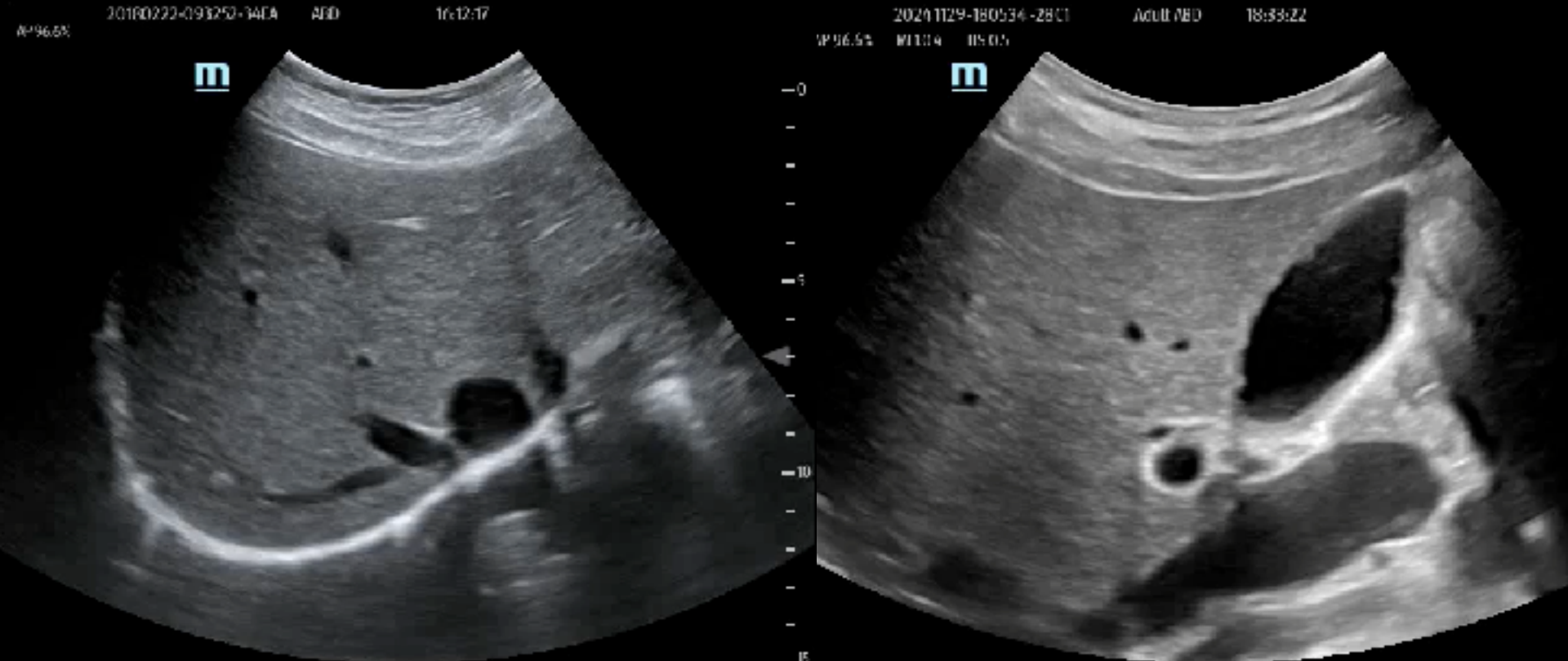




Hepatobiliary System

陳國智醫師 雙和醫院急診醫學科

juice119@gmail.com

POCUSAcademy.com

Resuscitative
急救復甦

Diagnostic
臨床診斷

Procedural
Guidance
處置導引

Symptom- or
Sign-Based
症狀導引

Therapeutic
輔助治療



Core Applications (2023 ACEP Emergency Ultrasound Guidelines)
15項急診超音波核心應用

陳國智醫師

Aorta

DVT

Trauma

Thoracic/Airway

Cardia/HD assessment

Procedural Guidance

US-guided NB

Testicular

Ocular

Skin & Soft tissue

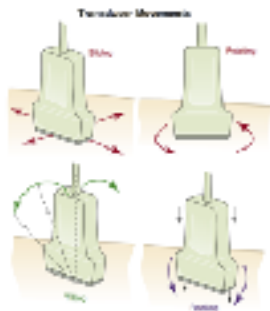
Hepatobiliary

Urinary tract

Pregnancy

Bowel

MSK



探頭掃描 6 大技巧



X

掃

Sweep

Y

滑

Slide

Z

轉

Rotate

傾

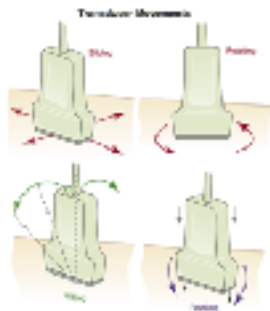
Fan/ tilt

搖

Rock

壓

Compress



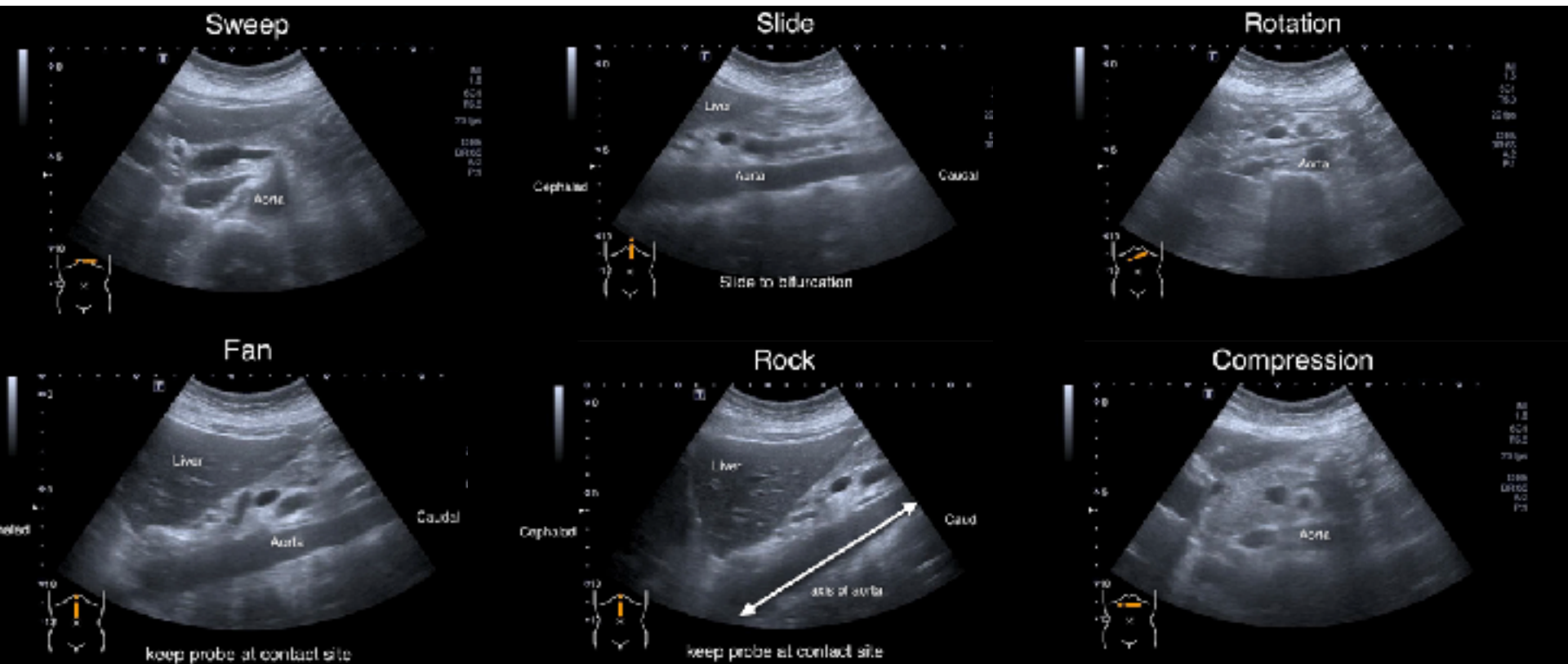
探頭掃描 6 大技巧



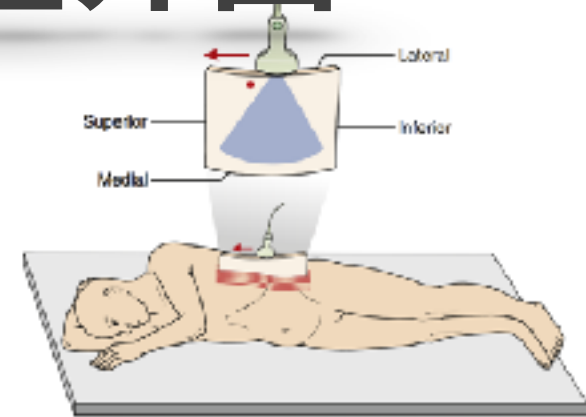
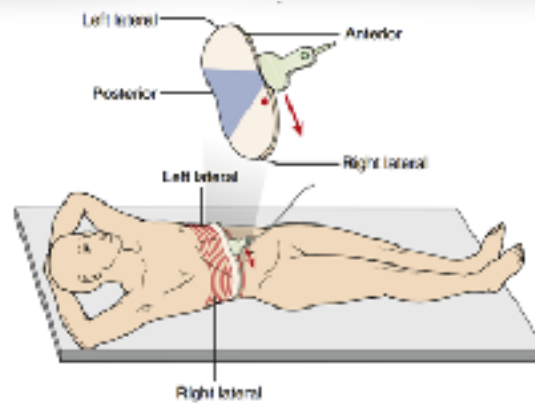
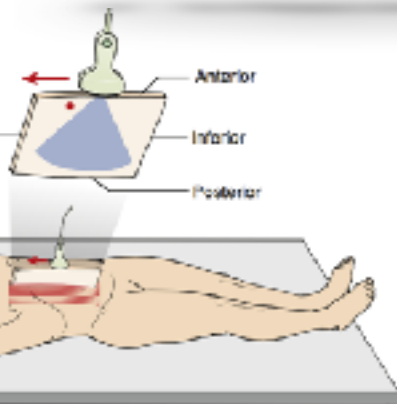
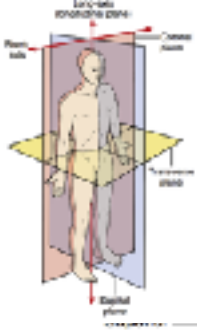
X

Y

Z



共通語言: 3D立體介面

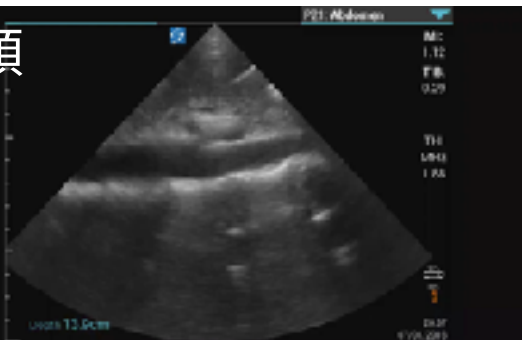


Sagittal 縱

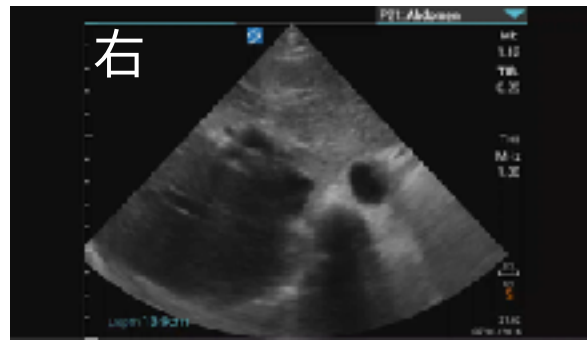
Transverse 橫

Coronal 側

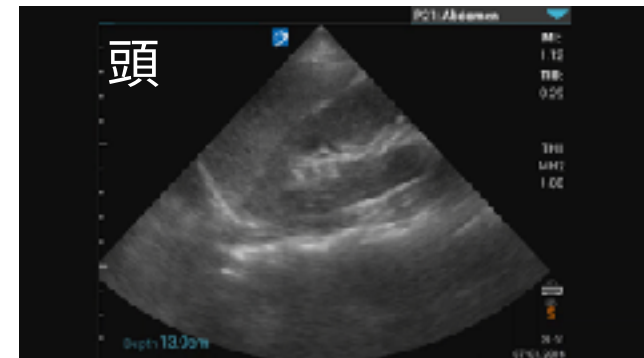
頭



右



頭



掃描前用手指碰觸探頭表面確認方向

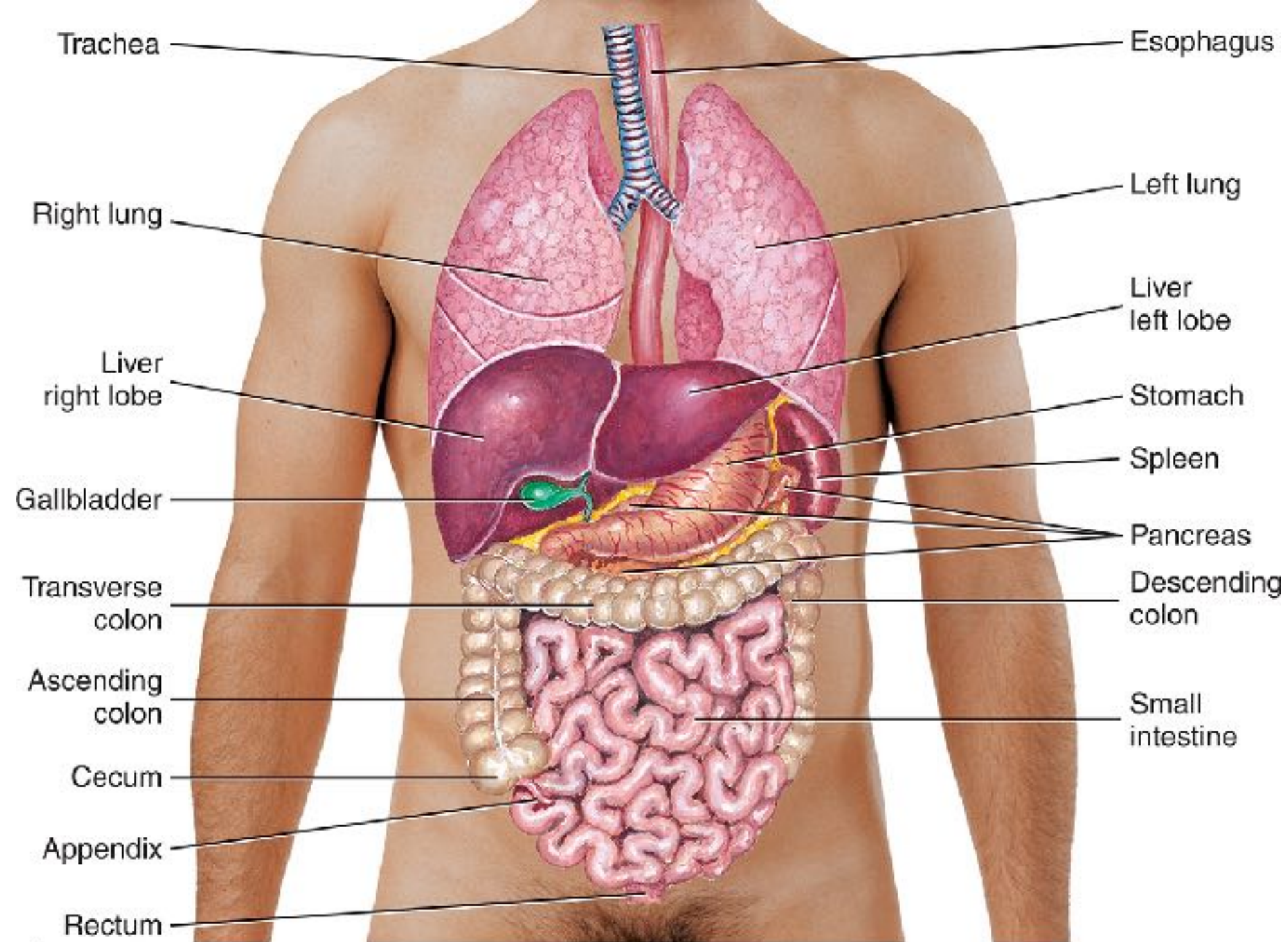
探頭選擇：腹為主／線為輔

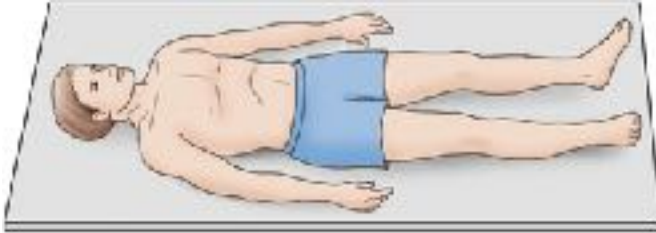


急診POCUS不用NPO

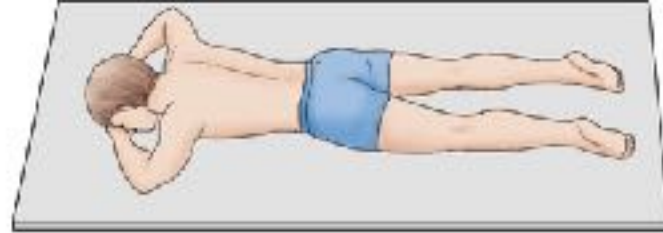
NPO的好處？

系統性掃描之後再聚焦

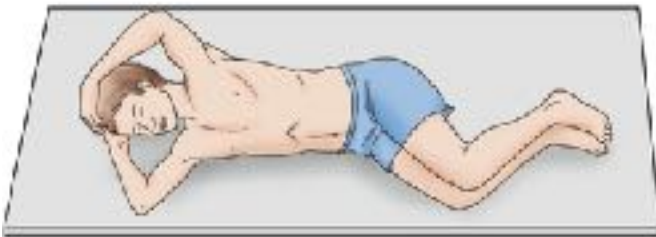




Supine



Prone



Right lateral decubitus



Left lateral decubitus



Right posterior oblique



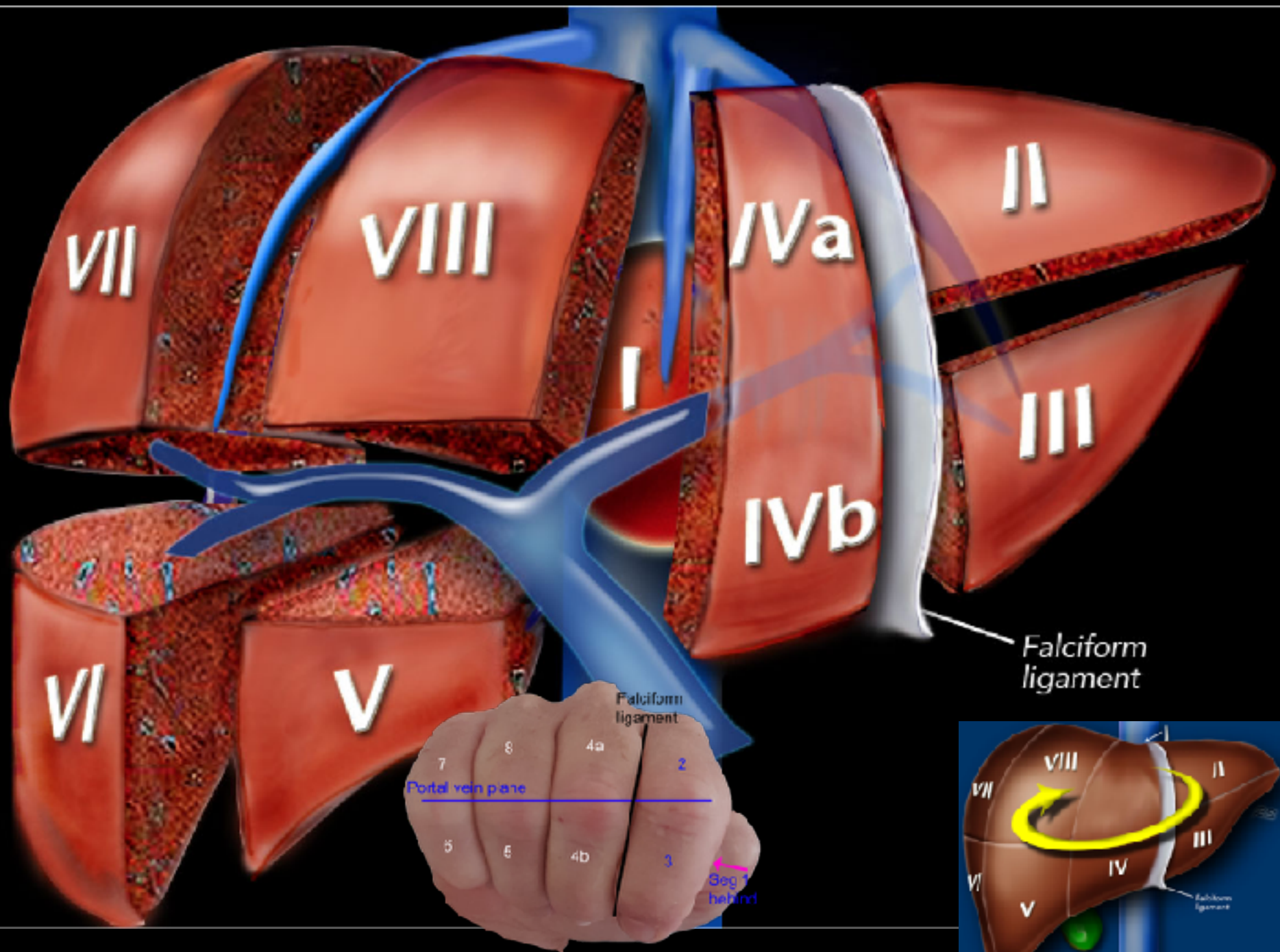
Left posterior oblique



Sitting semi-erect



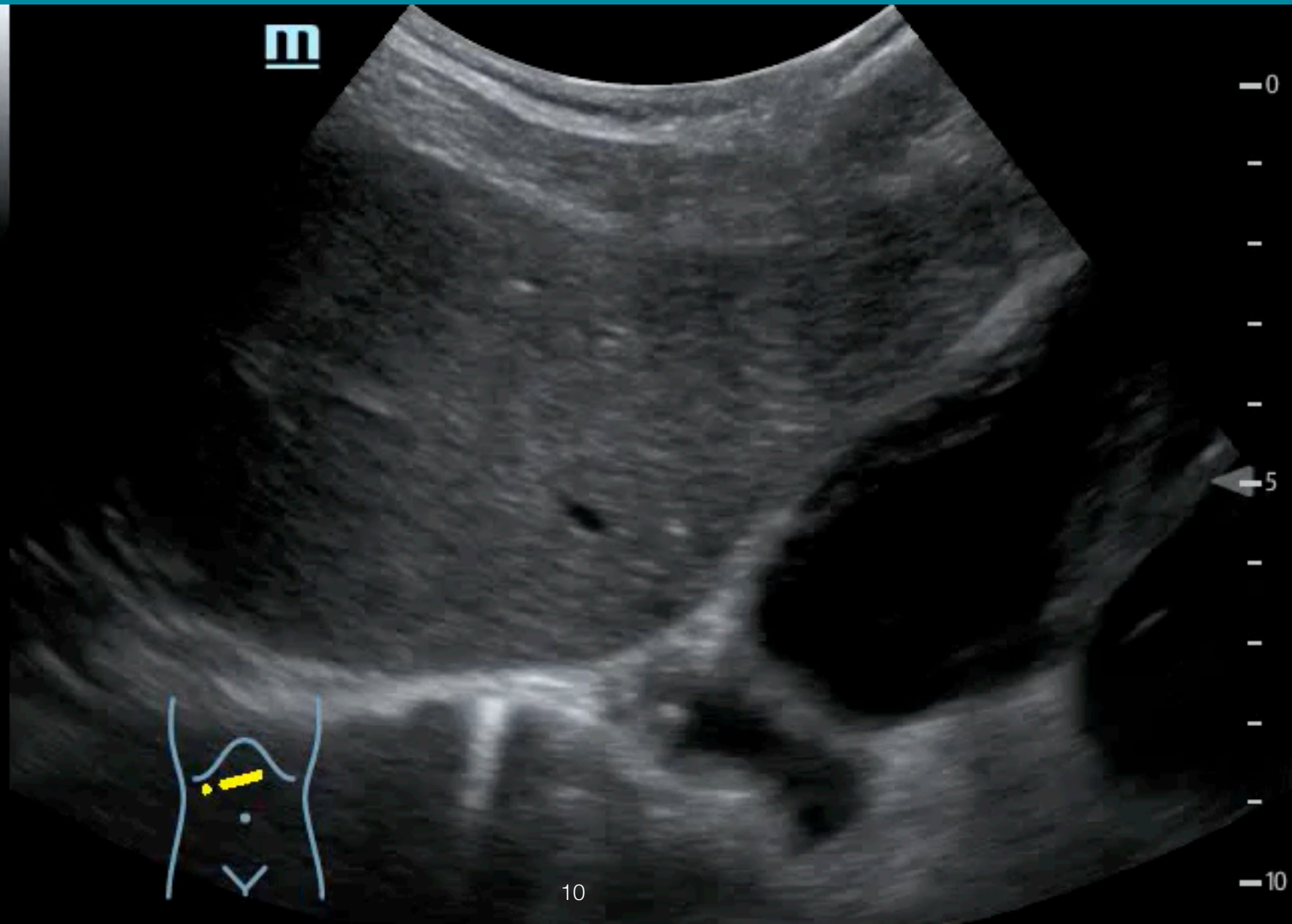
Sitting erect



Hepatic vein

MT 1.0
TIS 0.7

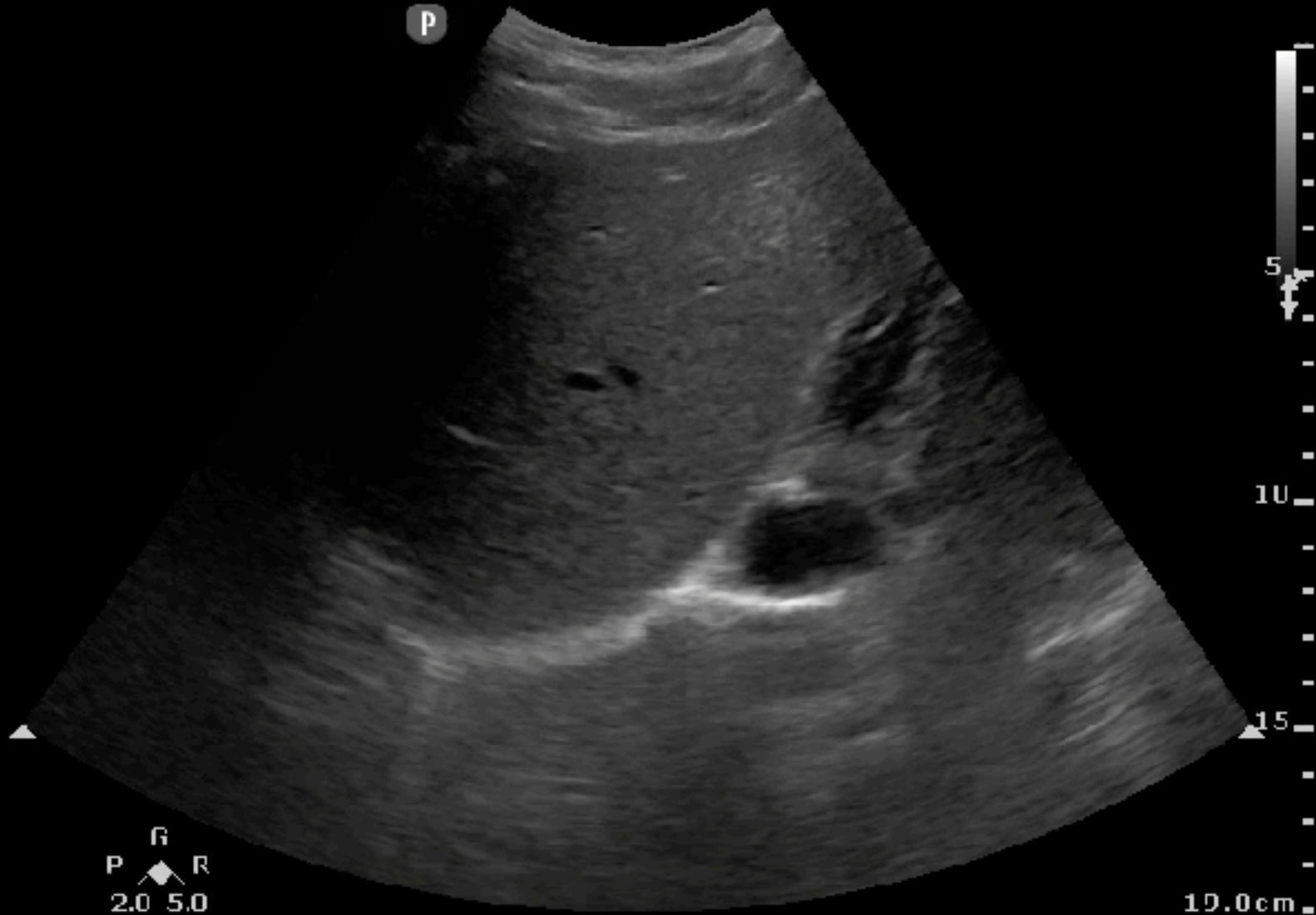
B
FH5.0
DR 120
FR 28
D 11.0
G 50



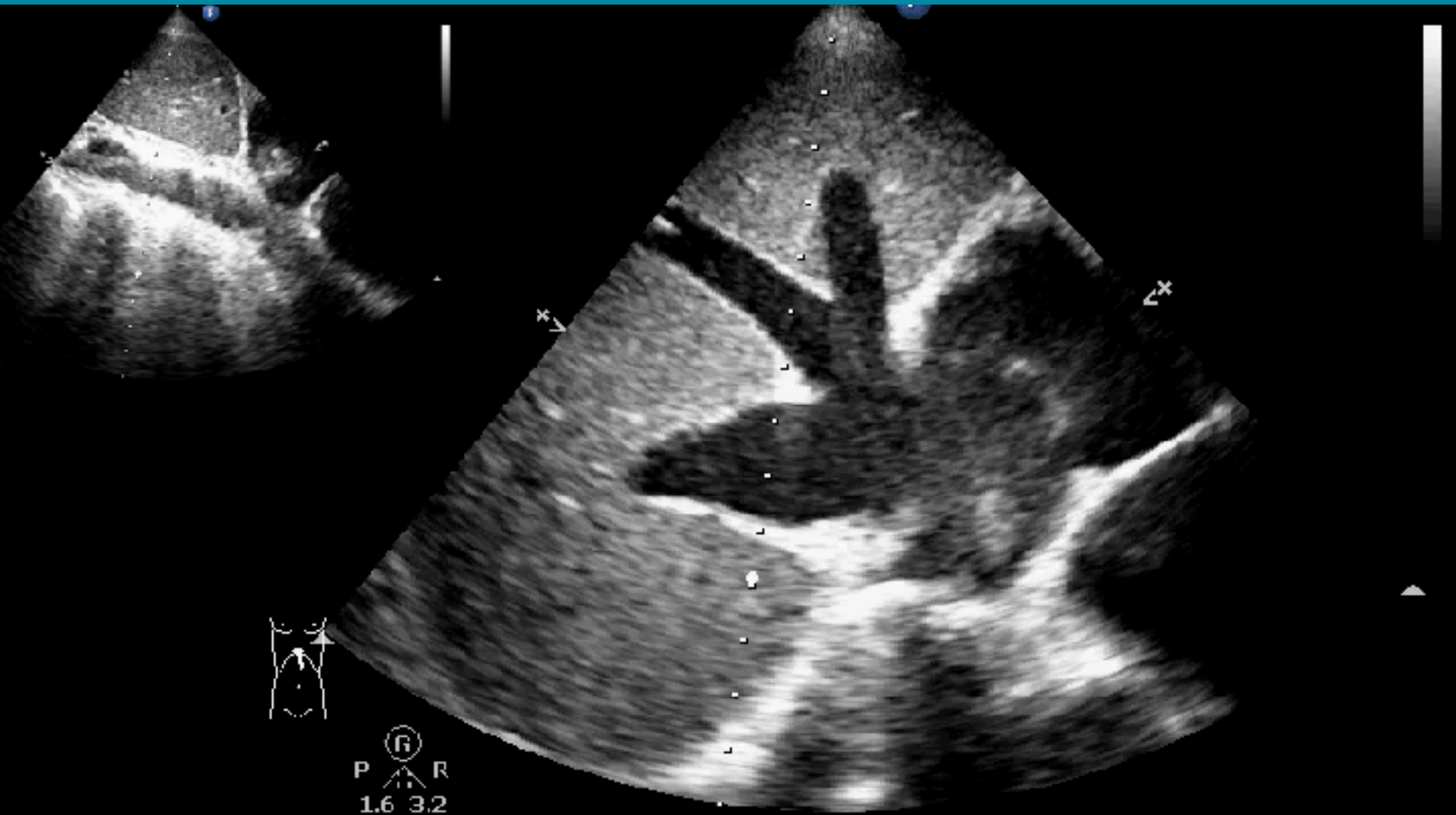
Playboy bunny sign

Abd Gen
C5-2
25 Hz
19.0cm

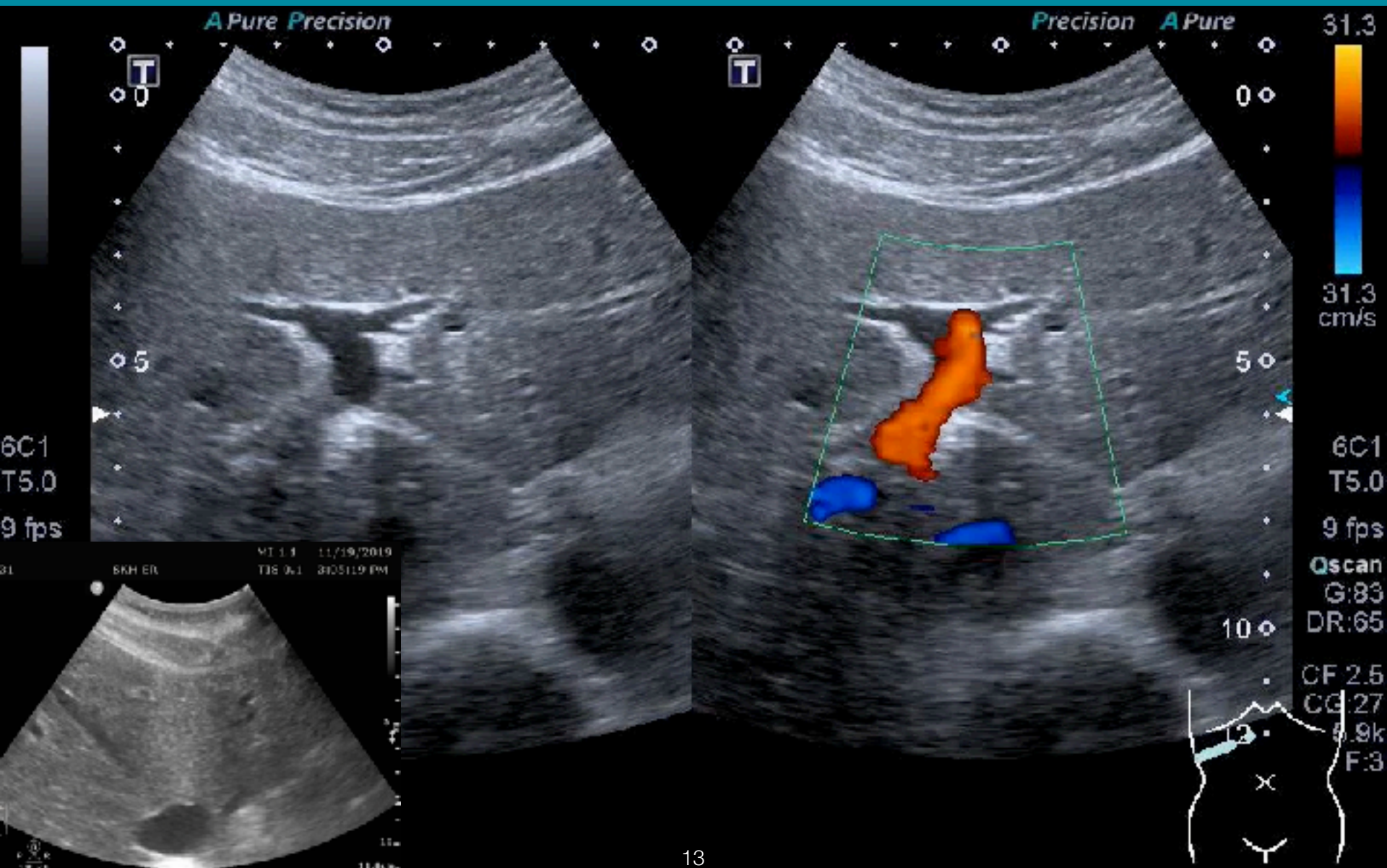
2D
Gen
Gn 64
57
3/3/3



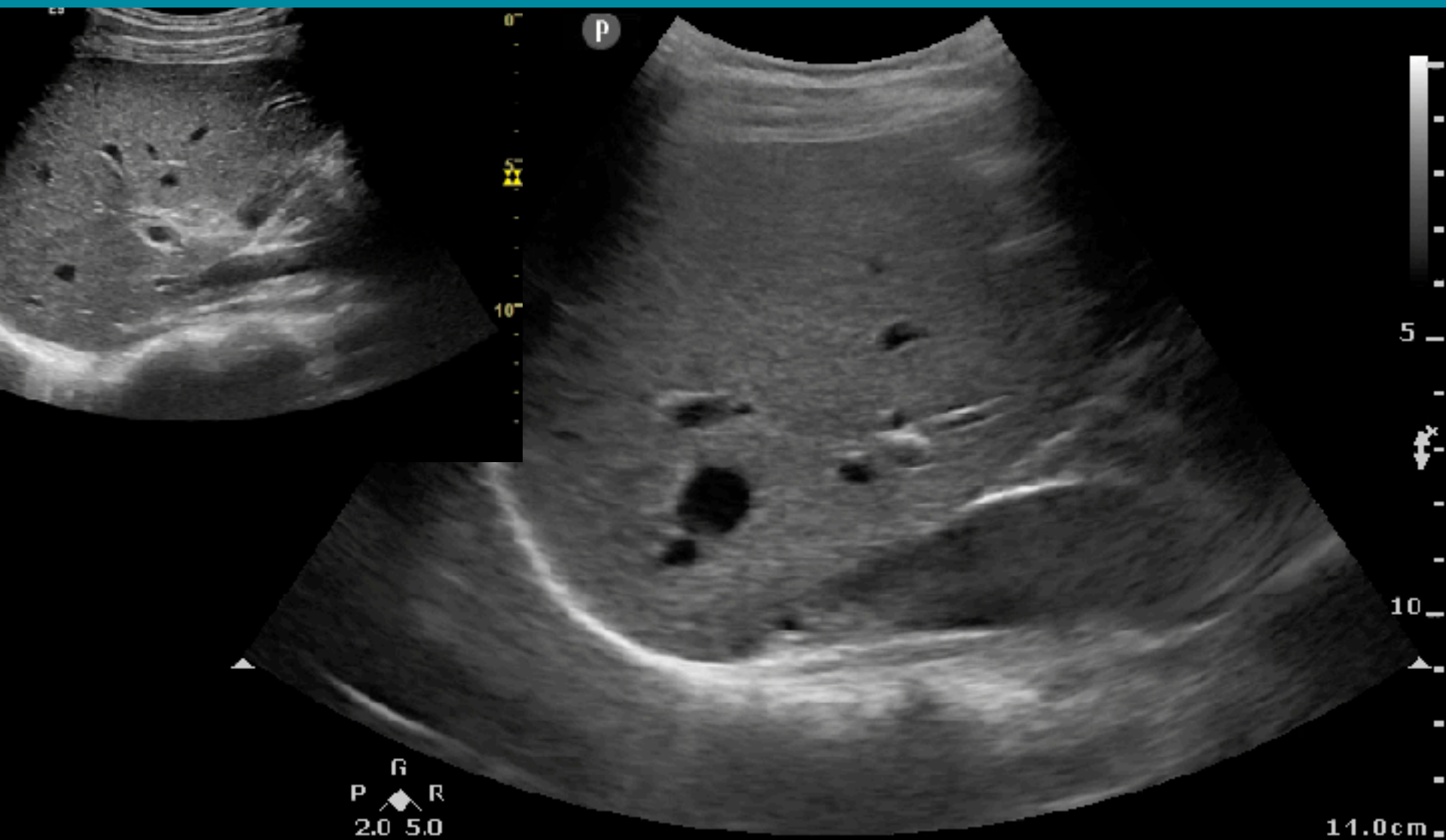
Playboy bunny sign

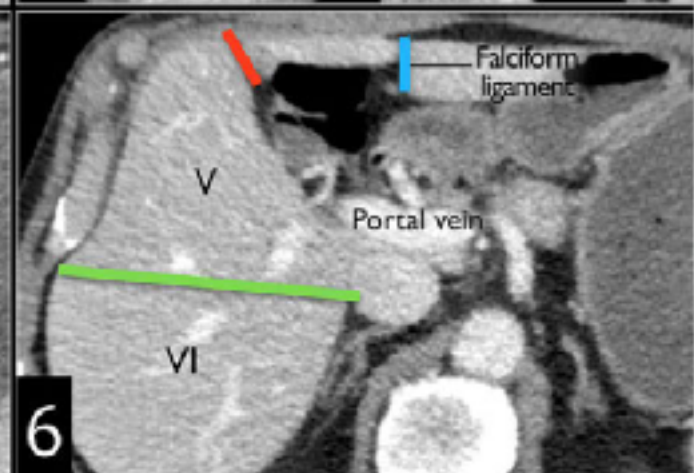
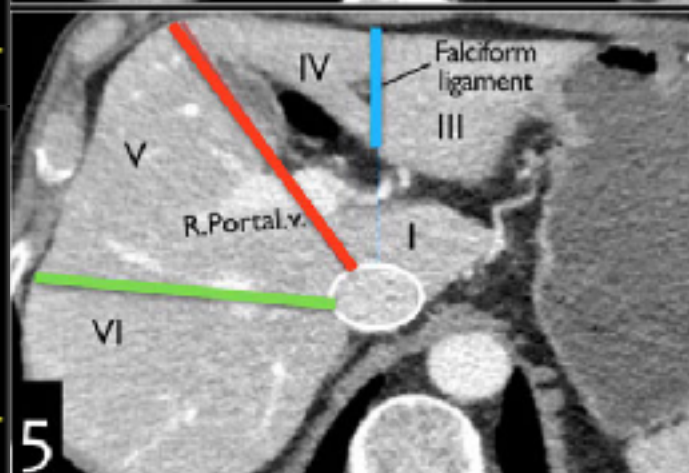
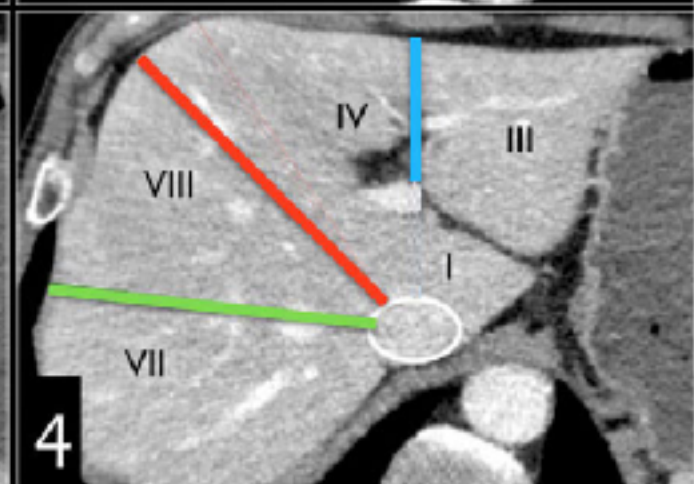
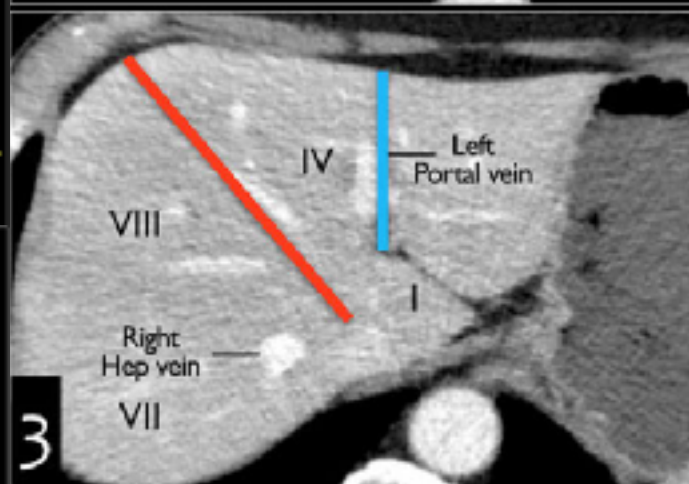
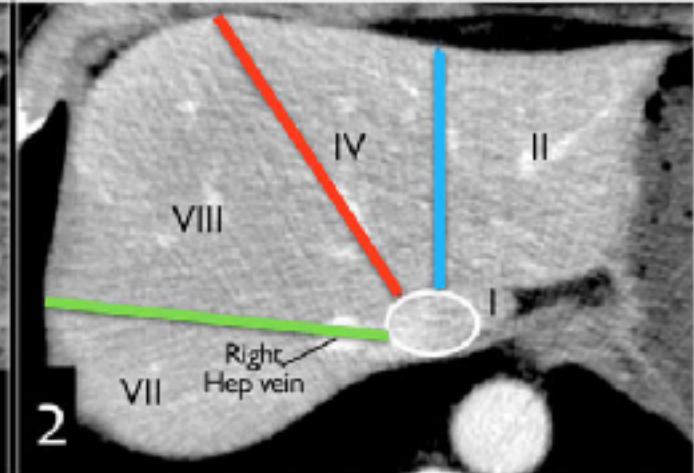
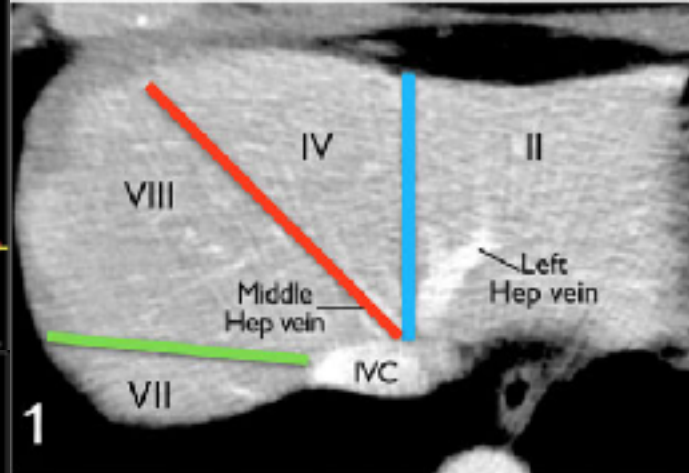
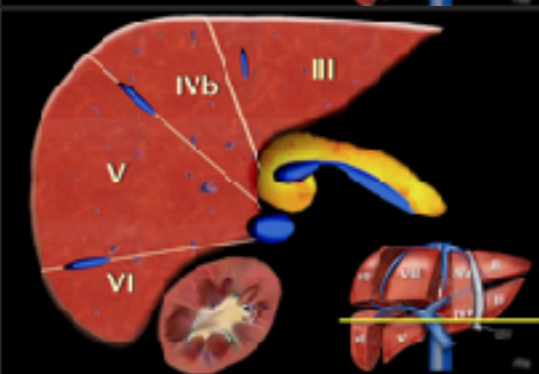
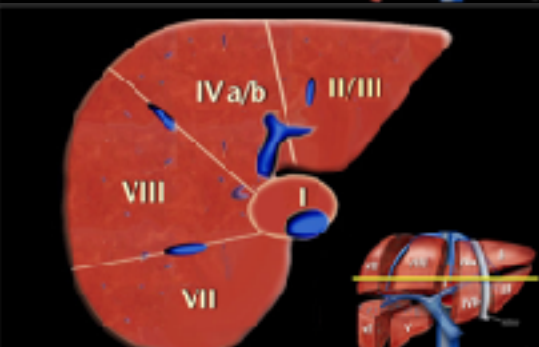


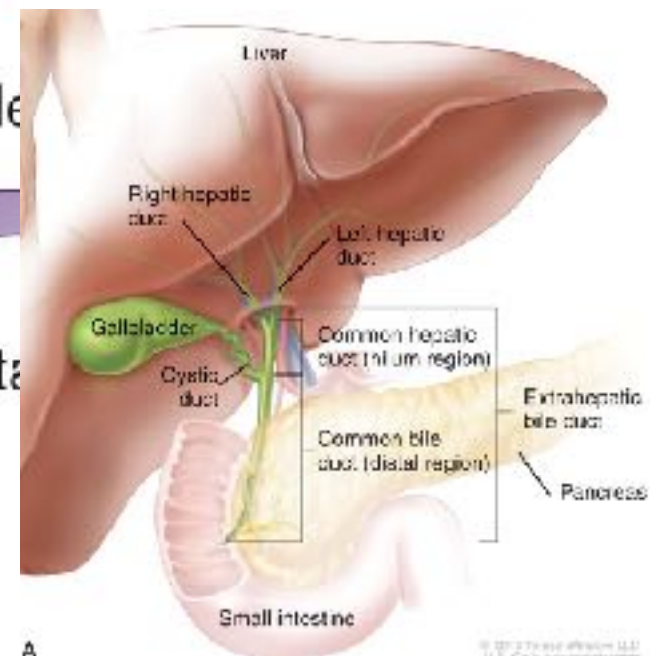
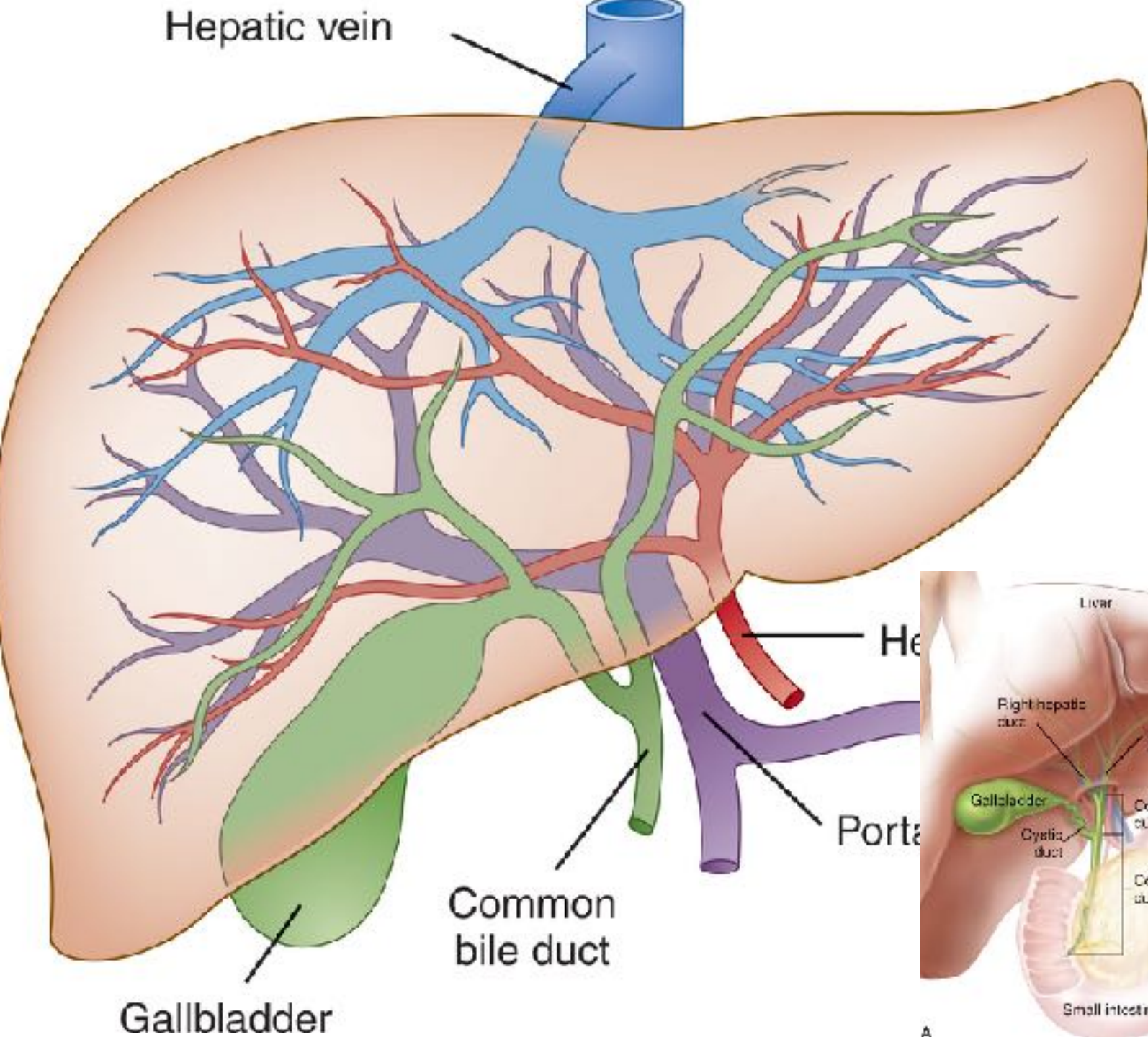
Portal vein - L



Portal vein - R



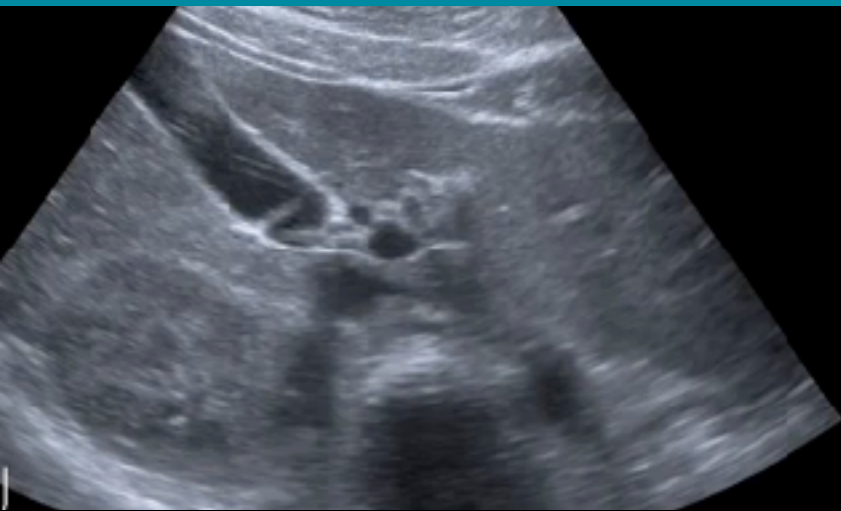




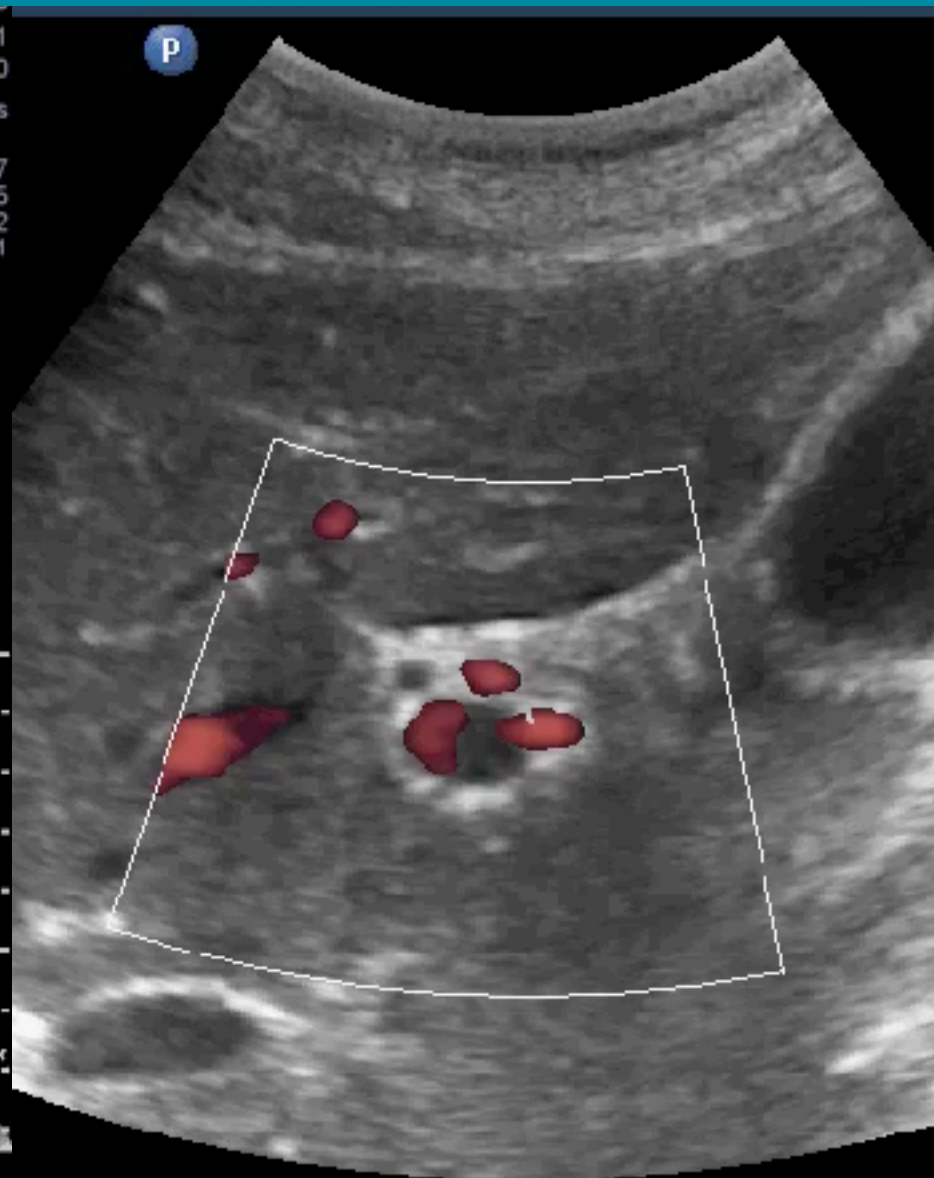
Mickey Mouse sign

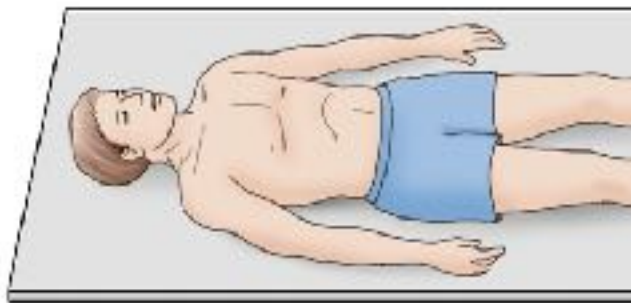


Mickey Mouse sign



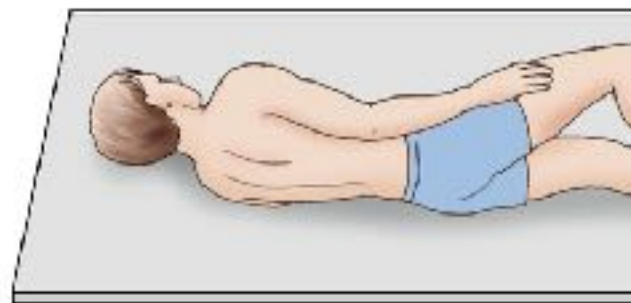
6C1
T5.0
19 fps
G:87
DR:65
A:2
P:1





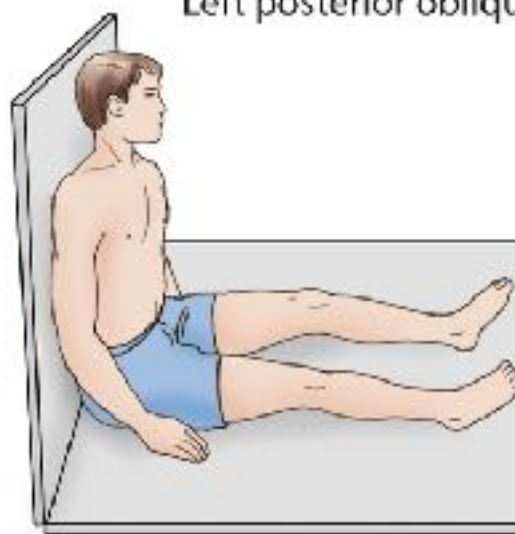
Supine

A



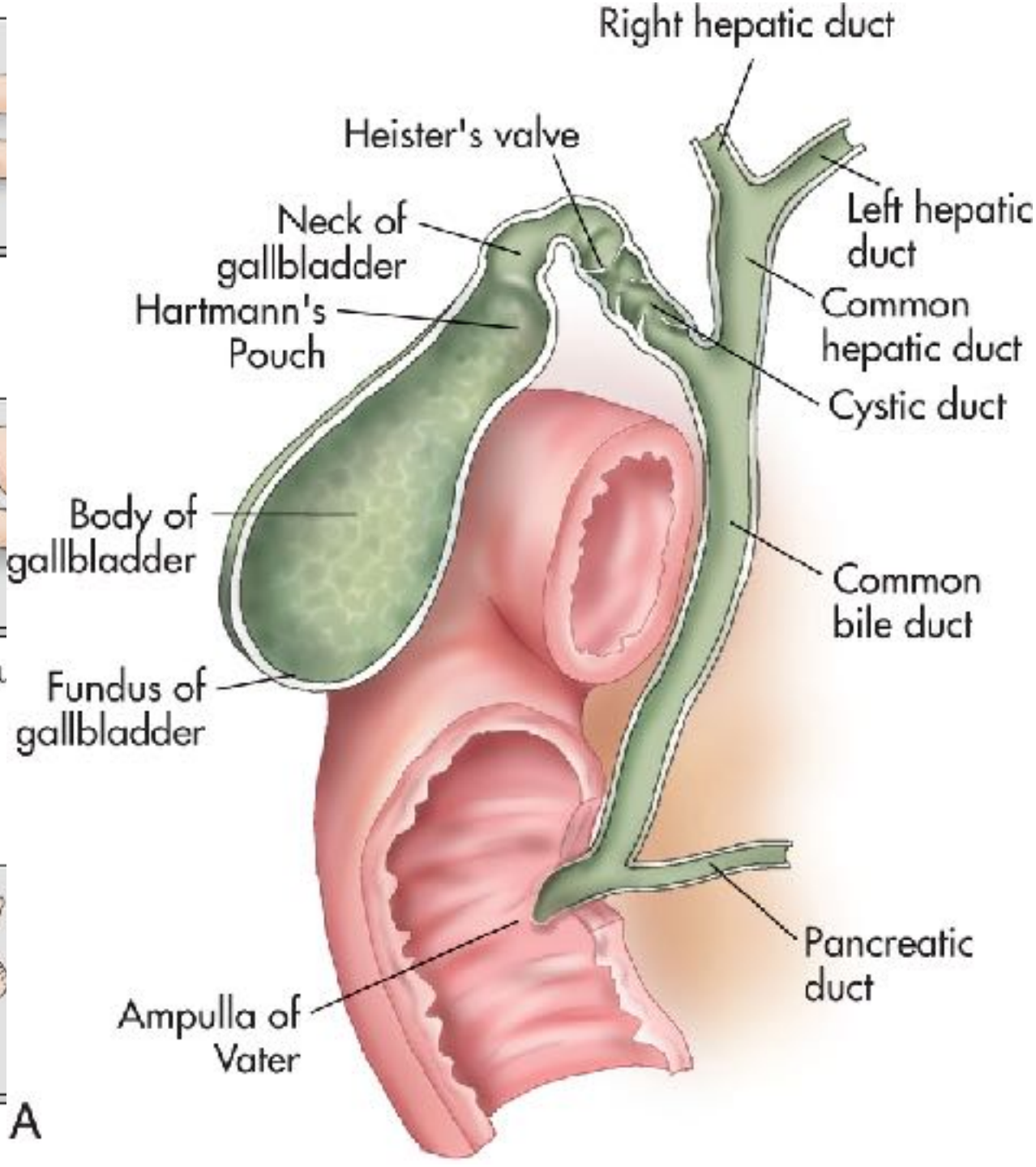
Left posterior oblique

B



Sitting erect

C



Gallbladder

2025/02/07
FH5.0
DR 130
FR 24
D 11.0
G 40



IM: 7

0

-

-

-

-

5

-

-

-

-

-

KV: 10
msec

iNeedle

iTouch

thk: mm

DFOV:



Gallbladder & biliary tree

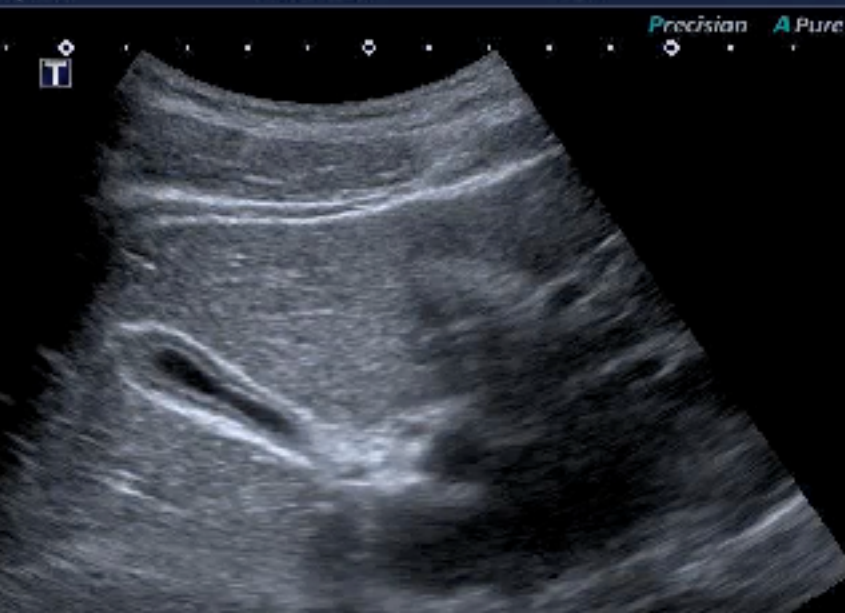


8C1
T5.0
22 fps
Scan 80534-28C1
G:86
DR:65
A:2
P:1

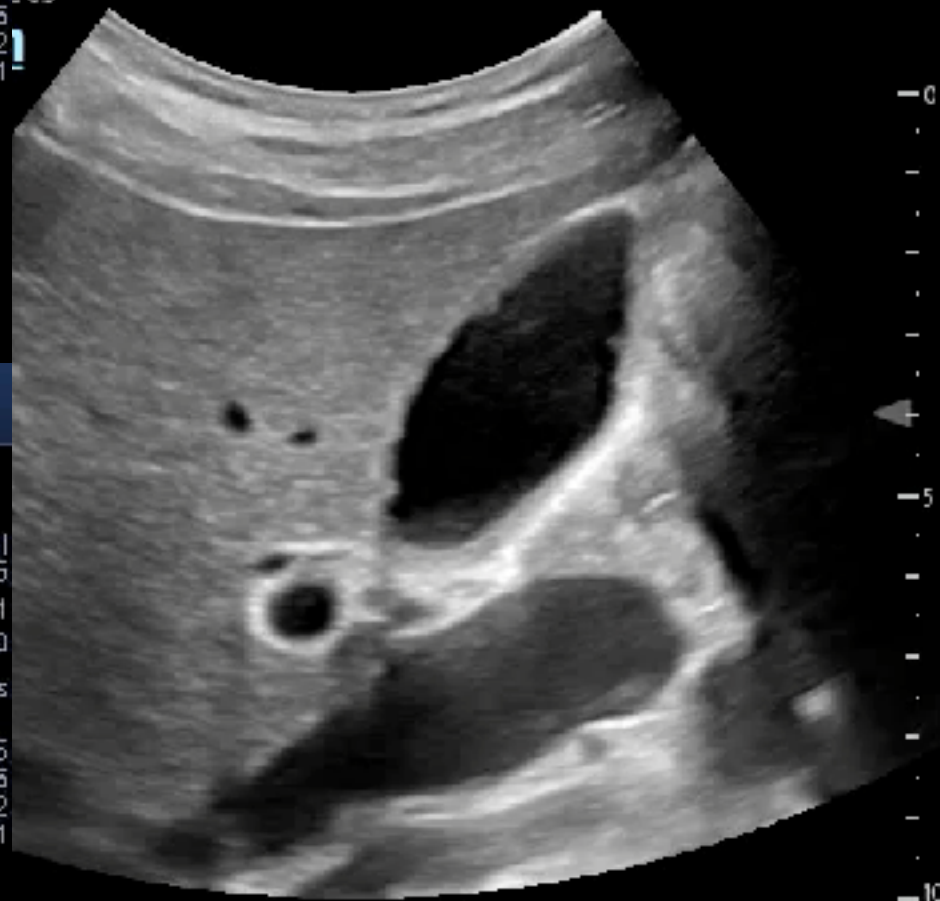
06-12-2024
18:33:22
Adult ADD

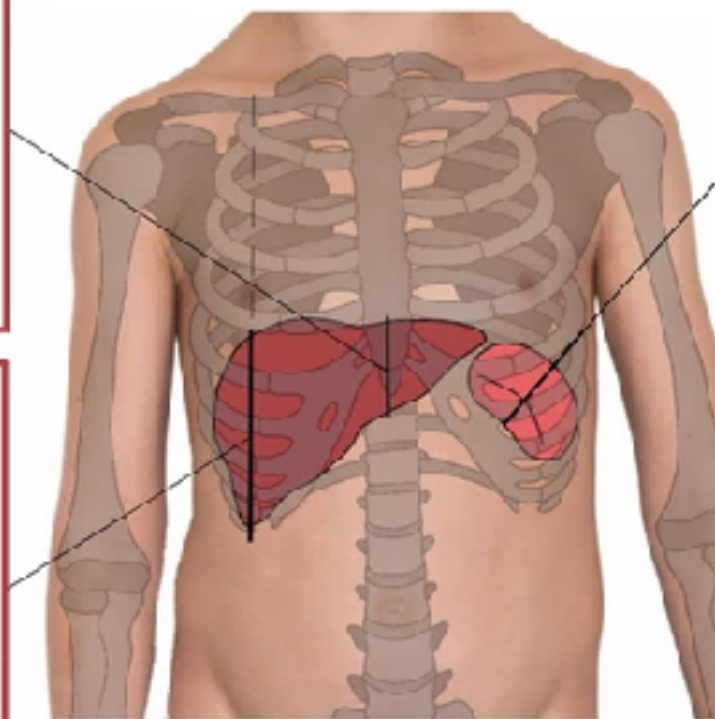
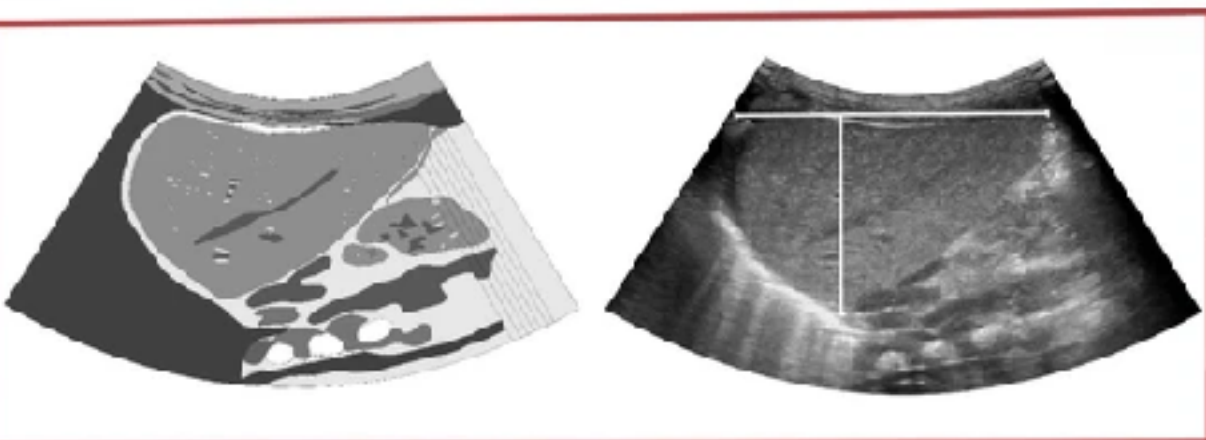
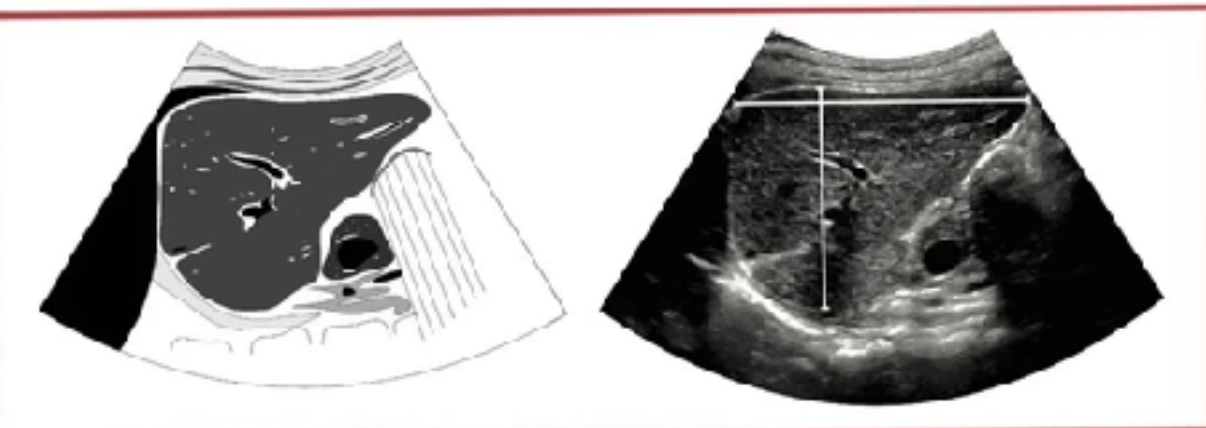
ospital Abdomen M 29 2017/06/03
3158 2:29:06 PM

Precision A Pure

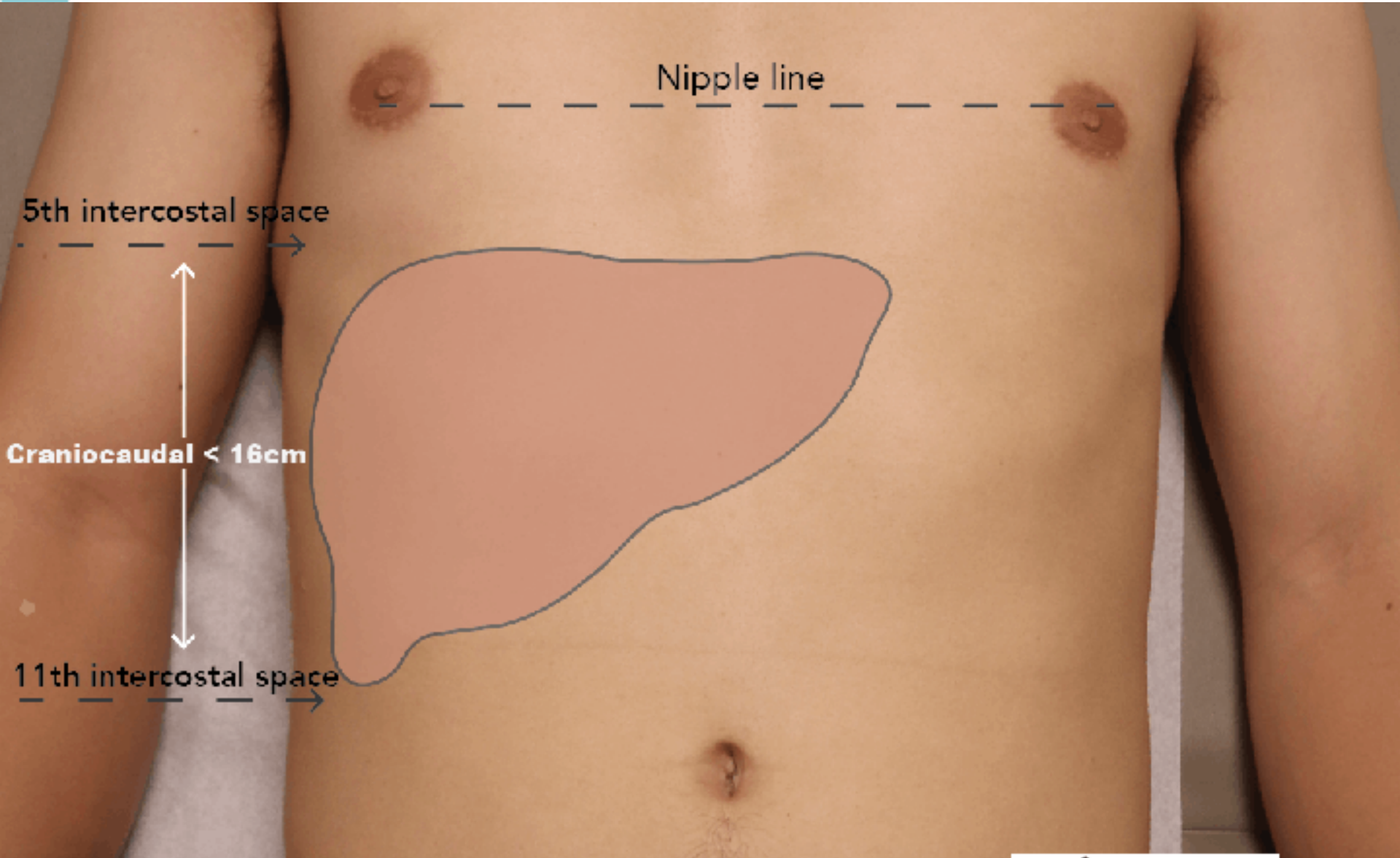


M1
1.5
8C1
T5.0
22 fps
G:85
DR:65
A:2
P:1



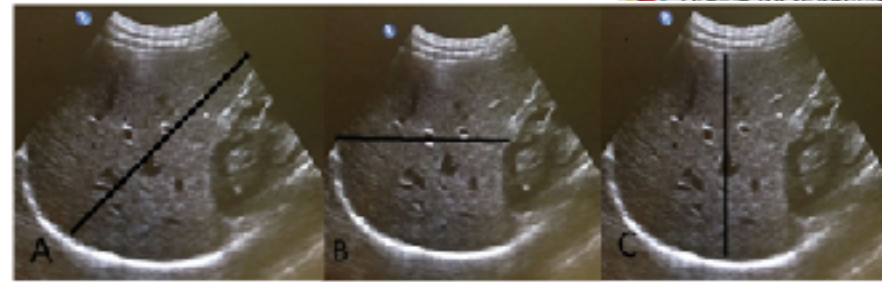


Liver



SONOGRAPHY

Liver: 13 ~ 16 cm
(Mid-clavicle line)



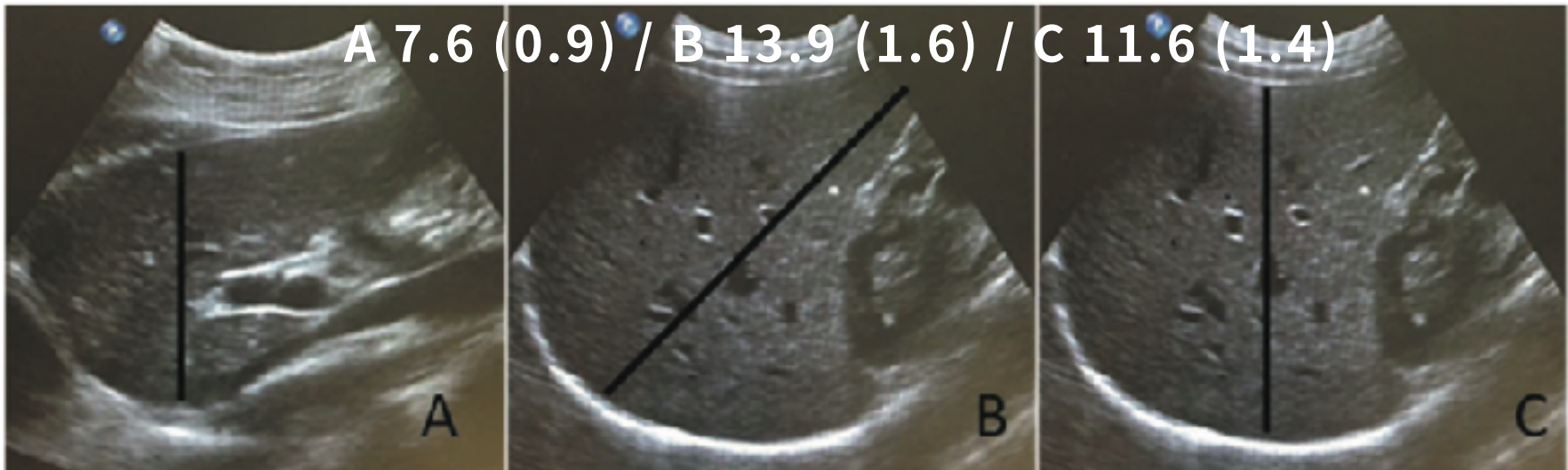
ORIGINAL ARTICLE

Ultrasound in the assessment of hepatomegaly: A simple technique to determine an enlarged liver using reliable and valid measurements

Jessie T Childs¹, Adrian J Esterman^{2,3}, Kerry A Thoirs¹, Richard C Turner⁴

¹ International Centre of Allied Health Research, University of South Australia, Adelaide, Australia

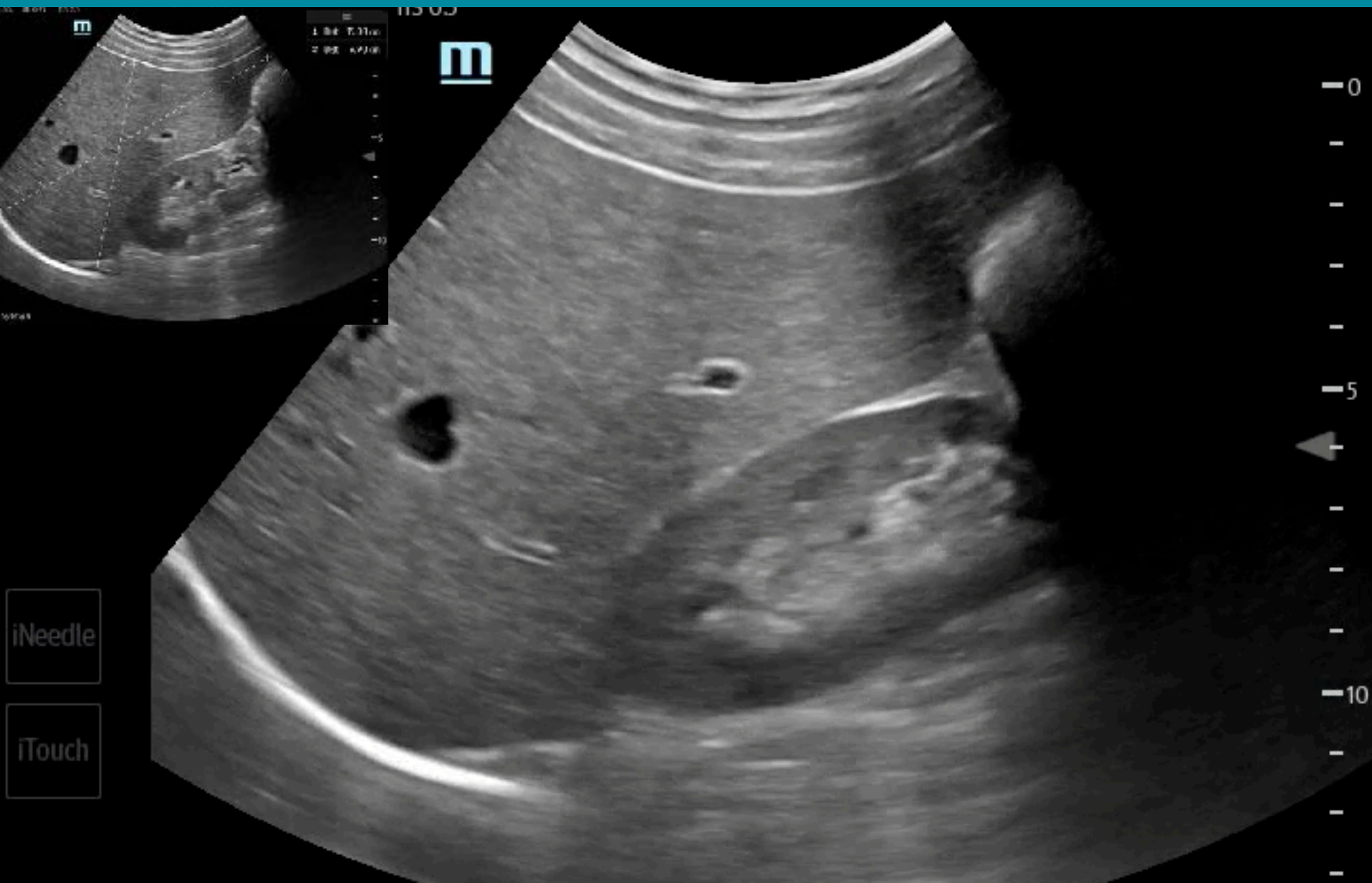
² University of South Australia, Adelaide, Australia



A 7.6 (0.9) / B 13.9 (1.6) / C 11.6 (1.4)

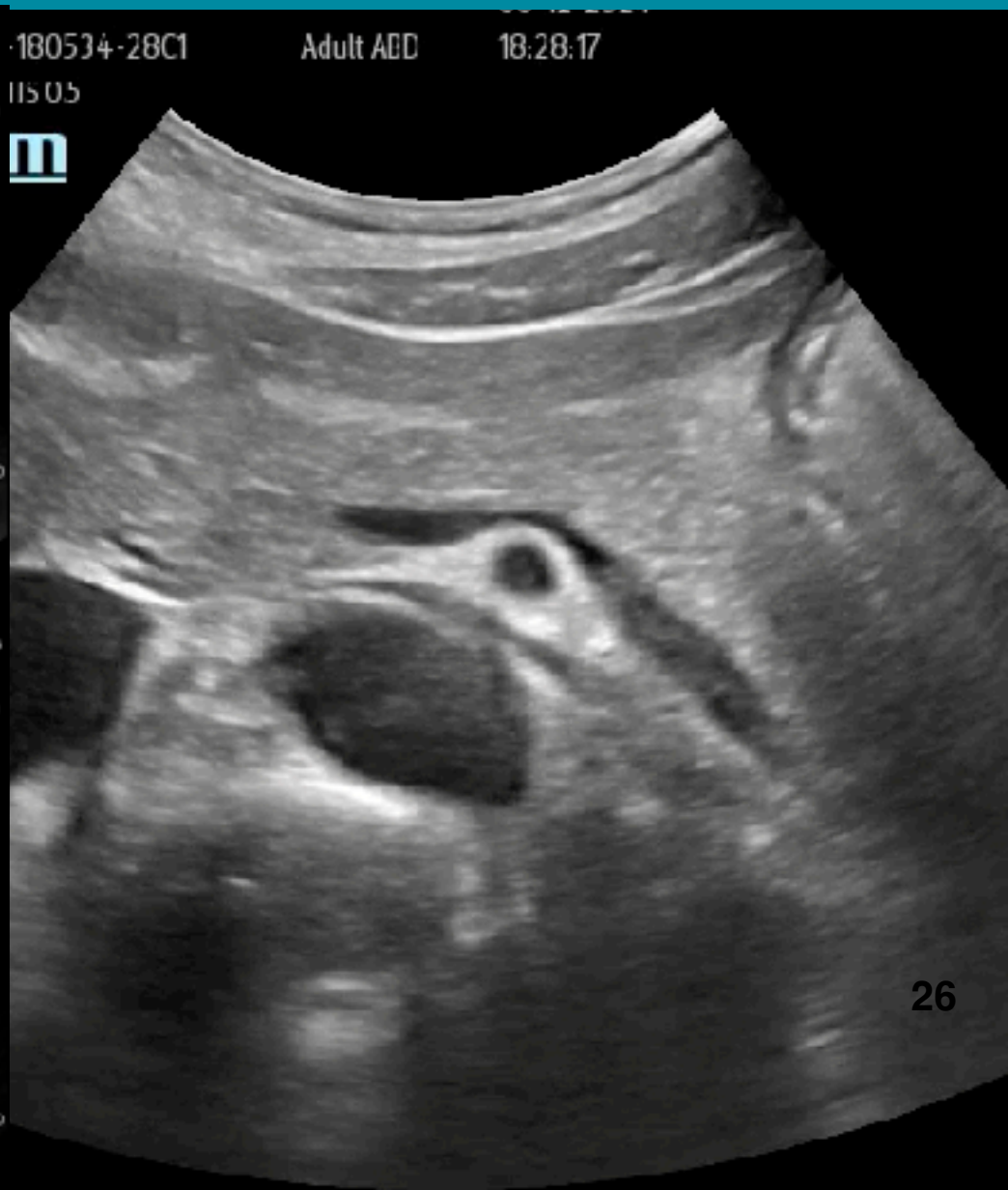
Liver volume (cm^3) = $343.71 + [0.84 \times ABC]$,
where ABC is the product of the three linear measurements $A \times B \times C$.
Reference range = $1062\text{--}2223 \text{ cm}^3$

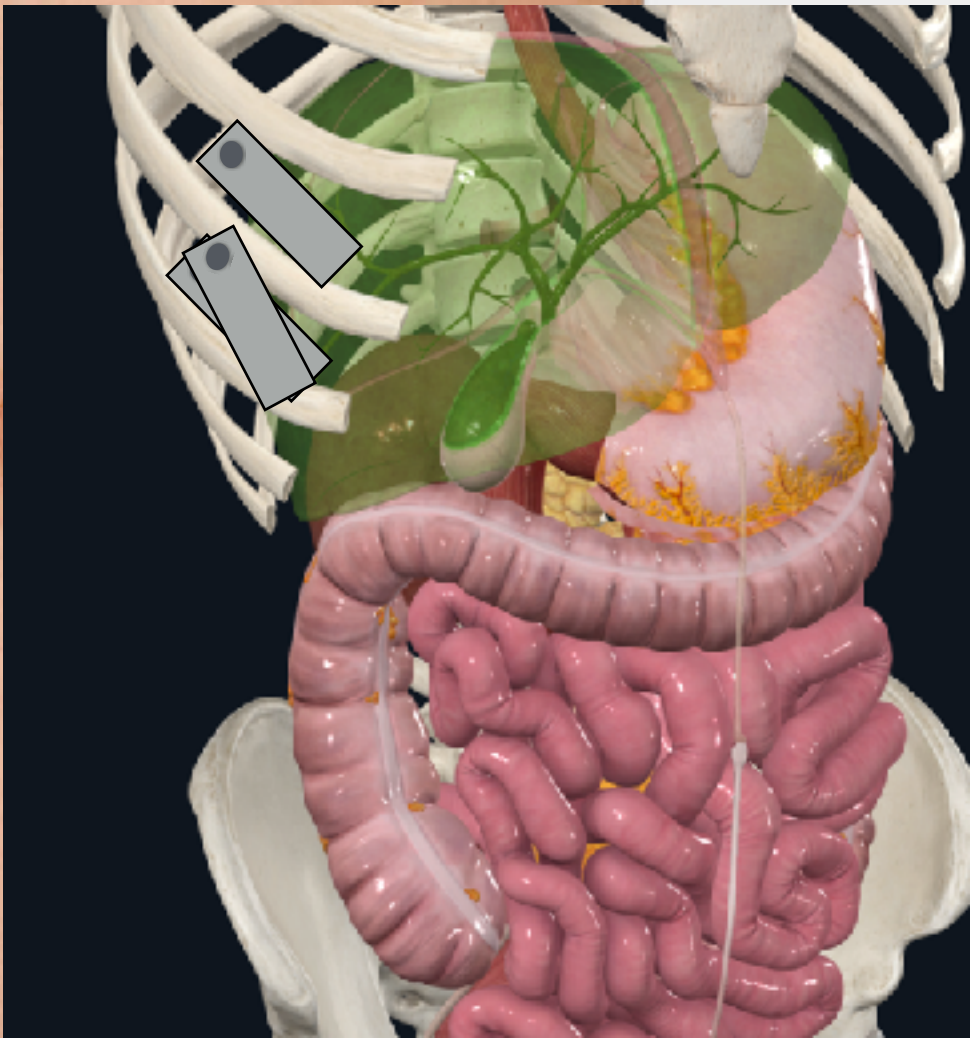
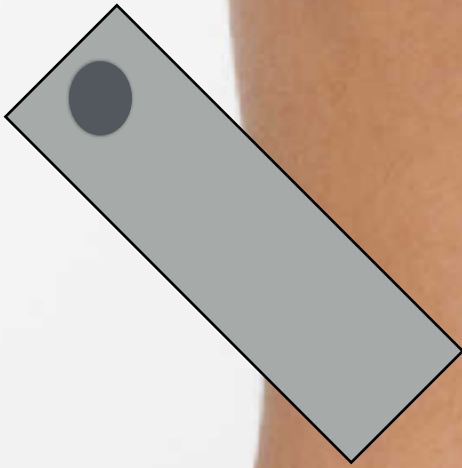
Liver (mid-clavicle line)



Echogenecity

Pancreas > Spleen > Liver > Renal cortex





劍突---腋前線
肋間擺位微調

15:00:44

Diaphragm

0041-28C1

0.5



40

19.

16.Dcm.

— 0

-5

1000

— 10

1000

1000

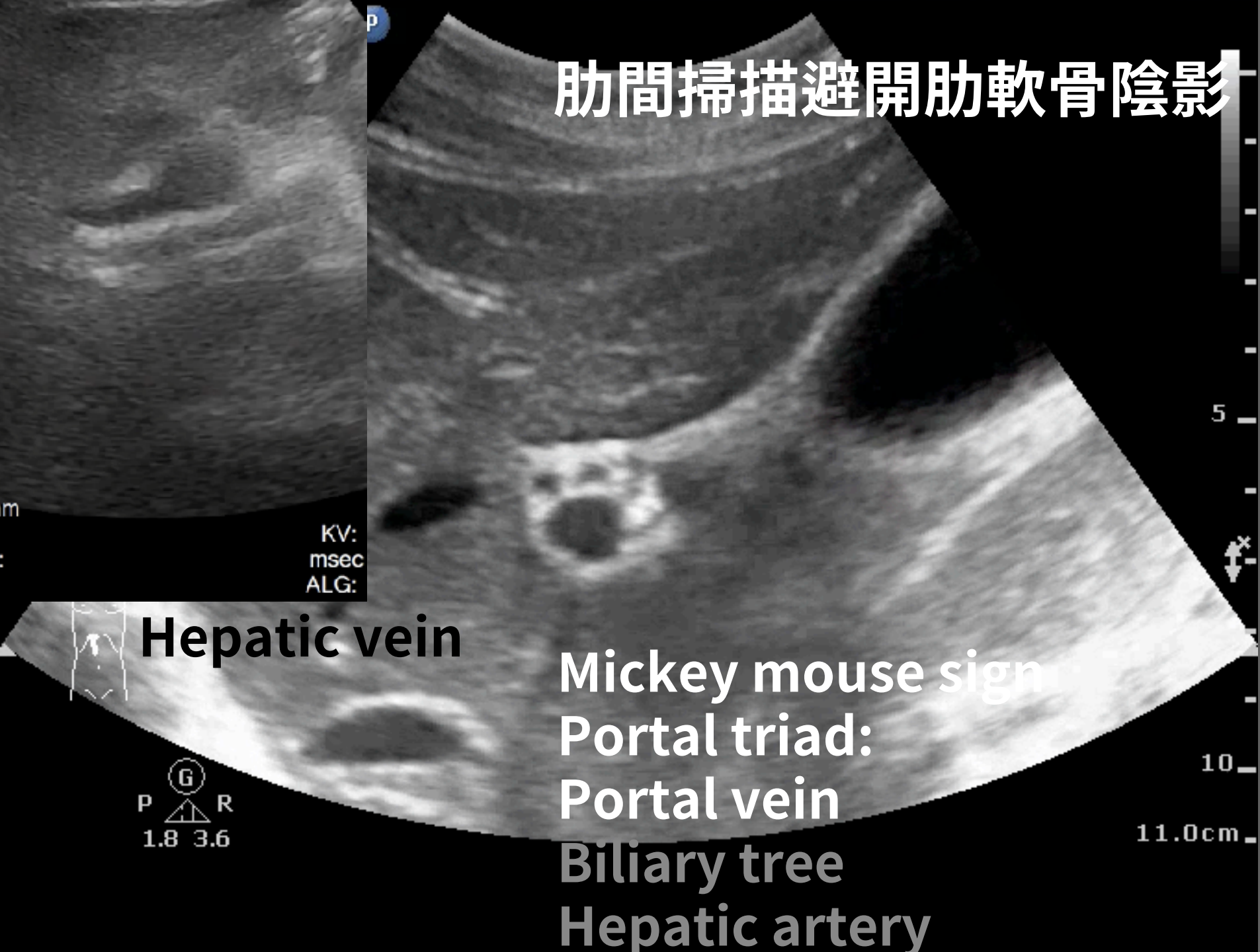
—

iNeedle

Liver

Right kidney

肋間掃描避開肋軟骨陰影



Hepatic vein

Mickey mouse sign

Portal triad:

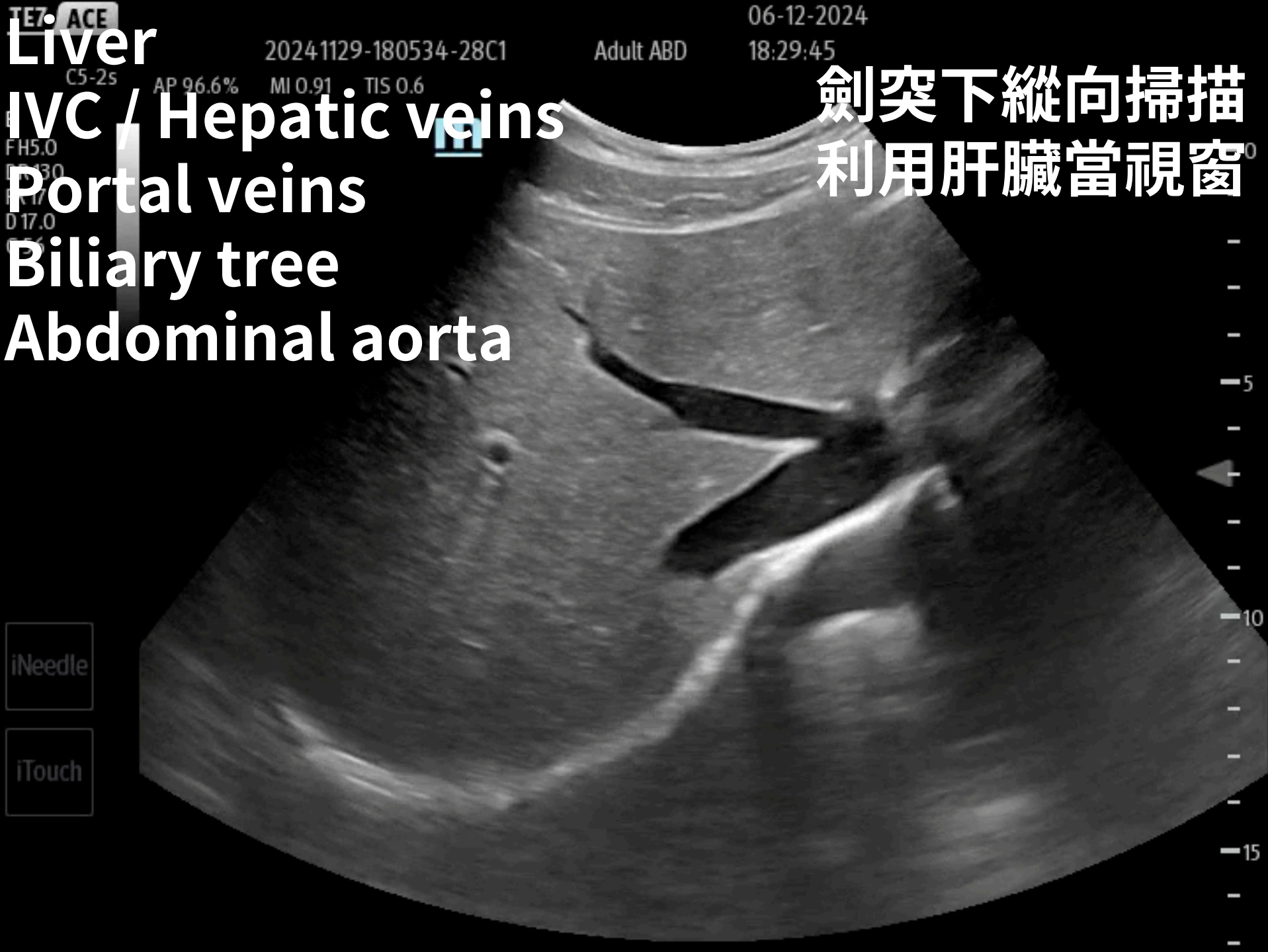
Portal vein

Biliary tree

Hepatic artery

劍突下 利用肝的視窗







TE7 ACE

20230324-150041-28C1

Diaphragm

24-03-2023

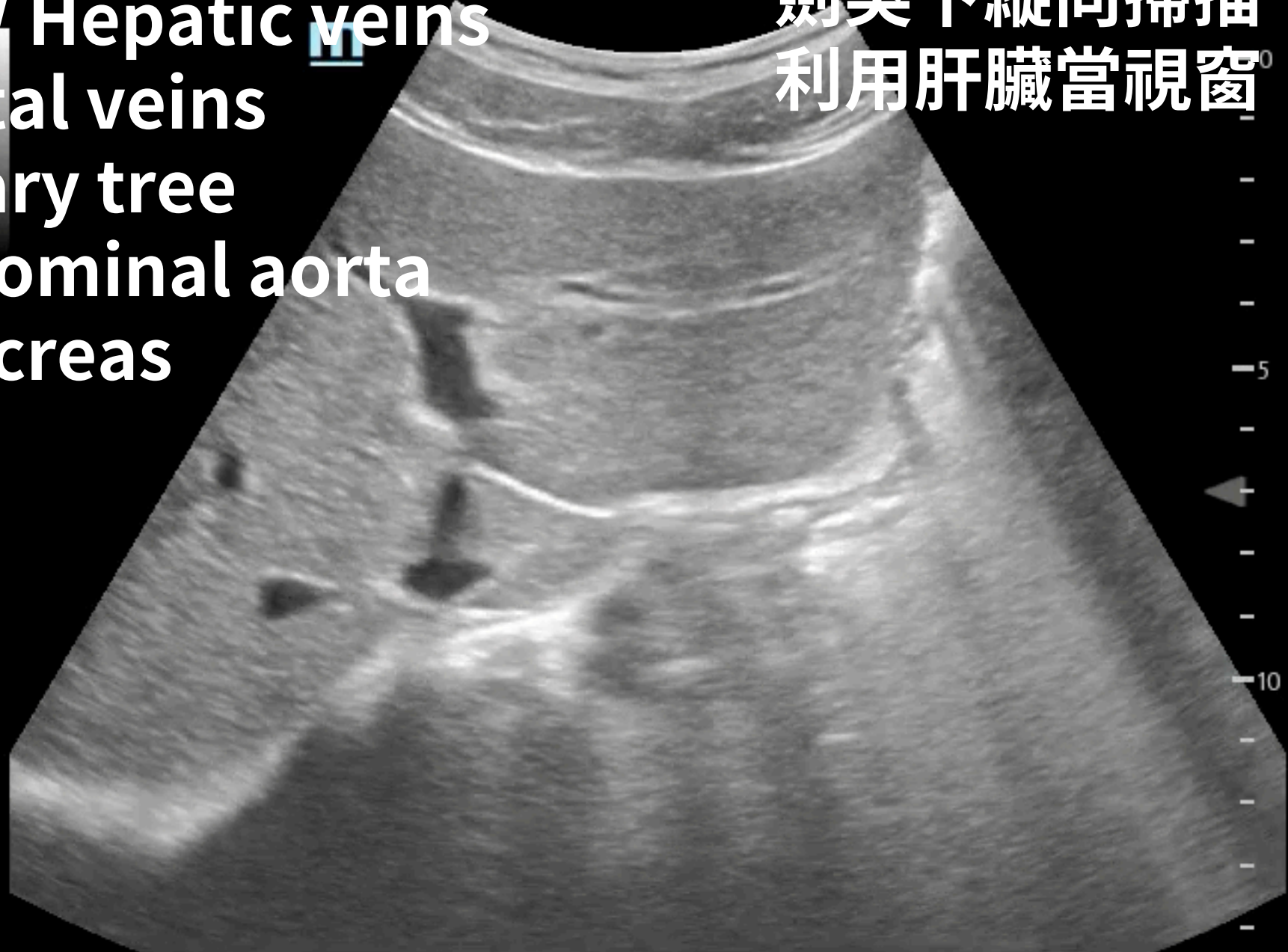
15:02:36

Liver
IVC / Hepatic veins
Portal veins
Biliary tree
Abdominal aorta
Pancreas

劍突下縱向掃描
利用肝臟當視窗

iNeedle

iTouch

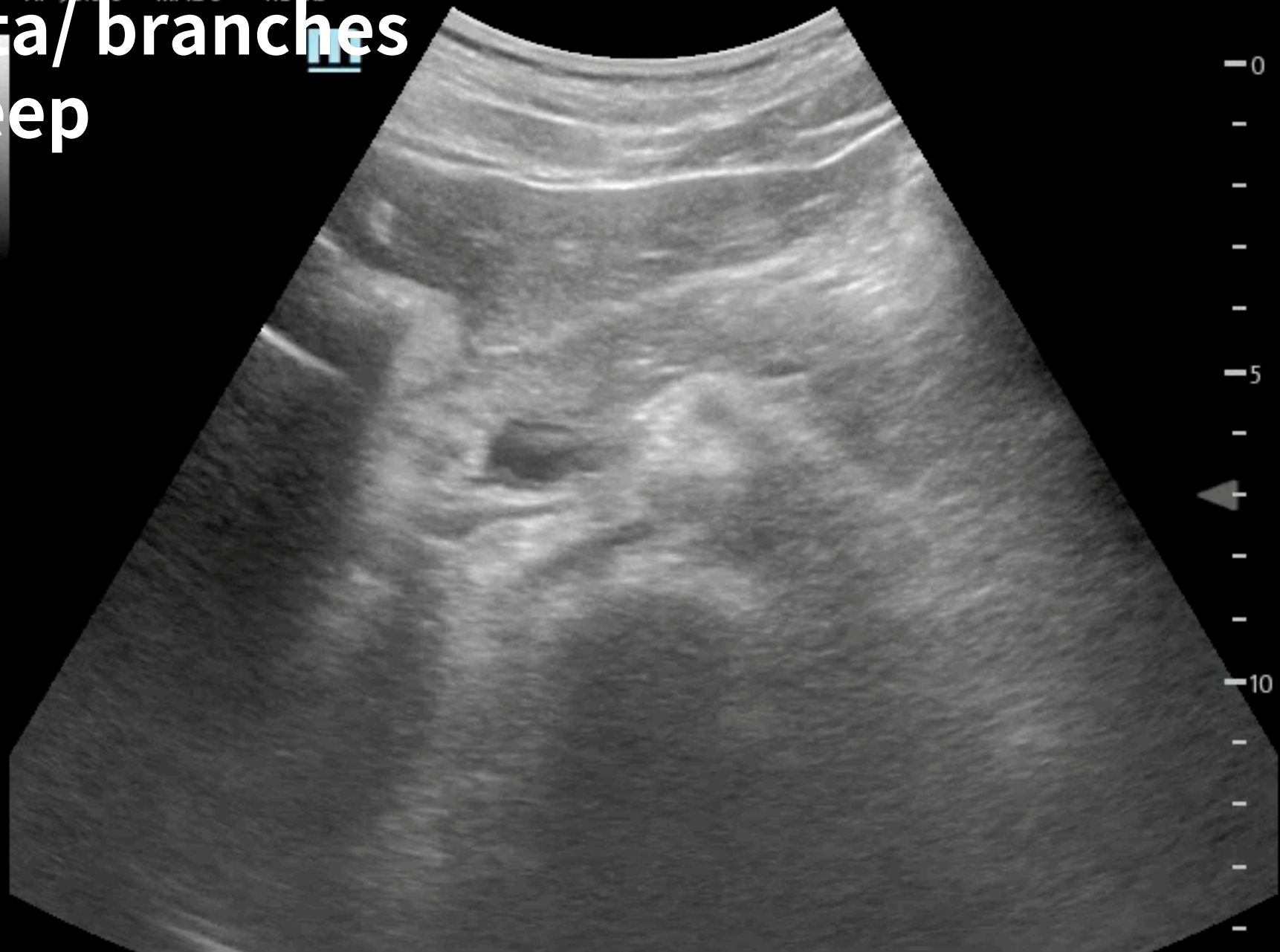


Aorta/branches Sweep

B
FH6.0
DP 130
FR 3
D 16.0
G 81
Z1.10

iNeedle

iTouch





TE7 ACE
20241129-180534-28C1
C5-25 AP 96.6% MI 1.00 TIS 0.5

Adult ABD
06-12-2024
18:29:18

劍突下縱向掃描
利用肝臟當視窗

Diaphragm
Liver
EC junction
Abdominal aorta
Pancreas
Antrum

iNeedle
iTouch



0
5
10

C5-1s

AP 96.6%

MI130

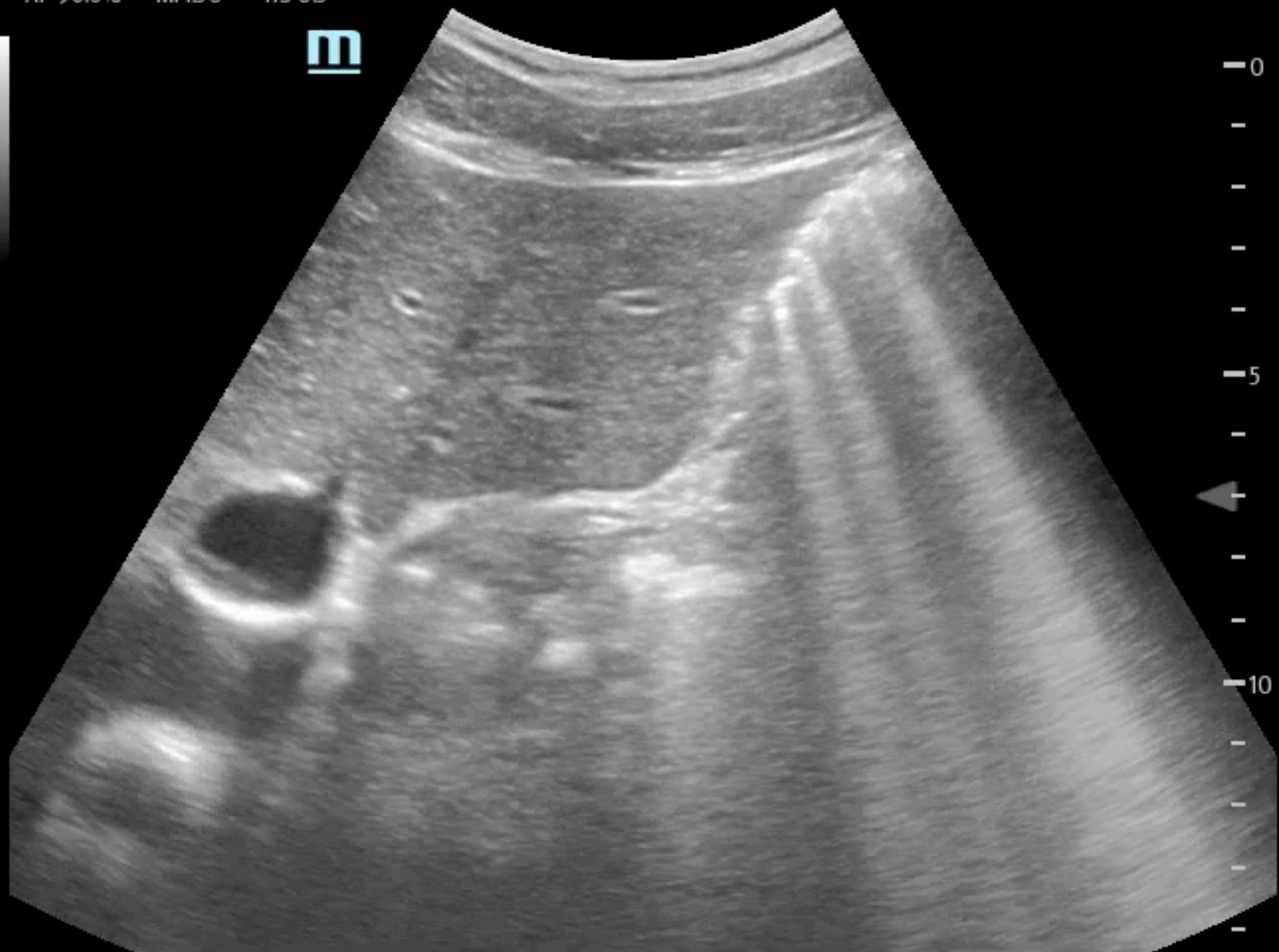
TIS 0.5

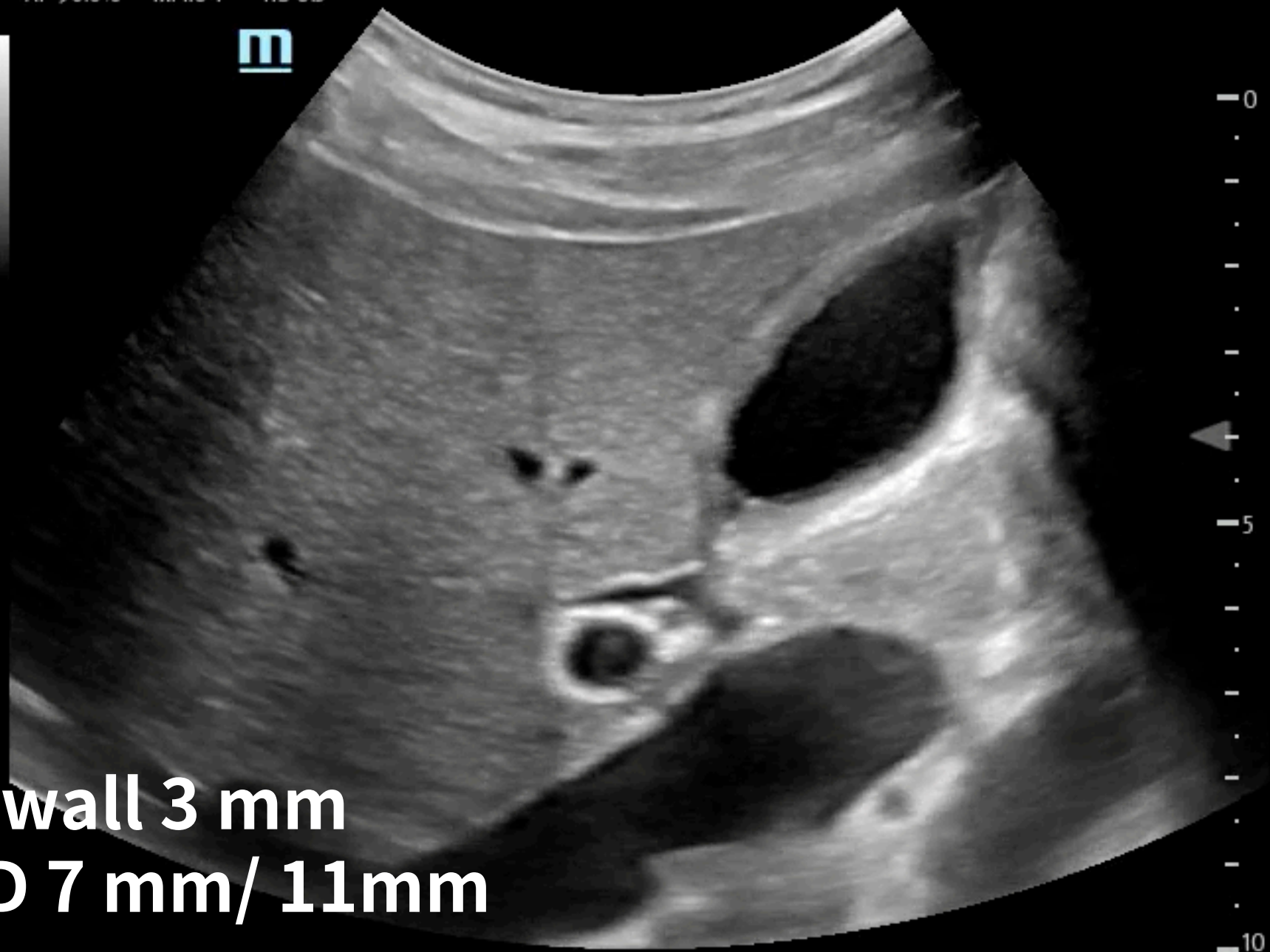
B
FH6.0
DR 130
FR 18
D 16.0
G 81
Z 1.10



iNeedle

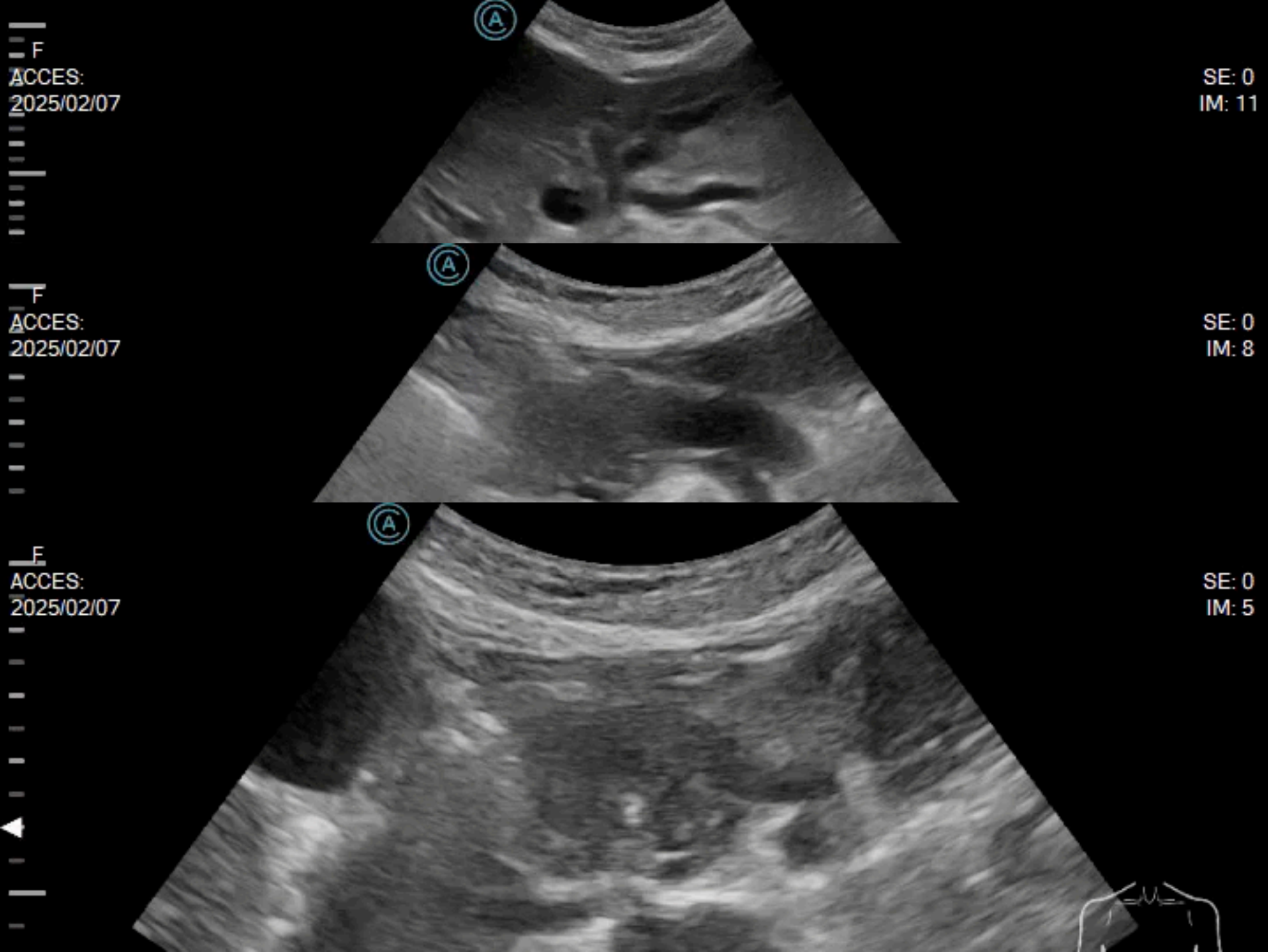
iTouch





GB wall 3 mm
CBD 7 mm/ 11mm





C5-2s

AP 96.6%

MI 1.00

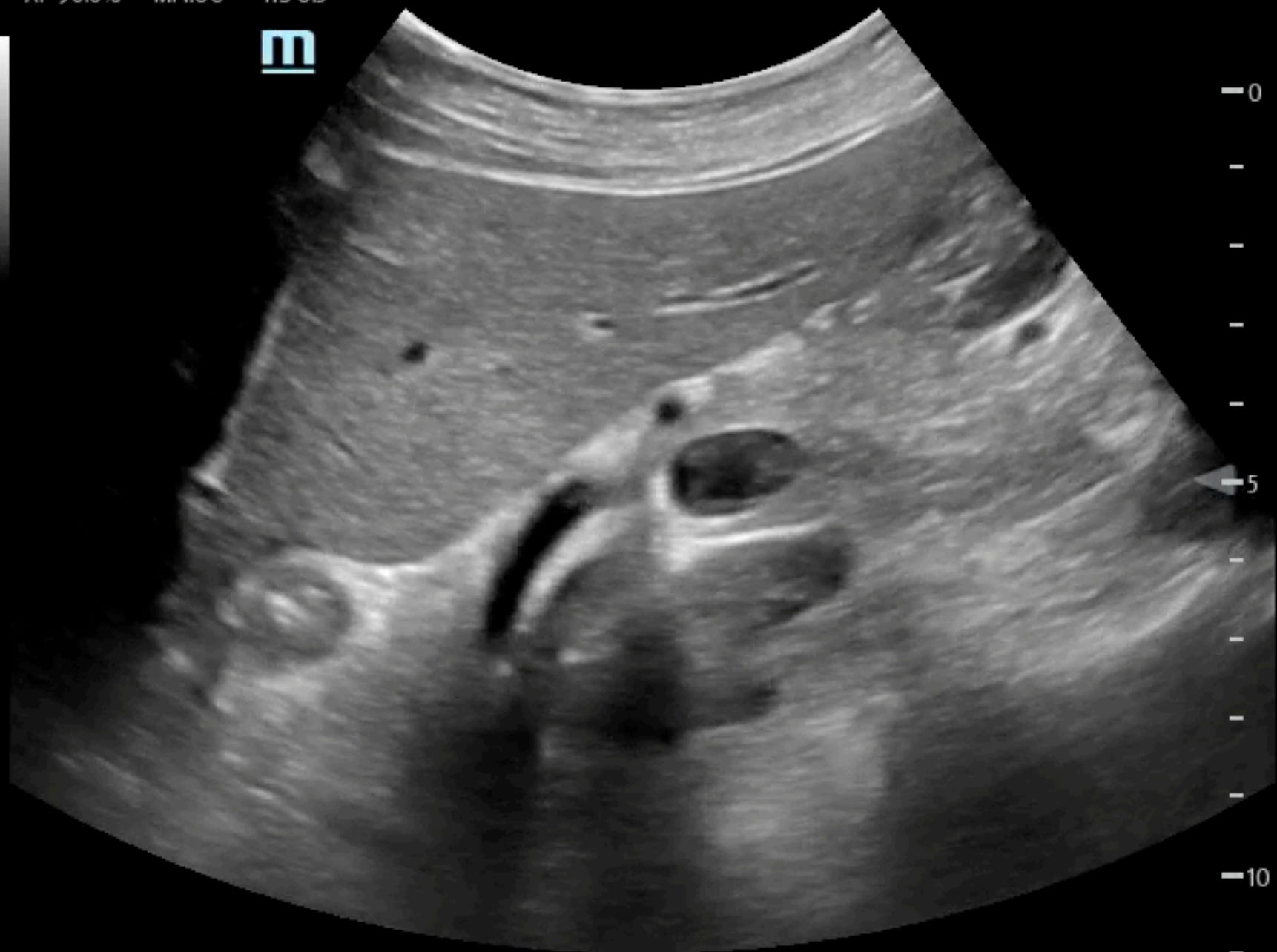
TIS 0.5

B
FH5.0
DR 130
FR 24
D 11.0
G 56



iNeedle

iTouch



S_{ize}

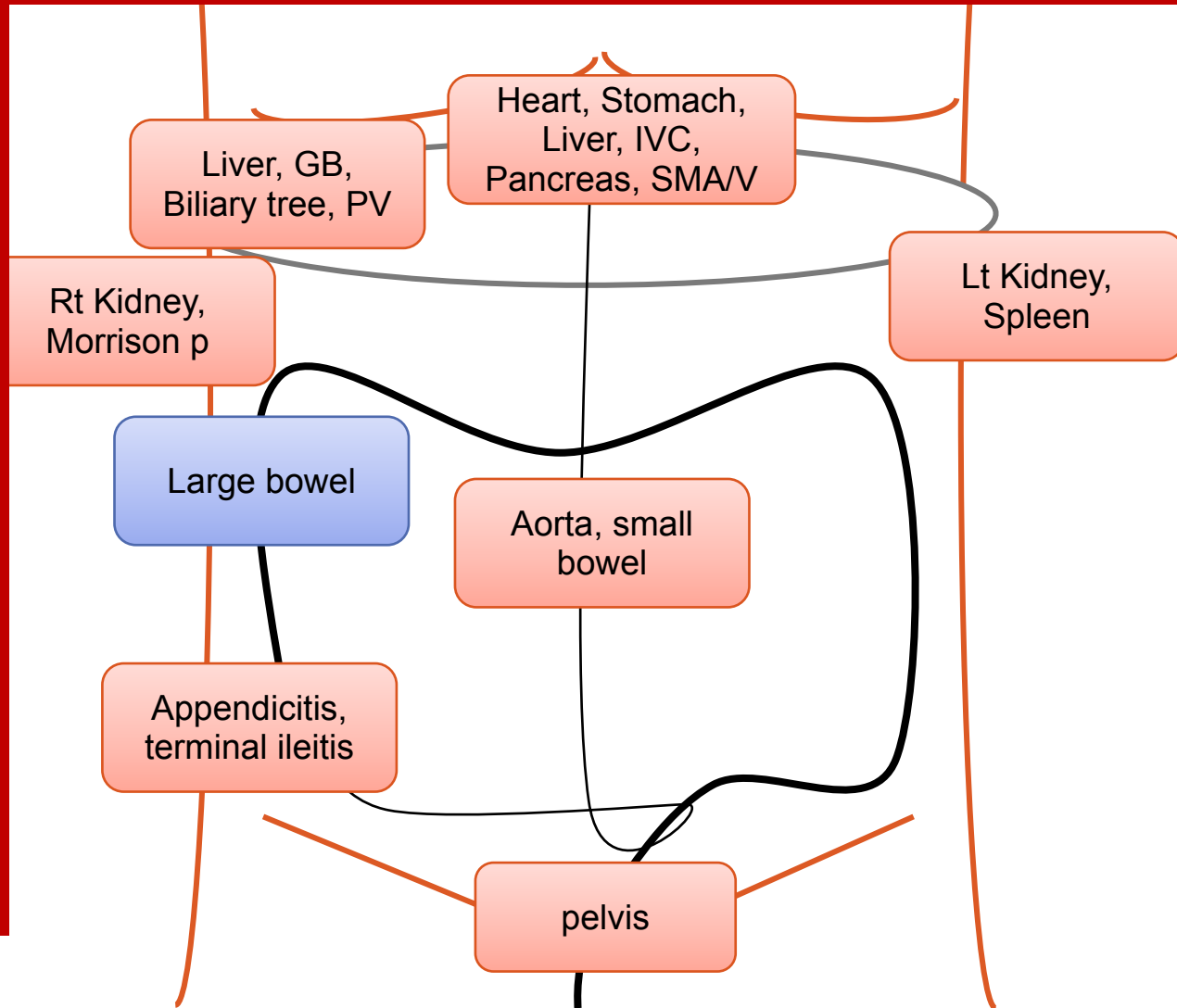
A_{ir}

F_{luid}

E_{cho-genicity}

R<sub>egional
lesion</sub>

Throw the SAFER Lasso!



Focused Assessment

Size

Air (free / trapped)

Fluid (free / trapped)

Echogenicity

Regional lesion

Normal / Abnormal

Y / N

Y / N

Homo / Hetero

Y / N

Focused Assessment

Size

Air (free / trapped)

Fluid (free / trapped)

Echogenicity

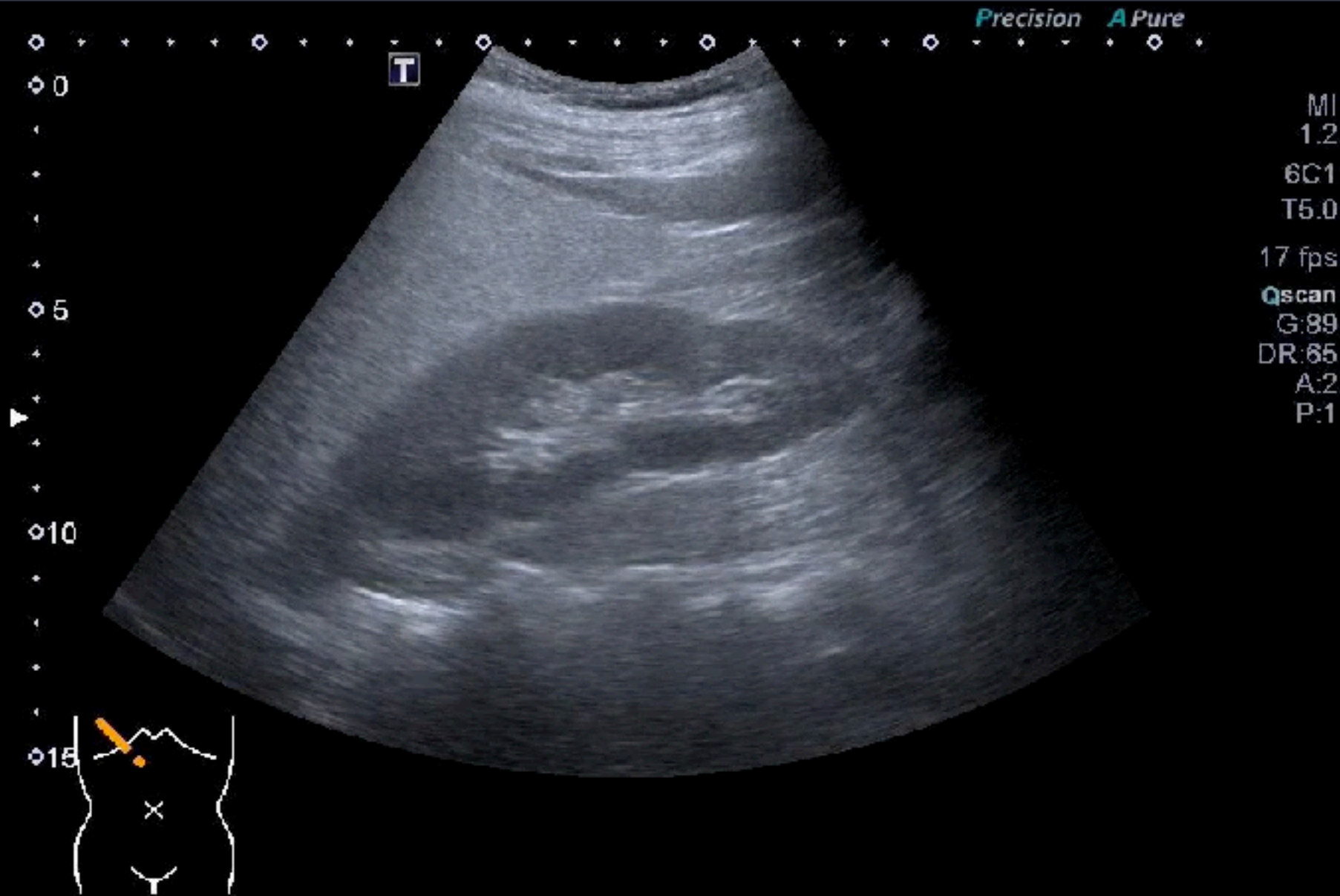
Regional lesion

Within / Surrounding

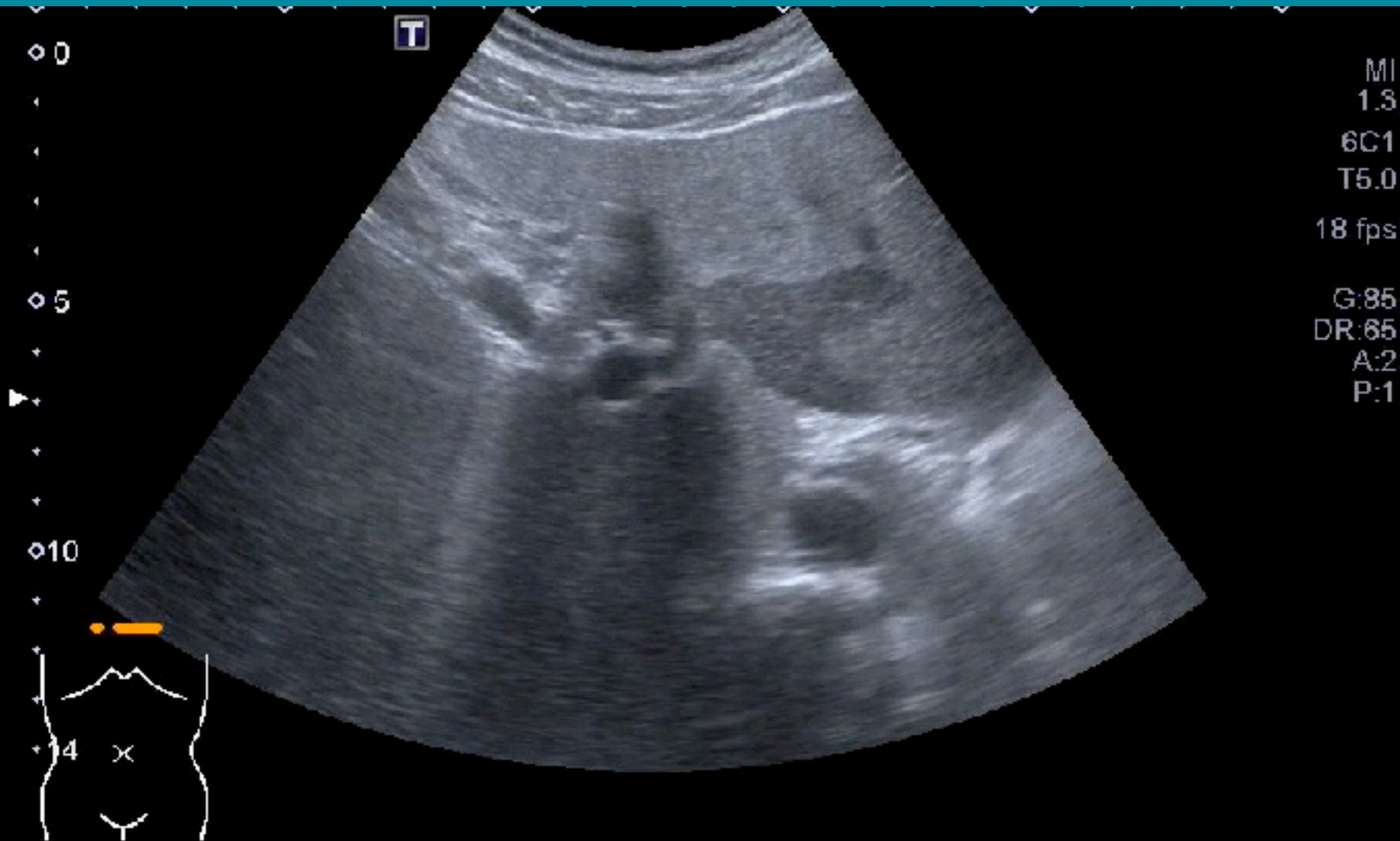
Within / Surrounding

Stones . Mass . Shape

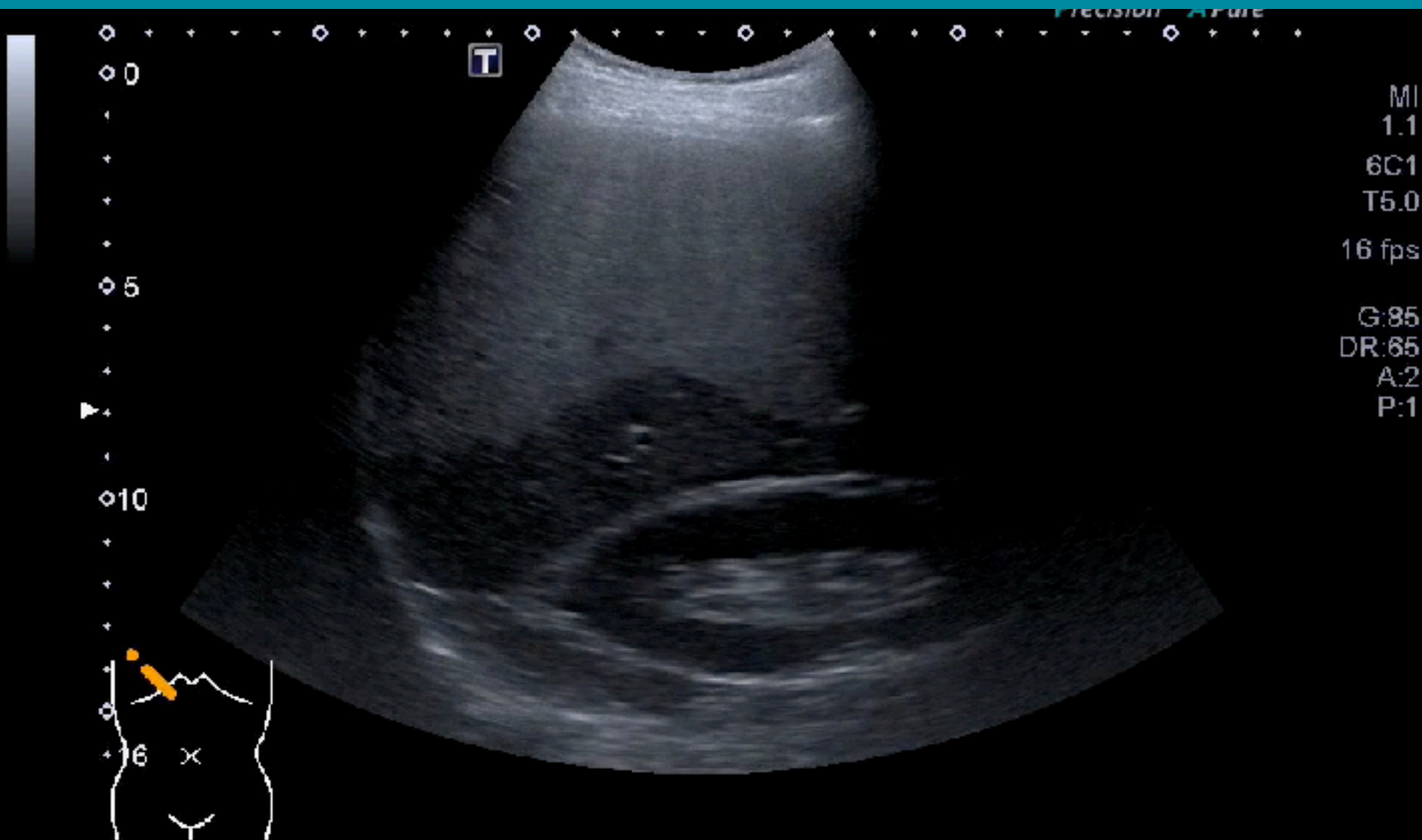
Fatty liver



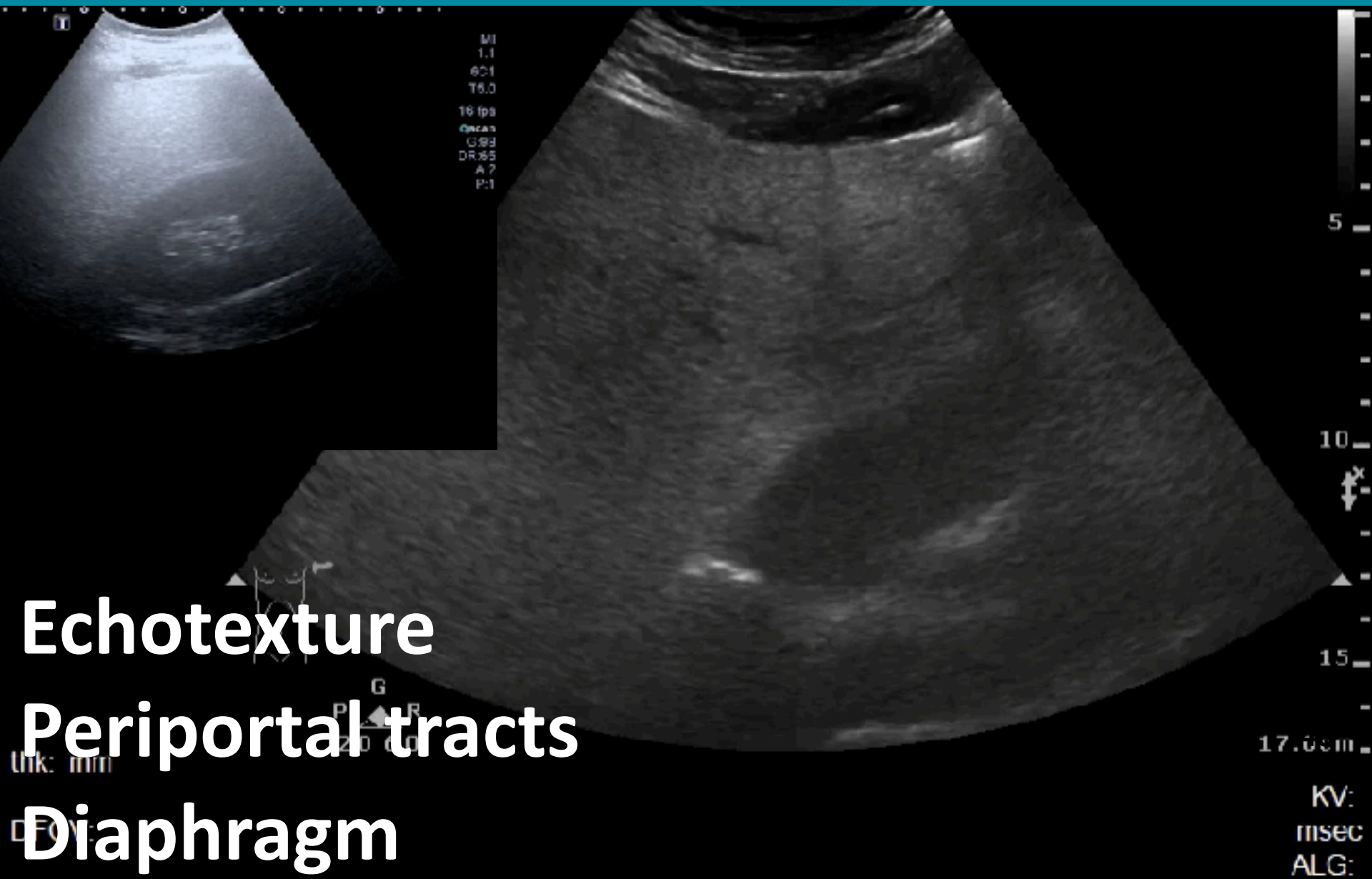
Fatty liver - focal sparing



Fatty liver - focal sparing

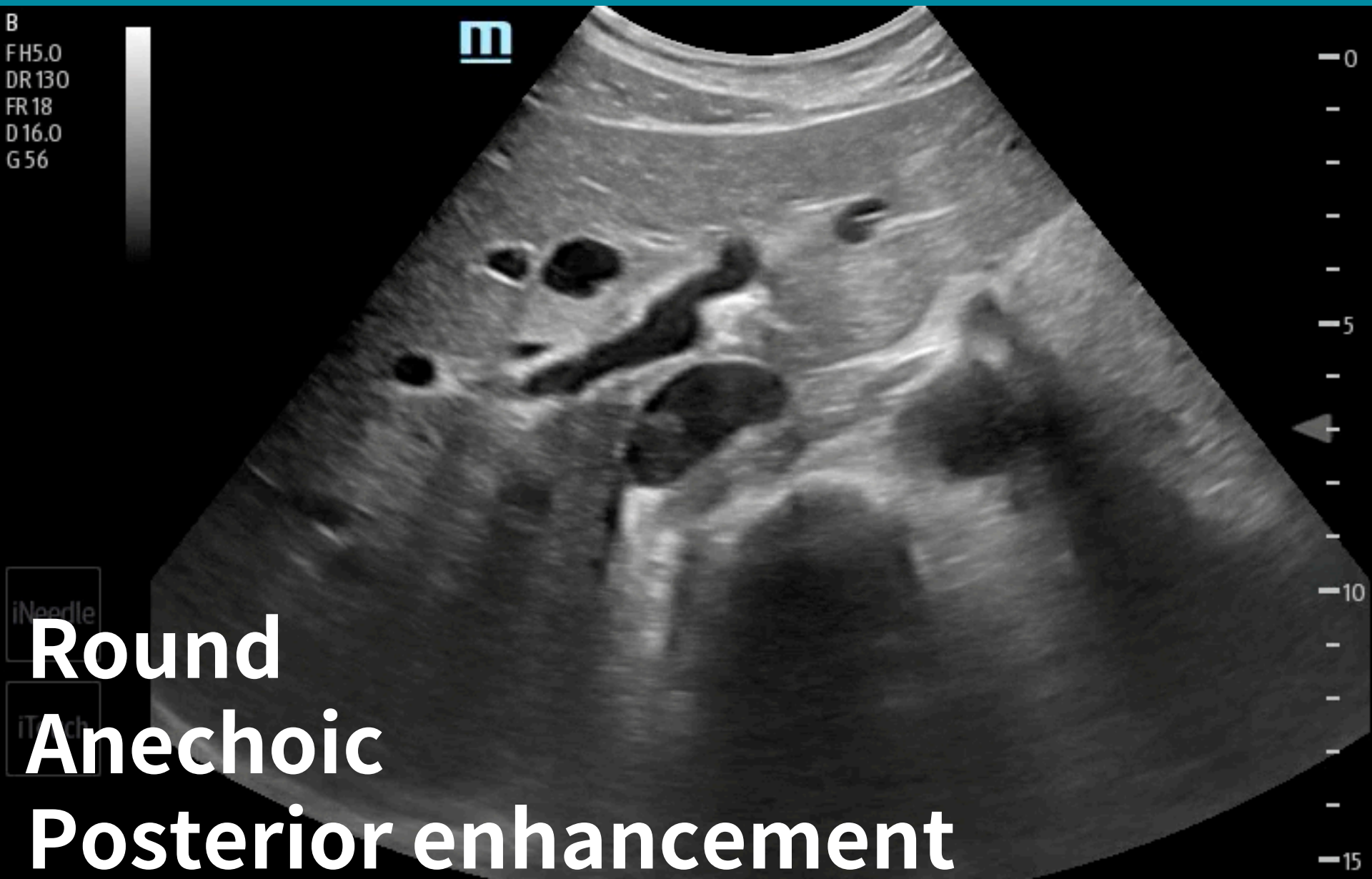


Fatty liver



Echotexture
Periportal tracts
Diaphragm

Cyst - liver

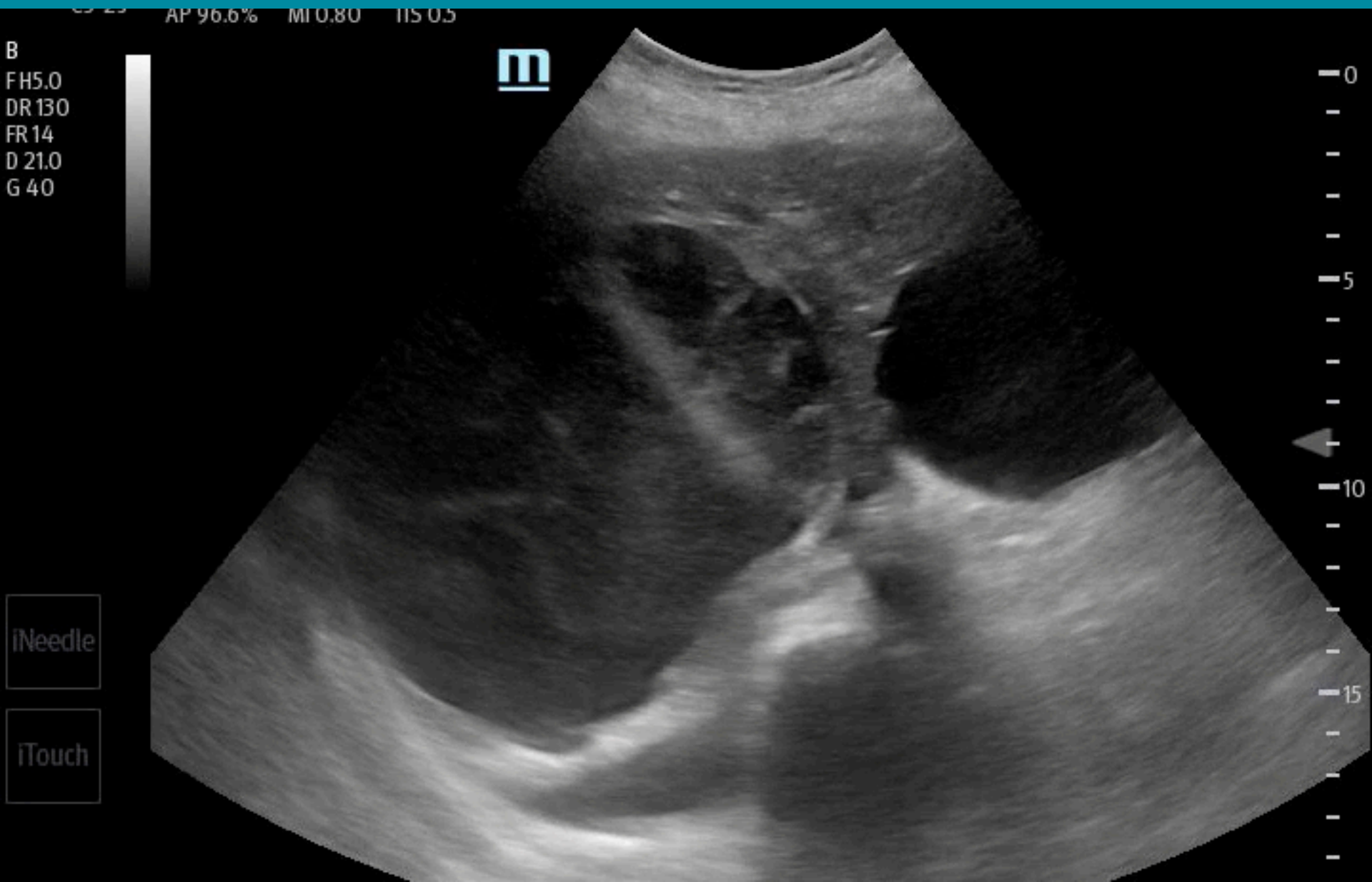


Round

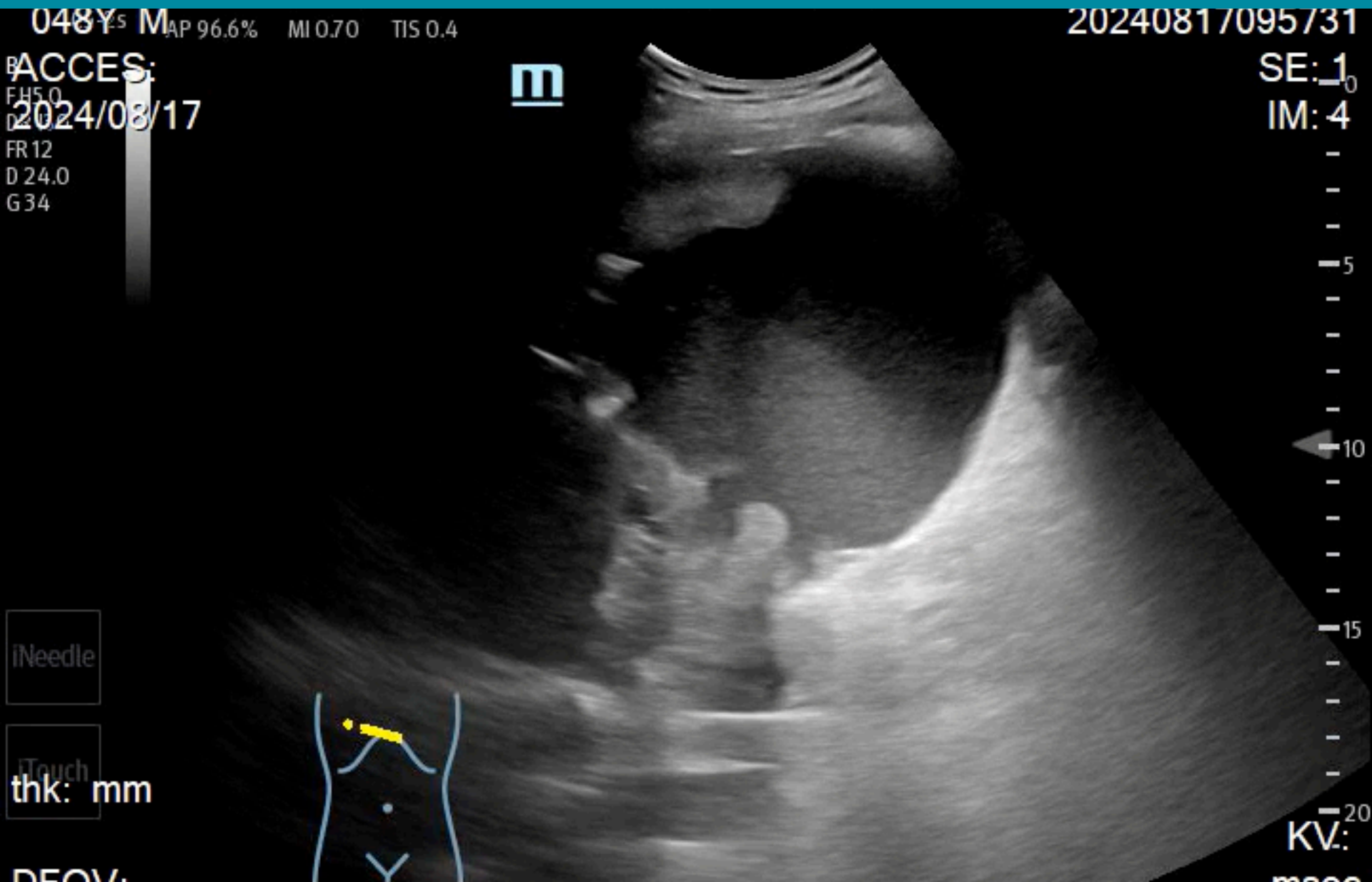
Anechoic

Posterior enhancement

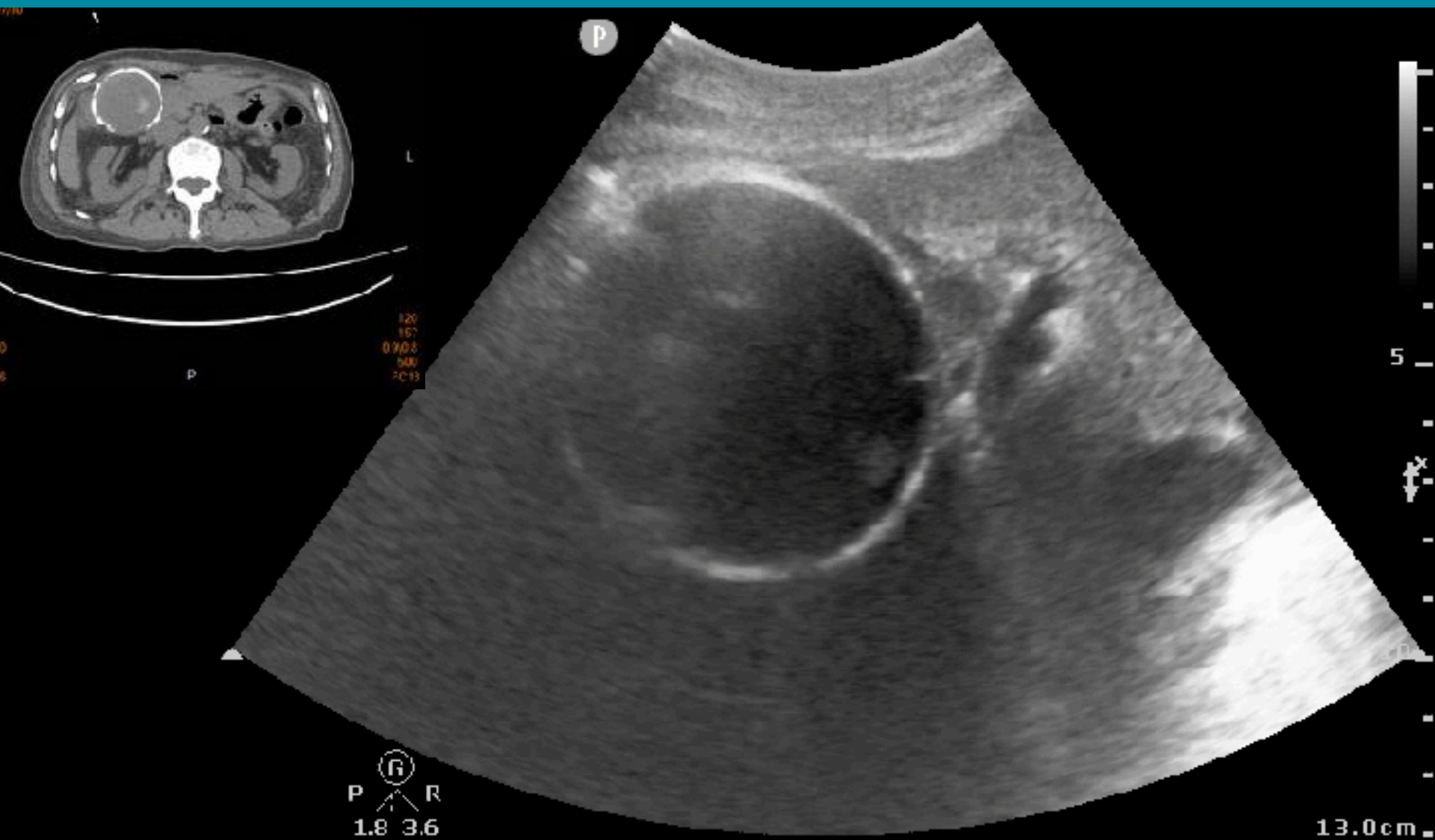
Cyst - complicated



Cyst - complicated



Cyst - calcified / hemorrhage



Abscess - liver

2024/09/15
FH5.0
DR 130
FR 17
D 17.0
G 59

m

IM: 4
—0

—

—

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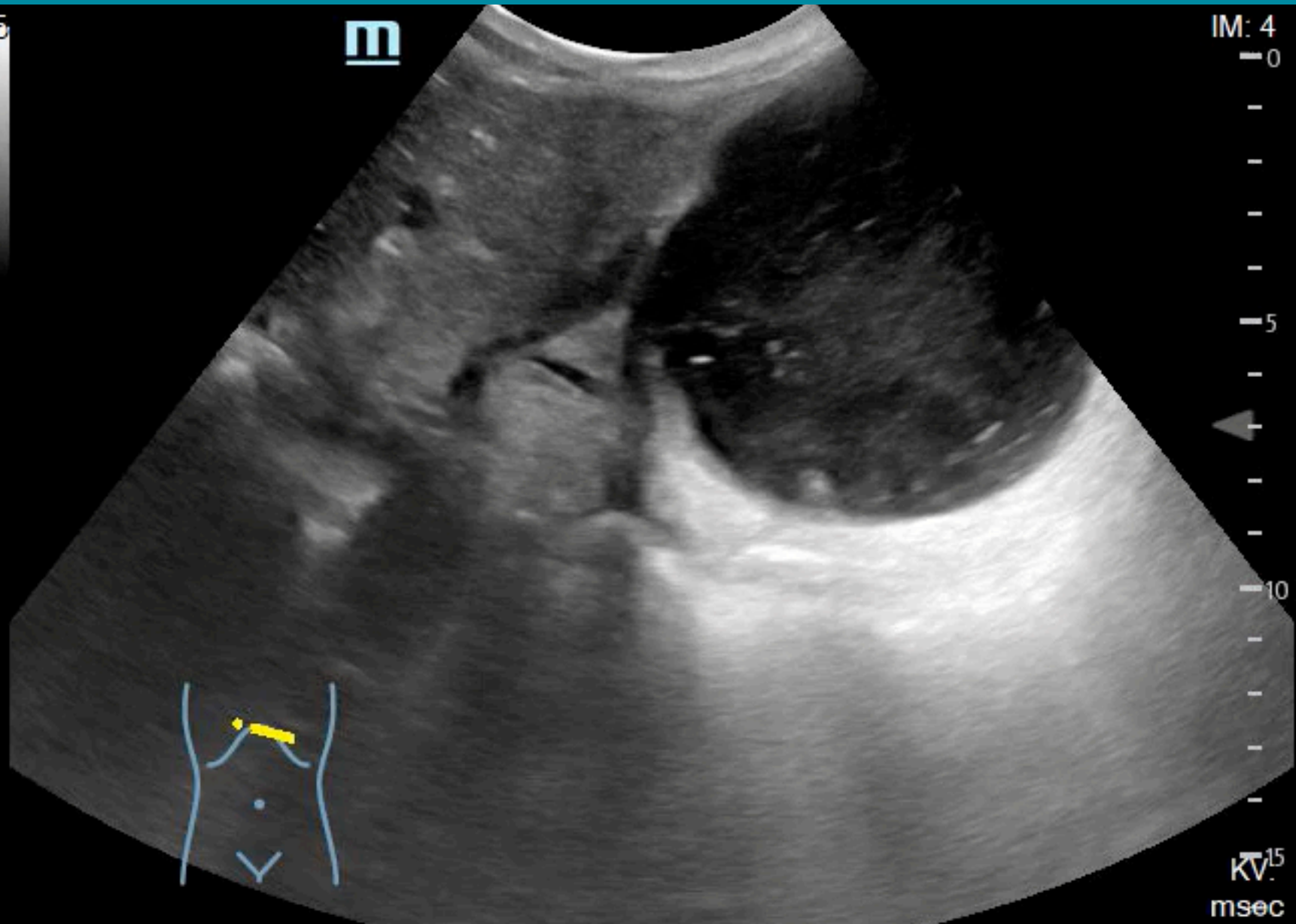
iNeedle

iTouch

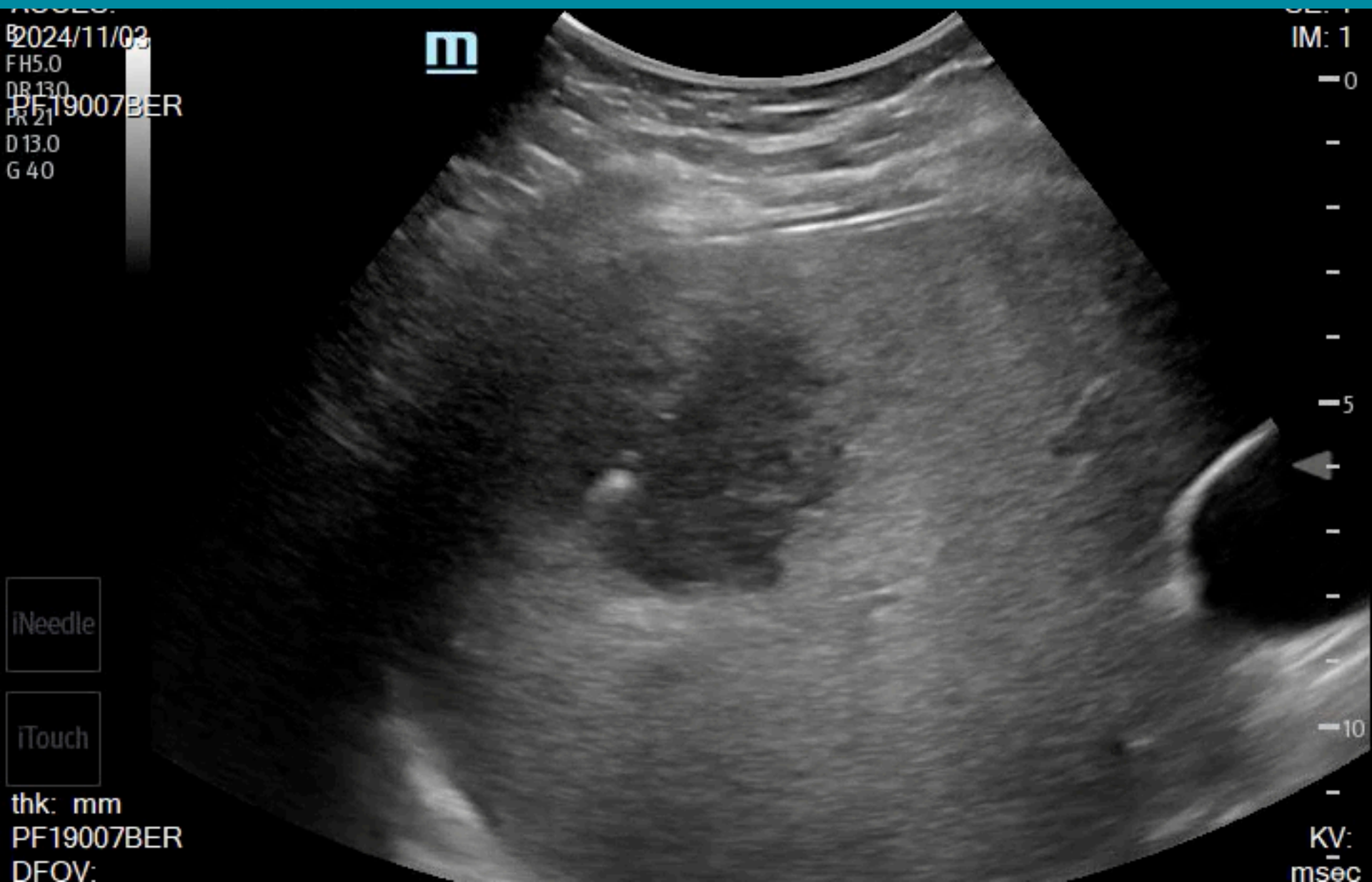
thk: mm

DFOV:

KV¹⁵
msec



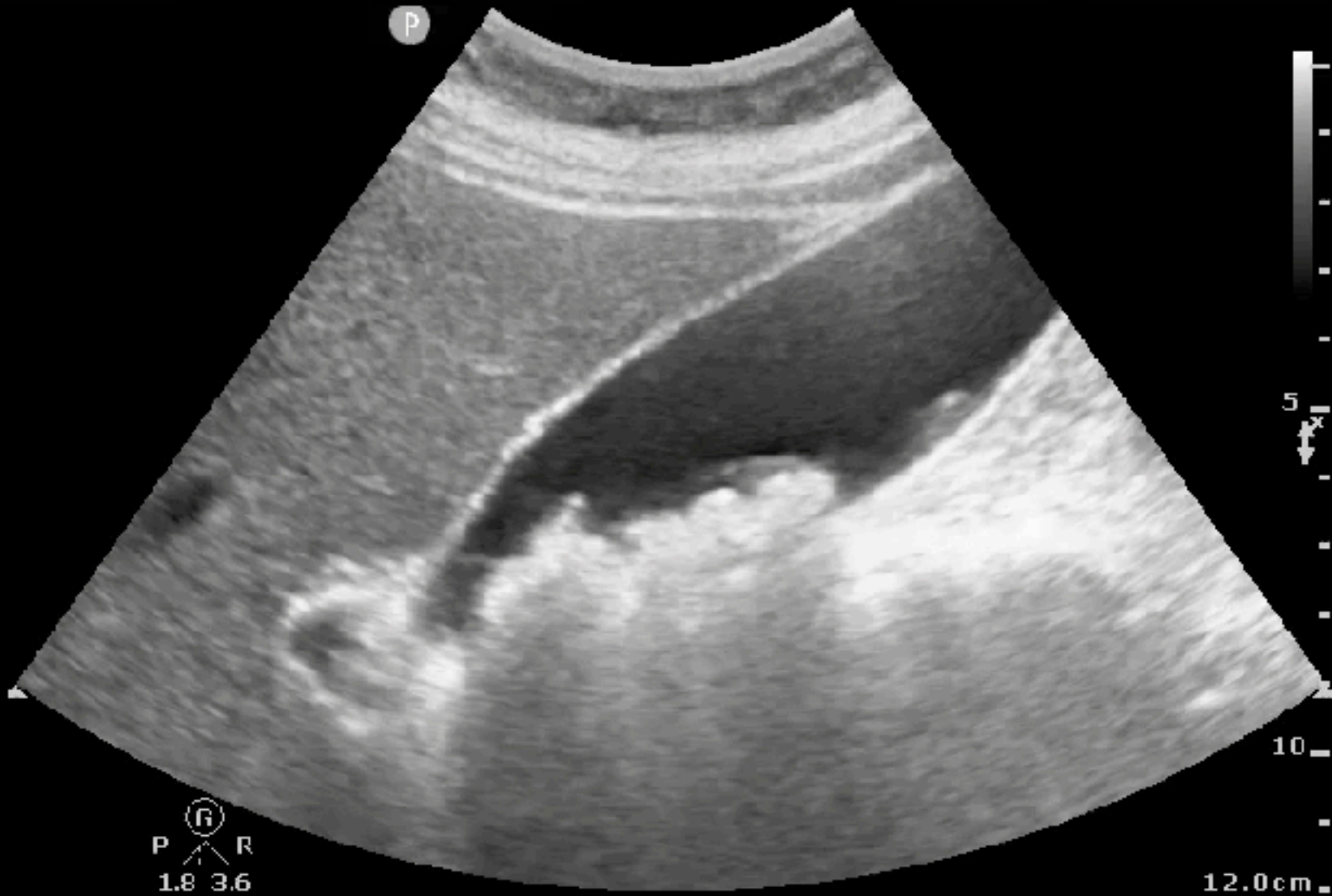
Abscess - liver



Stones - GB

Abd Gen
C5-1
39 Hz
12.0cm

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



Stones - cystic duct

2024/11/27
FH5.0
DR 130
FR 18
D16.0
G 35

m

IM: 12
-0

-
-
-
-
-5

-
-
-10

-
-
-

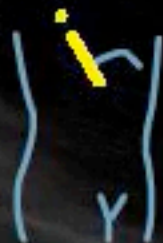
KV:
m

iNeedle

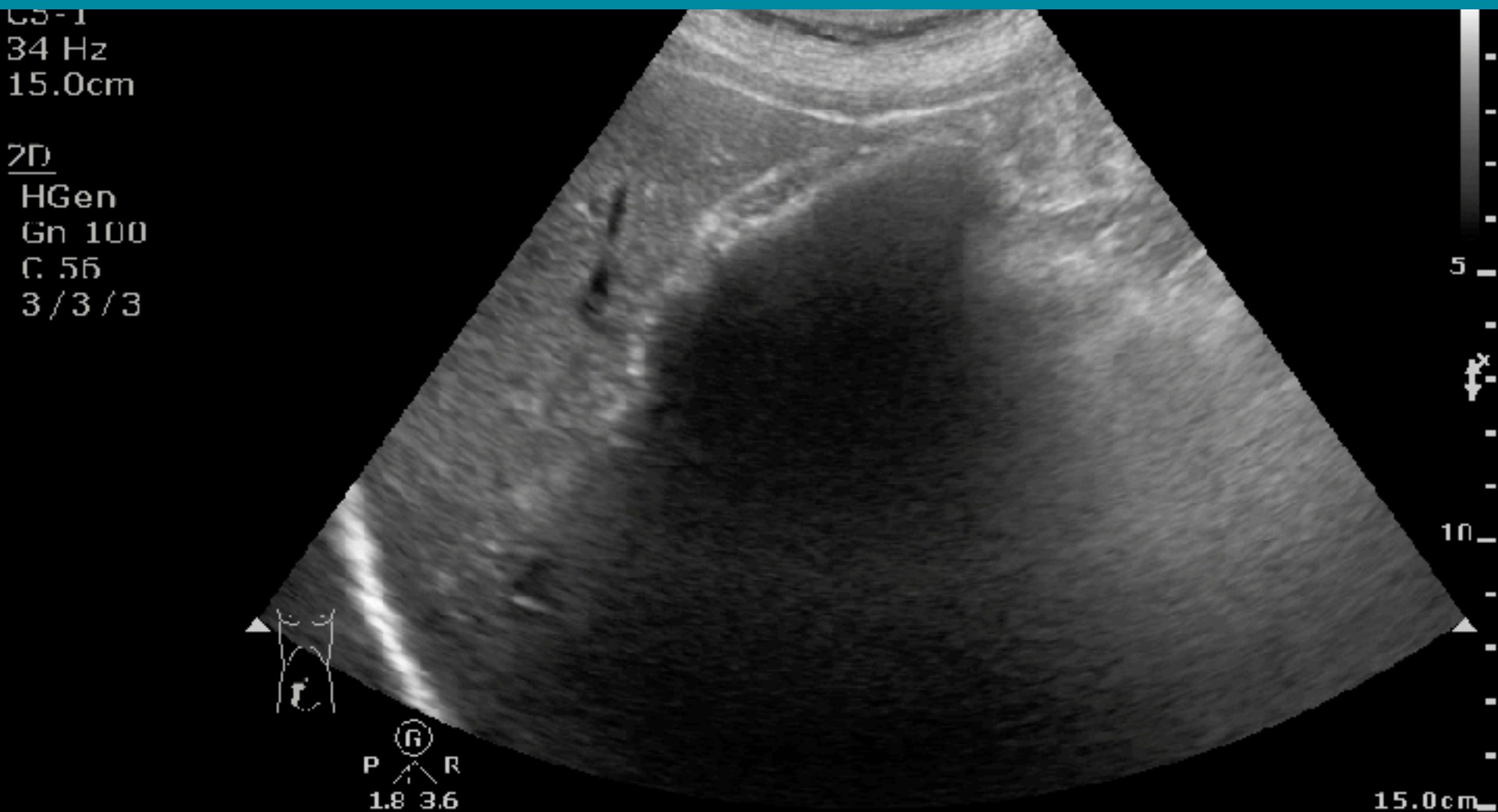
iTouch

thk: mm

DEOV



Stone - GB (WES sign)



Stones - CBD

ACCESS:
FH5.0
2024/08/17
FR 20
D14.0
G 40



SE: 1
IM: 4

-
-
-
-
-5
-
-
-
-10
-

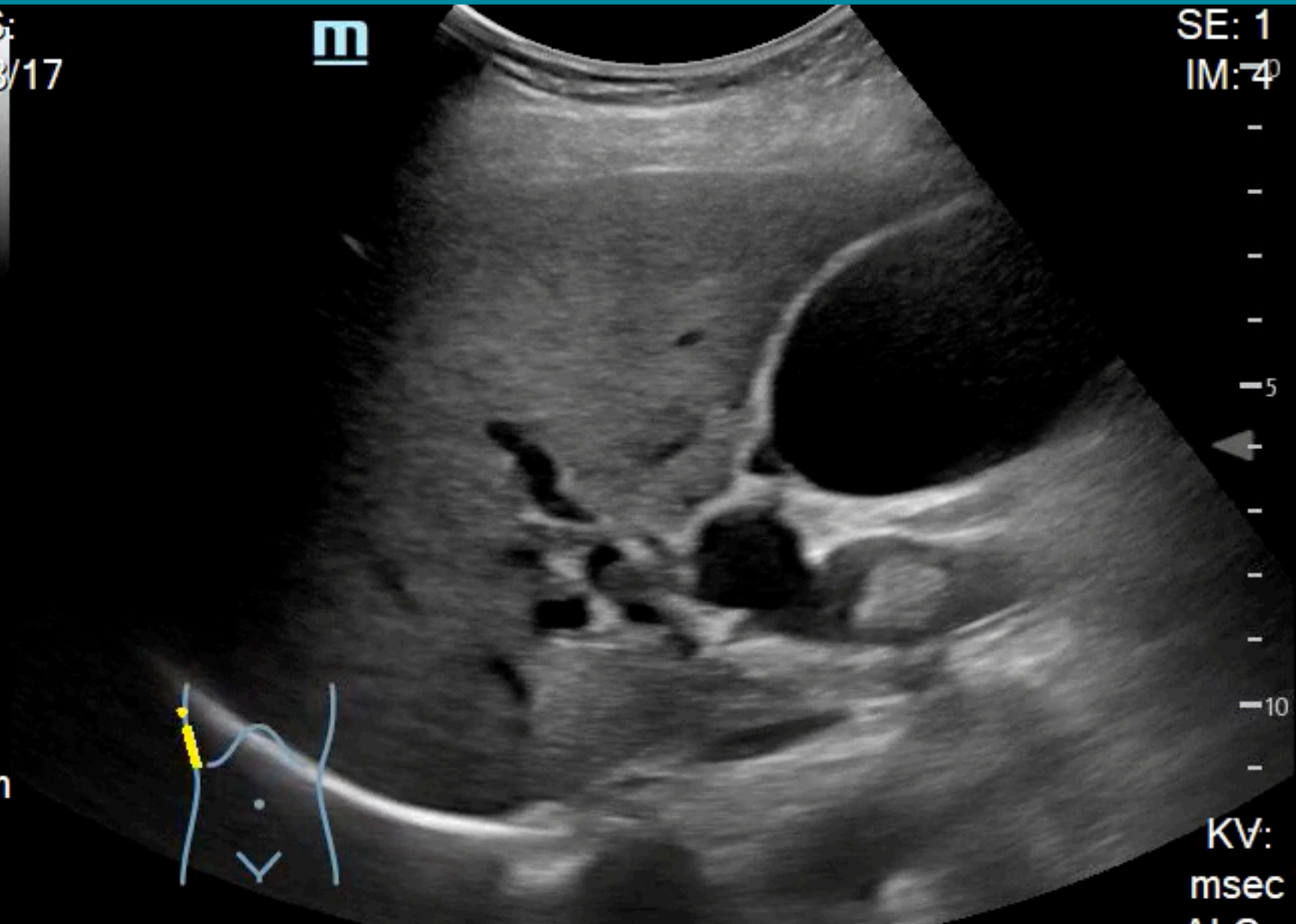
KV:
msec
ALG

iNeedle

iTouch

thk: mm

DFOV:



Stones - CBD

ACCESS:
FH5.0
2024/08/17
FR 20
D14.0
G 40

m

SE: 1
IM: 7

-
-
-
-
-5
-
-
-
-10
-

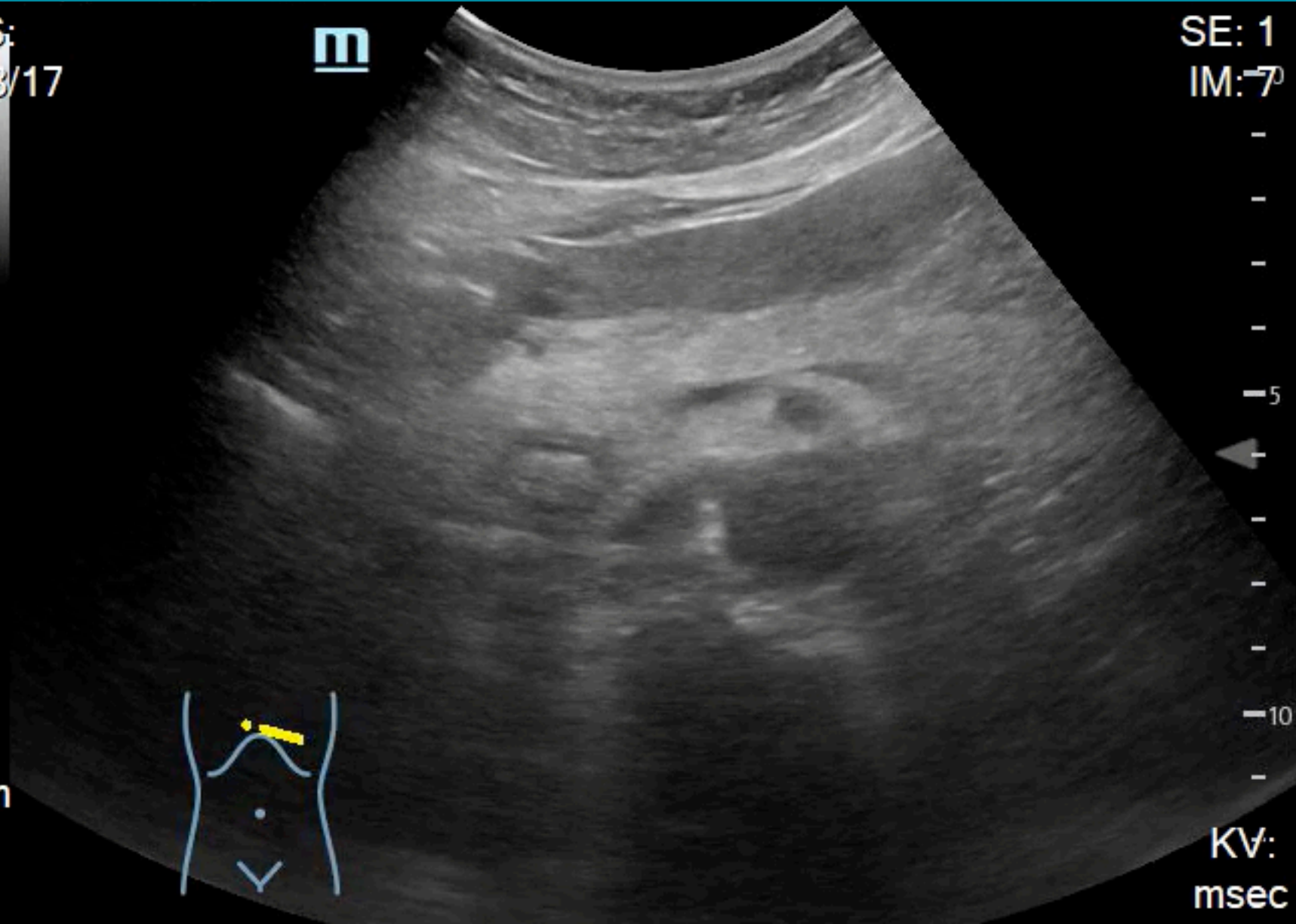
KV:
msec

iNeedle

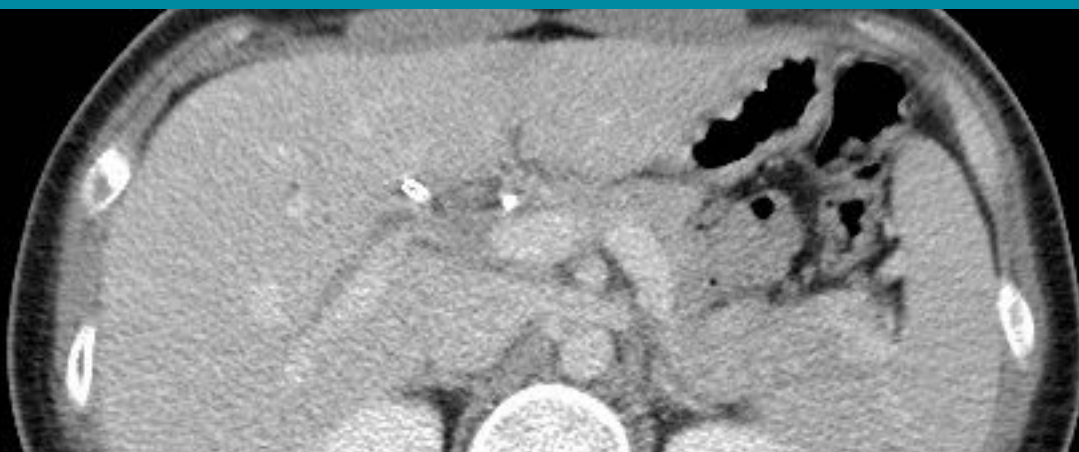
iTouch

thk: mm

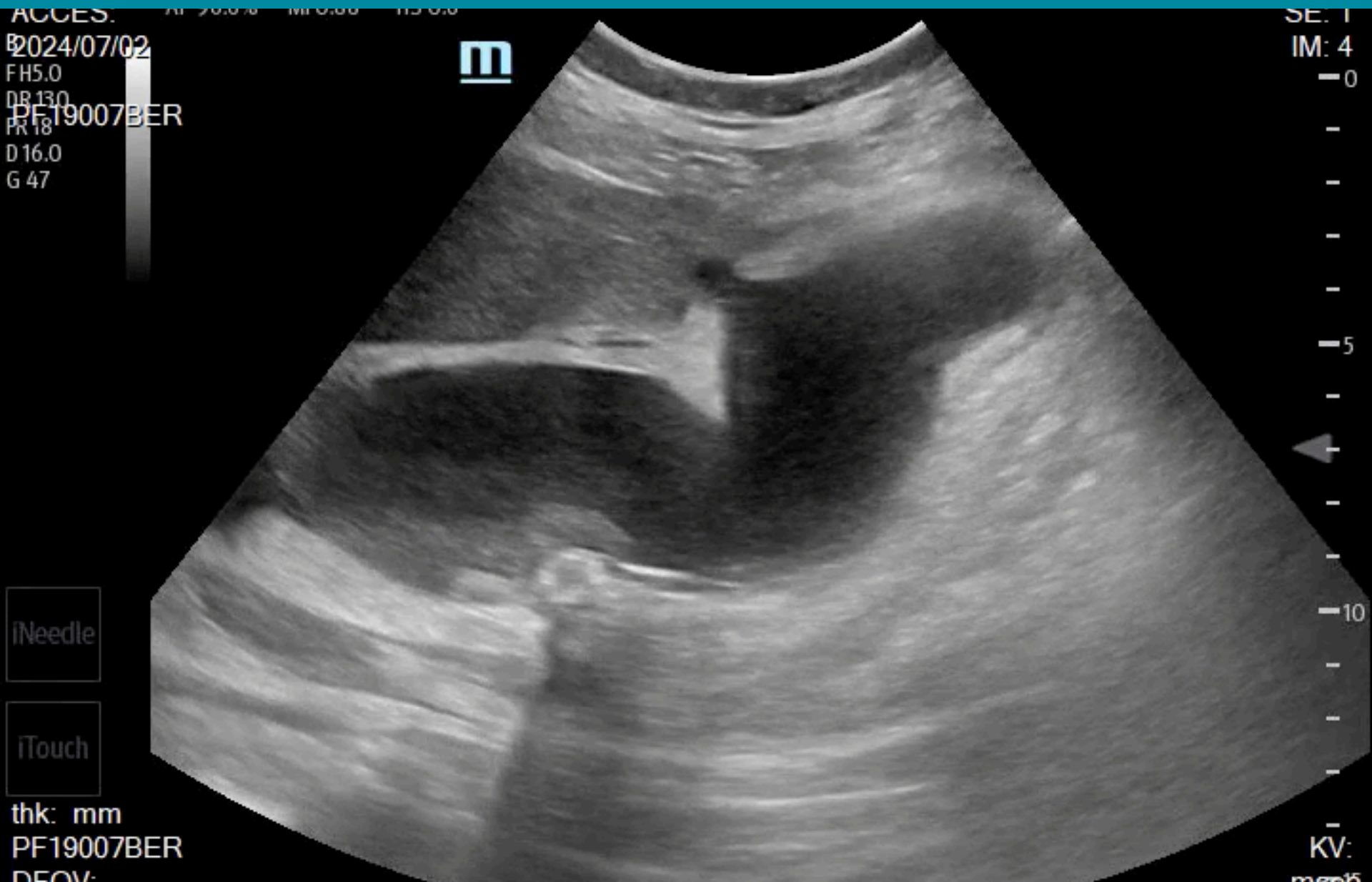
DFOV:



Stones - CBD



Obstruction - GB



Biliary dilatation

2024/11/01
FH5.0
DR 130
FR 18
D 16.0
G 56



IM: 6
—0

—5

—10

62

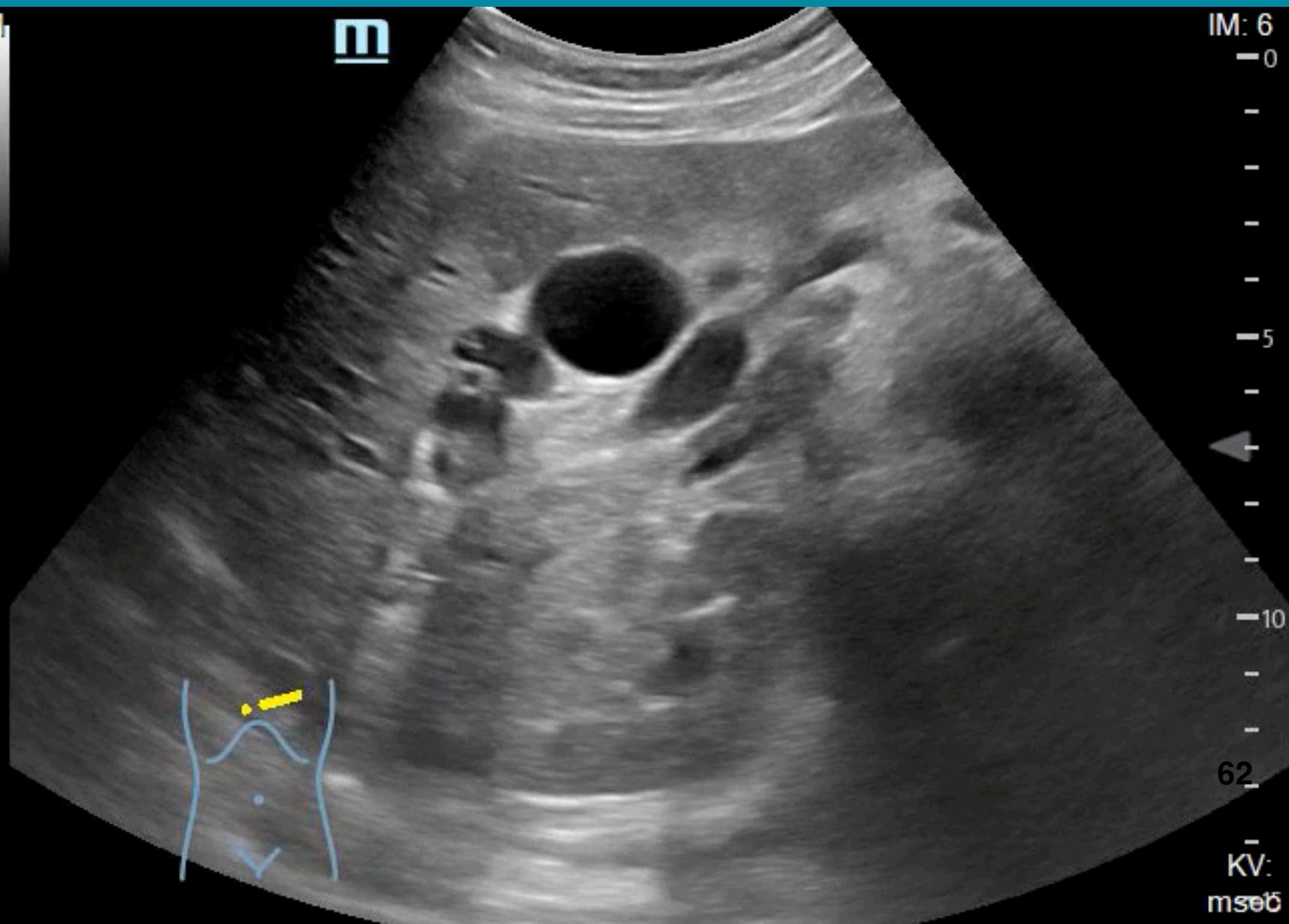
KV:
msec

iNeedle

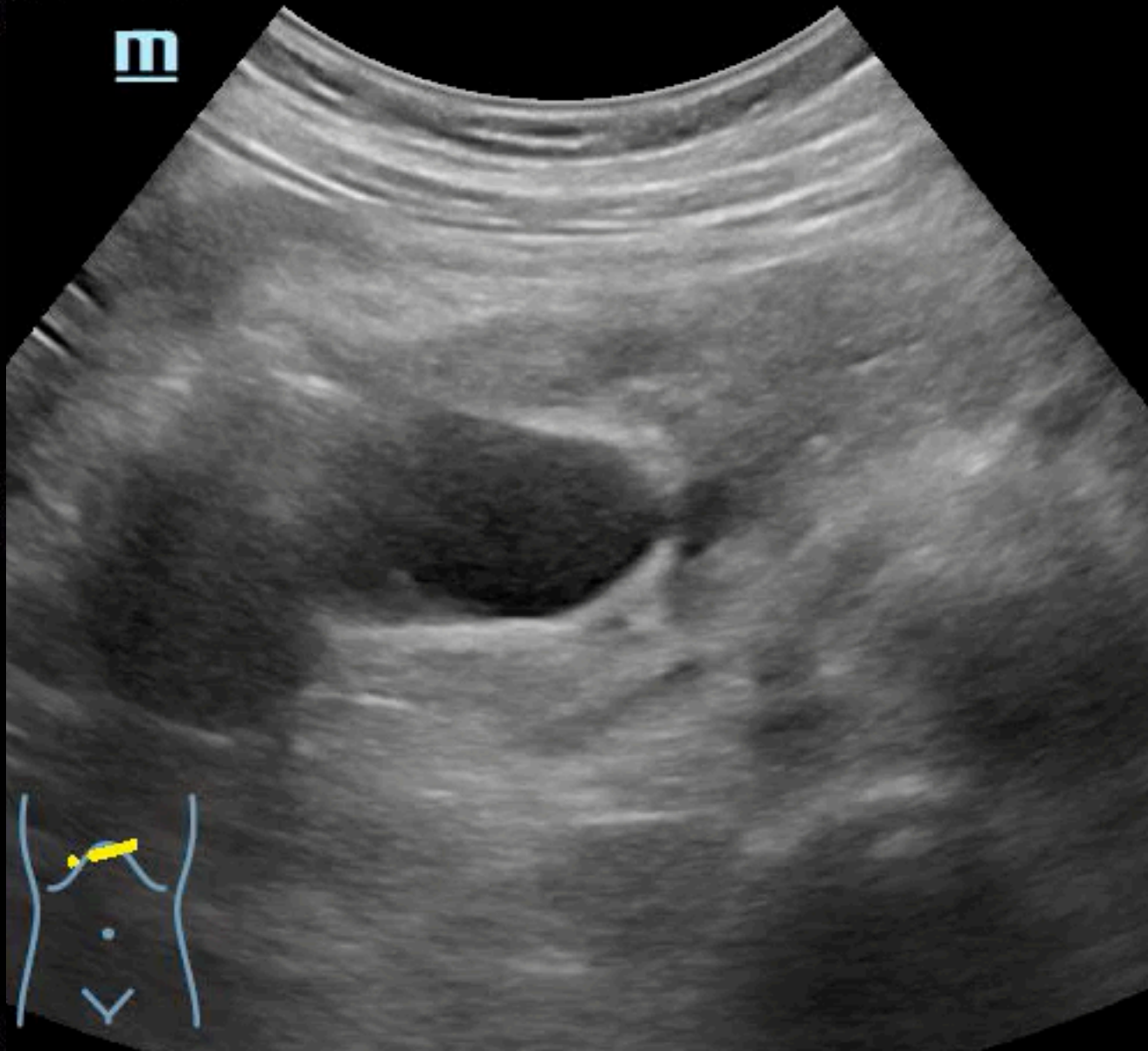
iTouch

thk: mm

DFOV:



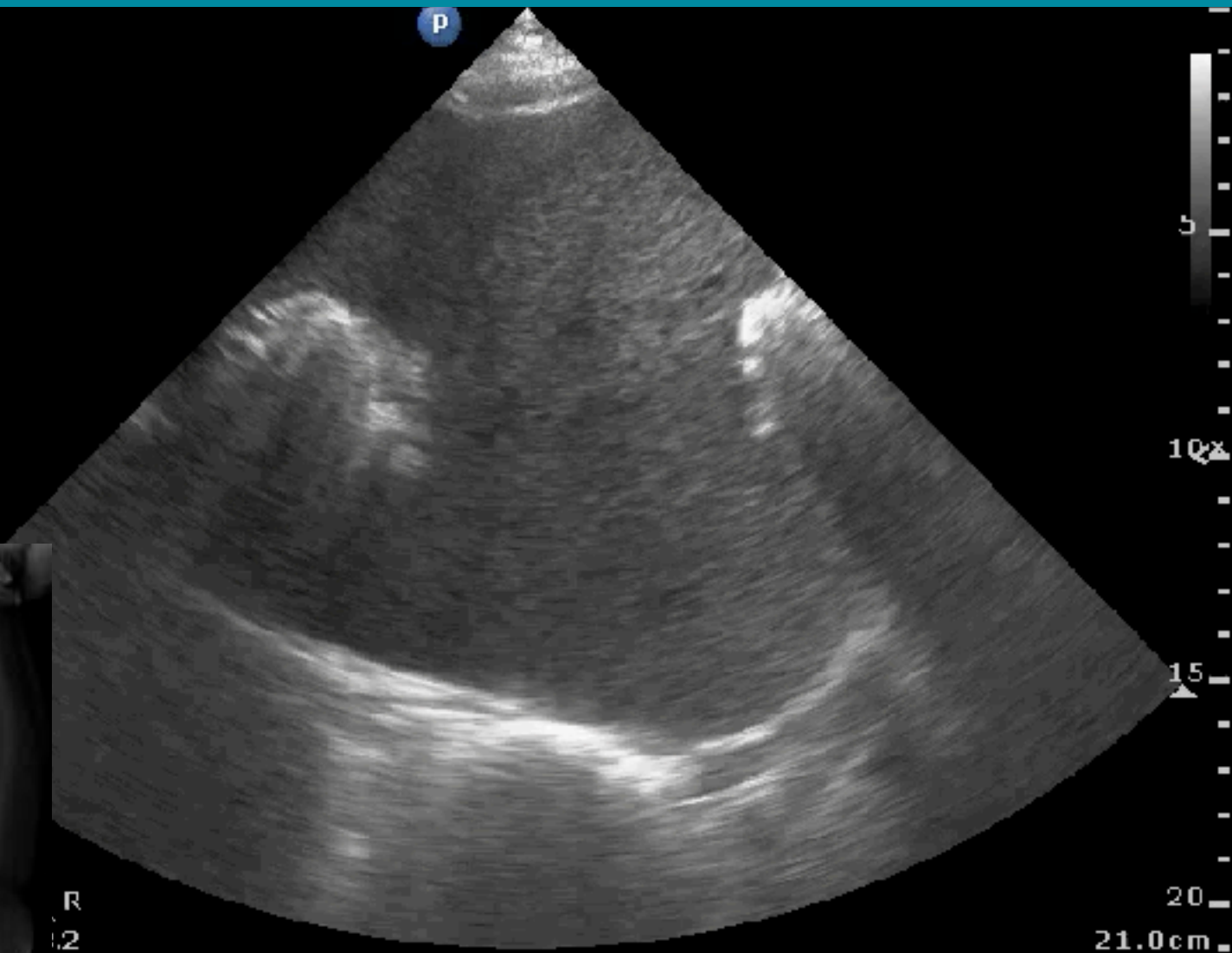
Pancreatic head tumor



Air - liver

Abd Gen
S5-1
17 Hz
21.0cm

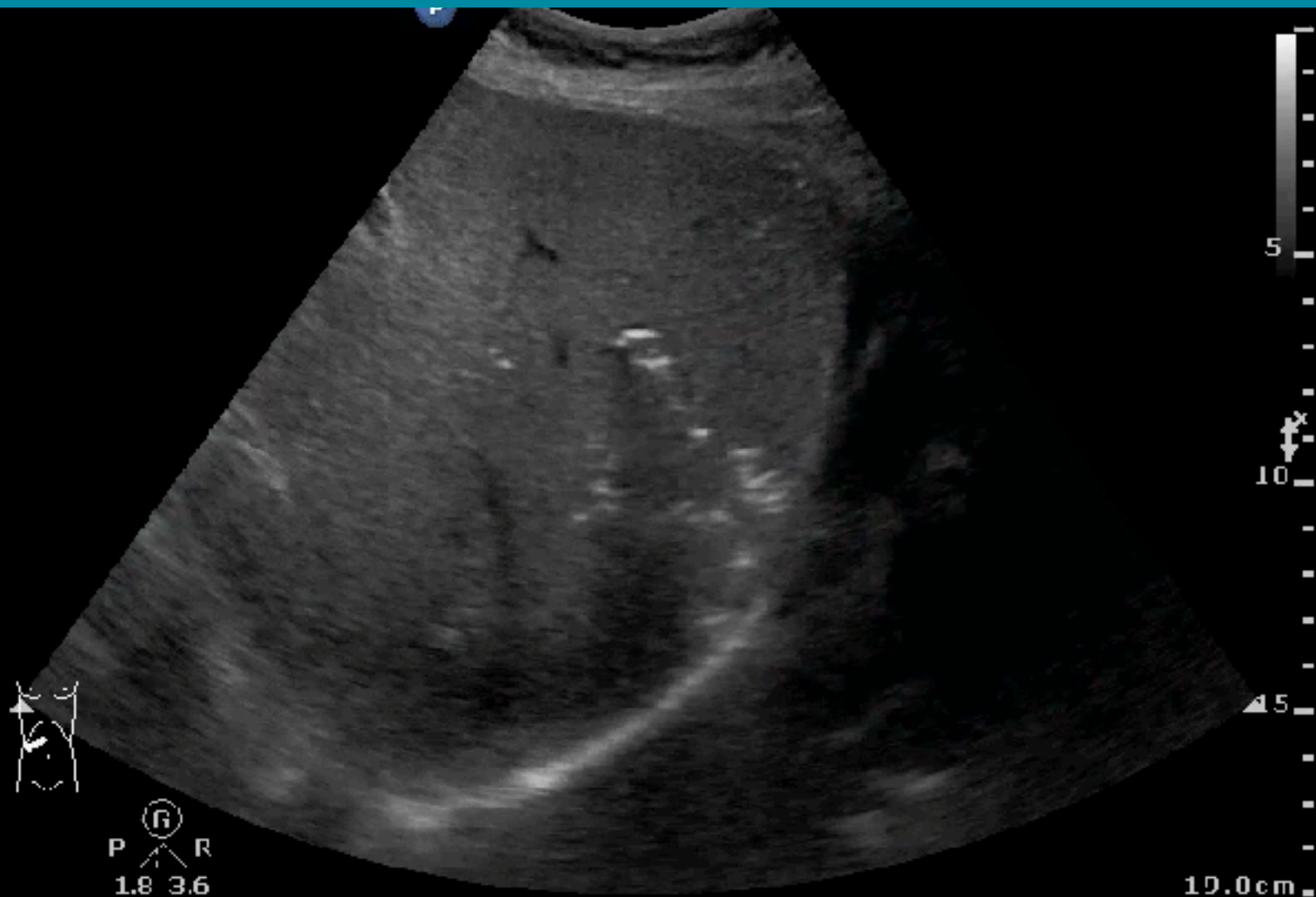
2D
HGen
Gn 70
C. 56
3/3/4



Air - liver vessels

Abd Gen
C5-1
29 Hz
19.0cm

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



Air - HPVG

ACCES: AP 90.0% MI 0.88 HS 0.0

2024/12/05

FH5.0

DR 130

PF19005CER

PR 18

D 16.0

G 55



SE: 1

IM: 1

-0

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

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iNeedle

iTouch

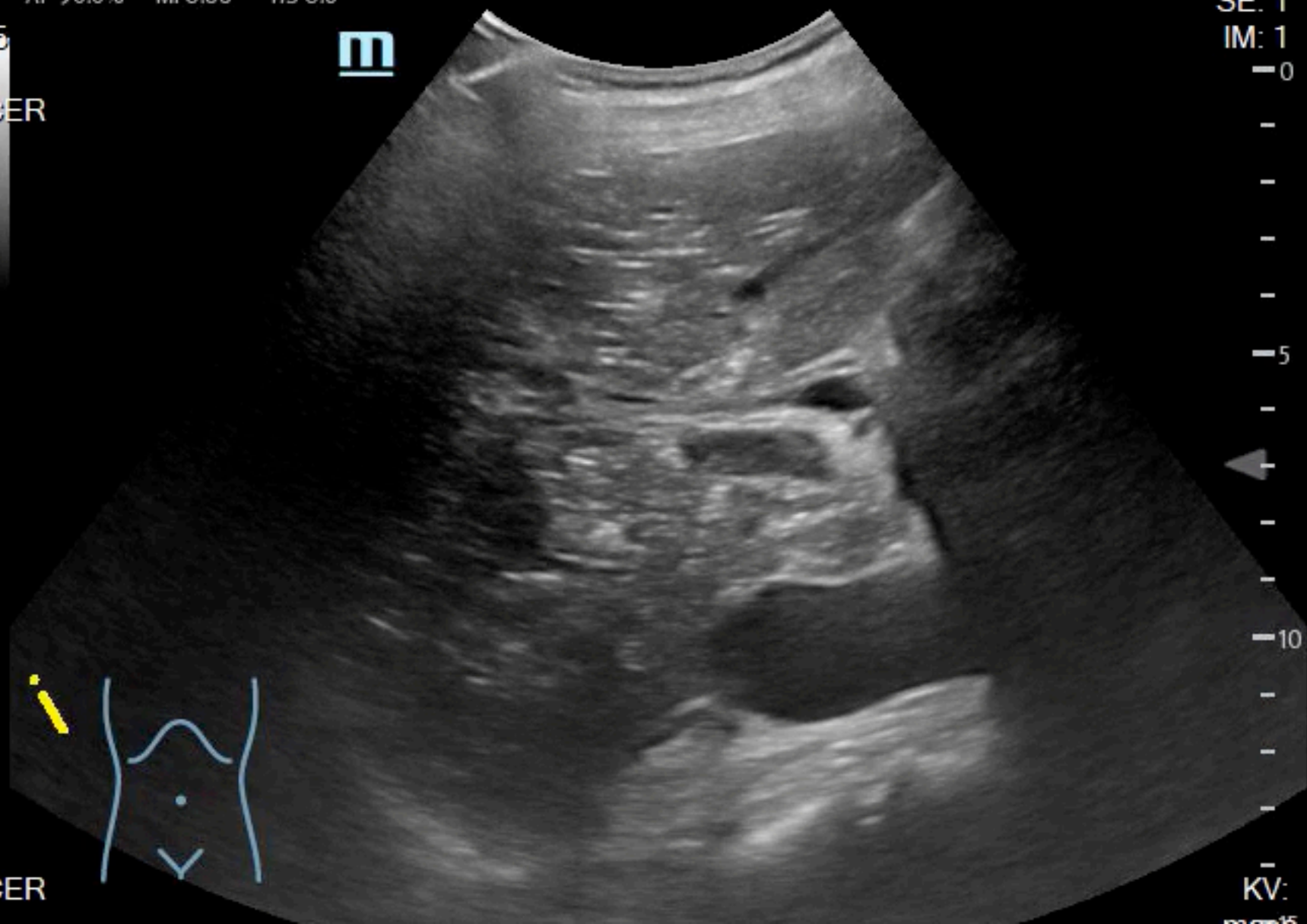
thk: mm

PF19005CER

DEOV:

KV:

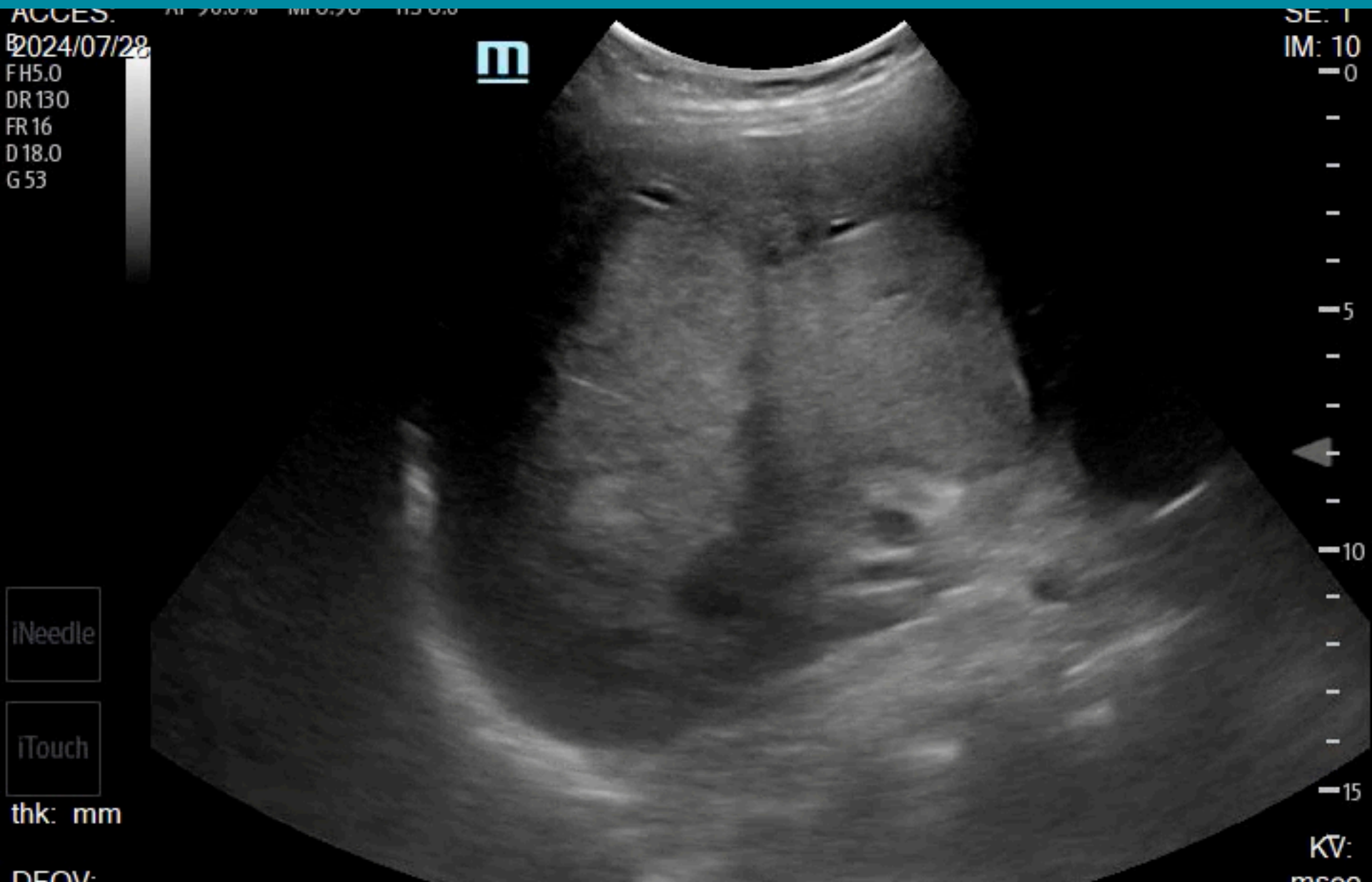
m 15



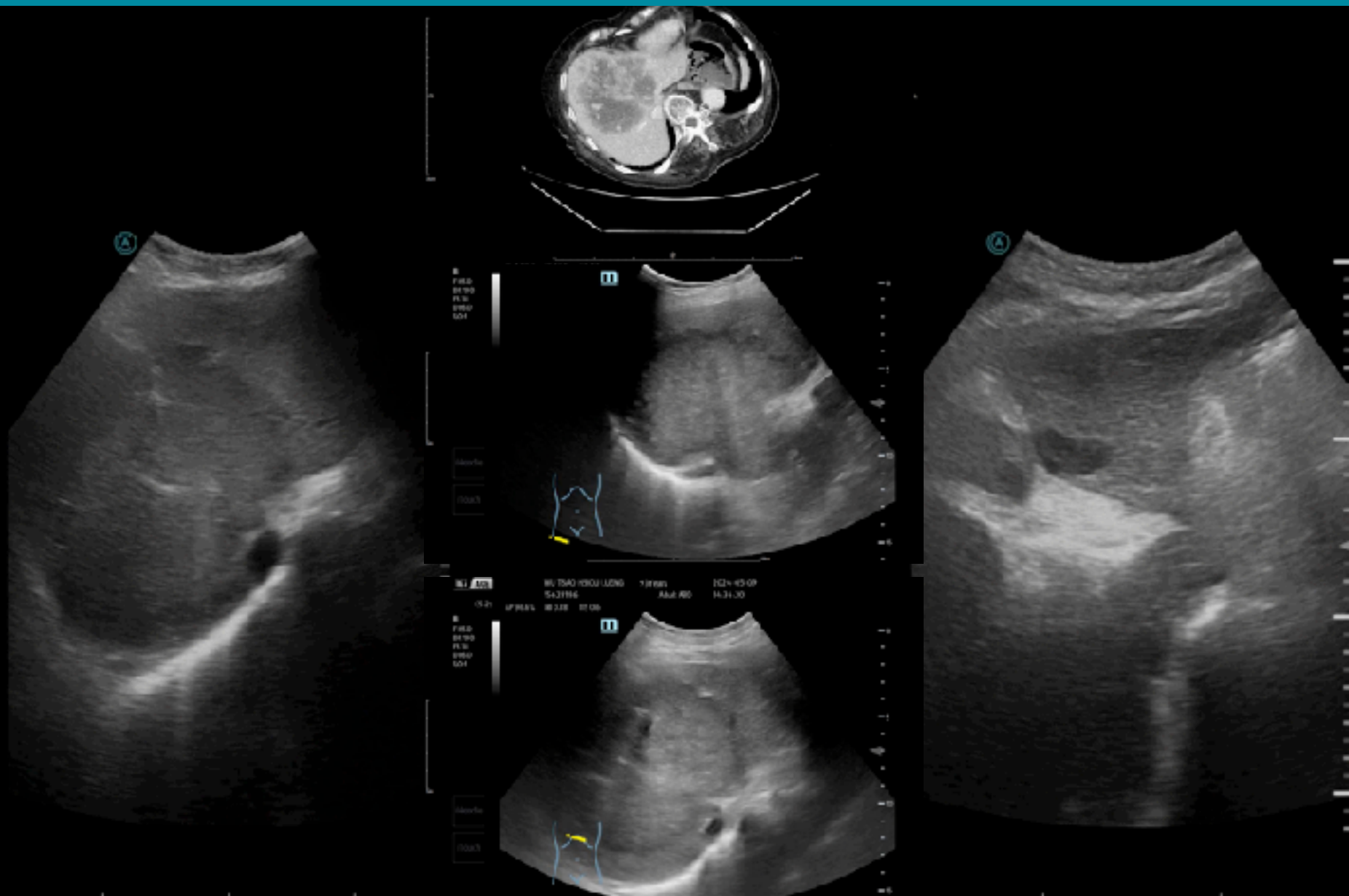
Mass - hemangioma



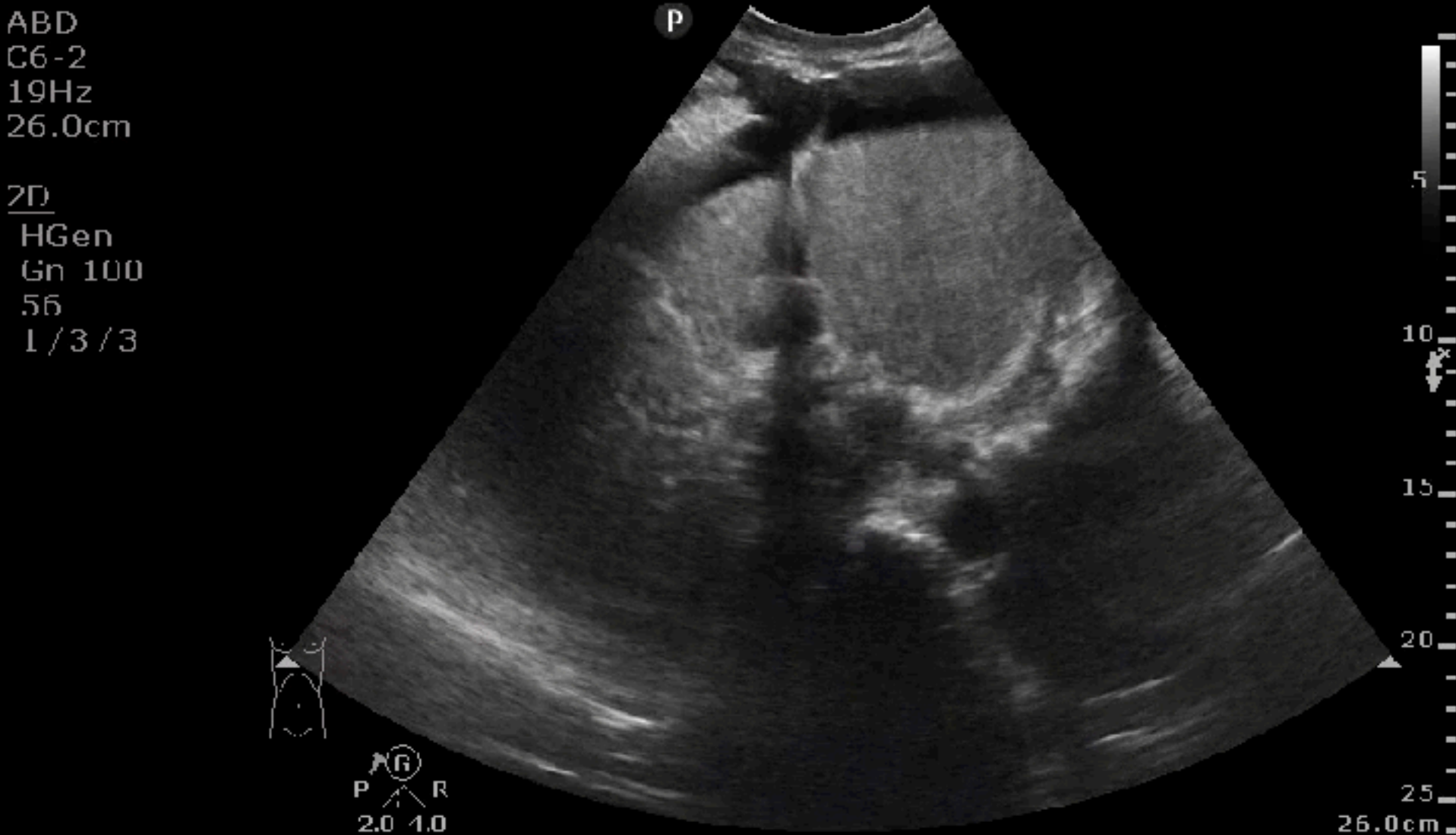
Mass - liver tumor



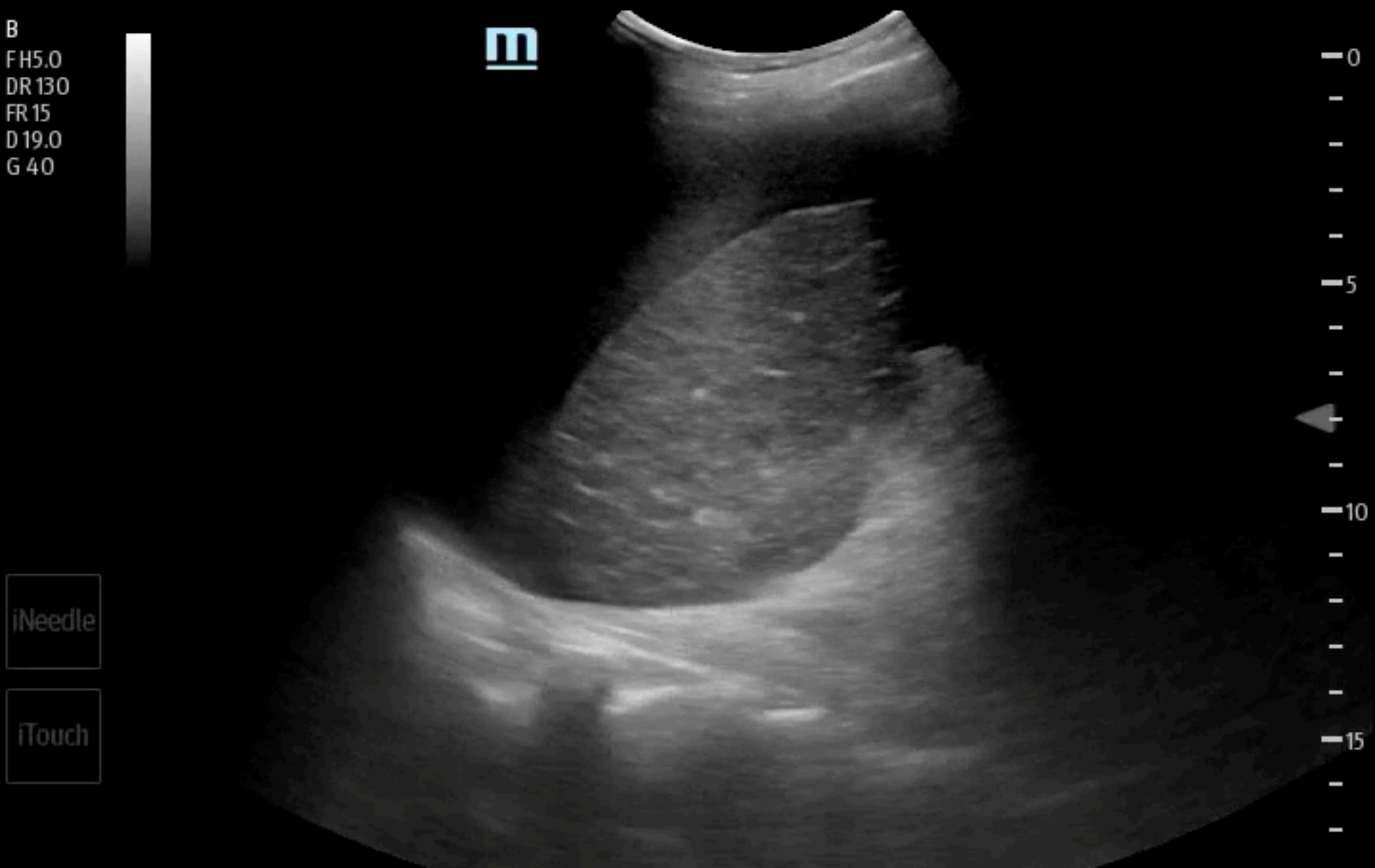
Mass - liver tumor



Cirrhosis



Cirrhosis - hemoperitoneum



Gen
l
Hz
0cm

en
72
6
3/3



G
P R
1.8 3.6

15.

T



0

5

10

15



8

Gen
1
Hz
0cm

en
100
56
3/3

P



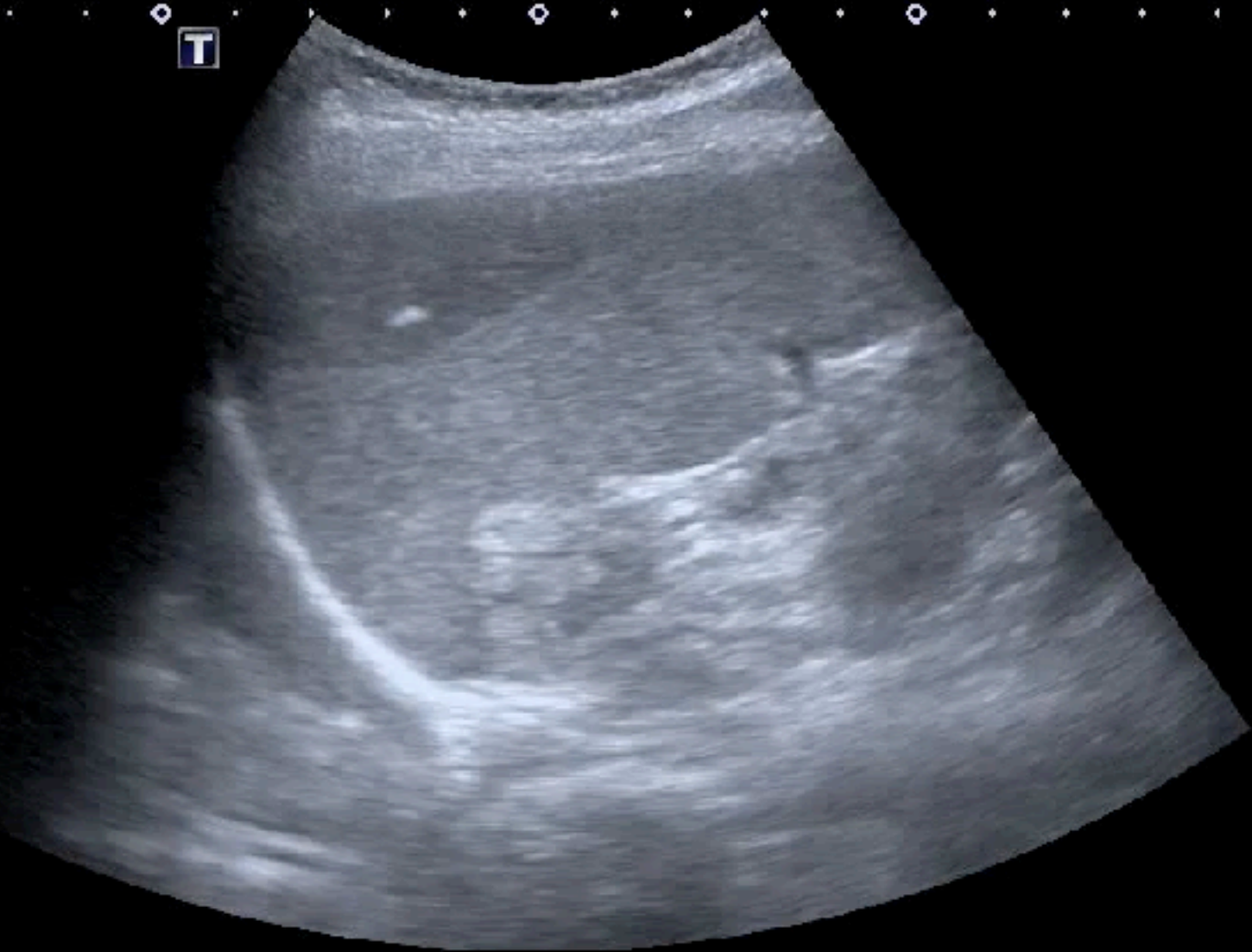
G
P R
1.8 3.6

19.0

T

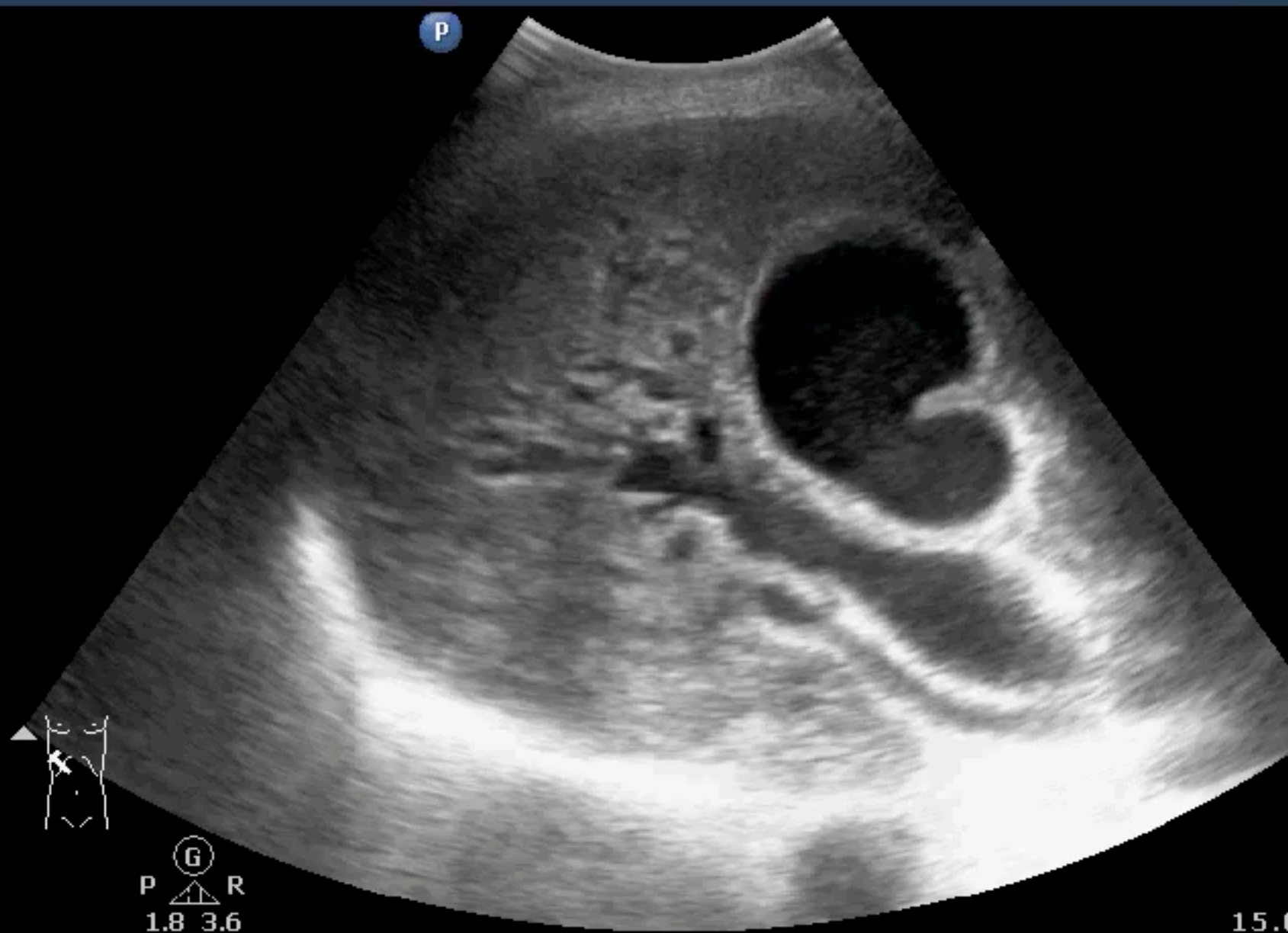
0

5



Gen
1
Hz
0cm

en
92
56
3/3



7/08/24
Gen
1
Hz
0cm

en
76
66
3/3

P



G
P R
1.8 3.6

15.0

100%

10cm

2023/01/17
FH5.0
DR130
PF19005CER
PR18
D16.0
G64

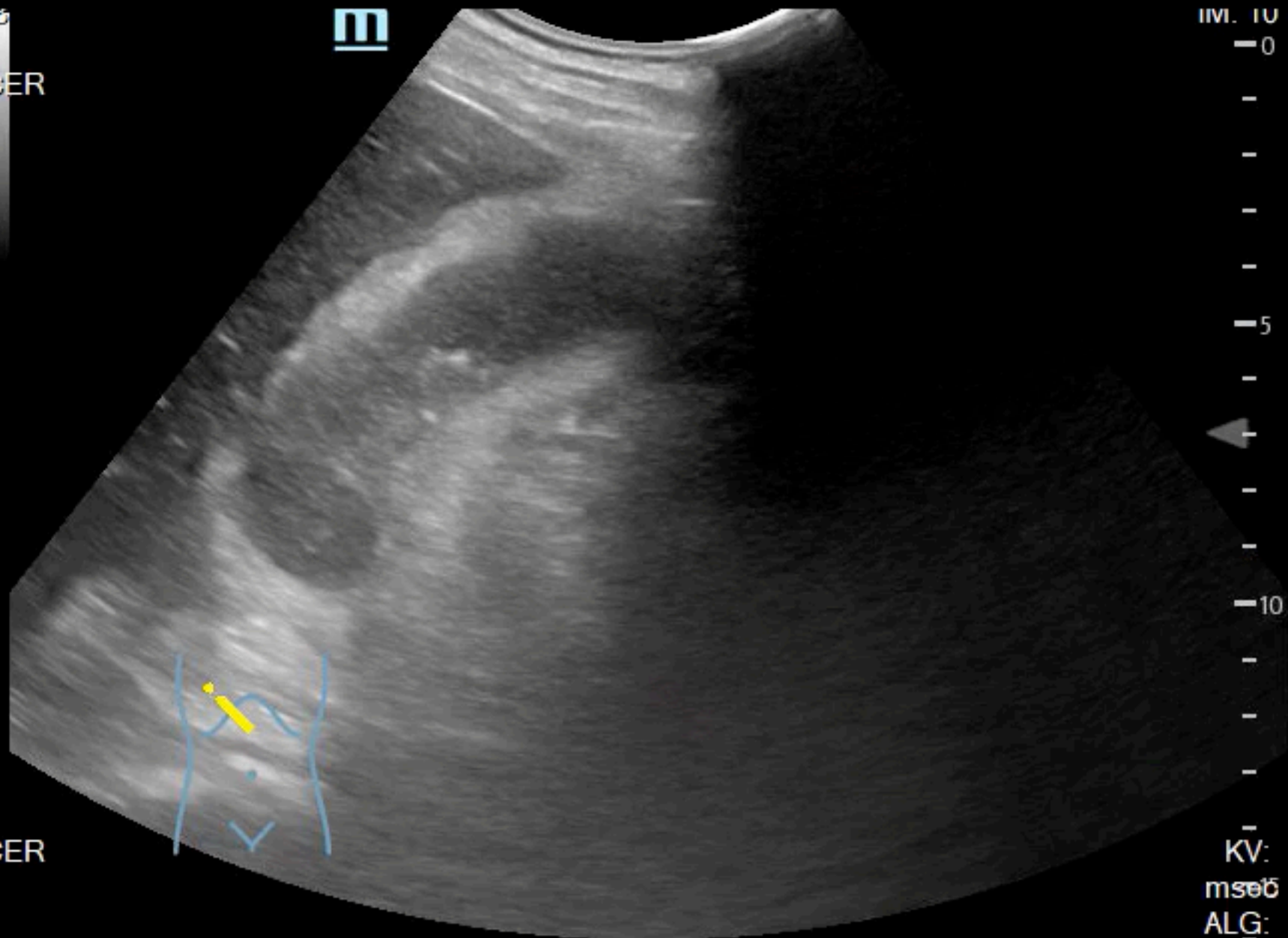


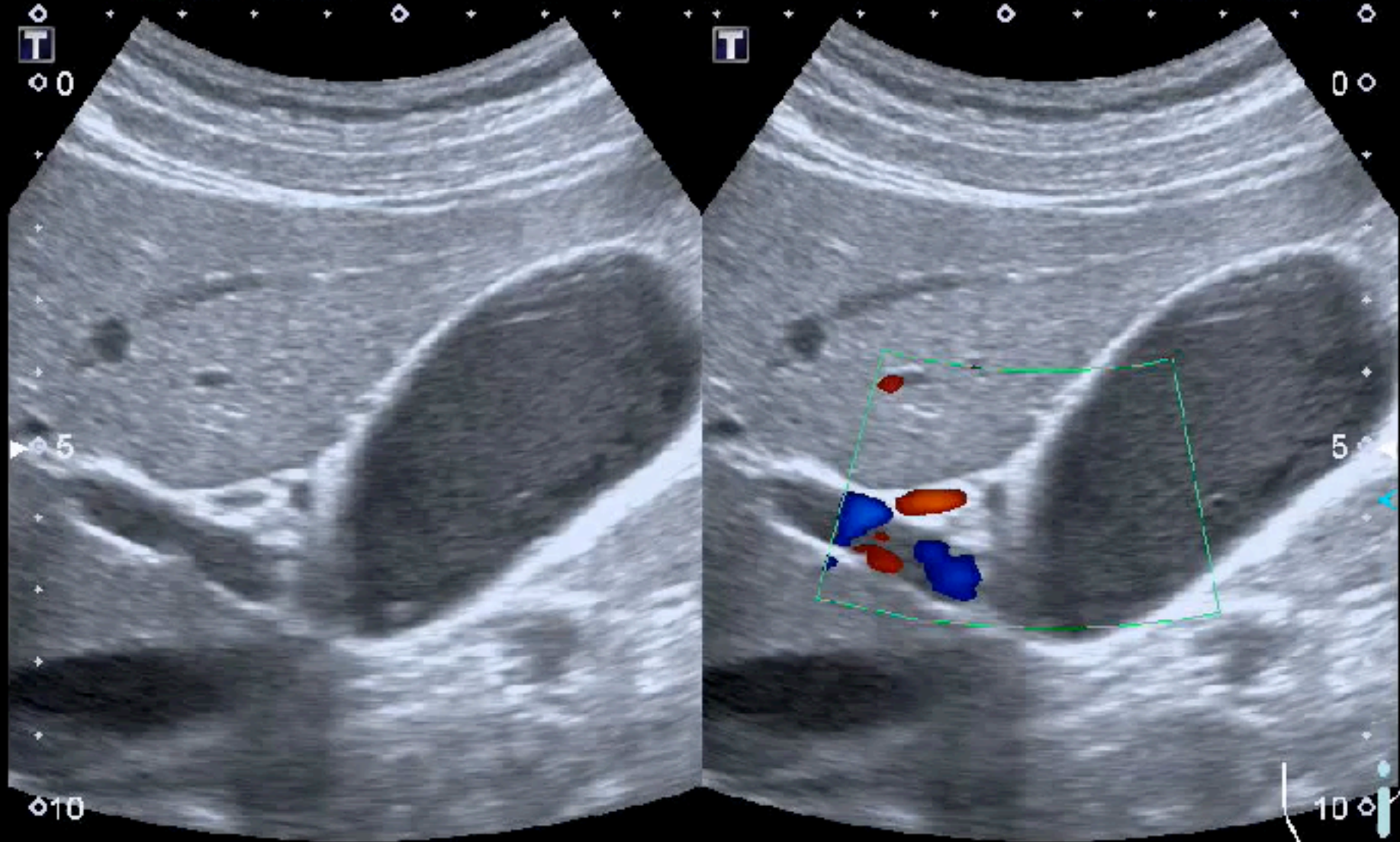
IMI. 10
-0
-
-
-
-
-5
-
-
-10
-
-
-
-
KV:
msec
ALG:

iNeedle

iTouch

thk: mm
PF19005CER
DFOV:

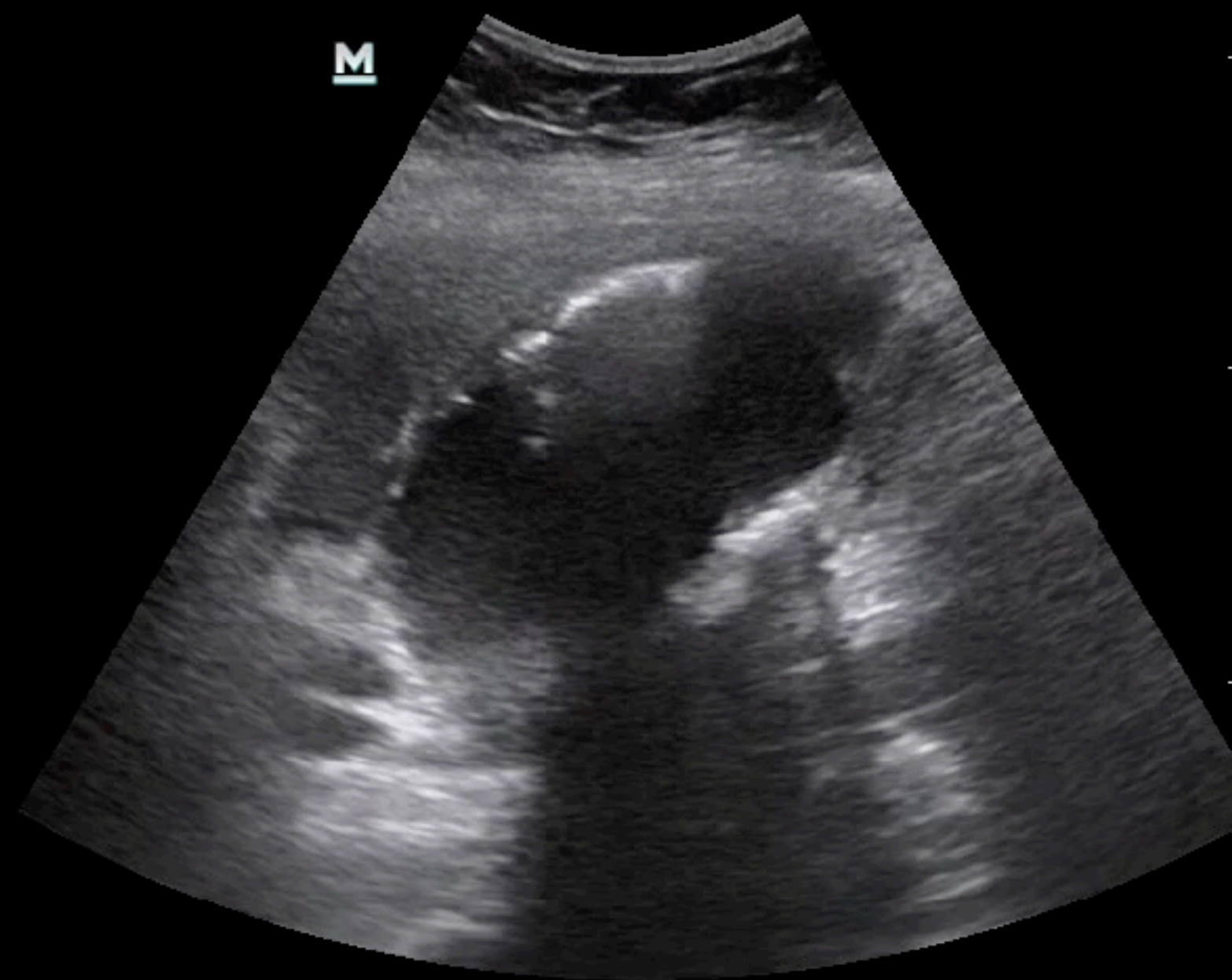




0 /D14.8
/FR30
/DR143



M



1/146

Gen
1
Hz
cm

en
100
66
3/3

P



G
P R
1.8 3.6

9.0

T

0

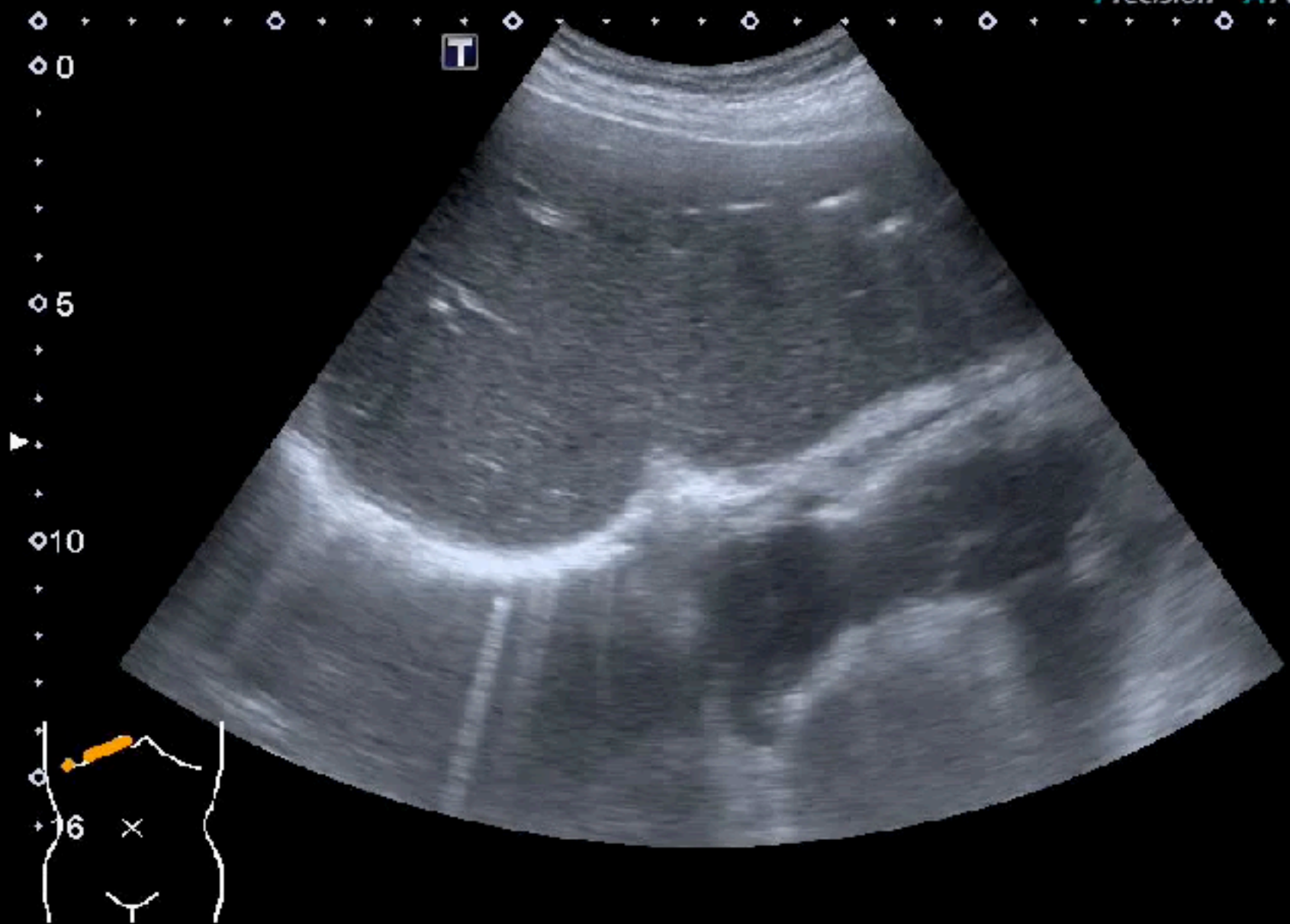
5

10

6

10

D



CES: AP 96.6% MI 0.86 IIS 0.6

4/12/05

9005CER



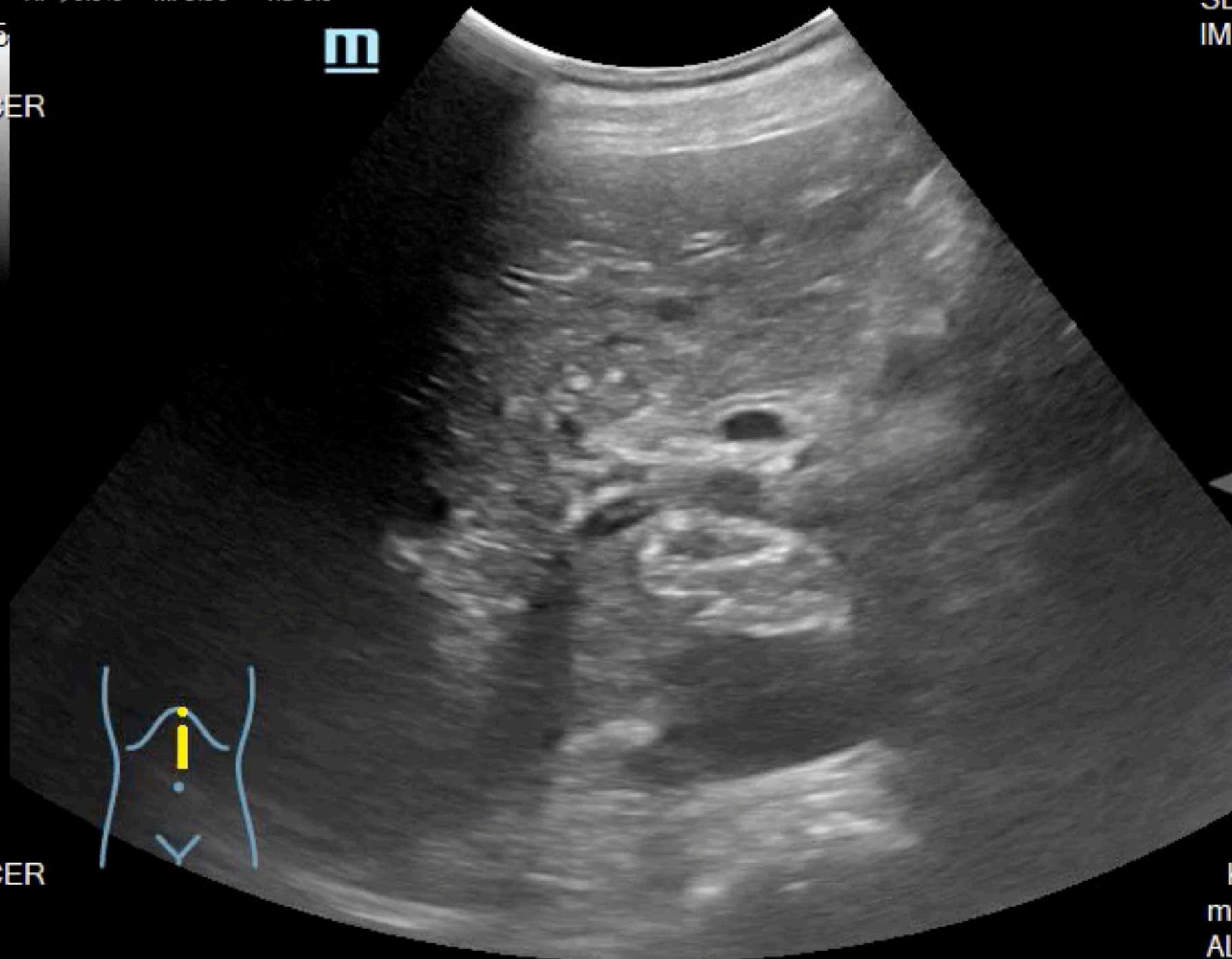
edle

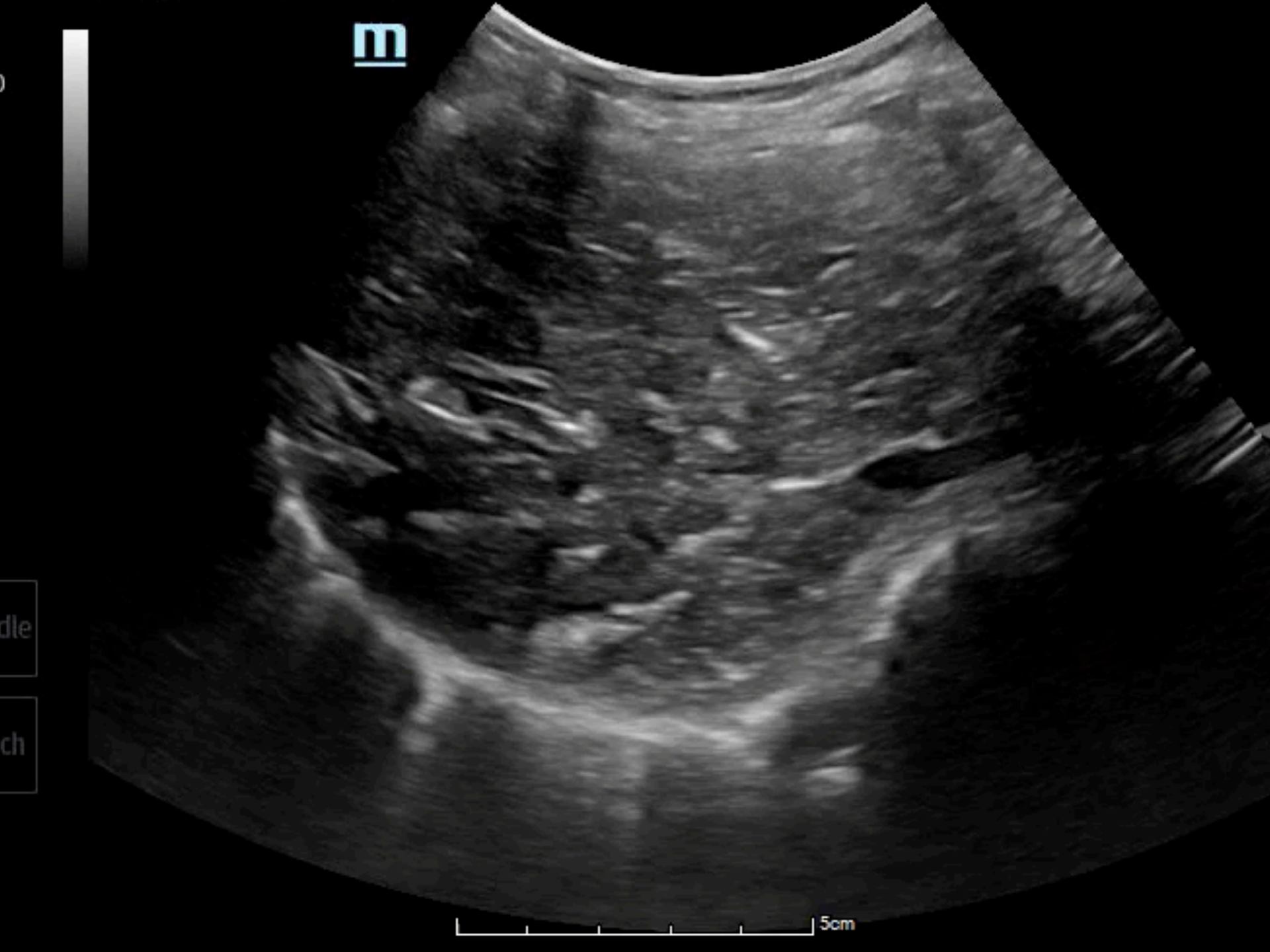
uch

mm

9005CER

OV:





Gen
L
Hz
cm

en
60
6
3/3



G
P R
1.8 3.6

20.



iTouch

DFOV:

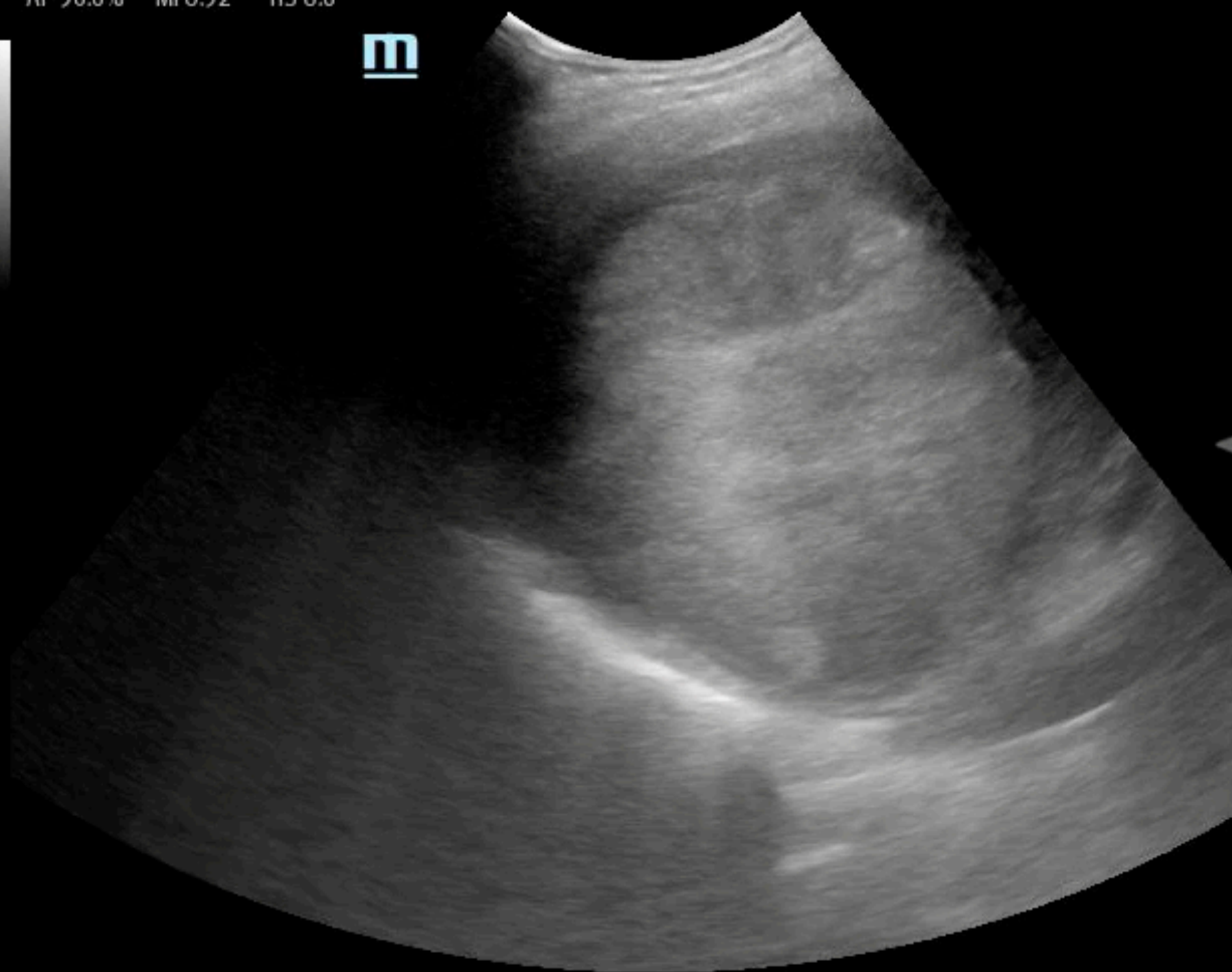
KV:
msec
ALG:

AP 50.0% MI 0.92 HS 0.0

m

dle

ch



Gen
l
Hz
0cm

en
73
6
3/3



G
P R
1.8 3.6

17.

T

0

5

10

6



16
C
D

025/07/15
45.0
3.130
PF19007BER
21
13.0
40



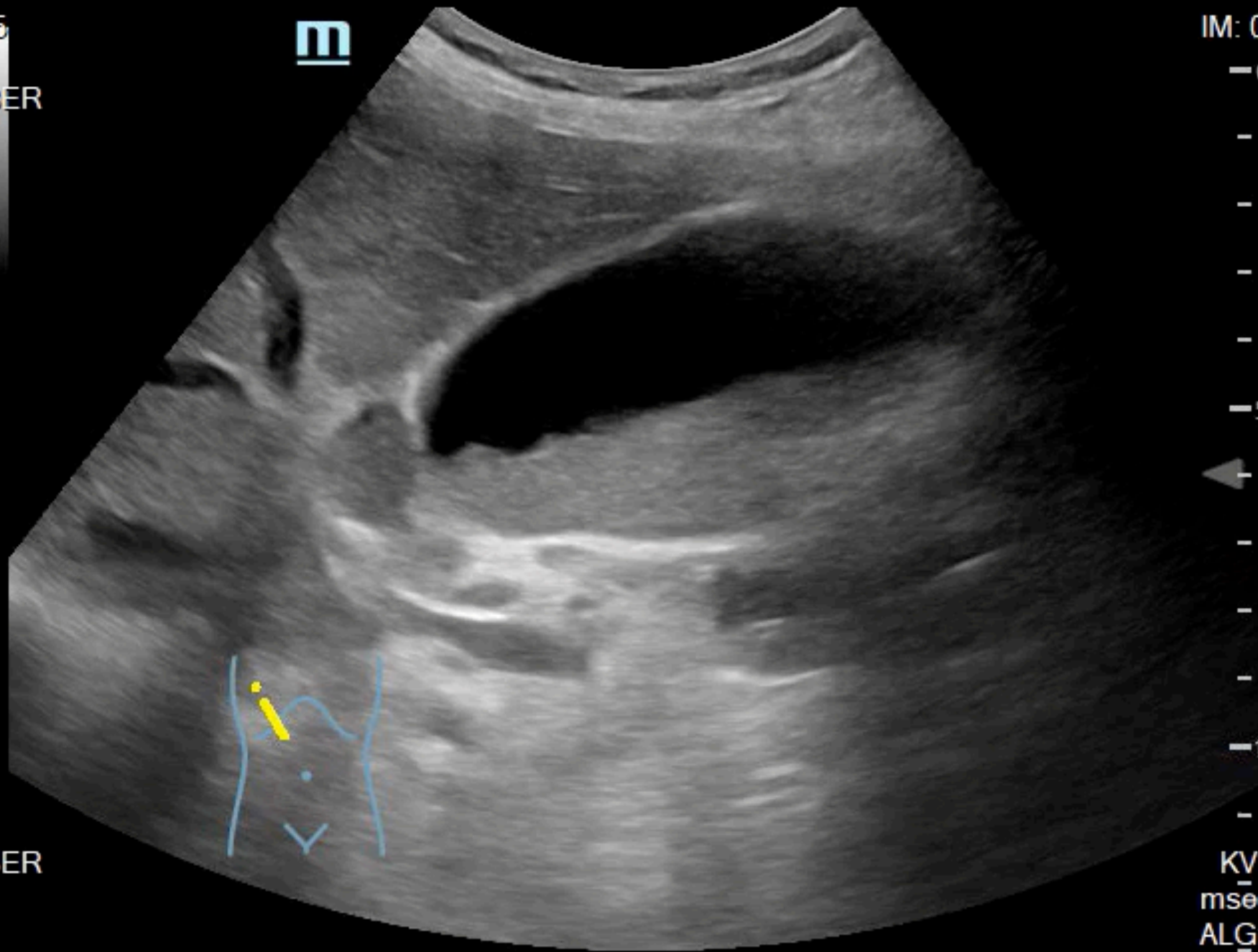
IM: C

Needle

Touch

nk: mm
PF19007BER
FOV:

KV
mse
ALG



2025/03/20
FH5.0
DB 130
PF19005CER
PR 18
D16.0
G 48



IM: 4
0

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-

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-

-

-



-

-

-

-

-

-

-

-

KV:
msec
ALG:

iNeedle

iTouch

thk: mm
PF19005CER
DFOV:

ACCESS:
FH5.0
2025/01/15
FR 26
D10.0
G70

m

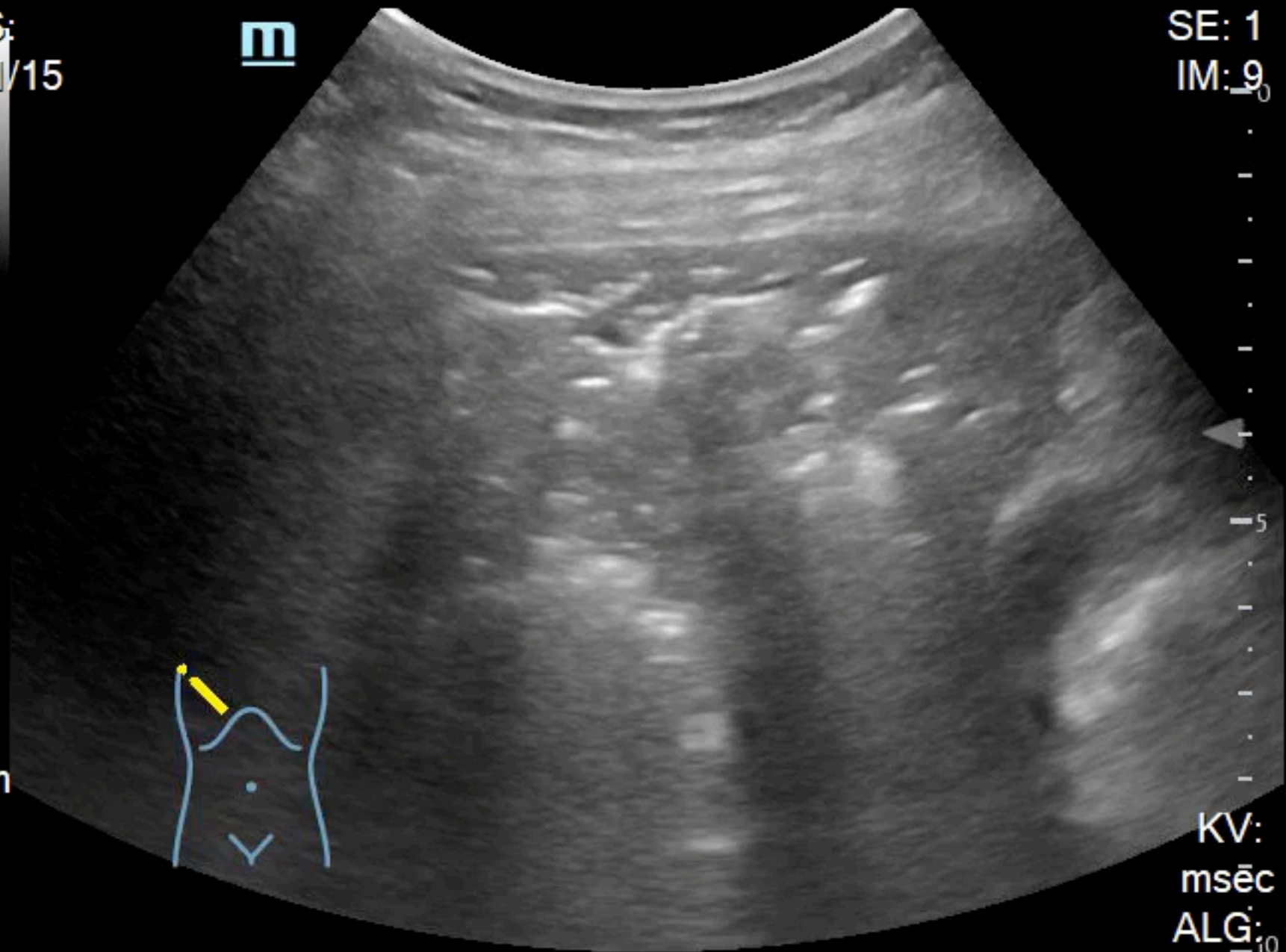
SE: 1
IM: 9

iNeedle

iTouch
thk: mm

DFOV:

KV:
ms $\bar{e}$ c
ALG: 10



T

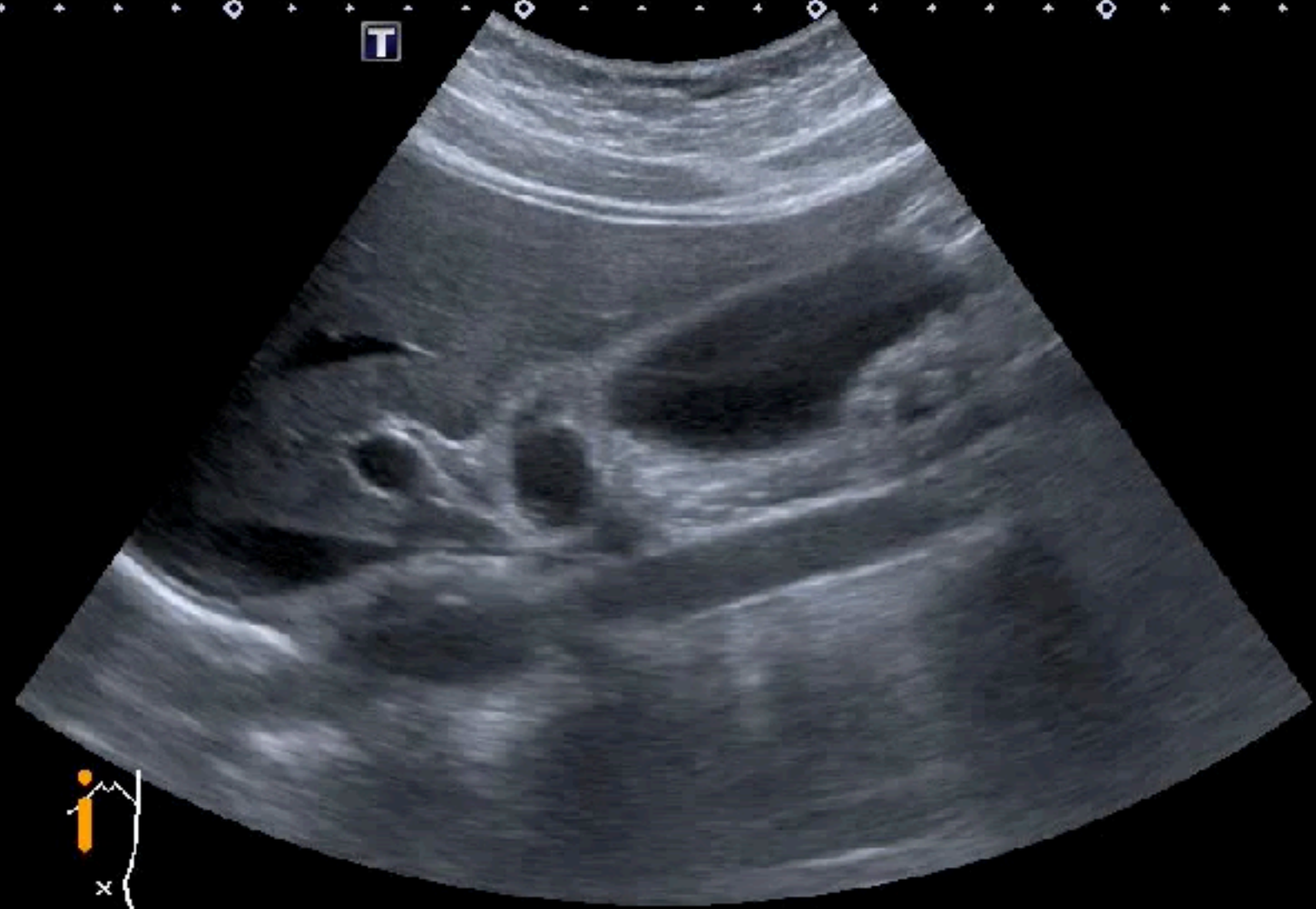
0

5

10

14

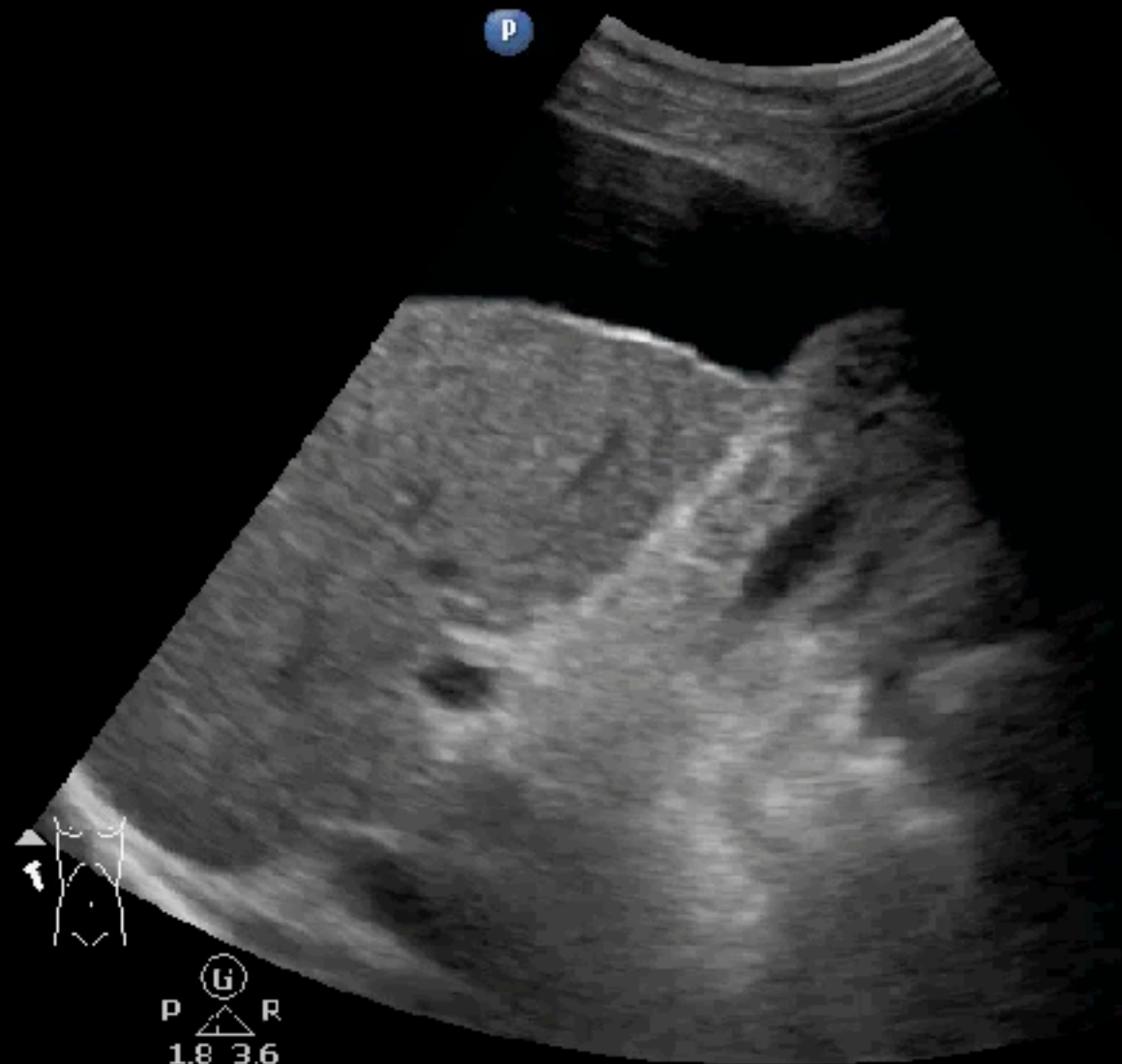
18
Q
C
DR



Abd Gen2
C5-1
34 Hz
15.0cm

2D

HGen
Gn 58
C 56
3 / 3 / 3



15.0cm

T

0

5

10

12



20
Q
C
D

Gen
1
Hz
0cm

en
92
6
3/3



ACCESS:
FH5.0
D21.0
FR 21
D13.0
PF19007BER



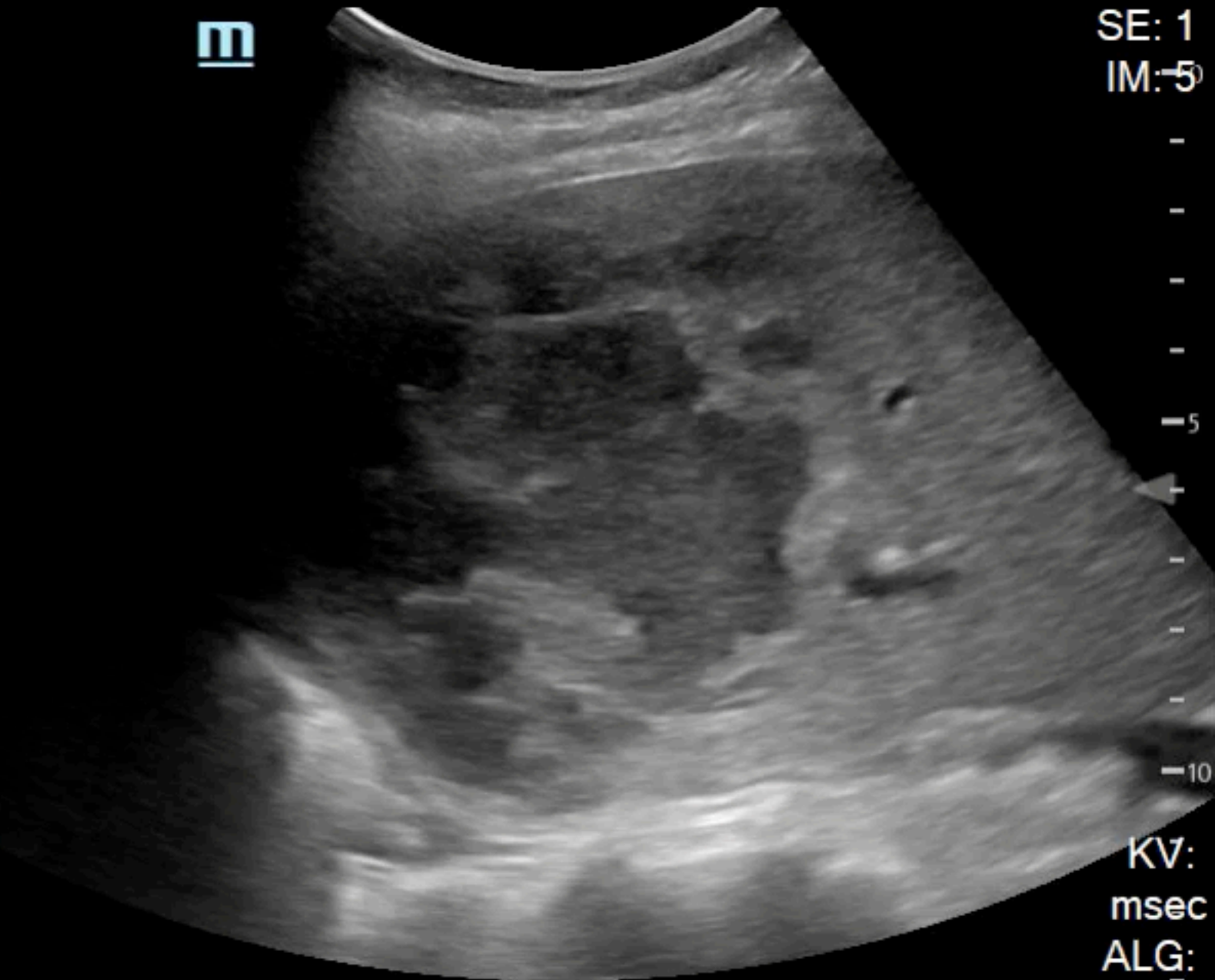
SE: 1
IM: 5

iNeedle

iTouch

thk: mm
PF19007BER
DFOV:

KV:
msec
ALG:



0

5

10

T

P10
6C
4
19fp
DR7
2D
10

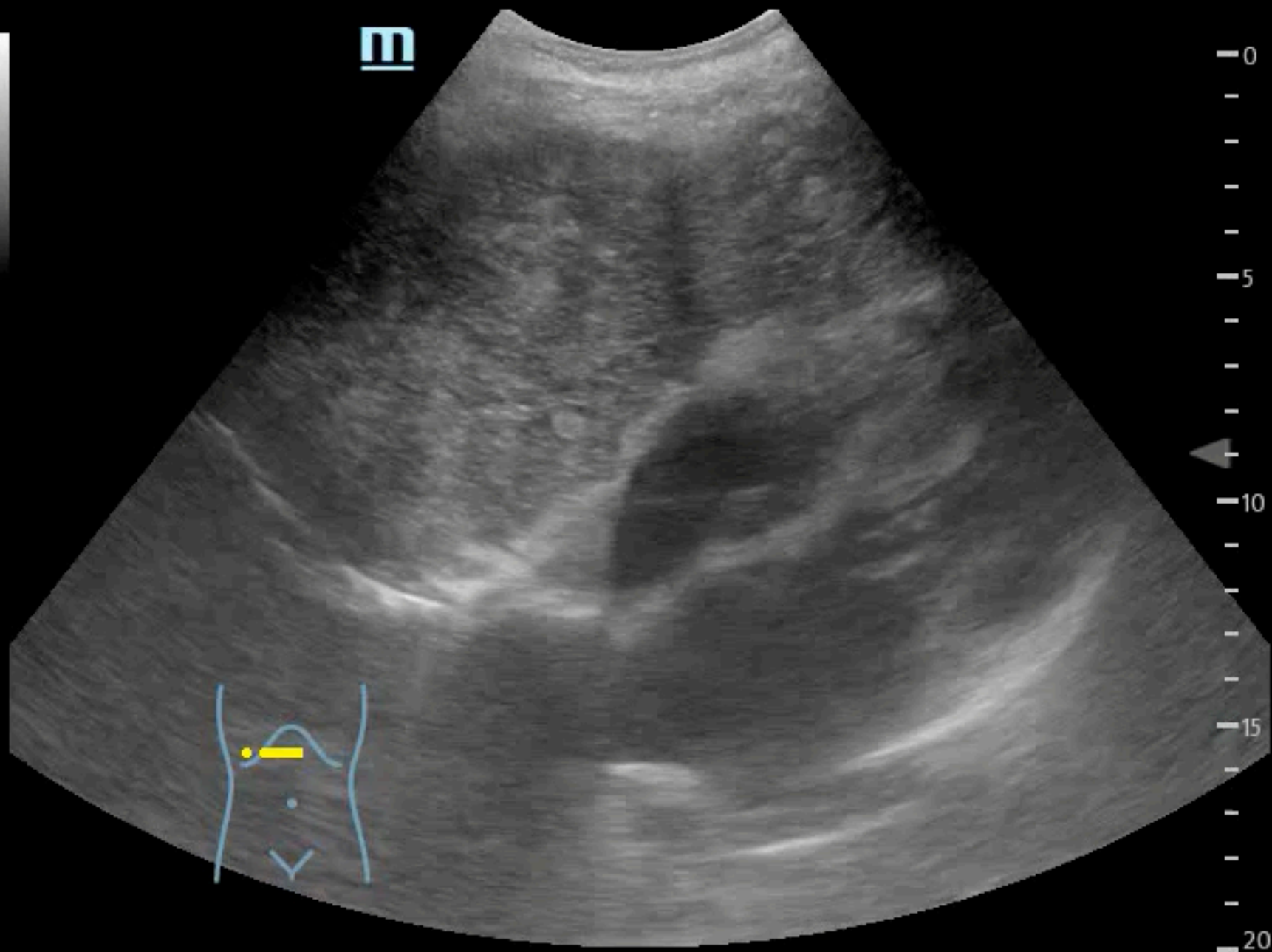


B
FH5.0
DR 130
FR 14
D 20.0
G 68

m

iNeedle

iTouch



.0 /D16.6
/FR27
/DR143

M



1/114