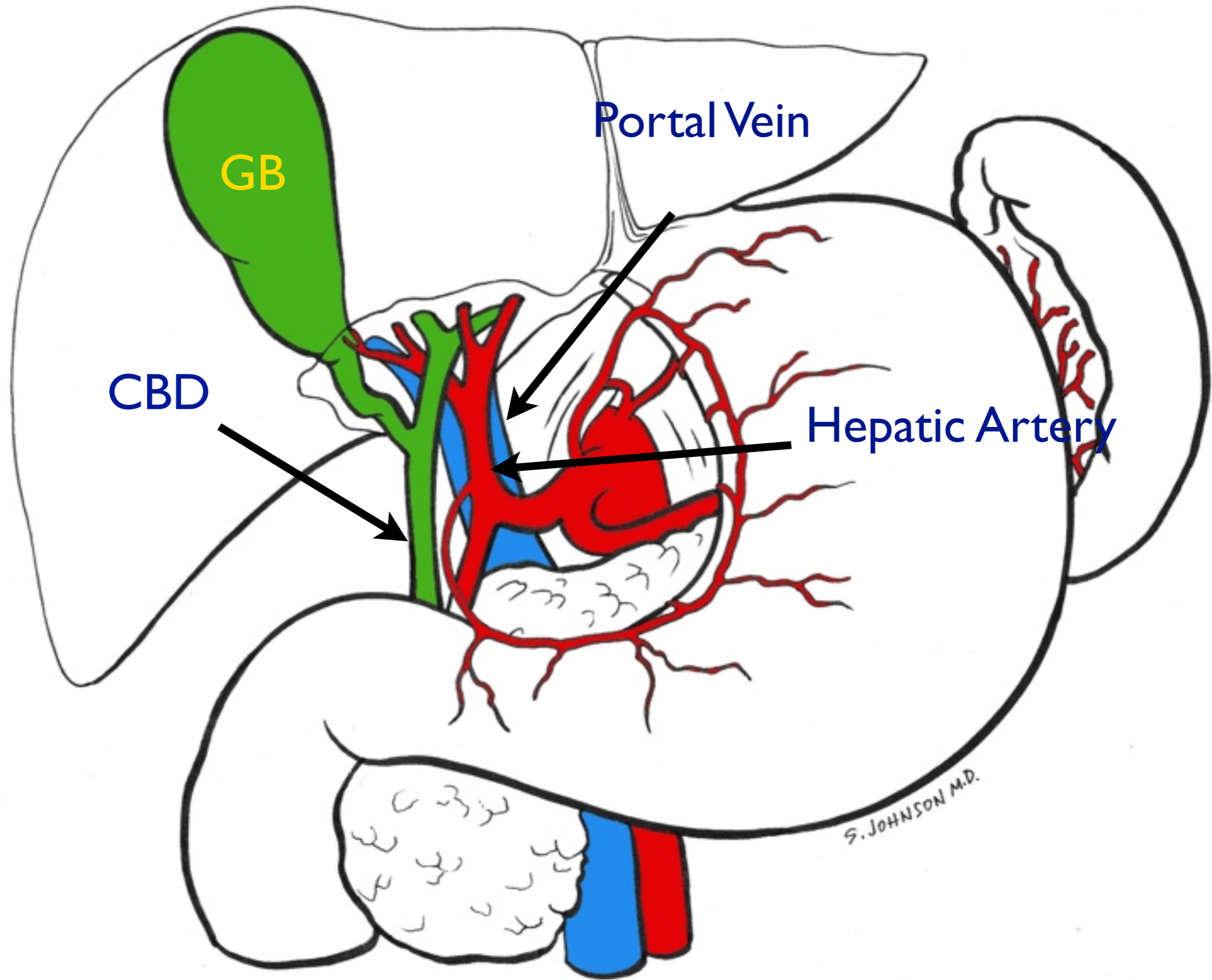
Contracted GB wall may appear thickened





# Cholelithiasis

- ◉ Dilated Common Bile Duct
- ◉ Often stone not visualized



GB

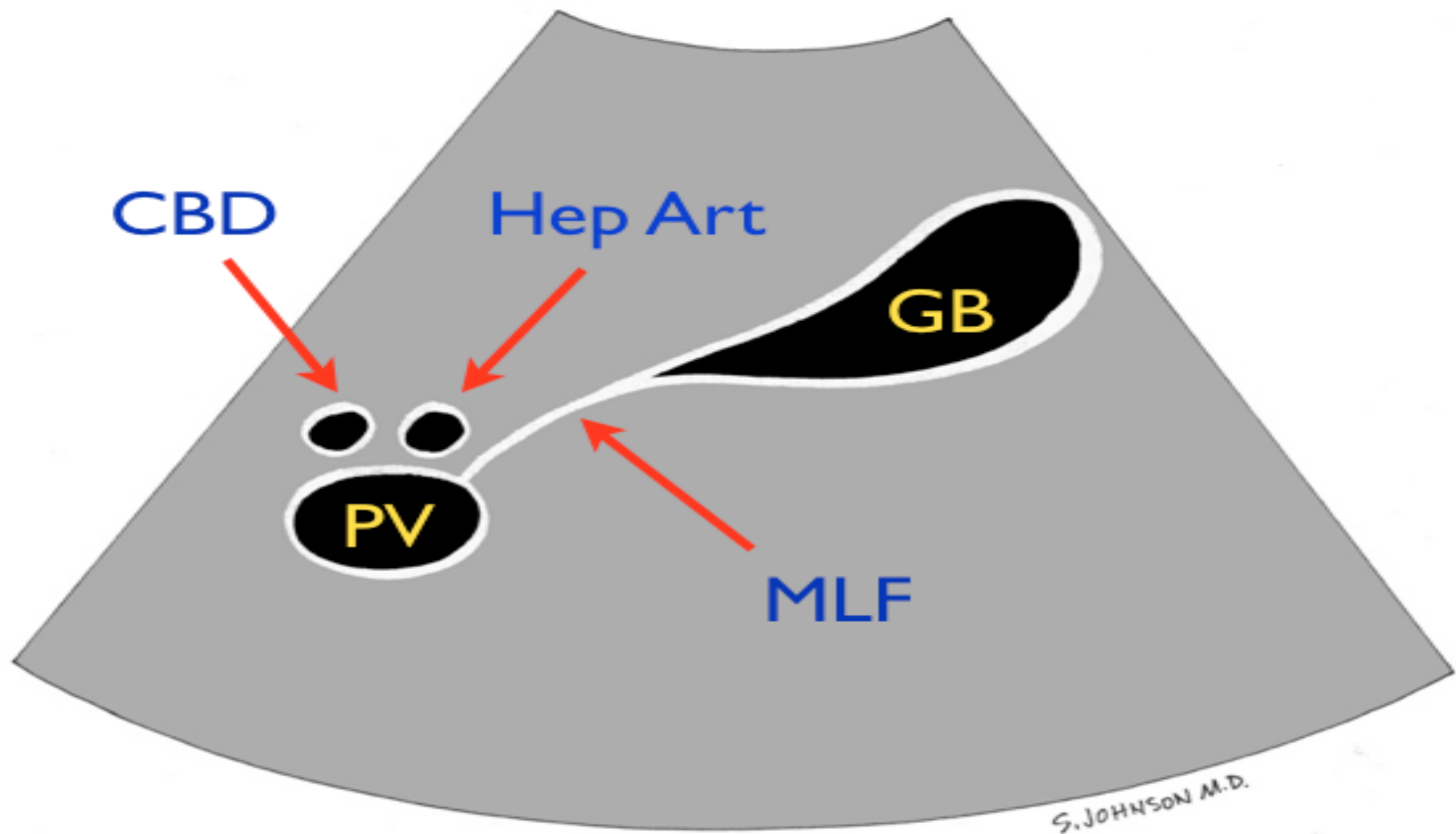
Portal Vein

CBD

Hepatic Artery

S. JOHNSON M.D.

# Portal Triad: Mickey Mouse Sign Median Lobar Fissure of Liver (MLF)



Gen THI  
S MB

Abd  
C60



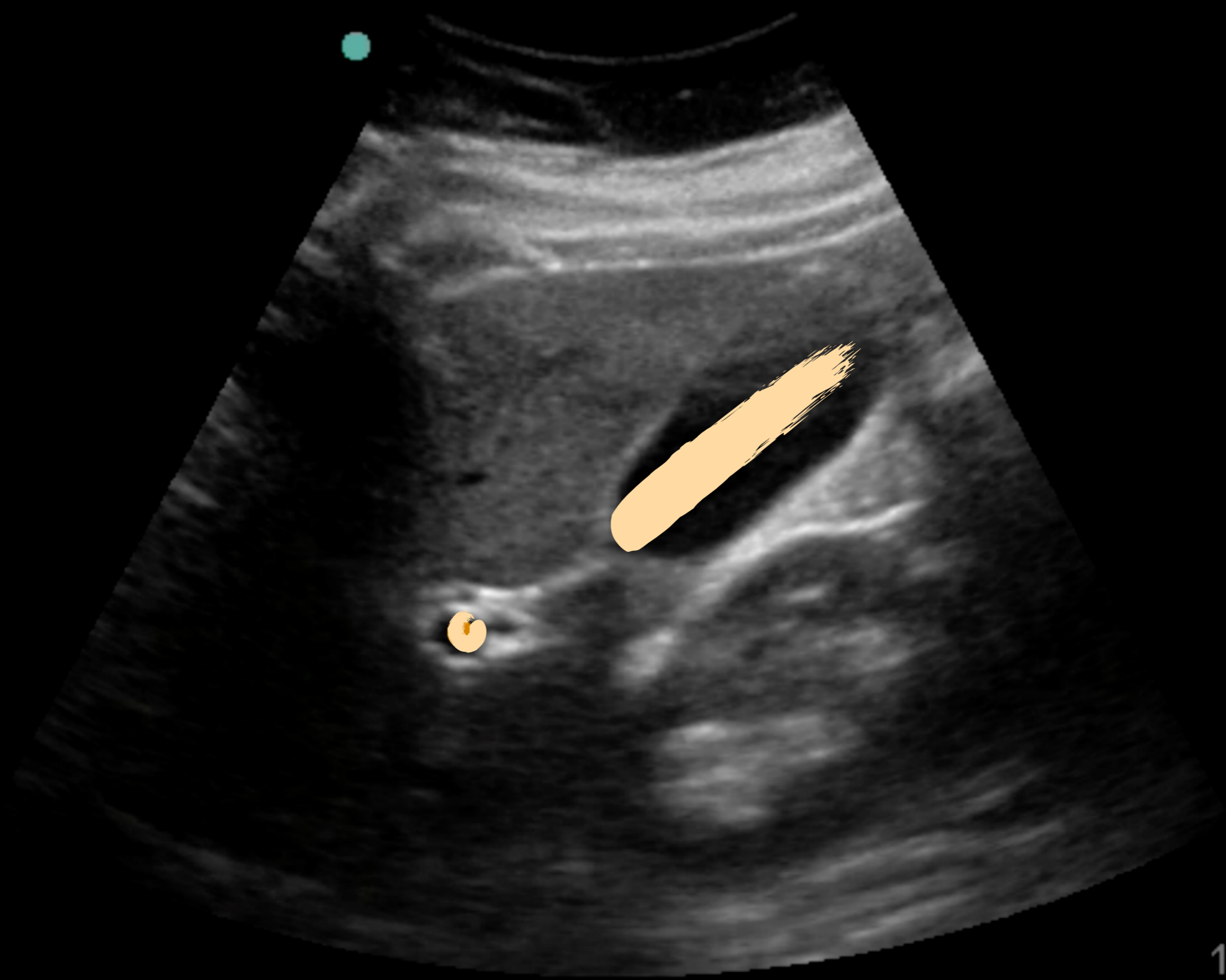
6%

MI  
0.7



15

Home Home/Set Label... Symbols... X Word Done



Gen THI  
MB



Ab  
C6

6%

M

0.7

A

B

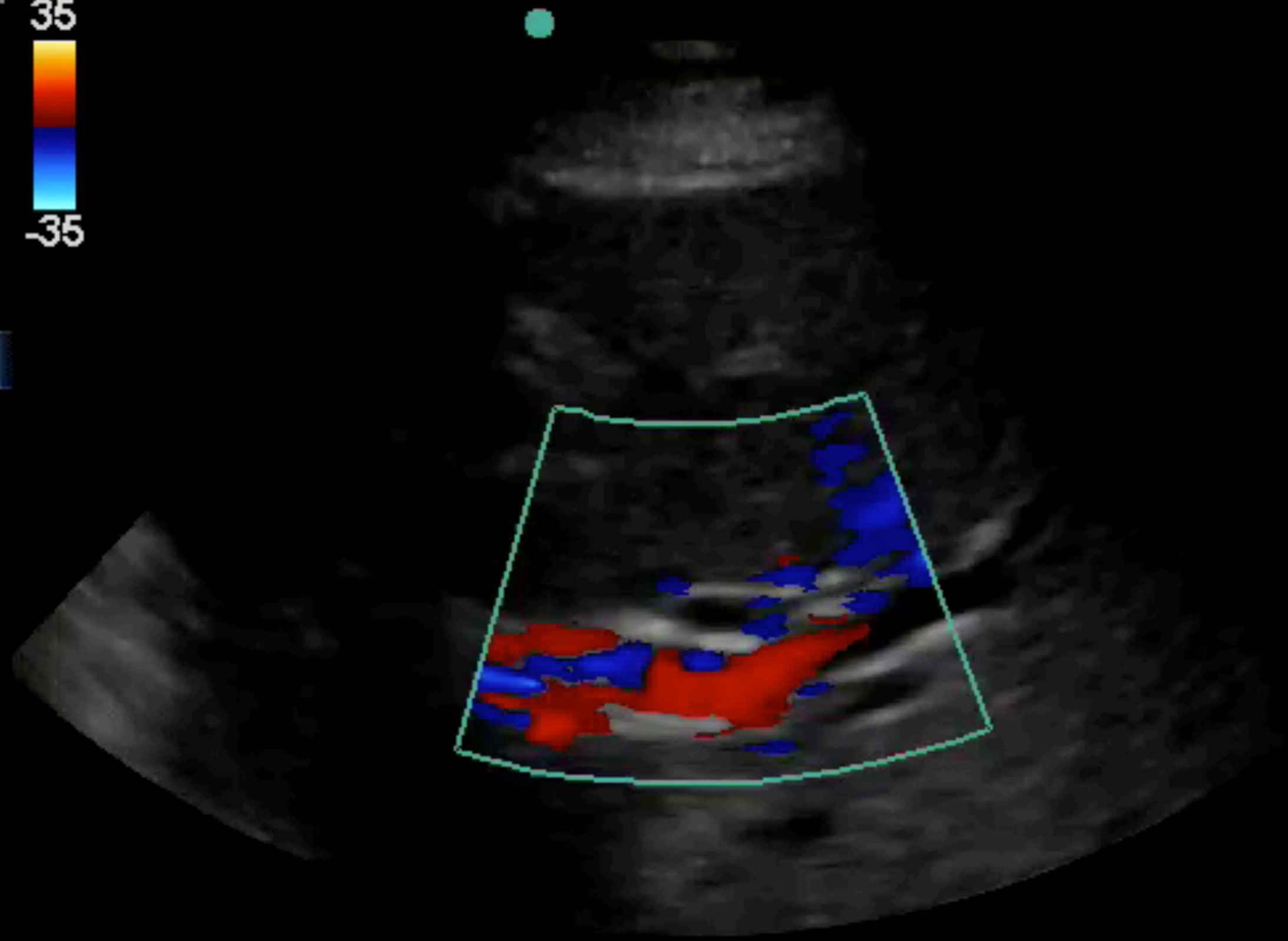
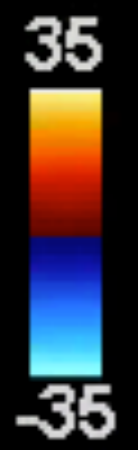
15

Z

Abd/Genera  
\_C4-1/CH4MH  
DR60/M3/P  
G68/E1/100%  
- MI1.3 TIs0.  
- 16.0 cr  
- 11 H  
-  $\triangle$  ZSI



Color THI  
016Hz



Ab  
- P2  
839  
M  
1.2  
TIS  
1.0

A  
B

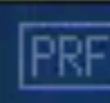
10



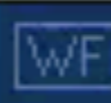
Color



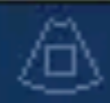
Med



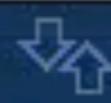
PRF Scale



WF Med

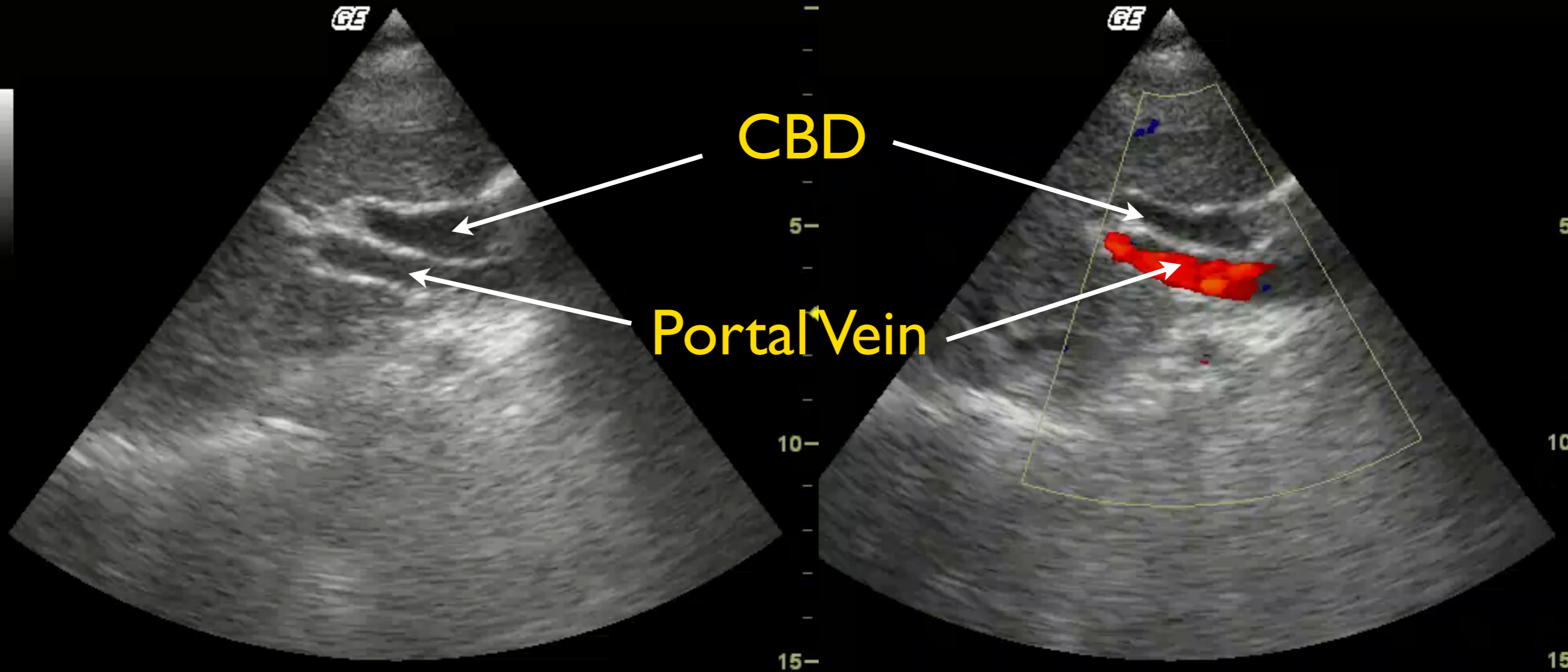


Hide



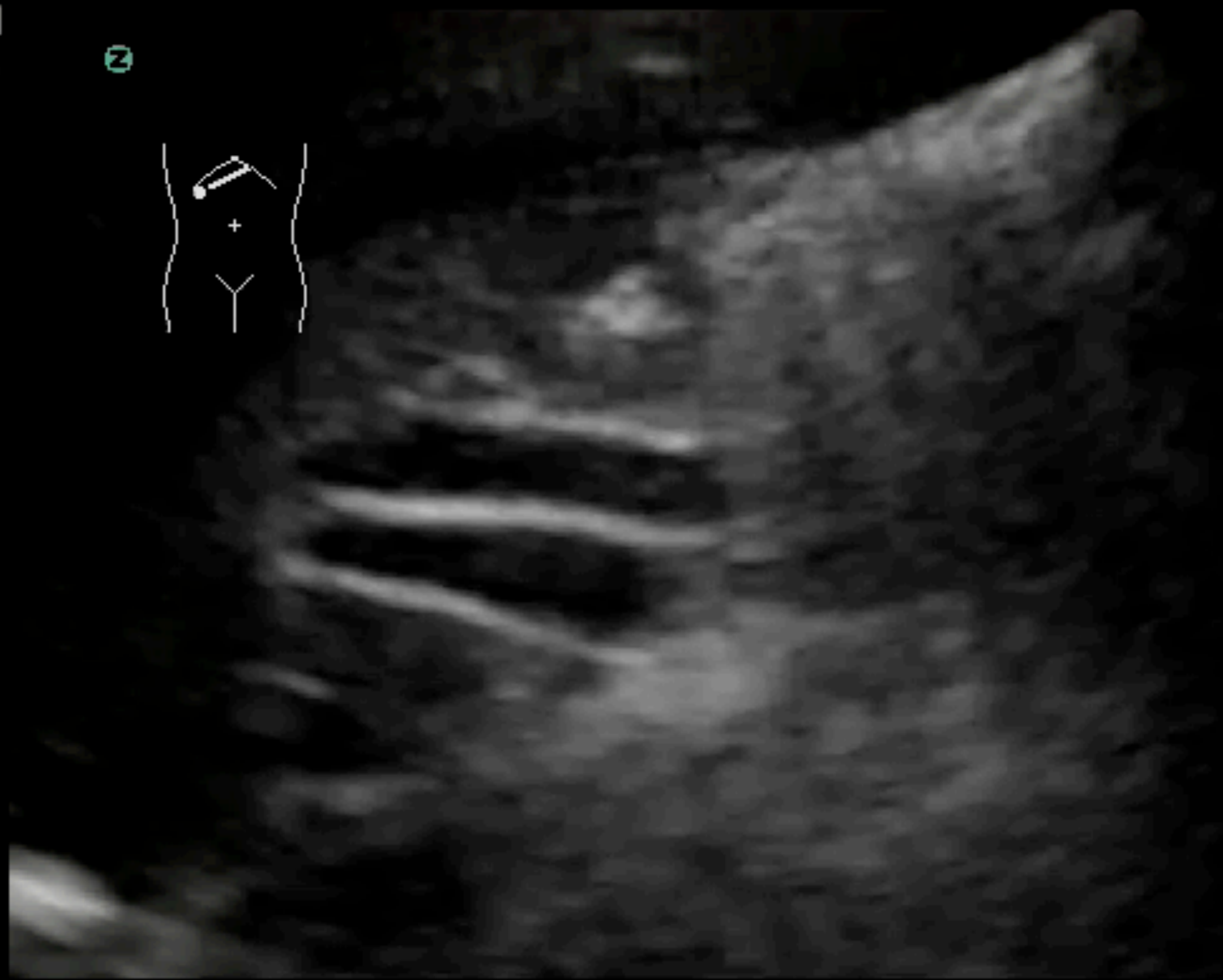
Invert

# "Shotgun" Sign



Dilated CBD





76%

MB

1.1

A

B



Gen



0



S On



MB On



THI On

Quiz!

# Case

- 36yo F with epigastric pain, nausea/vomiting
- PMH: DM, obesity
- VS: HR 105, BP 110/60, T 37.8C, RR 16, SpO2 99% RA
- PEx: obese, ttp epigastrium

en THI  
MB



Ab  
- C6  
· [ ]  
· [ ]  
· 84  
· M  
· 0.  
· TI  
· 0.  
· A [ ]  
· B [ ]

15 .

# What is your diagnosis?

Normal

Gallstones only

Acute Cholecystitis

Cholelithiasis

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What is the maximum thickness of a normal anterior gallbladder wall

3mm  
4mm  
5mm

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# Case

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# What is your diagnosis?

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Cholelithiasis

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# Which abnormal finding is NOT present

Gallstones

Thickened gallbladder wall

Pericholecystic fluid

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# Case

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- PMH: DM, obesity
- VS: HR 105, BP 110/60, T 37.8C, RR 16, SpO2 99% RA
- PEx: obese, ttp epigastrium

Z

Abd/Genera  
 P4-1c/CH4MH  
 · DR50/M2/P  
 -G92/E1/100  
 · MI1.5 TIs0  
 - 10.0 cr  
 · 17 H  
 △ ZSI



What is the name of this sign

WES sign

Shotgun sign

I have no idea, when is lunch?

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# What is a normal CBD diameter

< 4mm

< 5mm

< 6mm

s on the age

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Questions?