

HEART

LUNG

AORTA

DVT

KIDNEY

GB

Liver

FAST

急診基礎超音波工作坊

陳國智醫師 雙和醫院急診醫學科



陳國智 醫師 / POC



台灣急診醫學通訊 Taiwan Emergency Medicine Bulletin



「台灣急診醫學通訊」是一本以實踐為基礎，藉口術並廣設的急診實務與知識最新的資訊及專業觀點，提供讀者們各種臨床診斷、處置、照護作業的解決方案，提升急診教育訓練深度與廣度的雜誌。目前主要出版焦點包括各種臨床議題、超音波、影像學、心電圖、診斷學、師資培育、災難、公共衛生、醫學新知、醫師福祉等等專欄。希望藉由這個平台，讓一群具有專業和理念的作者們可以與急診醫學會員、相關領域專科醫師、住院醫師、專科護理師、護理師、救護技術員及醫學生等等夥伴，分享關鍵的知識與訊息。

"Taiwan Emergency Medicine Bulletin" is a Continuing Medical Education (CME) magazine grounded in evidence-based practice. It offers solutions for clinical diagnosis, management, and procedures through the latest information and professional perspectives in emergency medicine. The primary publication focuses currently include various clinical issues, ultrasound, radiology, electrocardiograms, diagnostics, faculty development, disaster medicine, public health, medical innovations, physician well-being, and other specialized columns. This platform aims to enable a group of professional and like-minded authors to share crucial knowledge and information with members of the Taiwan Society of Emergency Medicine, as well as related specialists, resident physicians, nurse practitioners, nurses, emergency medical technicians, and medical students.

超音波專欄 Ultrasound



陳國智醫師
Kuo-Chih Chen, MD.

Image



林秋梅醫師
Chiu-Mei Liu, MD, PhD.

心電圖專欄 ECG



王宗倫醫師
Tsong-Luen Wang, MD, PhD.



黃英傑醫師
Ying-Chieh Huang, MD, MS.

Tools of the Trade: Point-of-Care Ultrasonography as a Stethoscope

Hiroshi Sekiguchi, MD¹

¹Division of Pulmonary and Critical Care Medicine, Mayo Clinic, Rochester, Minnesota

Address for correspondence Hiroshi Sekiguchi, MD, Division of Pulmonary and Critical Care Medicine, Mayo Clinic, 200 First St SW, Rochester, MN 55905 (e-mail: sekiguchi.hiroshi@mayo.edu).

Semin Respir Crit Care Med 2016;37:68–87.

Inspection

Palpation

Percussion

Auscultation

Insonation

POINT-OF-CARE ULTRASOUND USES



POCUS uses	Scope of use	Example questions
Physical exam extension	Focused	"Is this palpable mass a cystic or solid structure?" "Is the baby in the cephalic or breech presentation?"
Procedural	Focused	"Where is the best location to insert a needle?" "Where is the foreign body?"
Diagnostic	Focused	"Are there stones in the gallbladder?" "Is there a pregnancy in the uterus?"
Multi-organ scans	Extended	"Is the patient's hypotension due to sepsis, heart failure, or acute blood loss?" "What is causing the patient's dyspnea?"



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

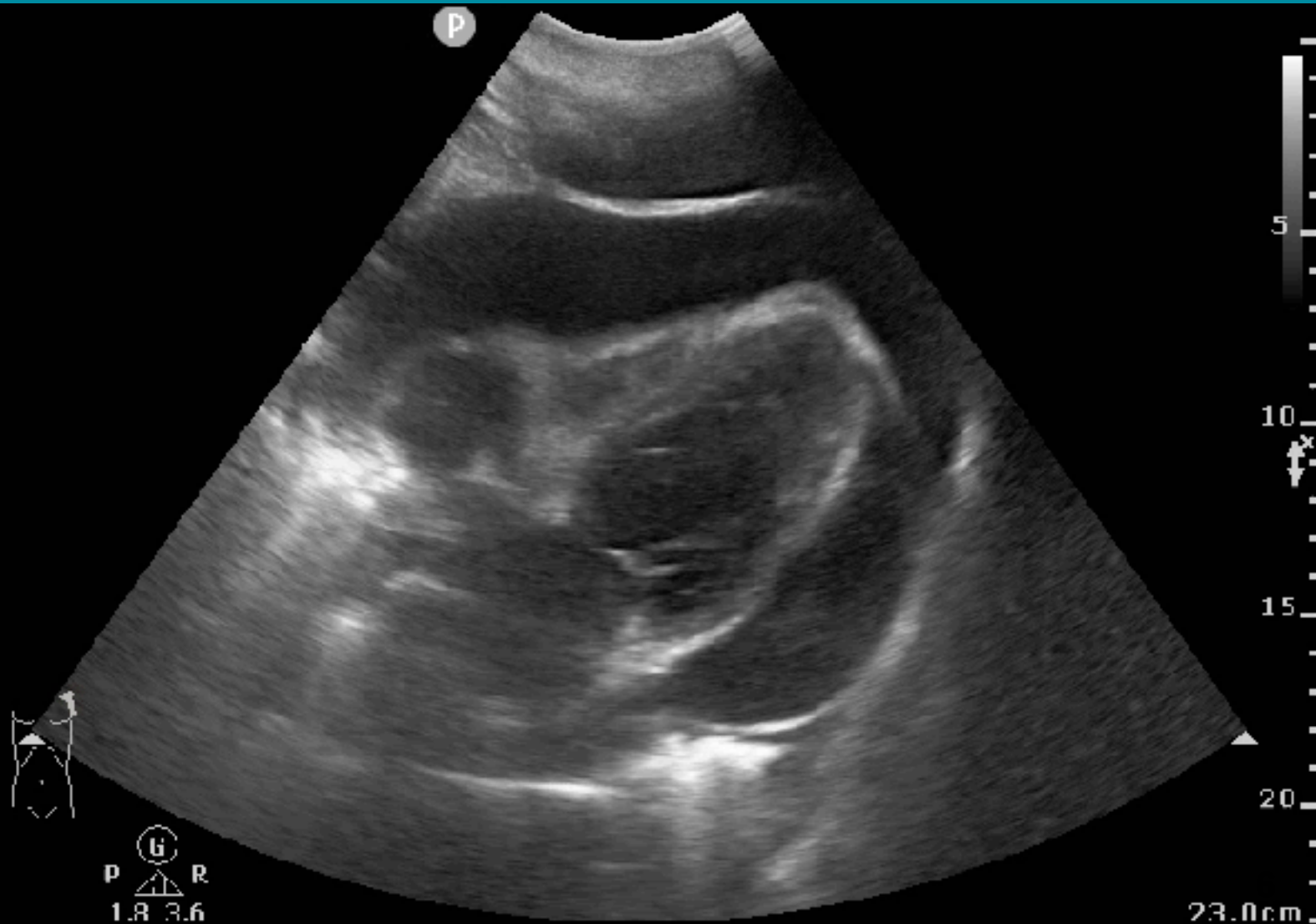


HEART

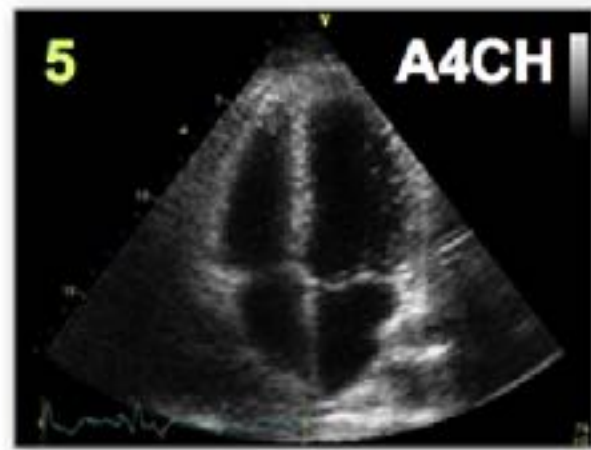
Abd Gen
C5-1
75 H7
23.0cm

2D

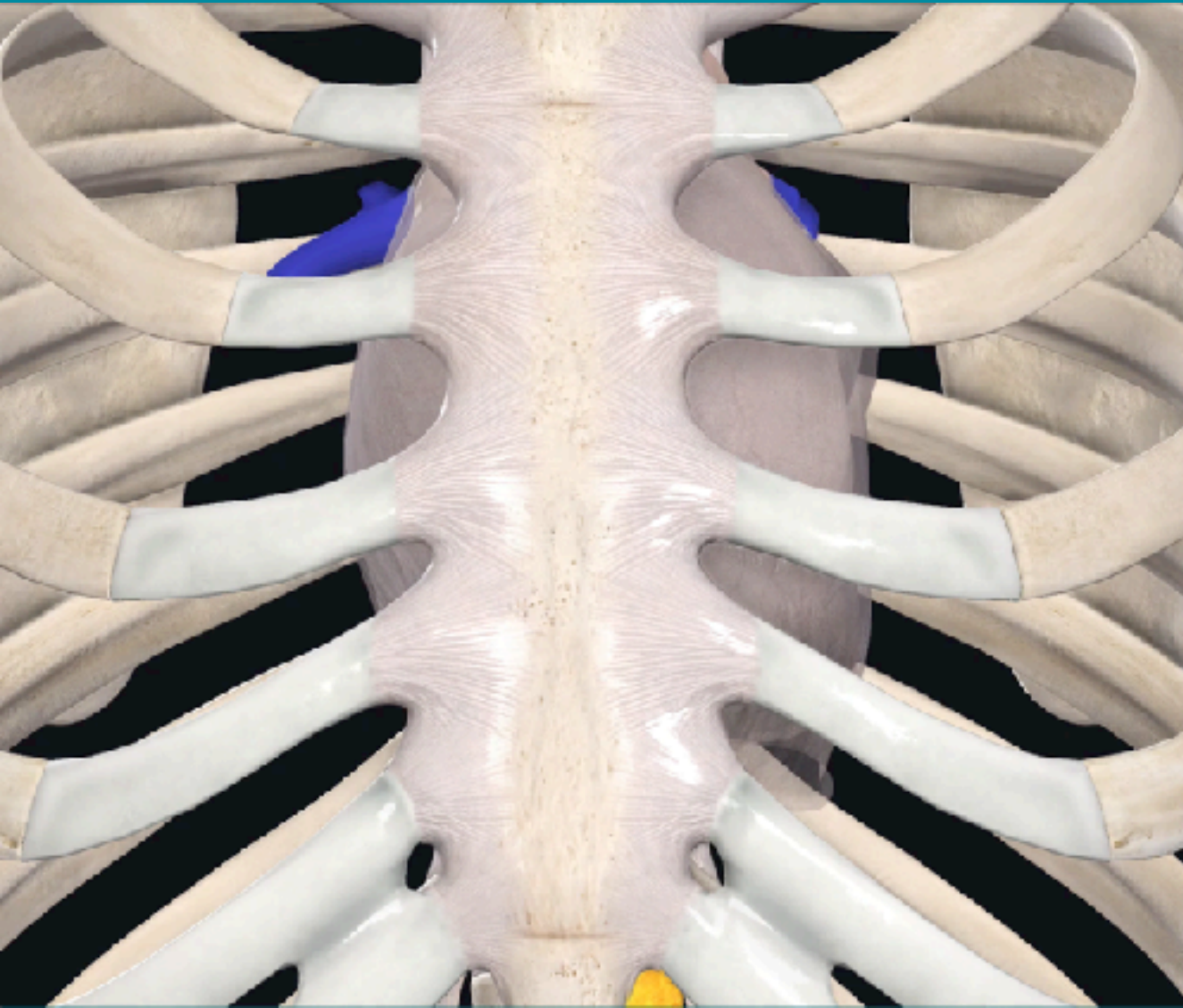
HGen
Gn 100
C 56
3 / 3 / 3



3W5V

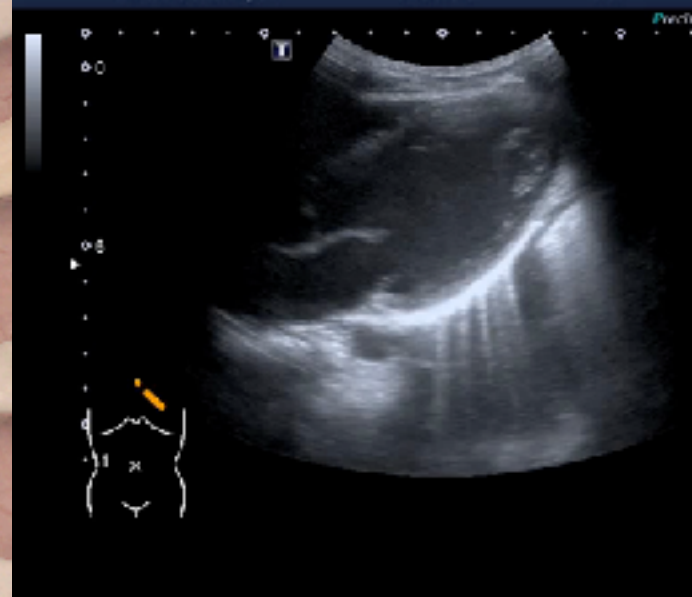
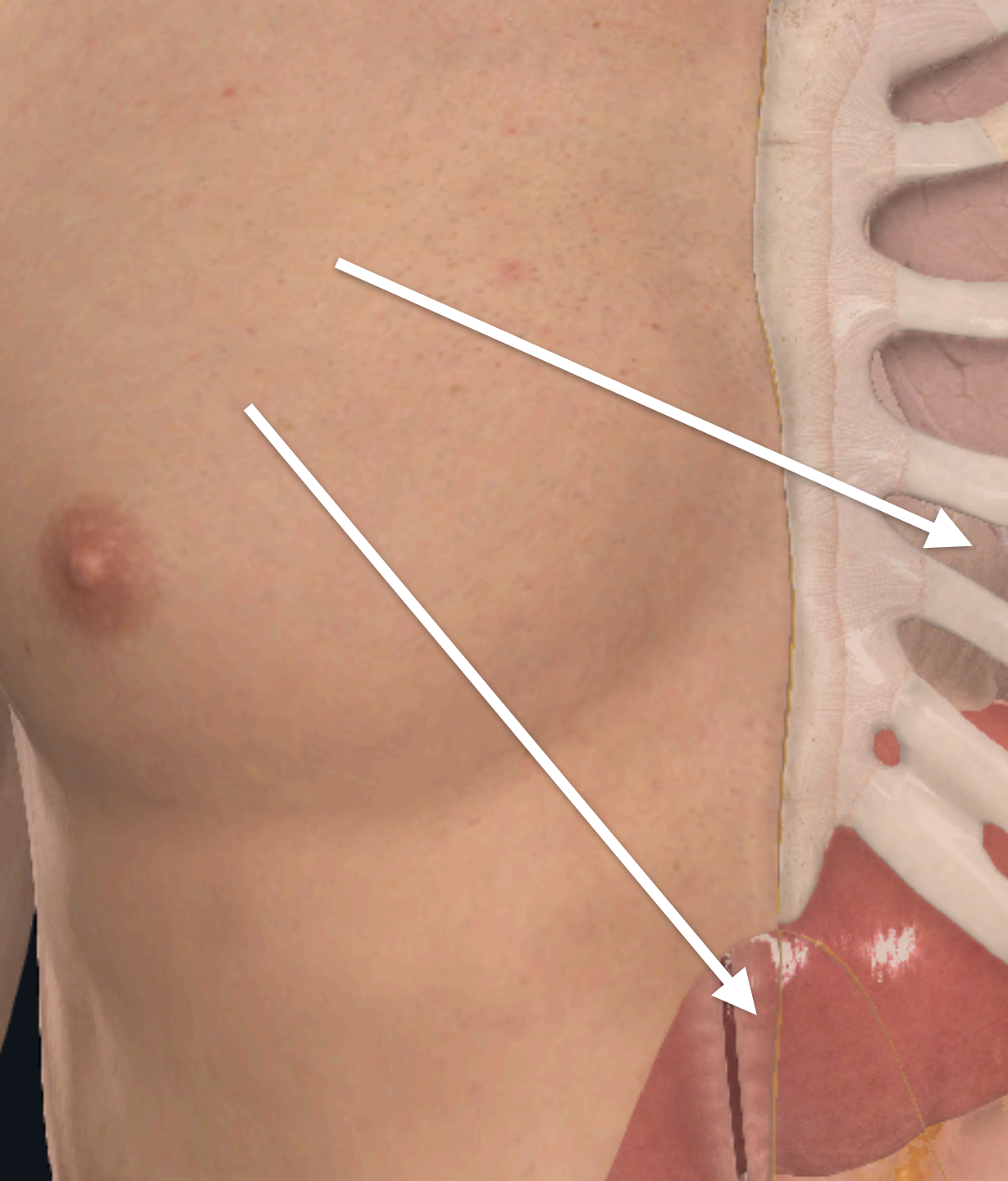


HEART



Arrest
Activity

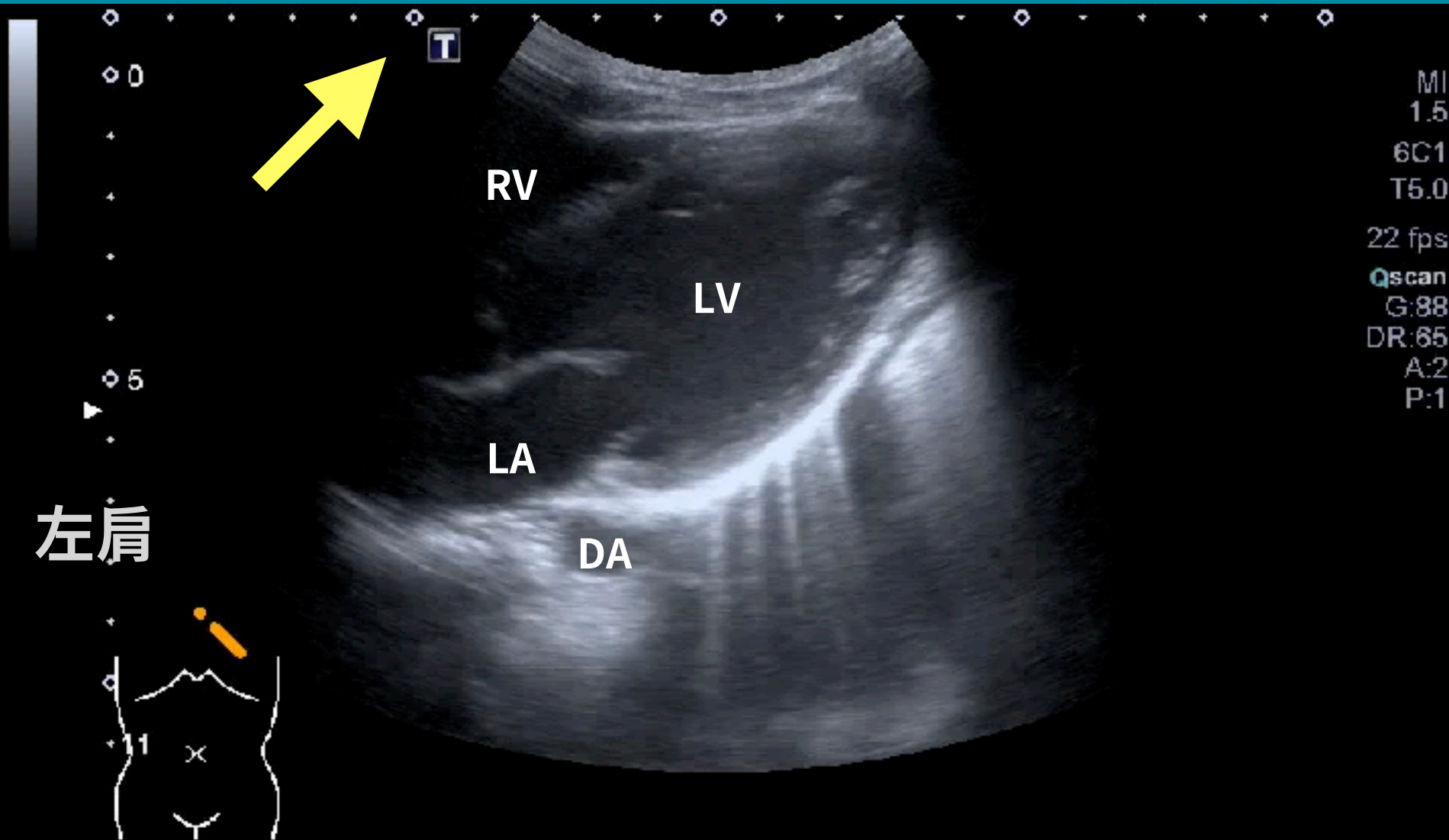
Shock
Effusion₈



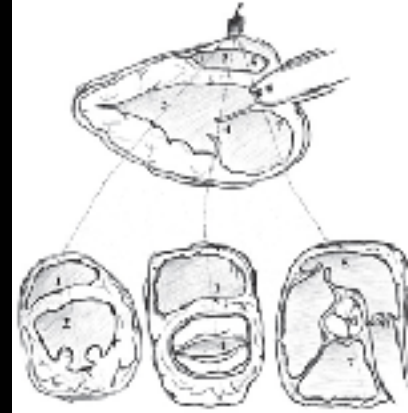
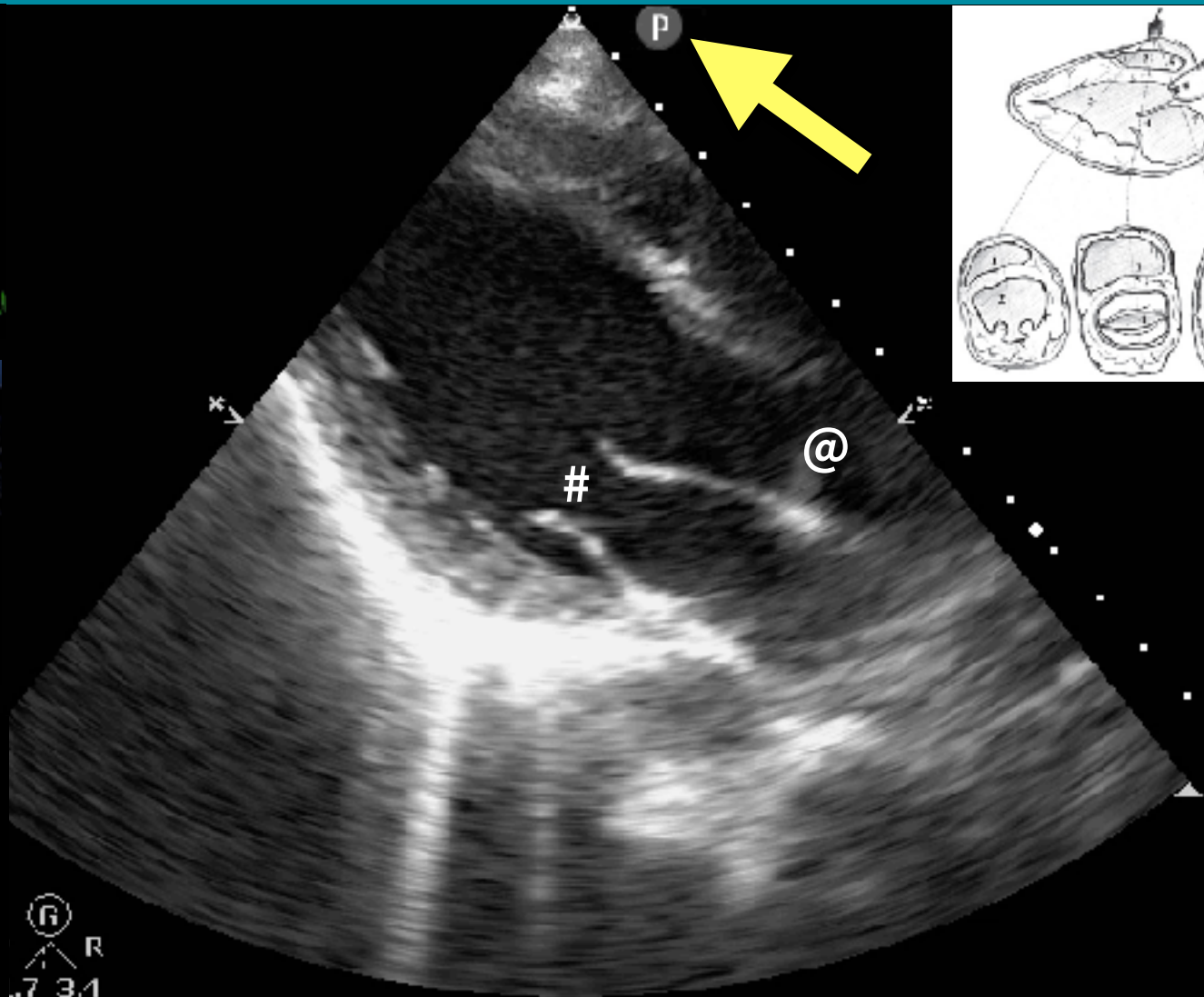
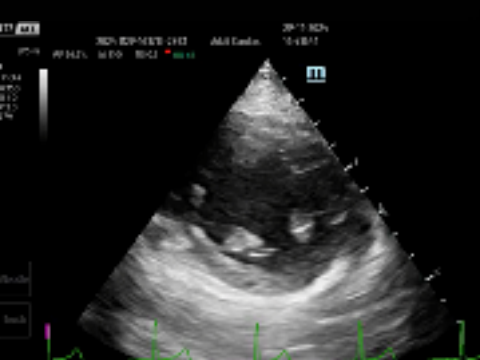
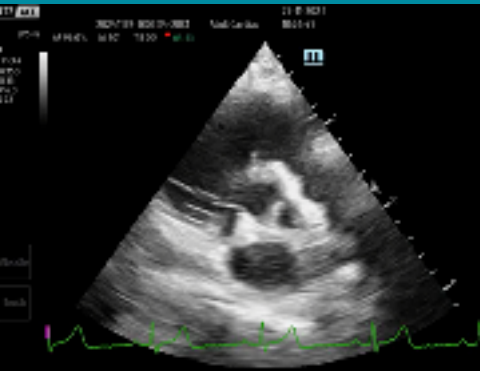
HEMOPERICARDIUM



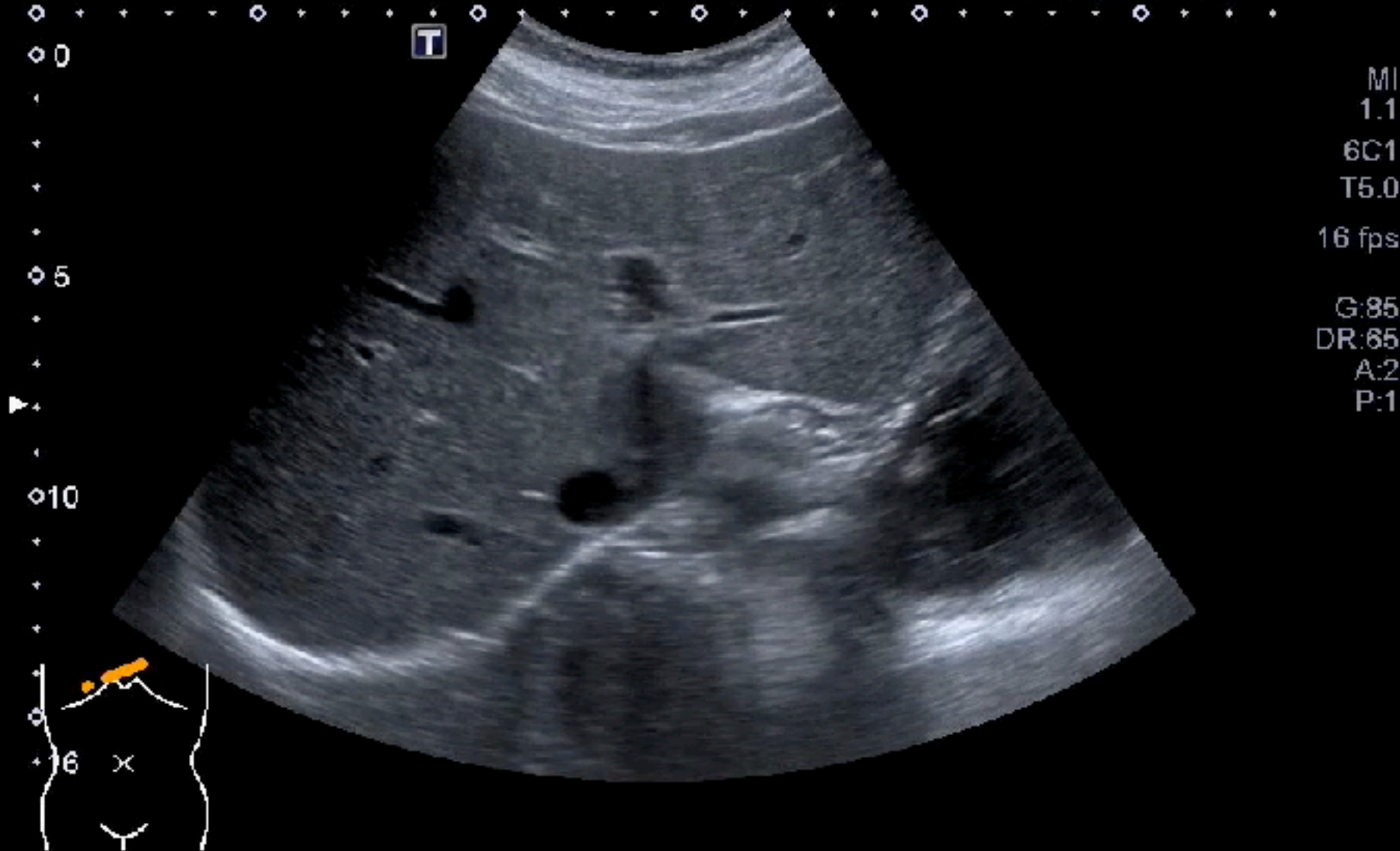
PARASTERNAL LONG AXIS



PARASTERNAL LONG AXIS



SUBCOSTAL 4 CHAMBER



CARDIAC ARREST



CARDIAC TAMPONADE

1.5d Con
3-1
3.8Hz
7.0cm

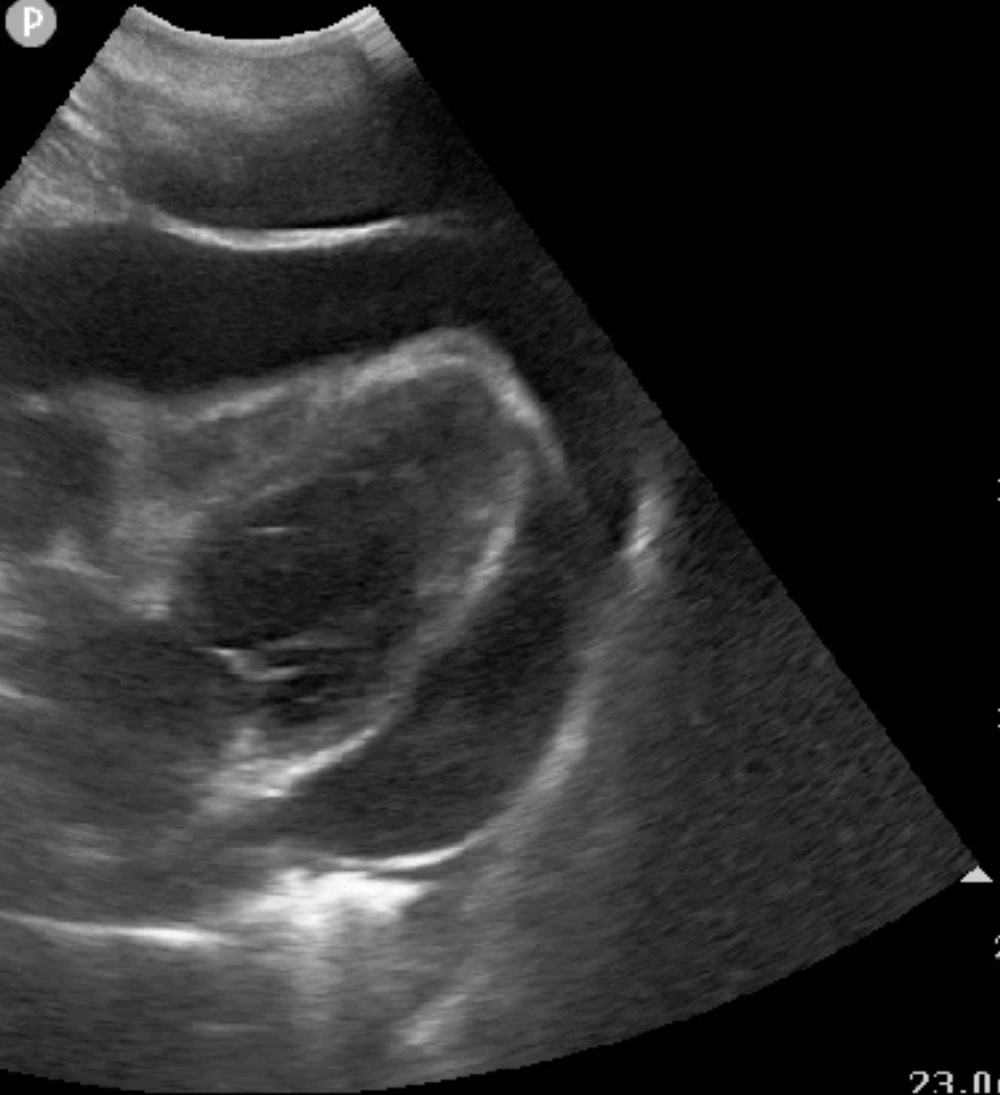
HD
H0cm
10.0cm
0.56
3/3/3



3/3/3



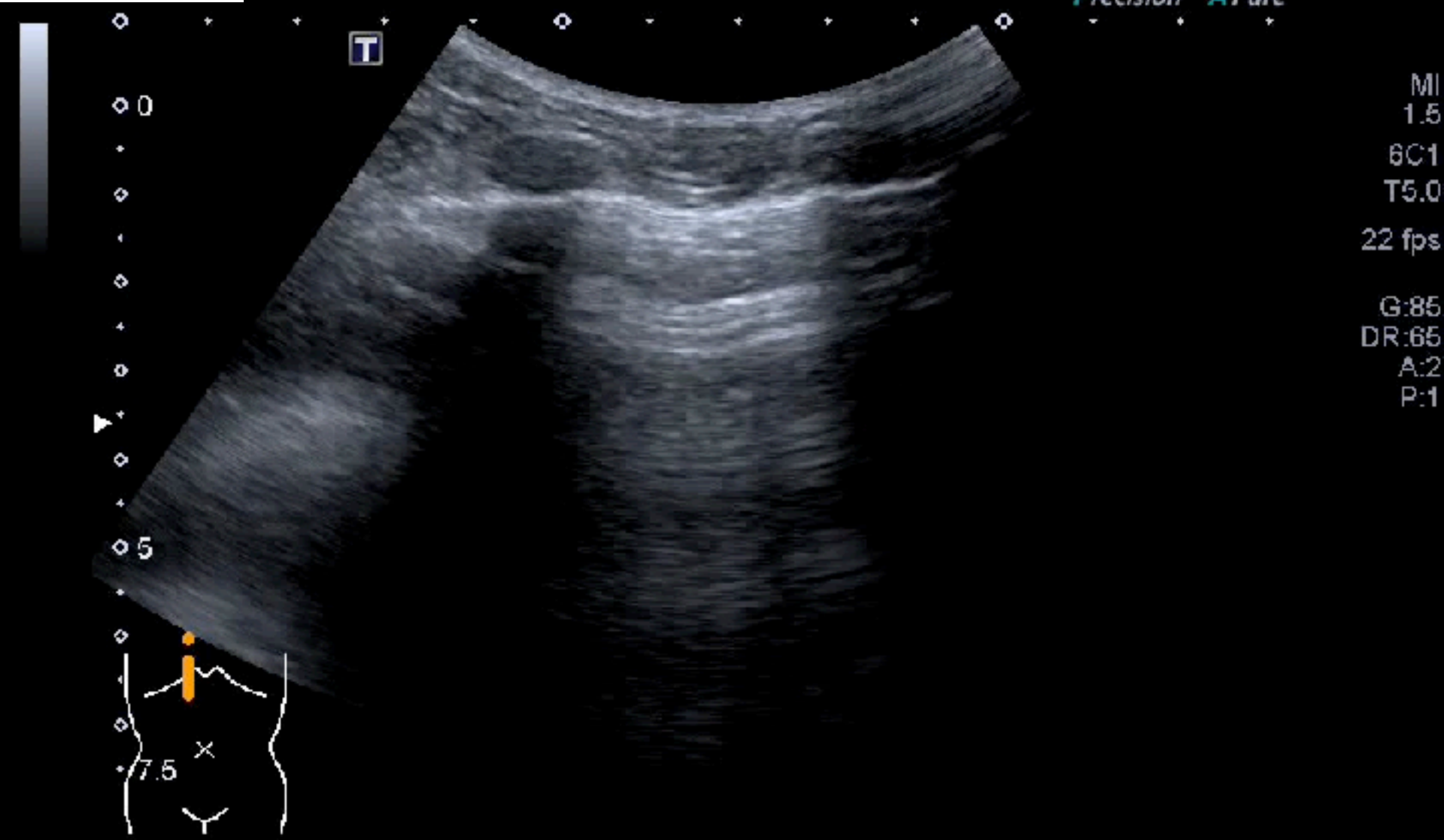
6
P R
1.8 3.6



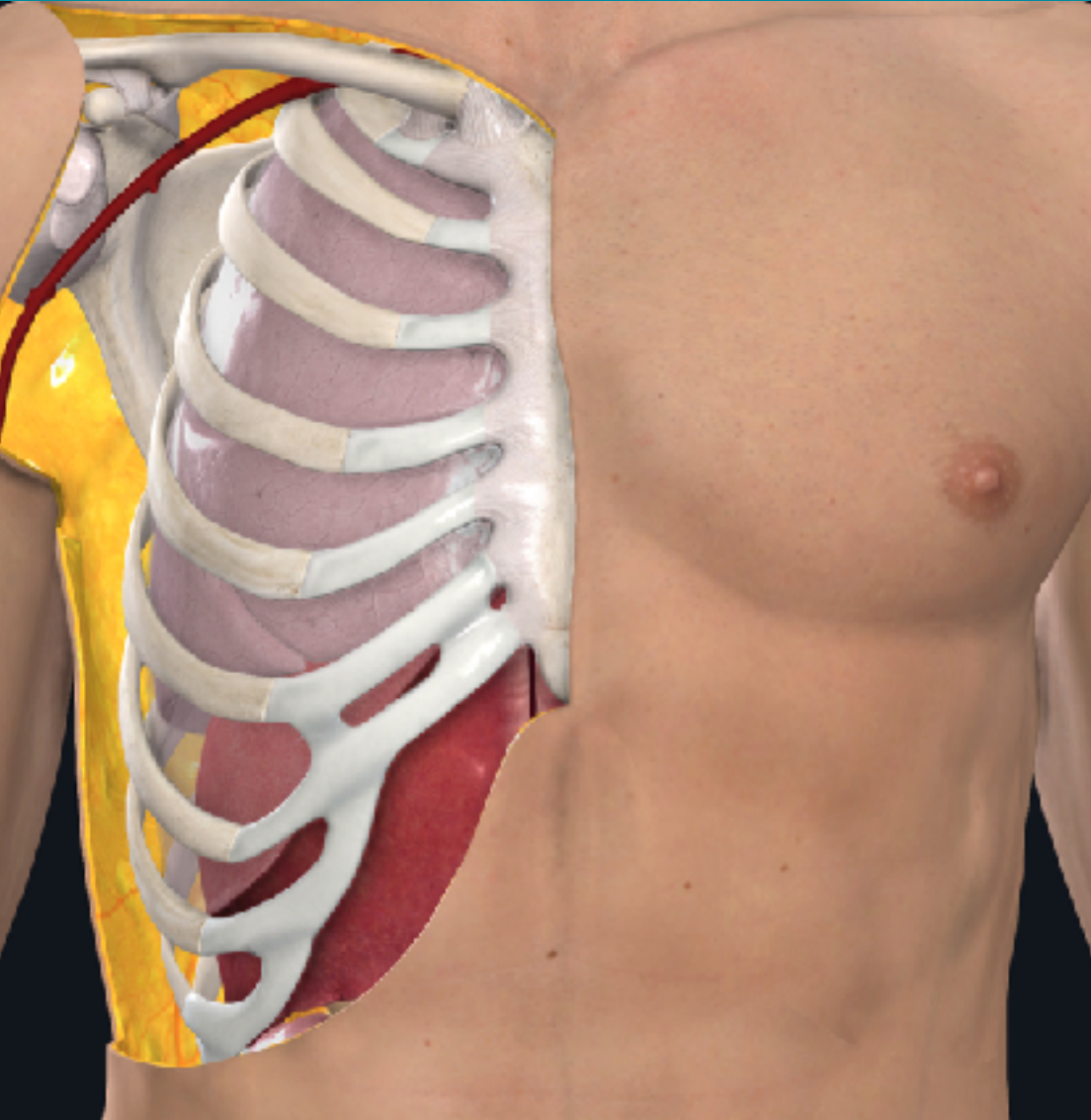
23.0cm



LUNG

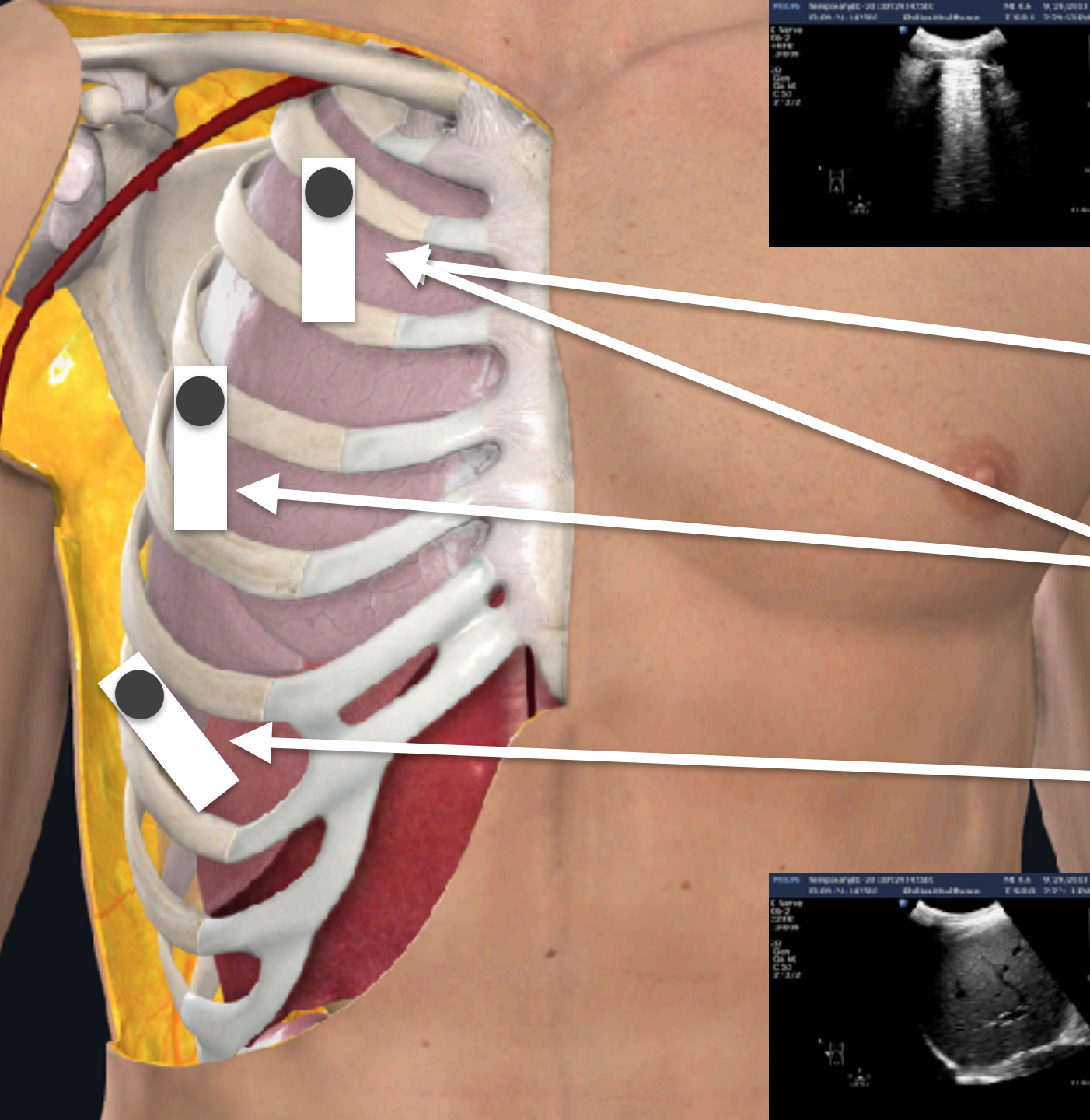


LUNG



Dyspnea
Chest pain

PTX
AIS
PLE



AIR

PTX

AIS

PLE

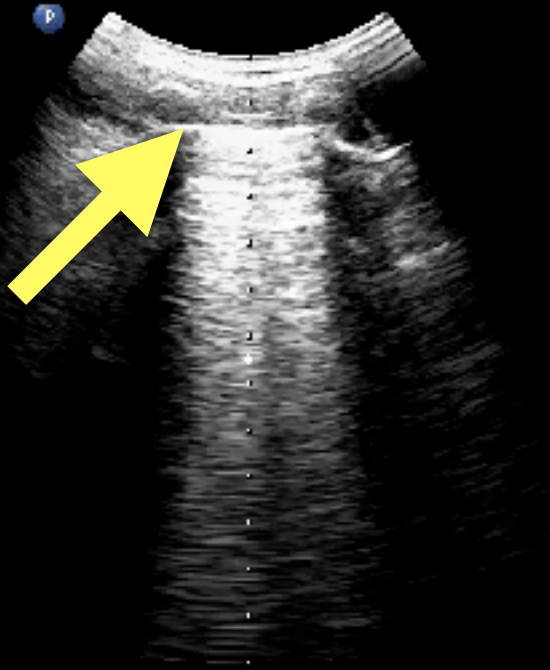
FLUID

NORMAL LUNG

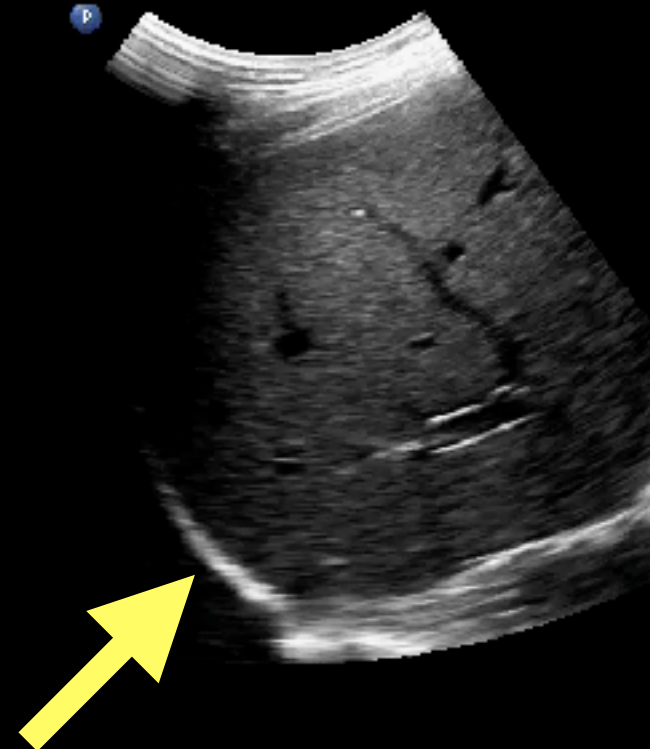
肋膜/滑動

橫膈膜/移動

TemporaryID 20130924142510 MT 0.6 9: PHILIPS 13 09 24 142510 Philips Healthcare TIS 0.1 2: TemporaryID 20130924142510 MT 0.6 9:24 13 09 24 142510 Philips Healthcare TIS 0.0 2:27



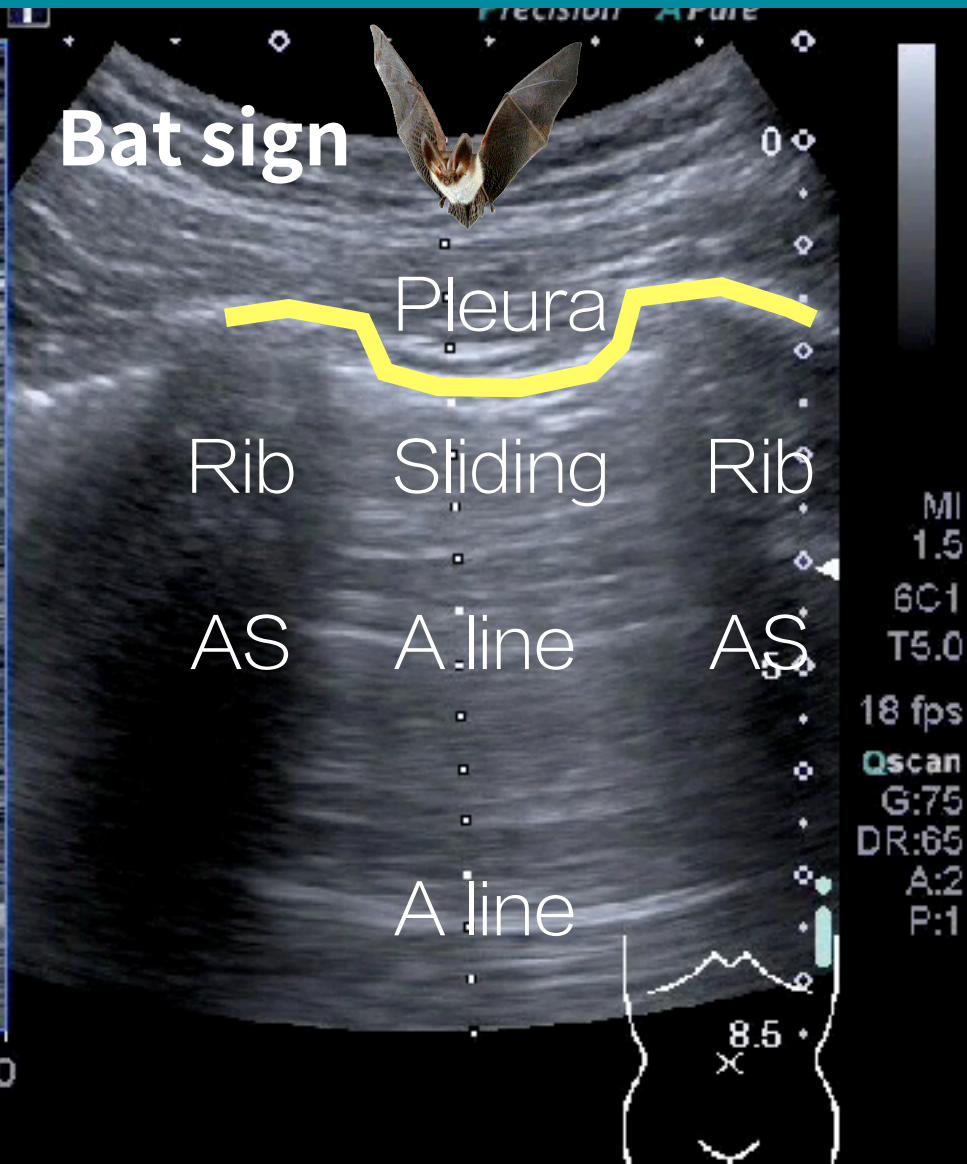
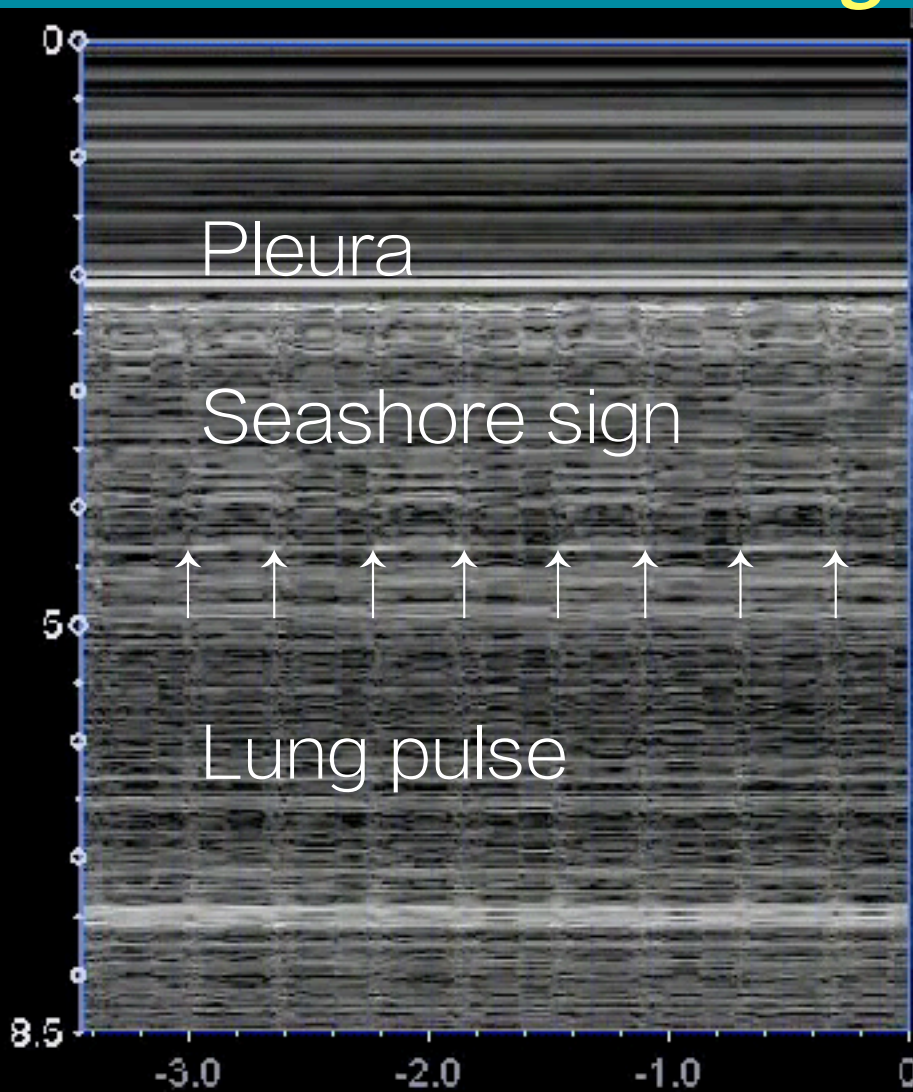
C Nerve
CG-2
22 Hz
13.0cm
2D
Gen
Gr 60
C 53
2/3/2



G
P K
2.0 6.0

NORMAL LUNG

Sliding + A lines



SLIDING FIRST



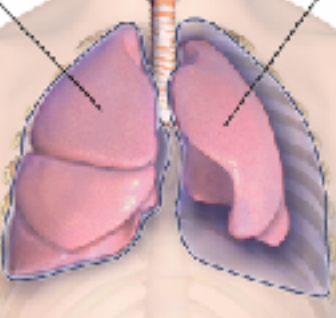
A line

肋膜下
水平線
等距離



B line

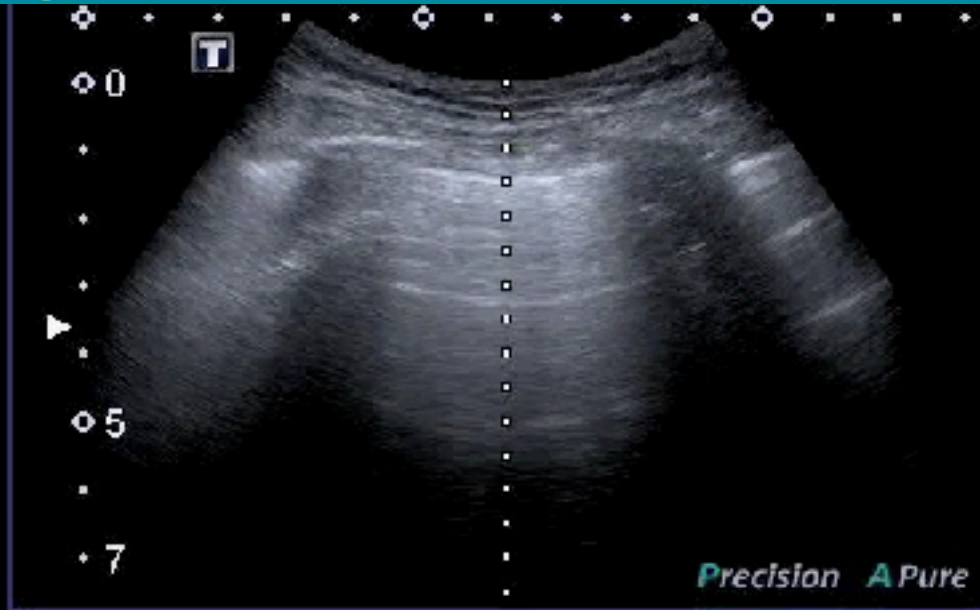
肋膜下
垂直線
大於三



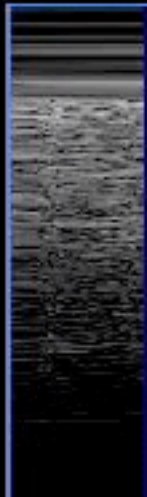
PNEUMOTHORAX ?

Sliding + A lines = Normal pleura

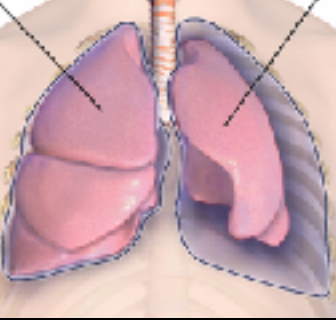
Seashore sign



MI:1.5
6C1
T5.0
18 fps
Qscan
G:71
DR:65
A:2
P:1



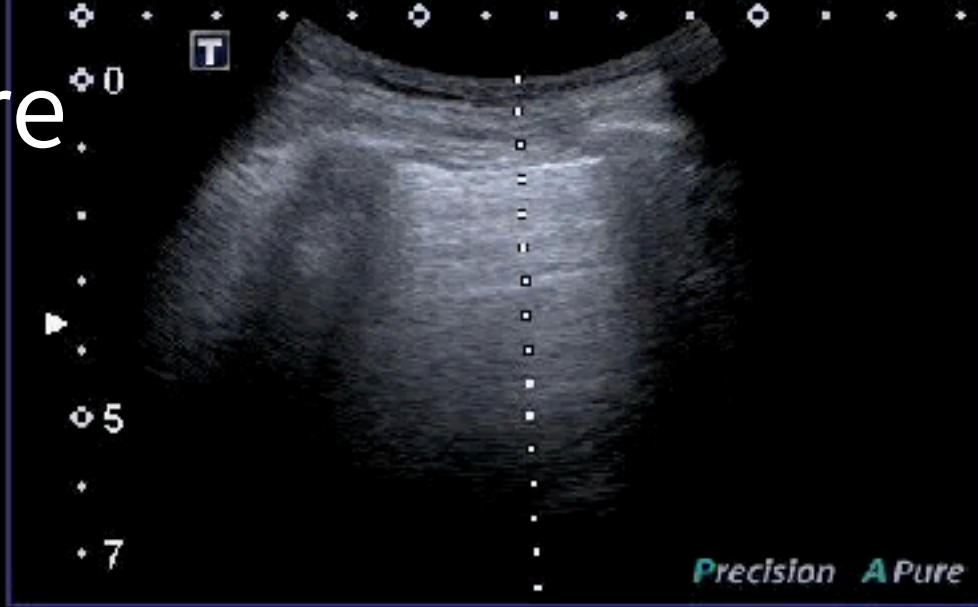
0
5
7



PNEUMOTHORAX ?

No Sliding + A lines >> Consider PTX

Stratosphere
sign



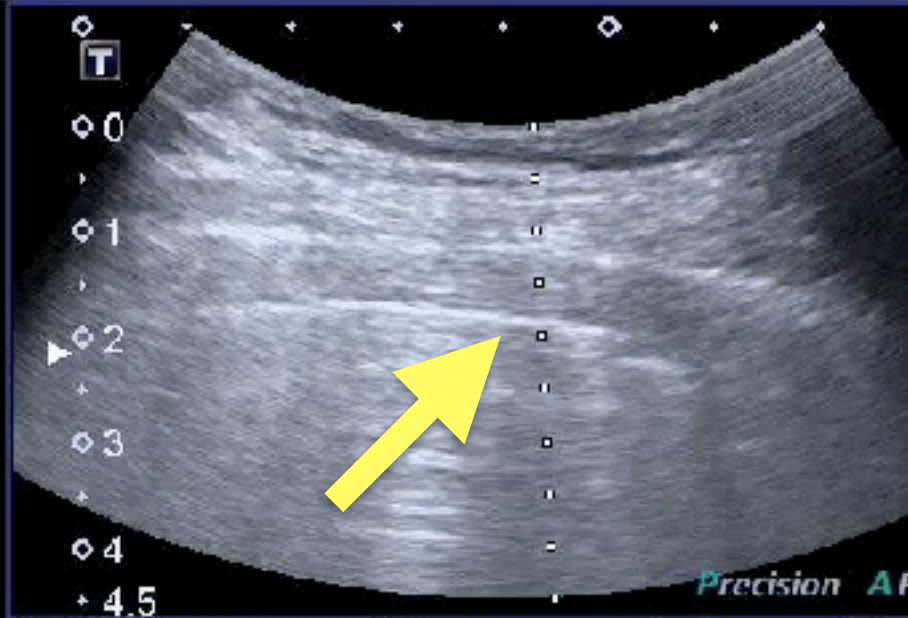
MI:1.5
6C1
T5.0
18 fps
Qscan
G:71
DR:65
A:2
P:1

Precision A Pure

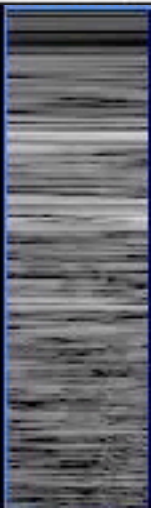


Lung Point

A

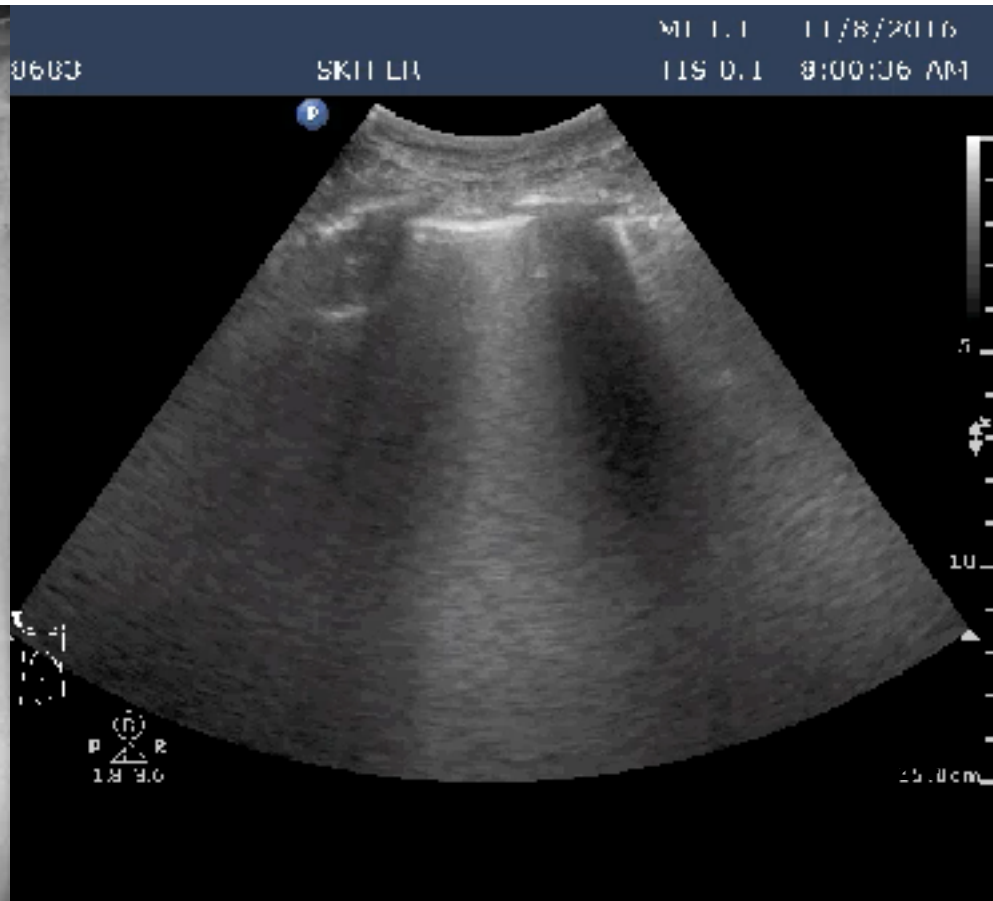
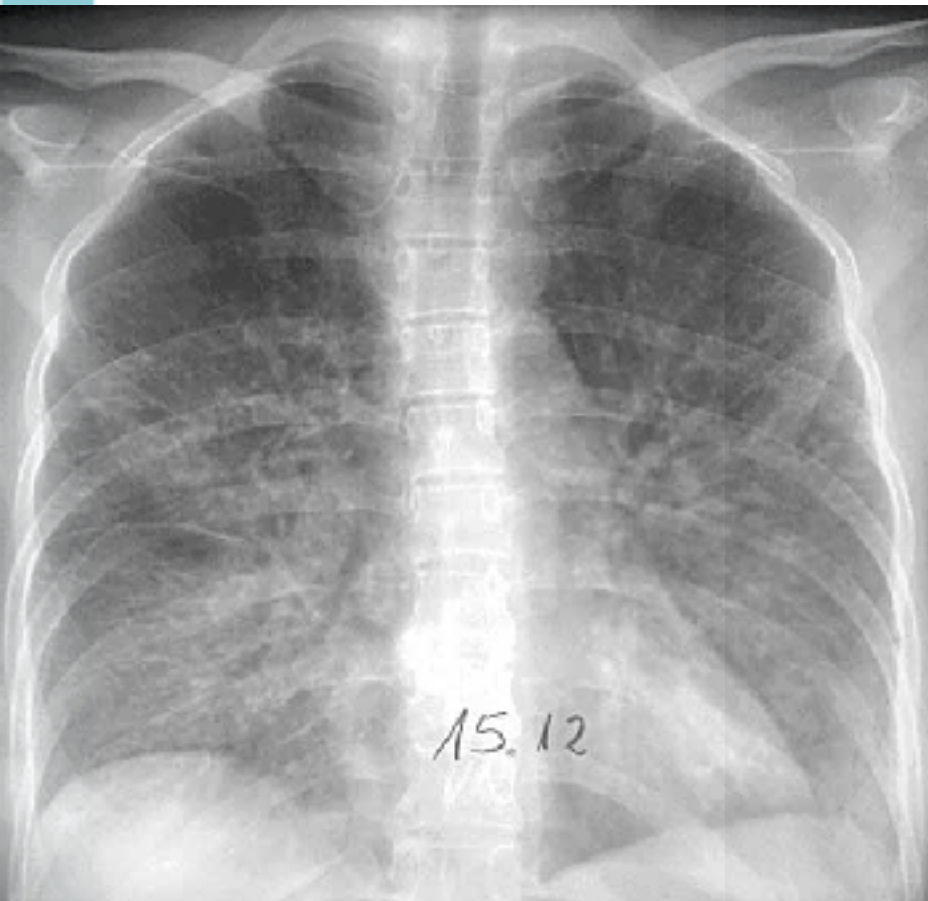


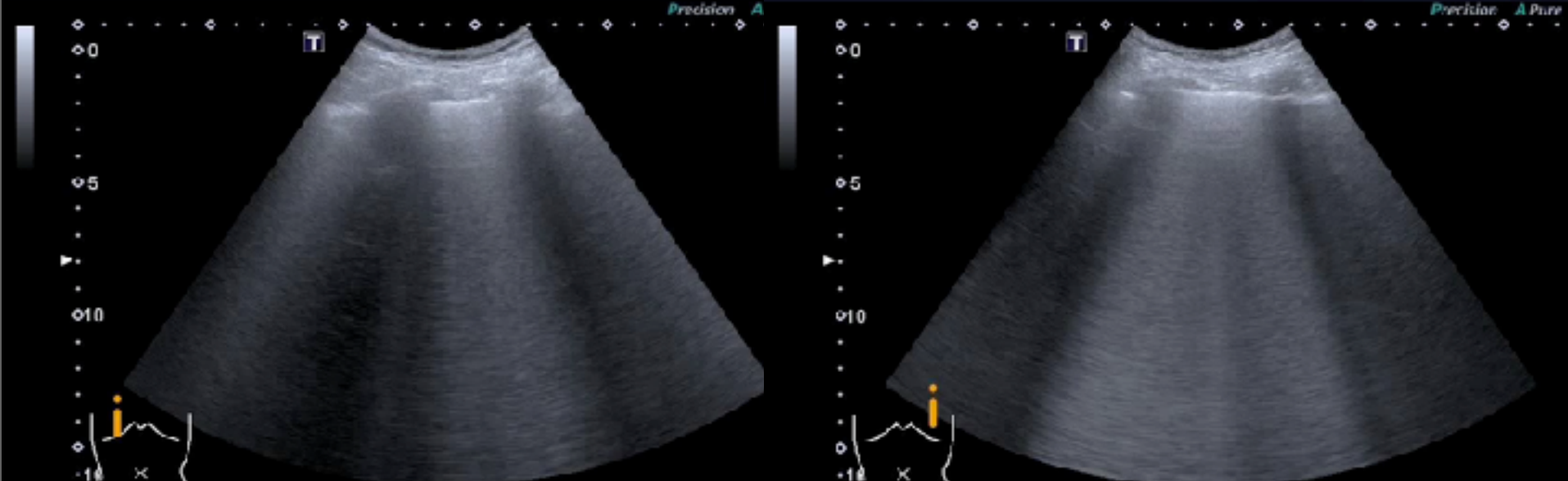
B



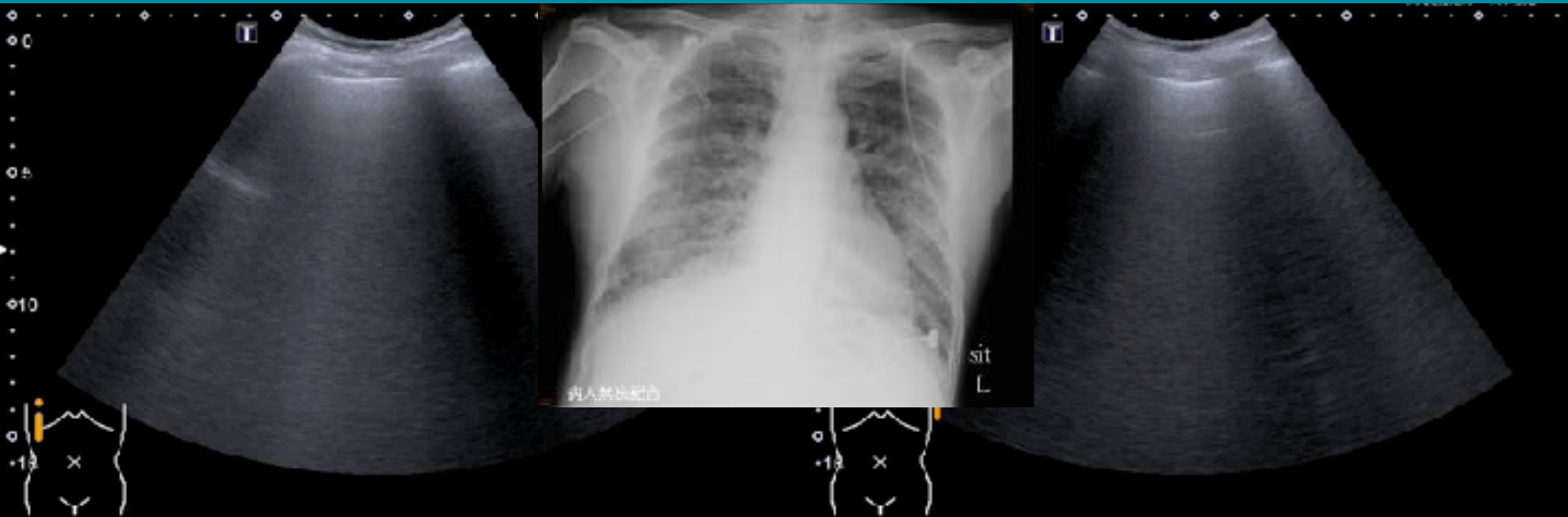
LUNG ROCKETS

ICS > 3 B lines

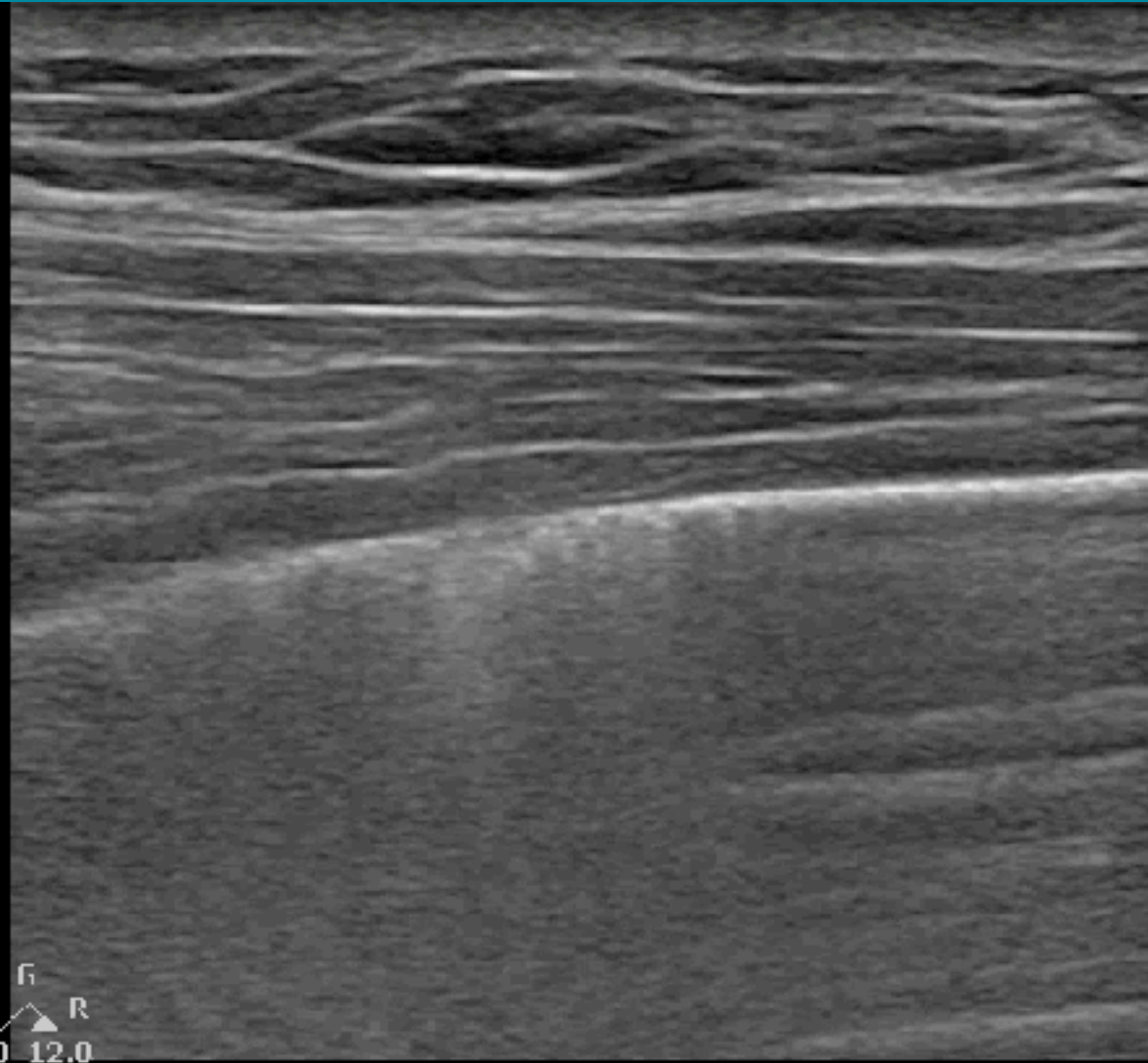




ALEVOLAR INTERSTITIAL SYNDROME



AIS: Localized



Pneumonia

Pneumonitis

Atelectasis

Contusion

Infarction

Pleural disease

Neoplasia

Normal lung

PLEURAL EFFUSION

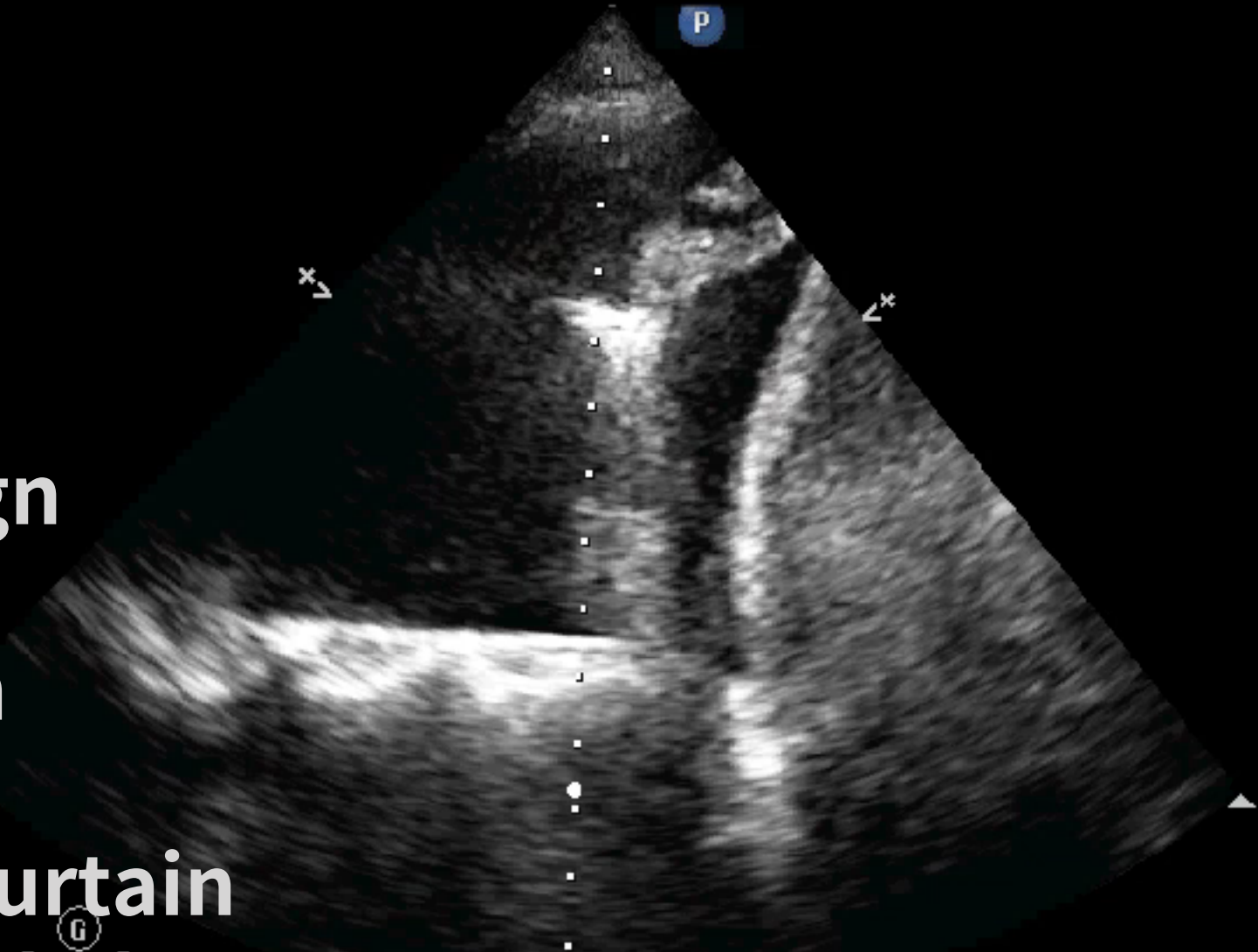
Adult Echo2
G-1
: Hz
5.0cm

Gen
n 30
50
/ 2 / 0

Spine sign

Jelly fish

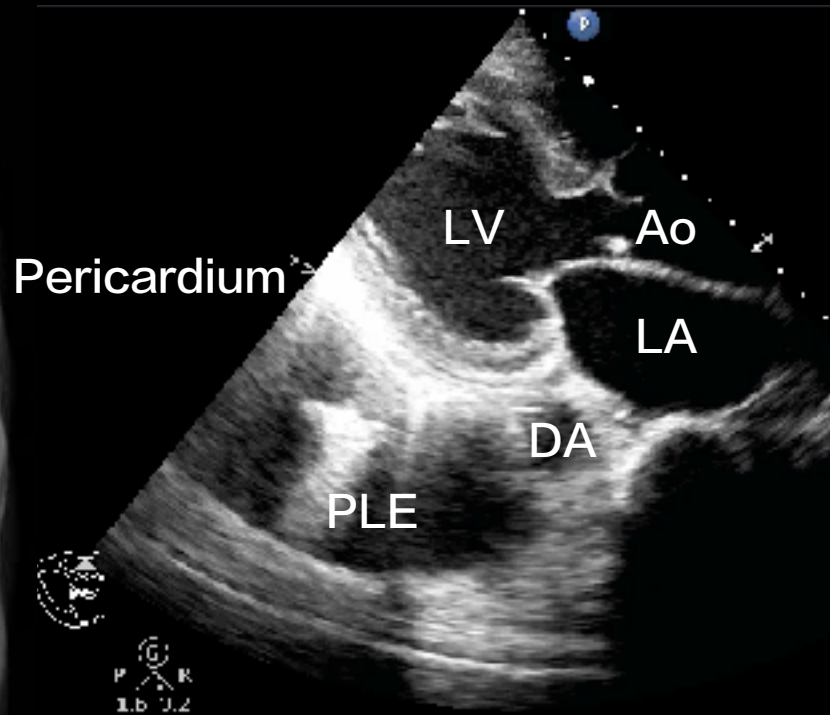
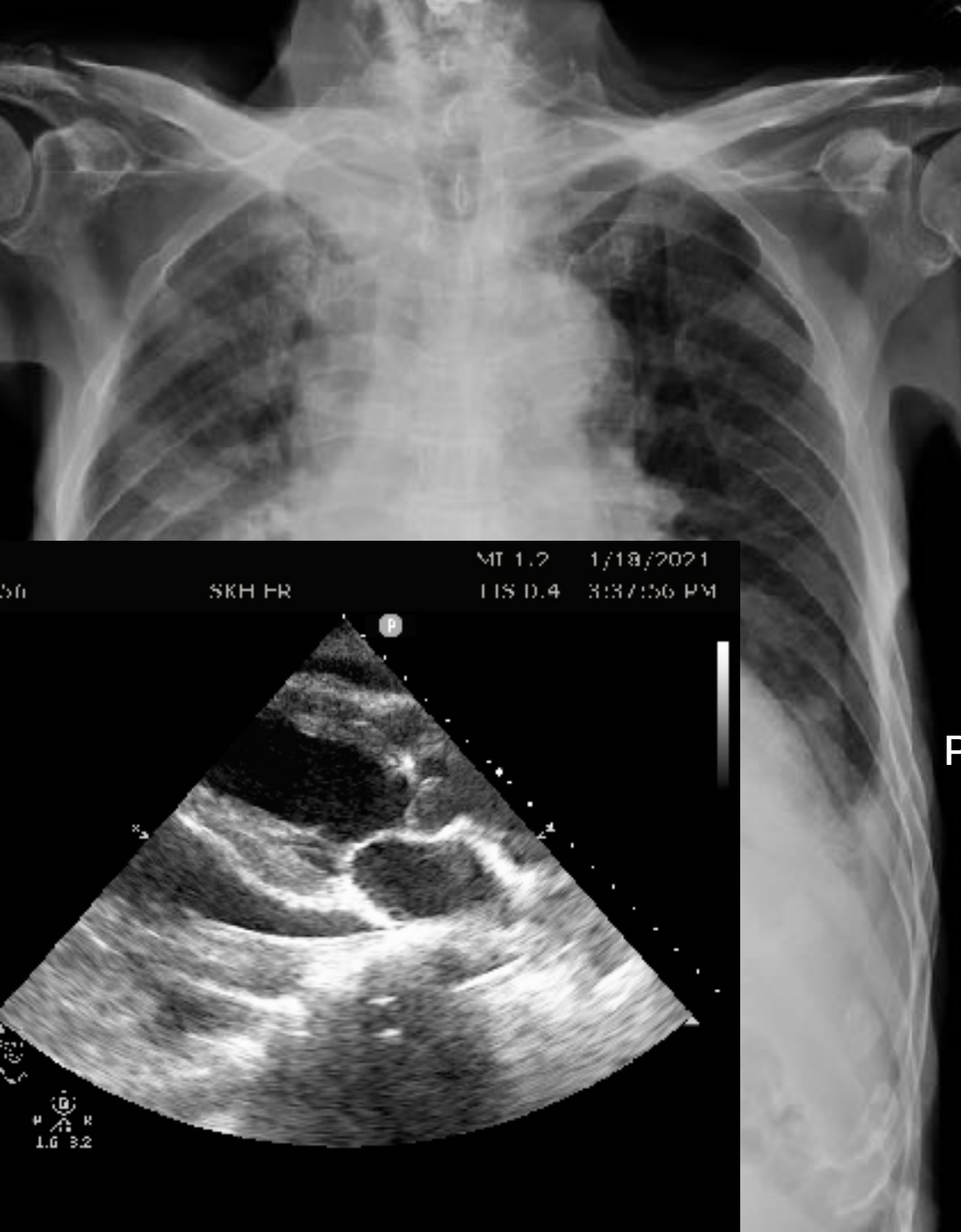
Loss of curtain





D aorta

Pericardial vs Pleural



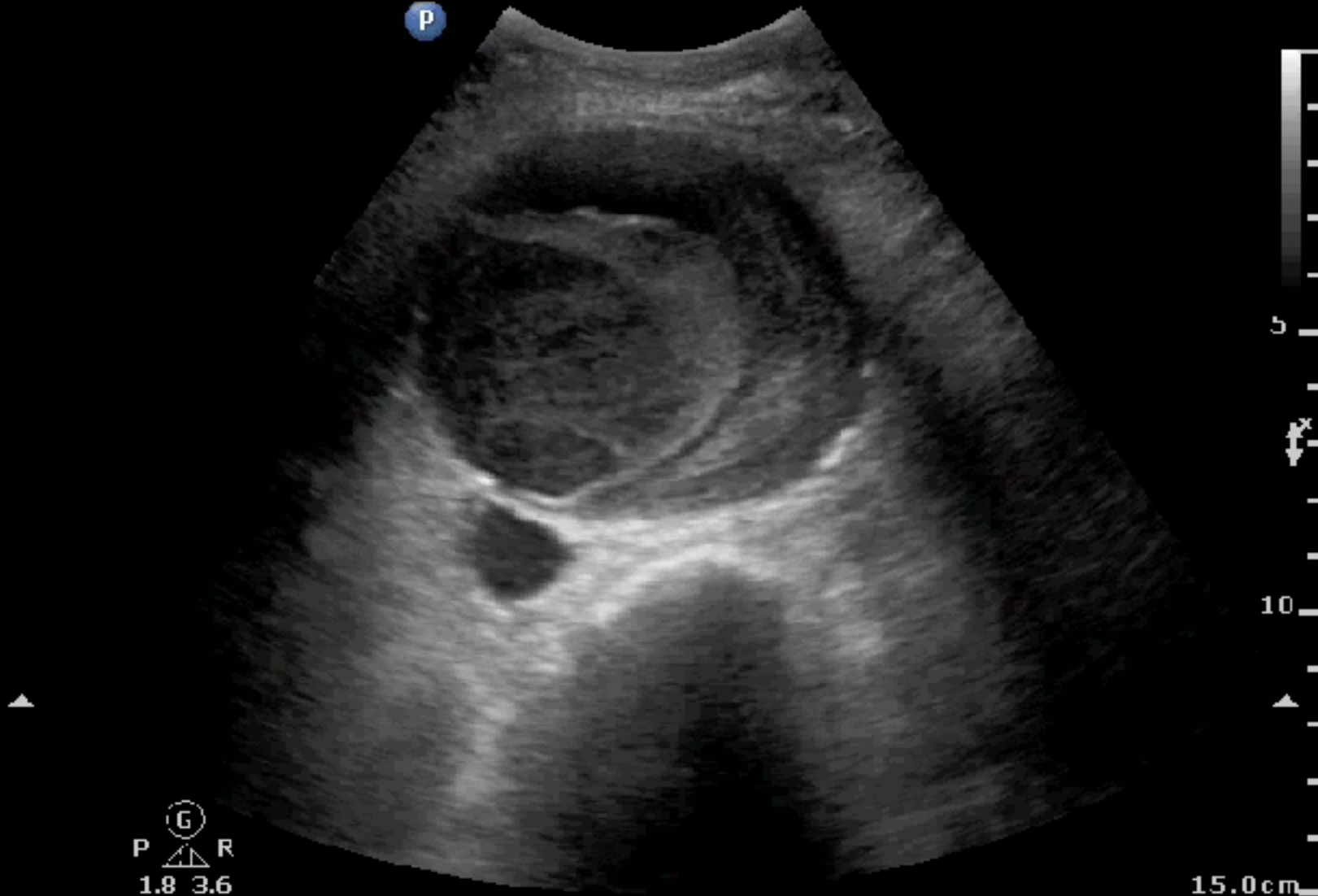


AORTA

Abd Gen
C.5-1
34 Hz
15.0cm

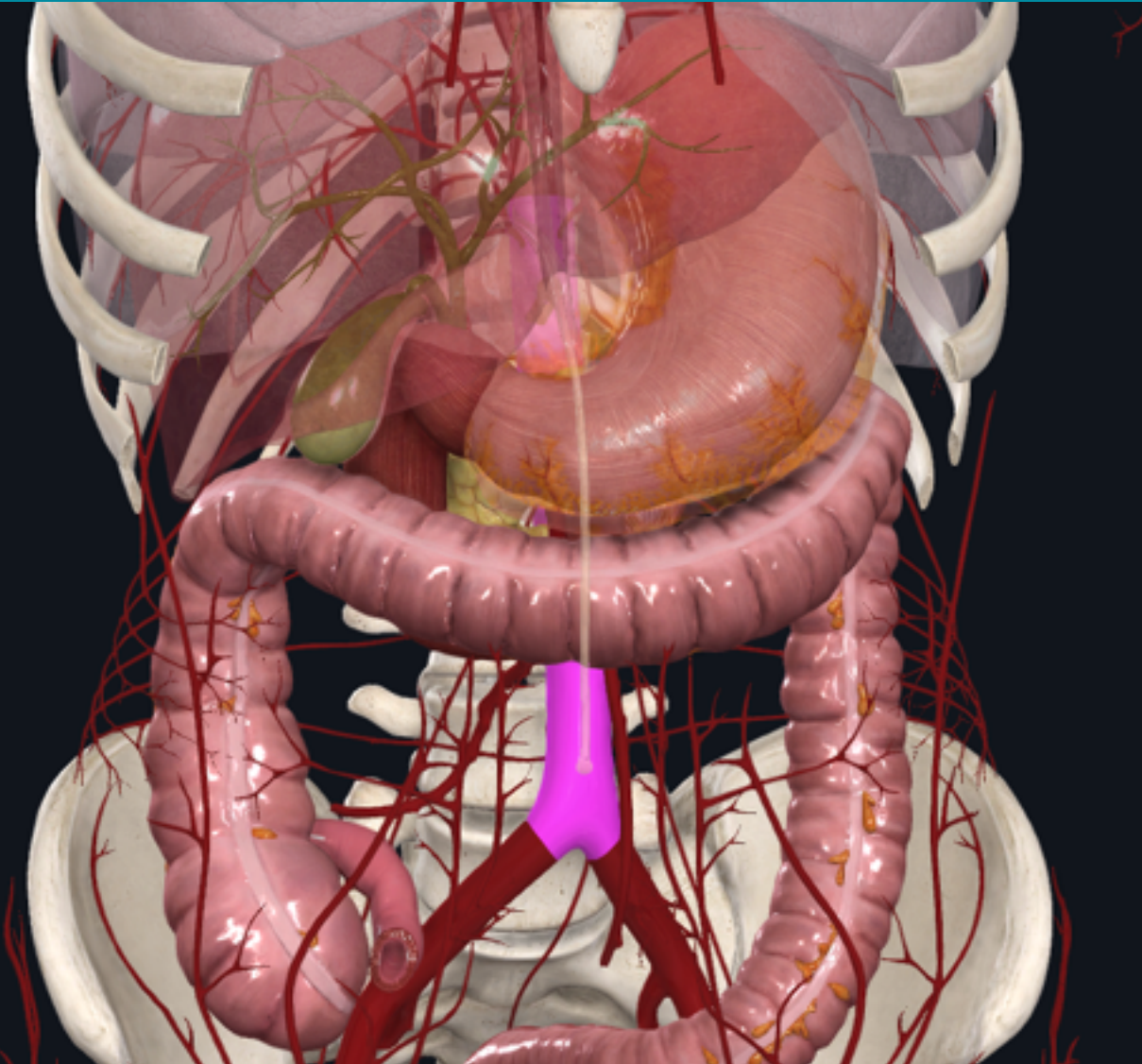
2D

HGen
Gn 57
C 56
3 / 3 / 3



15.0cm

AORTA



Pain
Shock

AAA

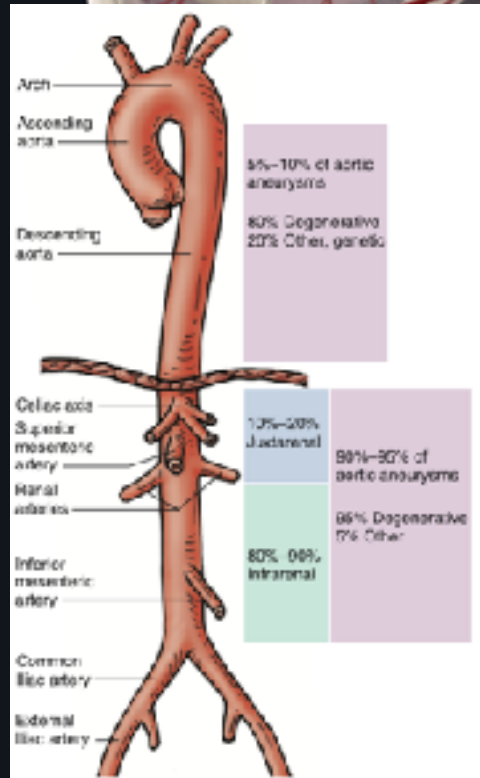
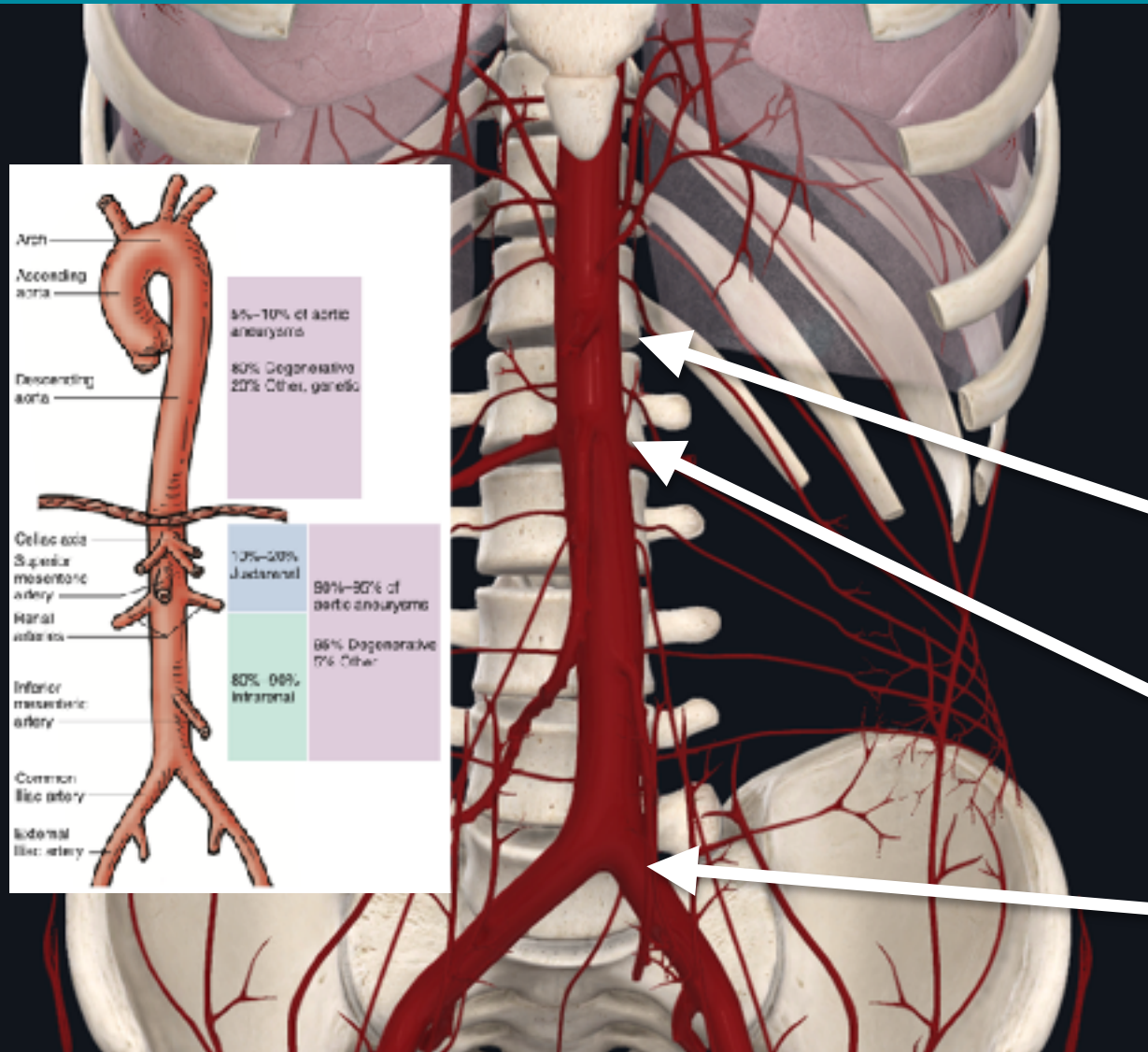
AORTA

**Abdominal
Aorta (3cm)**

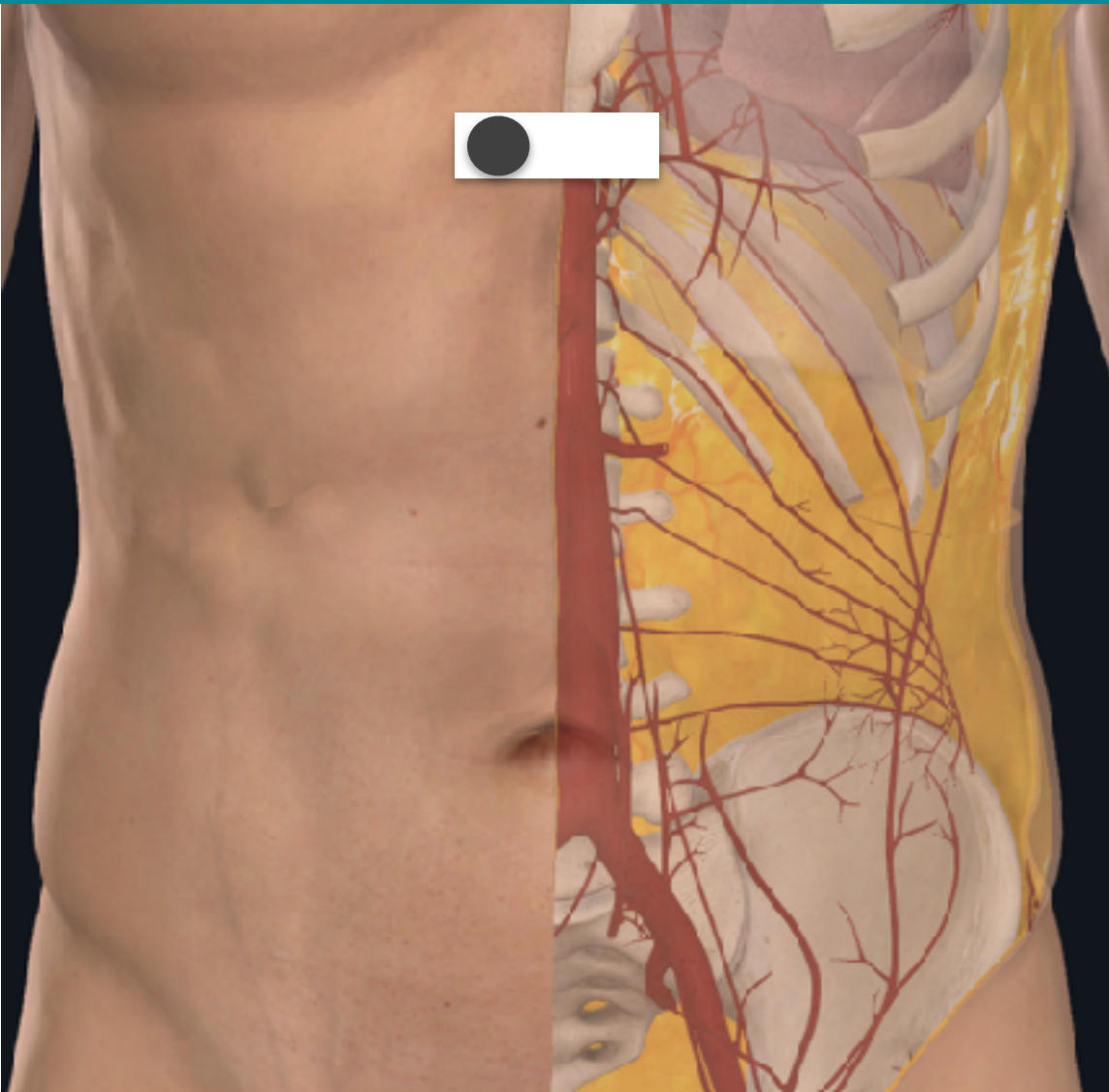
Celiac trunk

SMA

Bifurcation



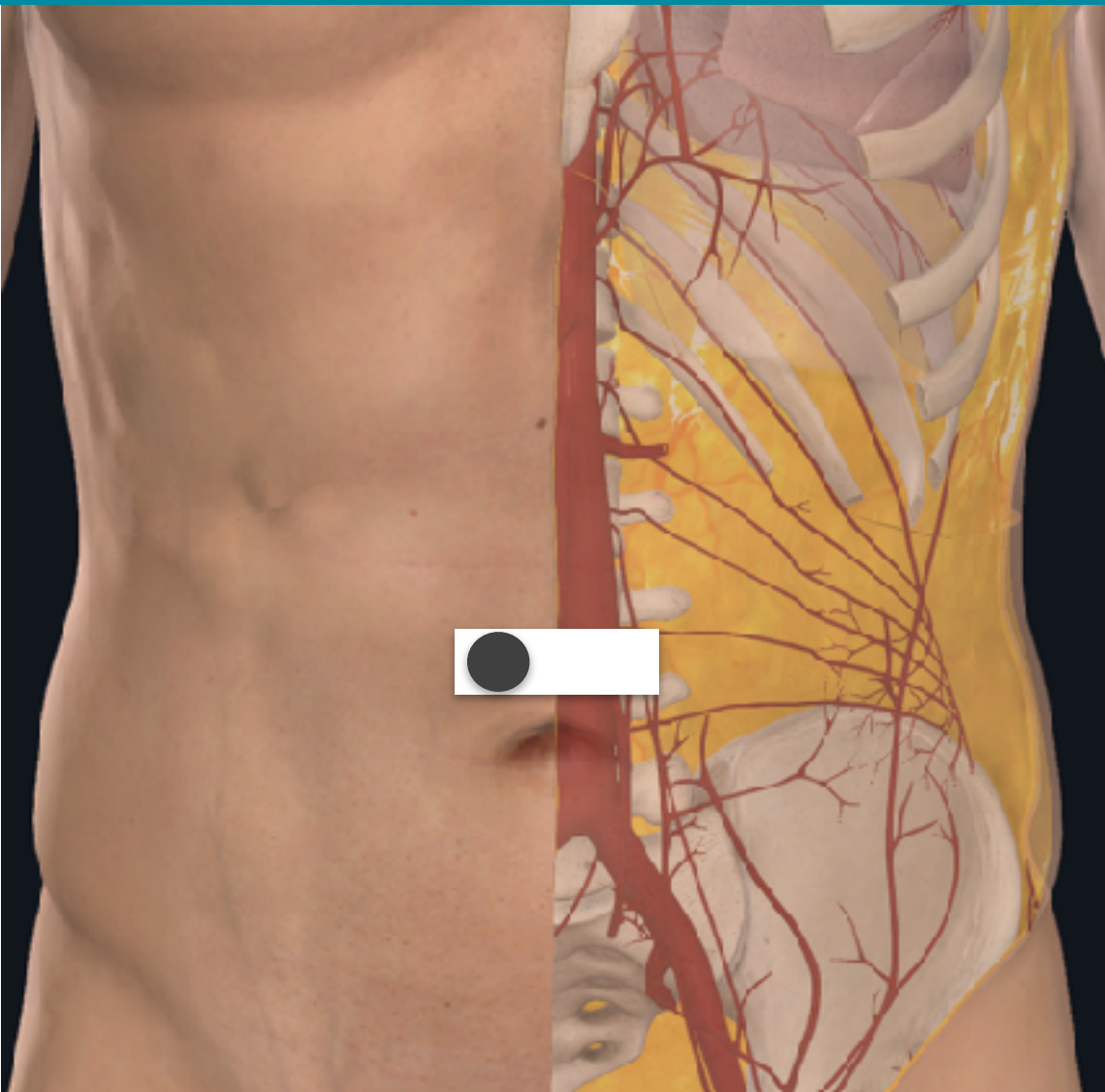
AORTA



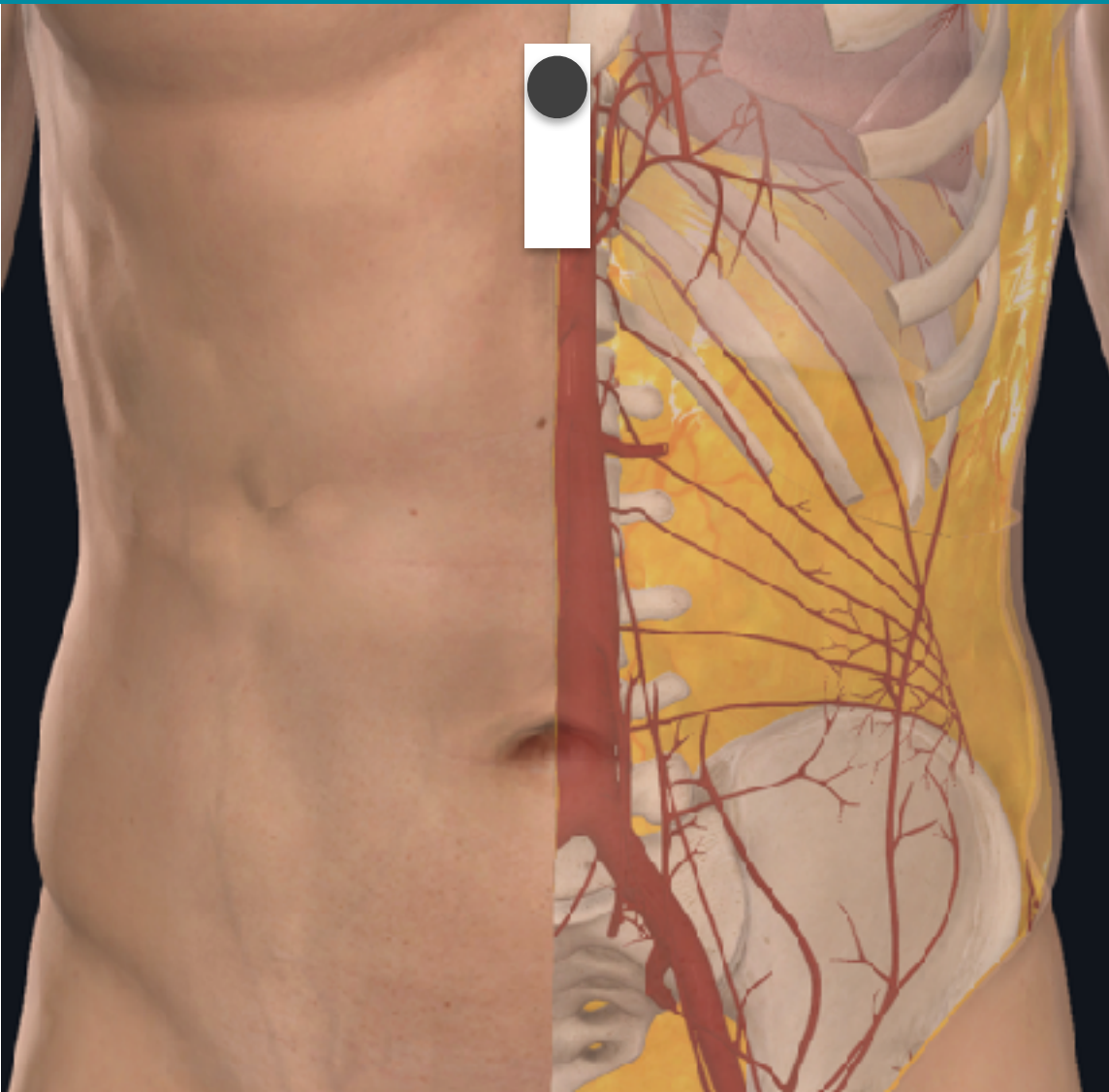
探頭: 弧形

位置: 劍突下

AORTA



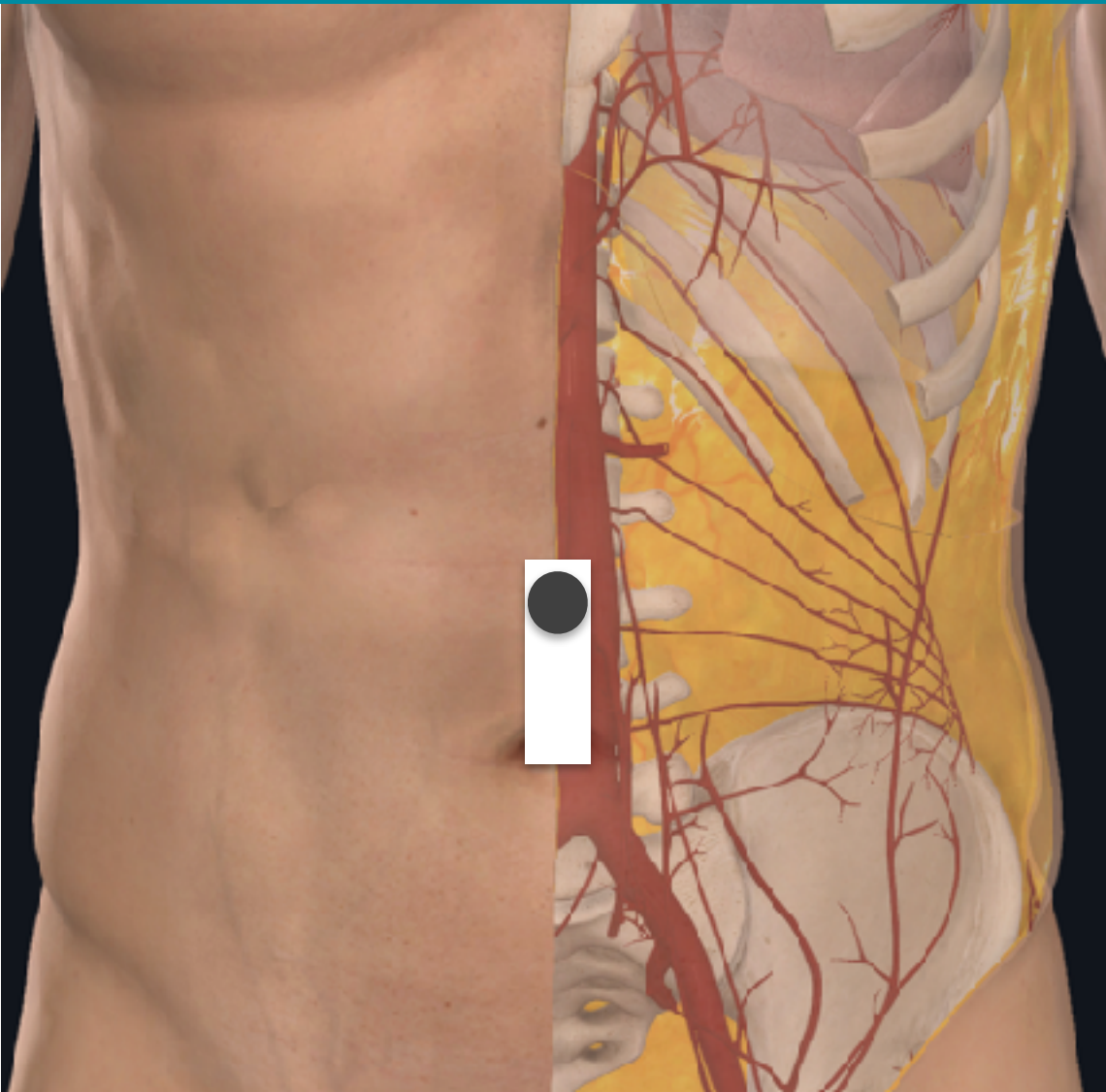
AORTA



探頭: 弧形

位置: 劍突下

AORTA



160331172347

SKII ER

MI 1.1

TIS 0.1

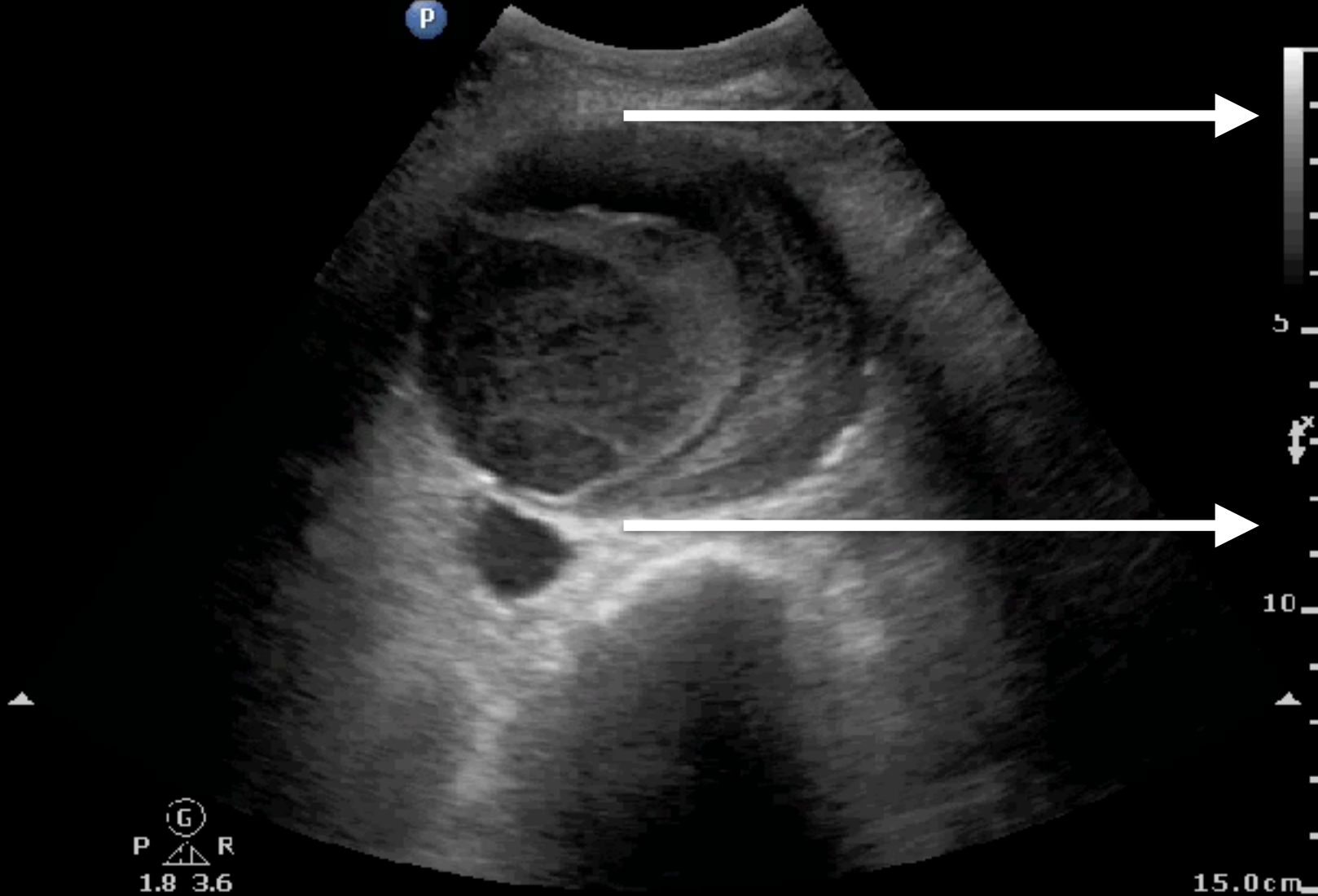


AAA: EYEBALLING

Abd Gen
C.5-1
34 Hz
15.0cm

2D

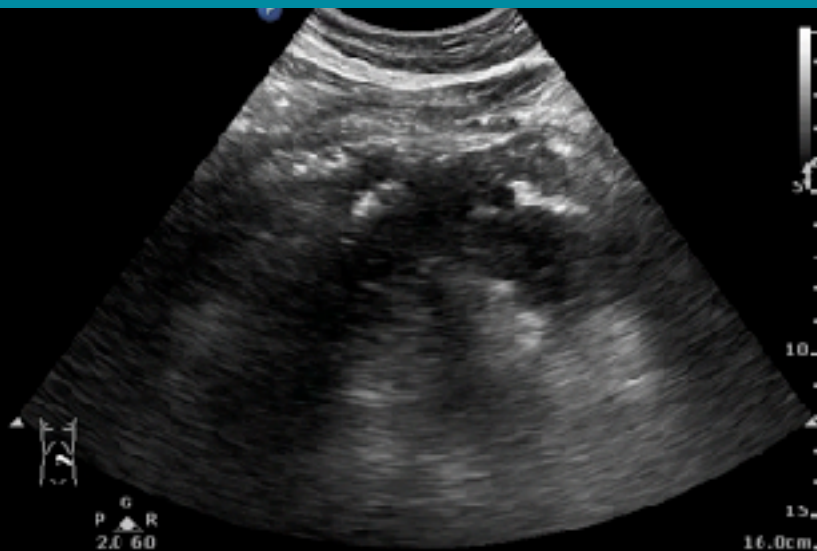
HGen
Gn 57
C 56
3/3/3



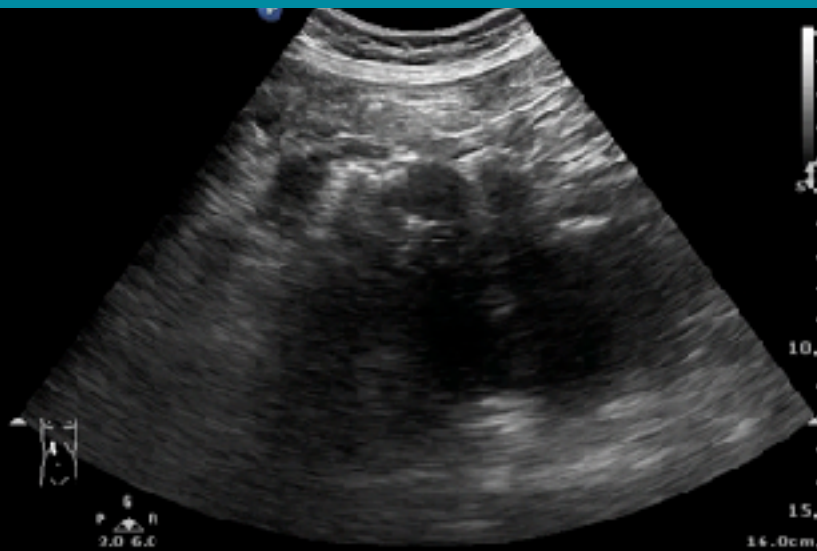
15.0cm

AAA ? RUPTURE ?

C Nerve
C6-2
22 Hz
16.0cm

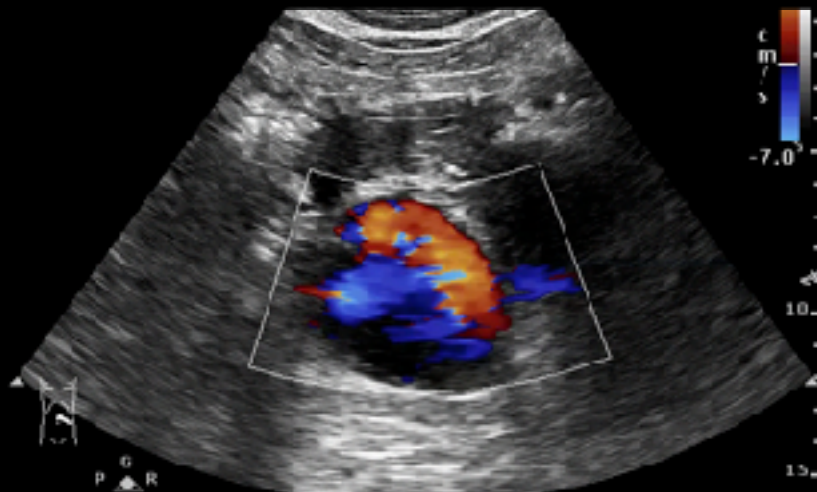


C Nerve
C6-2
22 Hz
16.0cm



11 Hz
16.0cm

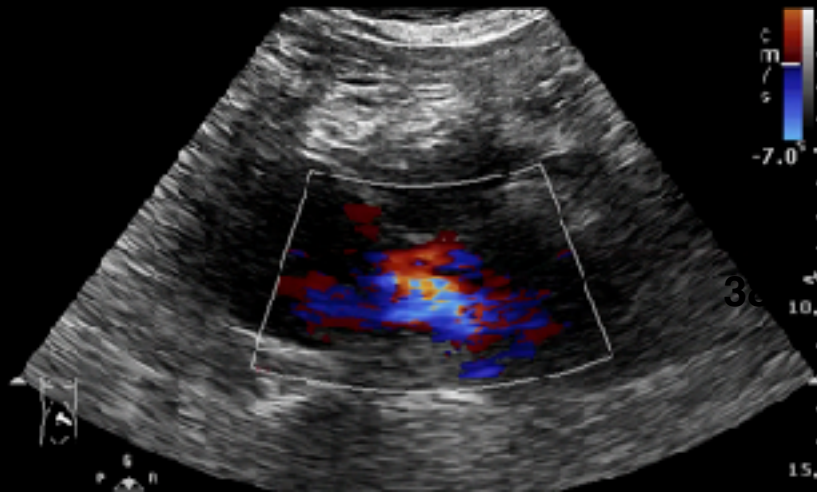
2D
Gen
Gh 60
C 53
2/3/3



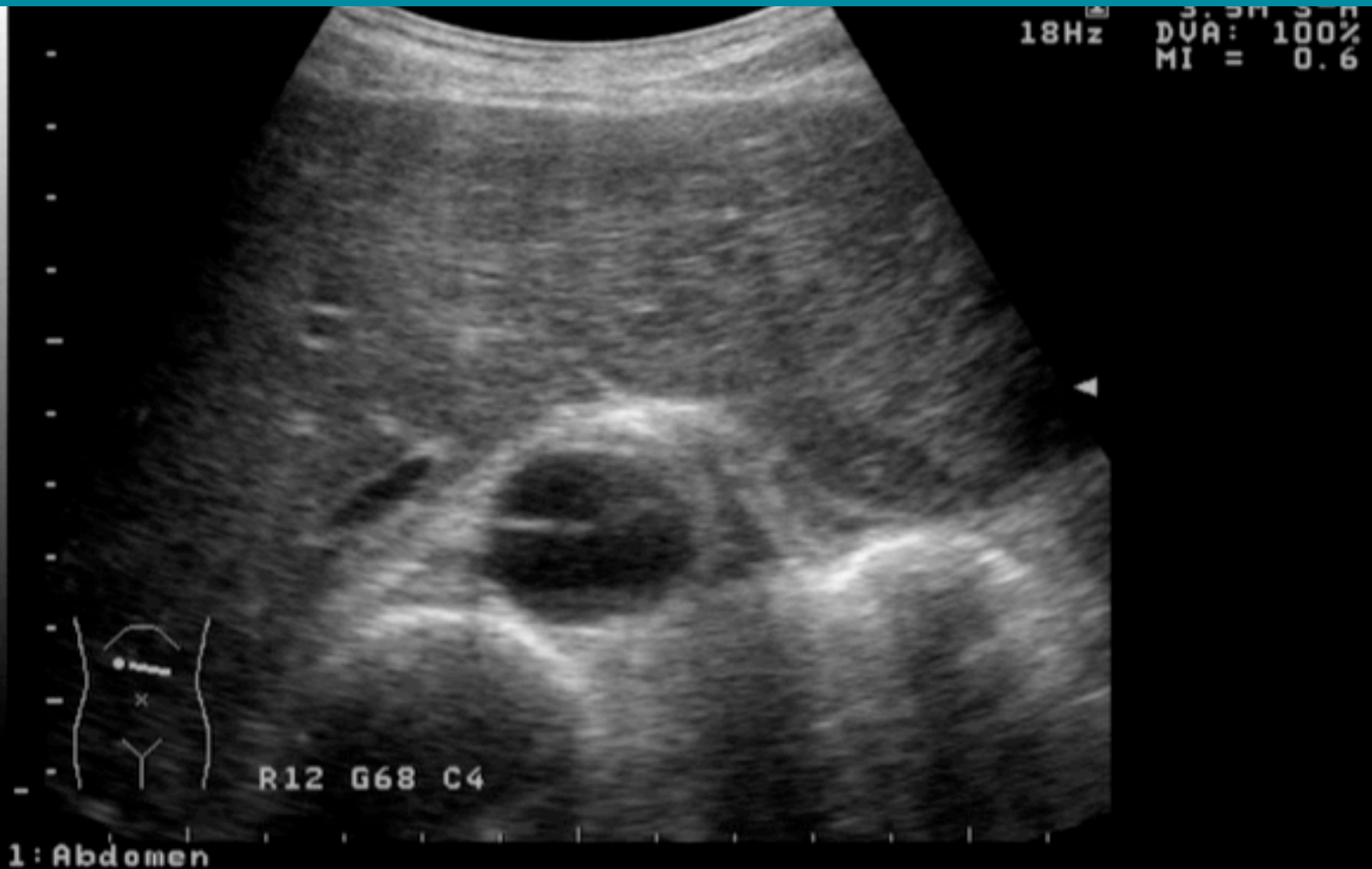
11 Hz
16.0cm

2D
Gen
Gh 60
C 53
2/3/3

Color
2.5 MHz
Gh 66
3/5/4
Filtr Med



AAA ?



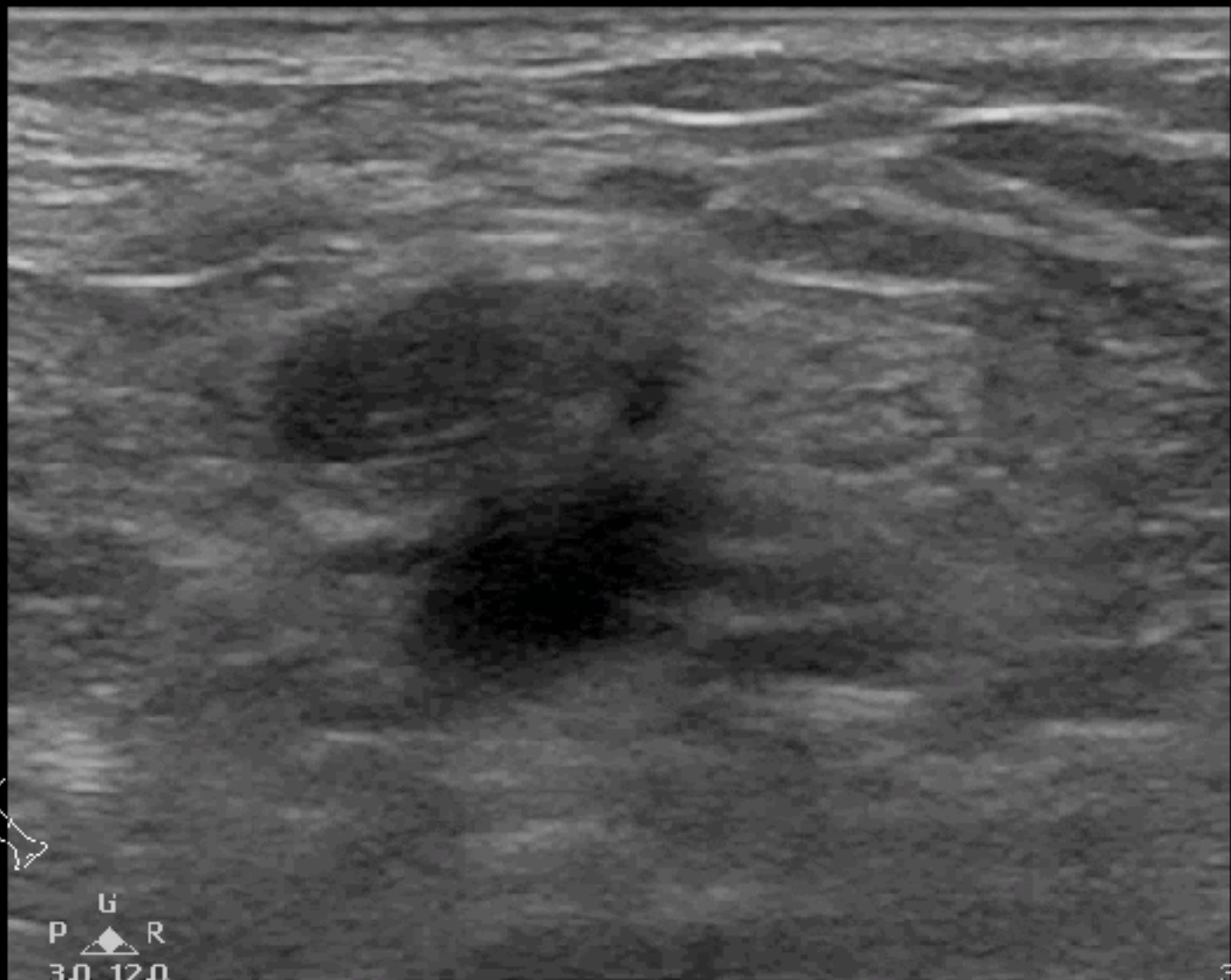
DVT



Superficial
_12-3
31 Hz
3.0cm

P

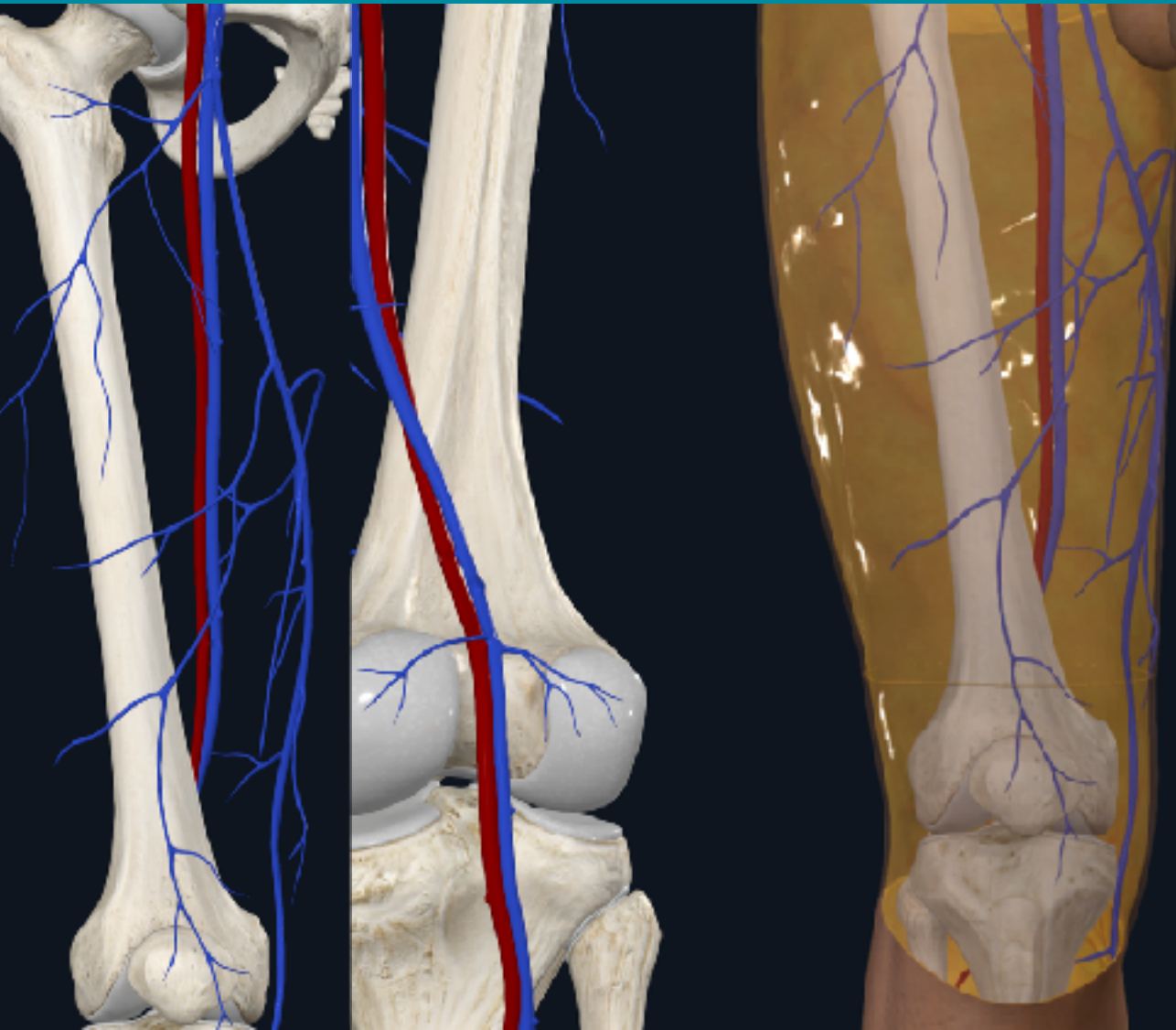
2D
Gen
Gn 88
C 52
4/3/2



G
P R
3.0 12.0

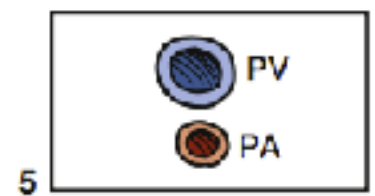
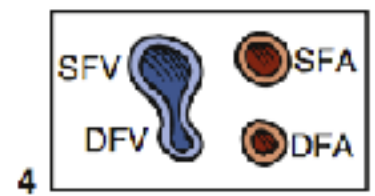
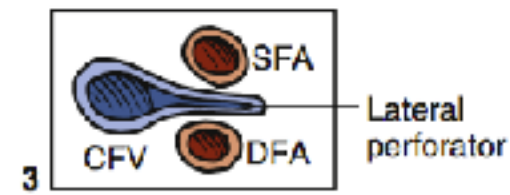
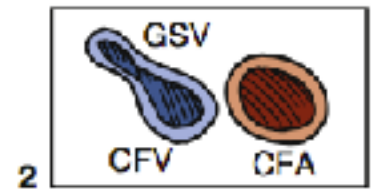
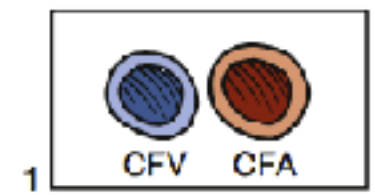
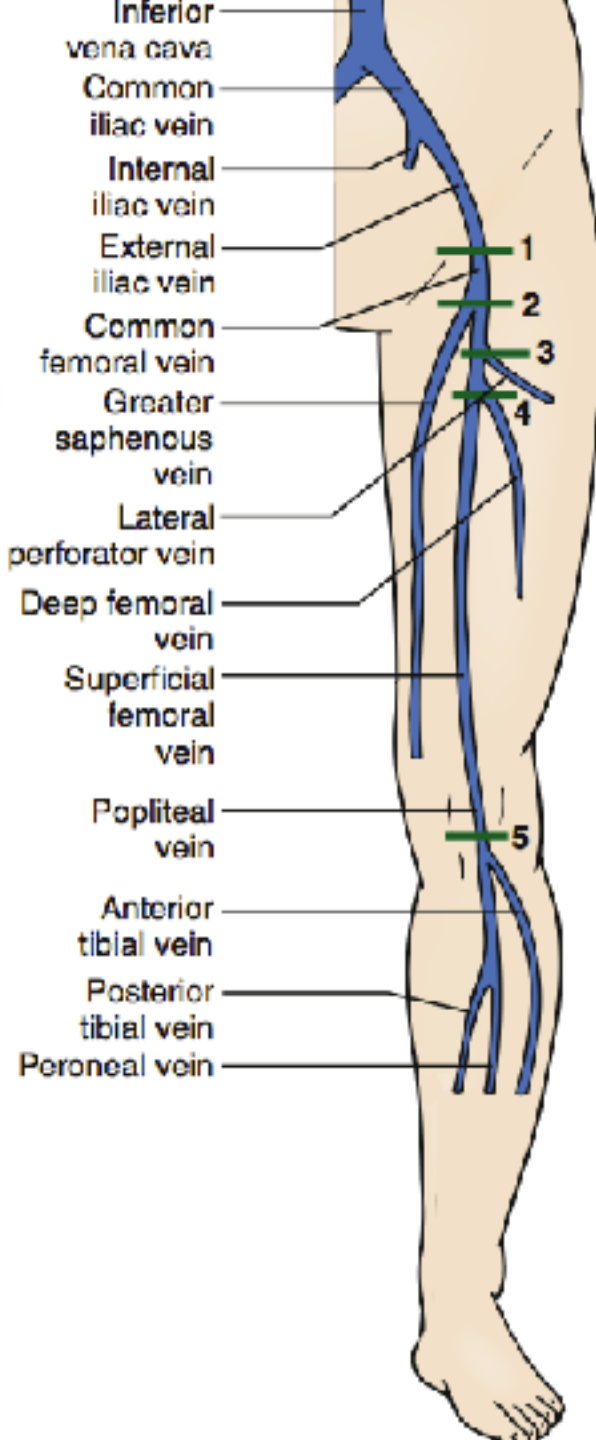
3.0cm

DVT

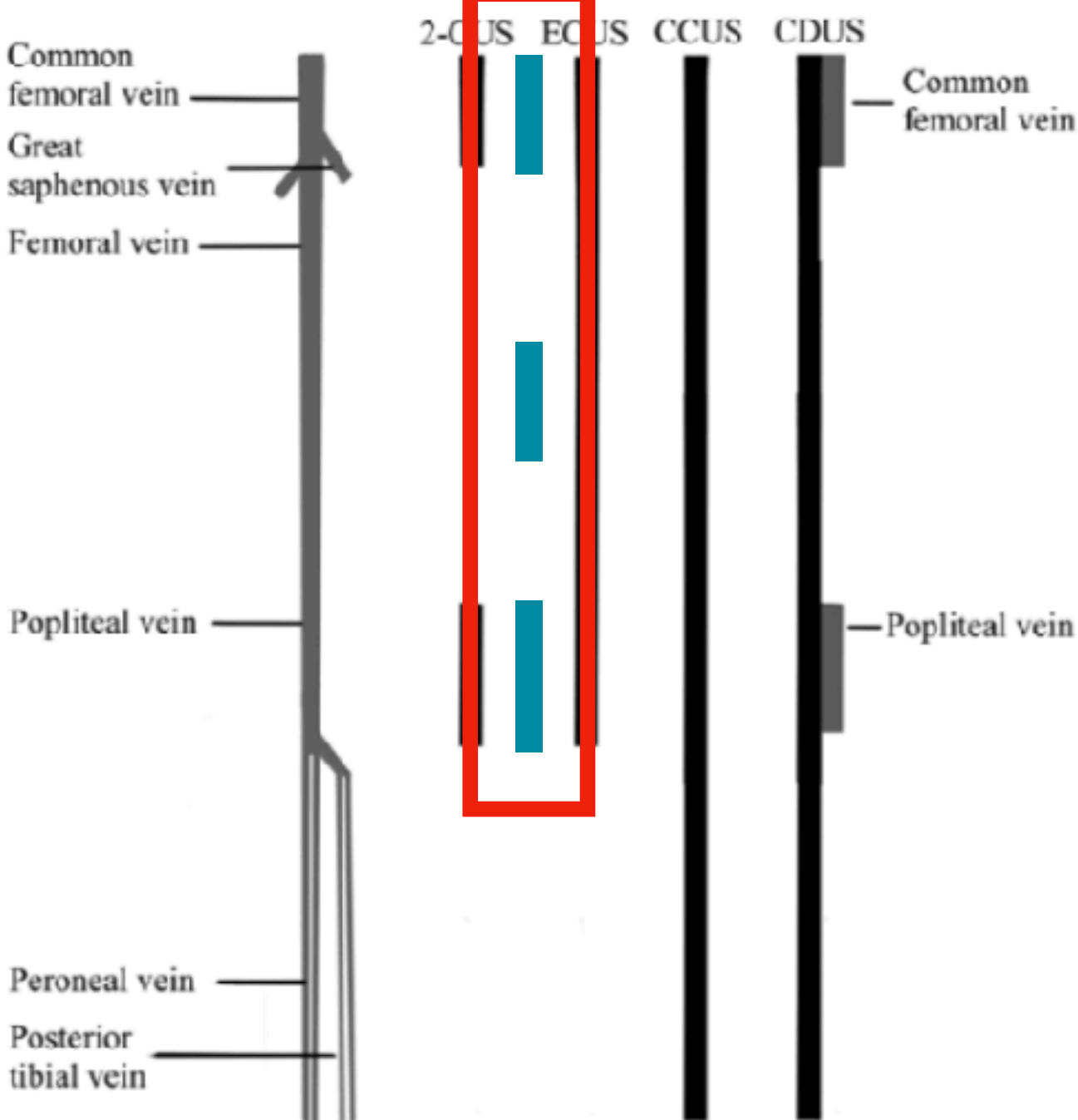


Swelling
Dyspnea
Shock

DVT



COMPRESSION US

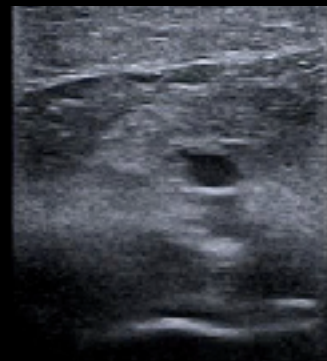
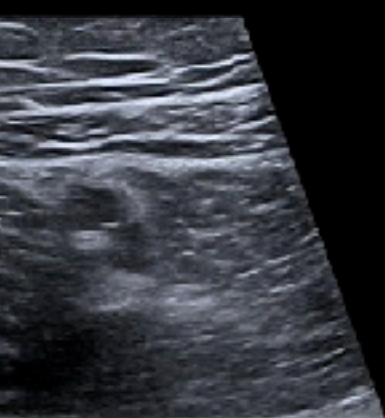
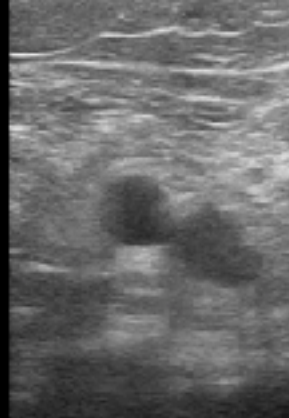


3 regions
Sen 90.57%
Spe 98.52%

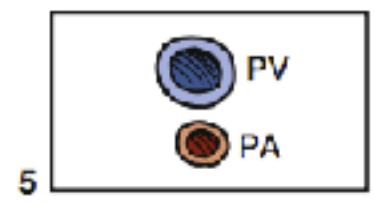
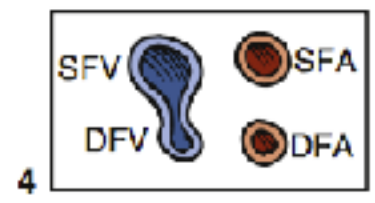
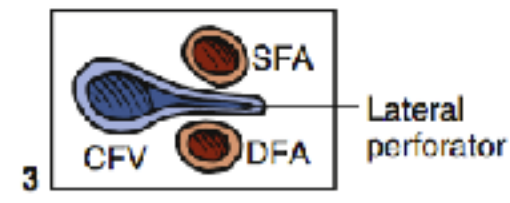
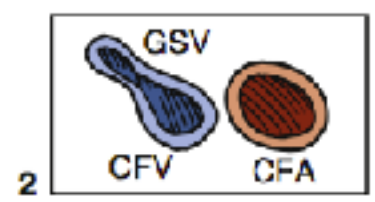
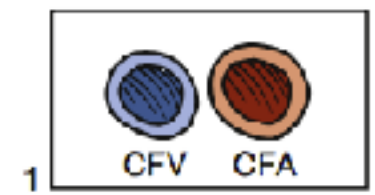
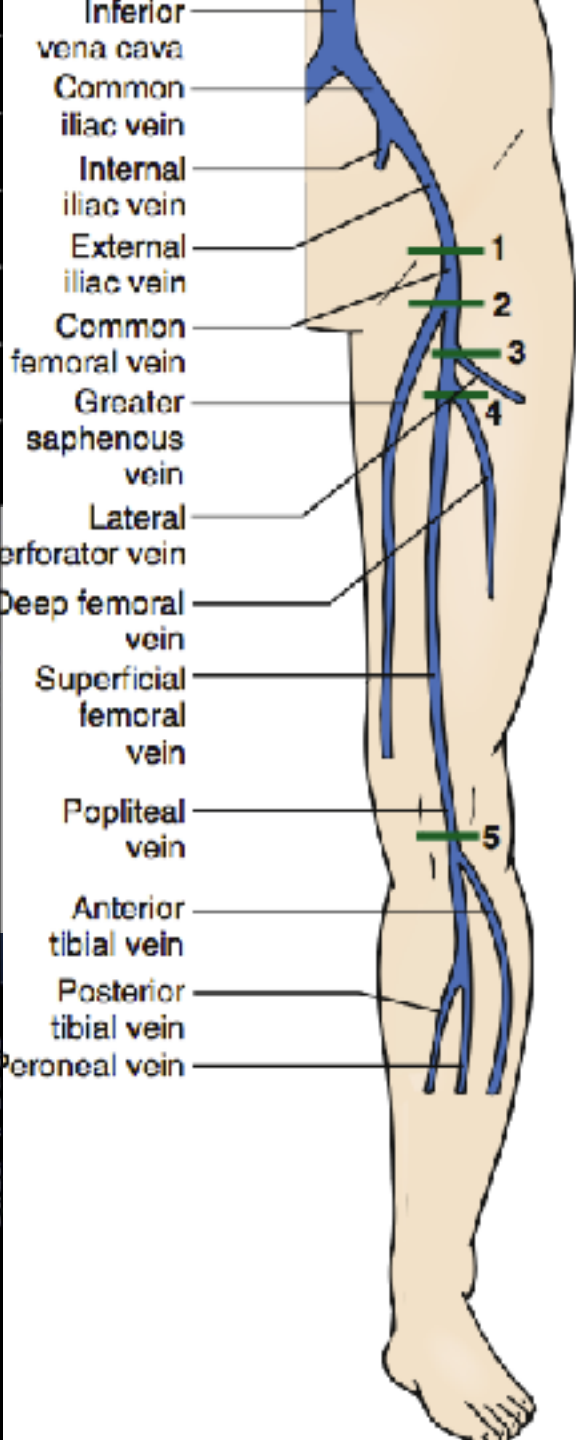
2 regions
Sen 82.76%
Spe 98.52%

Heather Hale, MD

0cm
Gen
n 32
41
7/3/12

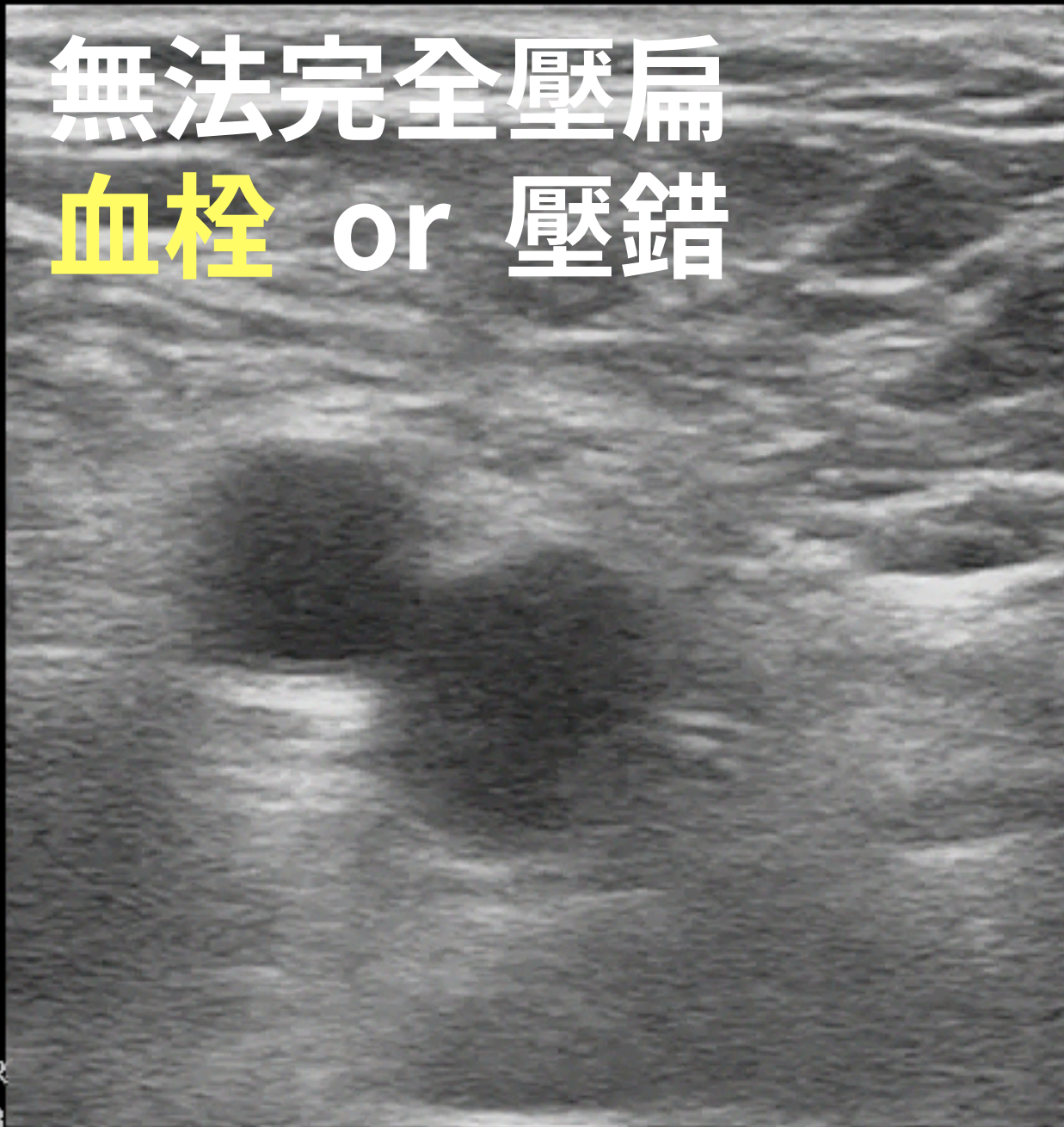


6.0cm
MI 1.5
11L4
dWT0.0
25 fps
G86
DR.80
A10
P3

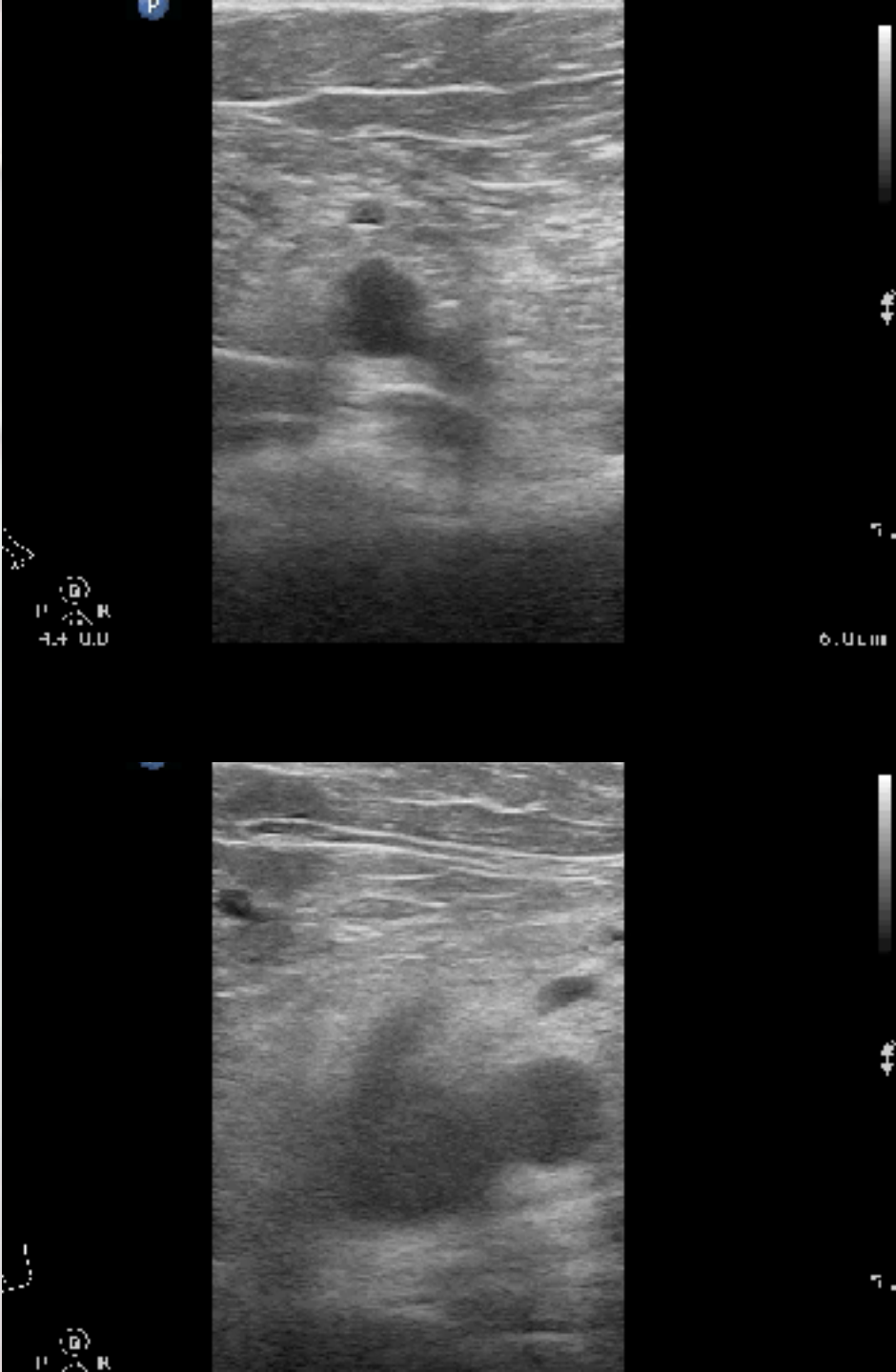


P

無法完全壓扁
血栓 or 壓錯



G
P R
4.4 8.8



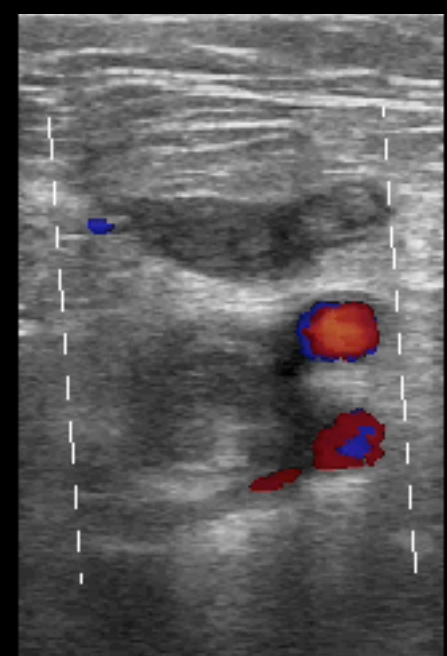


P
R
4.1 8.8

P
R



6.0cm



7.0
cm/s
-7.0

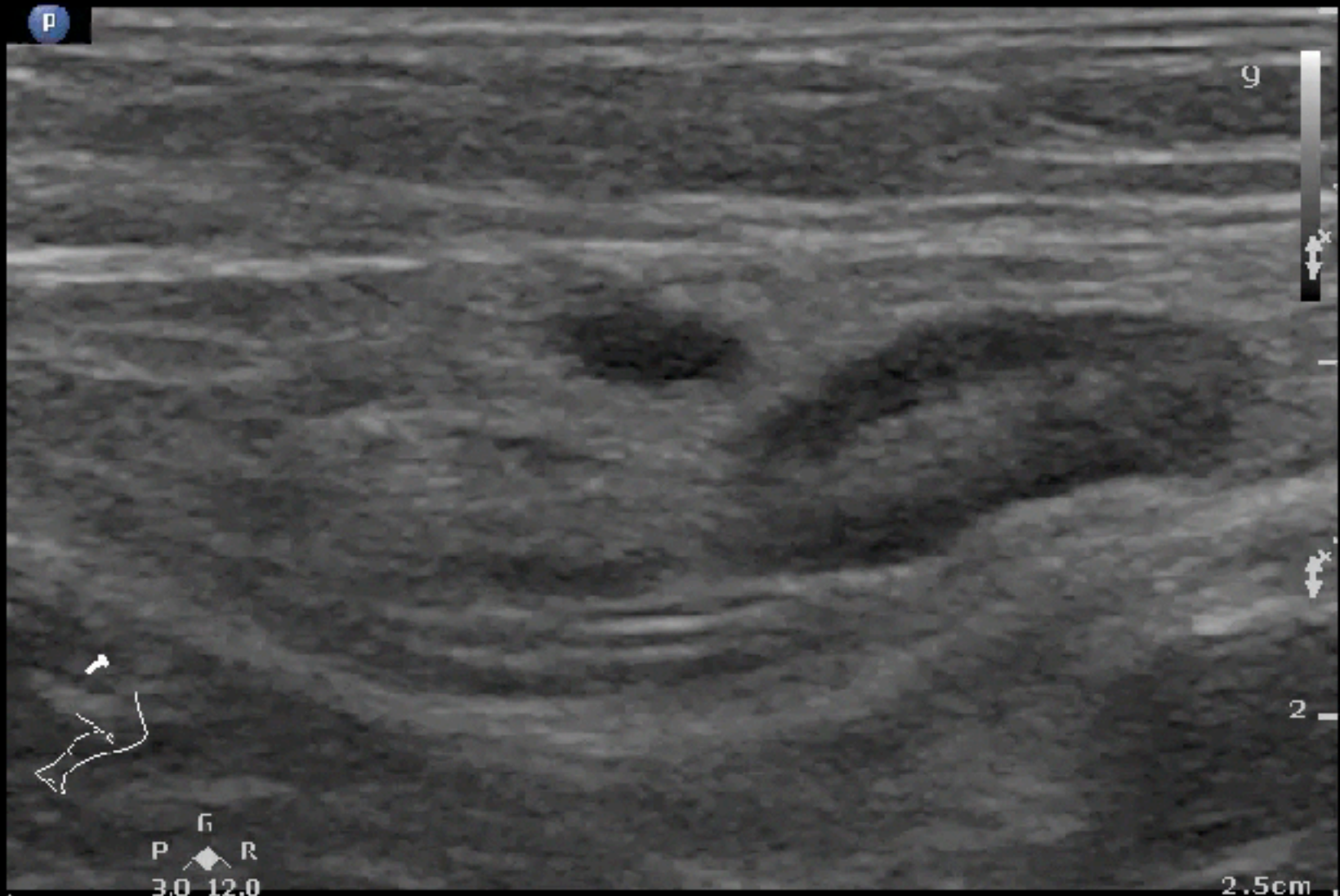
DVT ?

Superficial

L12-3
34 Hz
2.5cm

2D

Gen
Gn 60
C. 57
4/3/2



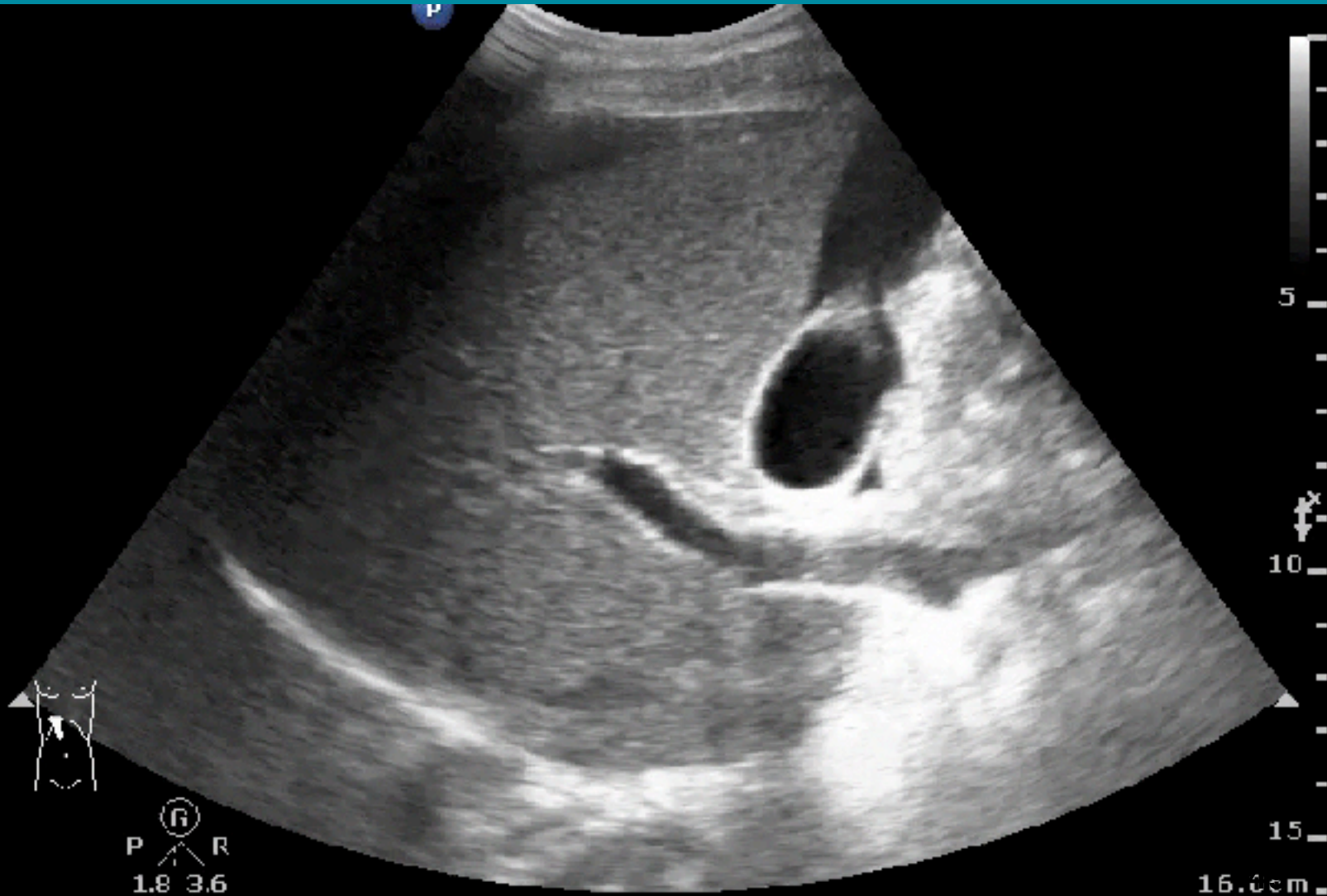
2.5cm

FAST

FOCUSED ASSESSMENT WITH SONOGRAPHY FOR TRAUMA

Abd Gen
C5-1
32 Hz
16.0cm

2D
HGen
Gn 90
C. 56
3/3/3

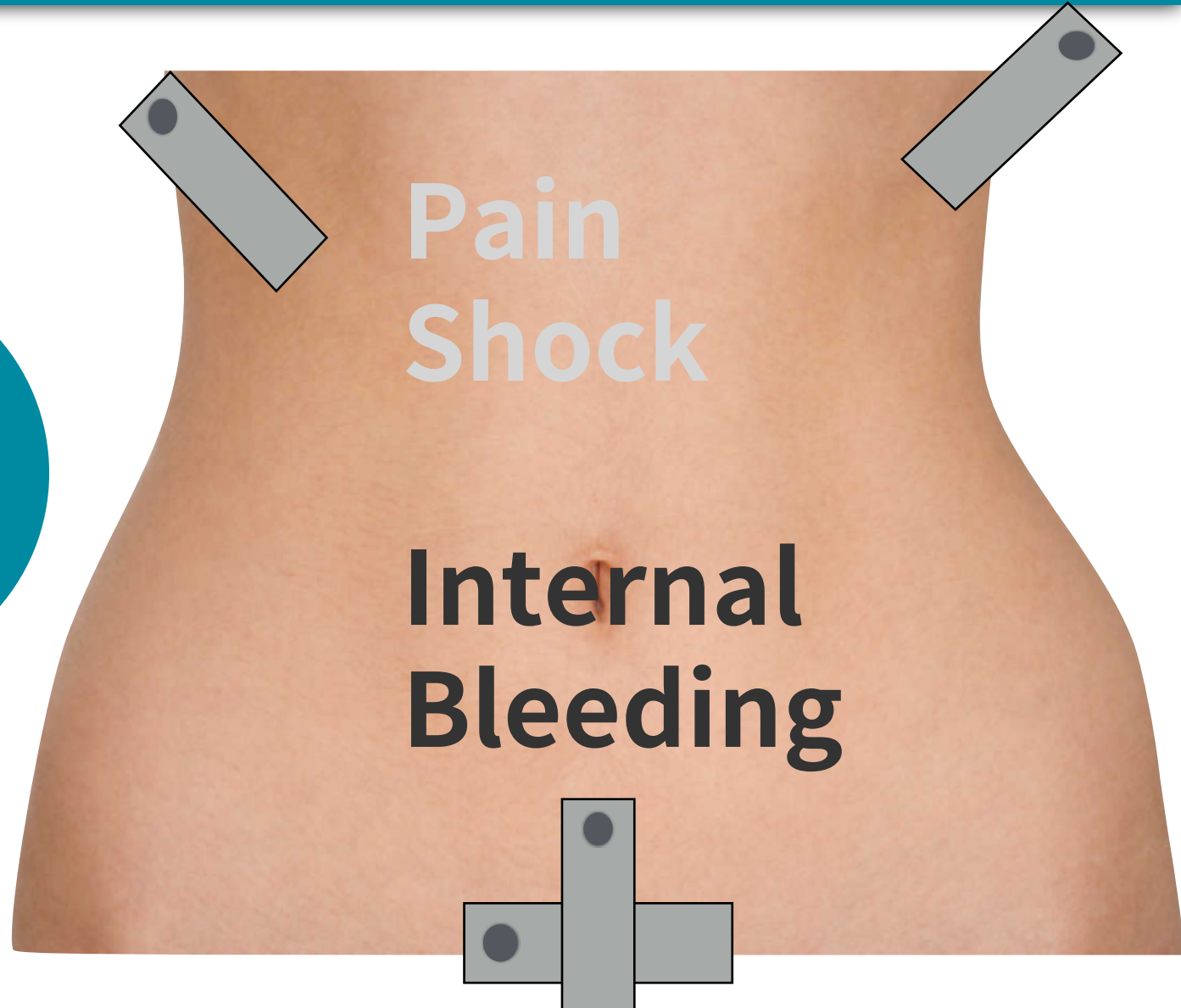




Free fluid



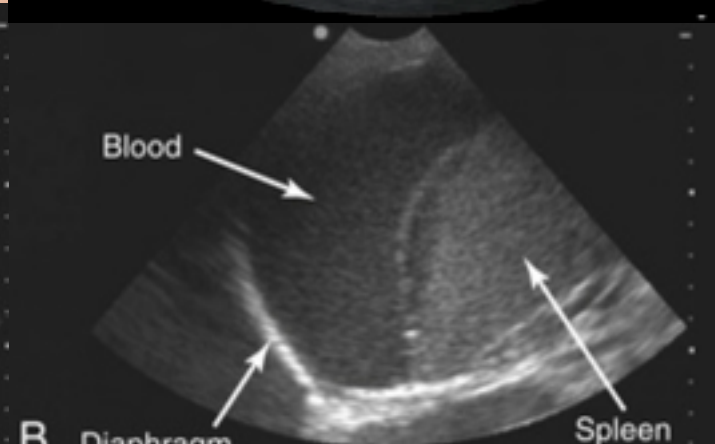
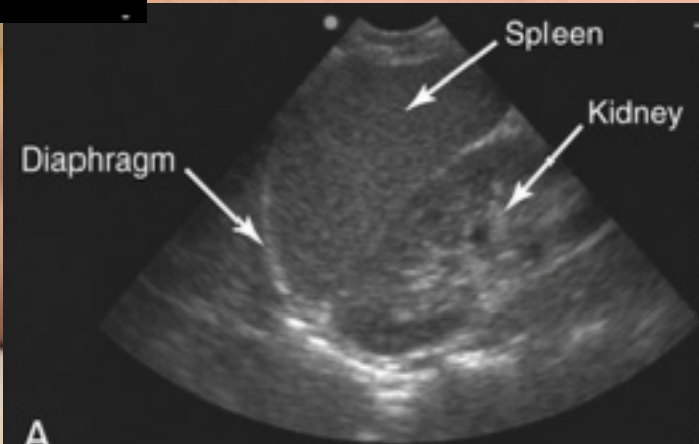
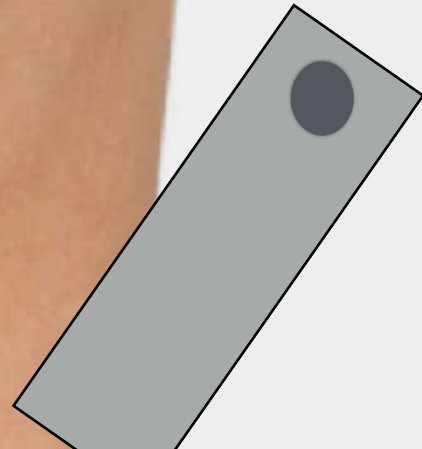
倒三角
掃描介面



劍突-腋前線交界點
平行肋間掃描以避開肋骨
第一目標:肝腎介面(Morrison's pouch)
第二目標:橫膈膜

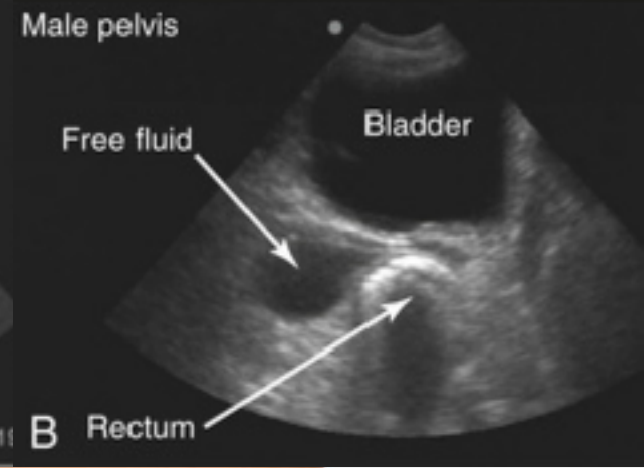
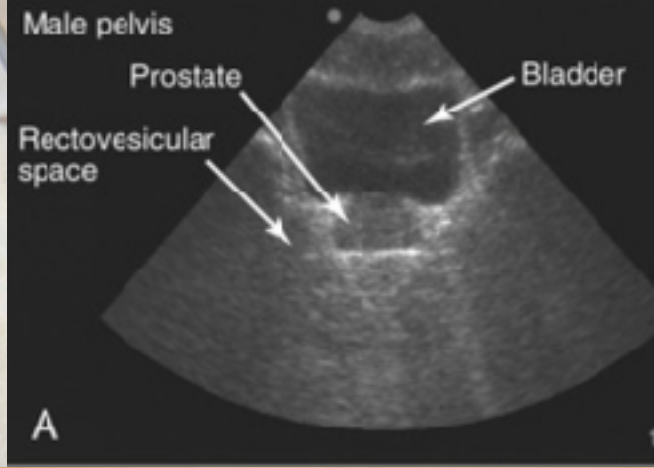


劍突-腋後線交界點
平行肋間掃描以避開肋骨
第一目標:橫膈膜下
第二目標:脾腎交界

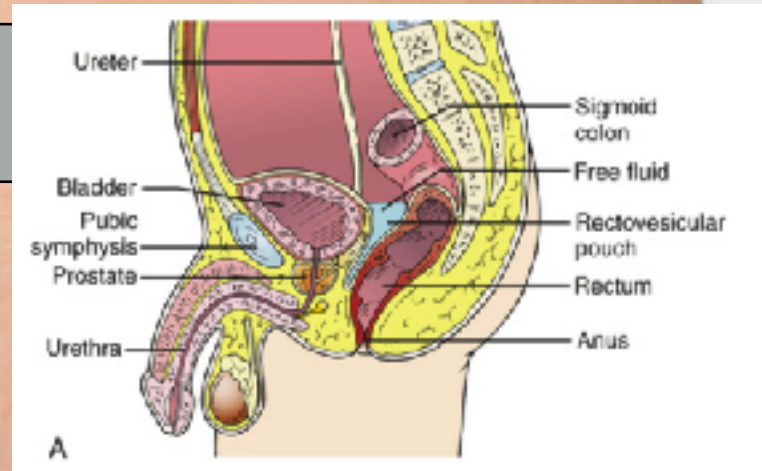


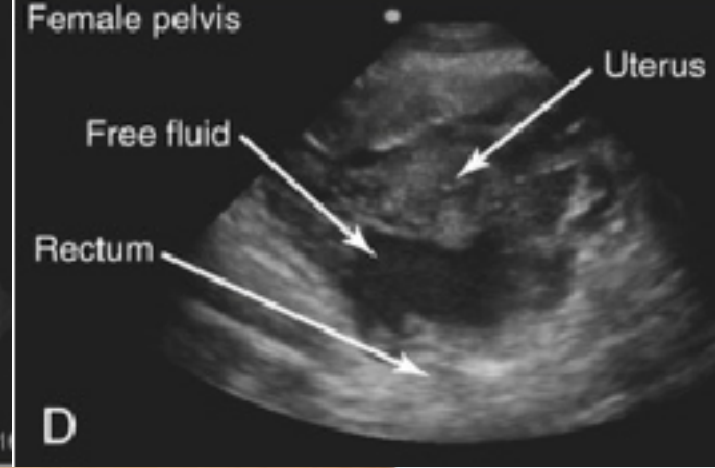
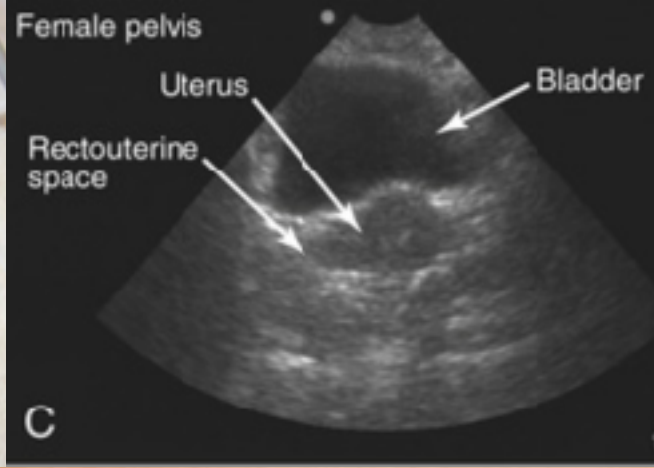
A

B

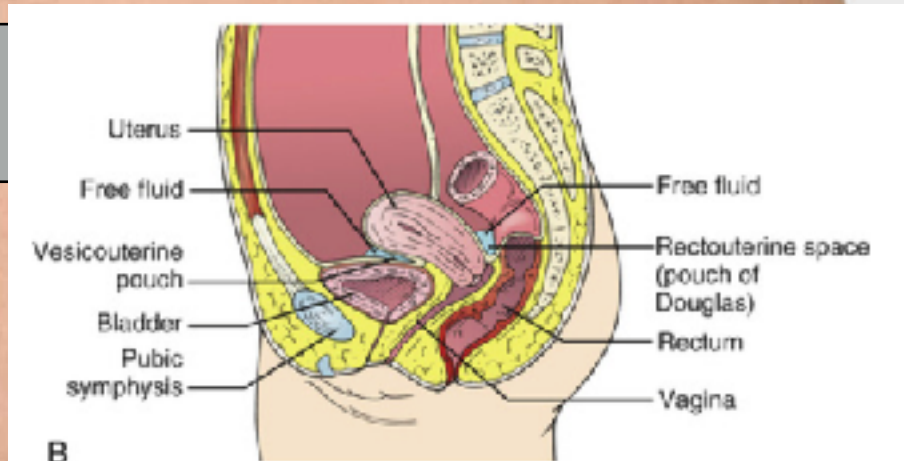


恥骨聯合上方
Tilt探頭進行掃描
要有好的視窗(尿液)
主要目標: 膀胱下方

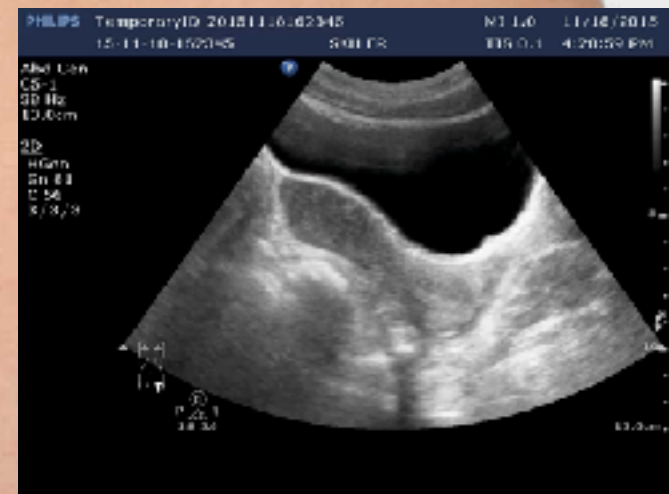
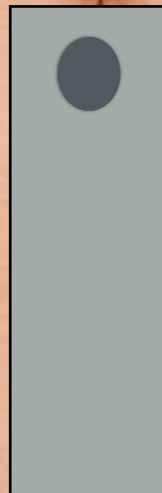




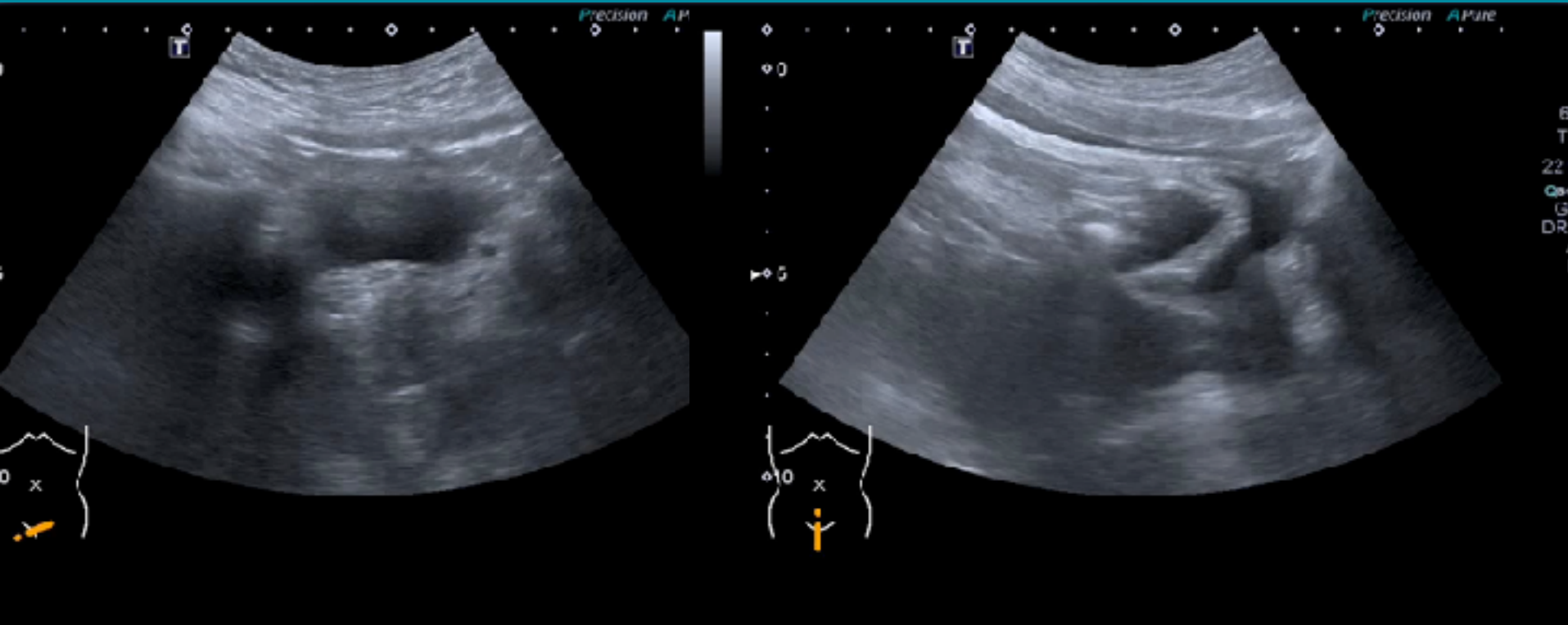
恥骨聯合上方
Tilt探頭進行掃描(頭腳)
要有好的視窗(尿液)
第一目標:子宮下方
第二目標:膀胱子宮間



恥骨聯合上方
Tilt探頭進行掃描(左右)
要有好的介面(尿液)
第一目標:子宮下方
第二目標:膀胱子宮間
男:膀胱下方

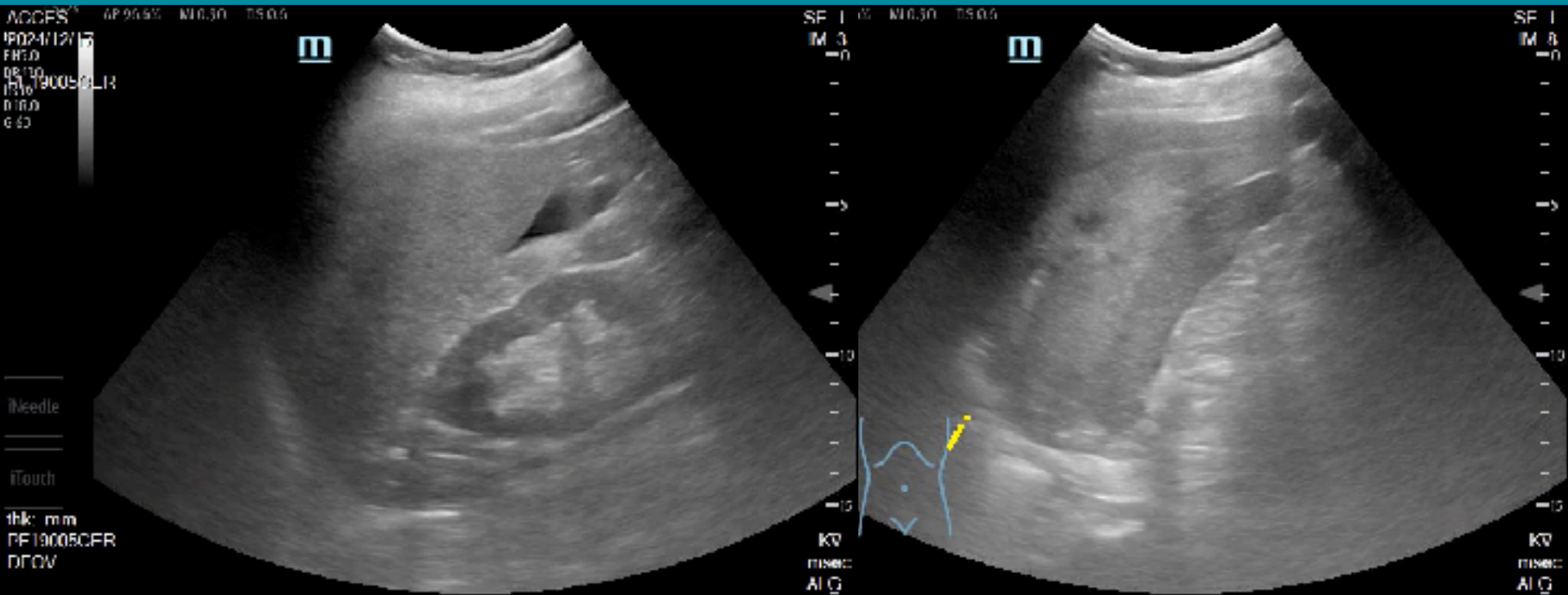


Free fluid ?



Transverse + Sagittal views = Standard

Trauma



腹腔積液Free fluid



有無游離液體

患者姿勢
患者體形
積液來源
經過時間
影像品質
掃描技術

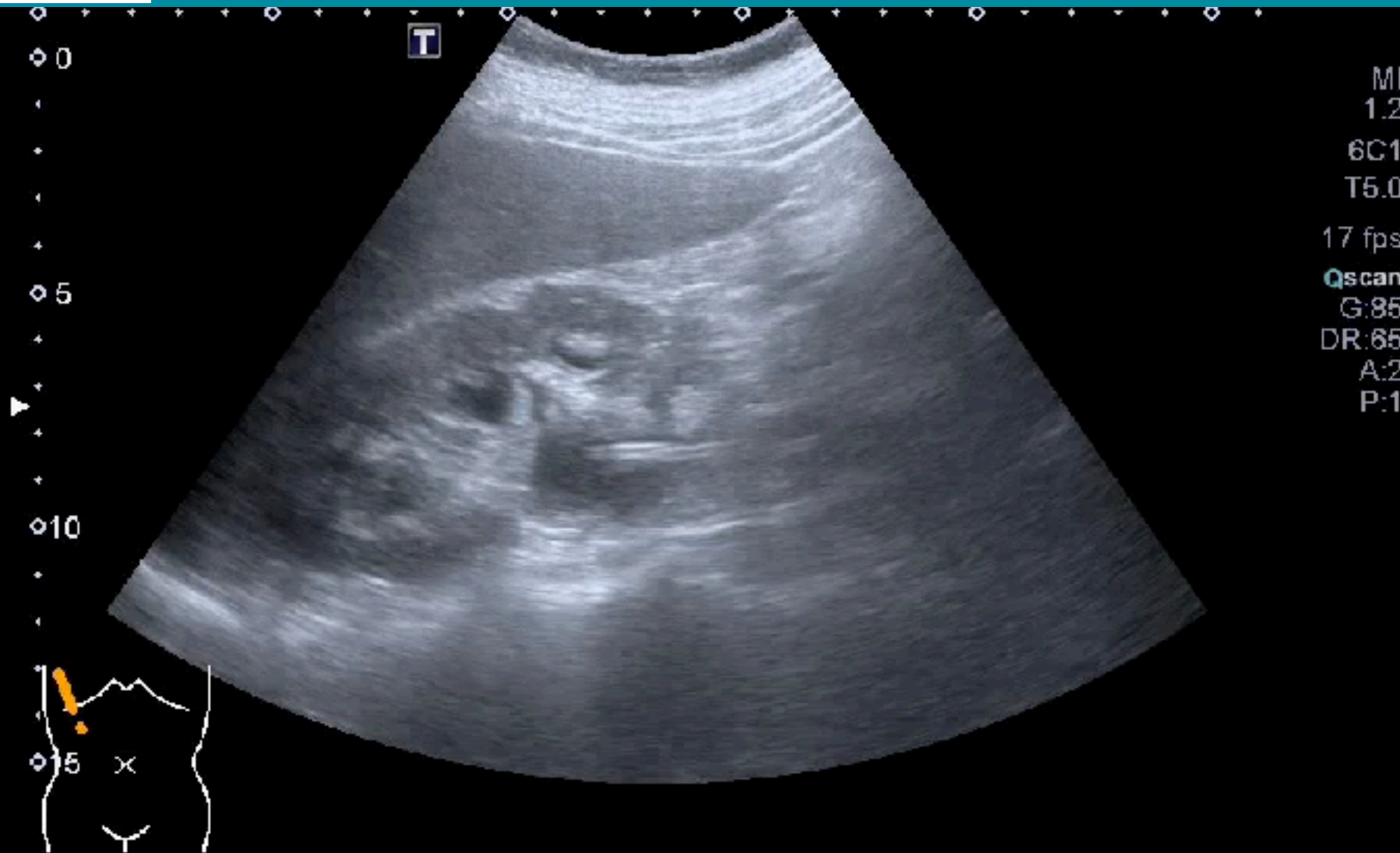
增加介面

增加頻次

替代影像



KIDNEY



KIDNEY & UB



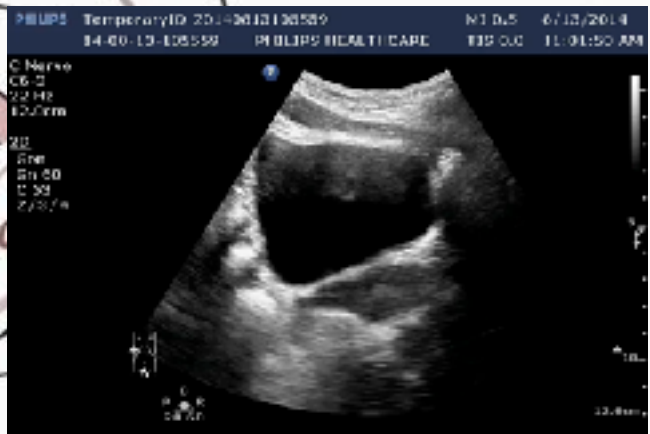
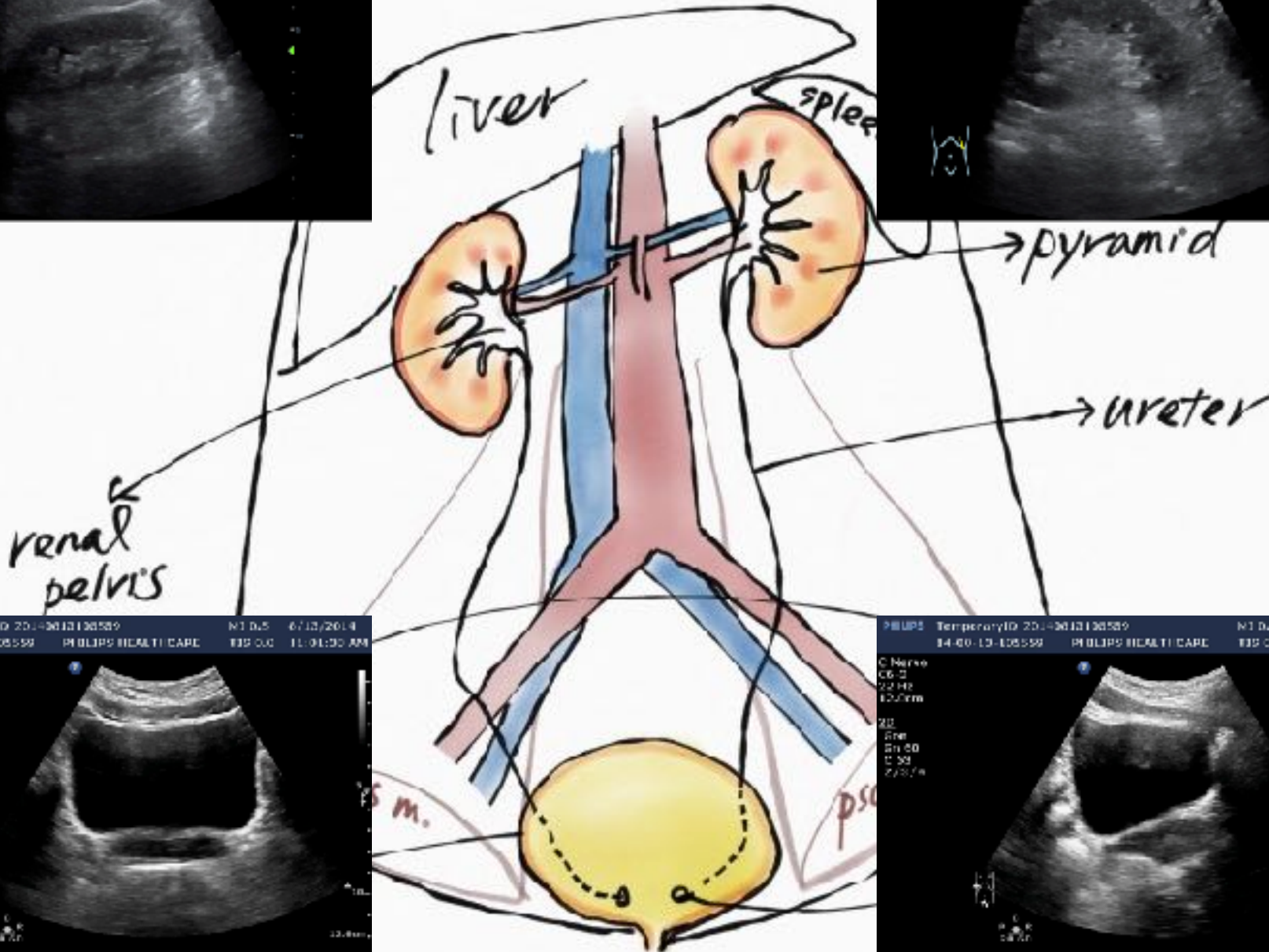
Pain
Infection
Renal failure

Obstruction

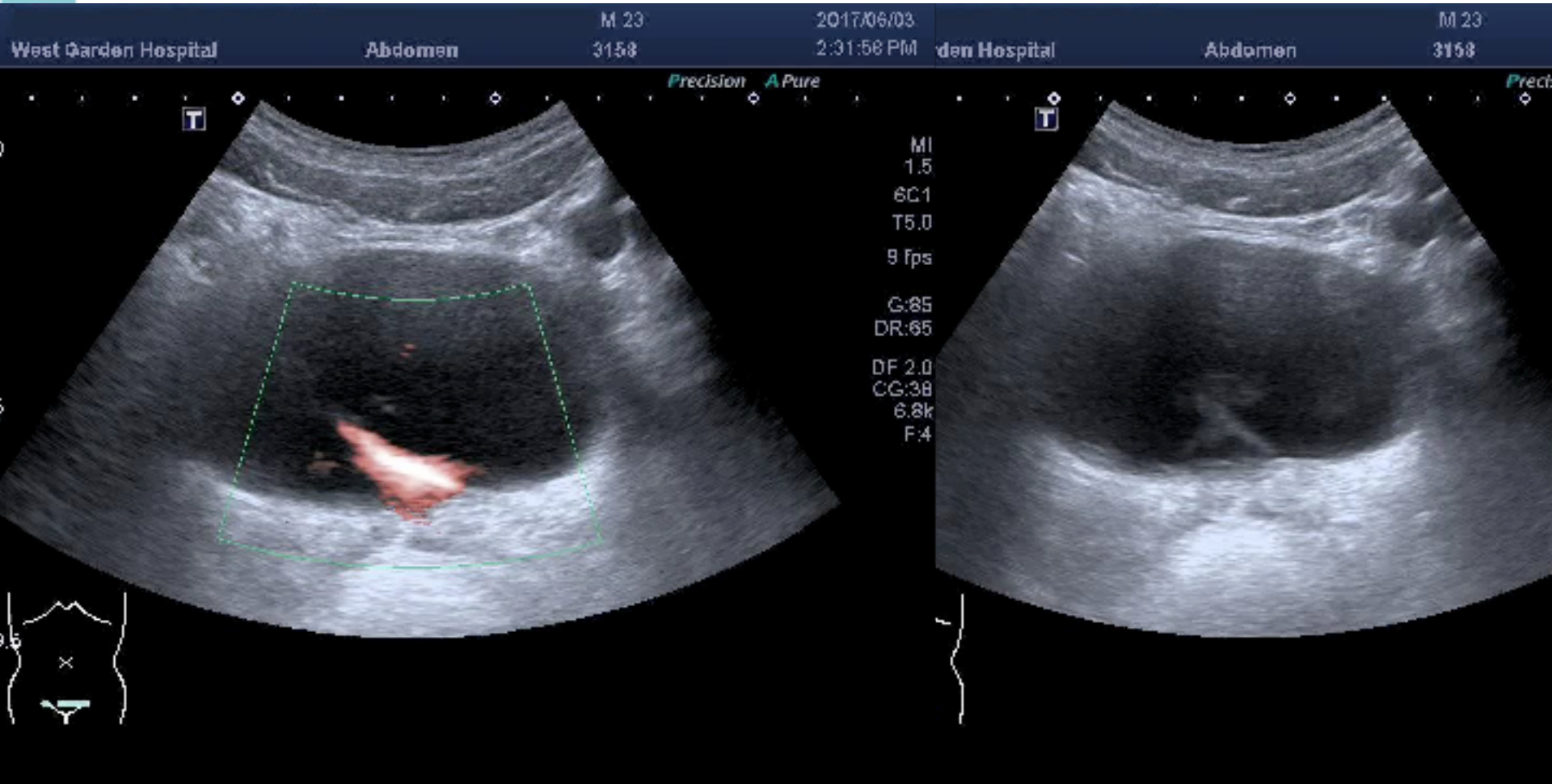
永遠要想到AAA



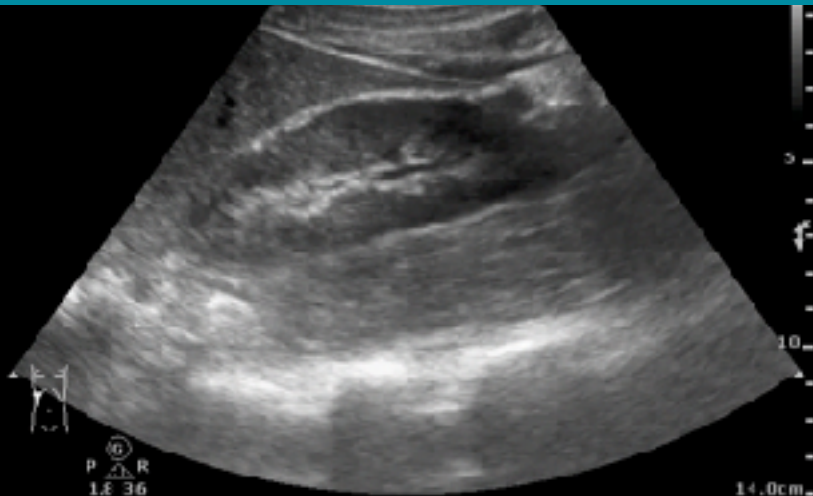
SIZE CHANG. All rights res



URINARY JET

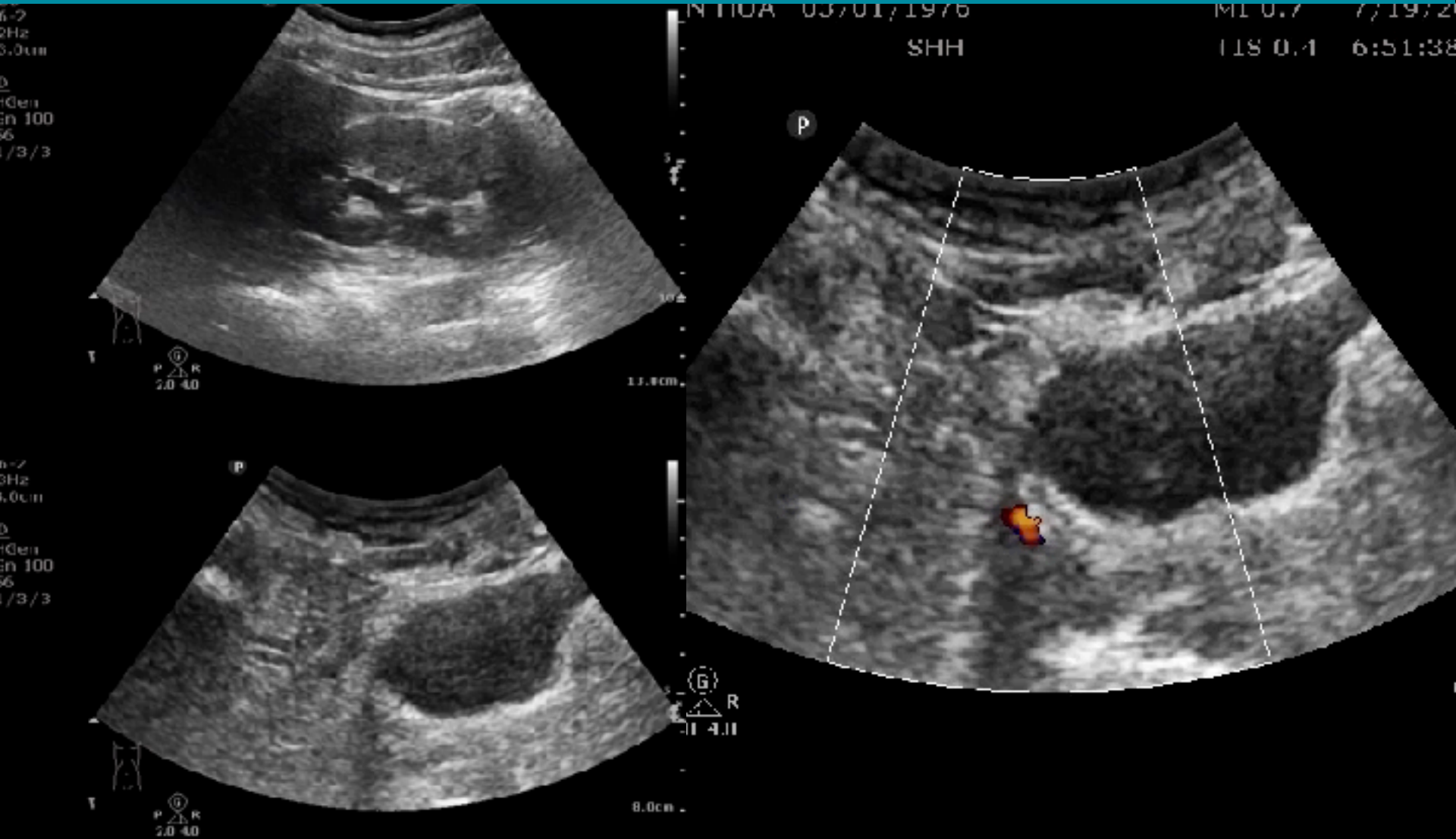


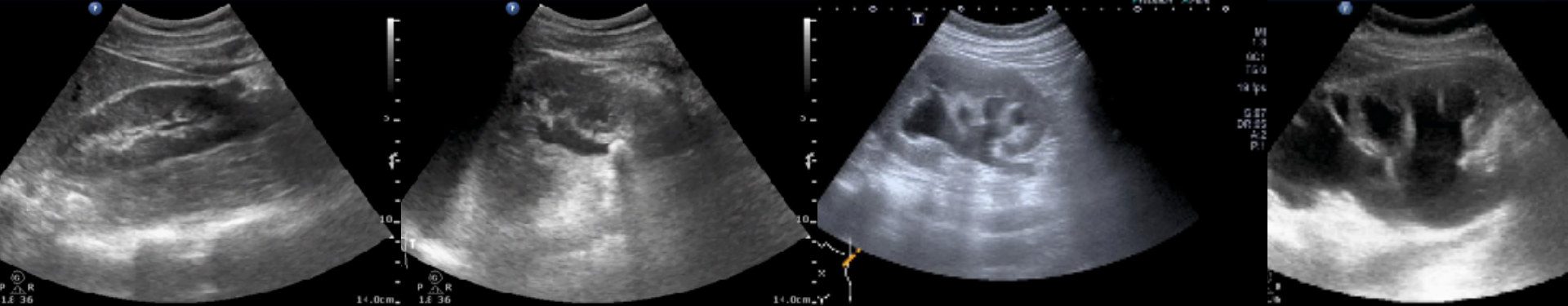
LEFT FLANK PAIN



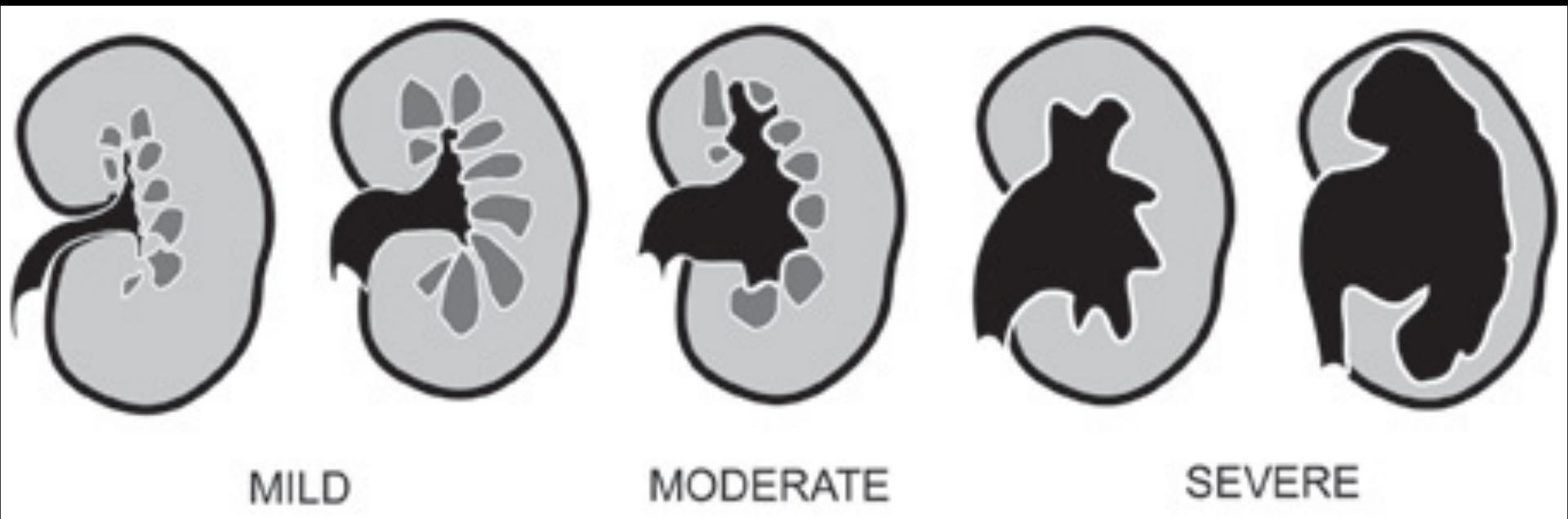
R ABDOMINAL PAIN

TWINKLING ARTIFACT





HYDRONEPHROSIS嚴重度

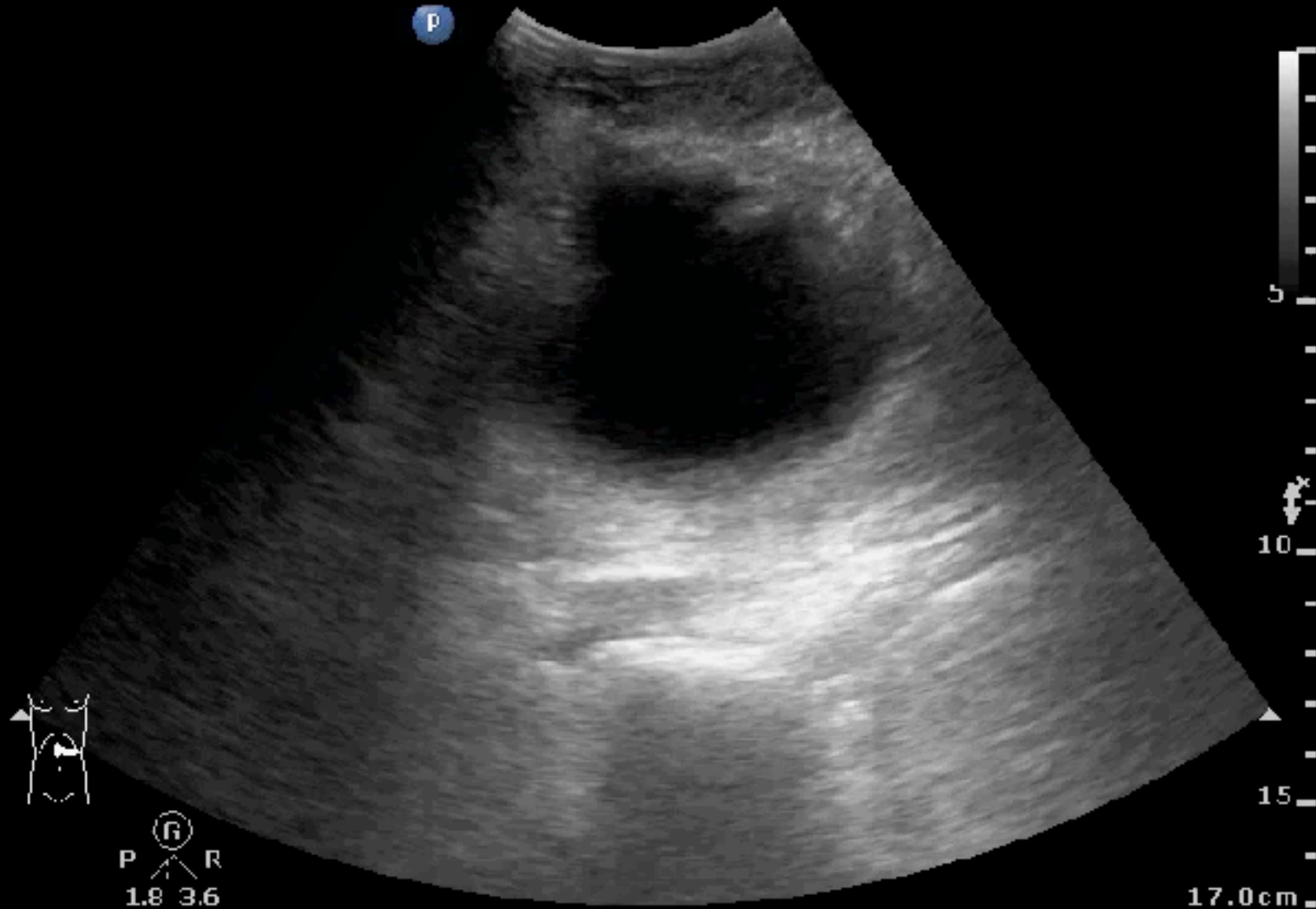


AUR

Abd Gen
C5-1
31 Hz
17.0cm

2D

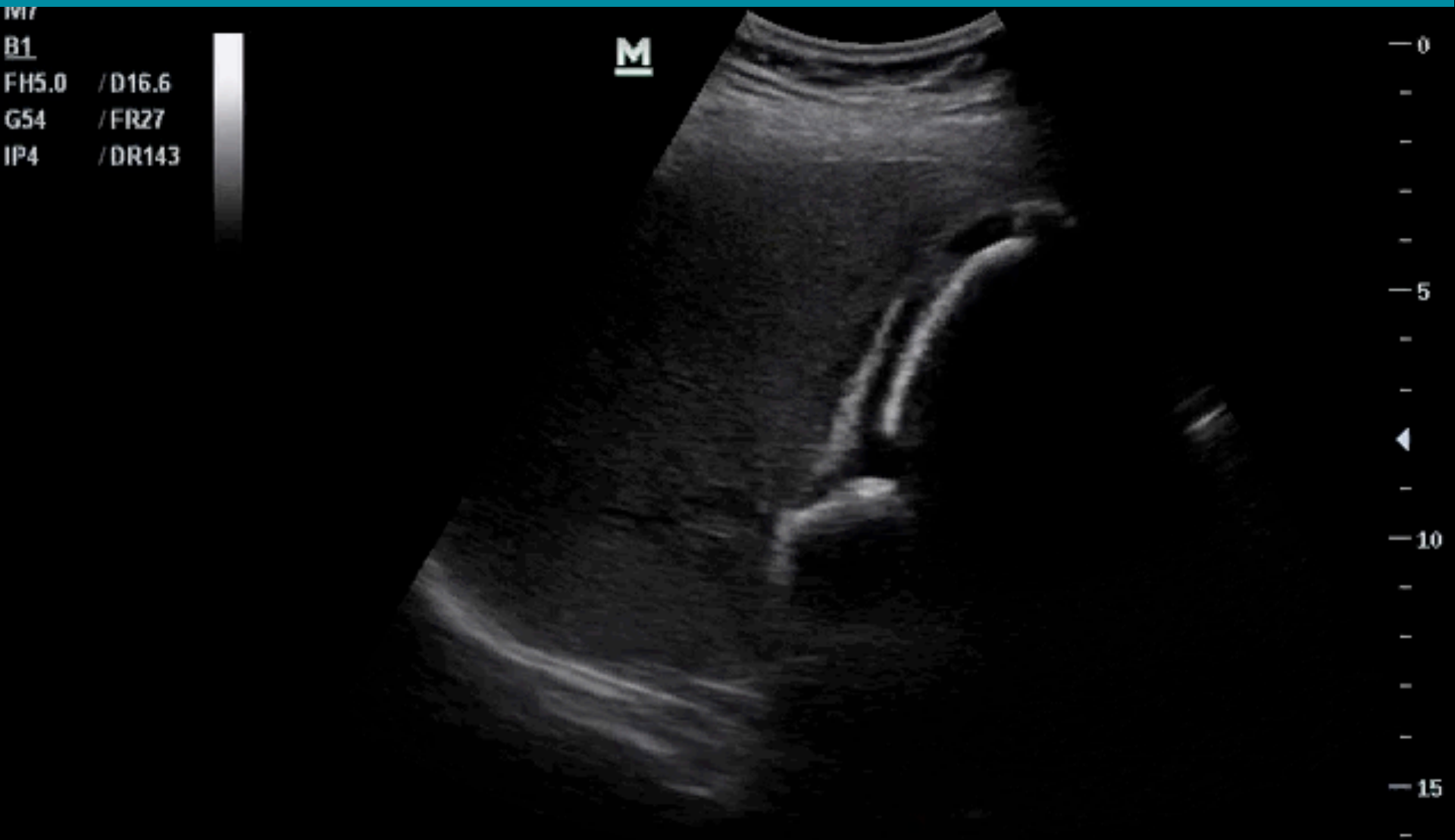
HGen
Gn 60
C. 56
3 / 3 / 3



P R
1.8 3.6

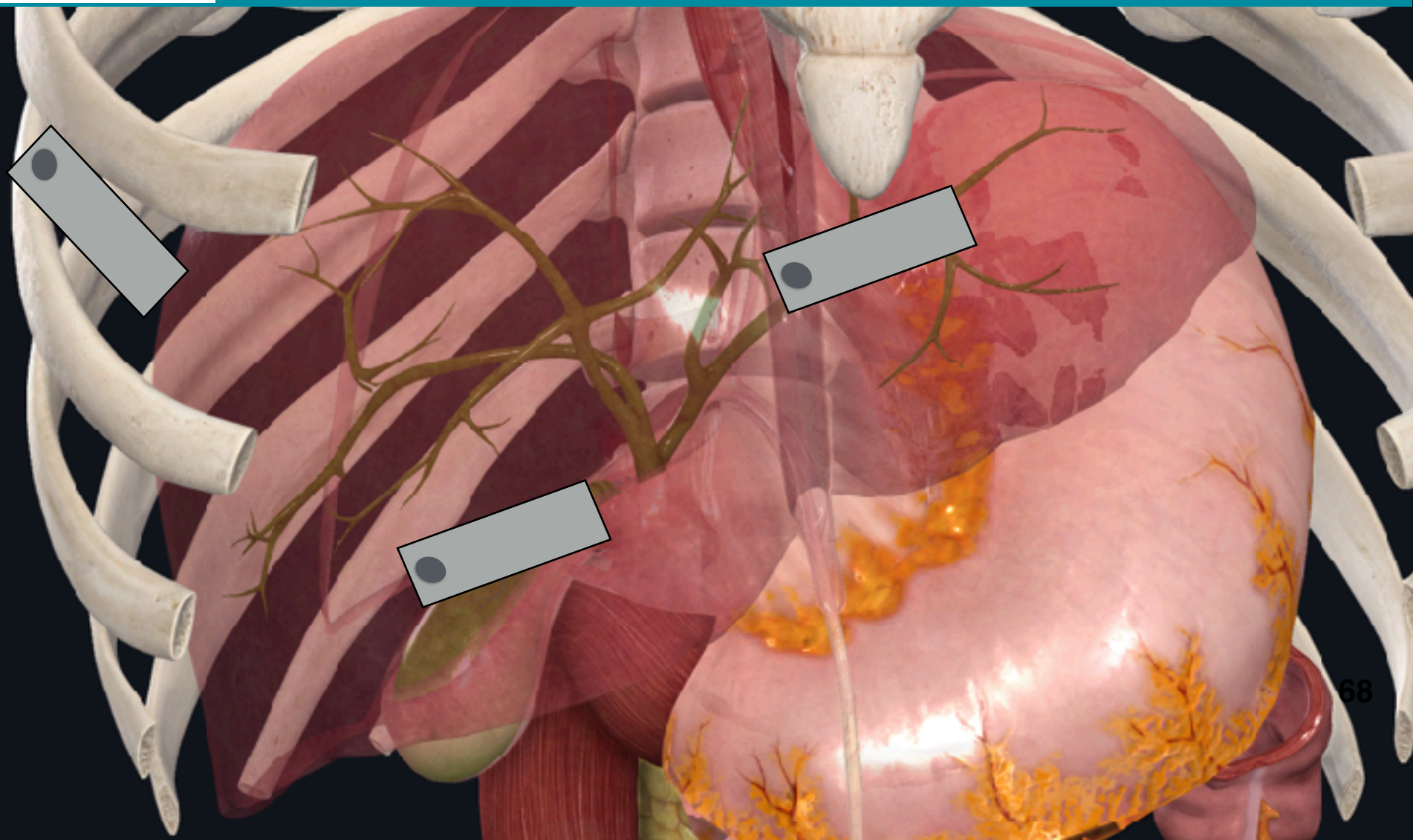
17.0cm

HEPATO-BILIARY



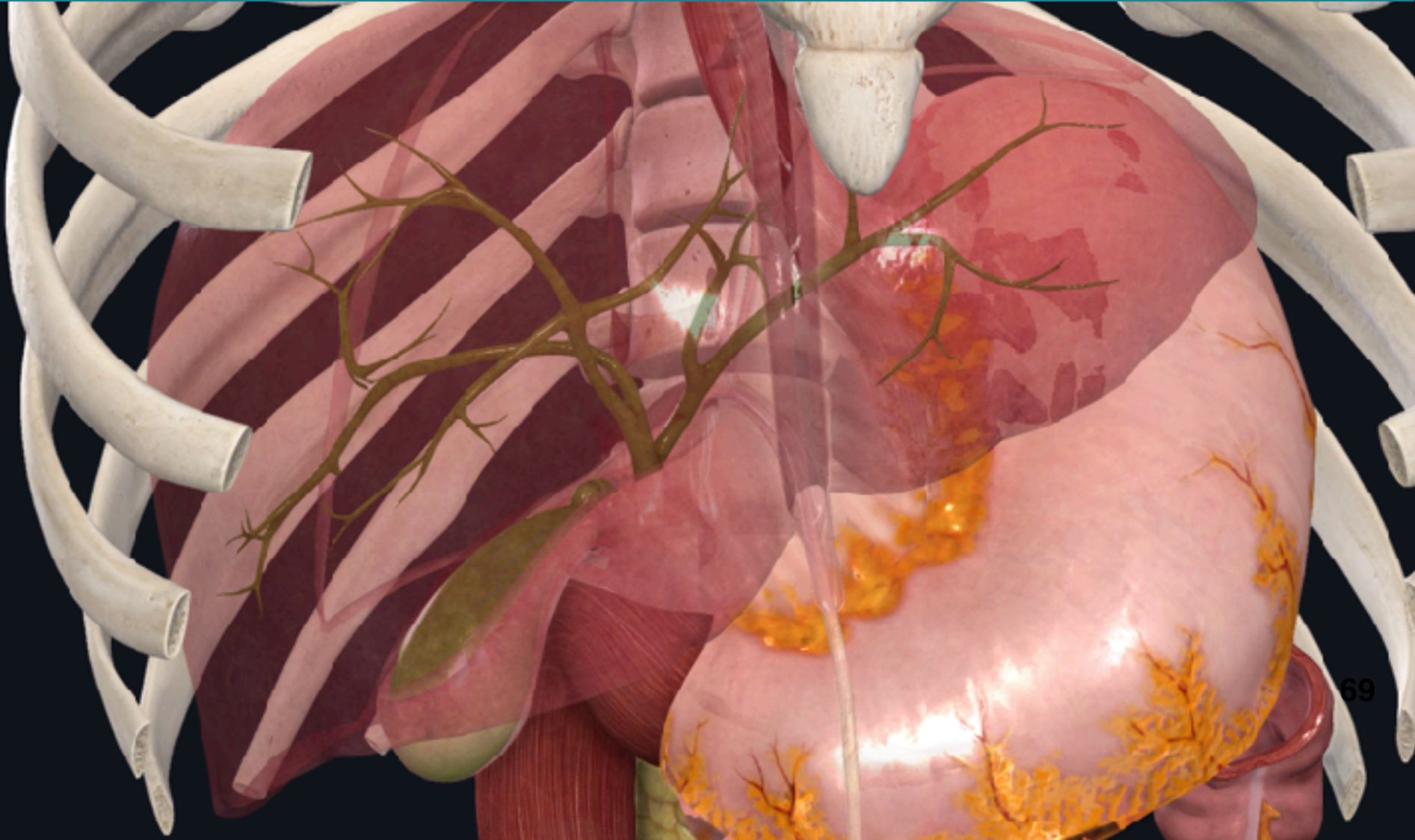


HEPATO-BILIARY





HEPATO-BILIARY



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



11.0cm

10

5



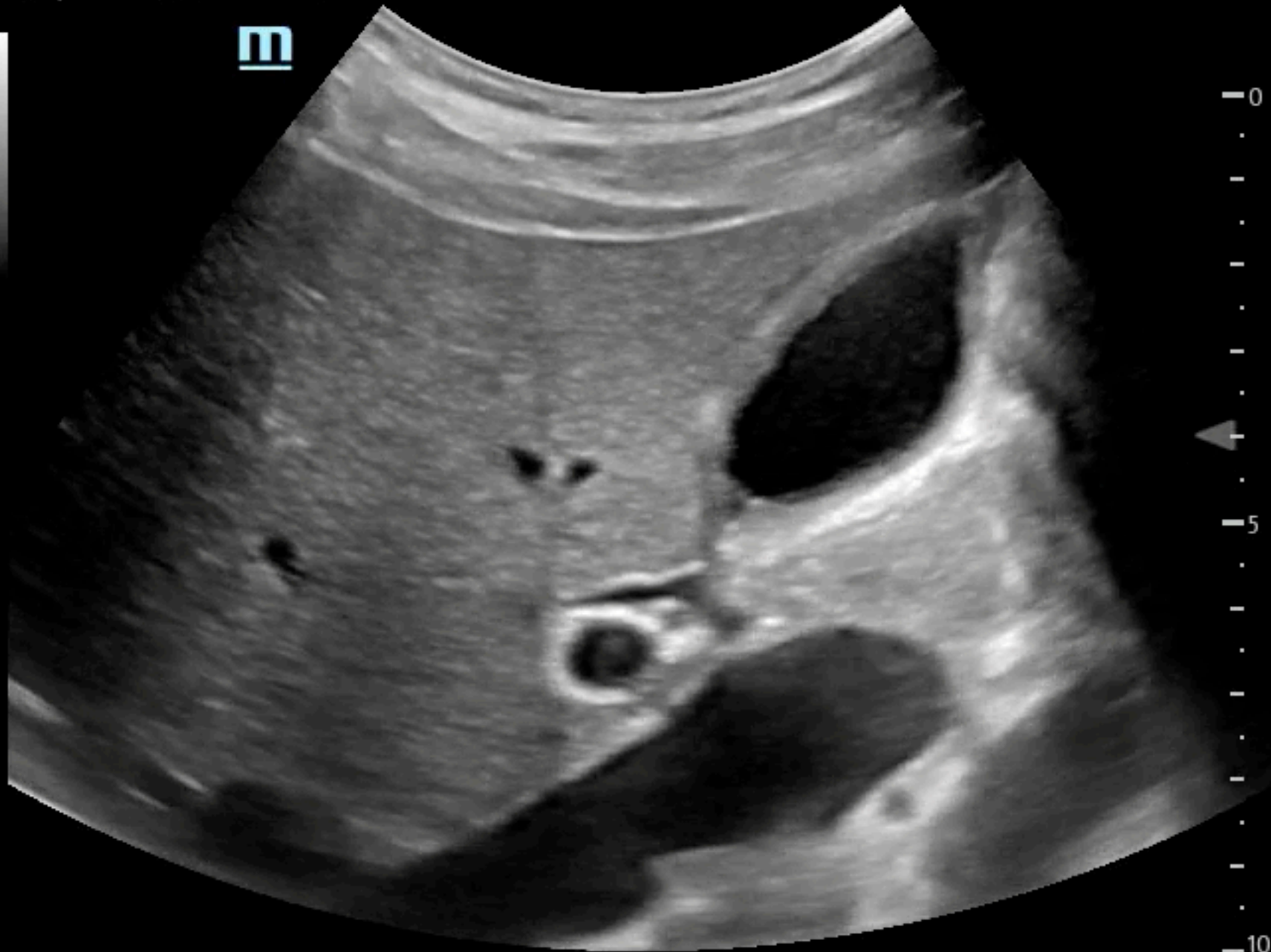
C5-2s

AP 96.6%

MI 1.04

TIS 0.5

B
FH5.0
DR 130
FR 26
D 10.0
G 56



iNeedle

iTouch

0
5
10

GB stone ?

Abd Gen
C5 1
34 Hz
15.0cm

2D
HGen
Gn 100
C 63
3 / 3 / 3



Subcostal scan
L decubitus position

GB stone / polyp / sludges



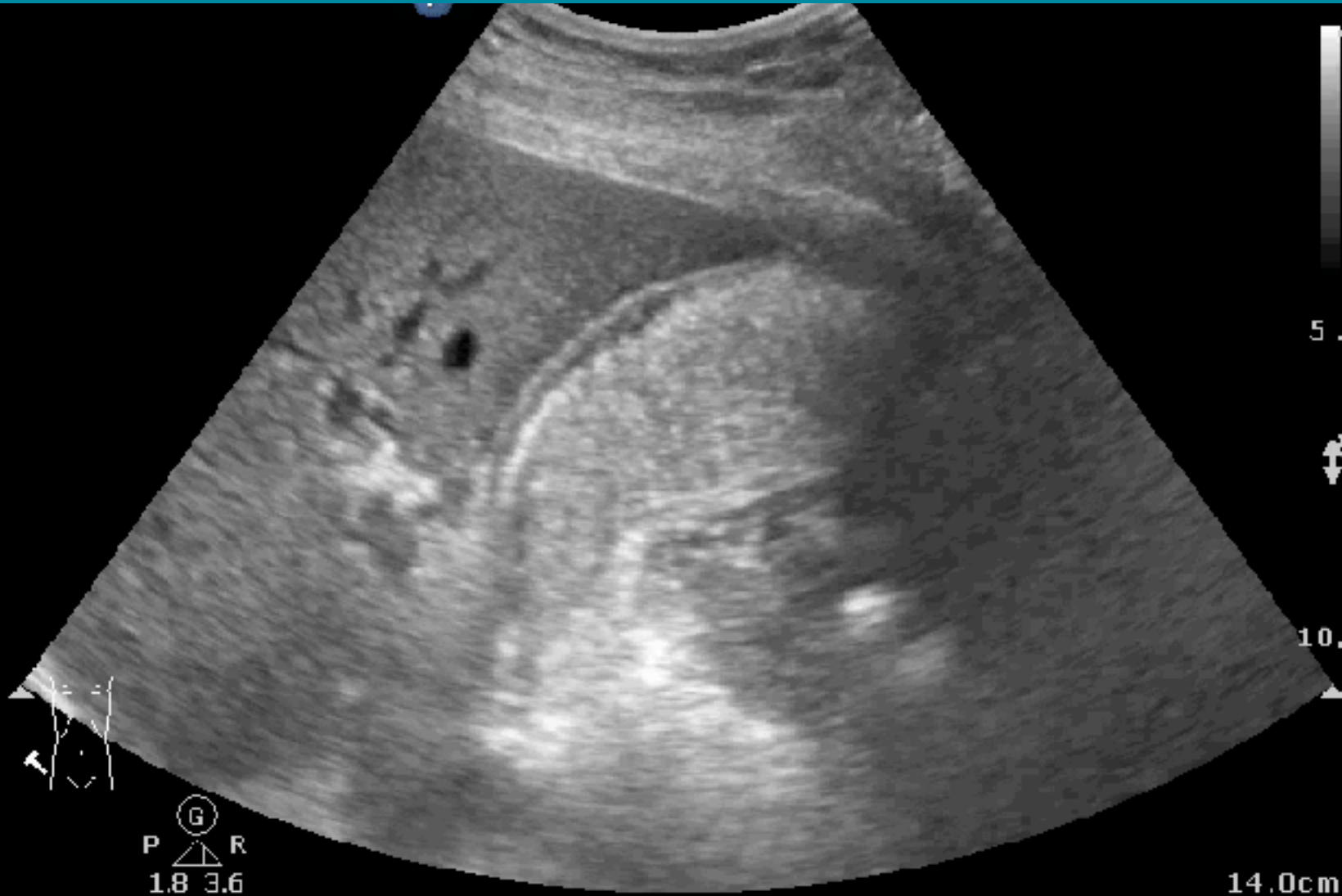
GB stone ?



GB stone ?

100.0cm
25 1
36 Hz
14.0cm

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



G
P R
1.8 3.6

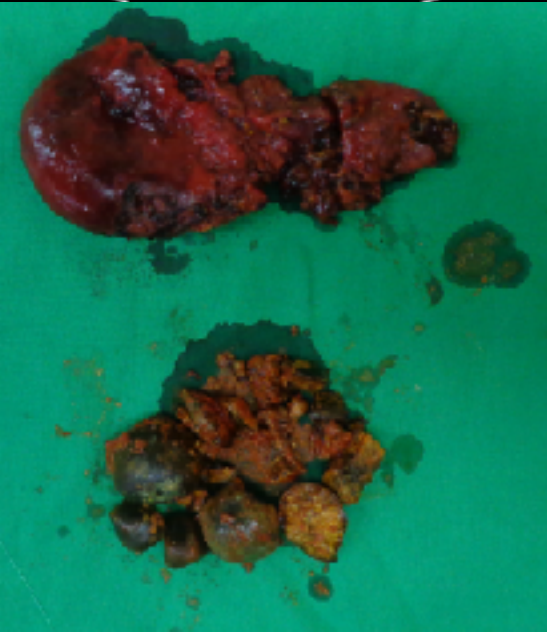
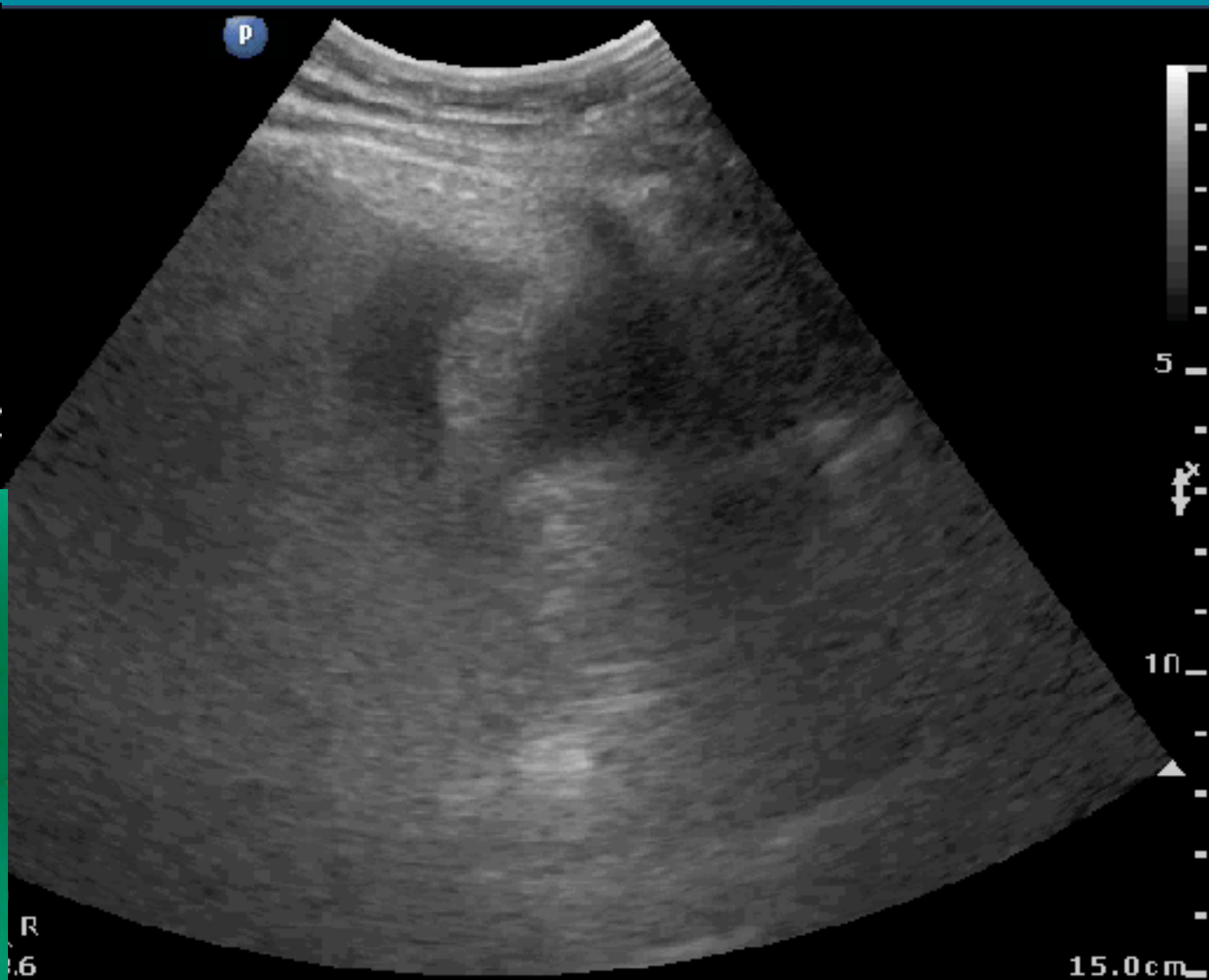
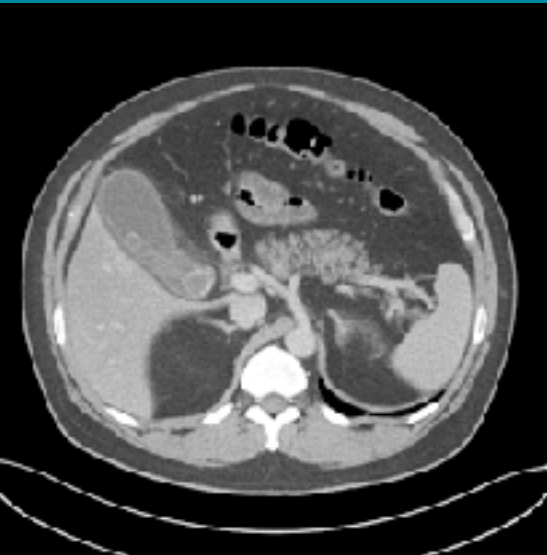
14.0cm

GB stone ?



Wall Echo Shadow (WES) sign

45M, RUQ pain & fever



R
6

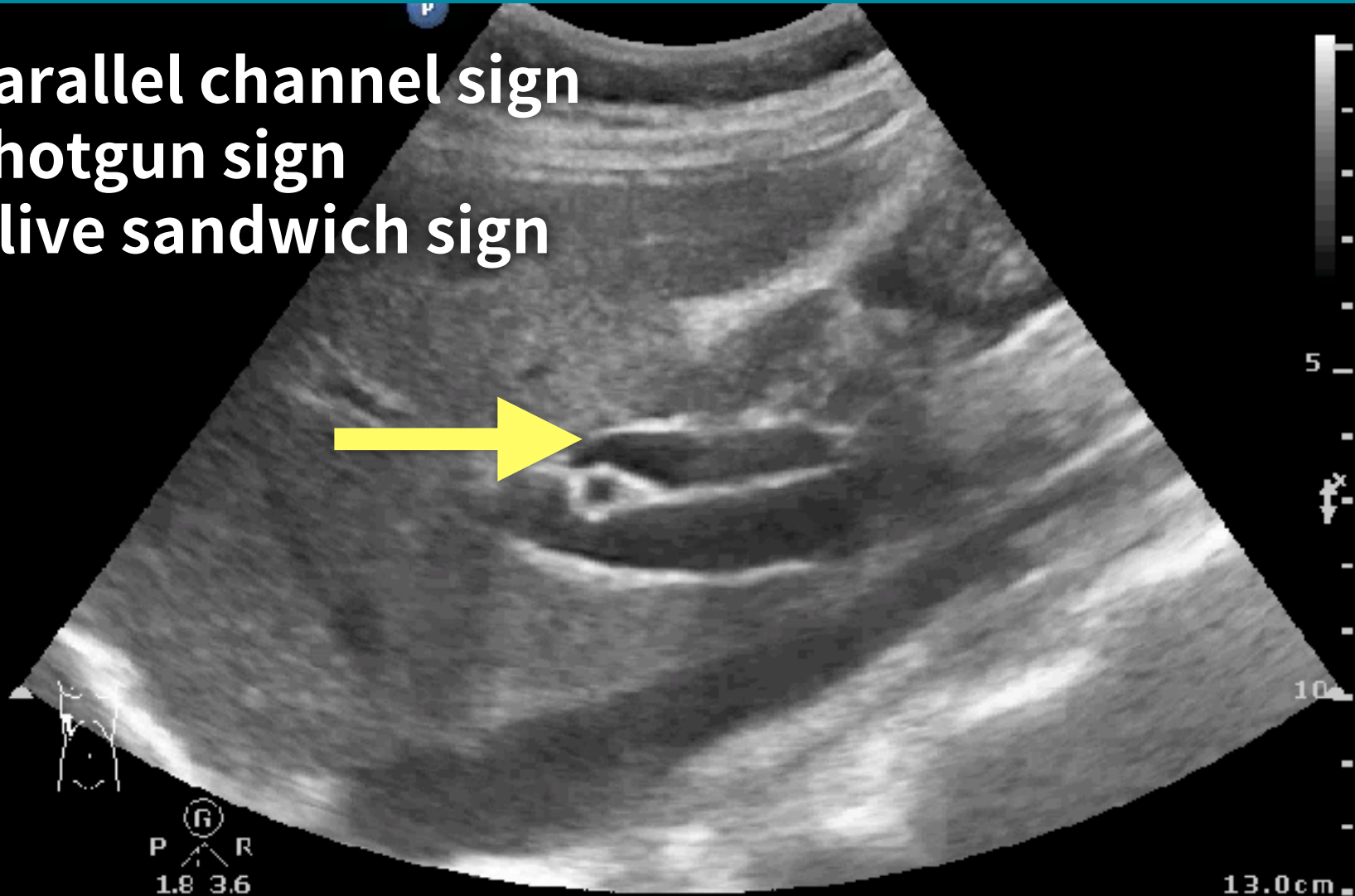
15.0 cm

Biliary dilatation ?

Abd Gen
C5-1
38 Hz
13.0cm

2D
HGen
Gn 82
C. 56
3/3/3

Parallel channel sign
Shotgun sign
Olive sandwich sign



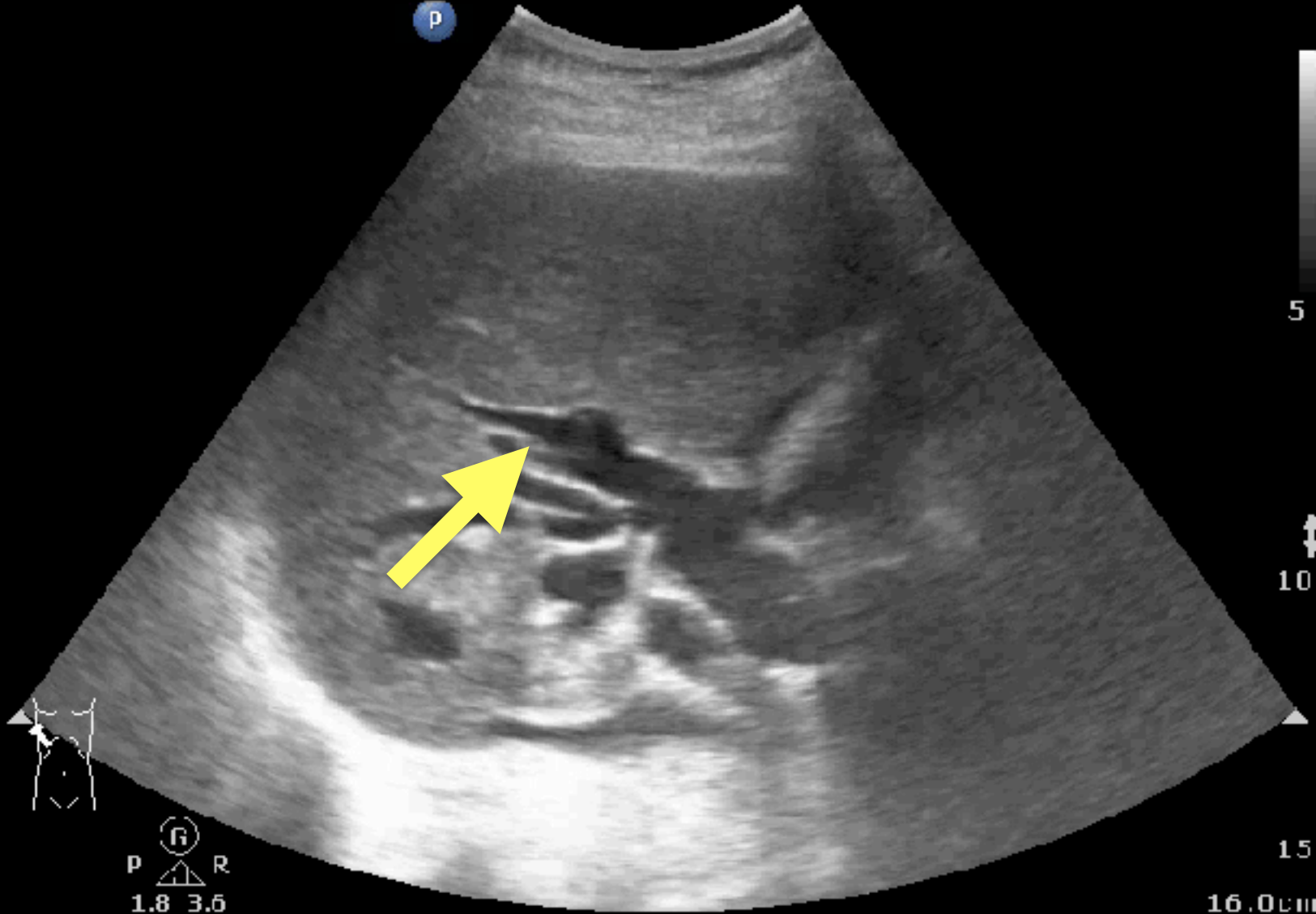
P
R
1.8 3.6

13.0cm

76F, Fever & Chills Biliary dilatation ?

Abd Gen2
C5-1
2 Hz
6.0cm

D
HGen
Gn 100
C 56
3/3/3



TE7 ACE
Liver

20241129-180534-28C1

Adult ABD

06-12-2024

18:29:45

C5-2s AP 96.6% MI 0.91 TIS 0.6
IVC / Hepatic veins

FH5.0
FR 130
PR 17
D 17.0
Portal veins

Biliary tree

Abdominal aorta

**劍突下縱向掃描
利用肝臟當視窗**



iNeedle

iTouch

TE7 ACE
Liver

20241129-180534-28C1

Adult ABD

06-12-2024
18:27:15

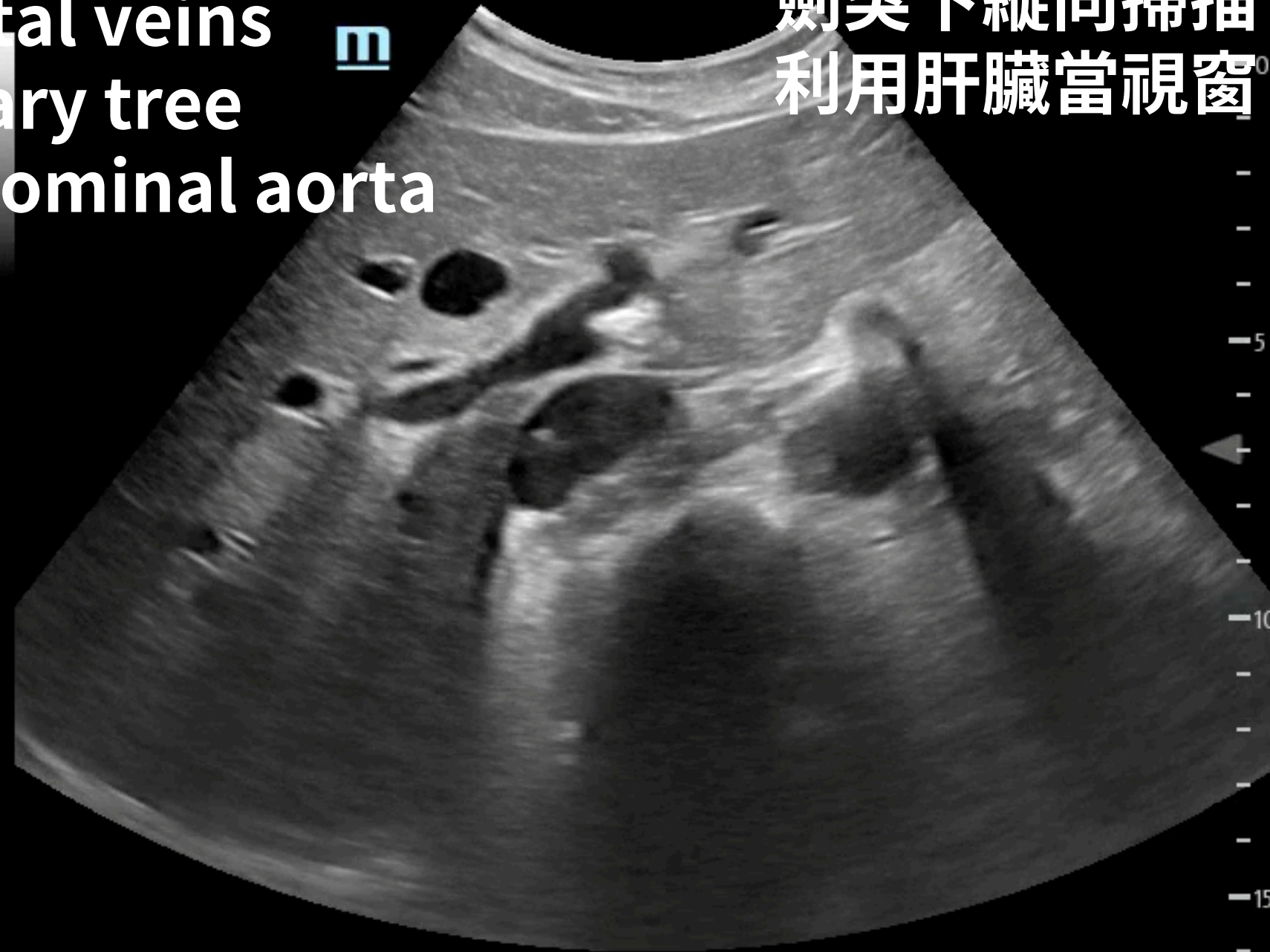
C5-2s AP 06.6% ML 0.88 TIS 0.6
Portal veins

FH5.0
D 16.0
Biliary tree

Abdominal aorta



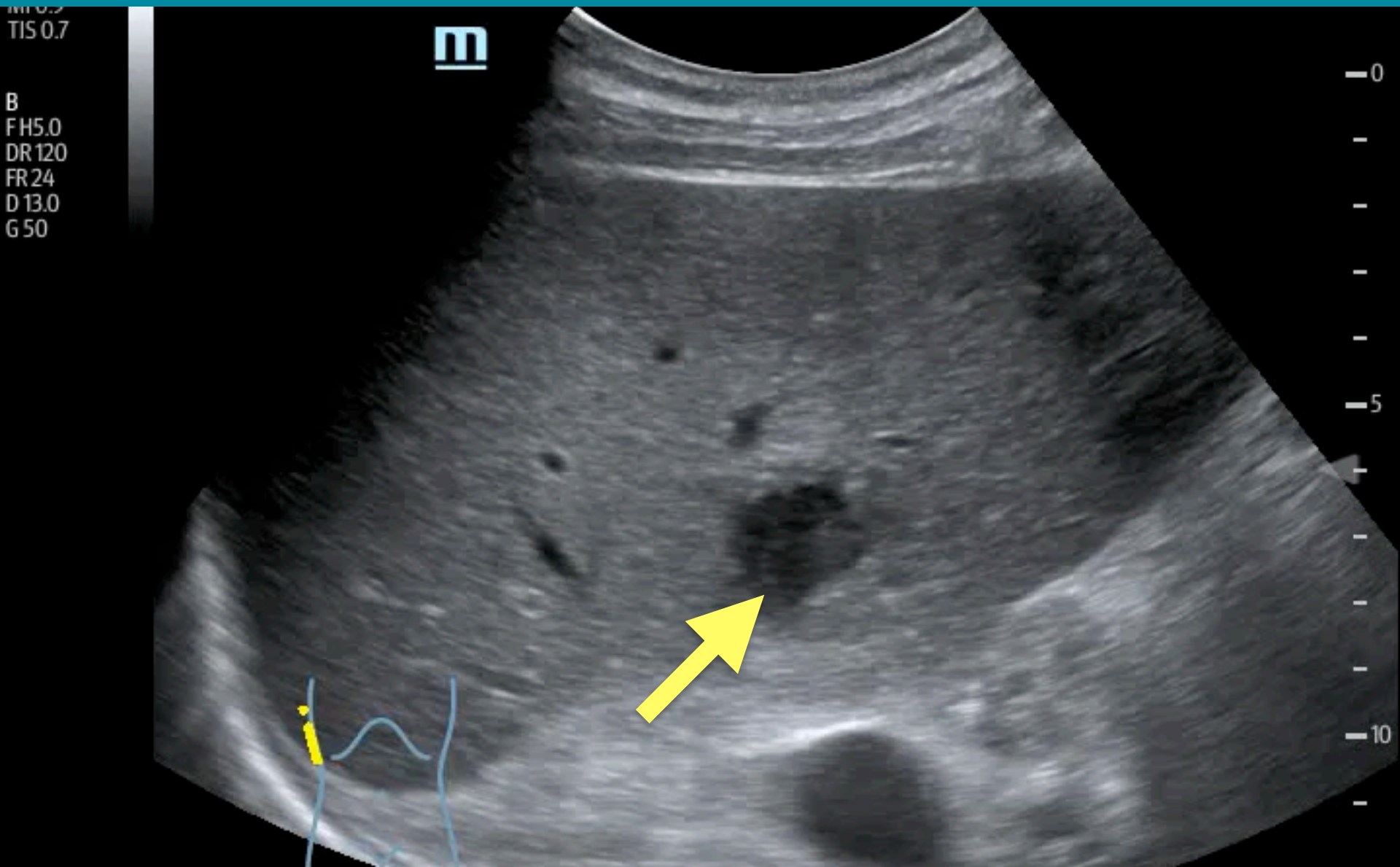
**劍突下縱向掃描
利用肝臟當視窗**



iNeedle

iTouch

Liver abscess

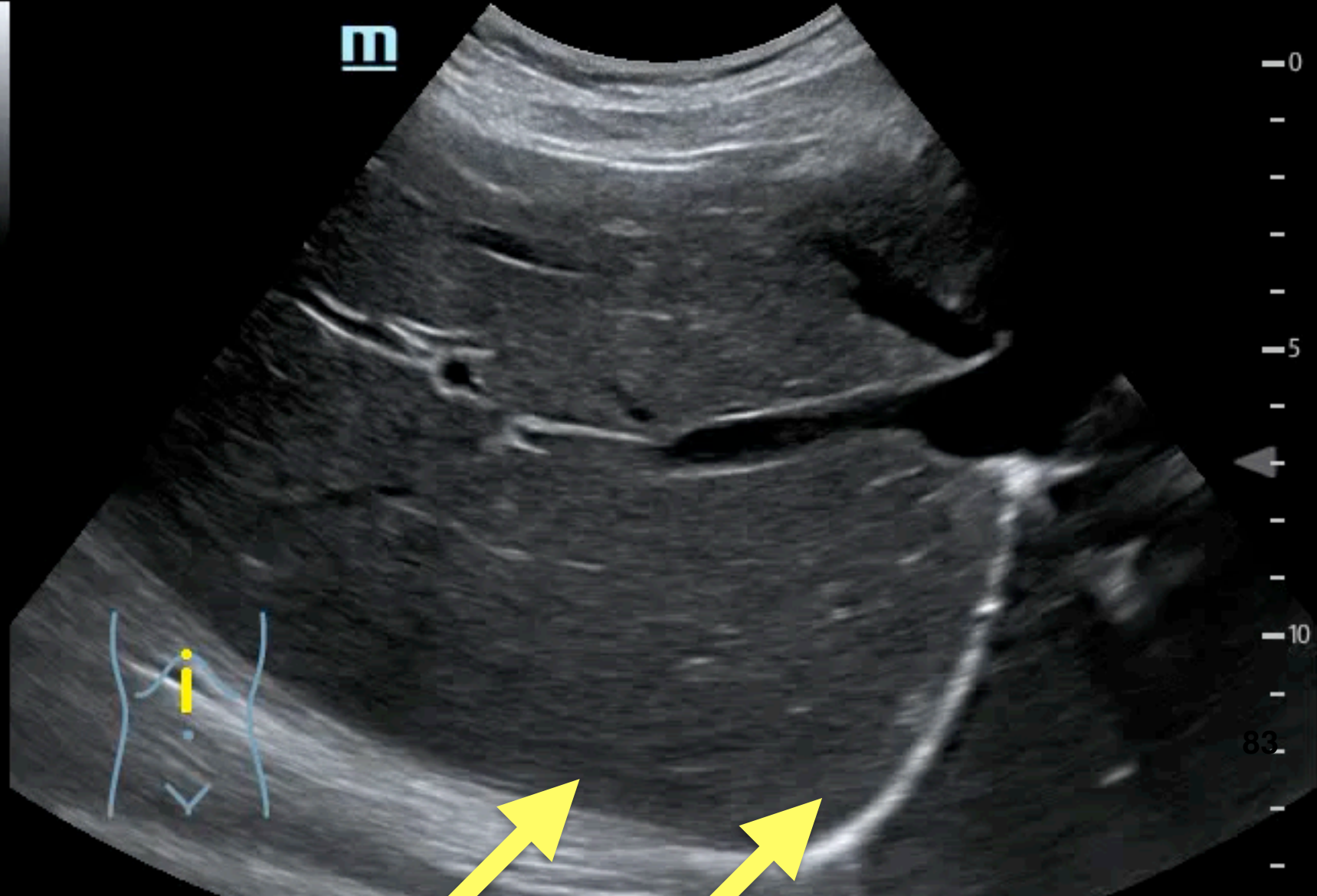


Hemangioma

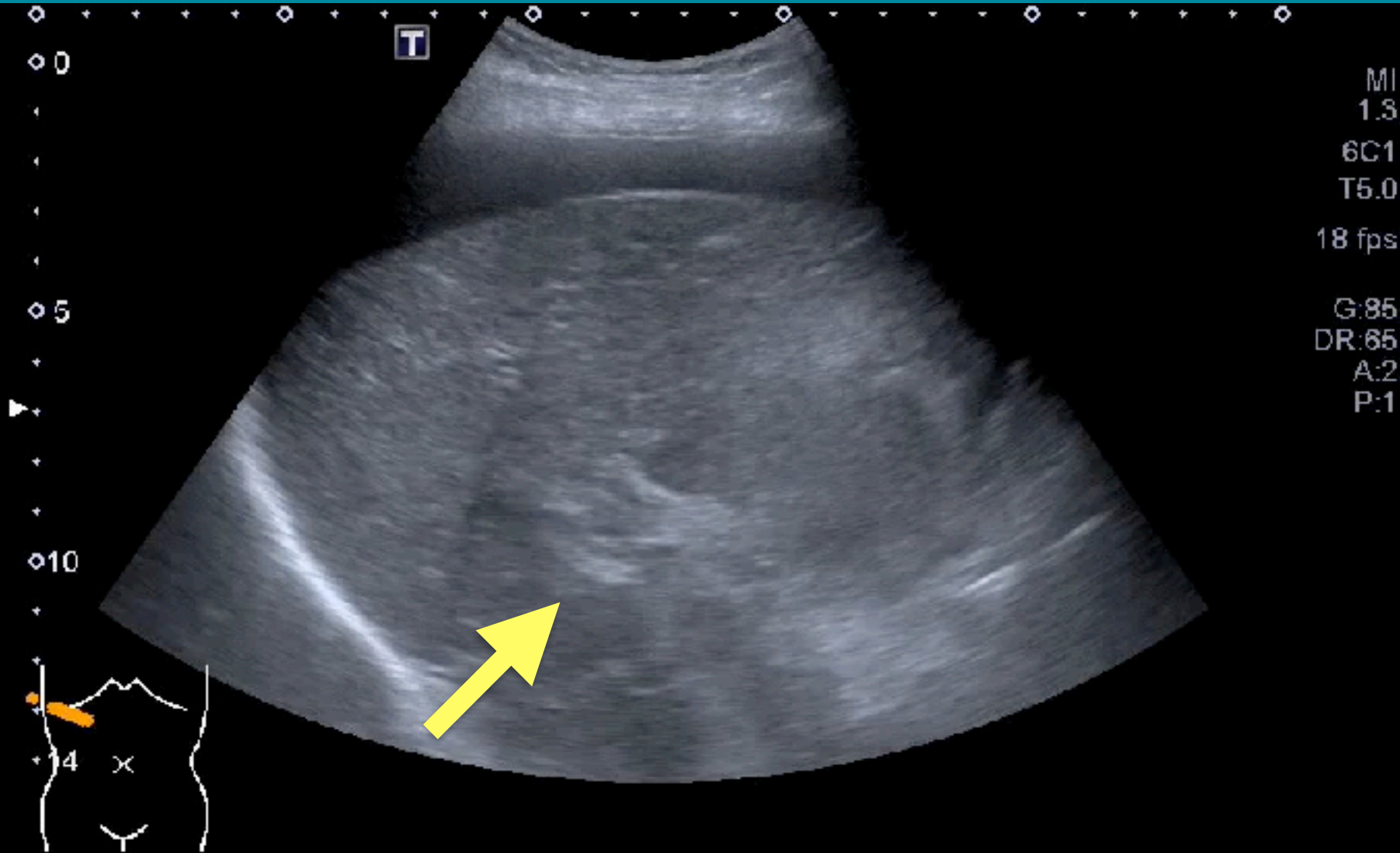
MI 0.9
TIS 0.7

B
FH5.0
DR120
FR 21
D 16.0
G 47

m



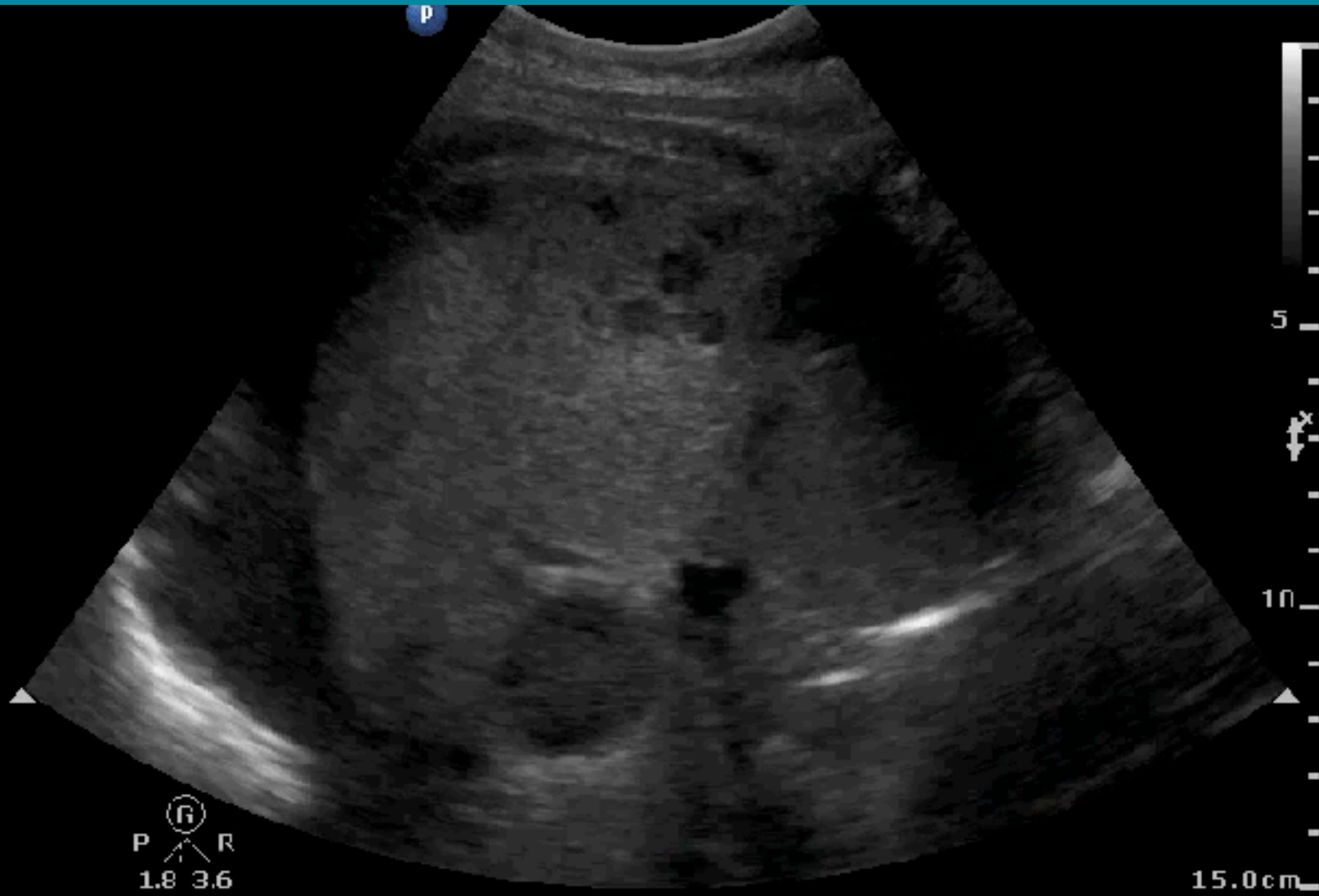
PVT



Metastatic liver tumor

Abd Gen
C5-1
34 Hz
15.0cm

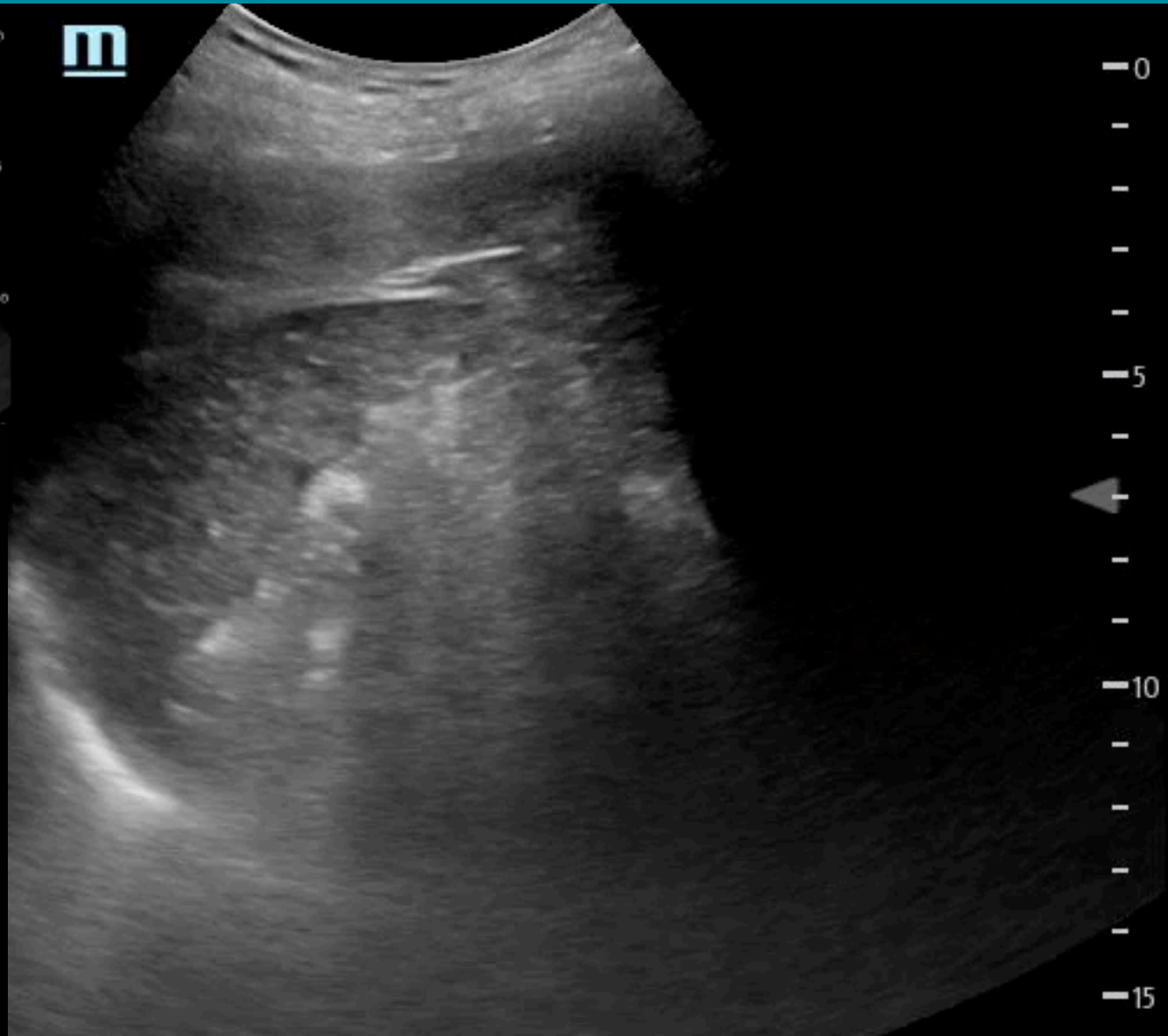
2D
HGen
Gn 82
C. 56
3 / 3 / 3

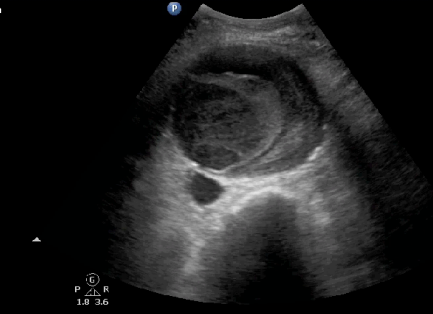
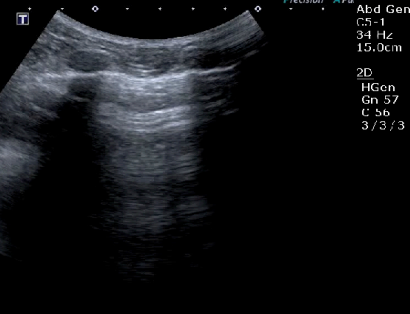
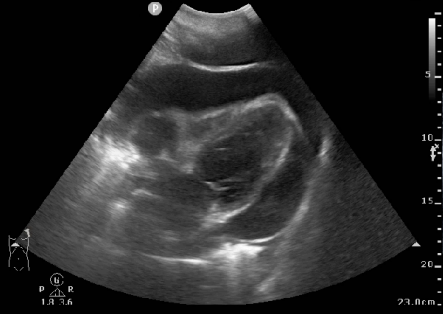


P R
1.8 3.6

15.0cm

Major trauma, internal bleeding ?





HEART

LUNG

AORTA

DVT

KIDNEY

GB

Liver

FAST

TAKE HOME IMAGES

