

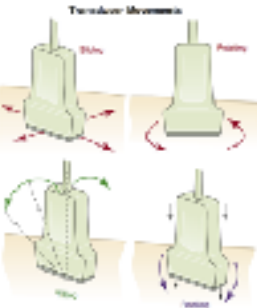


# Sonoanatomy for Abdomen & Retroperitoneum

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[POCUSacademy.com](http://POCUSacademy.com)



# 探頭掃描 6 大技巧



X

掃

Sweep

Y

滑

Slide

Z

轉

Rotate

傾

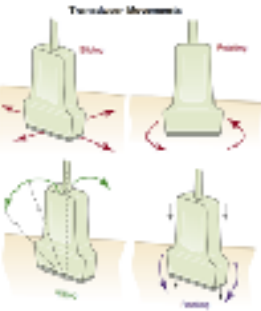
Fan/ tilt

搖

Rock

壓

Compress



# 探頭掃描 6 大技巧



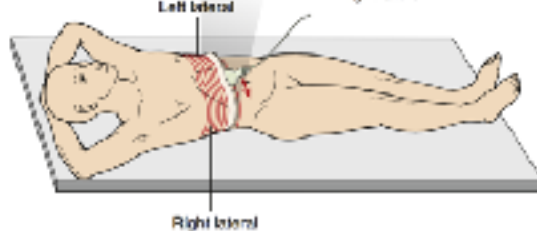
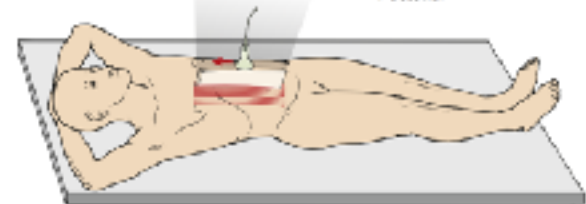
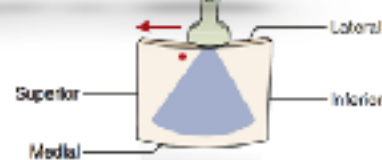
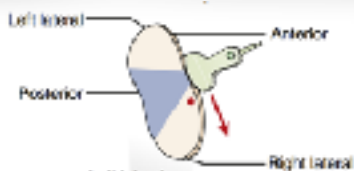
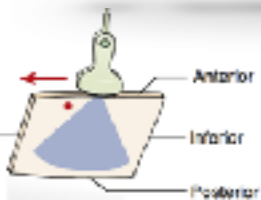
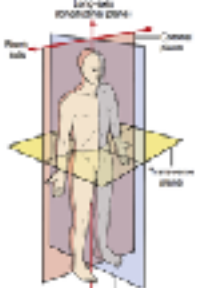
## X

## Y

## Z

<p><b>Sweep</b></p>	<p><b>Slide</b></p>	<p><b>Rotation</b></p>
<p><b>Fan</b></p>	<p><b>Rock</b></p>	<p><b>Compression</b></p>

# 共通語言: 3D立體介面

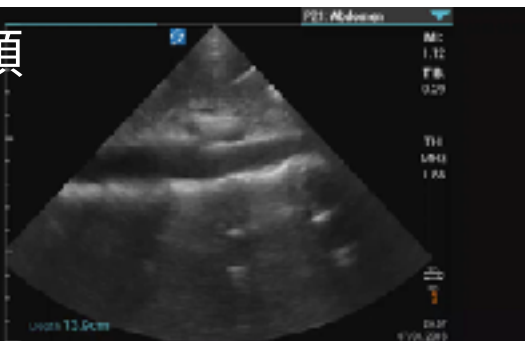


Sagittal 縱

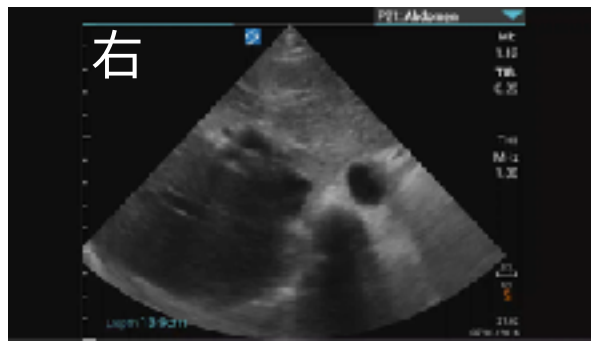
Transverse 橫

Coronal 側

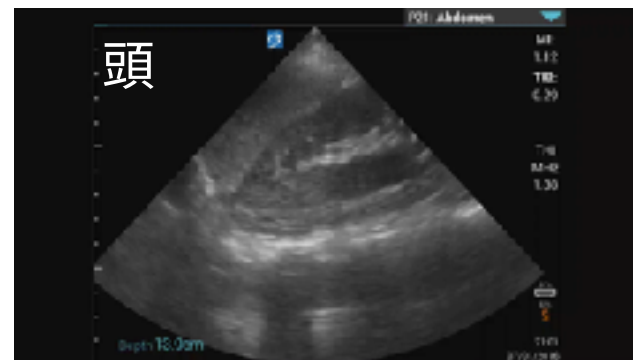
頭



右

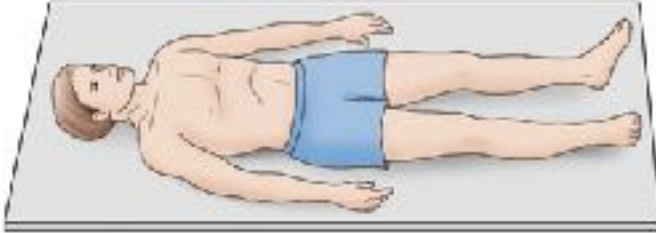


頭

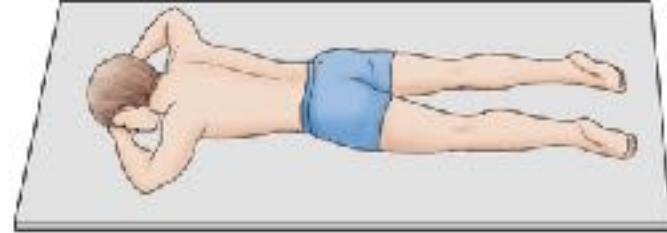


掃描前用手指碰觸探頭表面確認方向

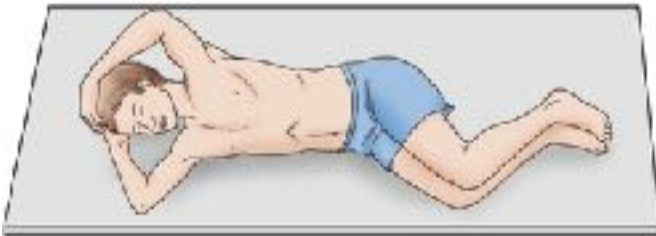




Supine



Prone



Right lateral decubitus



Left lateral decubitus



Right posterior oblique



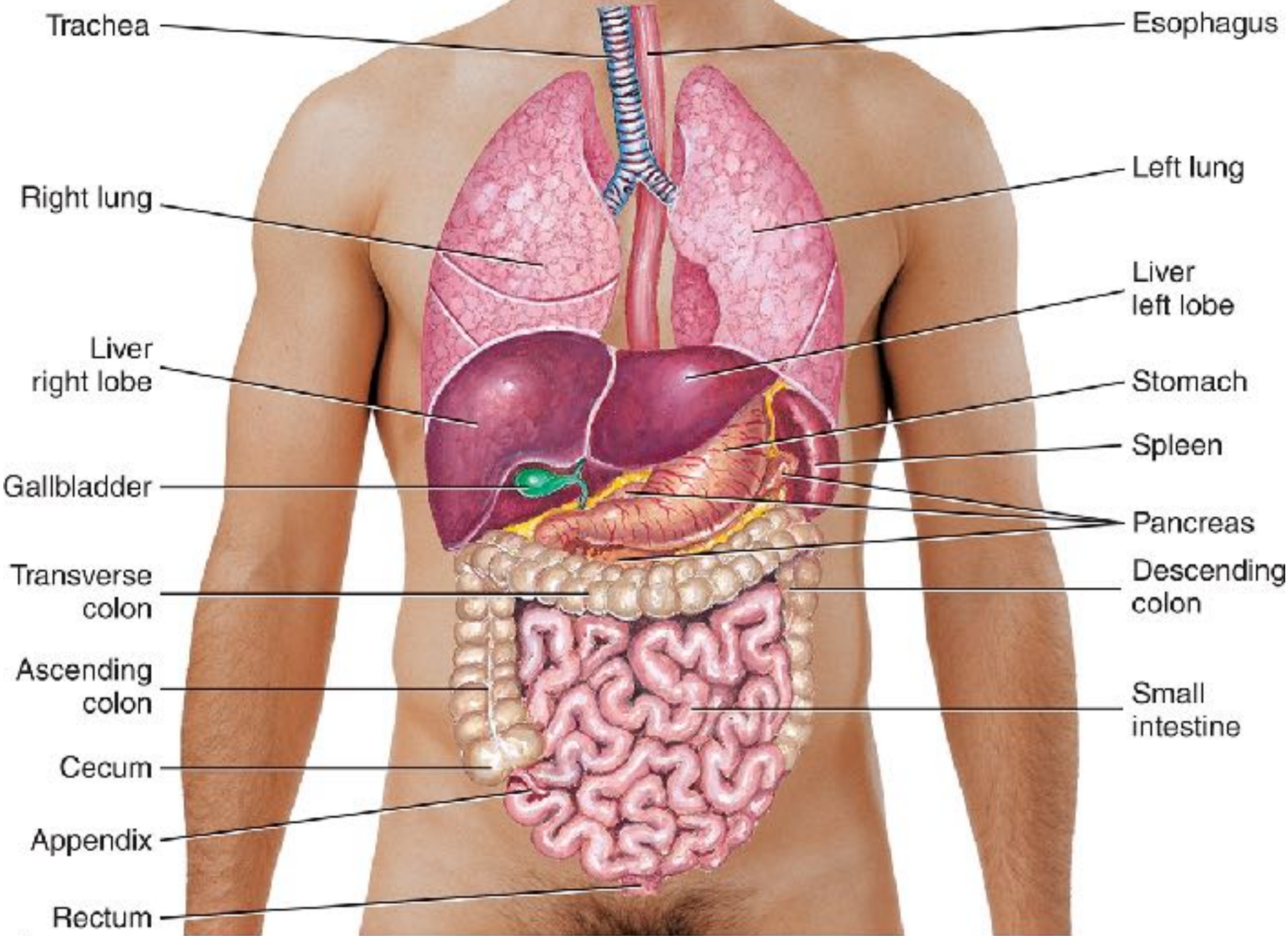
Left posterior oblique



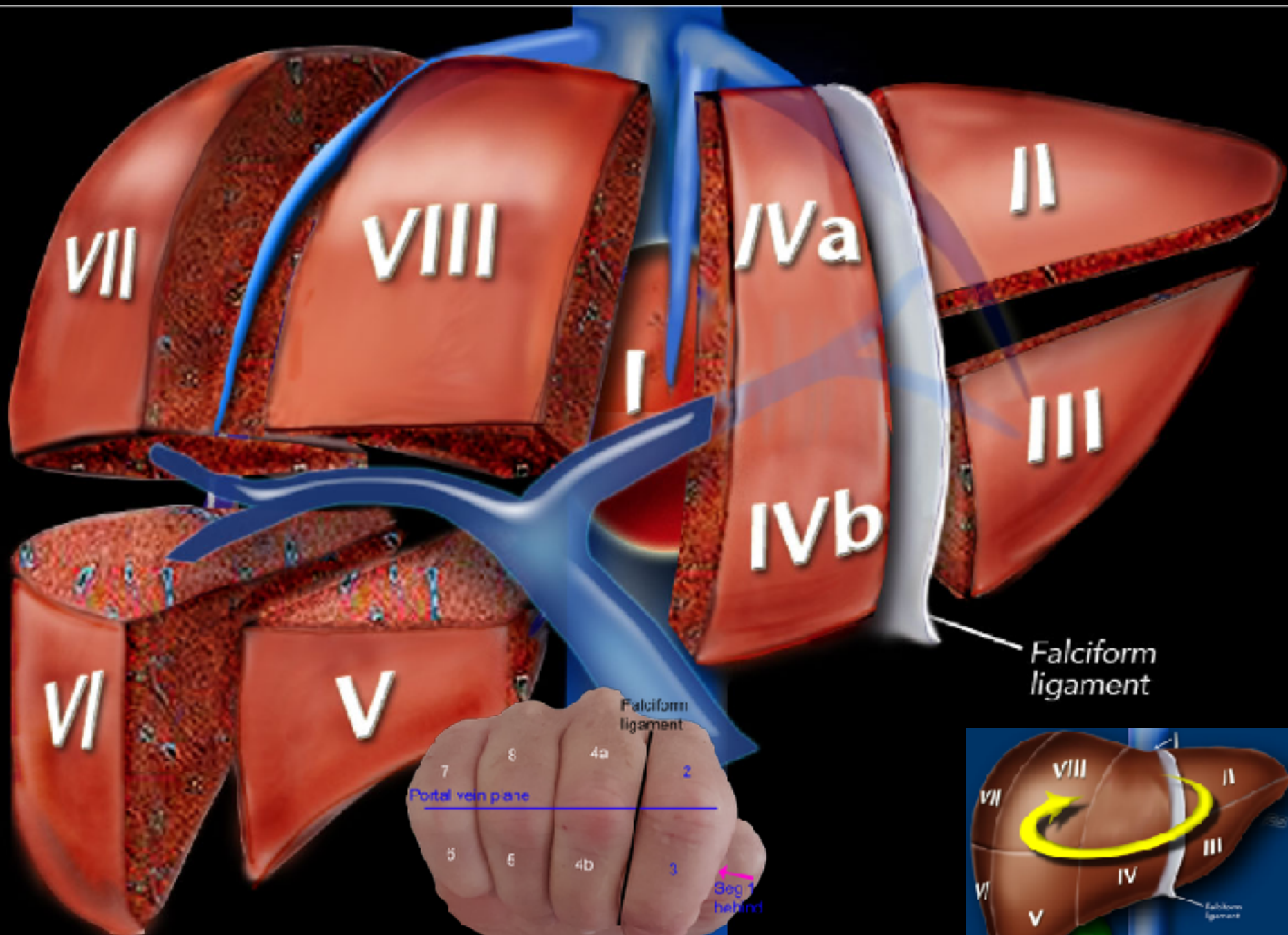
Sitting semi-erect

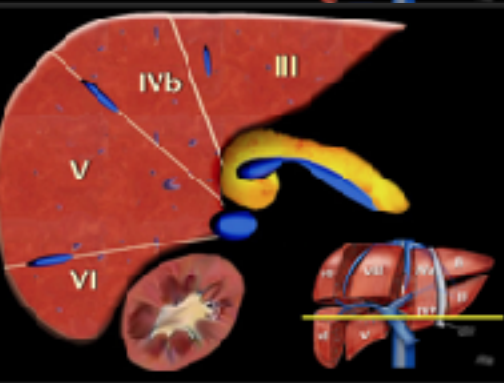
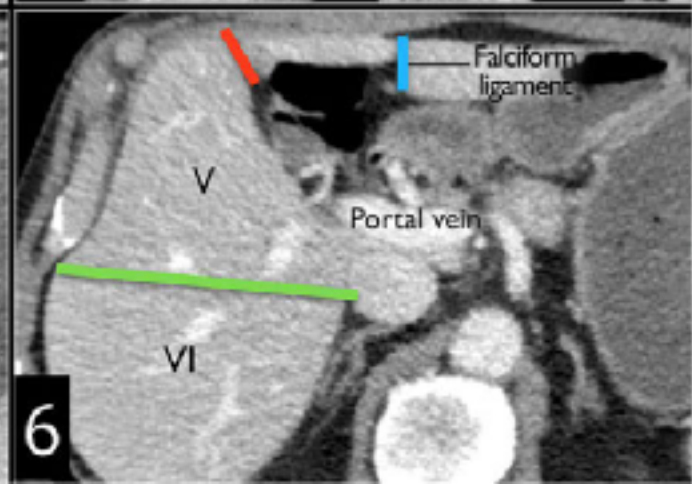
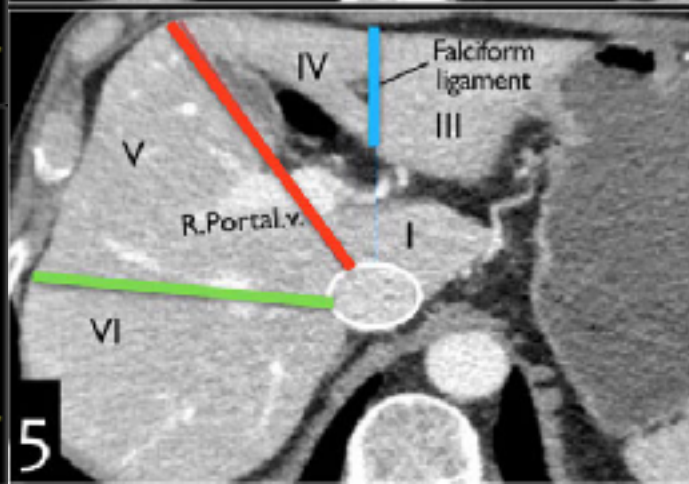
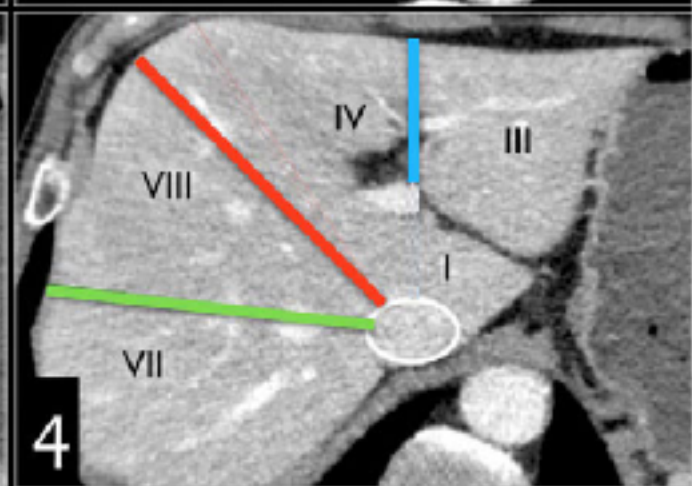
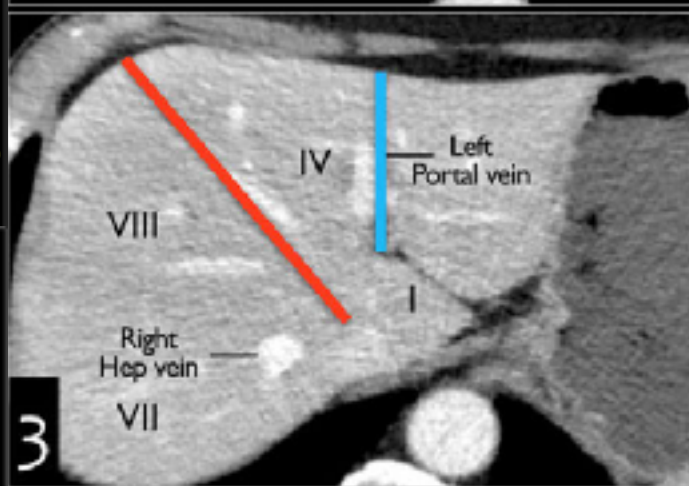
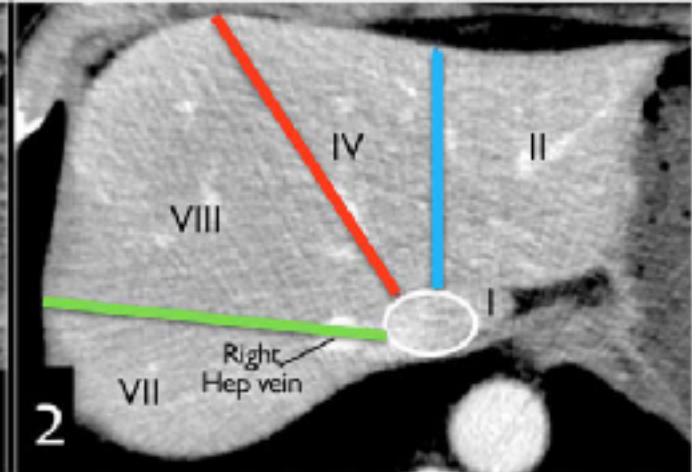
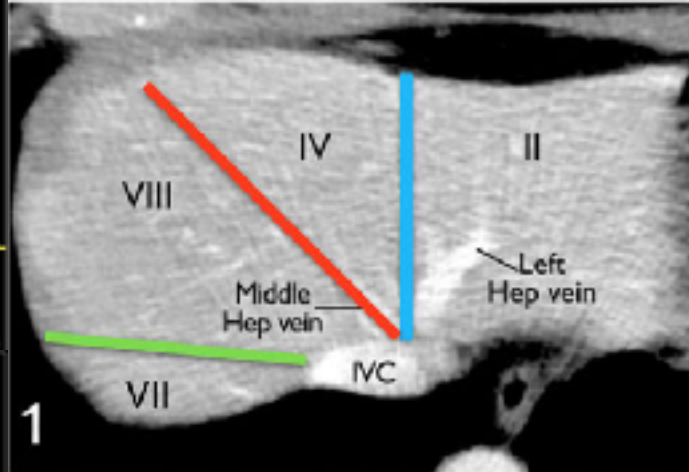
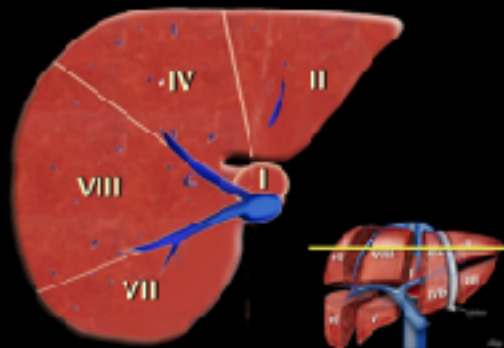


Sitting erect

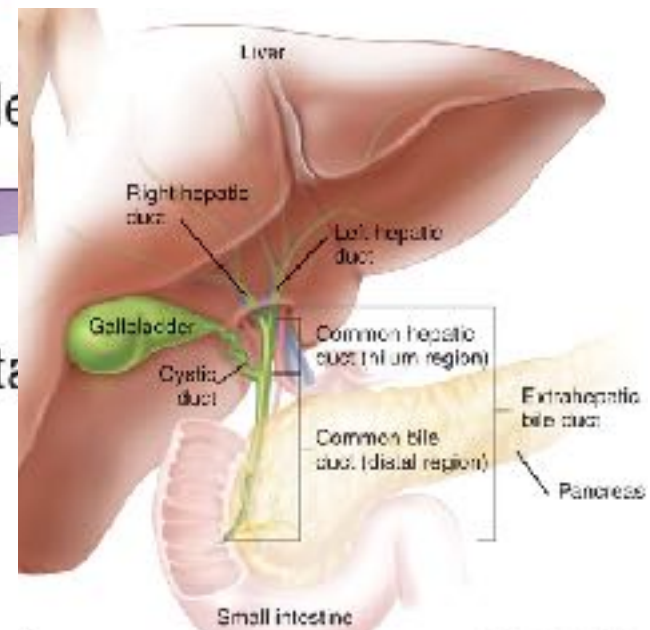
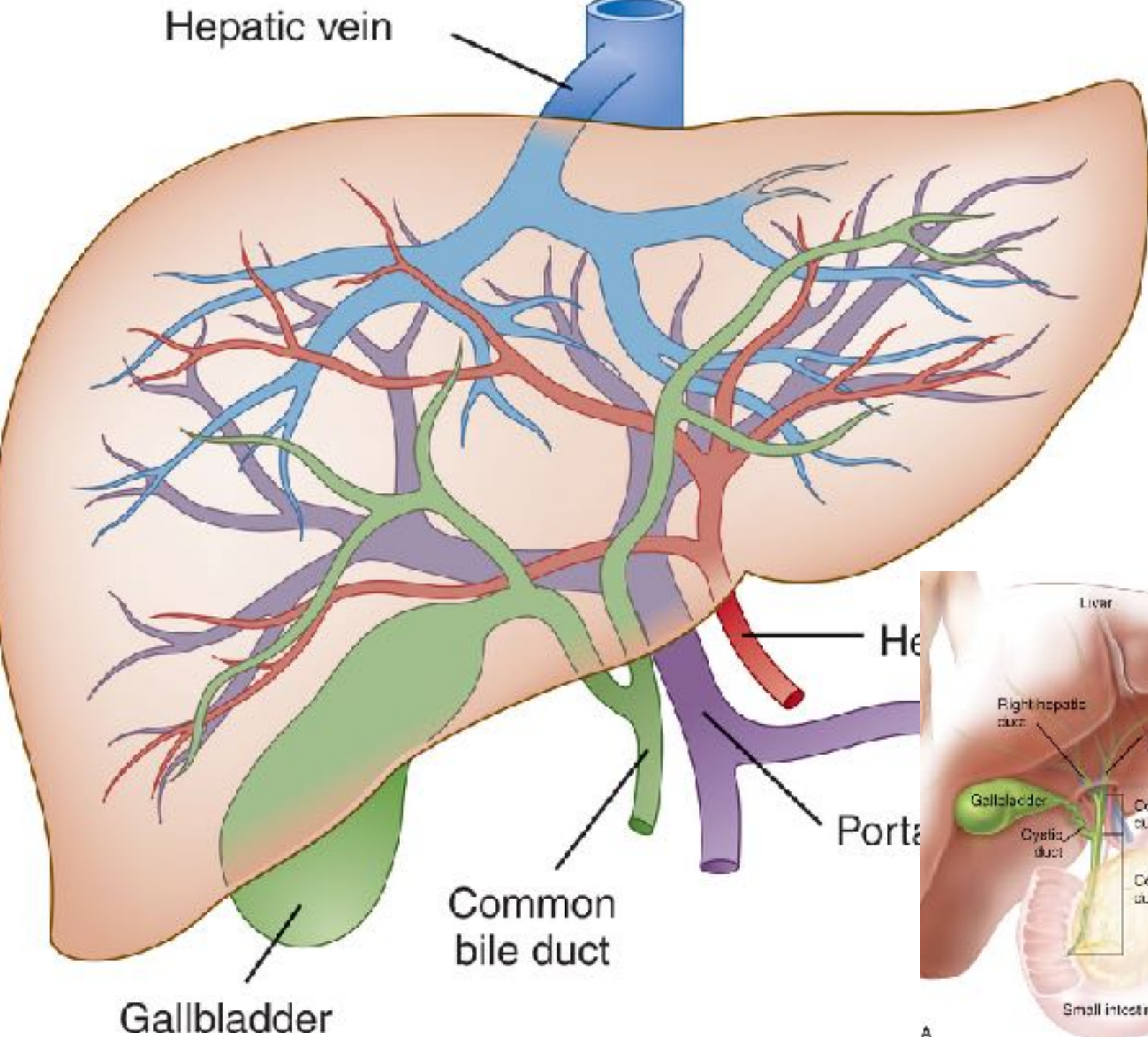




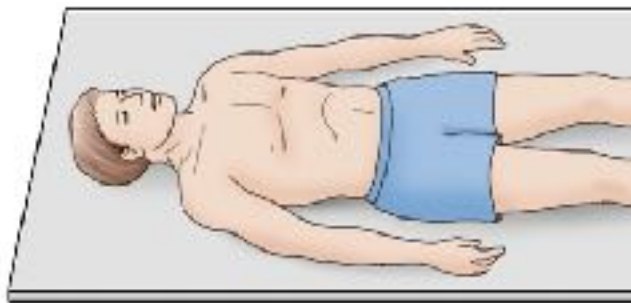




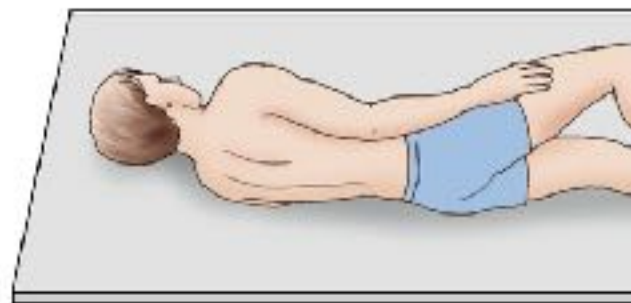




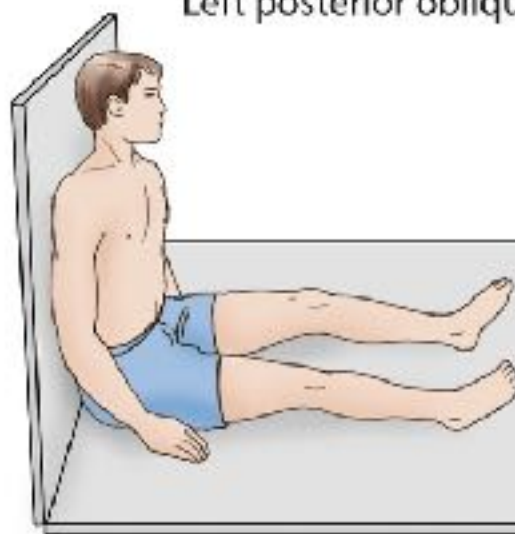




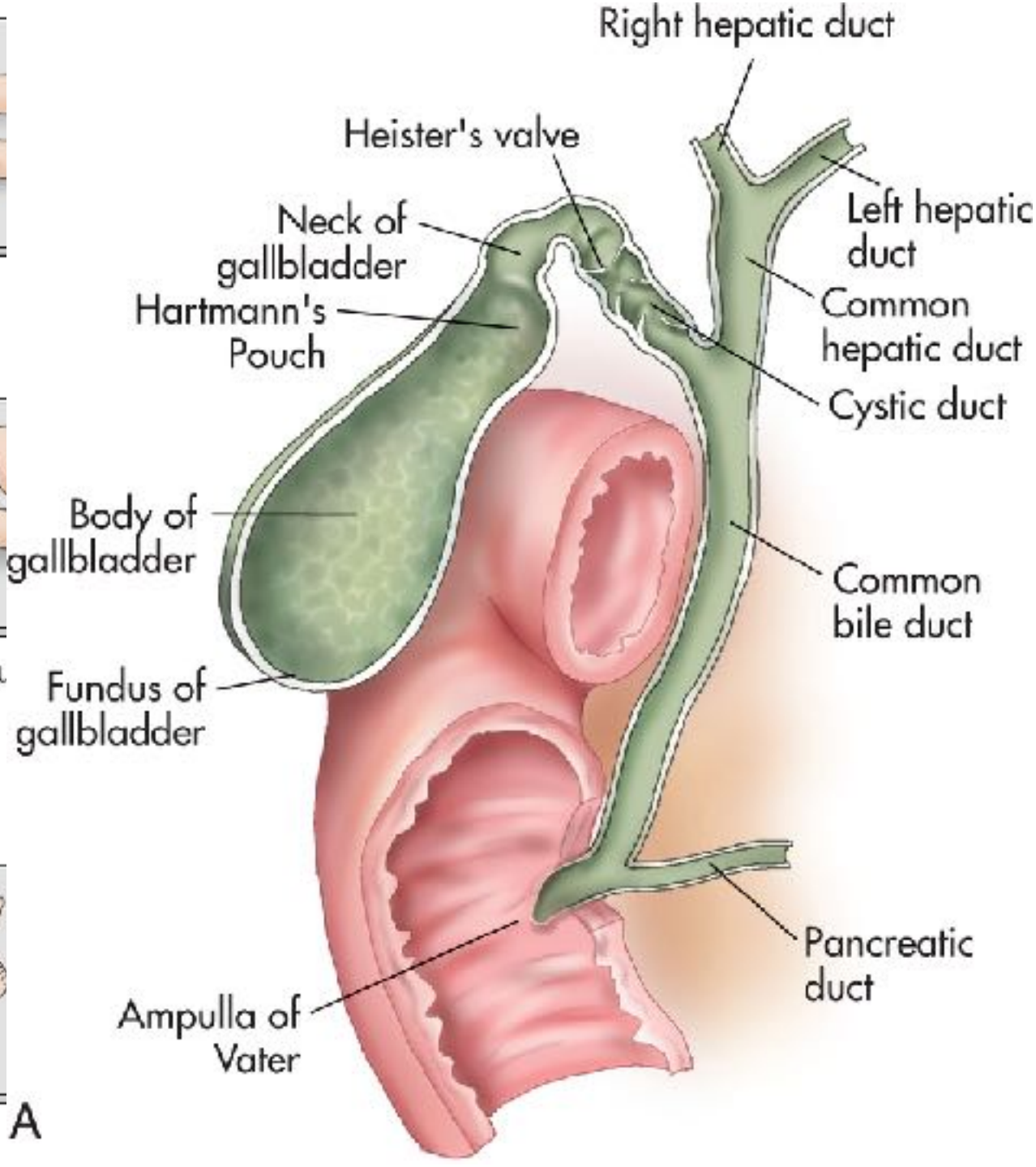
Supine

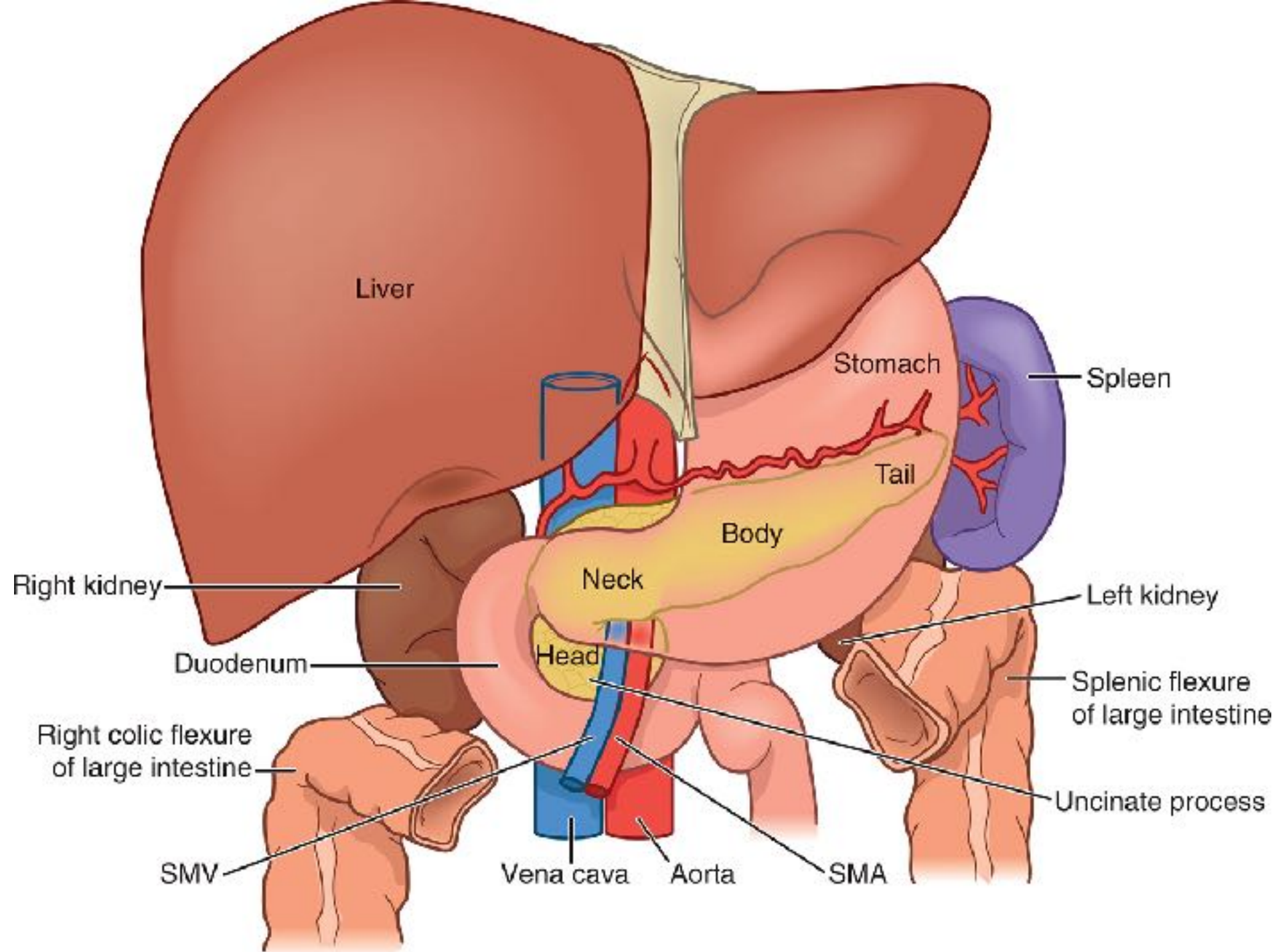


Left posterior oblique

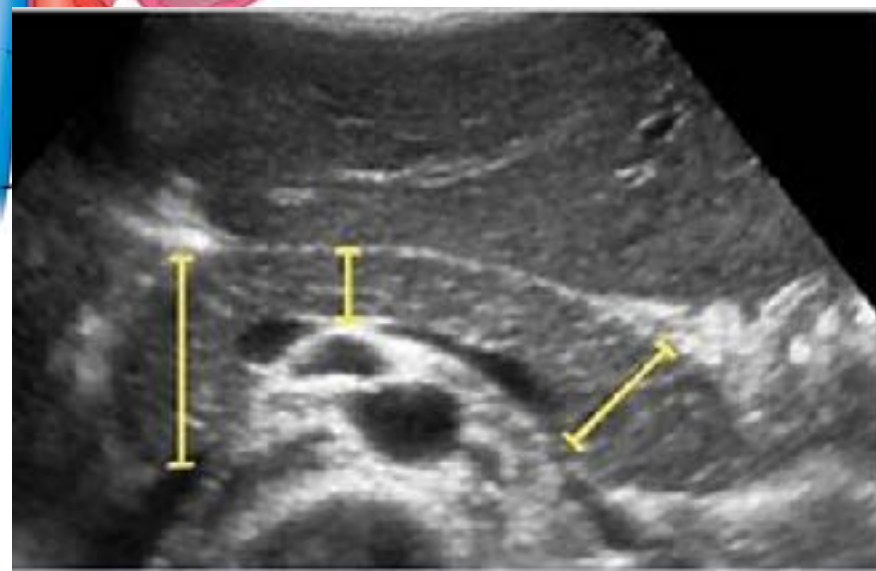
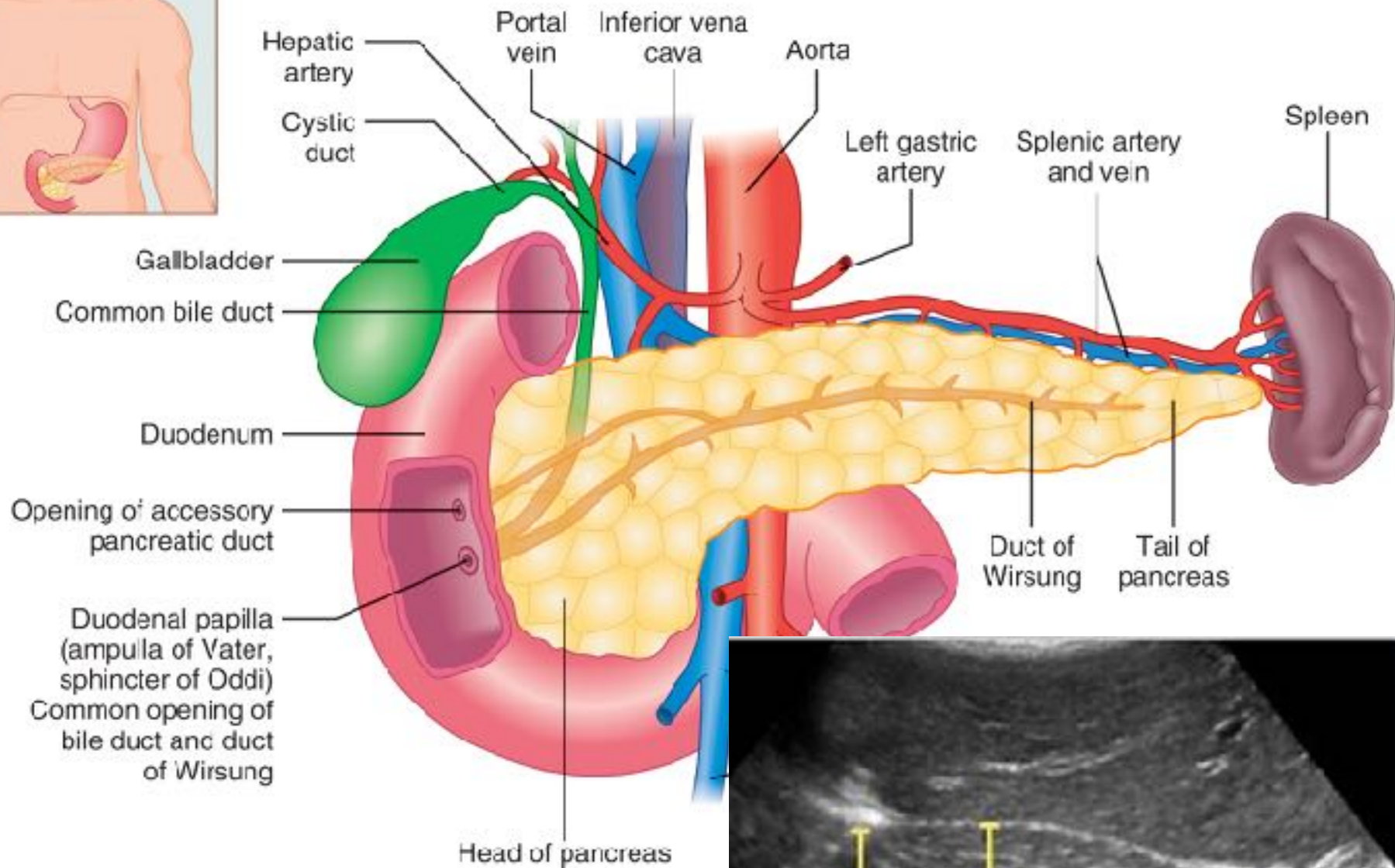


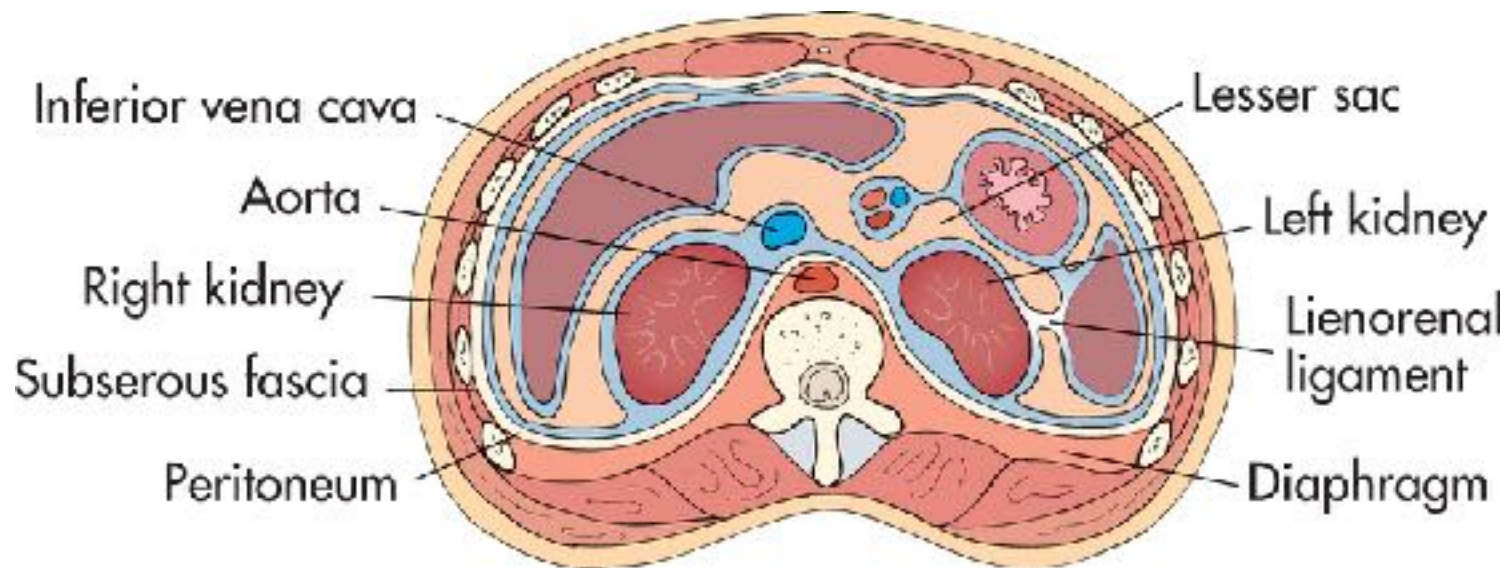
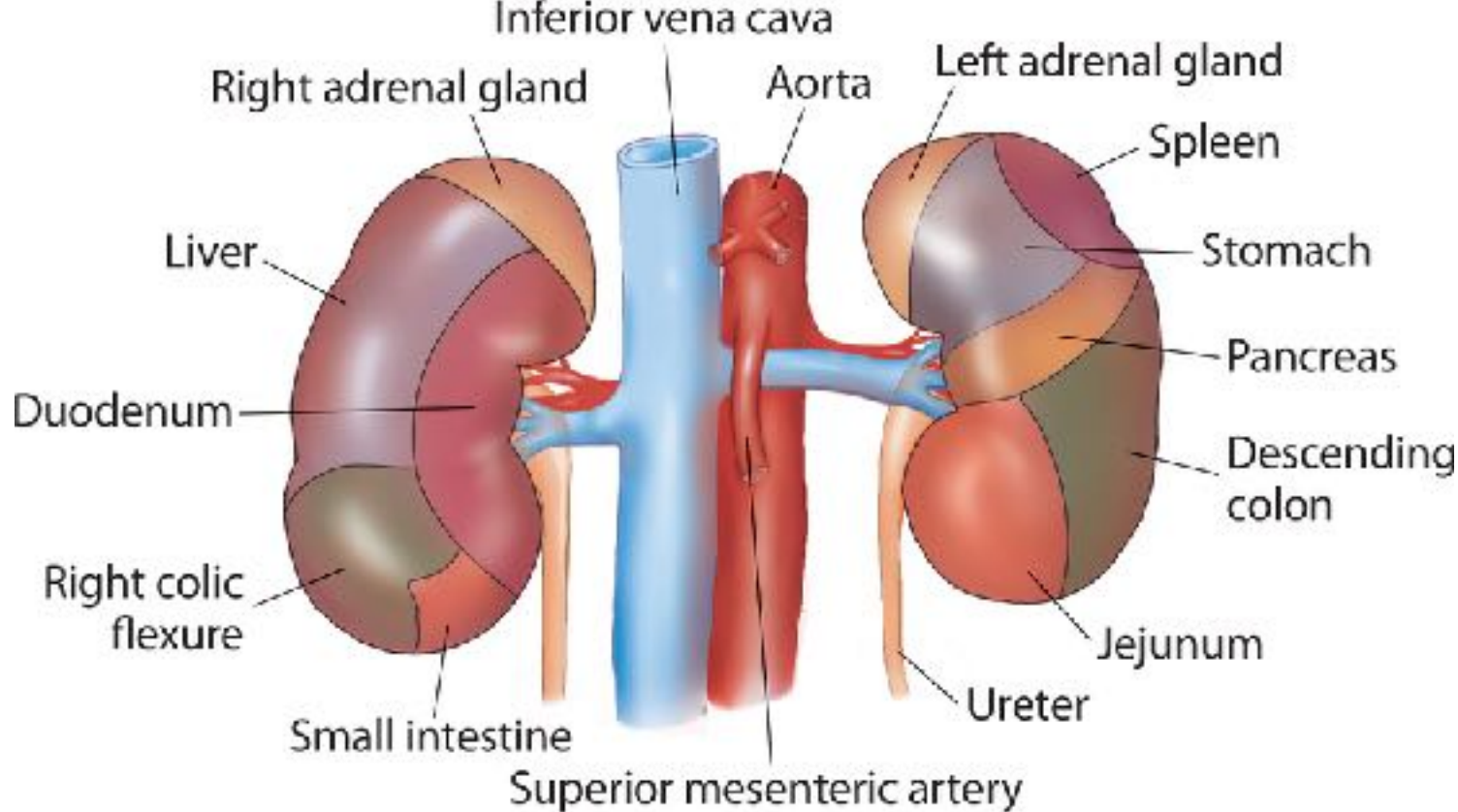
Sitting erect

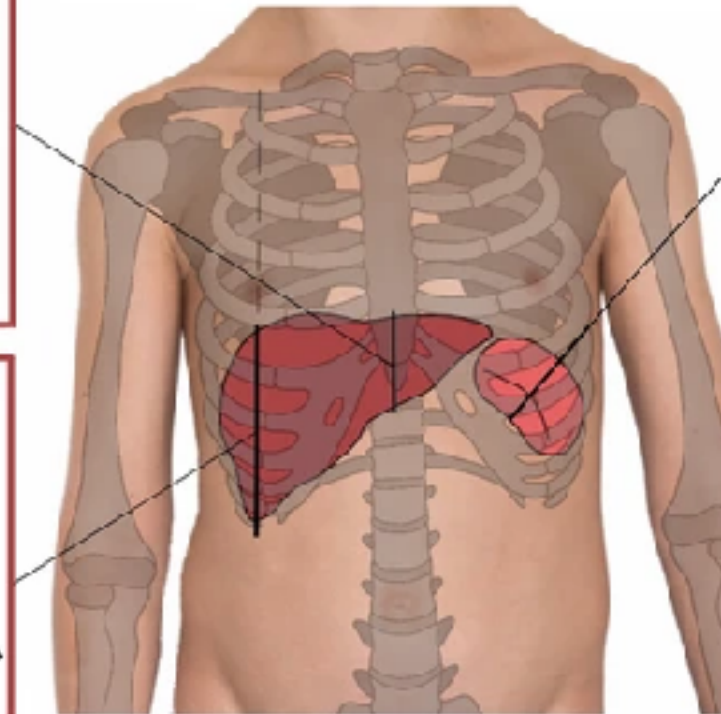
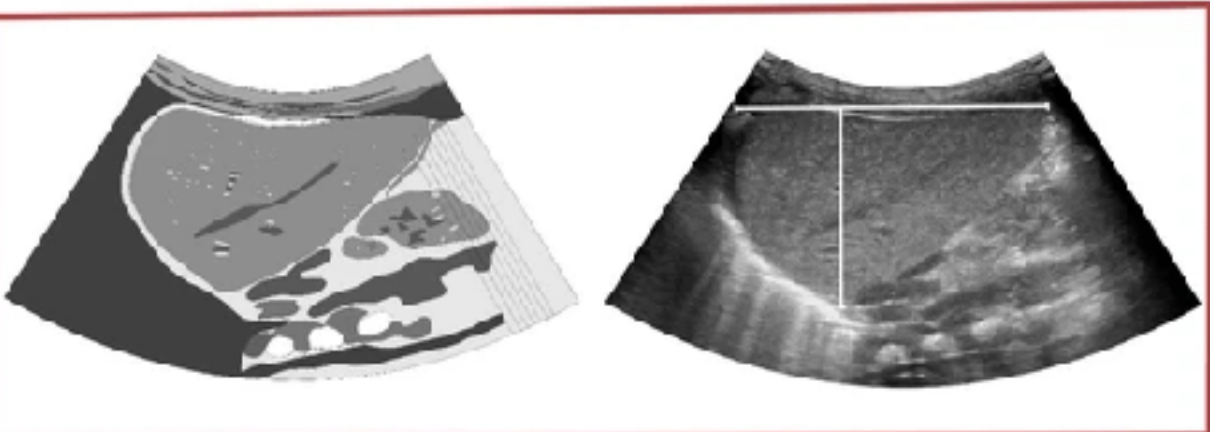
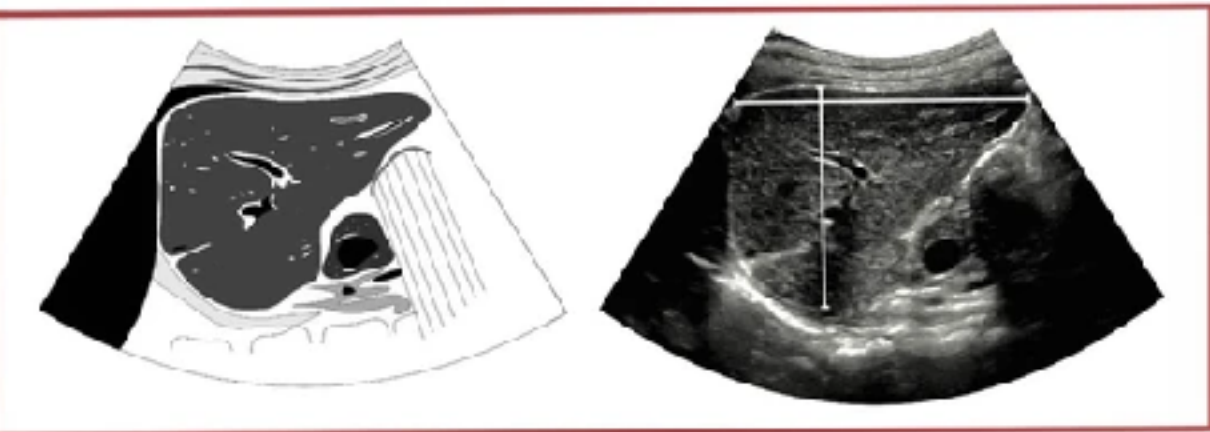




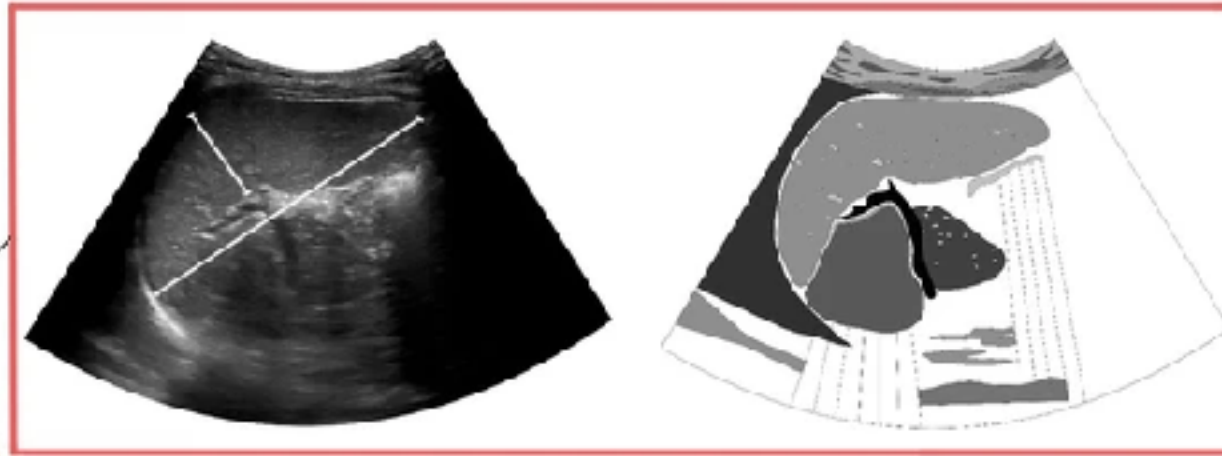
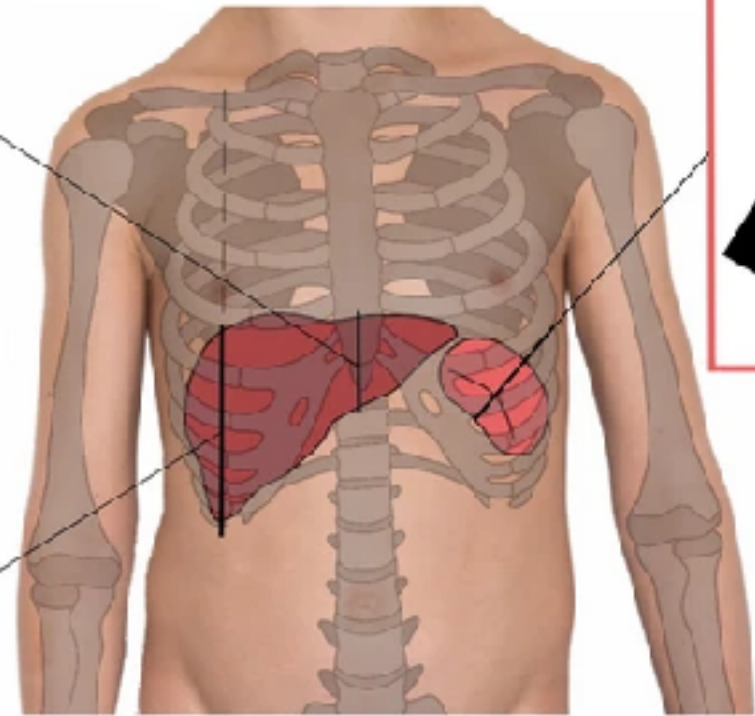




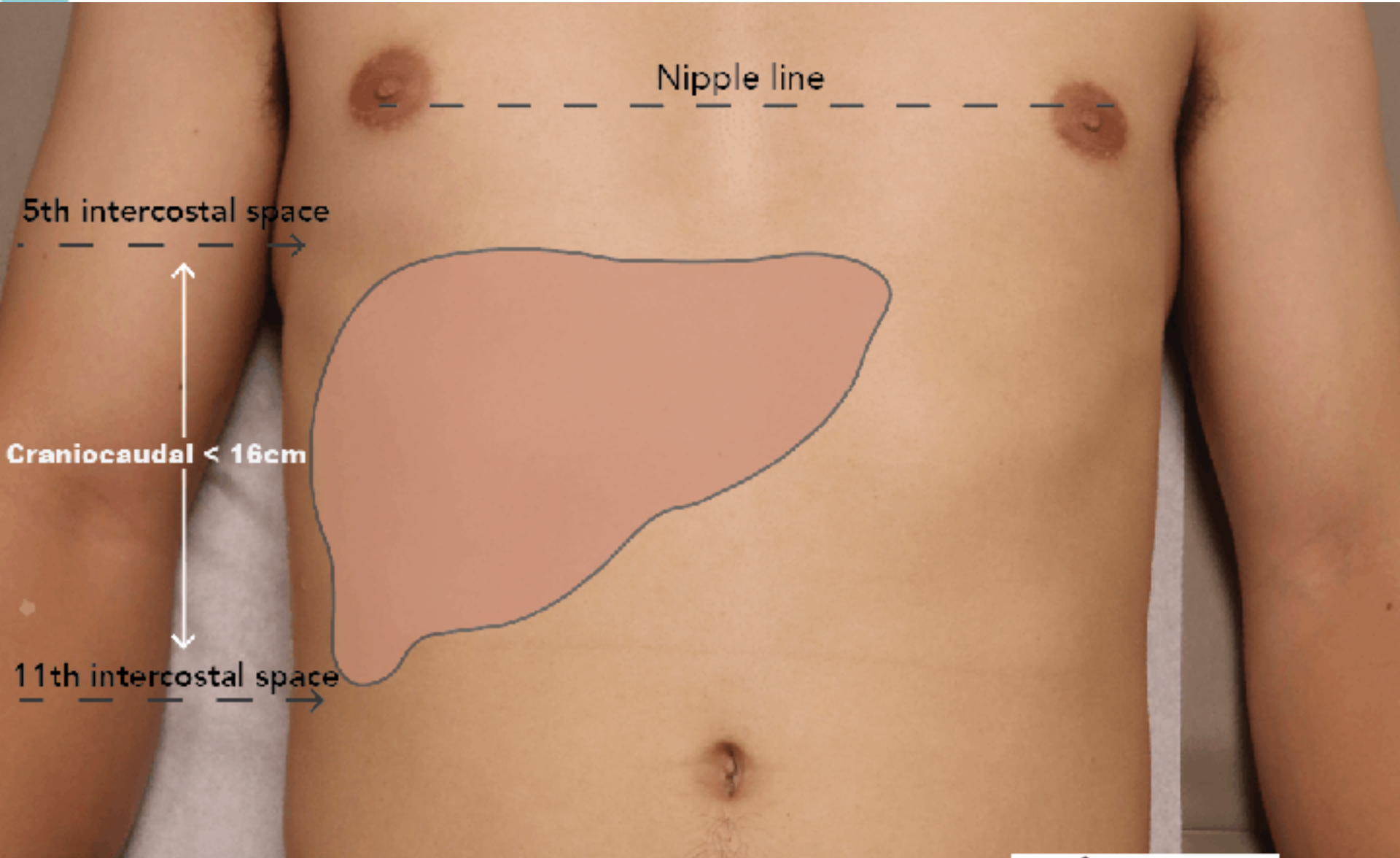




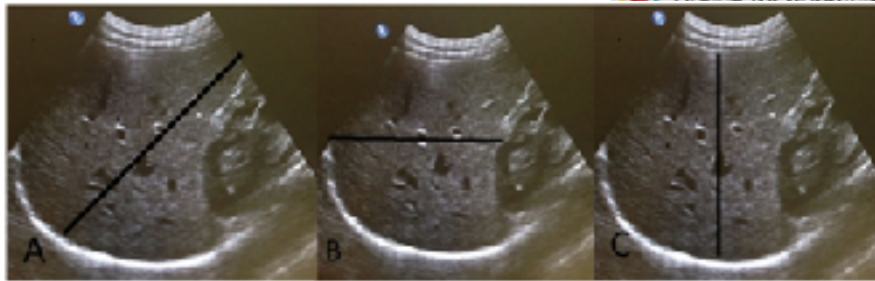




# Liver



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

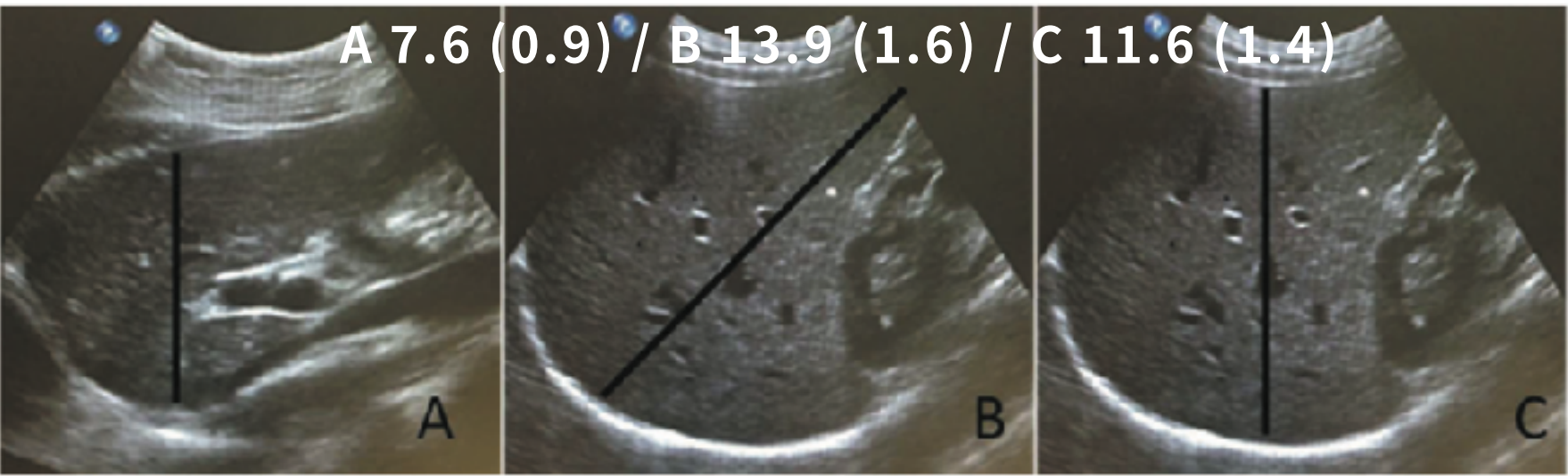


ORIGINAL ARTICLE

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

Jessie T Childs<sup>1</sup>, Adrian J Esteman<sup>2,3</sup>, Kerry A Thoirs<sup>1</sup>, Richard C Turner<sup>4</sup>

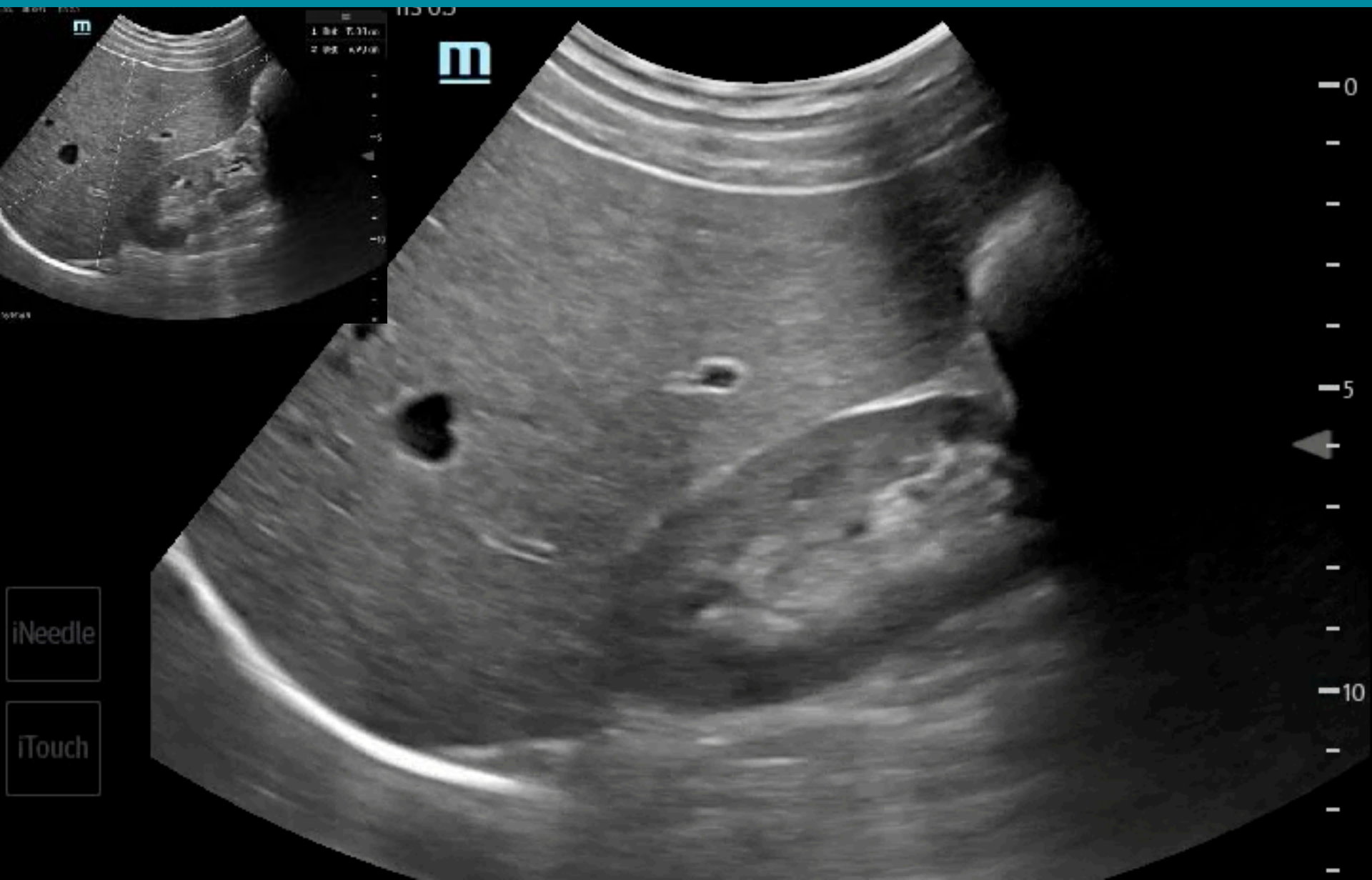
1 International Centre of Allied Health Research, University of South Australia, Adelaide, Australia  
2 University of South Australia, Adelaide, Australia



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

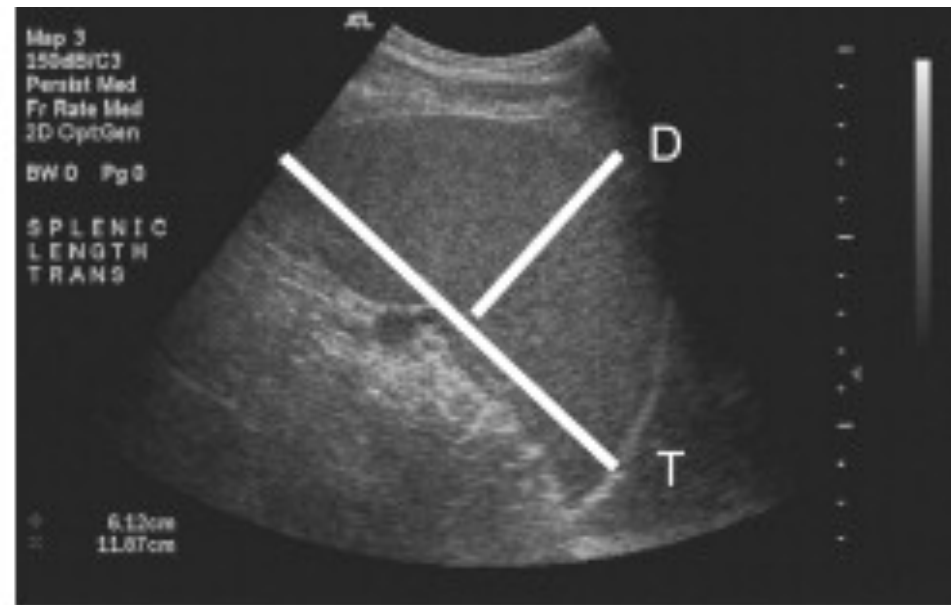
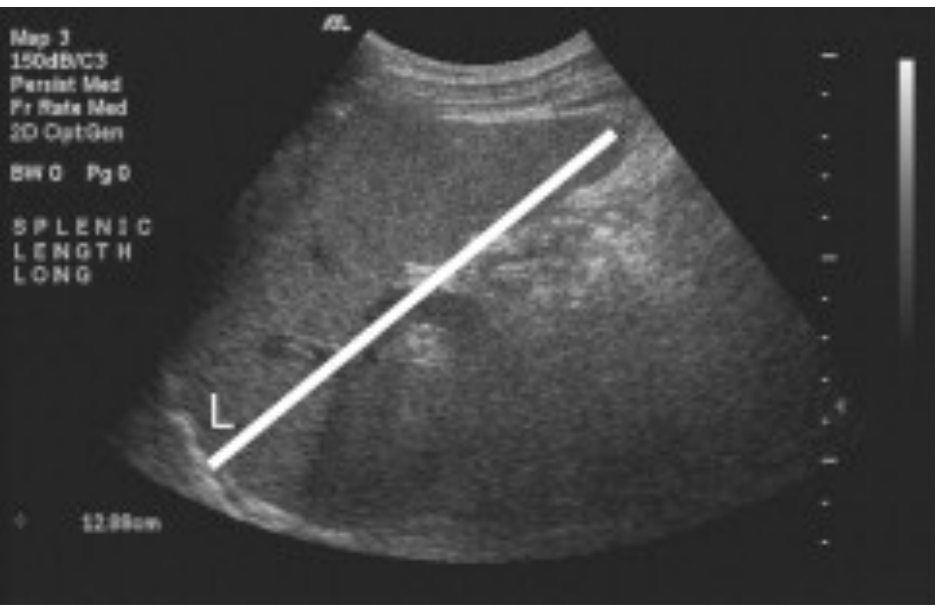
Liver volume (cm<sup>3</sup>) = 343.71 + [0.84 × ABC],  
where ABC is the product of the three linear measurements A × B × C.  
Reference range = 1062–2223 cm<sup>3</sup>

# Liver (mid-clavicle line)



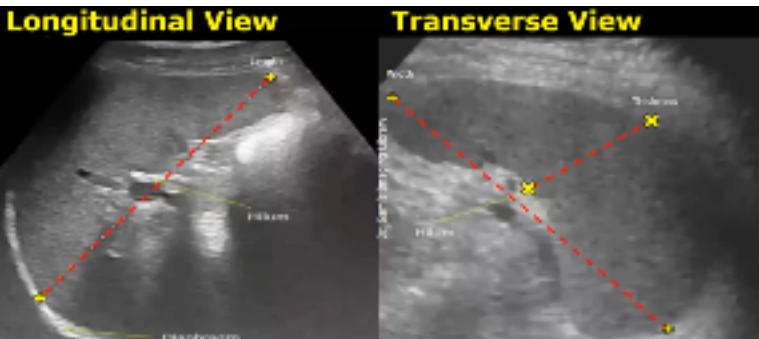


# Spleen : 12 (L) / 7(T) / 4 (D)



**Longitudinal diameter (L)** is the greatest dimension of the spleen on a longitudinal image through the hilum

**Transverse diameter (T)** is the greatest dimension on a transverse image through the hilum



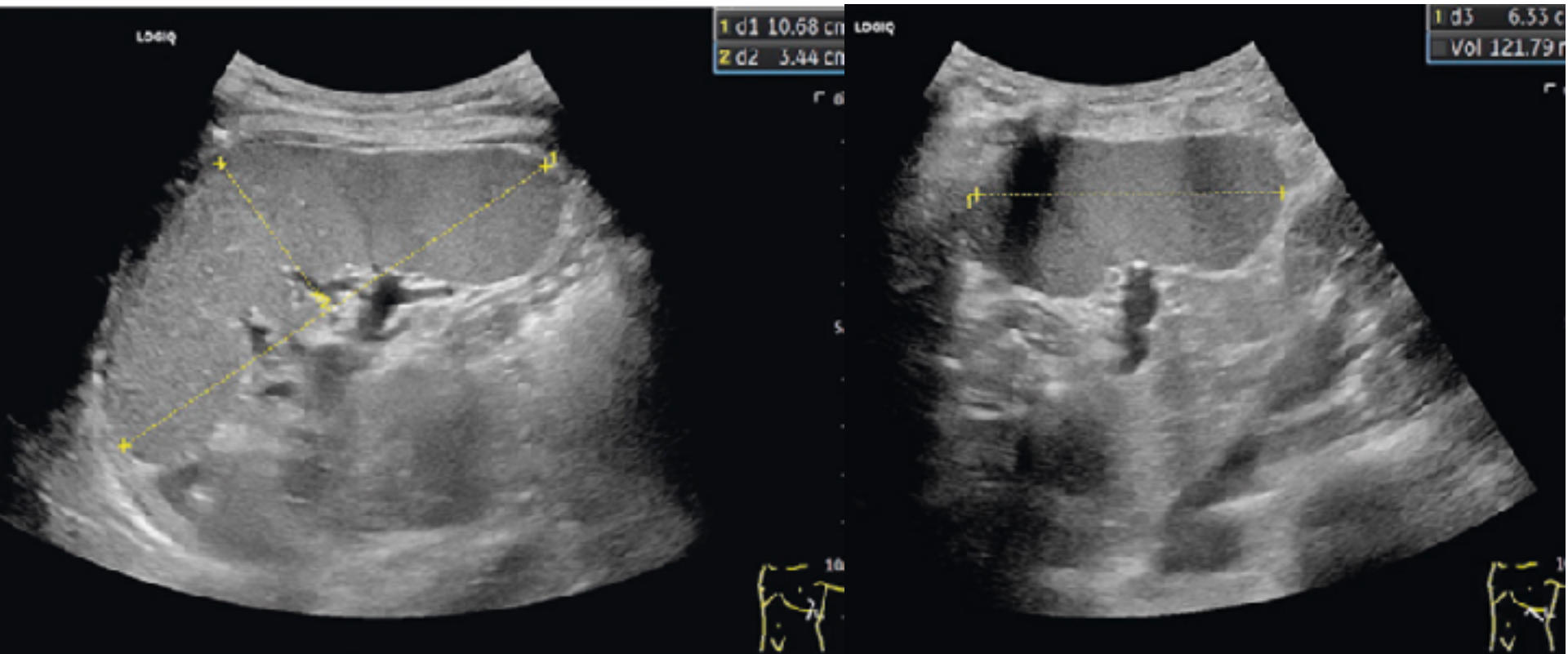
**Diagonal diameter (D; thickness)** measured in transverse image through the hilum as the distance from the hilum to the outer convex surface, approximately perpendicular to the transverse diameter



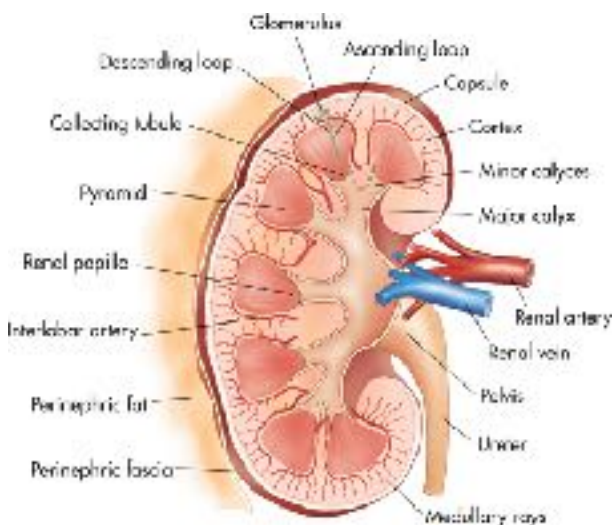
## Ultrasound of the spleen – an update on measurements, reference values, and influencing factors. A systematic review.

Claudia Lucius<sup>1</sup>, Jennifer Meier<sup>2</sup>, Anna Gschmack<sup>3</sup>, Constantinos Zervides<sup>4</sup>, Christian Jenssen<sup>5,6</sup>, Yi Dong<sup>7</sup>, Ole Graumann<sup>8</sup>, Marieke Petry<sup>9</sup>, Christoph F Dietrich<sup>9</sup>

# Splenomegaly : $L > 13\text{cm}$







RKL  $10.62 \pm 0.69$ cm  
 LKL  $10.76 \pm 0.70$ cm  
 RKW  $4.78 \pm 0.75$ cm  
 LKW  $5.10 \pm 0.64$ cm

## RESEARCH ARTICLE

# Reference ranges for ultrasonographic renal dimensions as functions of age and body indices: A retrospective observational study in Taiwan

Hsuan-An Su<sup>1</sup>, Han-Ying Hsieh<sup>2</sup>, Chien-Te Lee<sup>3</sup>, Shang-Chih Liao<sup>3</sup>, Chi-Hsiang Chu<sup>4</sup>, Chien-Hsing Wu<sup>3\*</sup>

**1** Department of Medical Education, Kaohsiung Chang Gung Memorial Hospital, Kaohsiung, Taiwan, **2** Department of Pediatrics, Tung's MetroHarbor Hospital, Taichung, Taiwan, **3** Division of Nephrology, Department of Internal Medicine, Kaohsiung Chang Gung Memorial Hospital, Kaohsiung, Taiwan, **4** Clinical Trial Center, Kaohsiung Chang Gung Memorial Hospital, Kaohsiung, Taiwan

\* [chienhsingwu@gmail.com](mailto:chienhsingwu@gmail.com)

## Abstract

An ethnicity-based reference range for normal renal size is fundamental for ultrasonographic assessment. Herein, we aimed to establish a Chinese renal reference by a large sample size, as well as to elucidate the relationship of renal dimension to age and body indices, with the aid of a comprehensive literature review. Records of 3707 healthy cases were obtained from health evaluation centers of Kaohsiung and Linkuo Chang Gung Memorial Hospitals. As a result, the mean right renal length was  $10.62 \pm 0.69$  cm, left renal length  $10.76 \pm 0.70$  cm, right renal width  $4.78 \pm 0.75$  cm, and left renal width  $5.10 \pm 0.64$  cm. Renal size was well-correlated curvilinearly to age, while linearly to body height, body weight, and body mass index. Renal size increases and then decreases with aging, and significant variations of renal size exist among different ethnicities. Our work provides a reliable reference range for renal size in the Chinese population, and valid relationships between renal dimensions and other parameters.

## OPEN ACCESS

**Citation:** Su H-A, Hsieh H-Y, Lee C-T, Liao S-C, Chu C-H, Wu C-H (2019) Reference ranges for ultrasonographic renal dimensions as functions of age and body indices: A retrospective observational study in Taiwan. PLoS ONE 14(11): e0224795. <https://doi.org/10.1371/journal.pone.0224795>

**Editor:** Giuseppe Remuzzi, Istituto Di Ricerca Farmacologica Mario Negri, ITALY

**Received:** November 30, 2018

**Accepted:** October 22, 2019

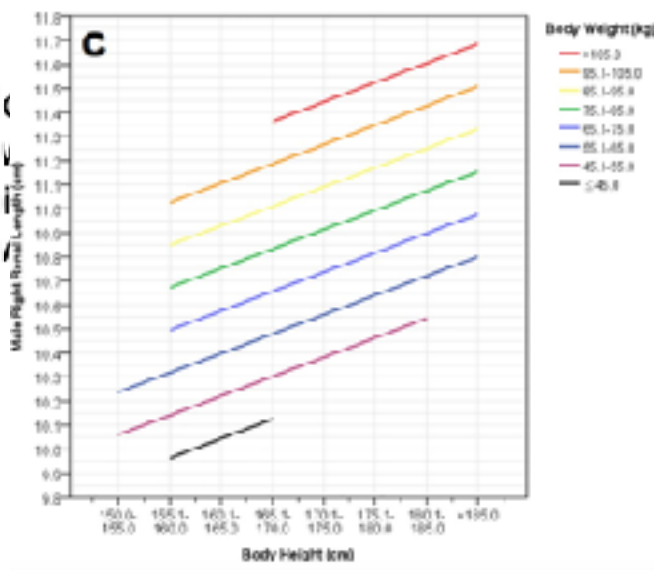
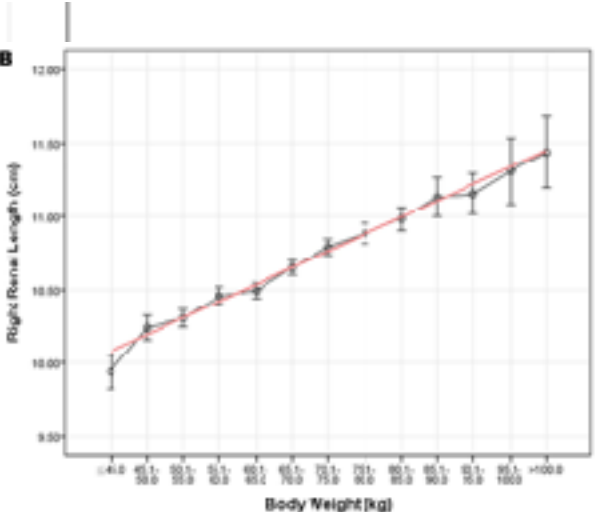
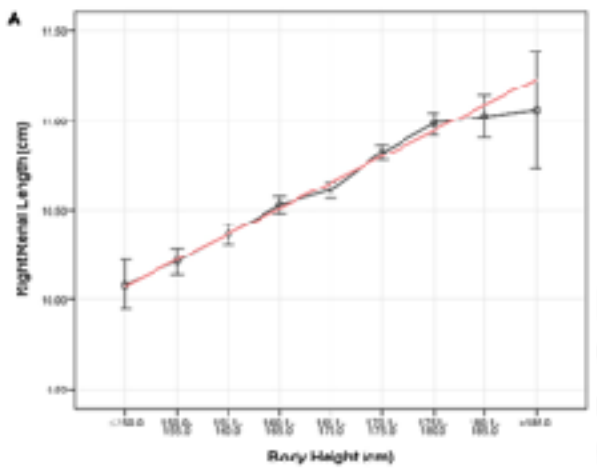
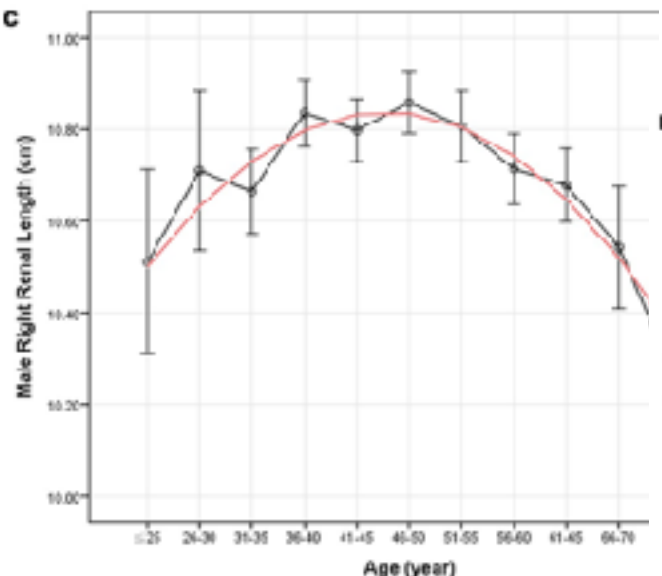
**Published:** November 7, 2019

# Reference ranges for ultrasonographic renal dimensions as functions of age and body indices: A retrospective observational study in Taiwan

Hsuan-An Su<sup>1</sup>, Han-Ying Hsieh  
Chien-Hsing Wu<sup>3\*</sup>

<sup>1</sup> Department of Medical Education, <sup>2</sup> Department of Pediatrics, Tung's M  
<sup>3</sup> Department of Internal Medicine, Kao

Liao<sup>3</sup>, Chi-Hsiang Chu<sup>4</sup>,



damental for ultrasono-  
renal reference by a large  
pension to age and body indi-

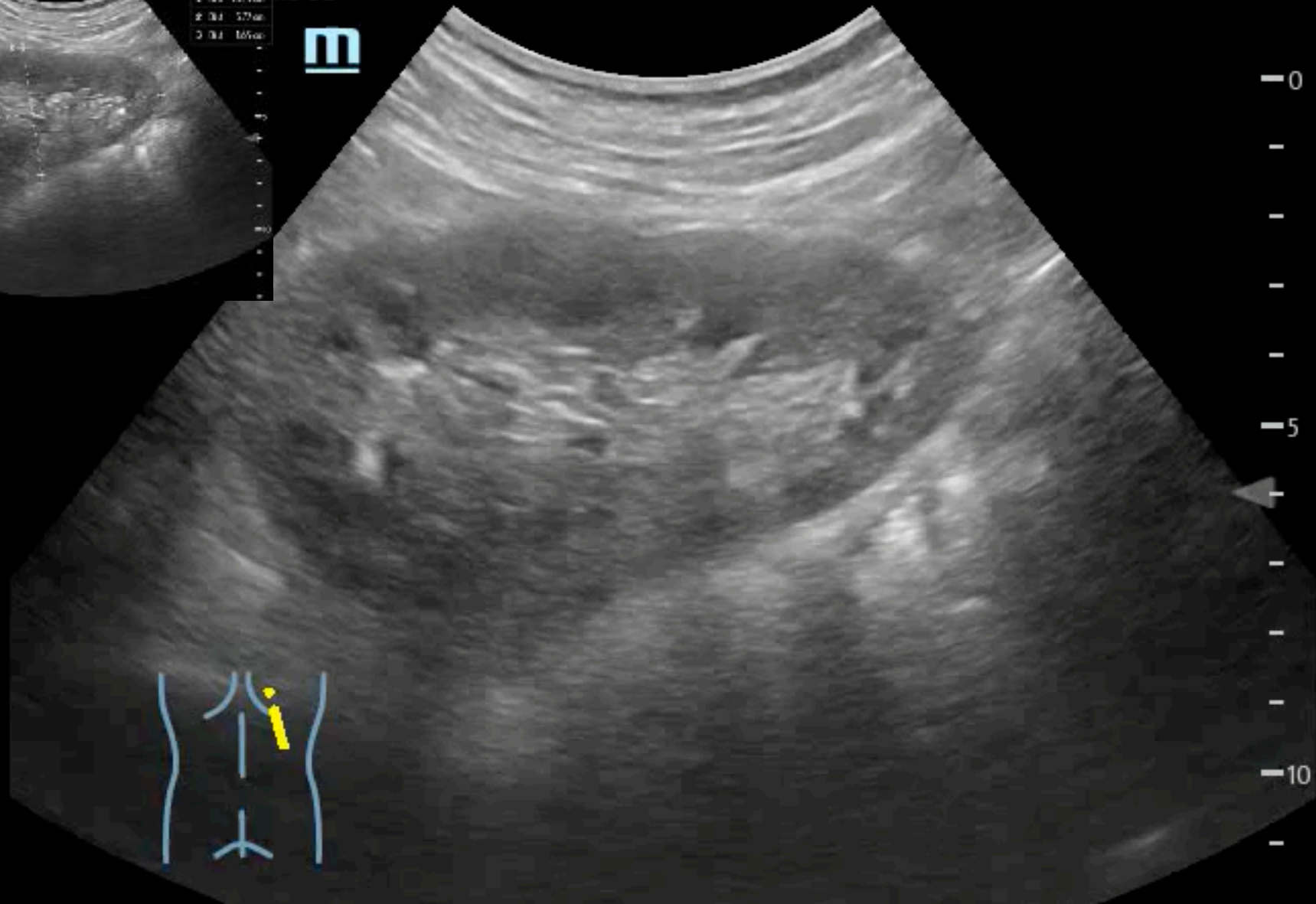


# Kidney



TIS 0.5

- 1. 0.1 13.5cm
- 2. 0.1 5.7cm
- 3. 0.1 1.6cm



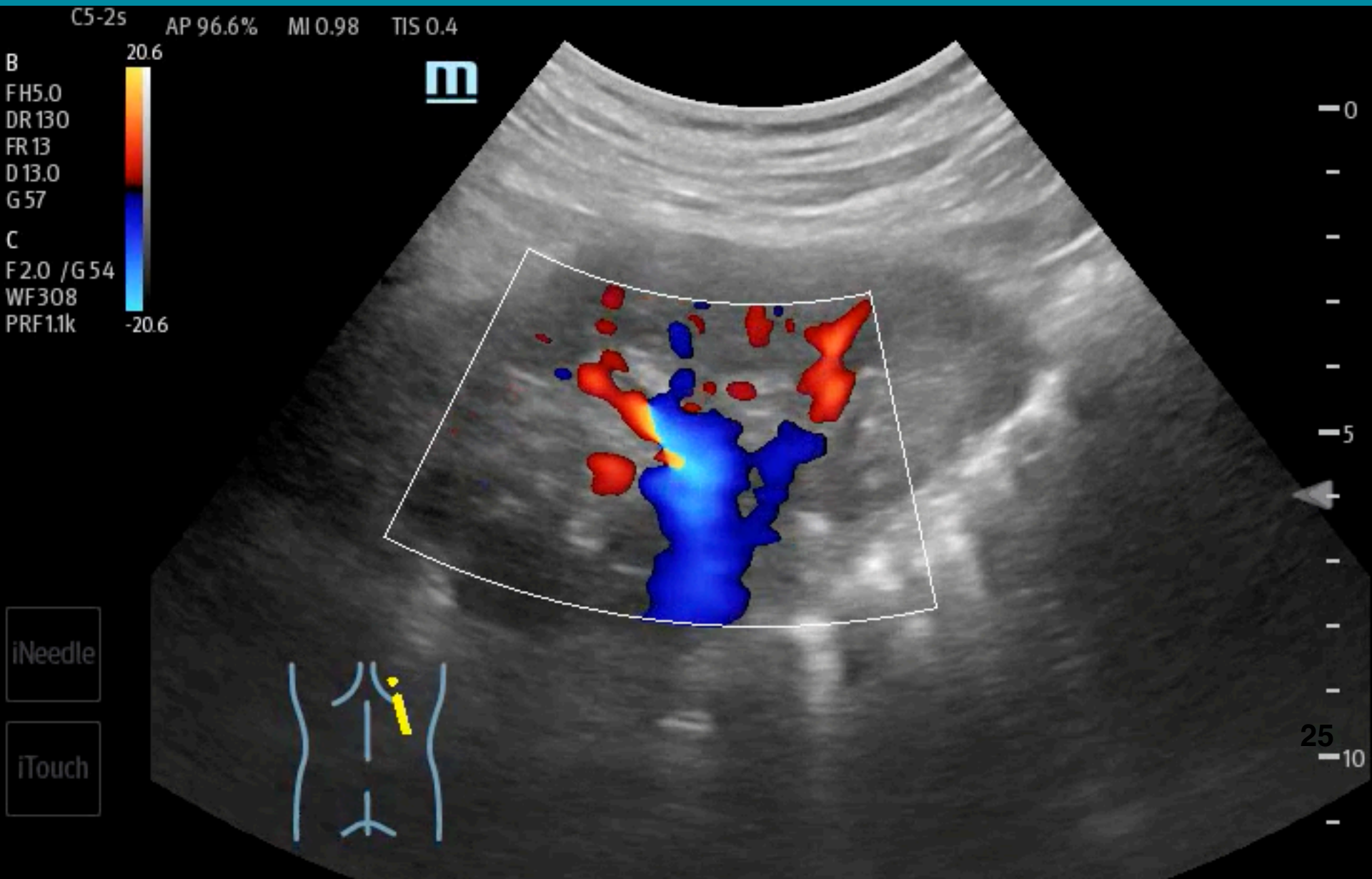
iNeedle

iTouch

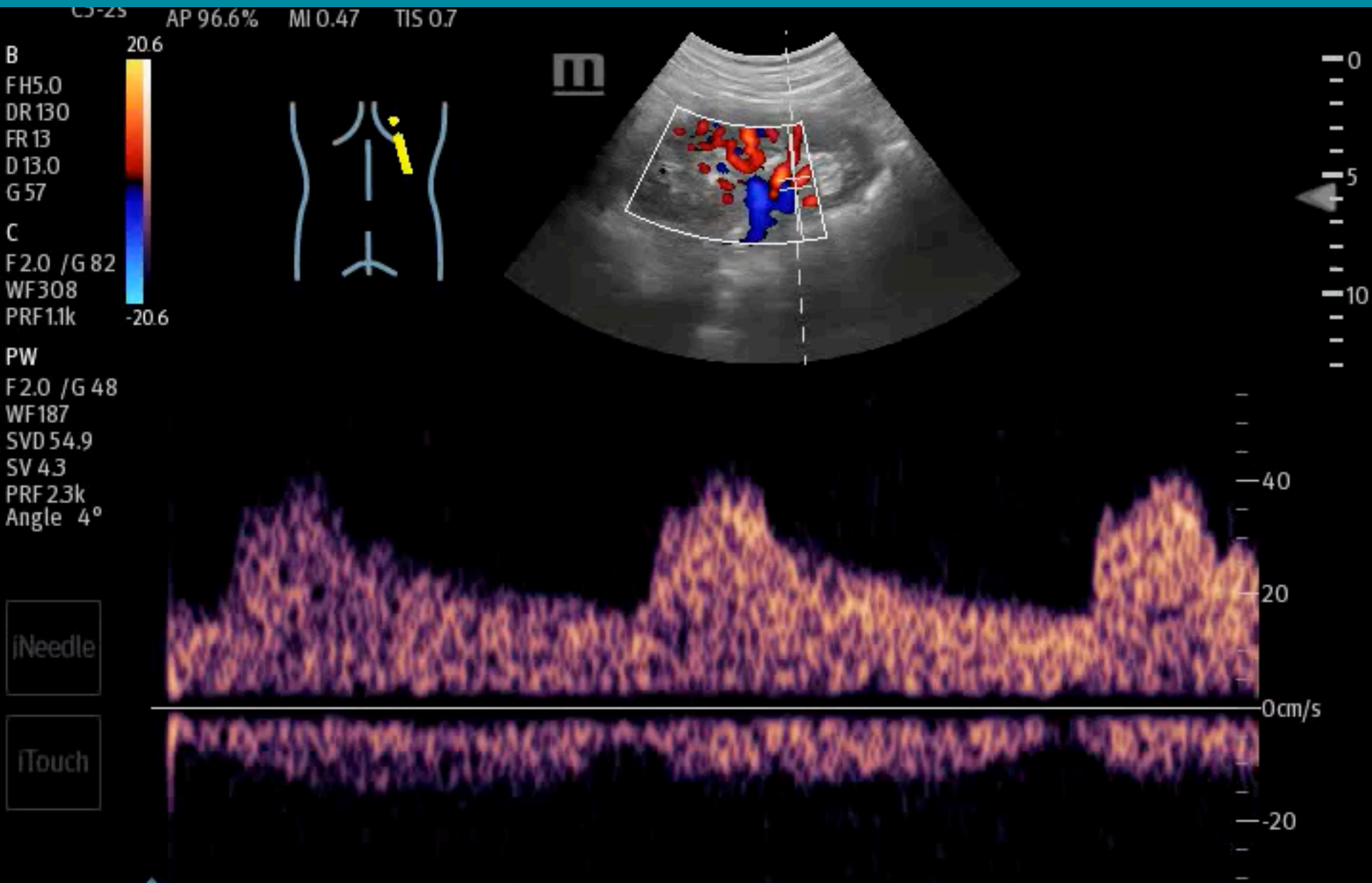




# Kidney



# Kidney



# Pancreatic ultrasound: An update of measurements, reference values, and variations of the pancreas

OPEN ACCESS

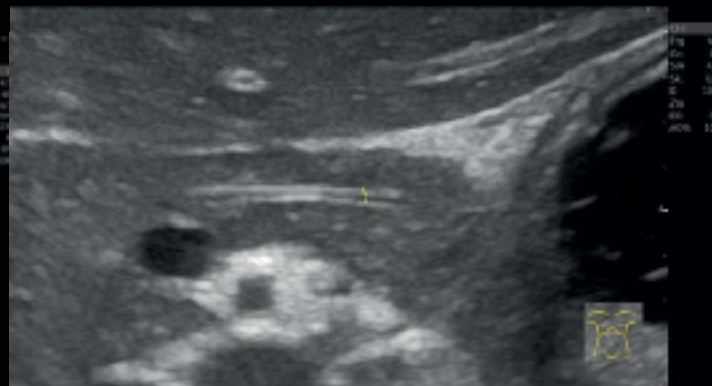


Authors

Jennifer Meier<sup>1</sup>, Claudia Lucius<sup>2</sup>, Kathleen Möller<sup>3</sup>, Christian Jenssen<sup>4</sup>, Constantinos Zervides<sup>5</sup>, Anna Maria Gschmack<sup>6</sup>, Yi Dong<sup>7</sup>, David Srivastava<sup>8</sup>, Christoph F. Dietrich<sup>1</sup>



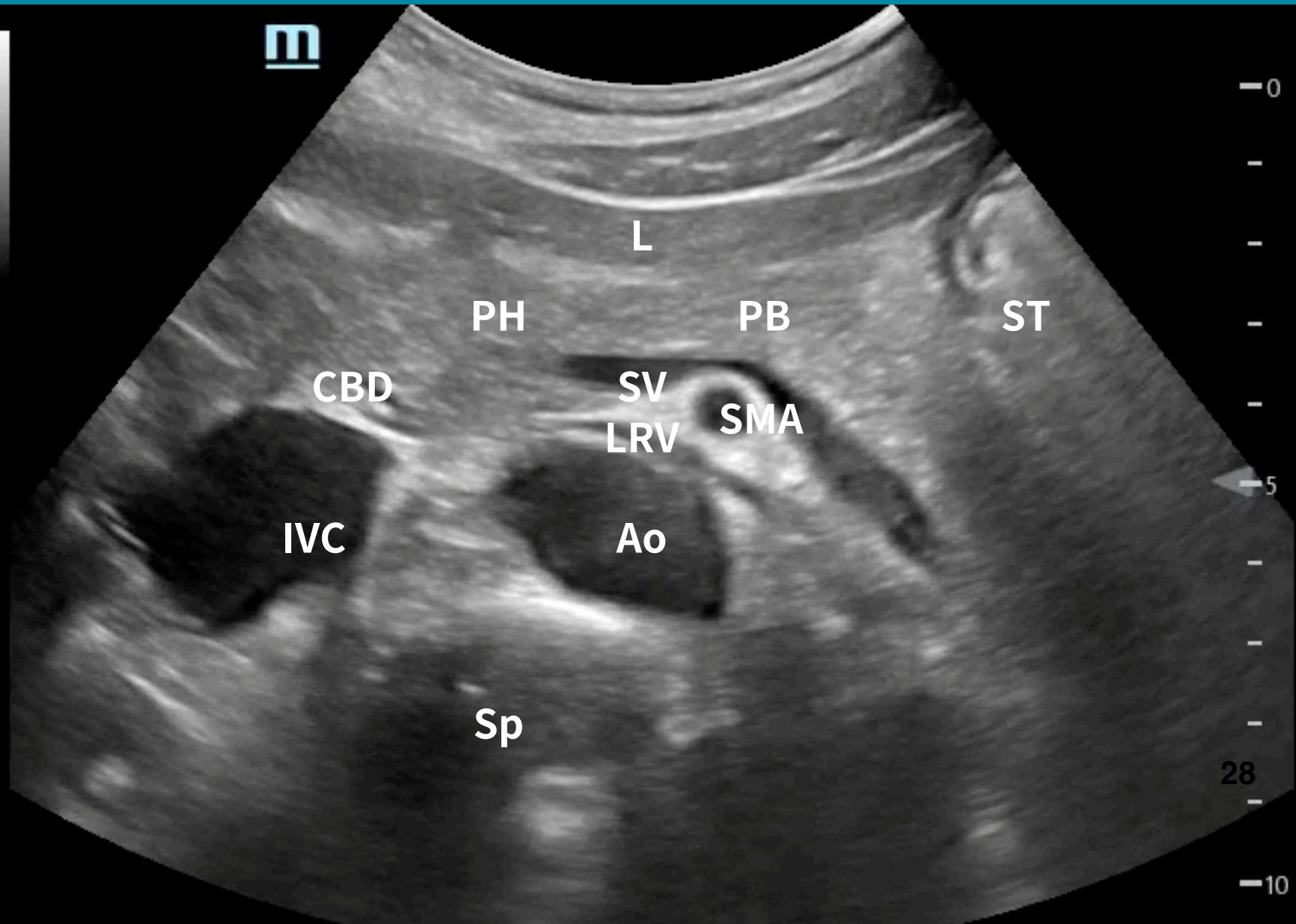
H:  $49 \pm 10$  mm (CC)  
 H:  $34 \pm 08$  mm (RL)  
 H:  $23 \pm 05$  mm (AP)  
 B: 10-20 mm (AP)  
 T: 20-35 mm (AP)  
 Duct (B) < 2mm





# Pancreas

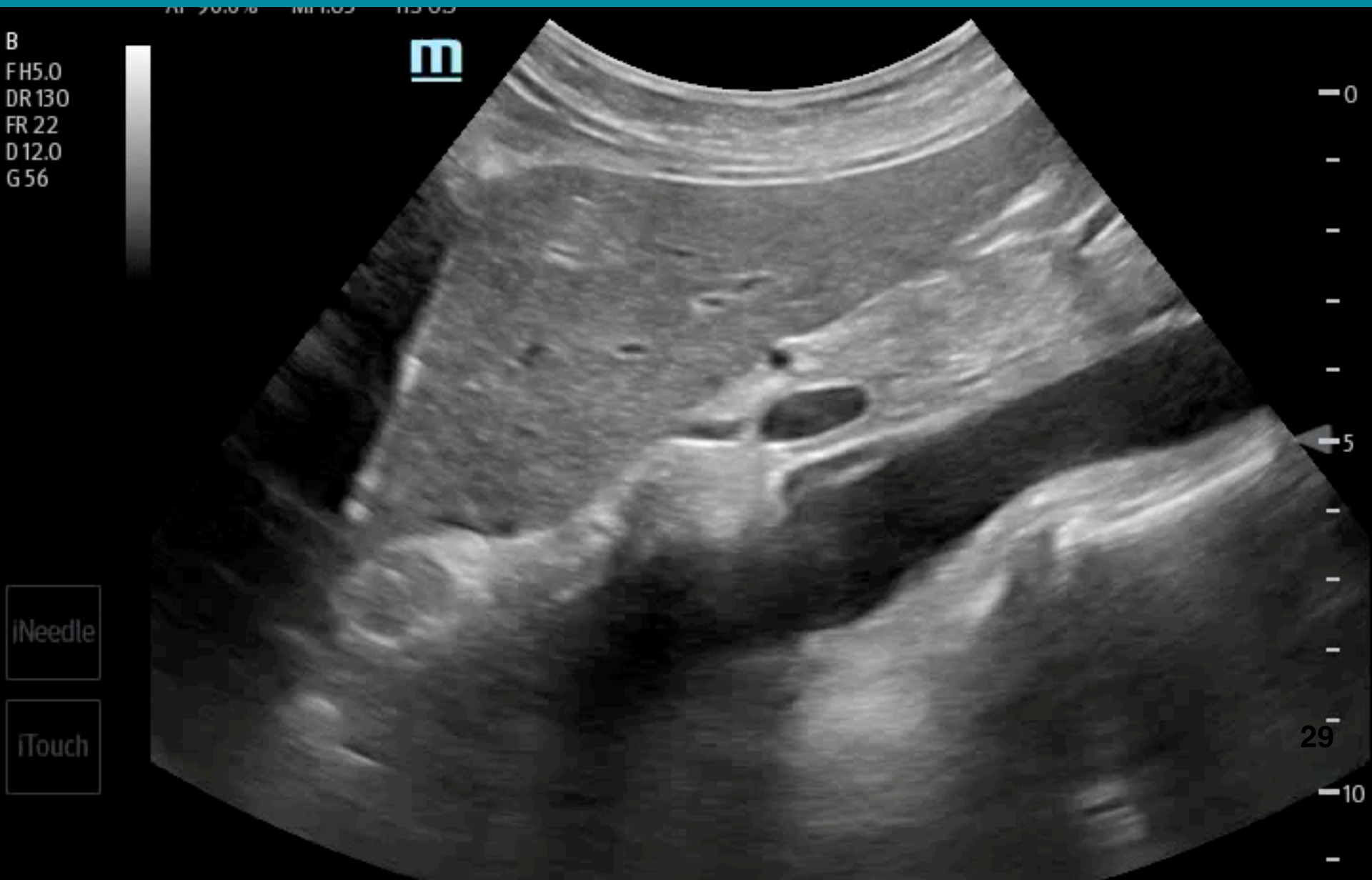
B  
FH5.0  
DR130  
FR 24  
D 11.0  
G 56



iNeedle

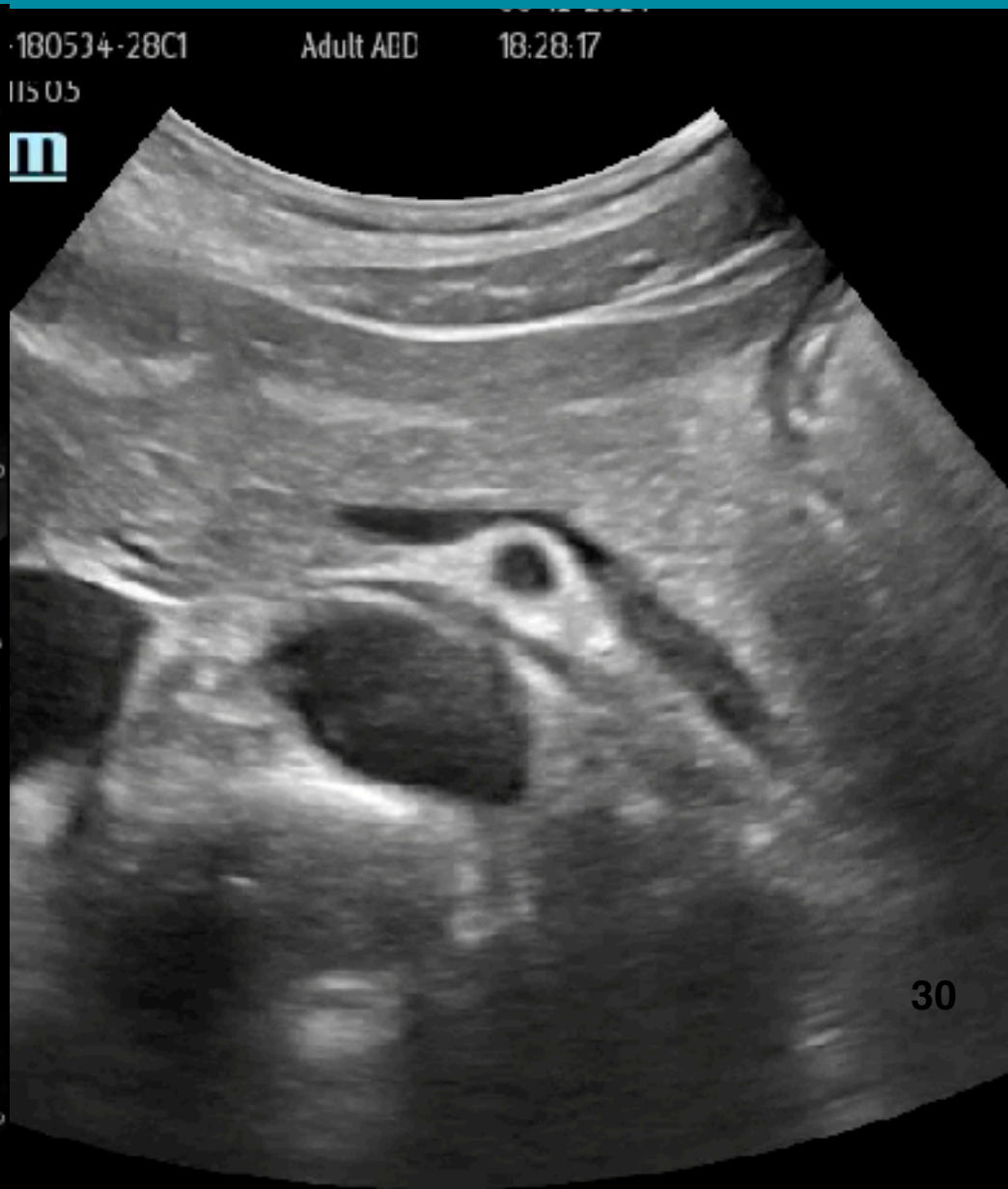
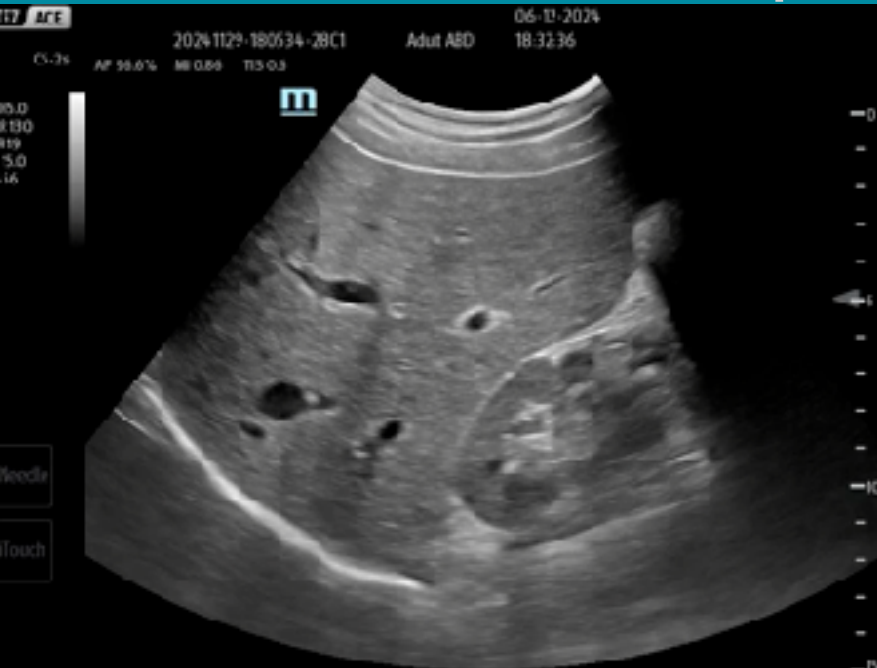
iTouch

# Pancreas

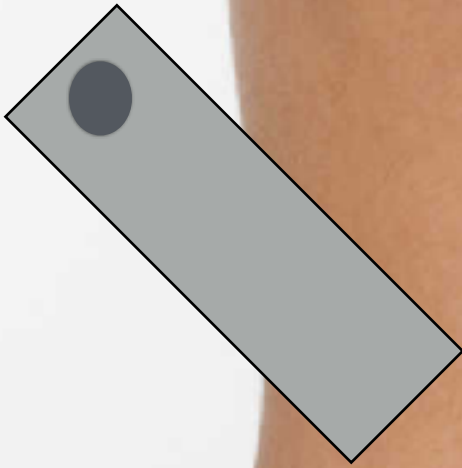


# Echogenicity

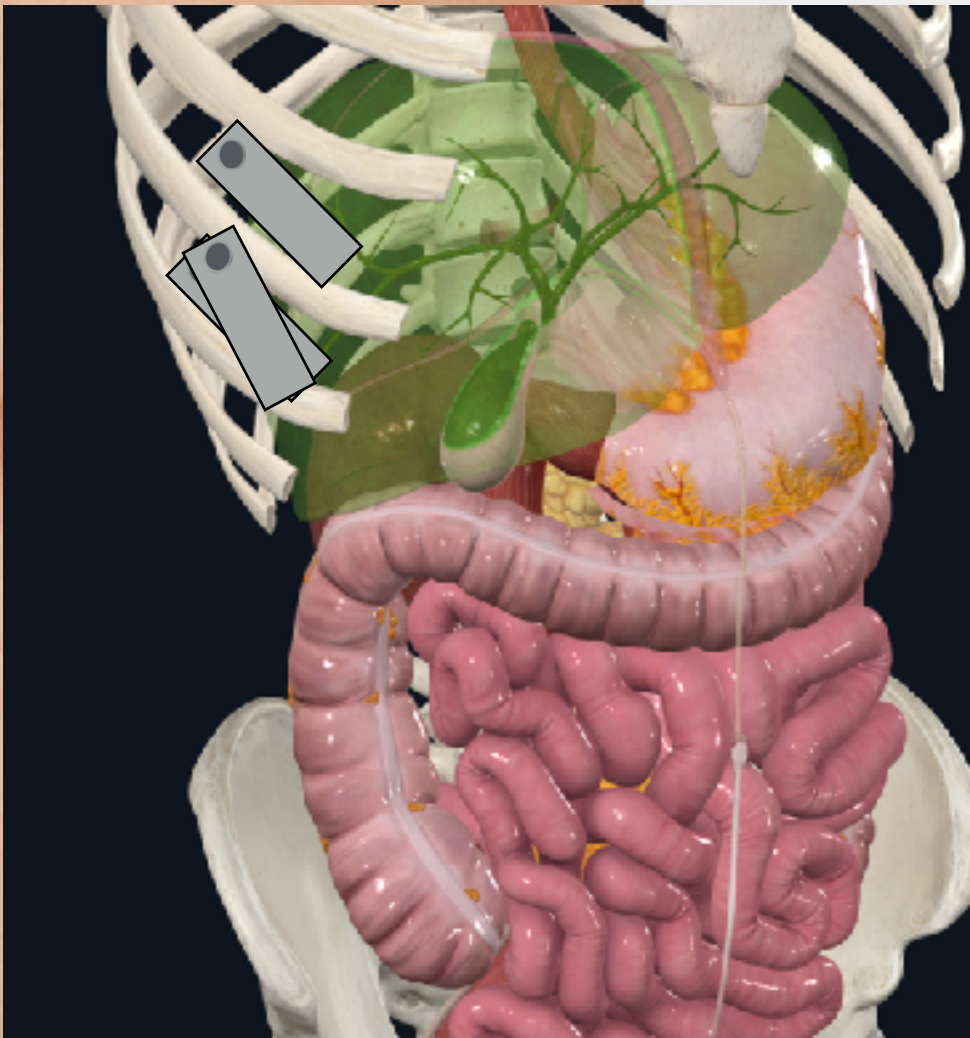
Pancreas > Spleen > Liver > Renal cortex

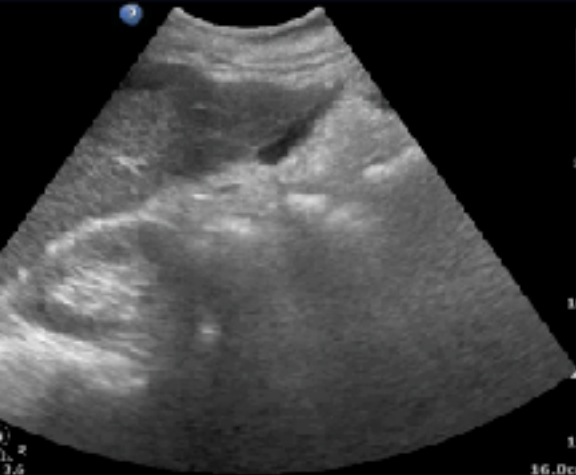






劍突---腋前線  
肋間擺位微調



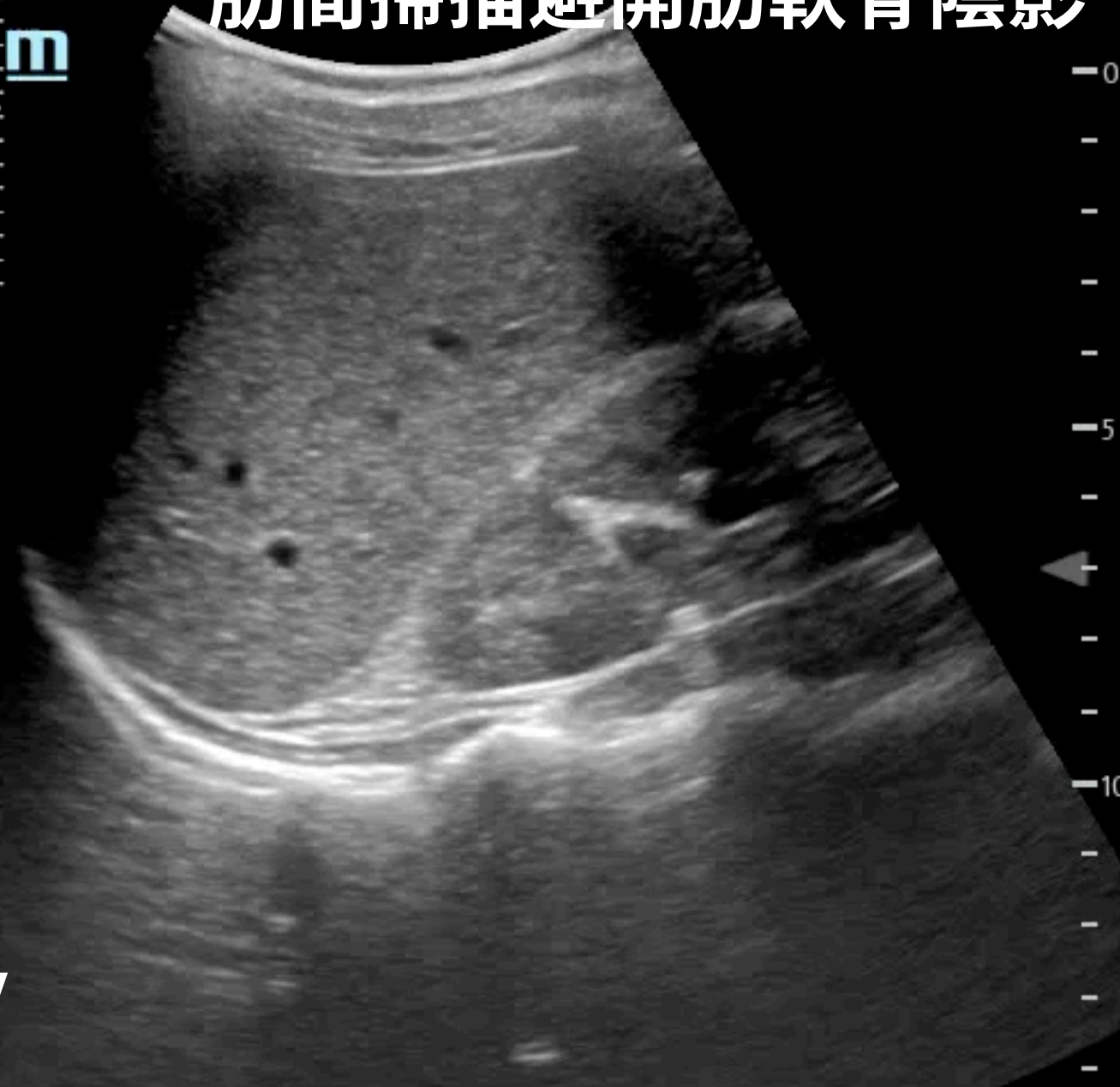


0041-28C1  
0.5  
m  
10  
15  
16.0cm

24-03-2023

15:00:44

# 肋間掃描避開肋軟骨陰影



iNeedle  
Diaphragm  
Liver  
Right kidney

P

# 肋間掃描避開肋軟骨陰影

Hepatic vein

Mickey mouse sign

Portal triad:

Portal vein

Biliary tree

Hepatic artery



5

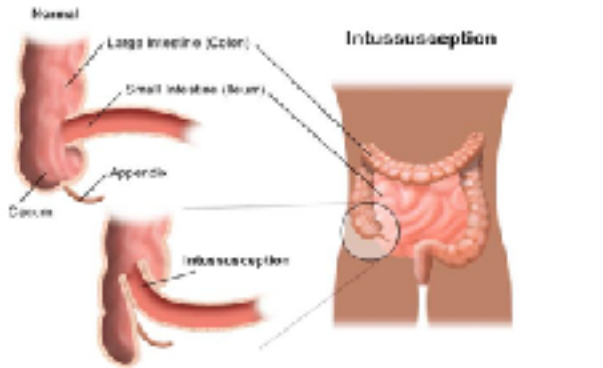
10

11.0cm



# Intussusception

## 小孩優先找右上腹



Ileum "telescopes" inside ascending colon, obstructing passage of intestinal contents.

Bleeding → "Currant jelly stools"

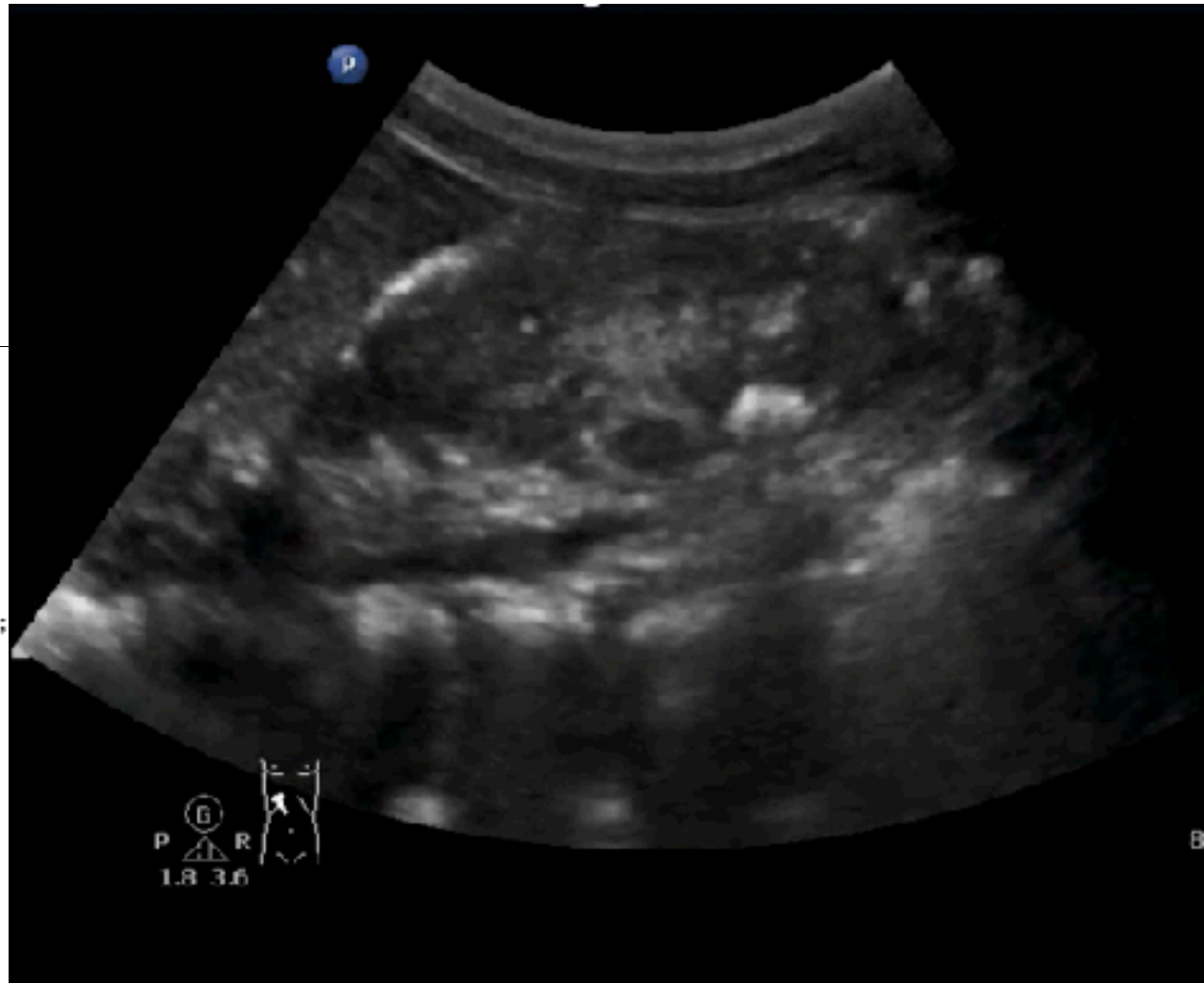
Blood vessels become trapped between layers; blood flow decreases.

Edema

Strangulation of bowel

Gangrene, sepsis, shock

Death



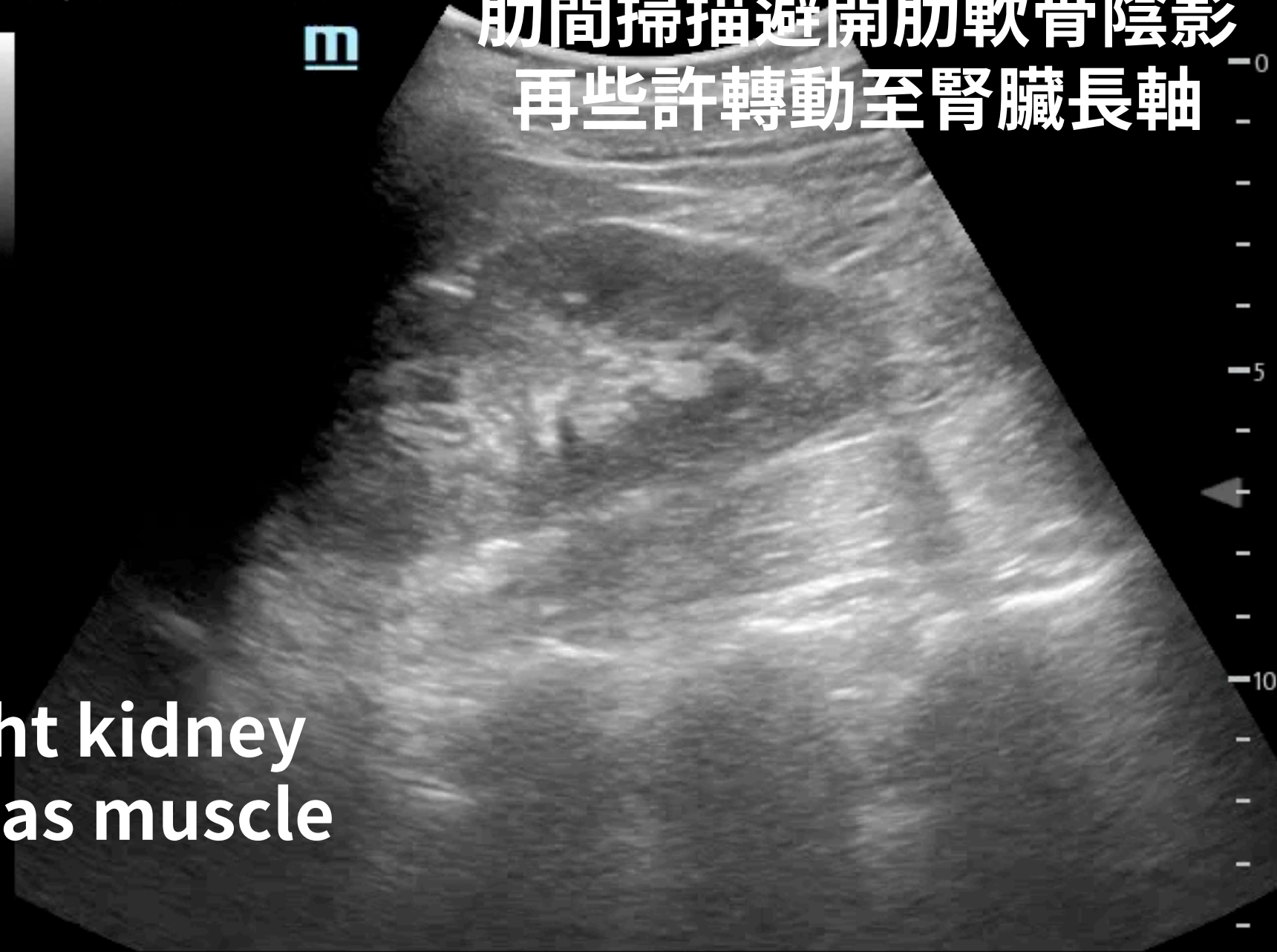
B  
FH6.0  
DR 130  
FR 18  
D 16.0  
G 71  
Z 1.10



肋間掃描避開肋軟骨陰影  
再些許轉動至腎臟長軸

iNeedle

Right kidney  
Psoas muscle



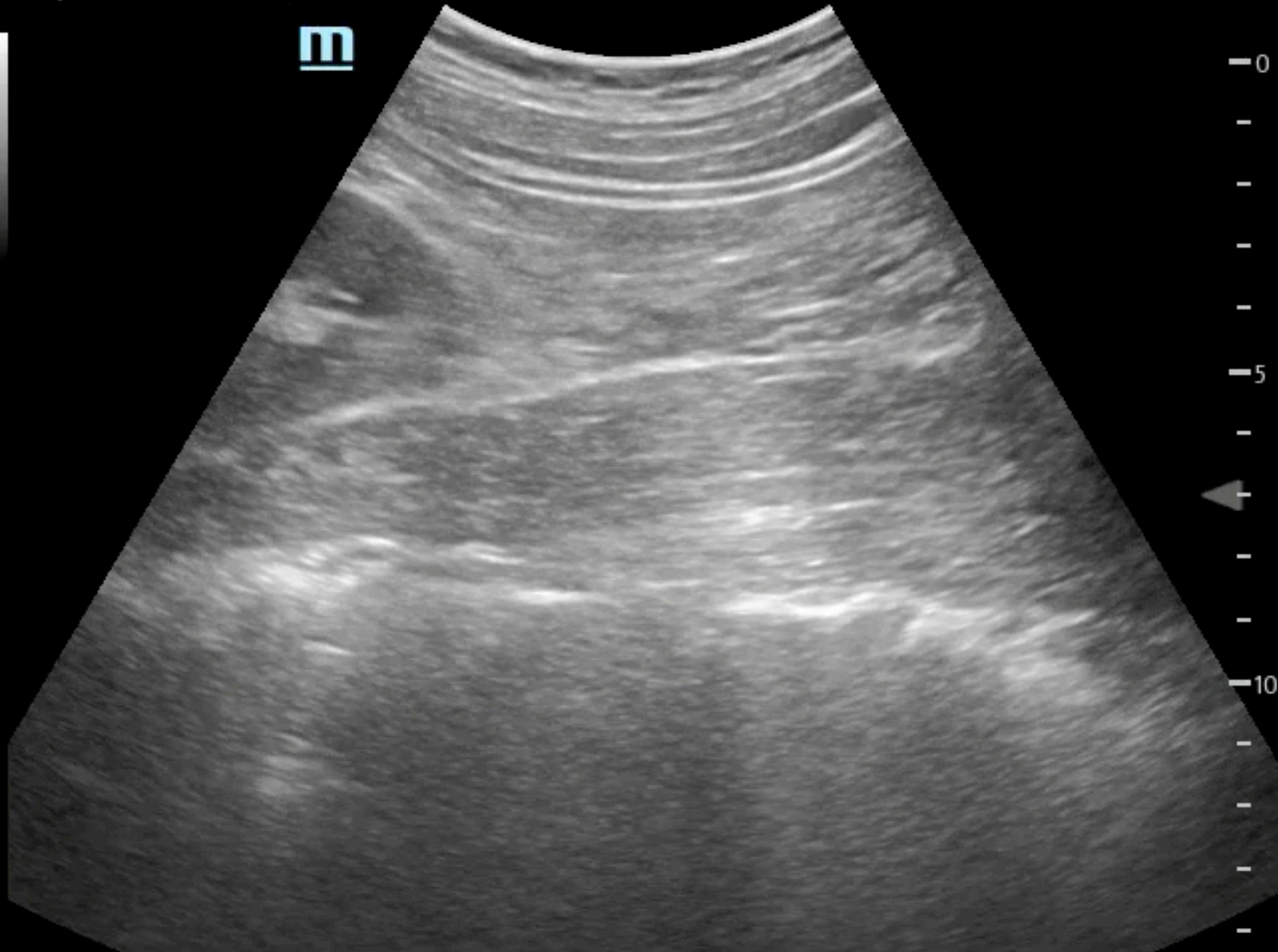
C5-1s

AP 96.6%

MI 130

TIS 0.5

B  
FH6.0  
DR 130  
FR 18  
D 16.0  
G 71  
Z 1.10



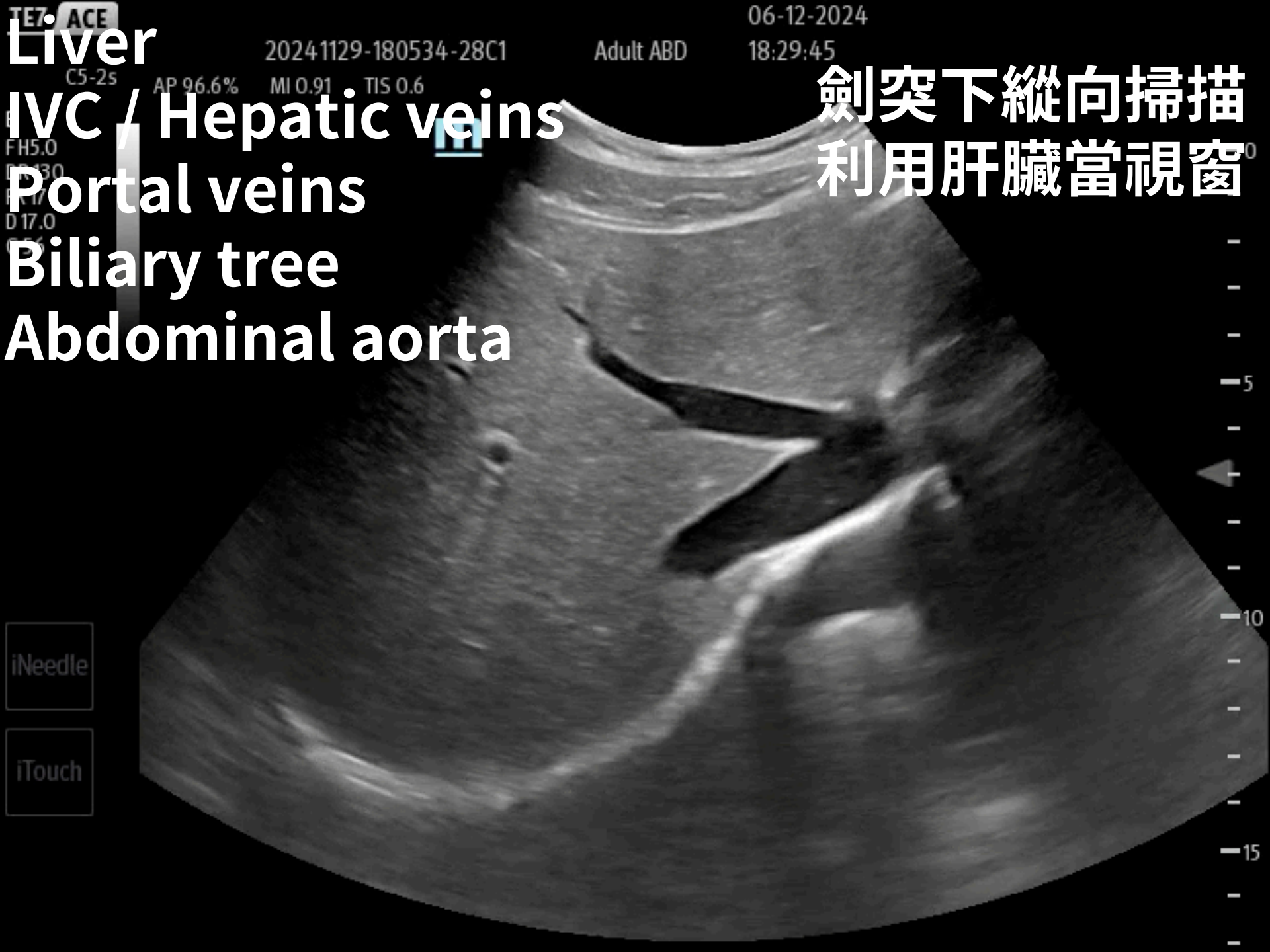
iNeedle

iTouch



# 劍突下 利用肝的視窗





TE7 ACE

20241129-180534-28C1

Adult ABD

06-12-2024

18:29:45

Liver

IVC / Hepatic veins

Portal veins

Biliary tree

Abdominal aorta

劍突下縱向掃描  
利用肝臟當視窗

iNeedle

iTouch

0  
-  
-  
-5  
-  
-  
-10  
-  
-  
-15  
-

TE7 ACE  
**Liver**

20241129-180534-28C1

Adult ABD

06-12-2024  
18:27:15

C5-2s AP 06.6% ML 0.88 TIS 0.6  
**Portal veins**



FH5.0  
D 16.3  
F 1.0  
D 16.0  
G 1.6  
**Biliary tree**

**Abdominal aorta**

**劍突下縱向掃描  
利用肝臟當視窗**



iNeedle

iTouch





TE7 ACE

Liver

20230324-150041-28C1

Diaphragm

24-03-2023

15:02:36

C5-1s

AP 96.6%

MI 130

TIS 0.5

IVC / Hepatic veins

Portal veins

Biliary tree

Abdominal aorta

Pancreas

劍突下縱向掃描  
利用肝臟當視窗

FH6.0  
D 130  
R 18  
D 16.0

iNeedle

iTouch

0  
-  
-  
-5  
-  
-  
-10  
-  
-  
-

C5-1s

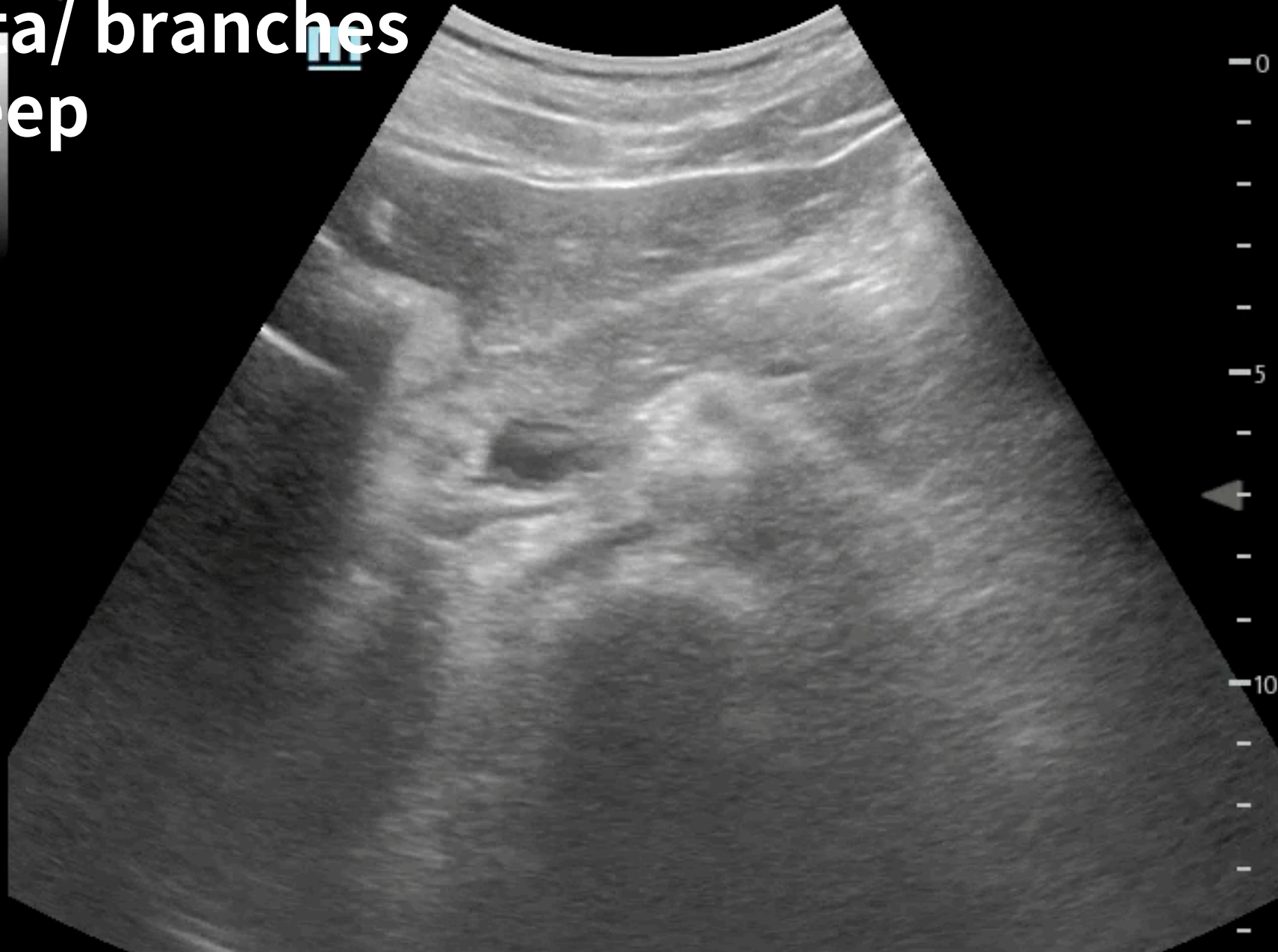
AP 96.6%

MI 130

TIS 0.5

# Aorta/branches Sweep

B  
FH6.0  
DP 130  
FR 3  
D 16.0  
G 81  
Z 1.10



iNeedle

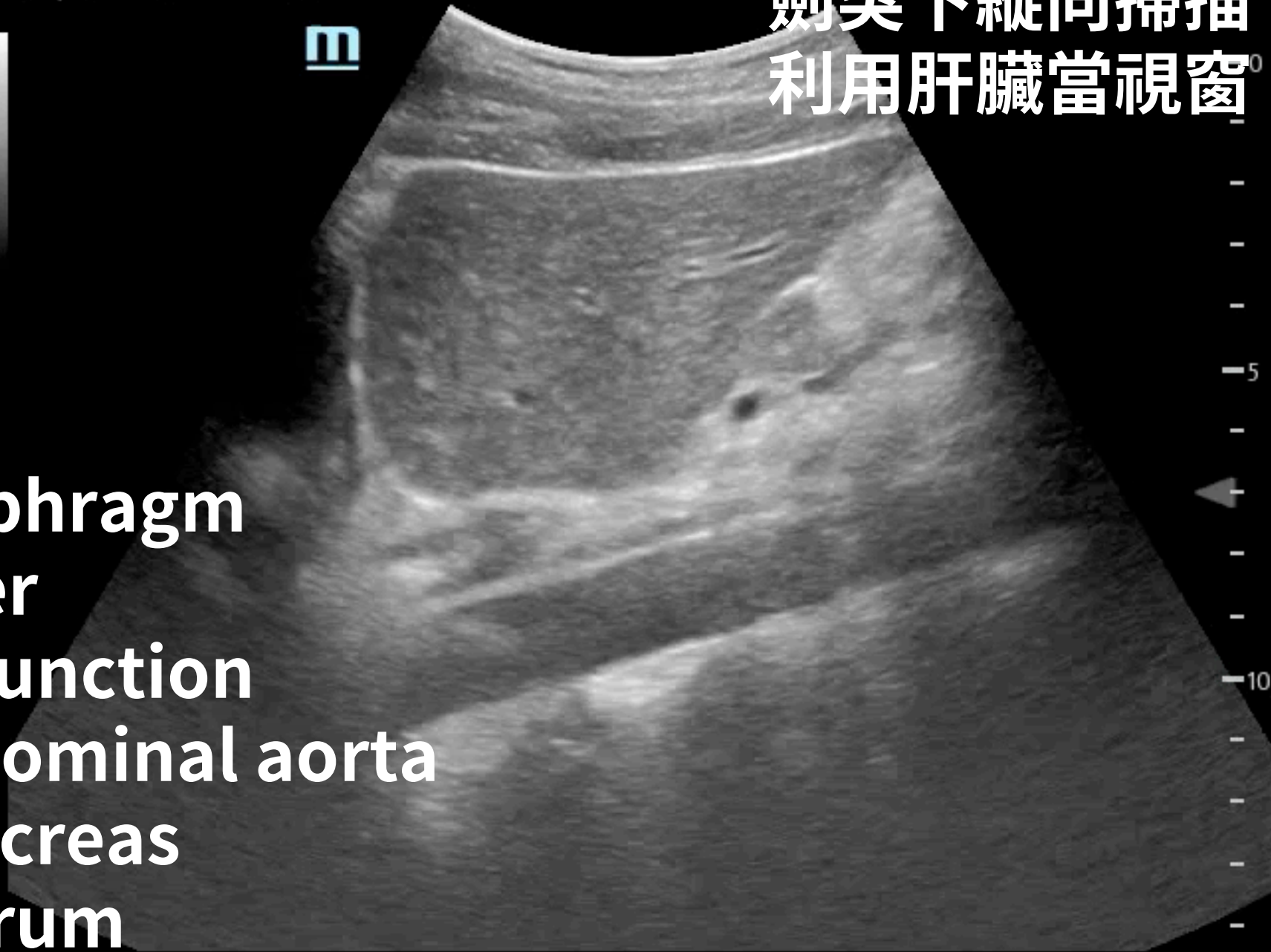
iTouch

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



# 劍突下縱向掃描 利用肝臟當視窗

- Diaphragm
- Liver
- EC junction
- Abdominal aorta
- Pancreas
- Antrum





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

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

Diaphragm  
Liver  
EC junction  
Abdominal aorta  
Pancreas  
Antrum

劍突下縱向掃描  
利用肝臟當視窗



iNeedle  
iTouch

0  
5  
10

C5-1s

AP 96.6%

MI 130

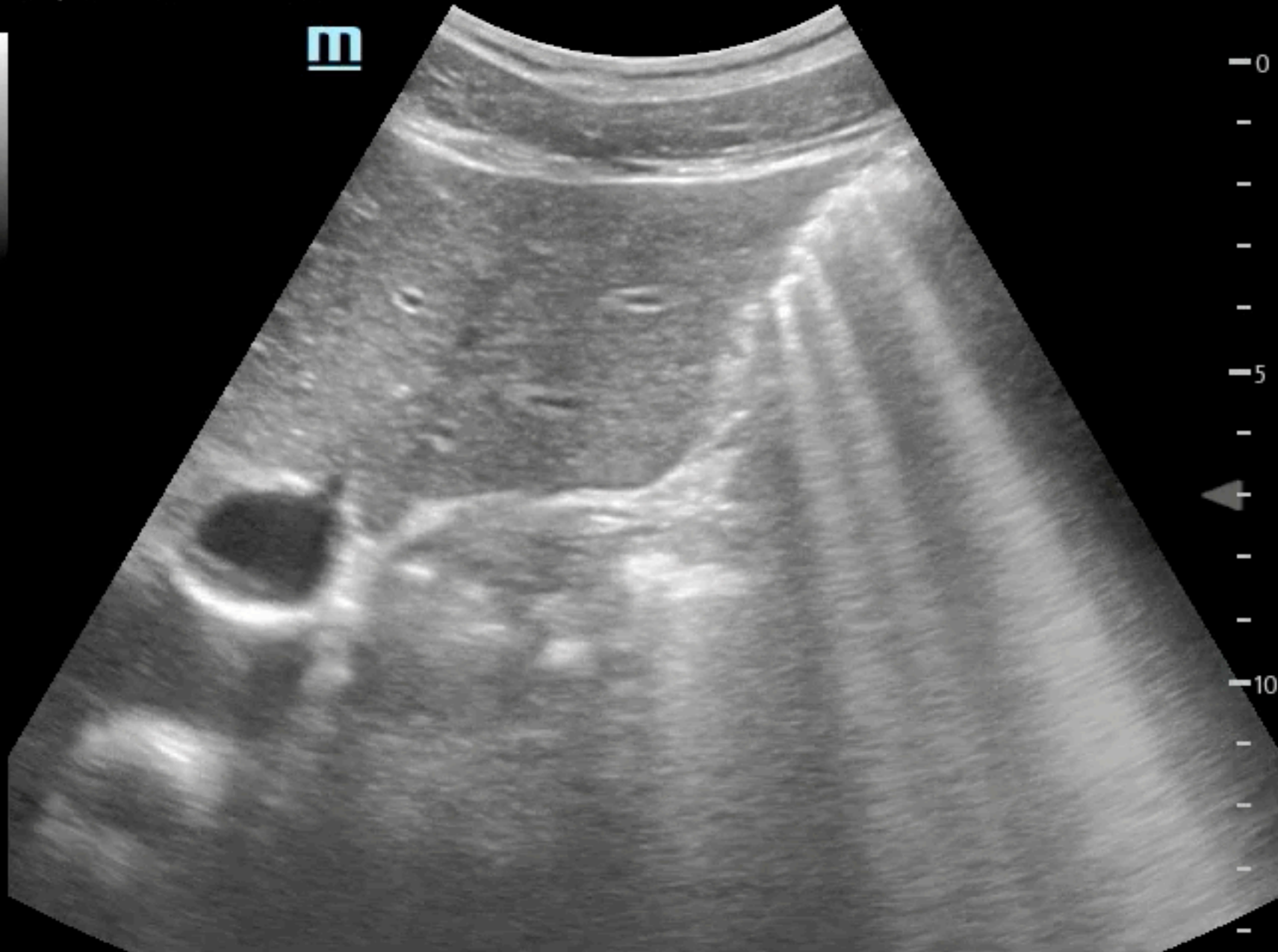
TIS 0.5

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



iNeedle

iTouch



0  
-  
-  
-  
-  
-  
5  
-  
-  
-  
-  
-  
10  
-  
-  
-





C5-2s

AP 96.6%

MI 1.00

TIS 0.5

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



0  
-  
-  
-  
-  
-  
5  
-  
-  
-  
-  
10  
-

iNeedle

iTouch

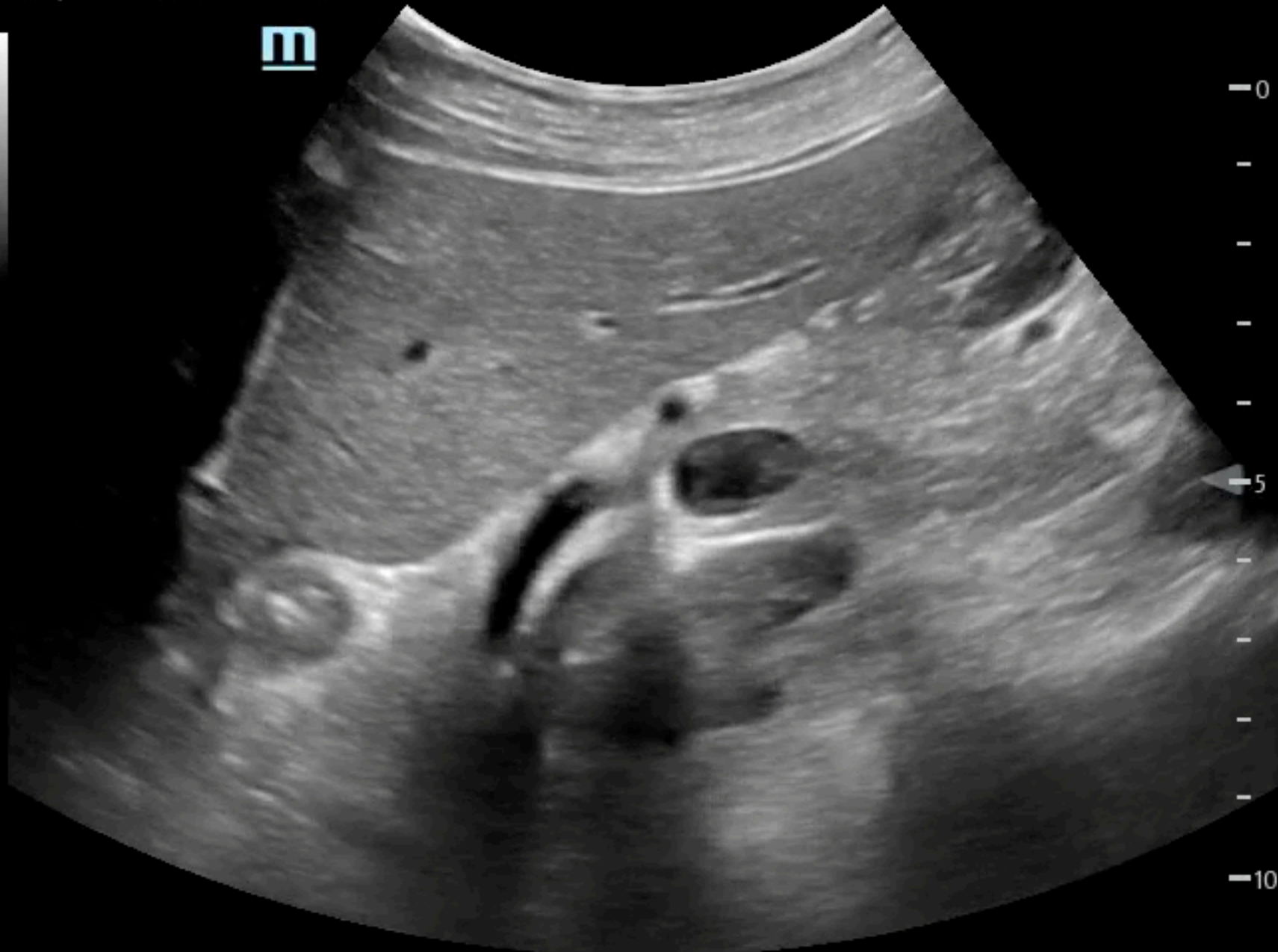
C5-2s

AP 96.6%

MI 1.00

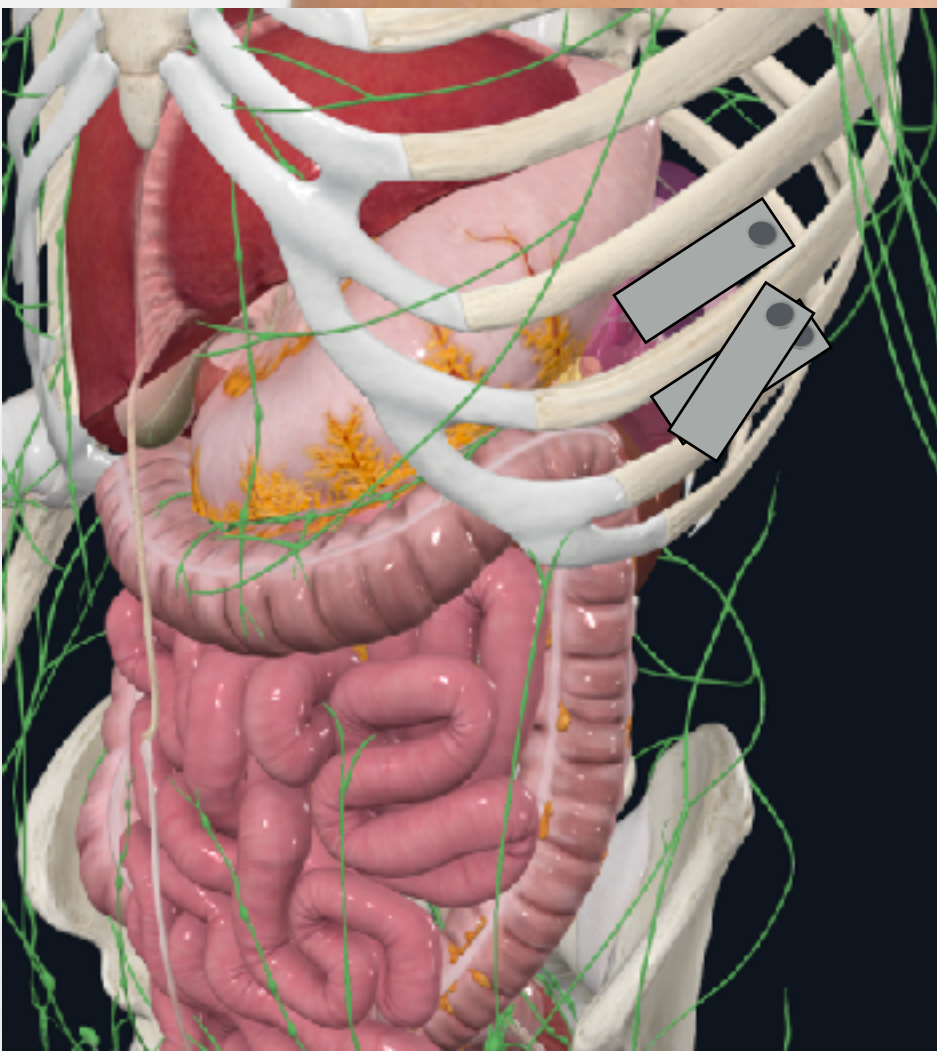
TIS 0.5

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



iNeedle

iTouch



劍突---腋後線  
平行肋間微調



TE7 ACE

24-03-2023

Abd 0902  
CS-1  
3.1 Hz  
12.0cm

Diaphragm

6033024-150041-28C1

Diaphragm

15:03:12

AP 96.6% 1130 TIS 0.5

Spleen



Pancreatic tail

Left kidney

Splenic flexure

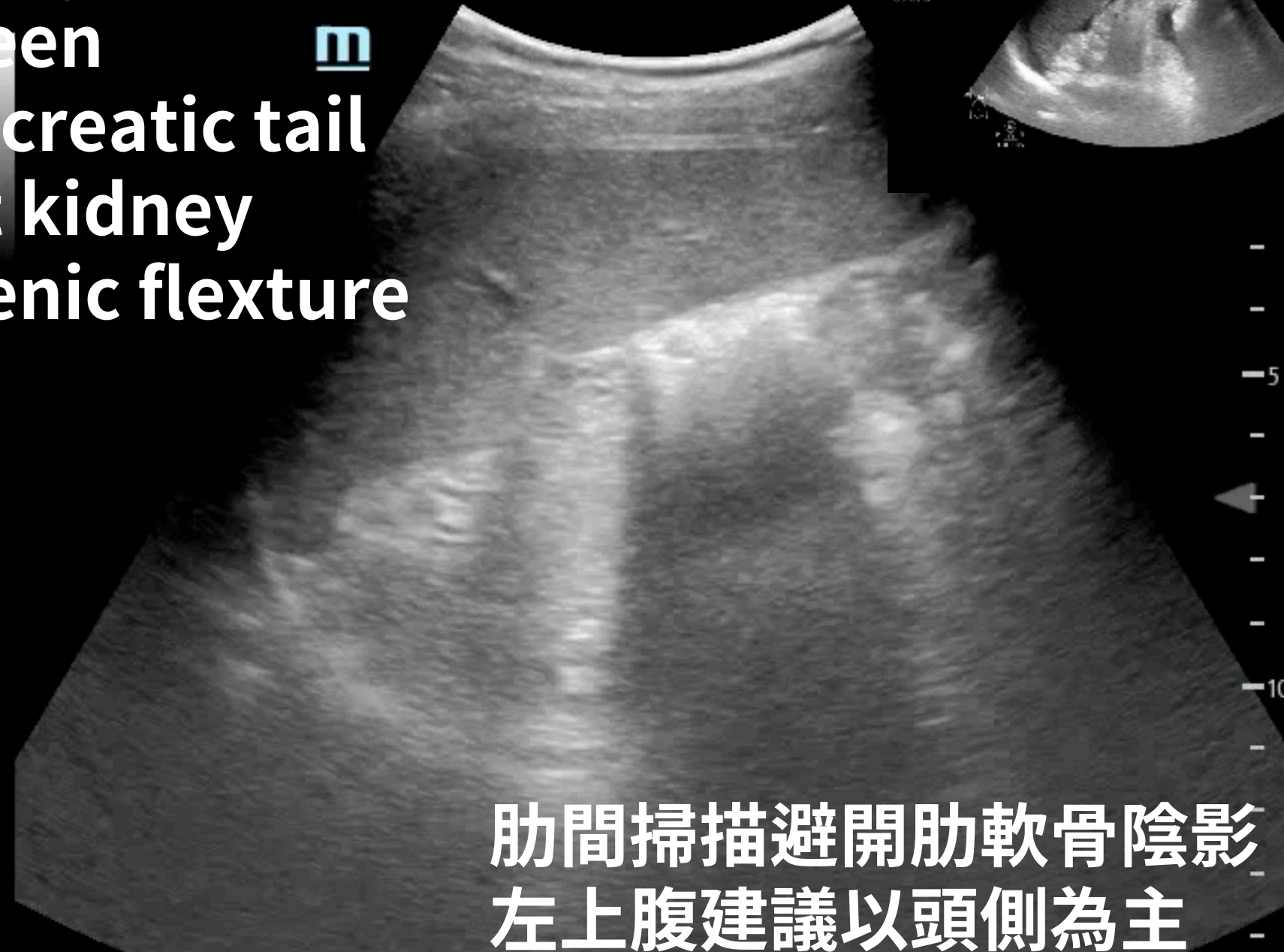


iNeedle

iTouch

-  
-  
-5  
-  
-  
-10  
-  
-

肋間掃描避開肋軟骨陰影  
左上腹建議以頭側為主



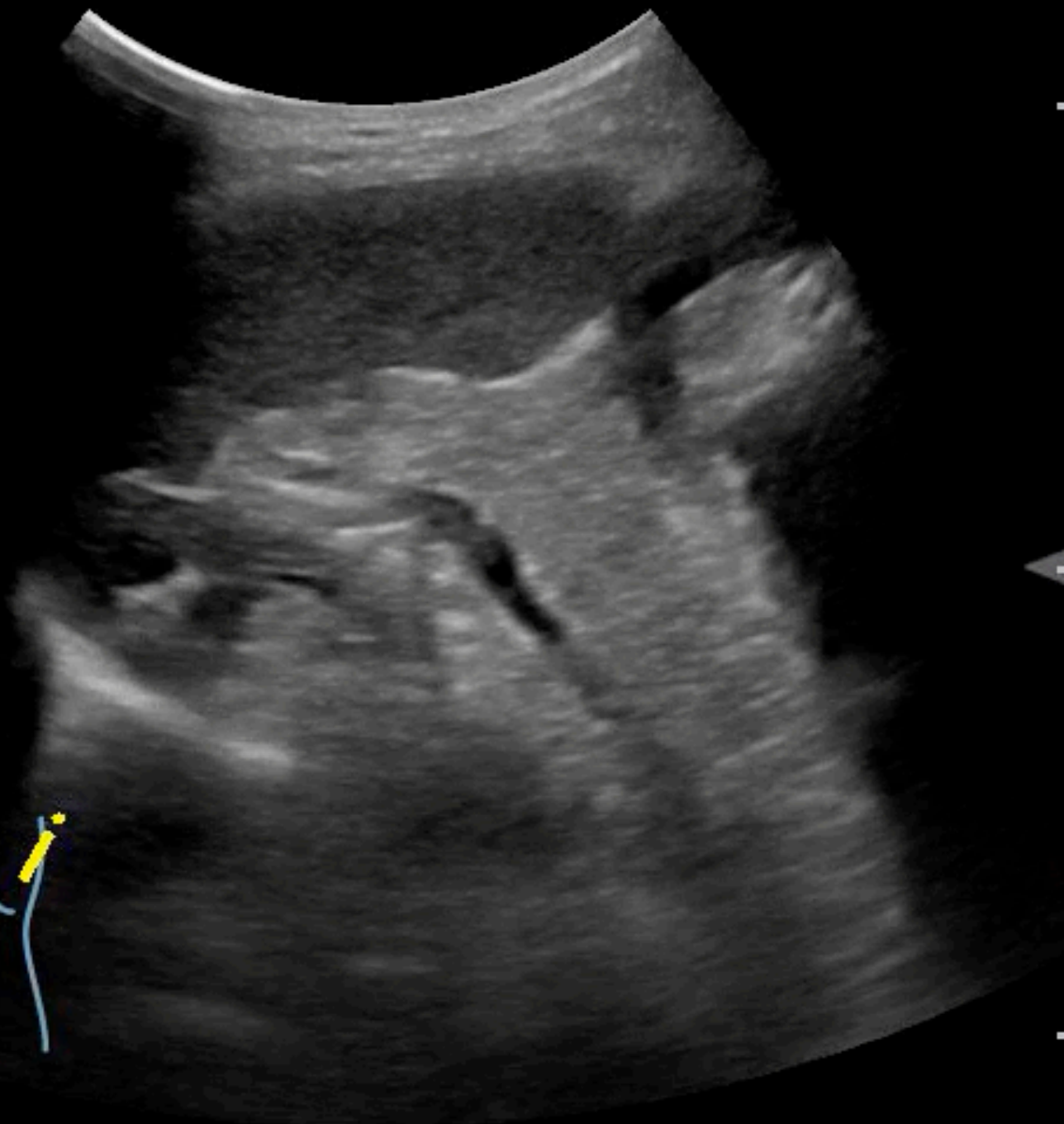
C5-2s AP 96.6% MI 1.00 TIS 0.5



1.0  
30  
24  
0  
0

needle

ouch



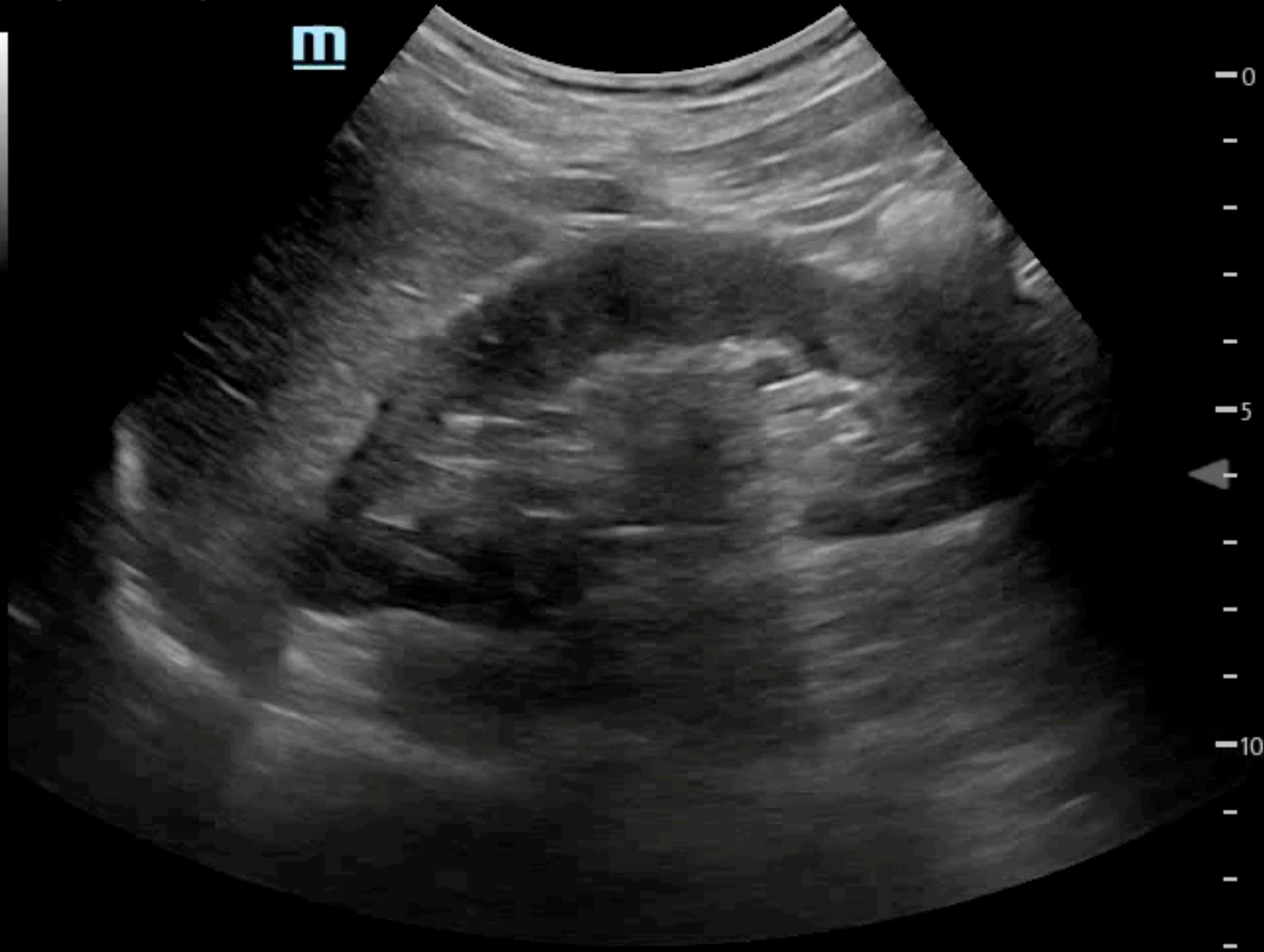
C5-2s

AP 96.6%

MI 0.95

TIS 0.5

B  
FH5.0  
DR 130  
FR 21  
D 13.0  
G 40



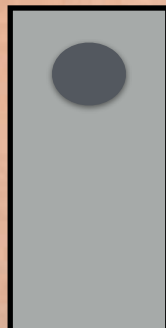
0  
-  
-  
-  
-  
-  
5  
-  
-  
-  
-  
-  
10  
-  
-  
-

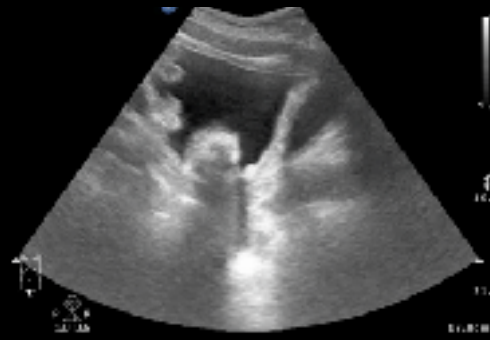
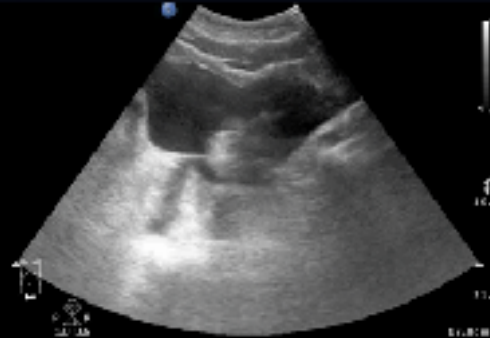
iNeedle

iTouch



# 恥骨聯合上 先縱-後橫





**UB**  
**Prostate**  
**Urethra orifice**  
**Rectum**



11.11

CPK

0.000

0.000

0.000

0.000

0.000

0.000

0.000

0.000

0.000

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

0.004

0.002

0.001

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

0.004

0.002

0.001

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

0.004

0.002

0.001

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

0.004

0.002

0.001

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

0.004

0.002

0.001

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

0.004

0.002

0.001

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

0.004

0.002

0.001

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

0.004

0.002

0.001

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

0.004

0.002

0.001

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

0.004

0.002

0.001

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

0.004

0.002

0.001

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

0.004

0.002

0.001

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

0.004

0.002

0.001

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

0.004

0.002

0.001

0.000

0.000

1.000

0.500

0.250

0.125

0.062

0.031

0.016

0.008

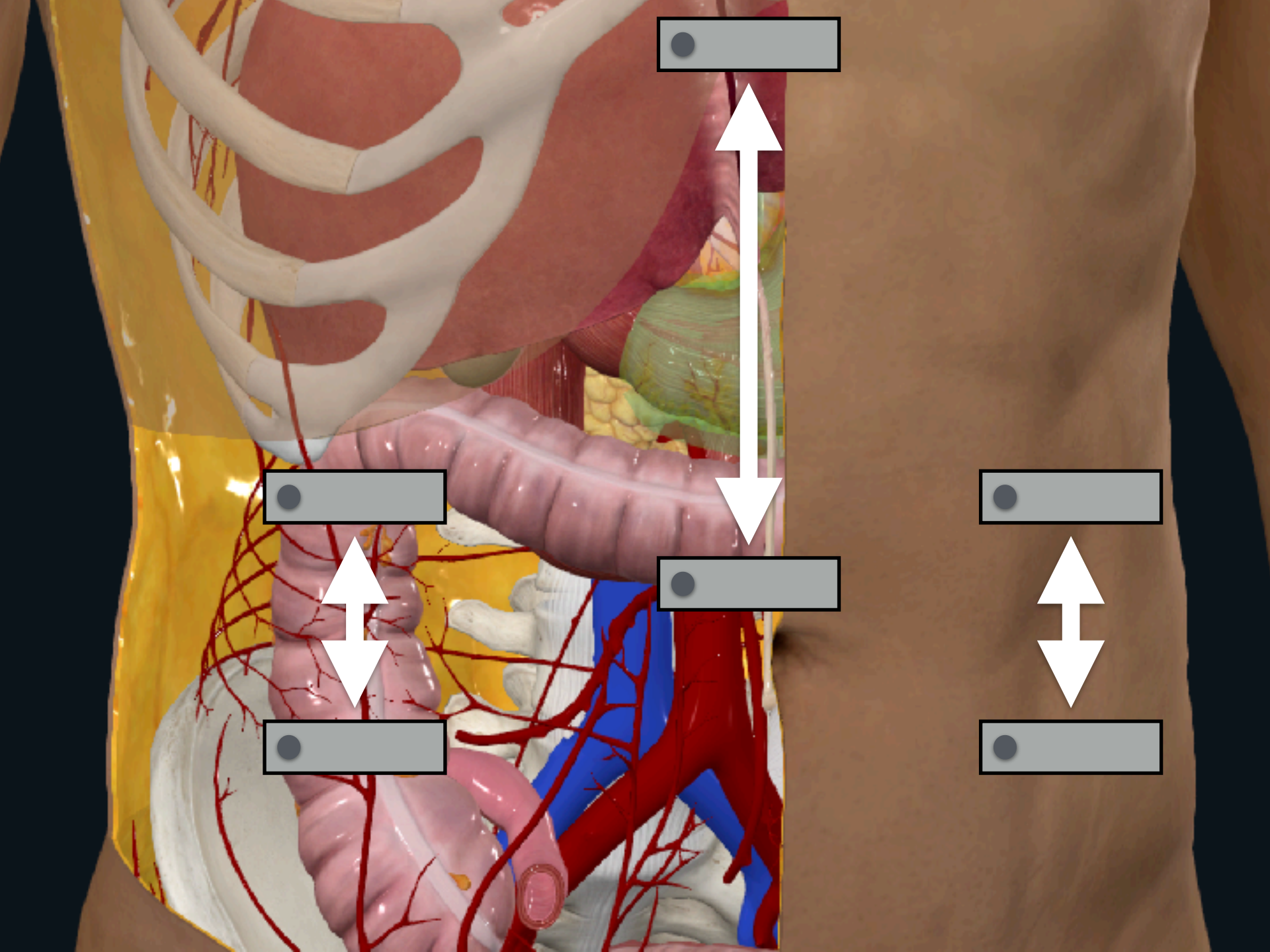
0.004

0.002

0.001

0.000

0.000





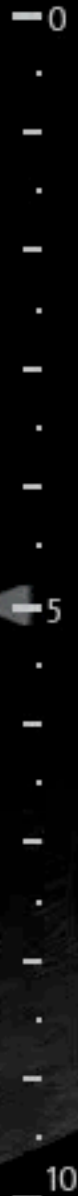
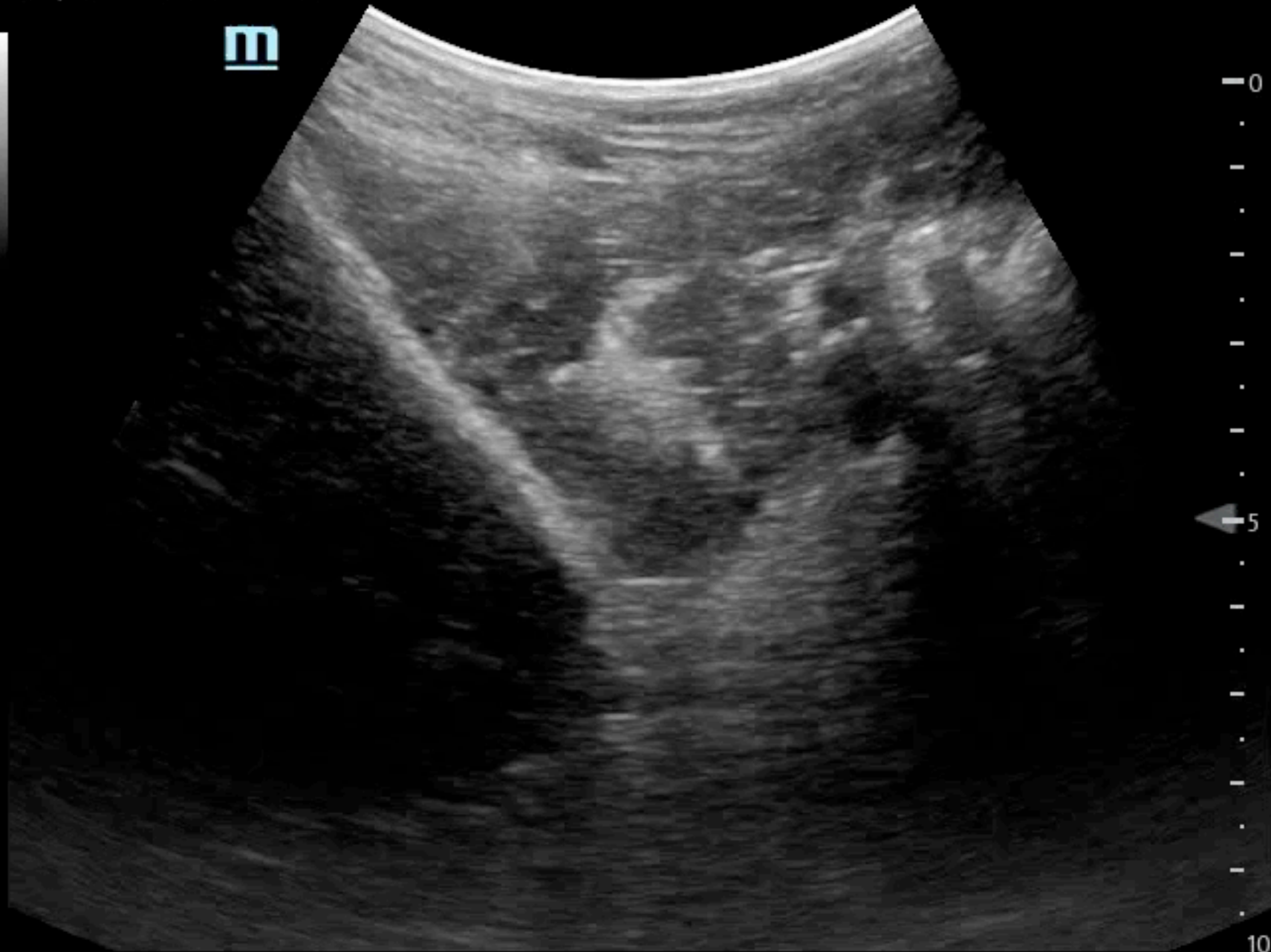
C5-1s

AP 96.6%

MI 1.18

TIS 0.5

B  
FH6.0  
DR 130  
FR 24  
D 11.0  
G 81  
Z 1.10



iNeedle

iTouch

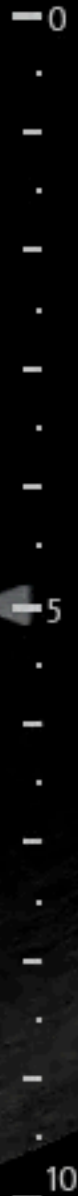
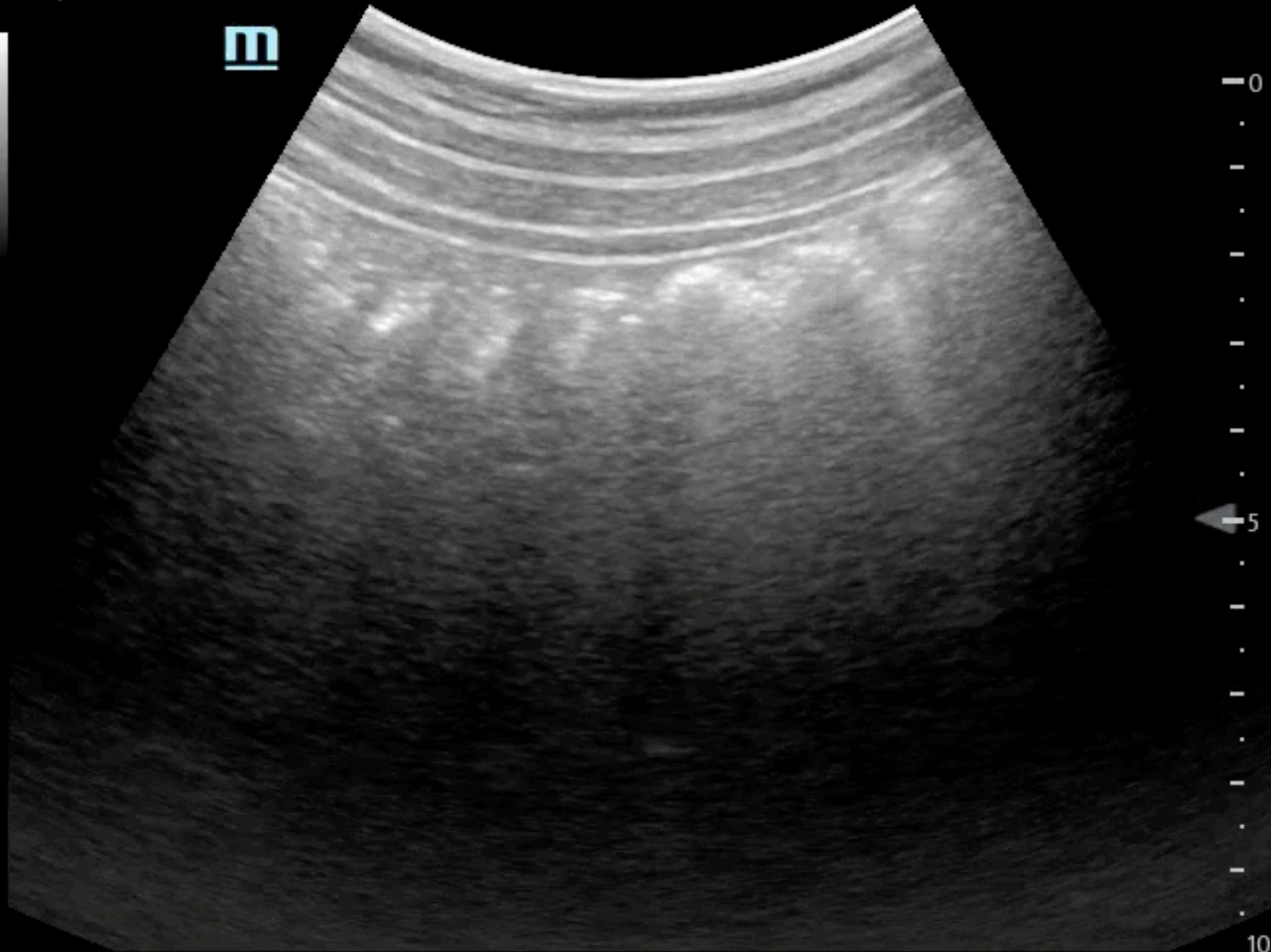
C5-1s

AP 96.6%

MI 1.18

TIS 0.5

B  
FH6.0  
DR 130  
FR 24  
D 11.0  
G 81  
Z 1.10



iNeedle

iTouch

姓名: 冯  
年龄: 59  
检查时间: 2014-08-28 22:36:06

深度: 140  
增益: M  
Pyl 0.0-0.0-0.0 12.36:06

深度: 170  
增益: M  
Pyl 0.0-0.0-0.0 12.36:06

病例号: 13056311  
姓名: Chen  
检查序列:  
性别: 男  
年龄: 59  
检查时间: 2014-08-28 22:36:06

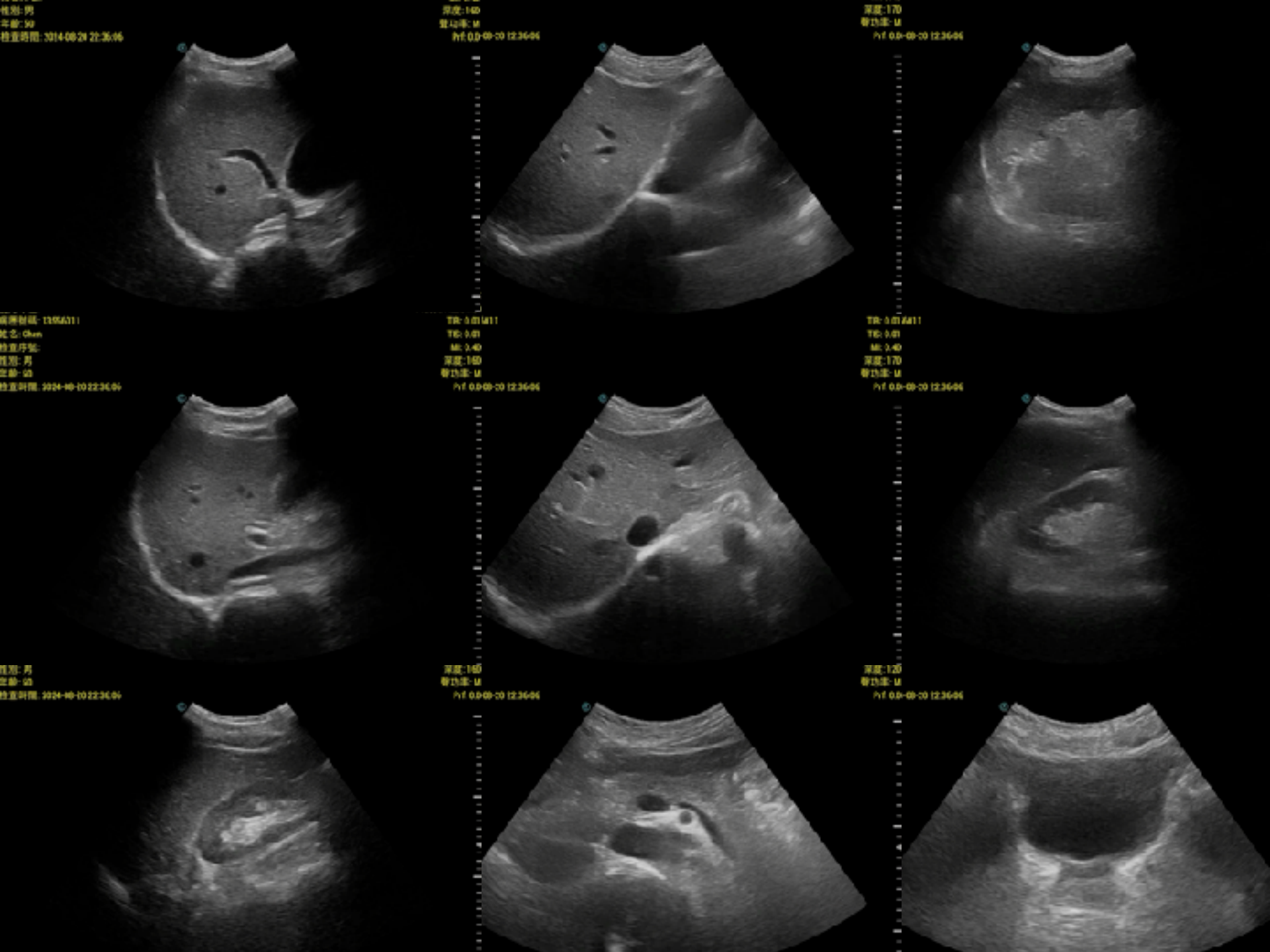
TR: 0.01411  
TE: 0.01  
MR: 0.40  
深度: 160  
增益: M  
Pyl 0.0-0.0-0.0 12.36:06

TR: 0.01411  
TE: 0.01  
MR: 0.40  
深度: 170  
增益: M  
Pyl 0.0-0.0-0.0 12.36:06

性别: 男  
年龄: 59  
检查时间: 2014-08-28 22:36:06

深度: 160  
增益: M  
Pyl 0.0-0.0-0.0 12.36:06

深度: 120  
增益: M  
Pyl 0.0-0.0-0.0 12.36:06





# Medical Mnemonic: RETROPERITONEAL ORGANS

**S** SUPRARENAL  
(ADRENAL)  
GLANDS



**P** PANCREAS



**E** ESOPHAGUS



**A** AORTA  
+ INFERIOR  
VENA CAVA



**U** URETERS



**R** RECTUM



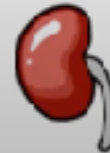
**D** DUODENUM  
(2<sup>nd</sup> + 3<sup>rd</sup>  
SEGMENTS)



**C** COLON  
(ASCENDING  
+ DESCENDING)

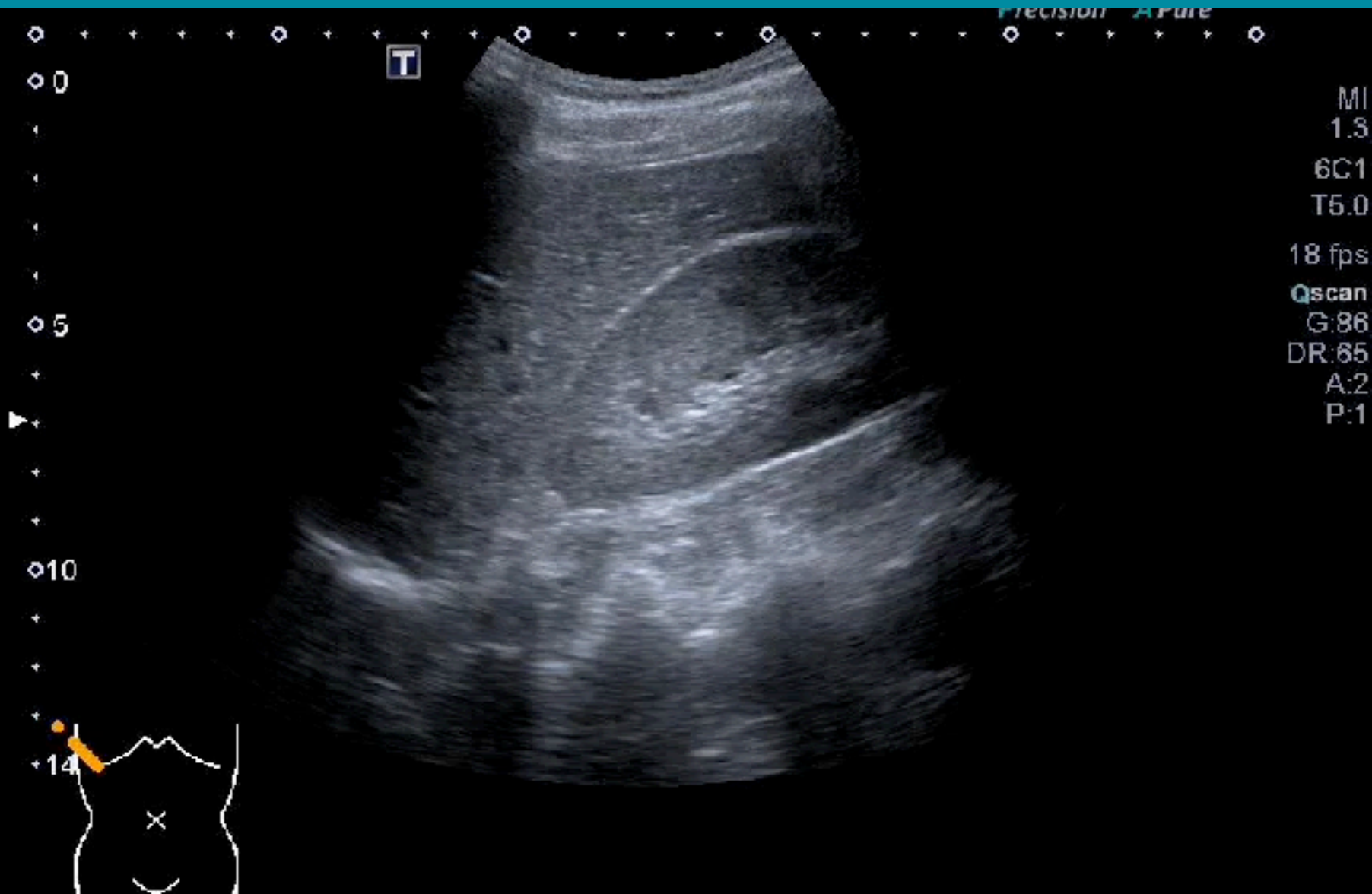


**K** KIDNEYS



## RETROPERITONEUM

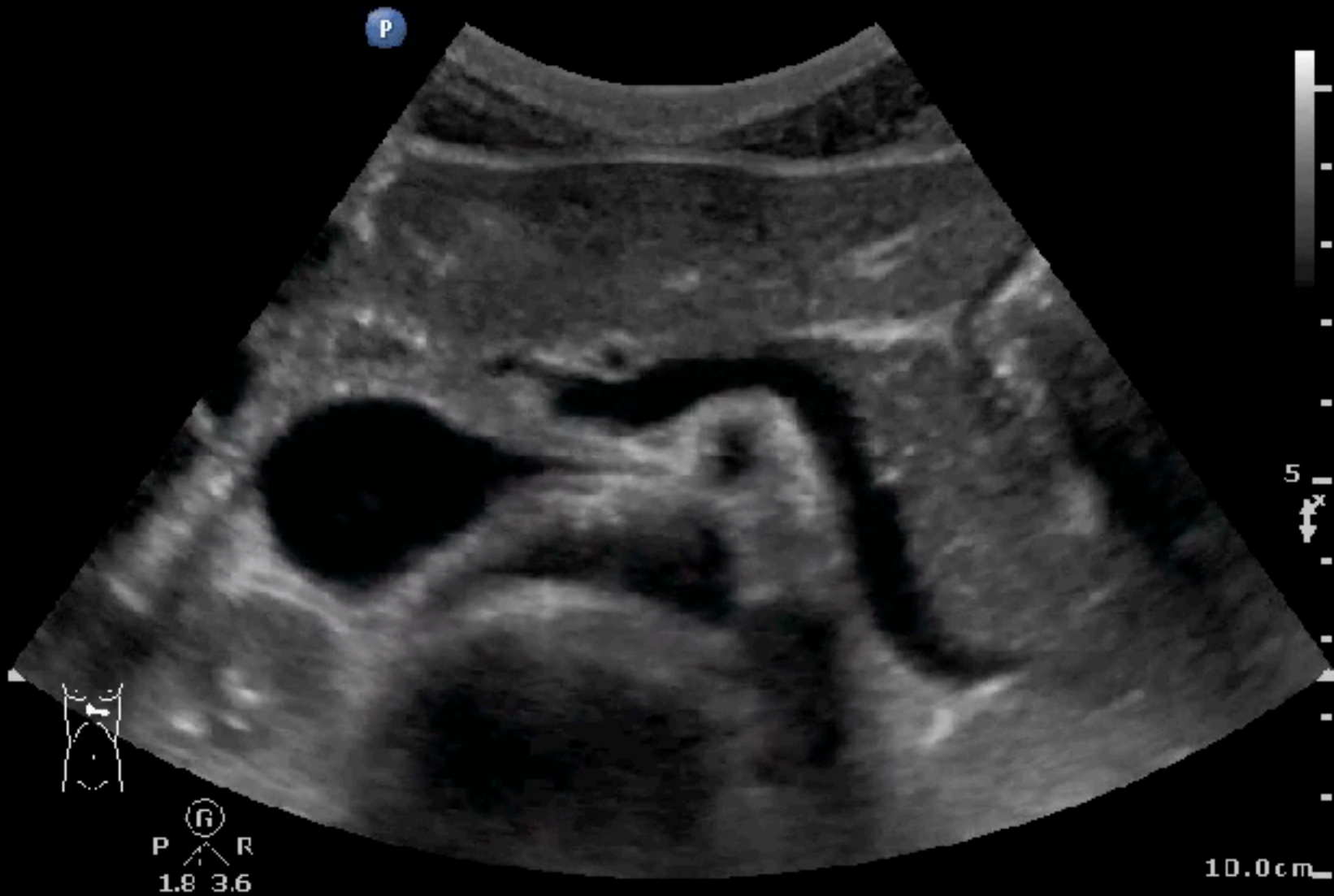
# SUPRARENAL (ADRENAL GLAND)



# AORTA + IVC

Abd Gen  
C5-1  
45 Hz  
10.0cm

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



P R  
1.8 3.6

10.0cm



# AORTA + IVC

Abd Gen  
C5-1  
34 Hz  
15.0cm

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



P  
R  
1.8 3.6

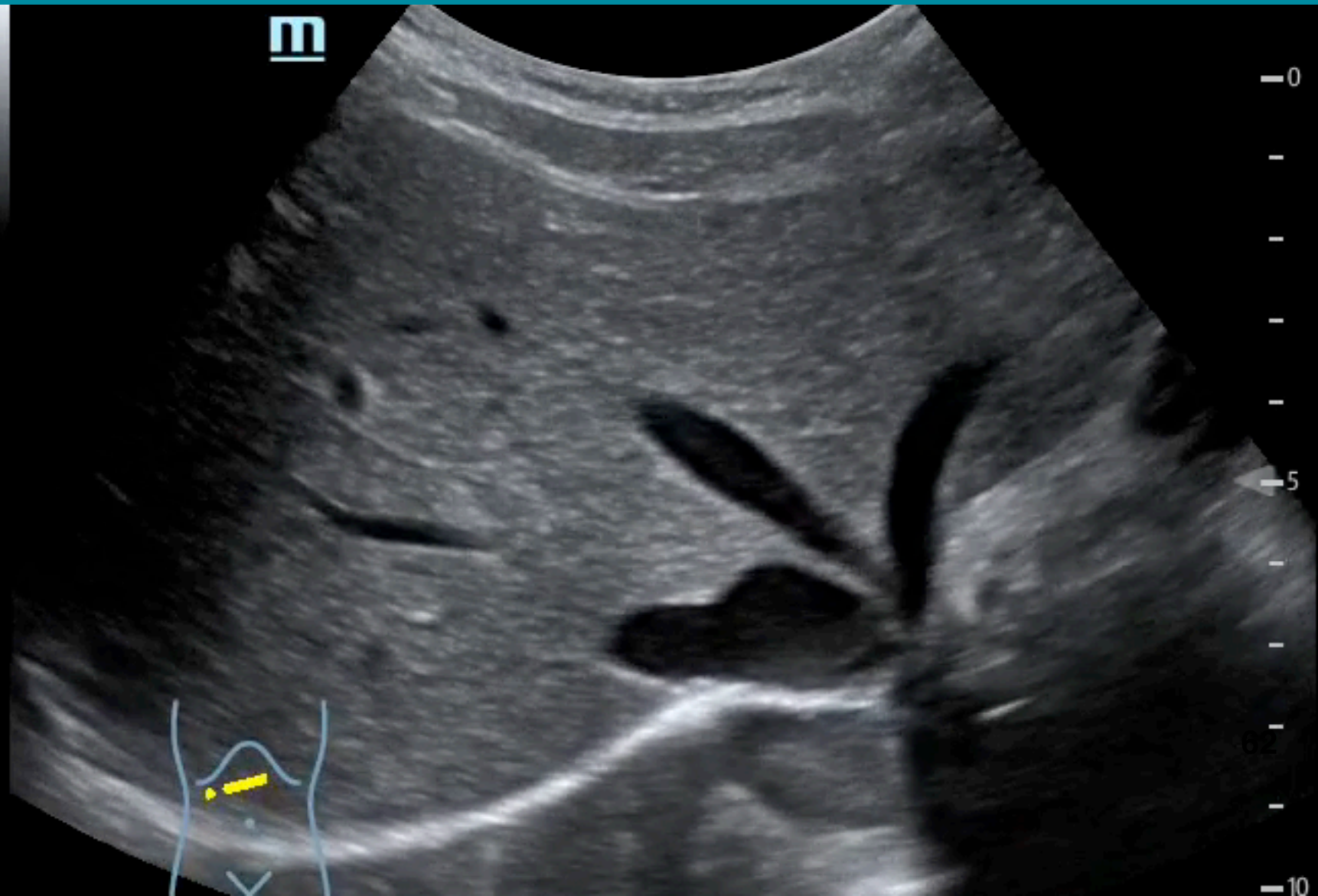
15.0cm

# AORTA + IVC

TIS 0.7



B  
FH5.0  
DR120  
FR28  
D11.0  
G50



0

-

-

-

-

5

-

-

-

-

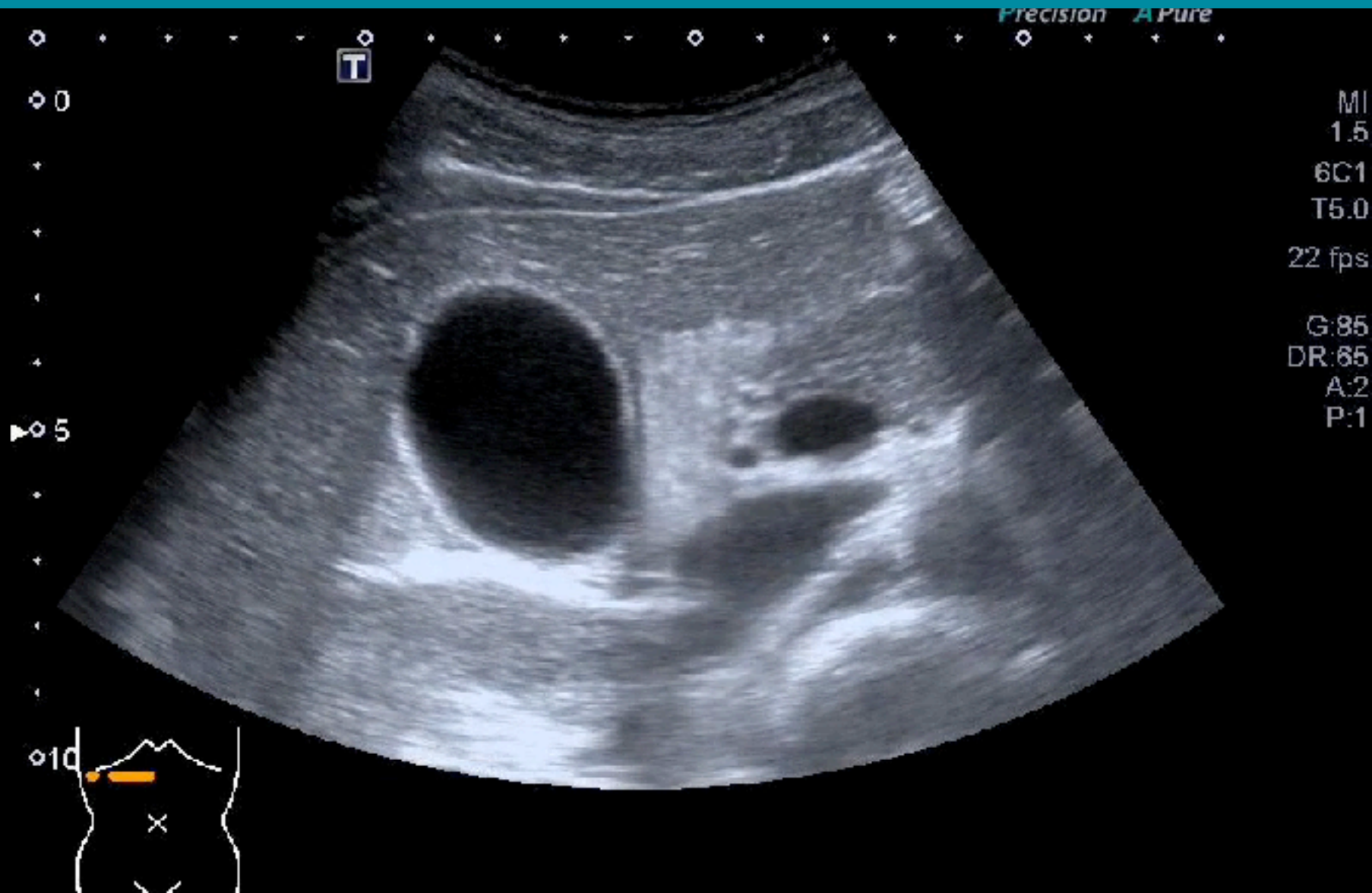
10

# DUODENUM (2ND/ 3RD SEGMENTS)





# DUODENUM (2ND/ 3RD SEGMENTS)



# DUODENUM (2ND/ 3RD SEGMENTS)

C5-1  
47 Hz  
9.0cm

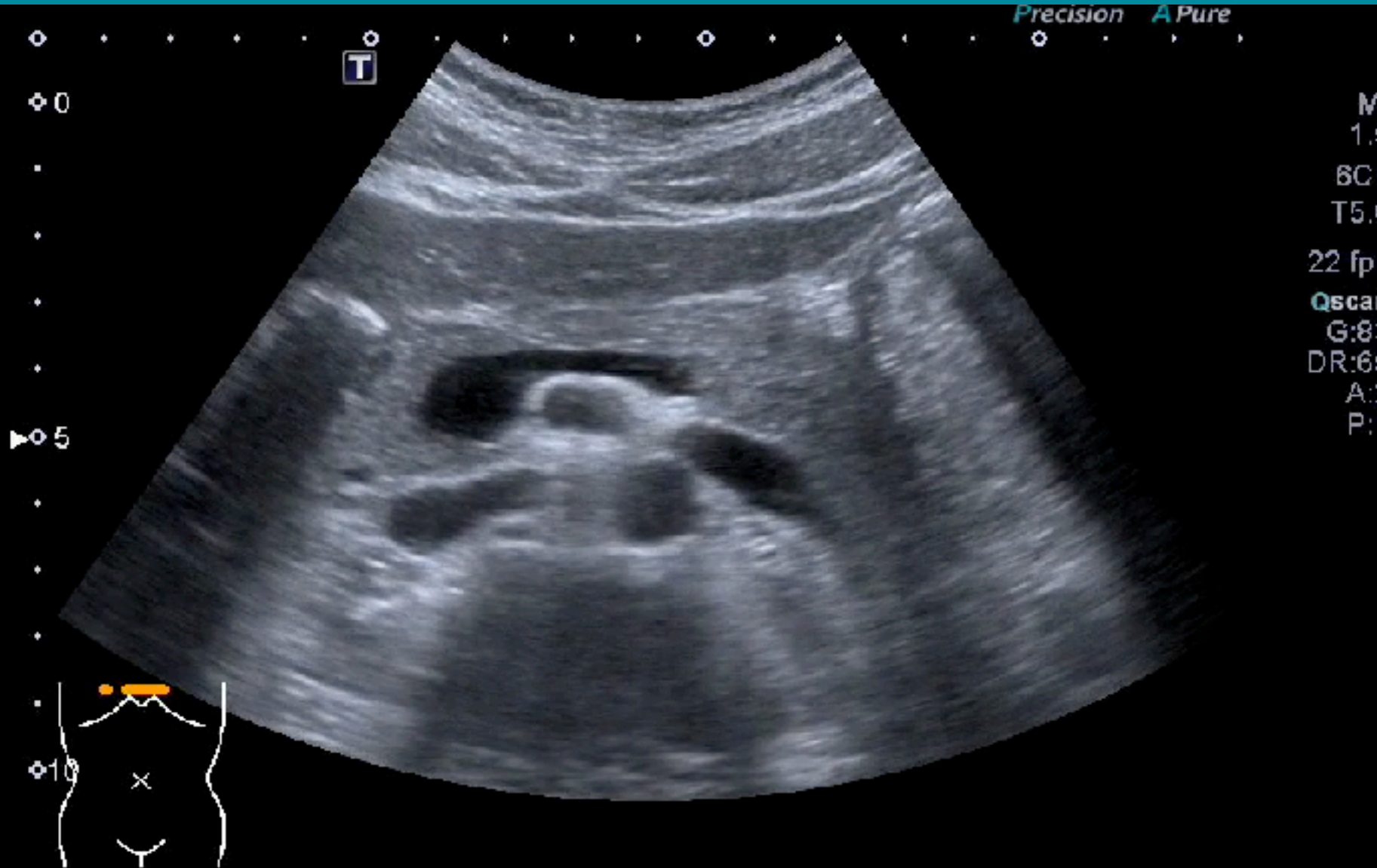
2D  
HGen  
Gn /6  
C. 56  
3/3/3



P R  
1.8 3.6

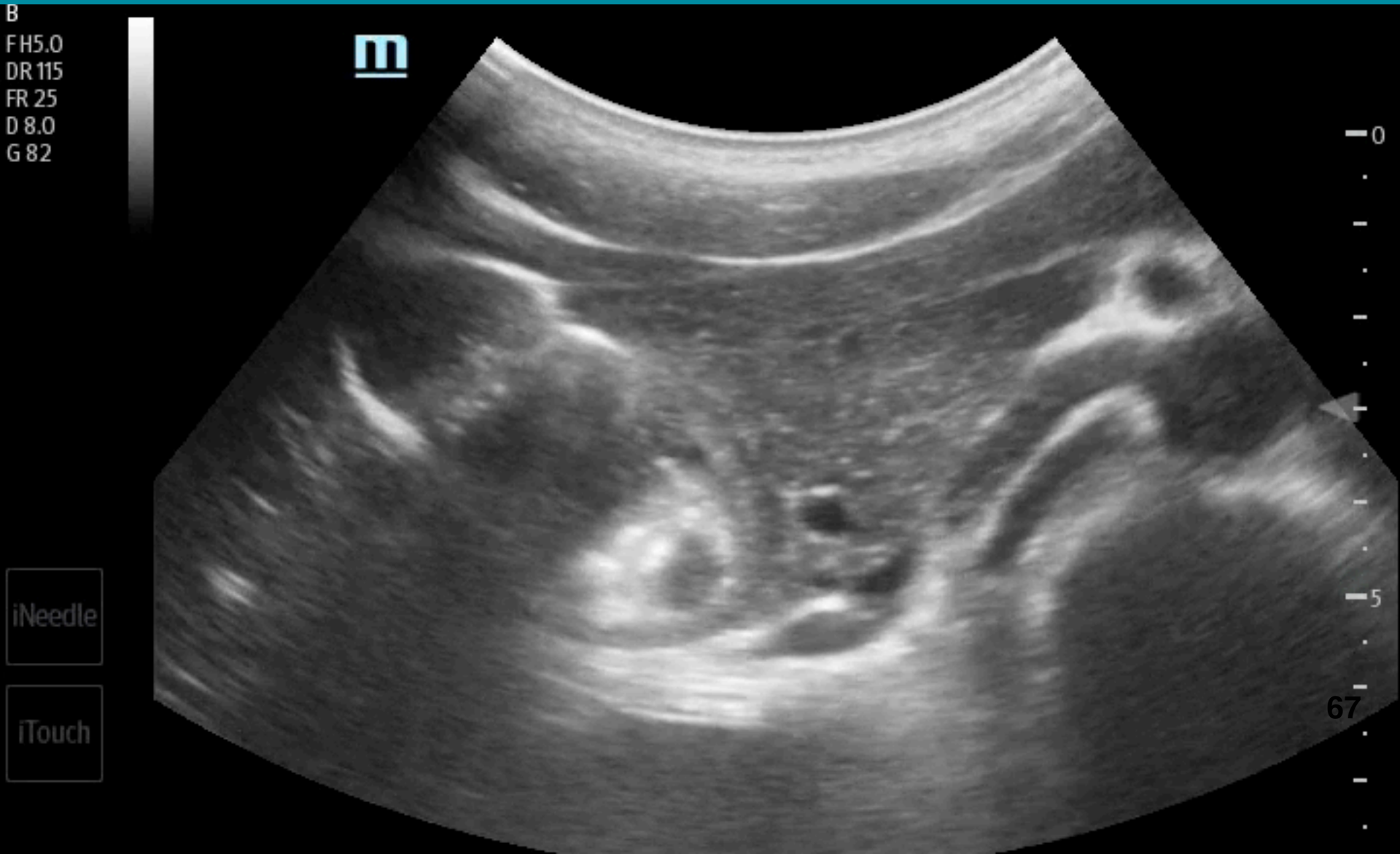
9.0cm

# PANCREAS

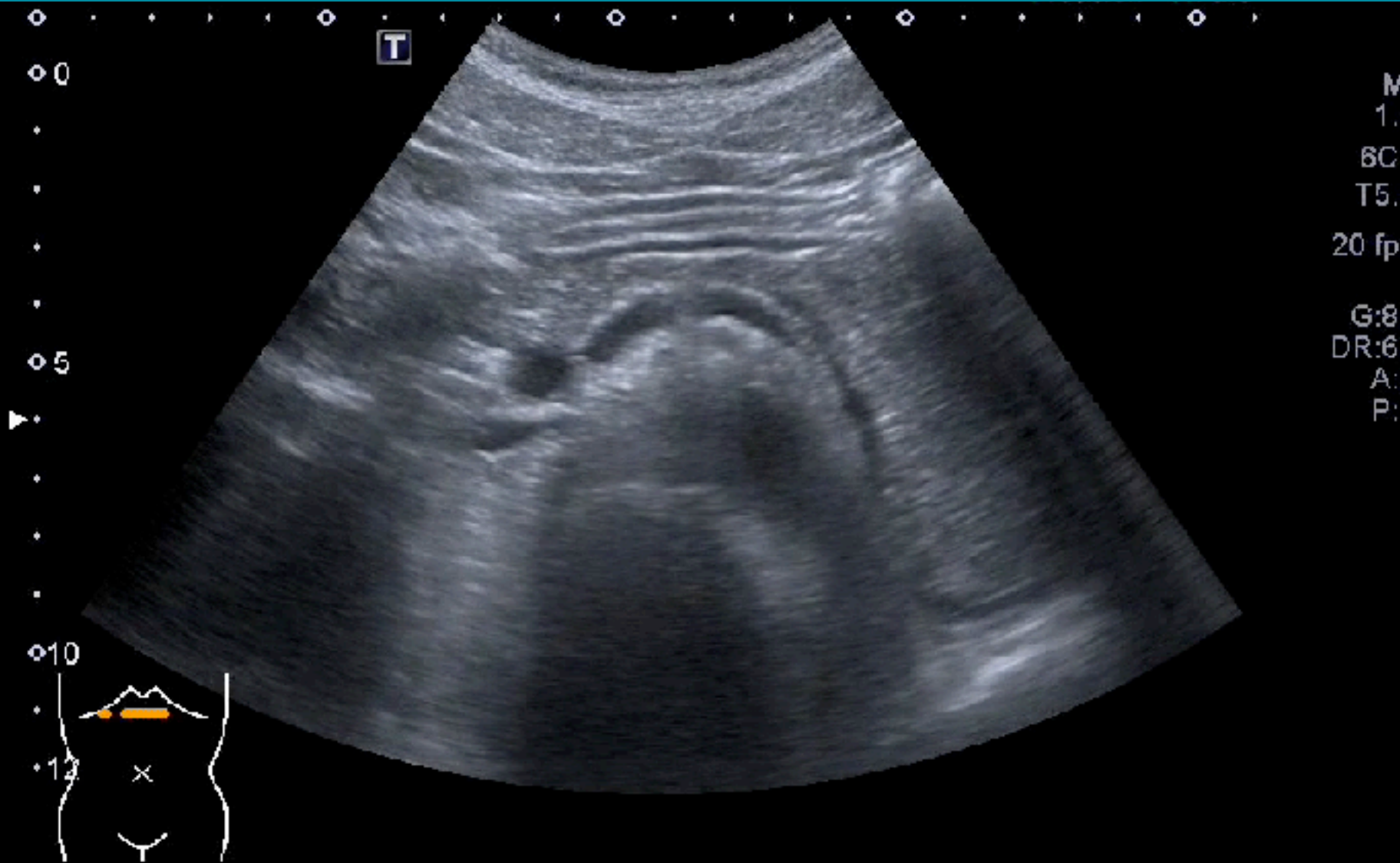




# PANCREAS



# PANCREAS



# PANCREAS

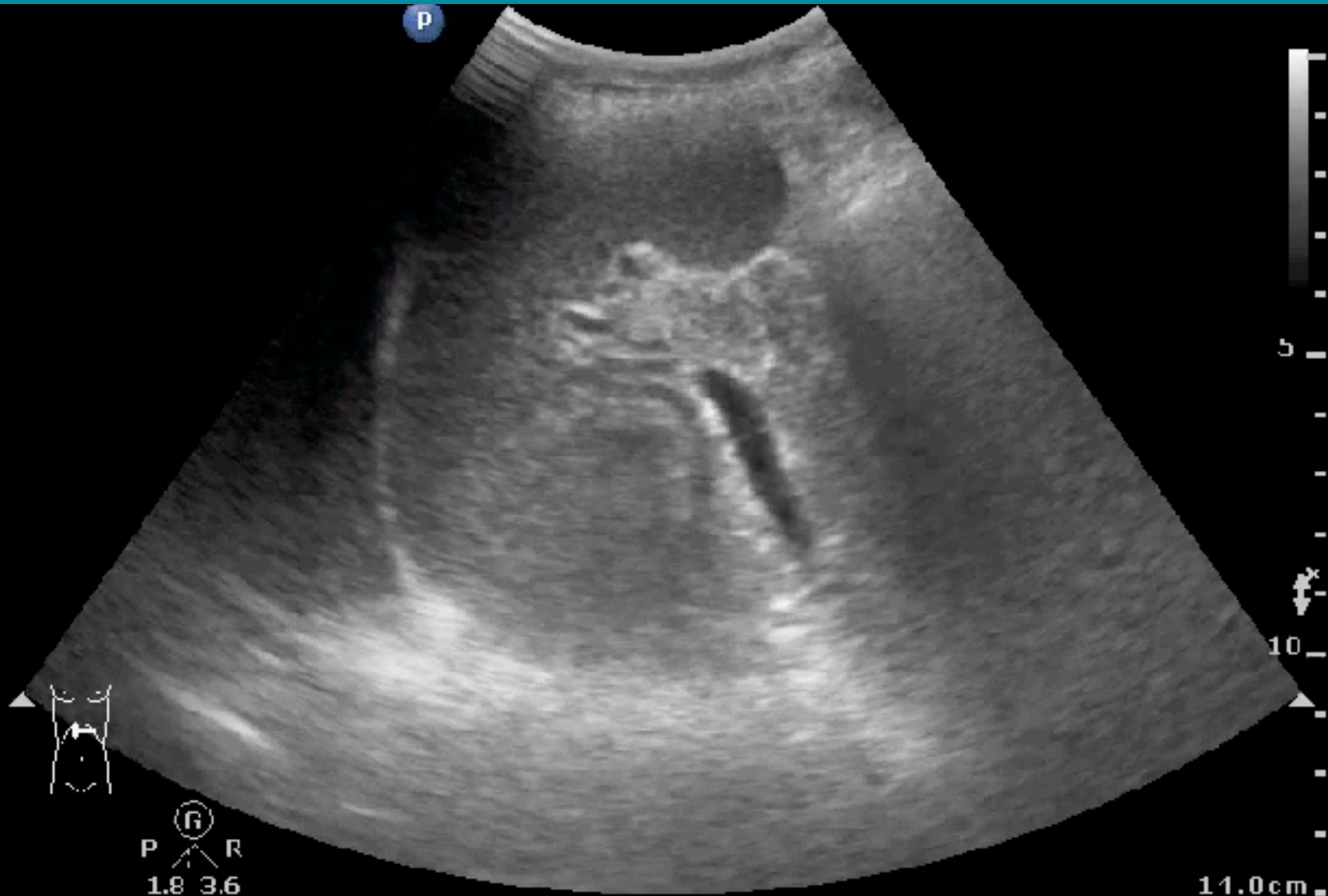


# PANCREAS

Abd Gen  
C5-1  
36 Hz  
14.0cm

2D

HGen  
Gn 9/  
C. 56  
3/3/3

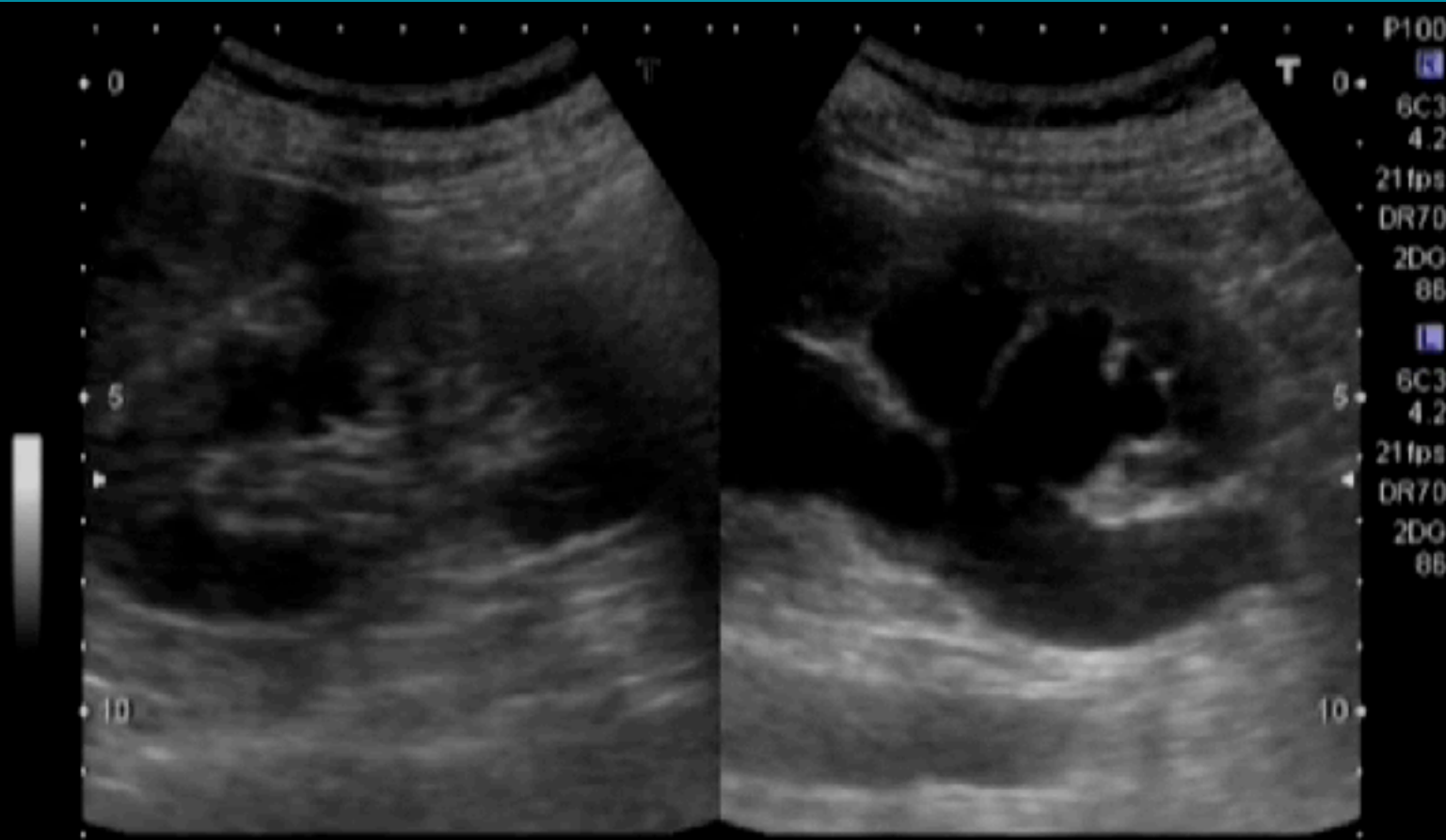


P R  
1.8 3.6

11.0cm



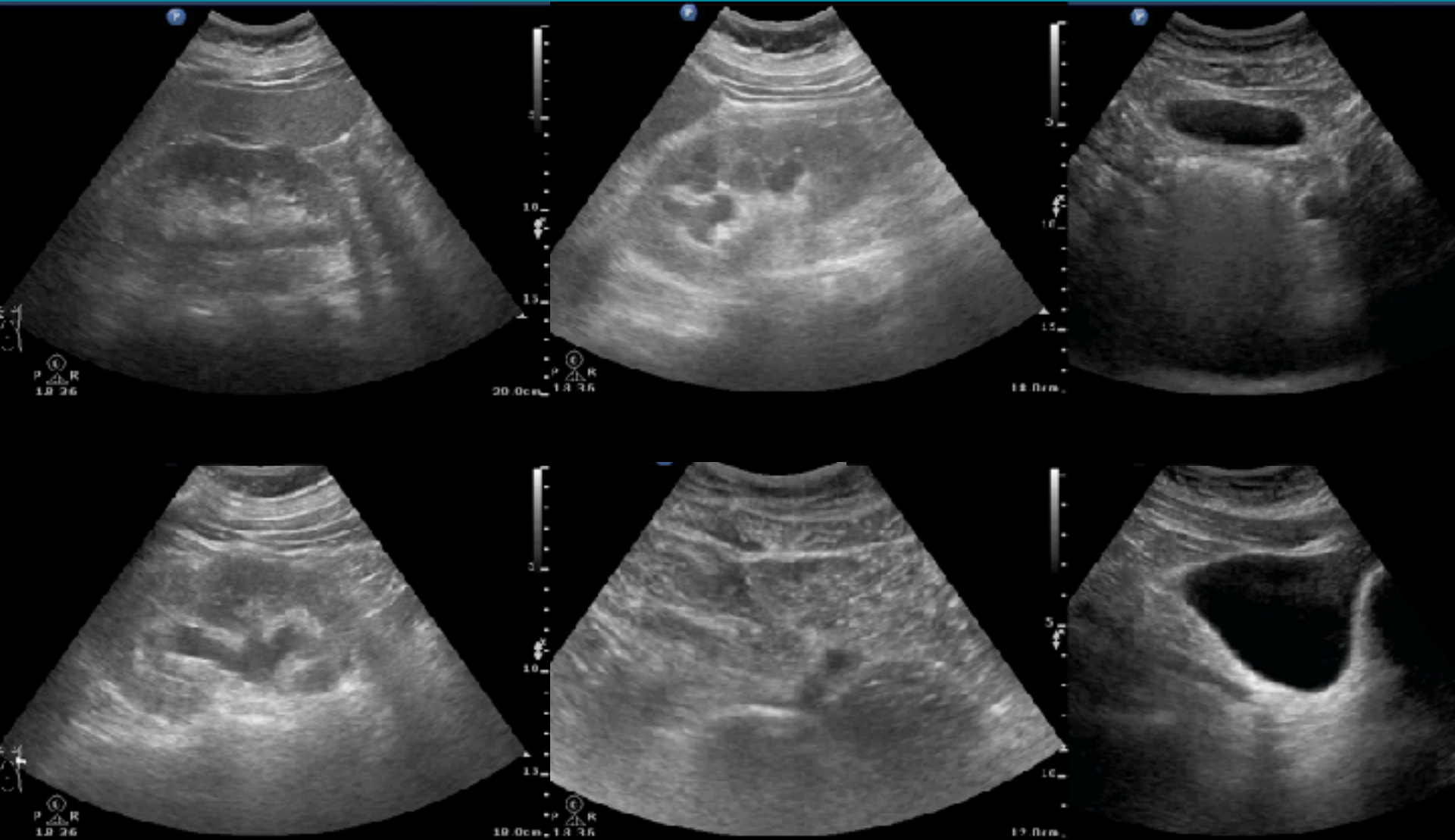
# URETERS



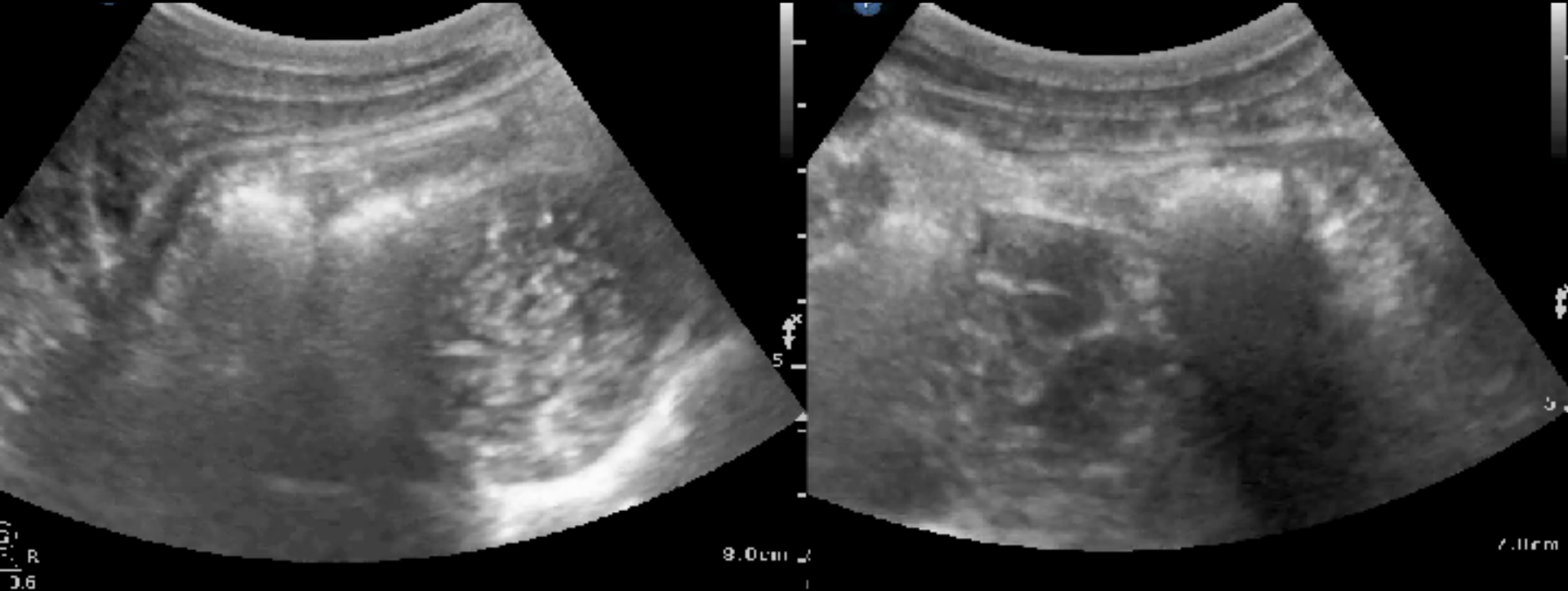
Free B



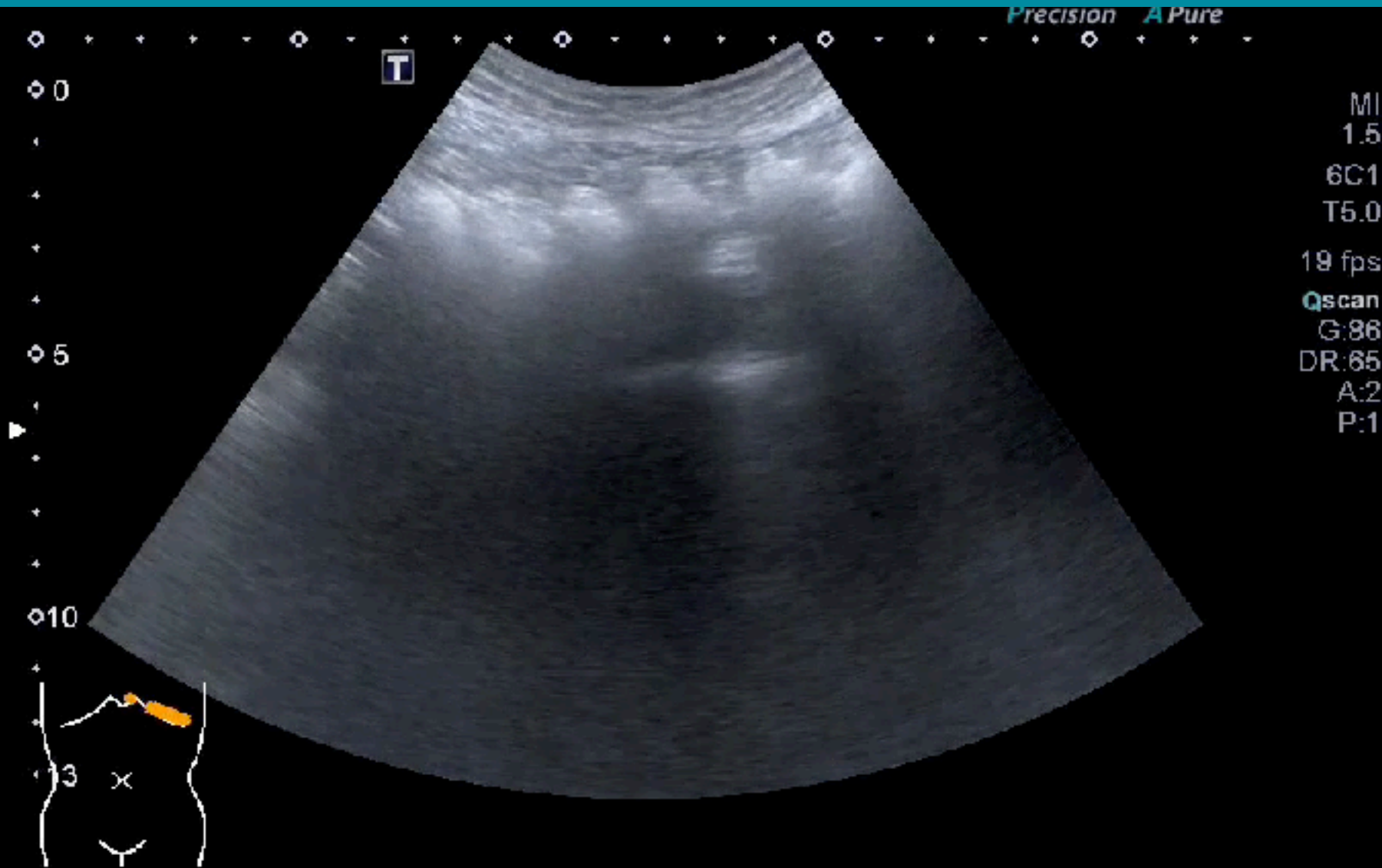
# URETERS



# COLON (ASCENDING + DESCENDING)



# COLON (ASCENDING + DESCENDING)





# KIDNEYS

StudyID-20140813105559

MI 0.6

8/19/06/11 03:37:11PM ADM

C1-6 ABD1 MI 1.2 T

13-105559

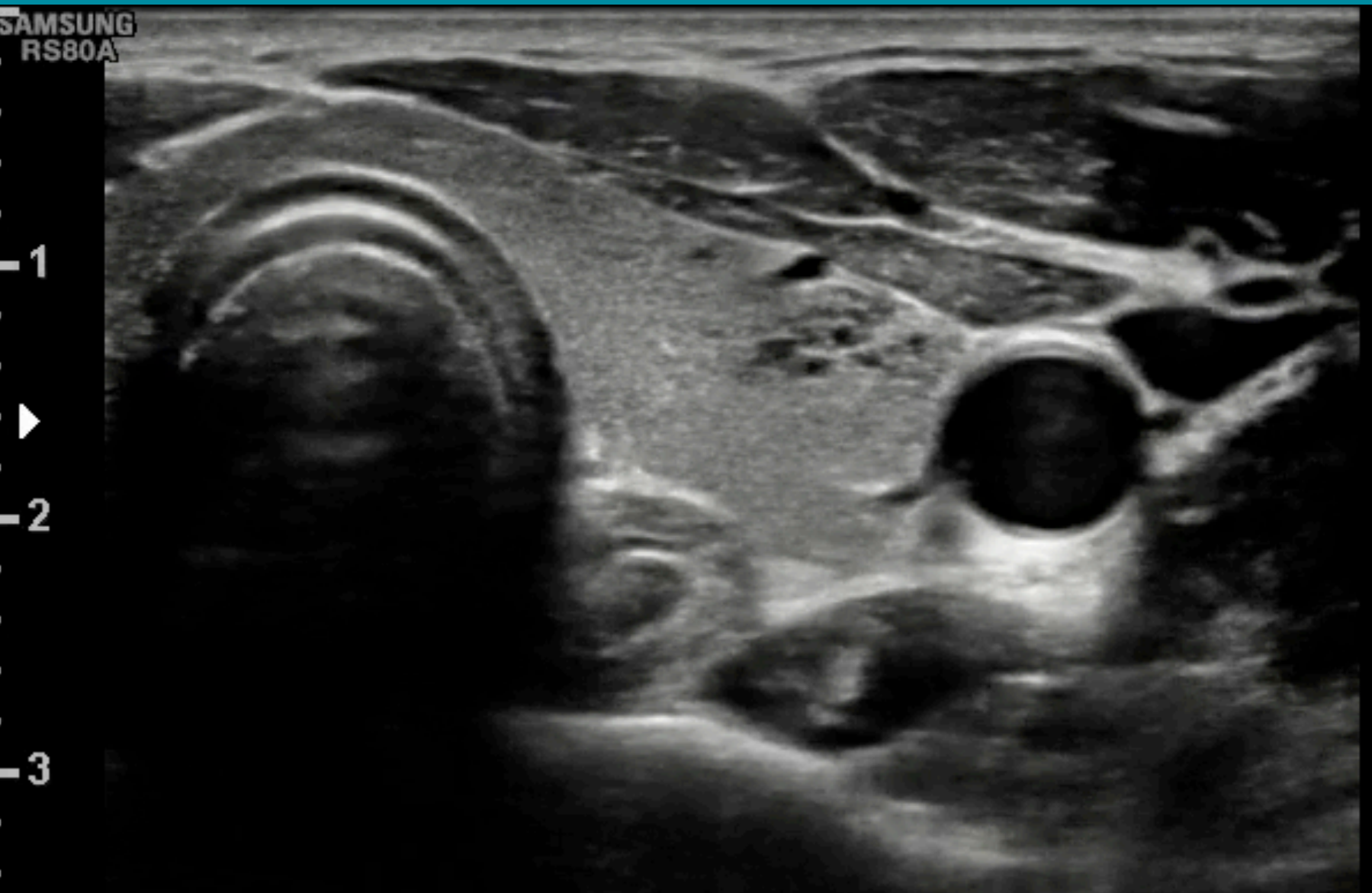
PHILIPS HEALTHCARE

TTS 0.0

LOGIQ  
E9



# ESOPHAGUS





# RECTUM

Abd Gen  
C5-1  
34 Hz  
15.0cm

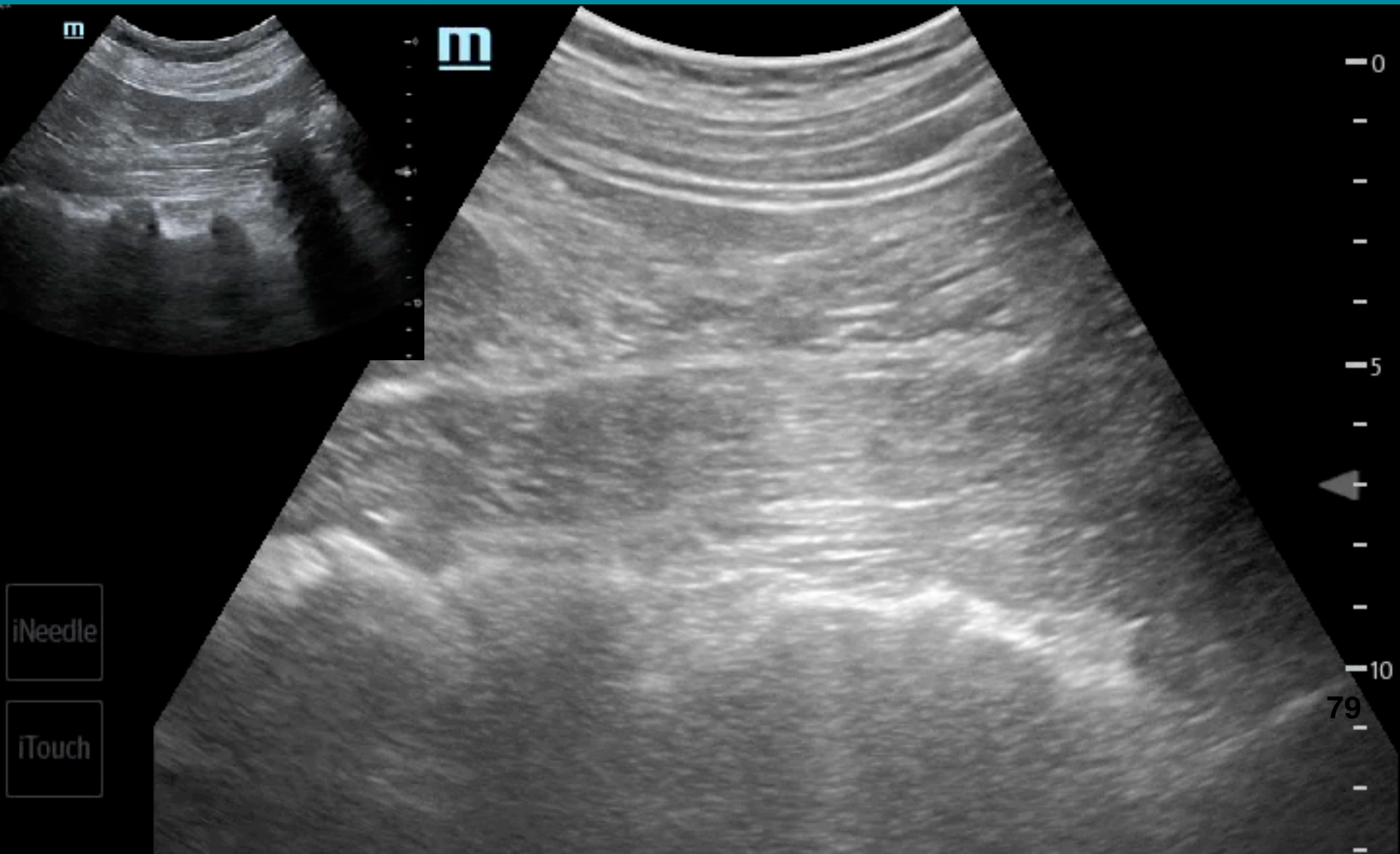
2D  
HGen  
Gn 55  
C. 56  
3 / 3 / 3



15.0cm



# PSOAS MUSCLE



# RETROPERITONEUM POCUS

<b>SAD</b>	<b>PUCKER</b>
Suprarenal glands	Pancreas
Aorta + IVC	Ureter
Duodenum (2nd / 3rd portion)	Colon (Ascending + Descending)
	Kindeg
	Esophagus
<b>Psoas muscle</b>	Rectum