



衛生福利部雙和醫院
(委託臺北醫學大學興建經營)
Taipei Medical University · Shuang Ho Hospital,
Ministry of Health and Welfare



POCUS in ER

Cardiovascular POCUS
in the Era of COVID-19 Pandemic
台灣心臟超音波學會 2022/03/05

陳國智醫師
雙和醫院 急診醫學科

陳國智 醫師



醫用超音波學會指導醫師
WINFOCUS director / instructor
急救加護醫學會重症超音波負責人

急診 / 重症 / 介入 / 急性疼痛

經歷

新光急診超音波訓練中心主任

西園醫院急診醫學科主任

急診醫學會超音波委員會主委

台灣疼痛醫學會大體模擬手術講師

診
斷

監
測

介
入

POINT OF CARE ULTRASOUND

~ 存在於臨床需求之所在 ~

Hand-Held Ultrasound

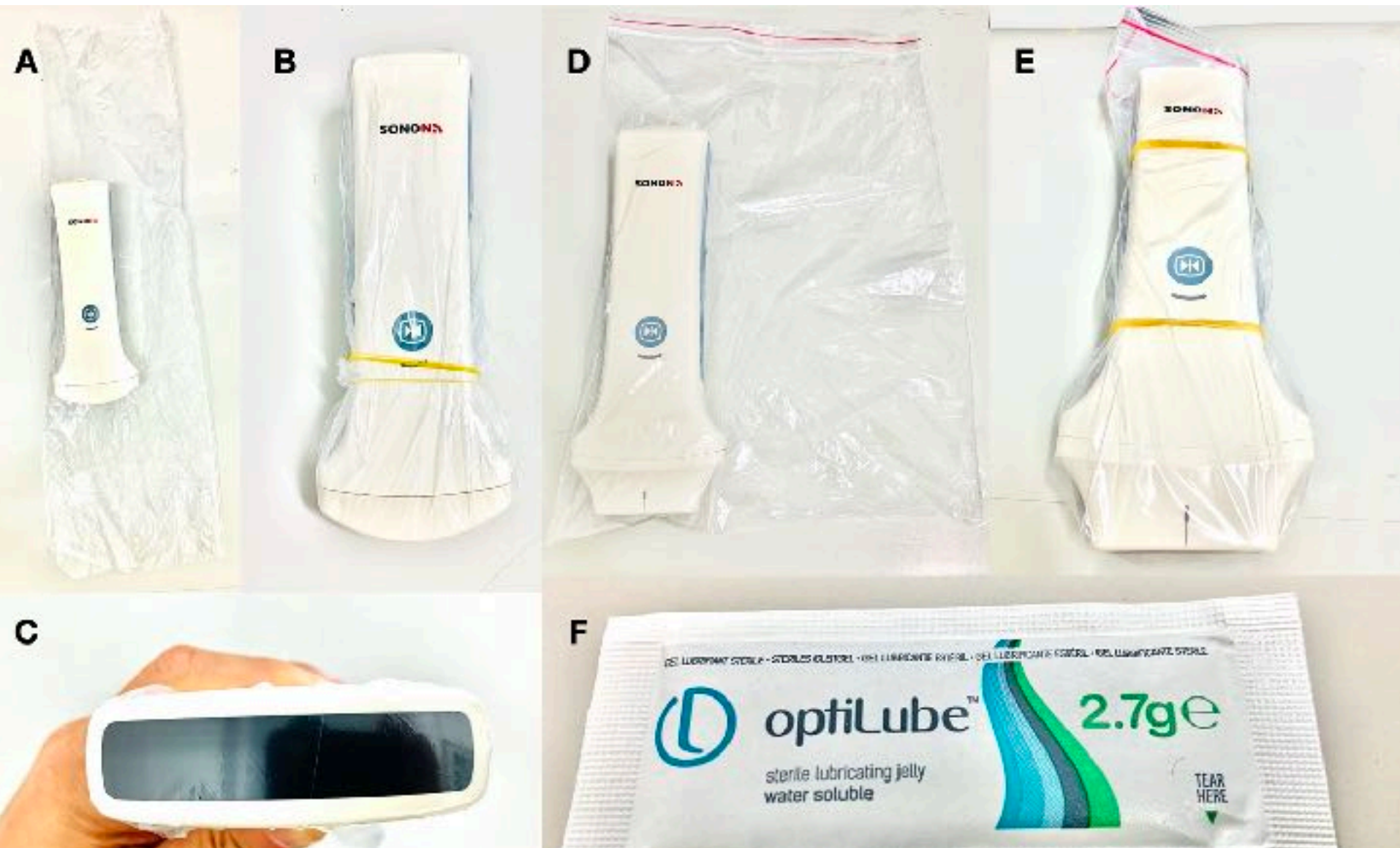


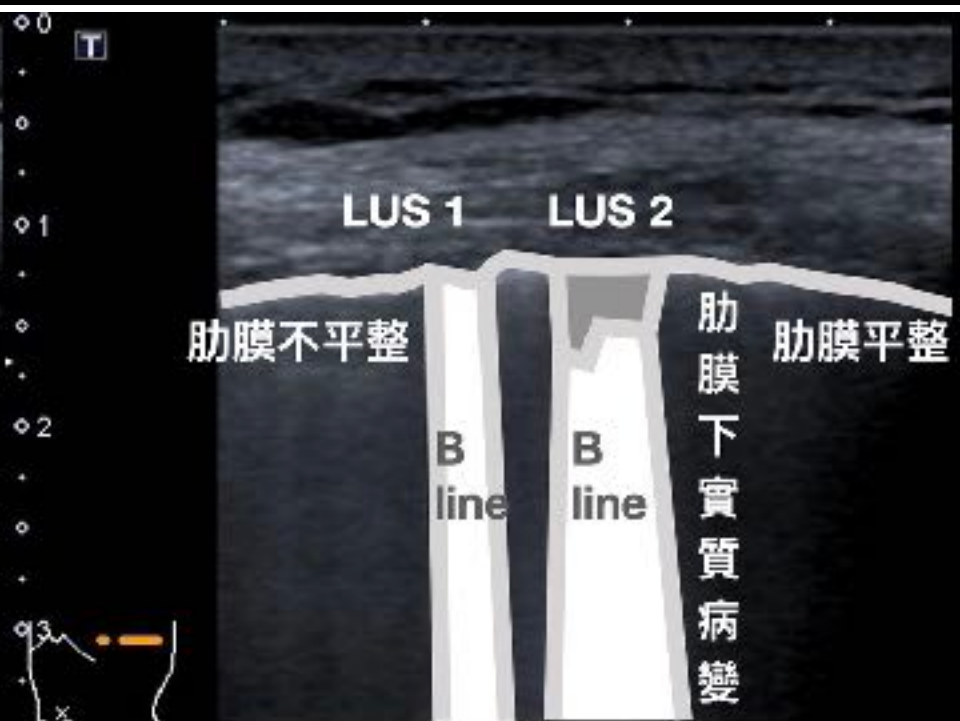
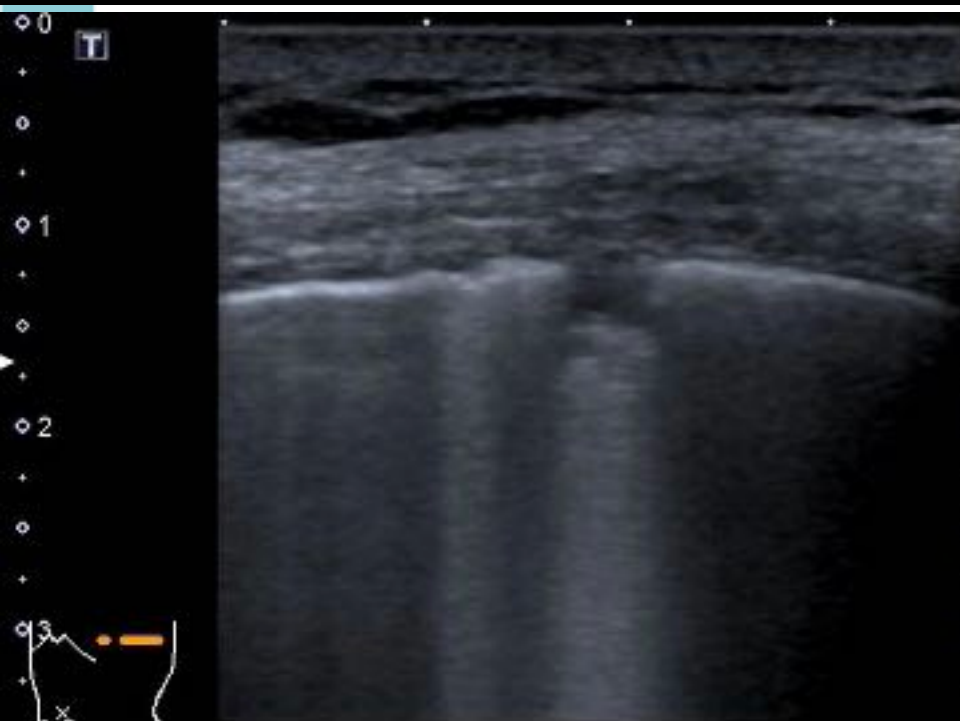
新冠肺炎流行期，該常規使用肺部超音波嗎？

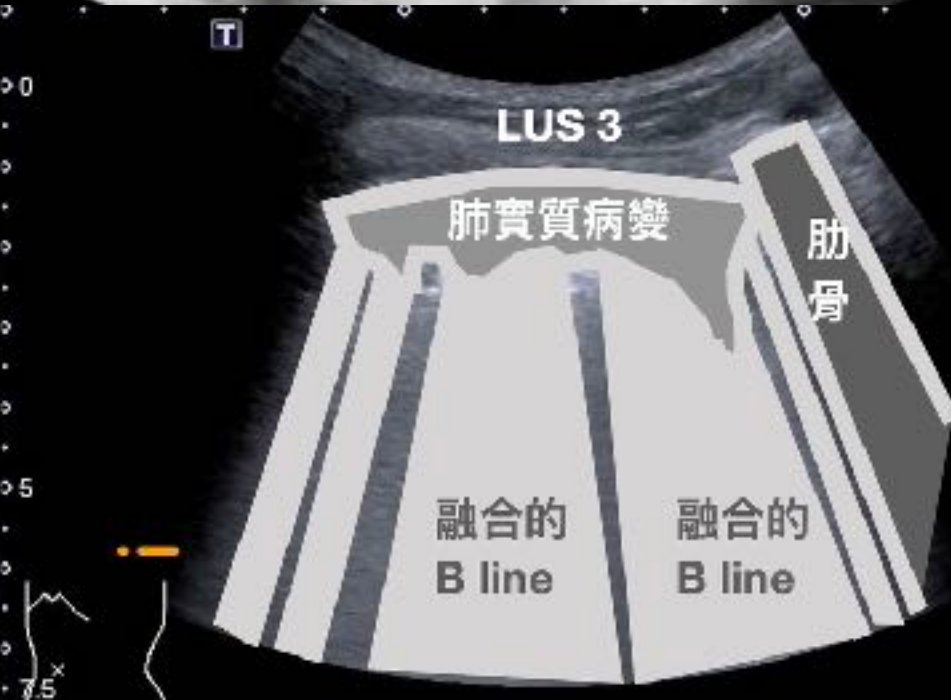
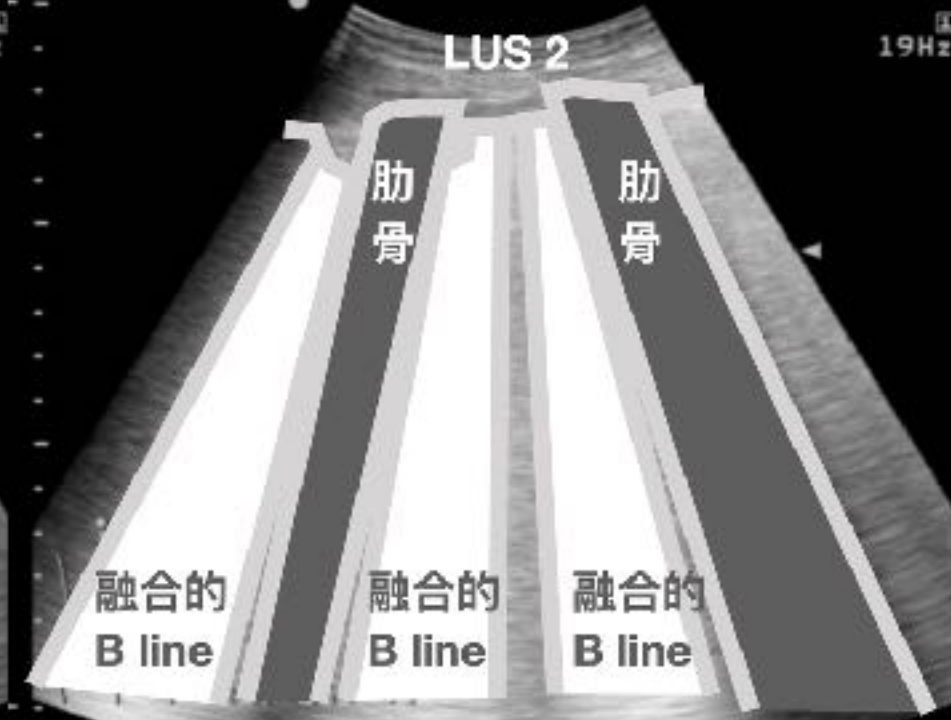
安全的防護

陳國智

2020急加專刊







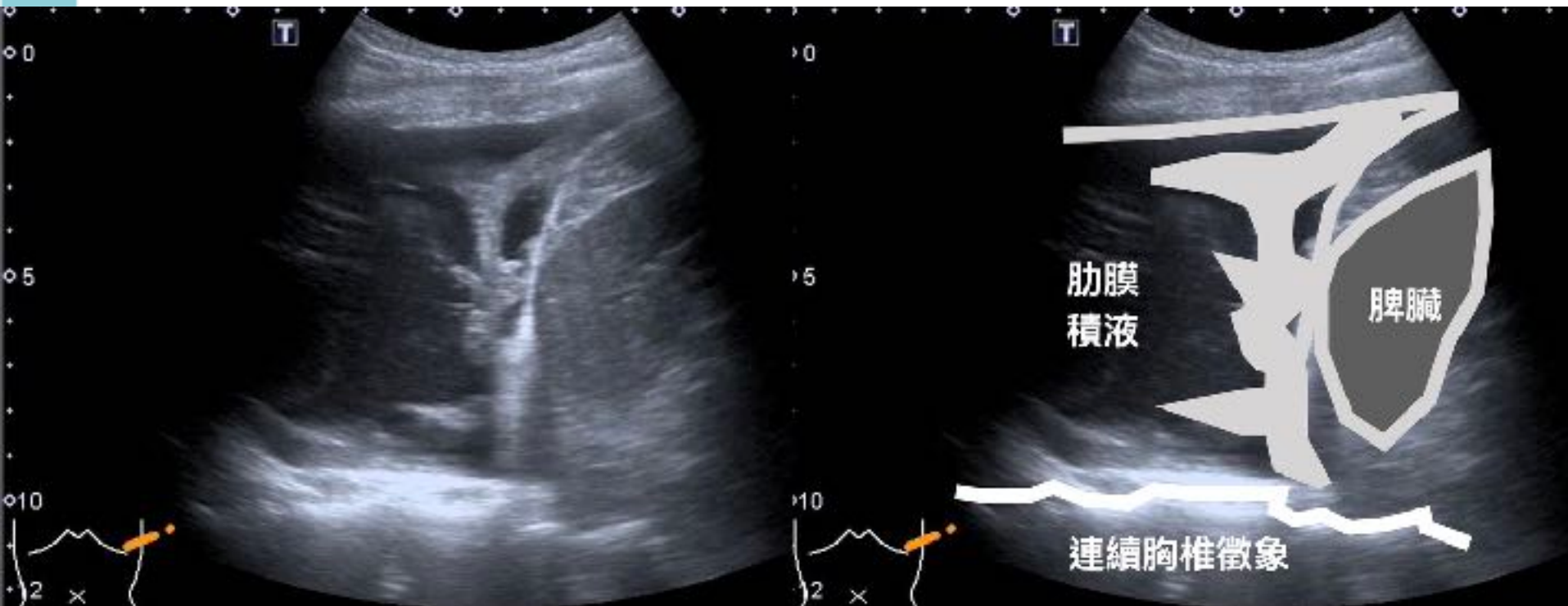
相對少見



Lung Ultrasound Score (LUS)

0 ~ 3 / 12 regions

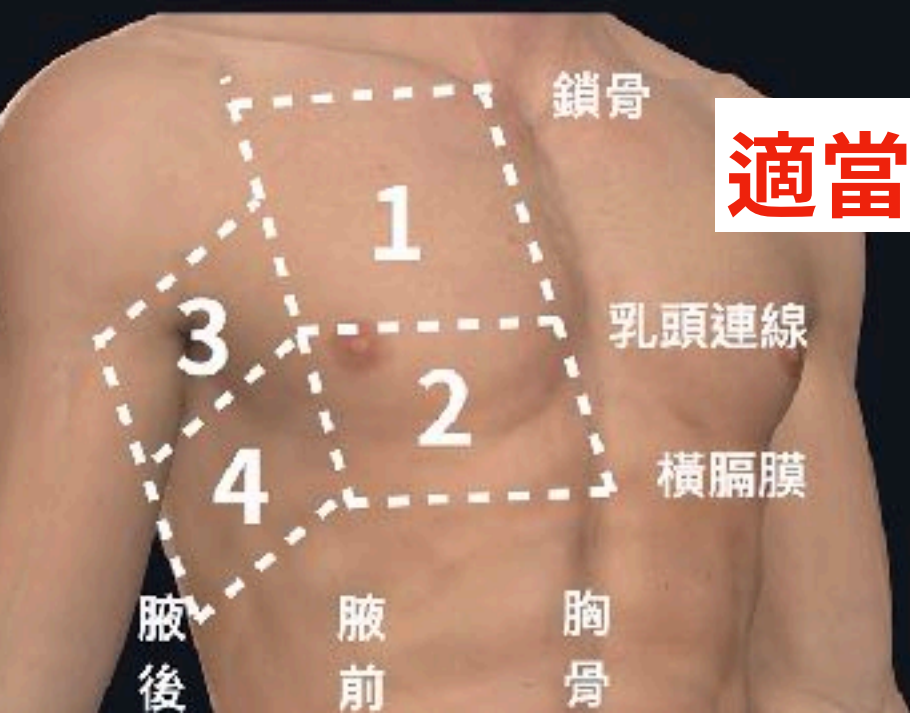
2020急加專刊



新冠肺炎流行期，該常規使用肺部超音波嗎？

肺部超音波

COVID-19的建議區域



適當的訓練



新冠肺炎流行期，該常規使用肺部超音波嗎？

陳國智

2020急加專刊

關鍵詞：新型冠狀病毒疾病，肺部超音波

臨床的必要

【結論】

以台灣目前的疫情而言，中小型醫院的急診部門，尤其是單線作業的急診，肺部超音波並不適合常規應用在COVID-19的診斷。然而，在完善的防護和有經驗的操作者手中，超音波在面對COVID-19的不同臨床情境中，無論是在到院前、急診、病房或是加護病房，應該能提供資源分配、疾病進展監測、治療成效評估和輔助醫療處置等決策的進行。

COVID-19 outbreak in 2021/05/14



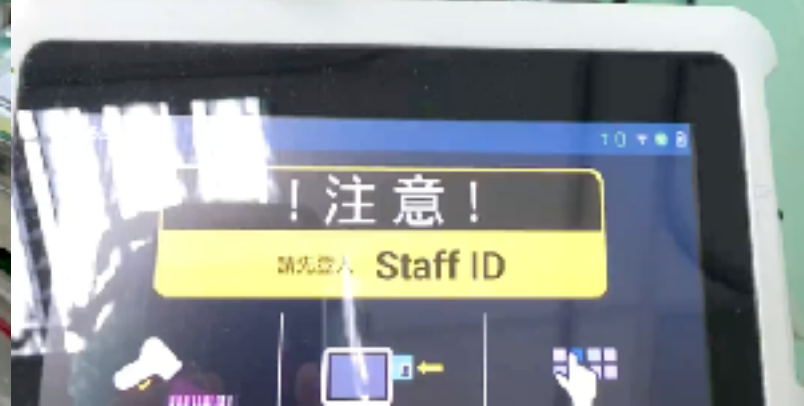
動線和流程重規劃以減少群聚和風險



決戰戶外～騎樓 & 帳篷

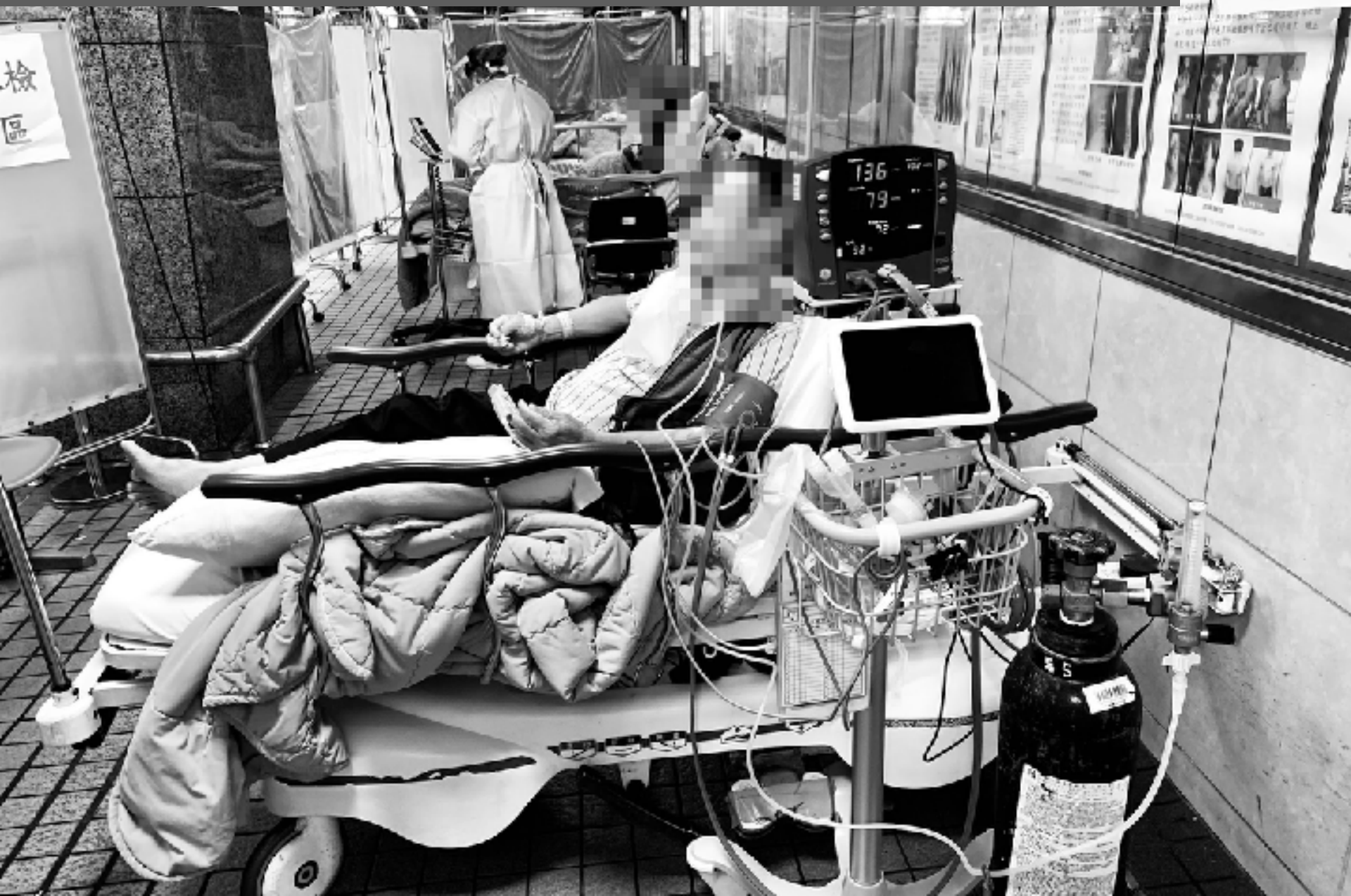


快篩陰ARDS (等PCR)





災難現場 ~ 只有PCR陽才能轉專責院所



等候

REVIEW

Open Access



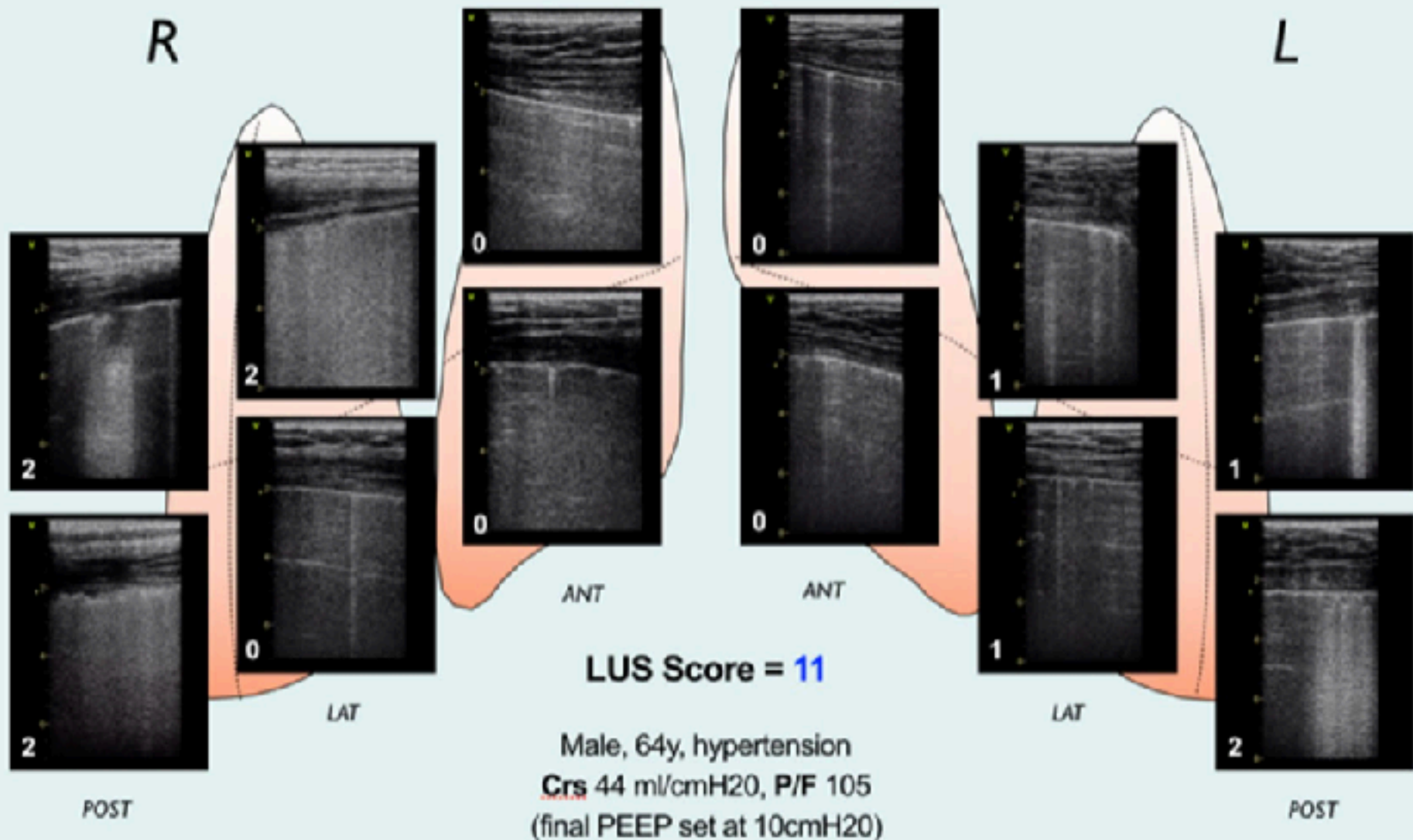
Multi-organ point-of-care ultrasound for COVID-19 (PoCUS4COVID): international expert consensus

Arif Hussain^{1*}, Gabriele Via^{2†}, Lawrence Melniker³, Alberto Goffi⁴, Guido Tavazzi^{5,6}, Luca Neri⁷, Tomas Villen⁸, Richard Hoppmann⁹, Francesco Mojoli¹⁰, Vicki Noble¹¹, Laurent Zieleskiewicz¹², Pablo Blanco¹³, Irene W. Y. Ma¹⁴, Mahathar Abd. Wahab¹⁵, Abdulmohsen Alsaawi¹⁶, Majid Al Salamah¹⁷, Martin Balik¹⁸, Diego Barca¹⁹, Karim Bendjelid²⁰, Belaid Bouhemad²¹, Pablo Bravo-Figueroa²², Raoul Breitzkreutz²³, Juan Calderon²⁴, Jim Connolly²⁵, Roberto Copetti²⁶, Francesco Corradi²⁷, Anthony J. Dean²⁸, André Denault²⁹, Deepak Govil³⁰, Carmela Graci³¹, Young-Rock Ha³², Laura Hurtado³³, Toru Kameda³⁴, Michael Lanspa³⁵, Christian B. Laursen³⁶, Francis Lee³⁷, Rachel Liu³⁸, Massimiliano Meineri³⁹, Miguel Montorfano⁴⁰, Peiman Nazerian⁴¹, Bret P. Nelson⁴², Aleksandar N. Neskovic⁴³, Ramon Nogue⁴⁴, Adi Osman⁴⁵, José Pazeli⁴⁶, Elmo Pereira-Junior⁴⁷, Tomislav Petrovic⁴⁸, Emanuele Pivetta⁴⁹, Jan Poelaert⁵⁰, Susanna Price⁵¹, Gregor Prosen⁵², Shalim Rodriguez⁵³, Philippe Rola⁵⁴, Colin Royse^{55,56}, Yale Tung Chen⁵⁷, Mike Wells⁵⁸, Adrian Wong⁵⁹, Wang Xiaoting⁶⁰, Wang Zhen⁶¹ and Yaseen Arabi⁶²

Low lung elastance, low ventilation/perfusion ratio



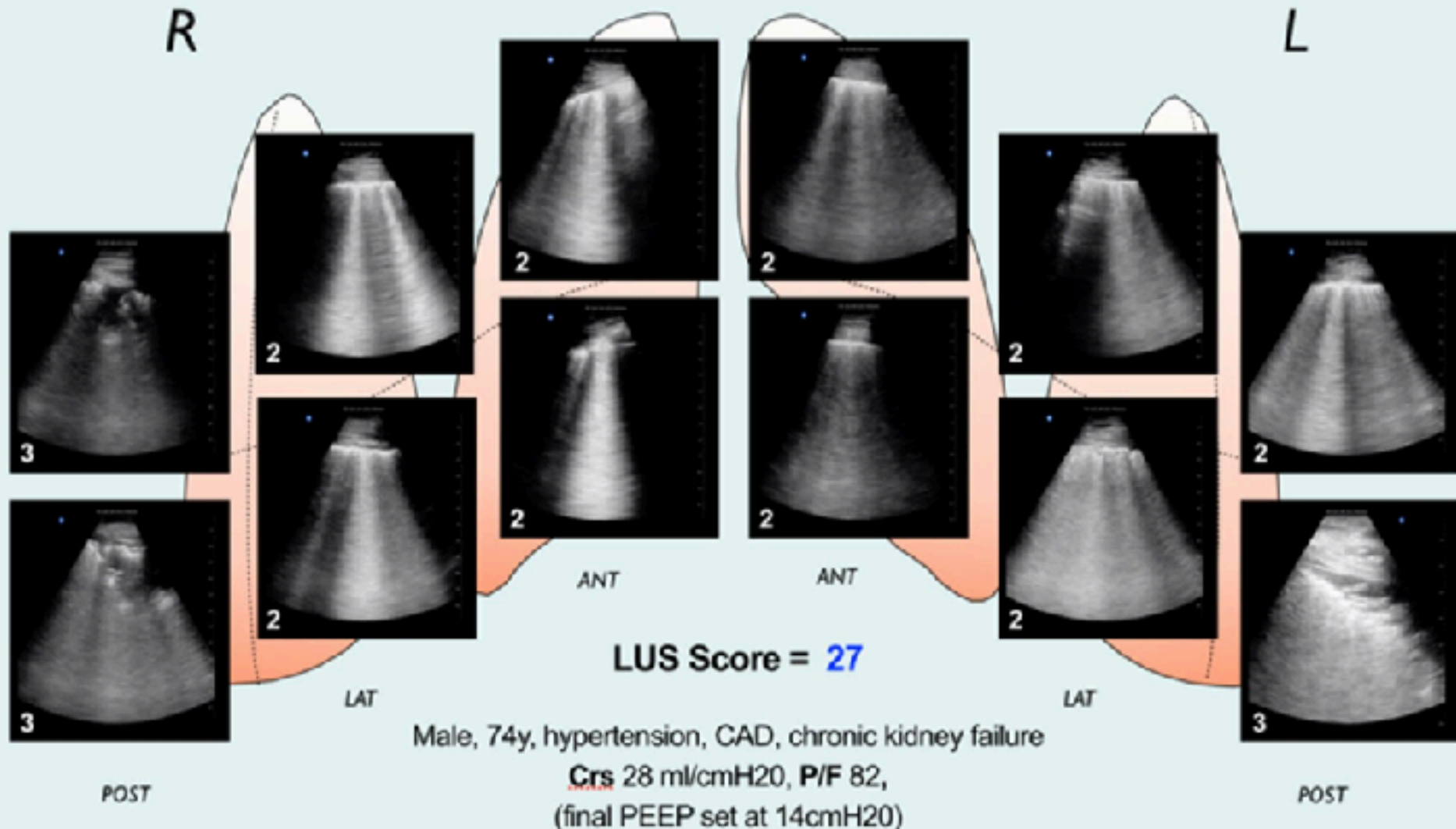
COVID-19 PNEUMONIA LUS, consistent with “Phenotype L”



High lung elastance, high R-L shunt



COVID-19 PNEUMONIA LUS, consistent with “Phenotype H”



POTENTIALLY USEFUL PoCUS APPLICATIONS in COVID-19 PATIENTS



**RESPIRATORY FAILURE
DIAGNOSIS /
TRIAGE AT ADMISSION**
[LUS, FoCUS, DVT]

**COVID-19 PNEUMONIA
PHENOTYPE IDENTIFICATION**
[LUS], MONITORING [LUS, ECHO]

**MECHANICAL VENTILATION
GUIDANCE**
(RECRUITABILITY ASSESSMENT, PEEP
TITRATION, PRONATION RESPONSE
PREDICTION) [LUS, ECHO]

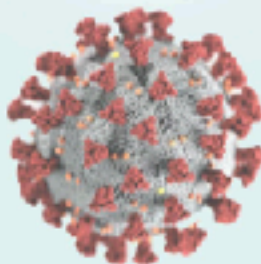
CARDIOVASCULAR ASSESSMENT
(SCREENING FOR PRE-EXISTING
DISEASE, SEPSIS-RELATED
MYOCARDIAL DYSFUNCTION,
MYOCARDITIS DIAGNOSIS,
RV DYSFUNCTION DIAGNOSIS,
INCL ACP) [FOCUS, ECHO]

**MECHANICAL
VENTILATION
COMPLICATIONS
SCREENING**
(SUPERINFECTION,
ATELECTASIS,
PNEUMOTHORAX) [LUS]

VENTILATION WEANING
(READINESS, PREDICTION,
FAILURE CAUSE DIAGNOSIS)
[LUS, ECHO, DUS, MUS]

**SECONDARY
ORGAN DYSFUNCTION
DIAGNOSIS**
(AKI, ABDOMINAL
COMPLICATIONS),
[FOCUS, ECHO, PORTAL /
HEPATIC VEIN DOPPLER, ABD]

TELE-ULTRASOUND
[GUIDANCE, SECOND OPINION & REMOTE TRAINING]



**FLUID STATUS
ASSESSMENT**
(SCREENING FOR
SEVERE HYPOVOLEMIA,
VOLUME RESPONSIVENESS,
FLUID OVERLOAD)
[FOCUS, ECHO]

**DEEP VENOUS
THROMBOSIS
SCREENING
& DIAGNOSIS**
[DVT, FOCUS]

**STROKE DIAGNOSIS,
NEURO-MONITORING**
[TCD, ONSD ULTRASOUND]

Safety





第四卷第四期

刊登日期：2021/08/30

Taiwan Emergency Medicine Bulletin 4(4) : e2021040409

POCUS在COVID-19流行期的急診應用經驗分享!



57F, Bilateral PN & ARDS

Rapid antigen: negative

PCR: positive (3d later)

Wireless probe

Leltek
wireless handheld ultrasound device



Safety

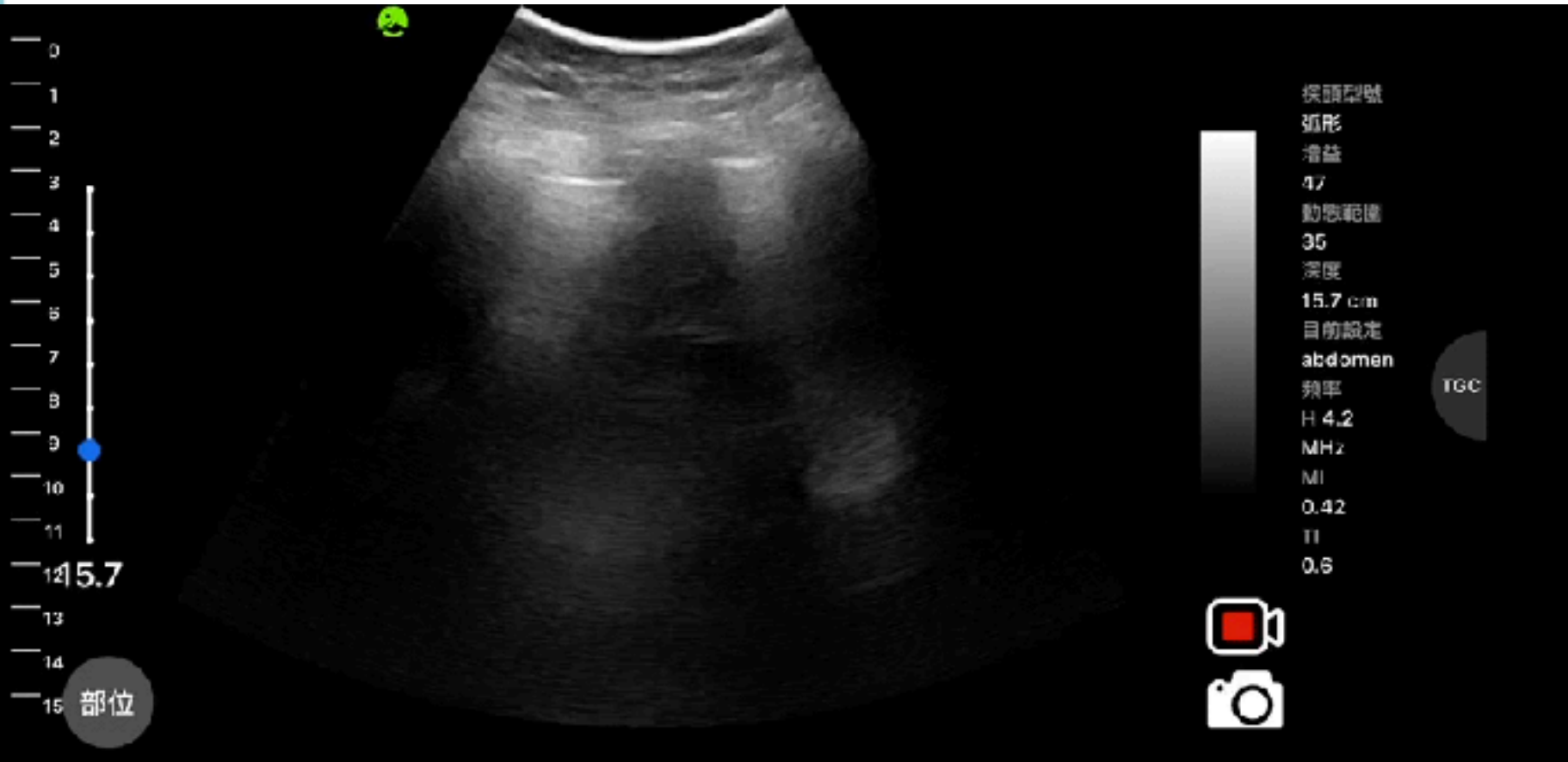
(夾鍊袋)

Leltek
wireless handheld ultrasound device



LUS score 0

Leltek
wireless handheld ultrasound device



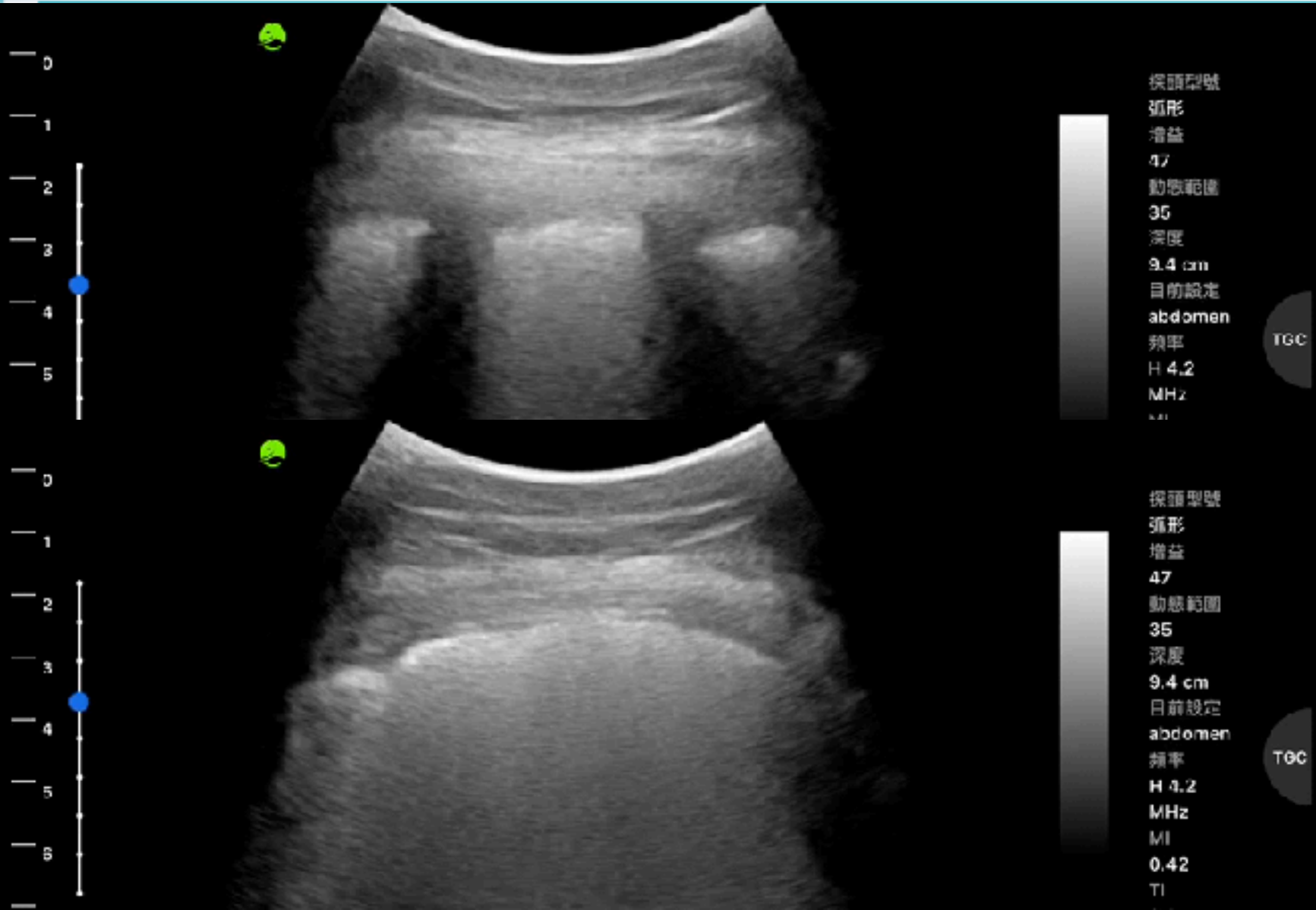
LUS score 1

Leltek
wireless handheld ultrasound device



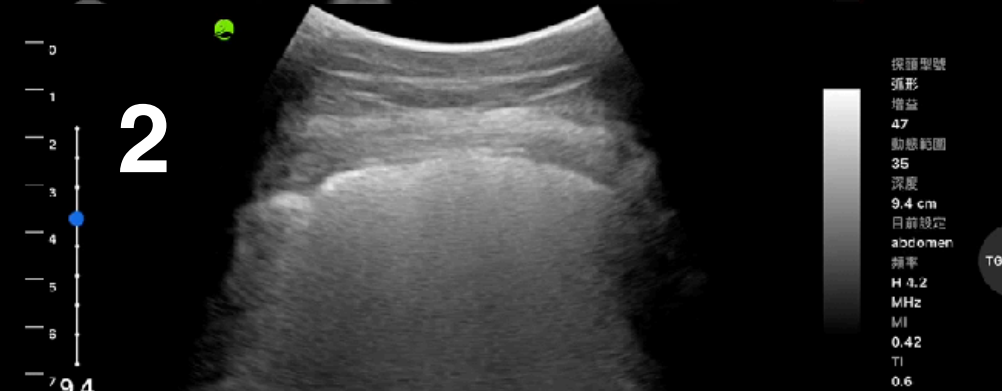
LUS score 2

Leltek
wireless handheld ultrasound device



LUS score 0 ~ 3

Leltek
wireless handheld ultrasound device



右前胸上部－>右前胸下部－>右側胸上部－>右側胸下部－>
左前胸上部－>左前胸下部－>左側胸上部－>左側胸下部－>
右後背上部－>右後背下部－>左後背上部－>左後背下部，

右前胸－右側胸－左前胸－左側胸－右後背－左後背

簡化掃描流程和操作

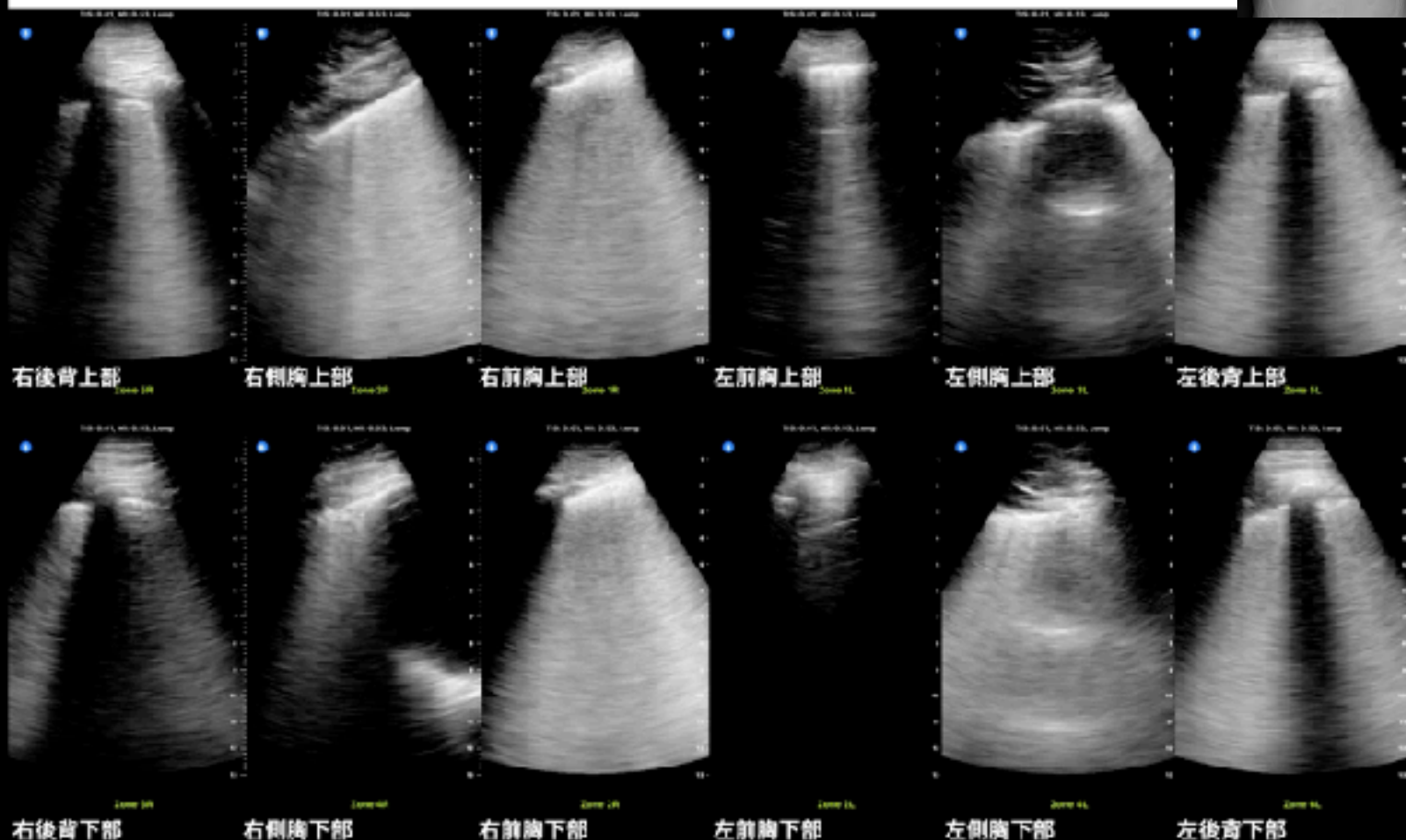
順序 錄影 標記 圖示

POCUS在COVID-19流行期的急診應用經驗分享!

57歲女性，就診時SpO2 64%，主訴咳和喘約5天

BT 38.2°C; PR 86; RR 18; BP 122/70 mmHg

Rapid test antigen: **negative**; RT-PCR on 3rd day: **positive**



POCUS在COVID-19流行期的急診應用經驗分享!

1。若患者無症狀或呼吸道症狀非常輕微，基本上是不需要常規進行胸部影像(包含LUS)

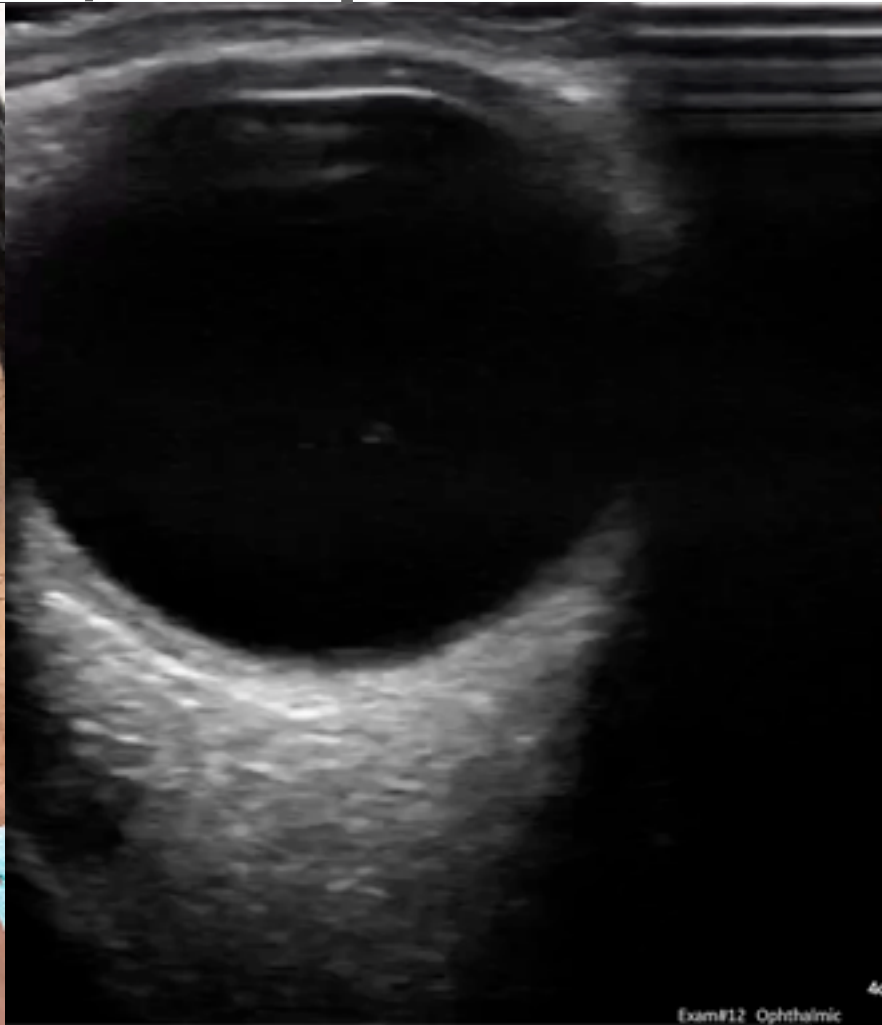
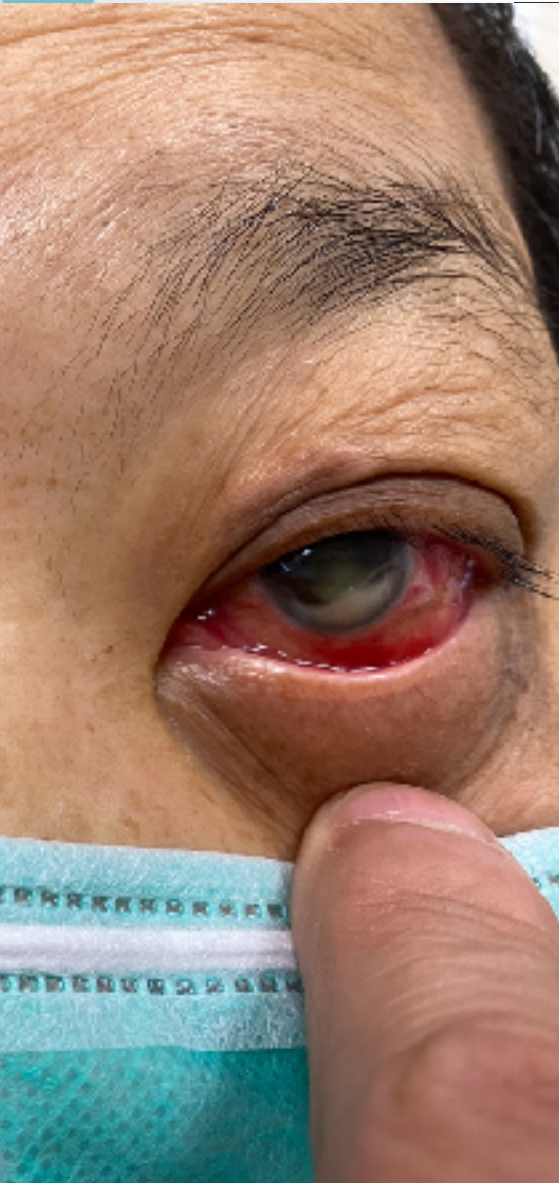
2。若患者無症狀或呼吸道症狀非常輕微，但具有高危險因子（如65歲以上、合併有心血管疾痛、糖尿病、慢性疾病、高血壓、免疫不全等），應進行胸部X光檢查，如果CXR沒有明顯異常但臨床上仍懷疑有肺炎者，建議進行LUS

3。若患者有明顯呼吸道症狀（如血氧下降、呼吸窘迫等）或病情快速惡化，一律進行胸部X光檢查，若影像與臨床表現不符，或是有其他臨床懷疑，建議進行LUS，或是考慮CT檢查

- 4。COVID-19患者合併有其他臨床需求時，在有經驗的操作者執行下，POCUS可以提供重點式的心臟功能評估、DVT的評估、輔助侵入式的處置和評估是否有併發症的發生。若有同時多器官掃描的需要，需考慮COVID-19專用的超音波和探頭，或是同時配有不同的無線探頭來進行掃描和協助處置。
- 5。在疫情失控，爆發大規模感染，醫療資源顯著不足時，應該在社區或醫療院所的篩採站設置LUS，由專門獨立出來有經驗的操作者，在完整防護下篩檢確診個案中有立即醫療需求者，以有效進行安置。
- 6。在專責防疫旅館，由有經驗的操作者進行LUS，搭配SpO2的測量綜合考量下，也有助於判斷是否需送至專責醫療院所就醫。

EYE (ONSD, RD, VD, VH)

Liver abscess / Endophthalmitis



EYE (ONSD, RD, VD, VH)



PHILIPS

Superficial

L12-3

31 Hz

3.5cm

2D

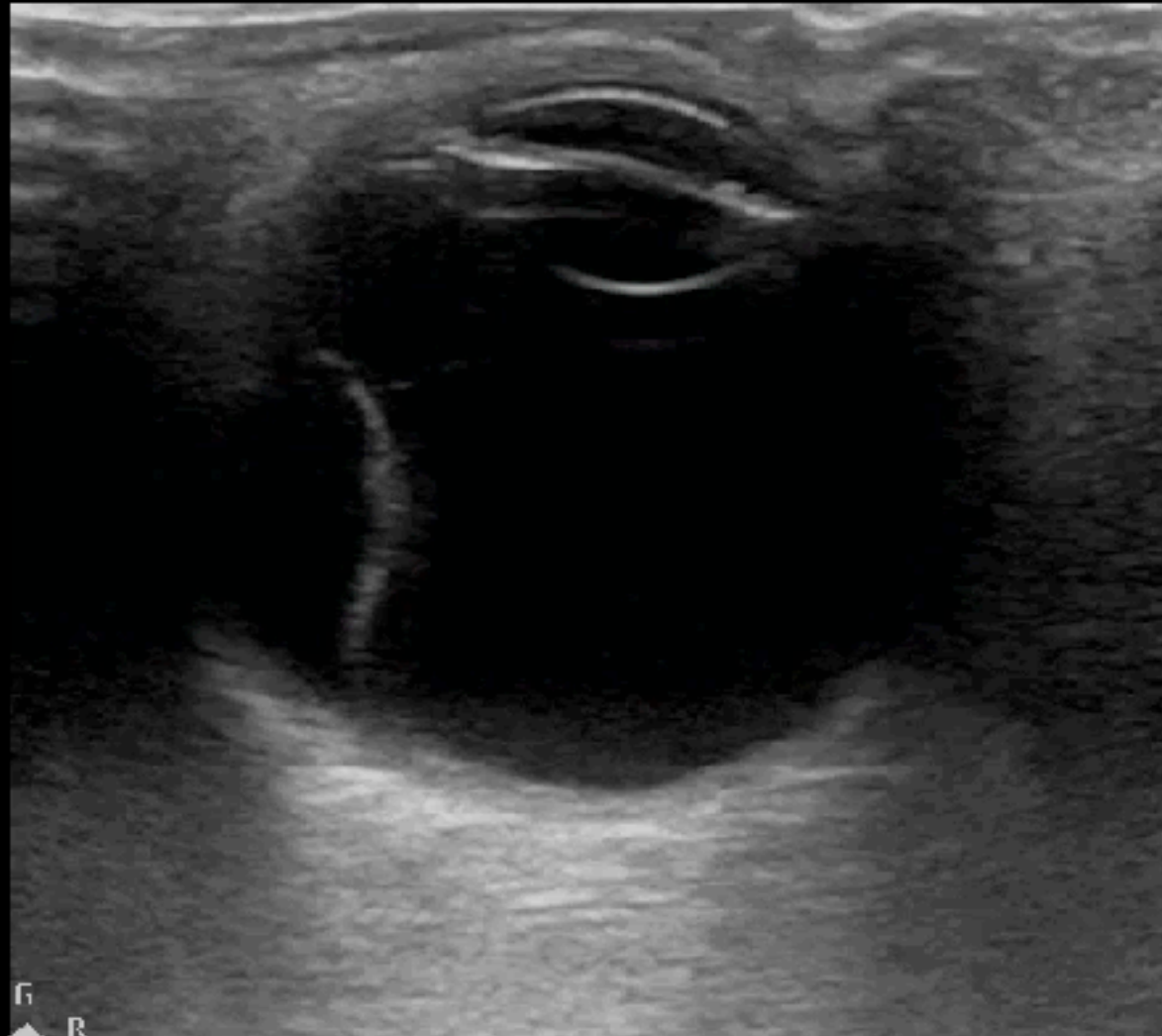
Gen

Gn 100

C. 57

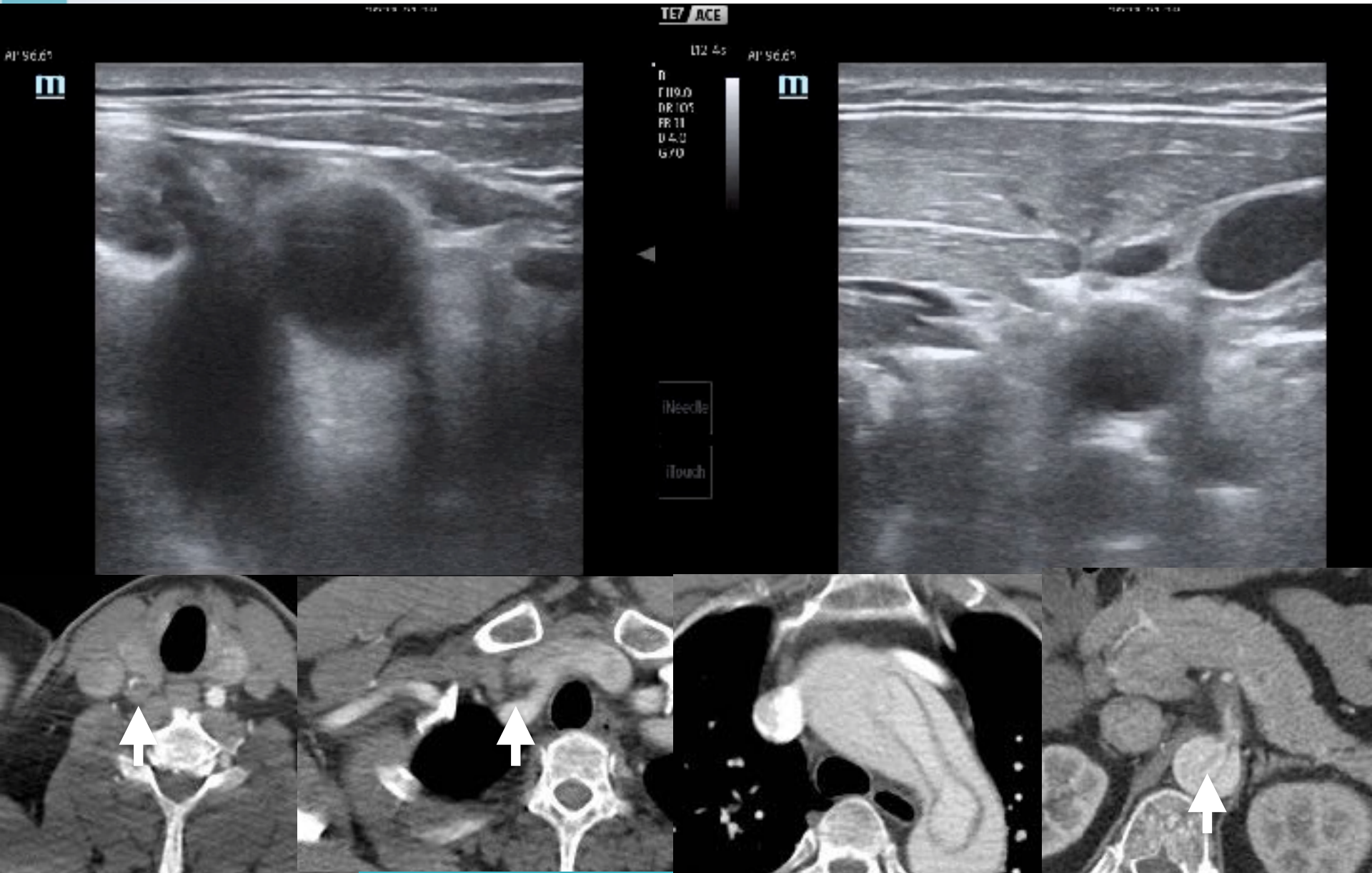
4/3/2

P



P G R

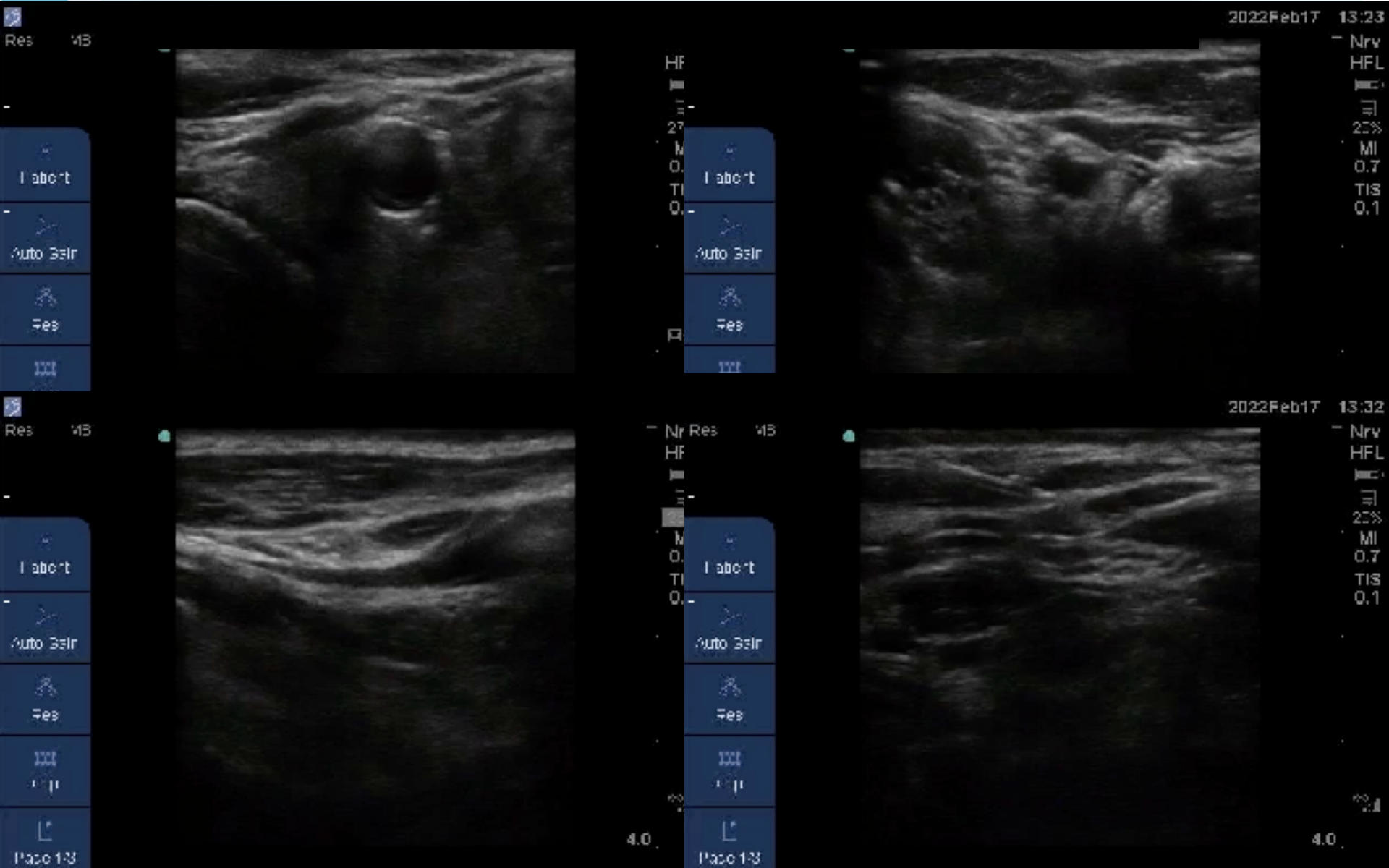
52M, Chest pain & back soreness



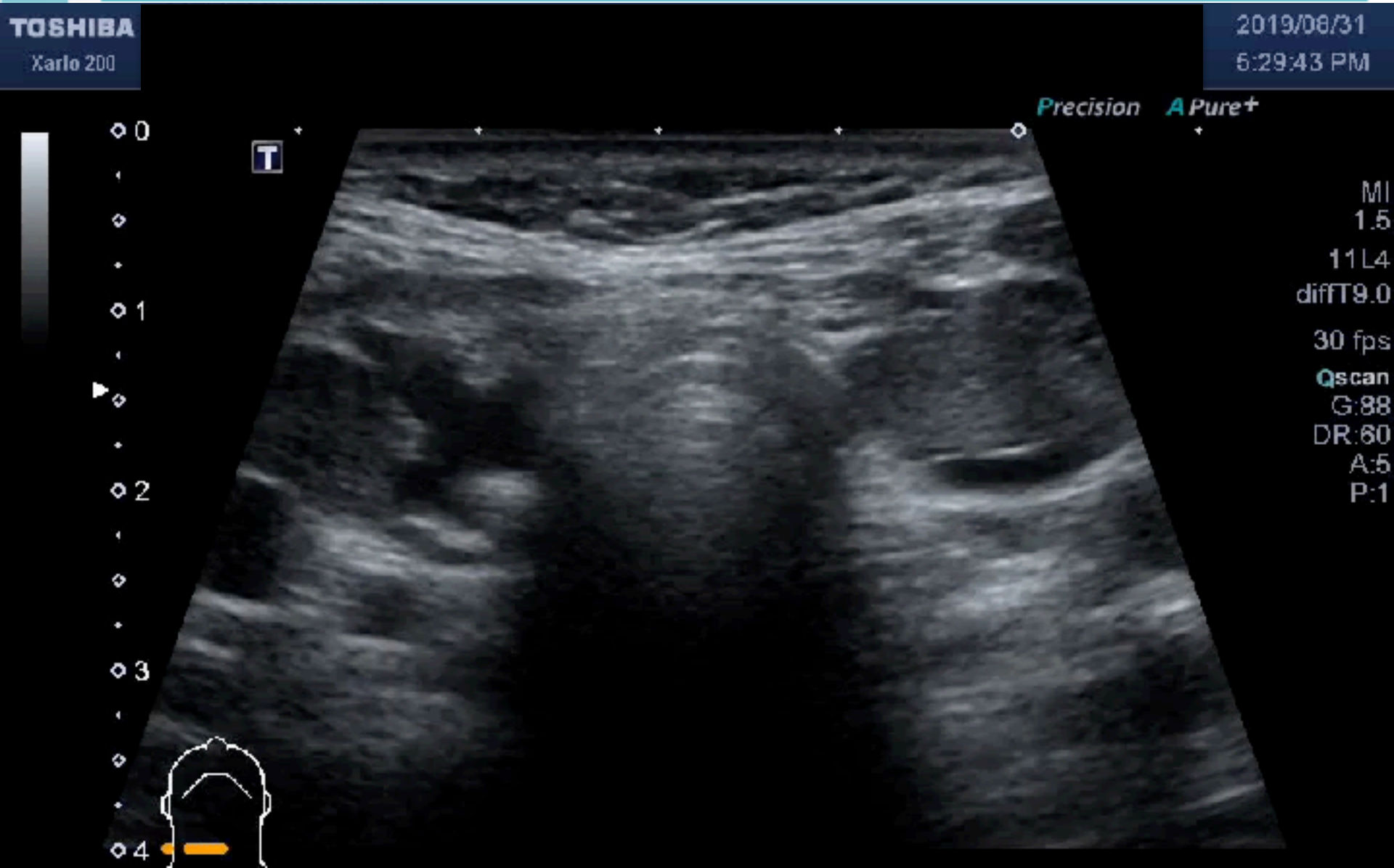
AD (CCA-Pericardium-ABD Ao)



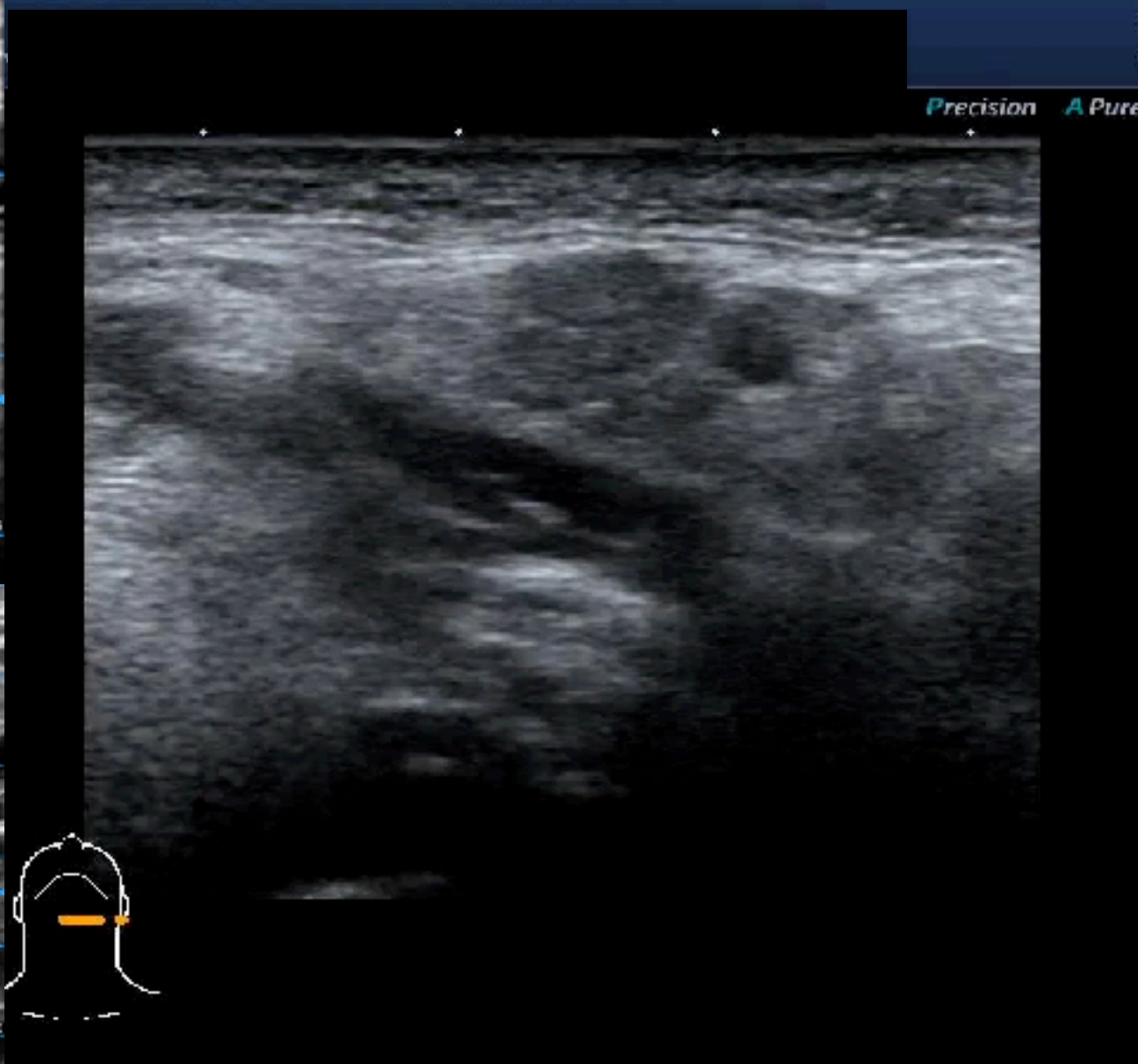
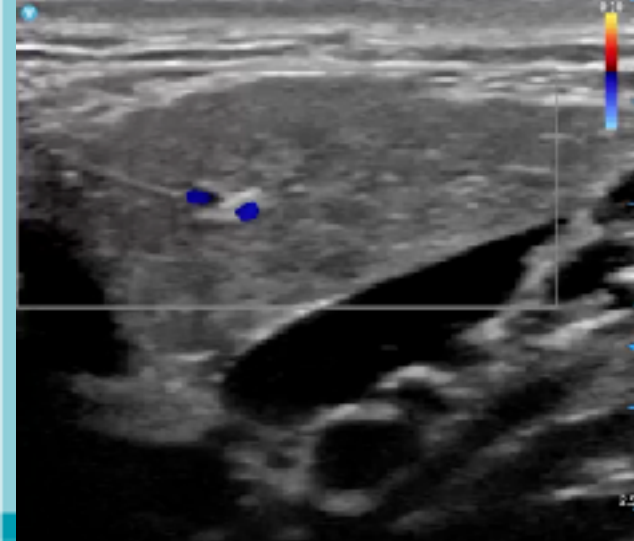
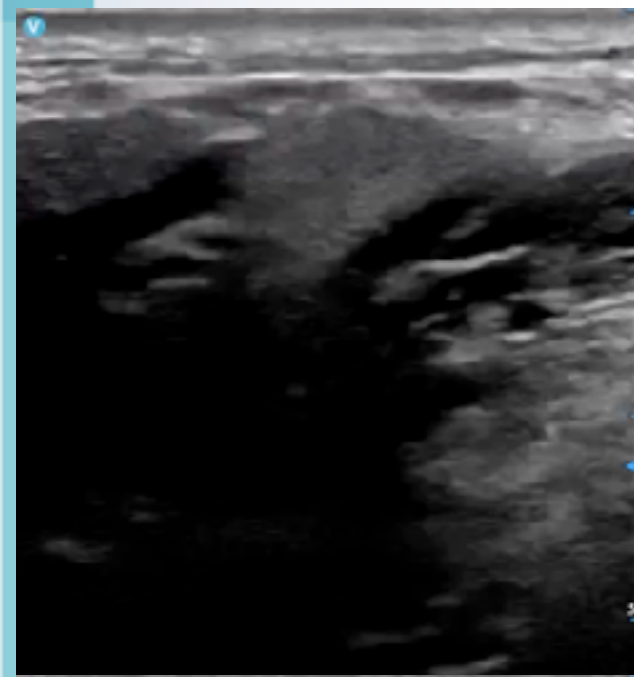
Echo guided CVC on left IJV



36F, Hypokalemia / Hypothyroidism



Submandibular gland Sialolithiasis w/ obstruction



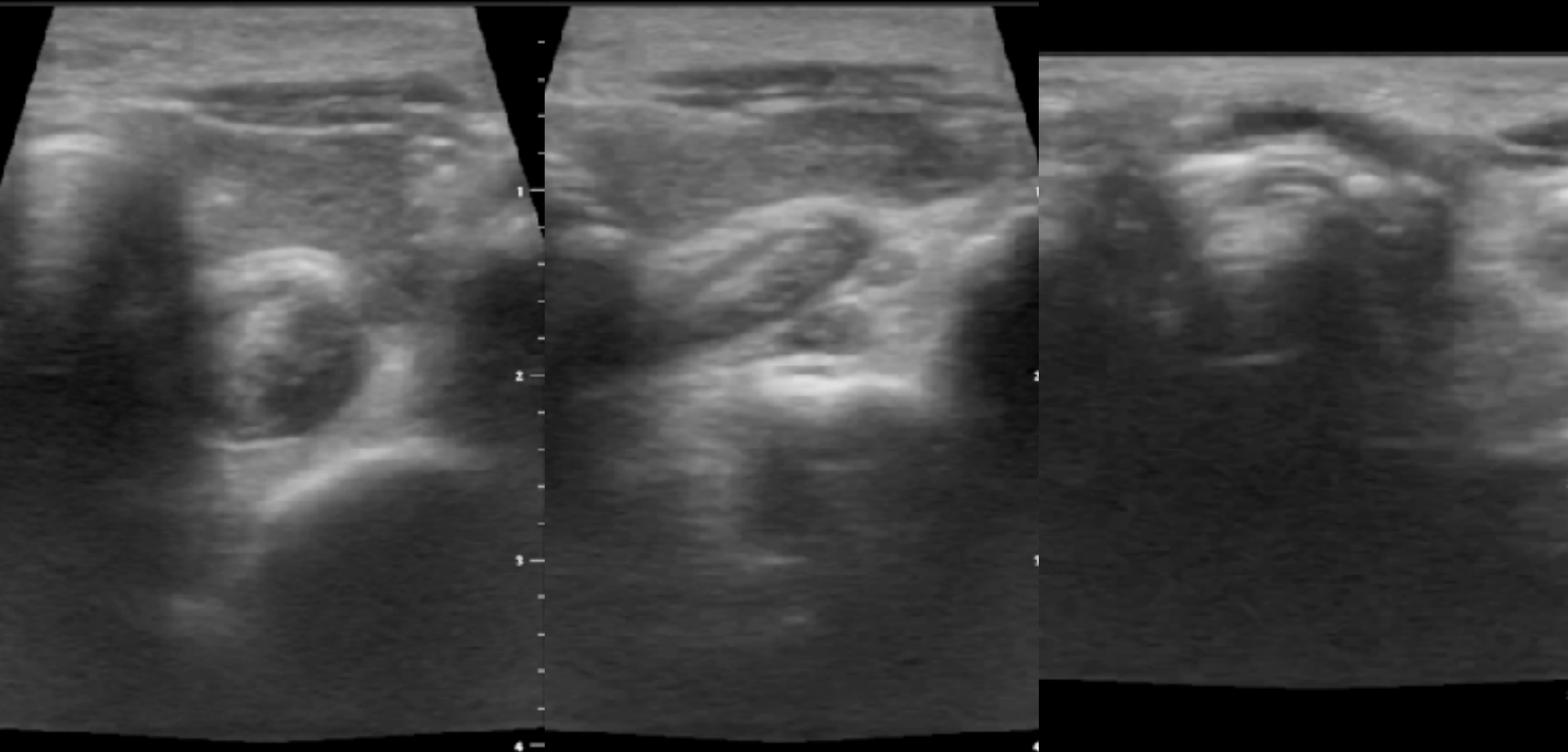
75F, shock & resuscitation



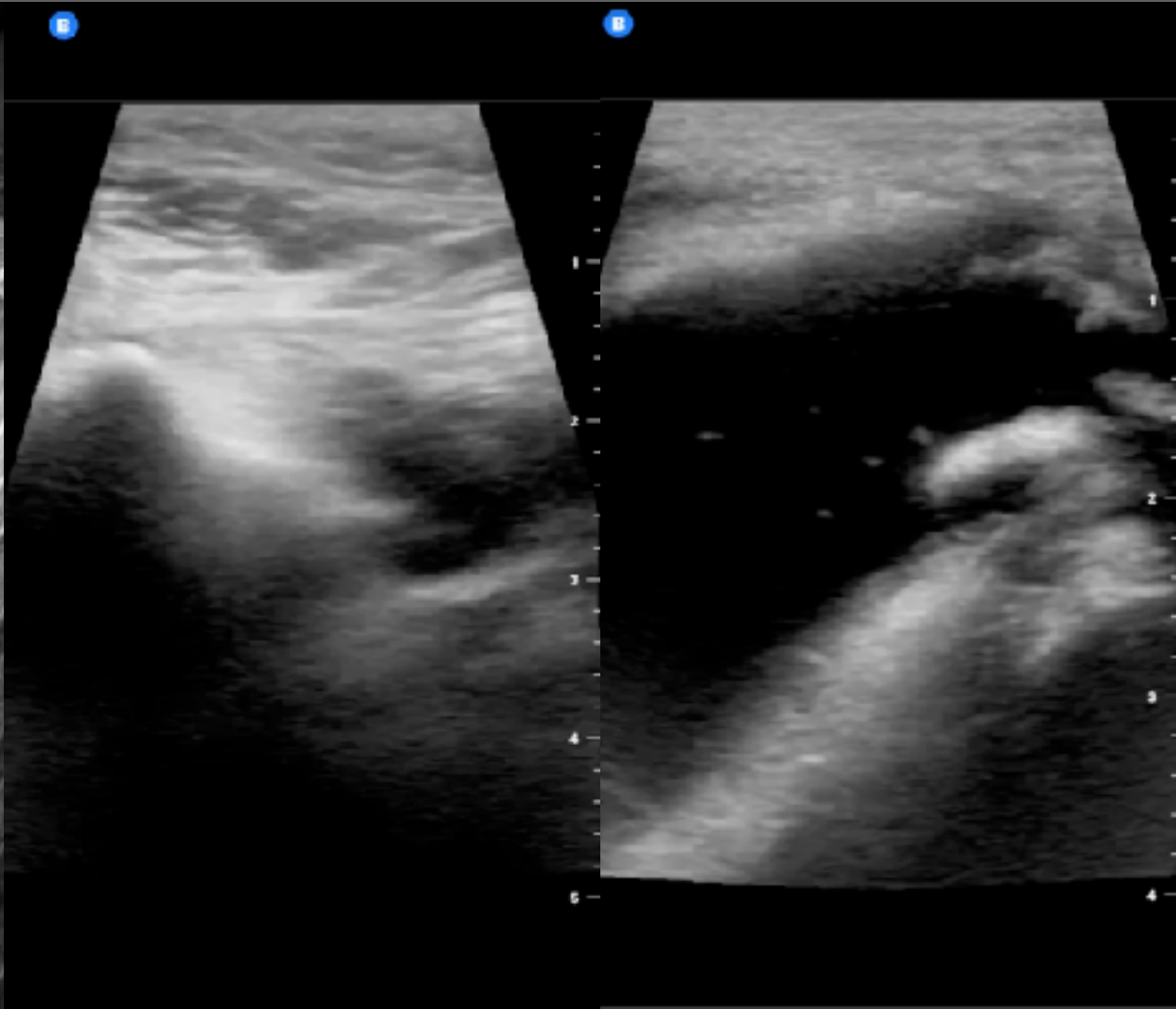
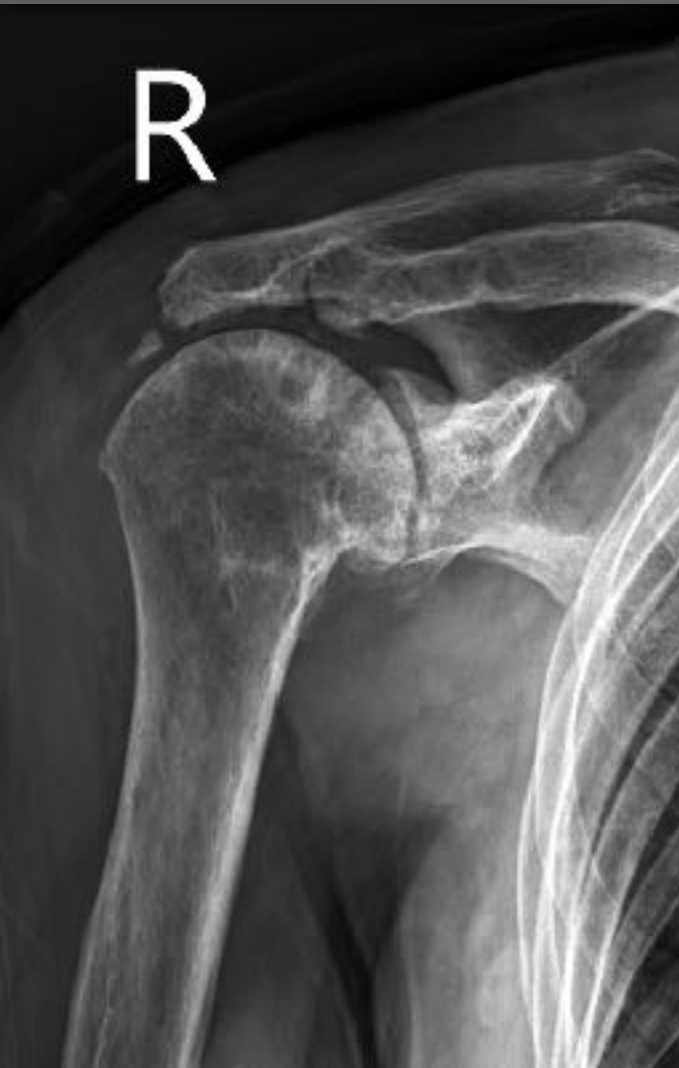
TIS: 0.01, MI: 0.35, MSK-Soft Tissue

TIS: 0.01, MI: 0.35, MSK-Soft Tissue

TIS: 0.01, MI: 0.26, MSK-Soft Tissue



93F, 原本躺著孫子要扶起來，
不慎拉傷右肩，昨天右肩痛，右手無法上舉



62F, Breast ca hx with dyspnea & shock



Parasternal approach pericardiocentesis



PHILIPS

MI 1.2 1/18/2021

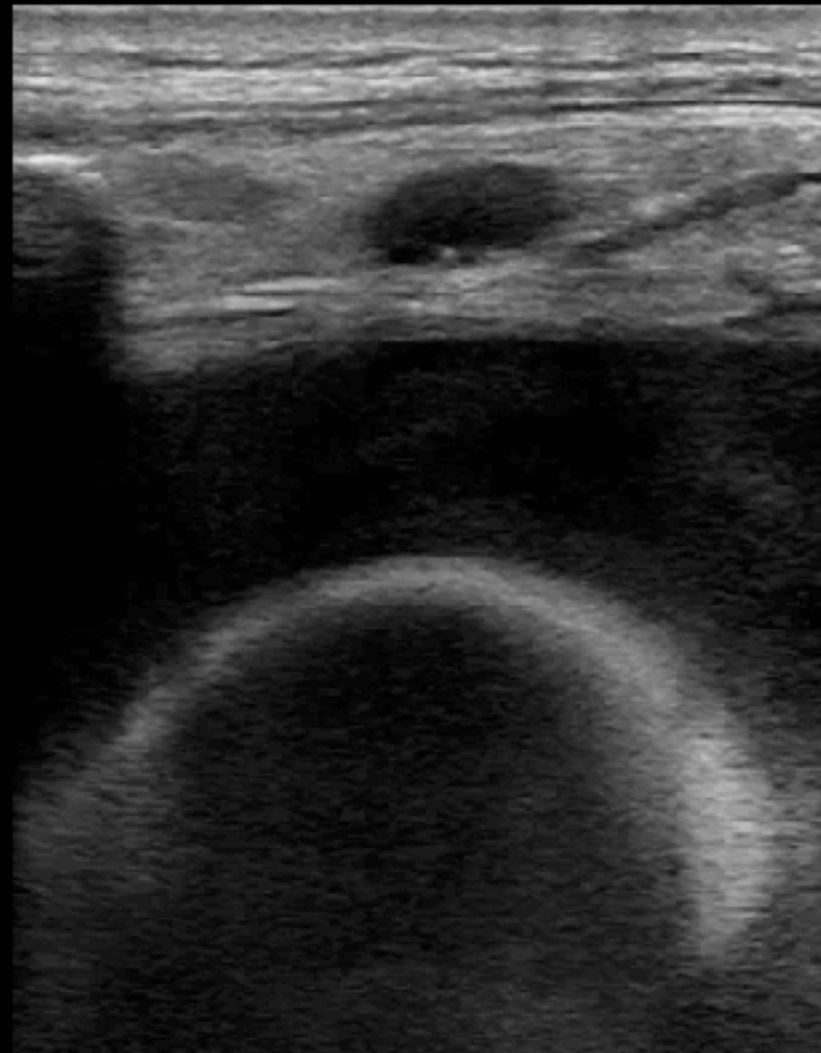
TIS 0.2 3:47:10 PM

Arterial
L12-3
34 Hz
5.0cm

2D

HGen
Gn 66
C. 41
3/3/2

P



P R

2

4

62F, Breast ca hx with dyspnea & shock



PHILIPS

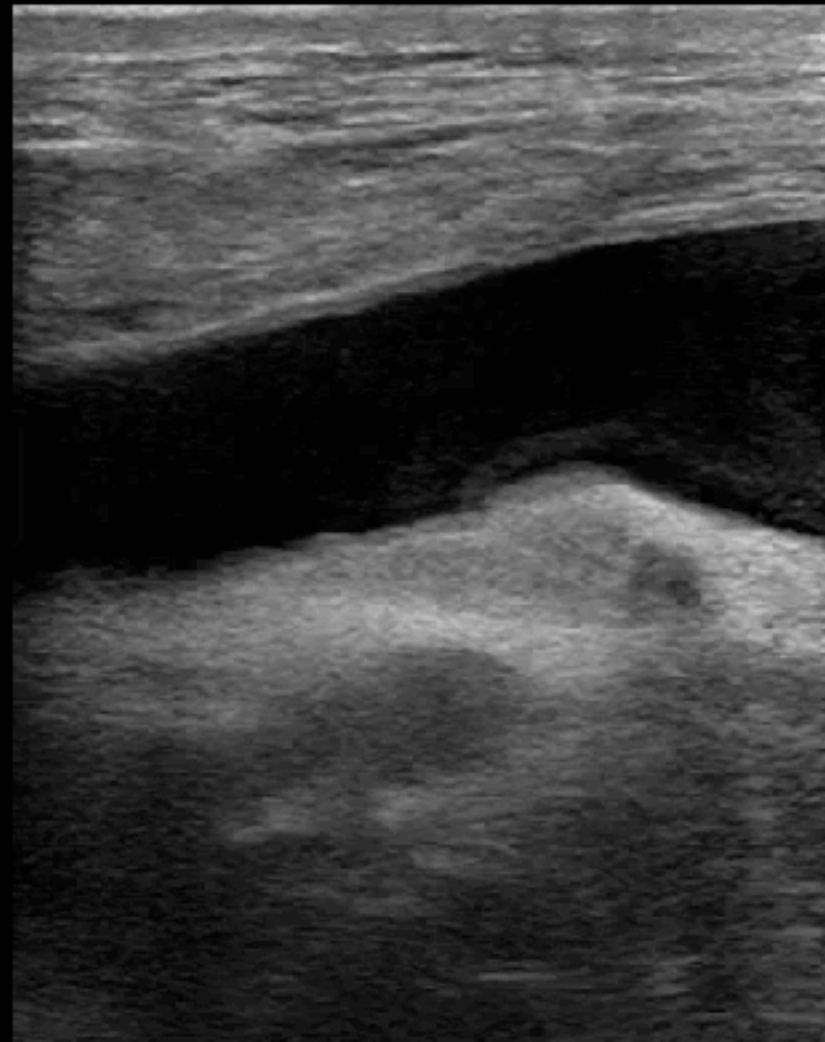
MI 1.2 1/18/2021

TIS 0.2 3:54:32 PM

Arterial
L12-3
34 Hz
5.0cm

2D
HGen
Gn 66
C. 41
3/3/2

P

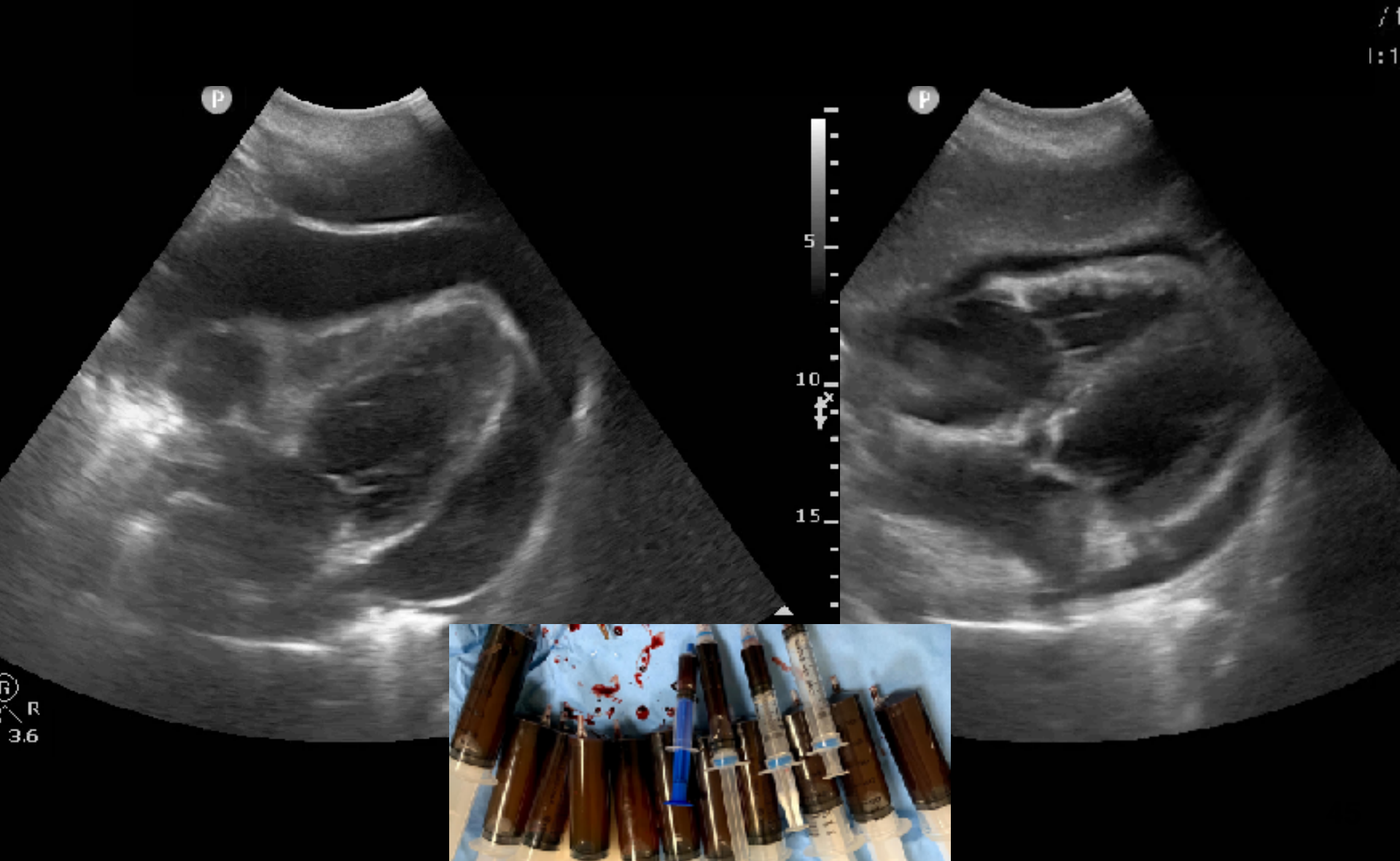


P A R

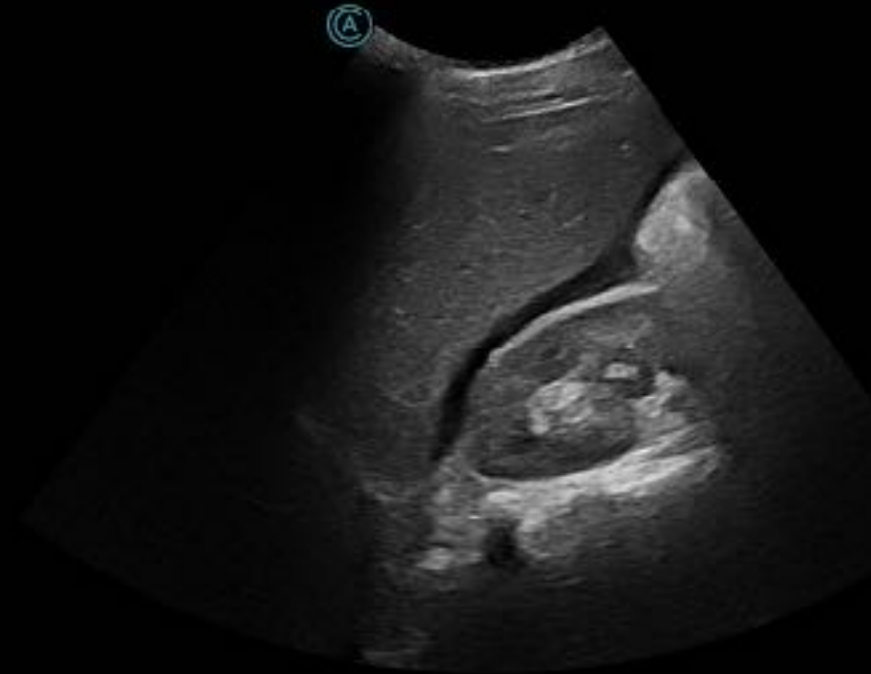
2

4

Monitor response



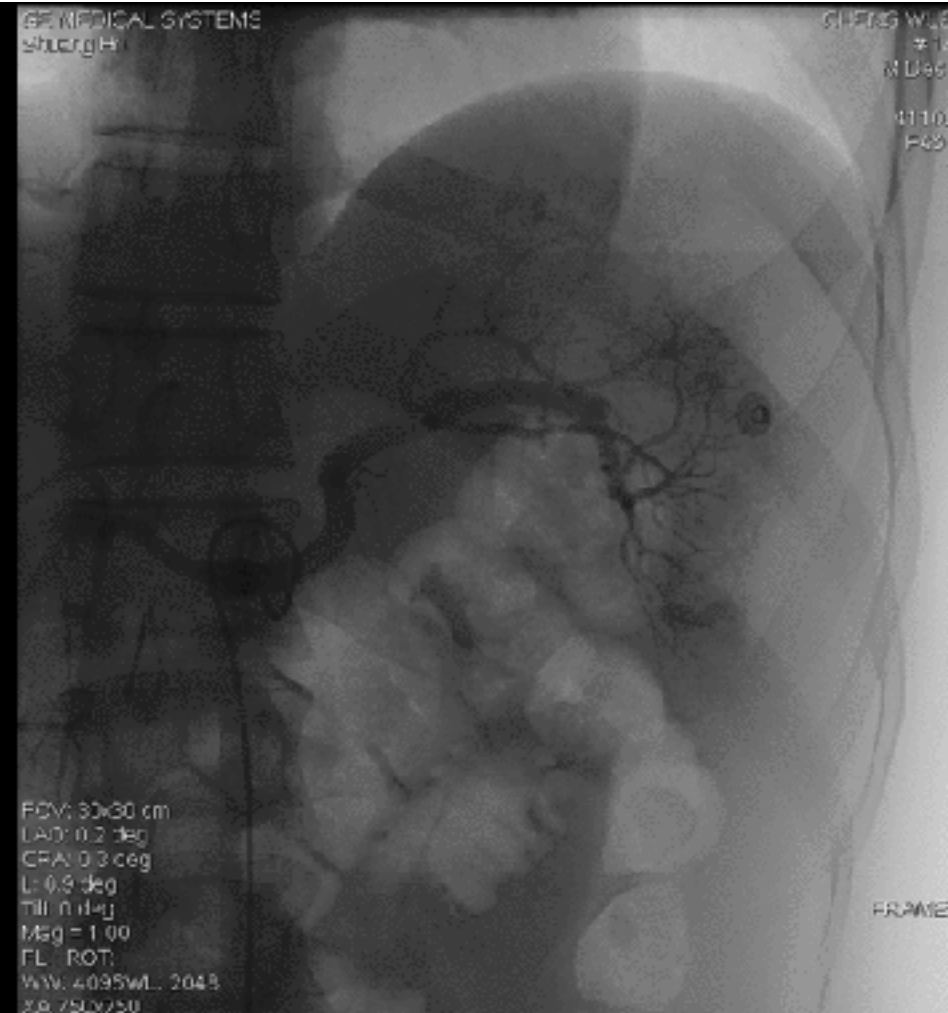
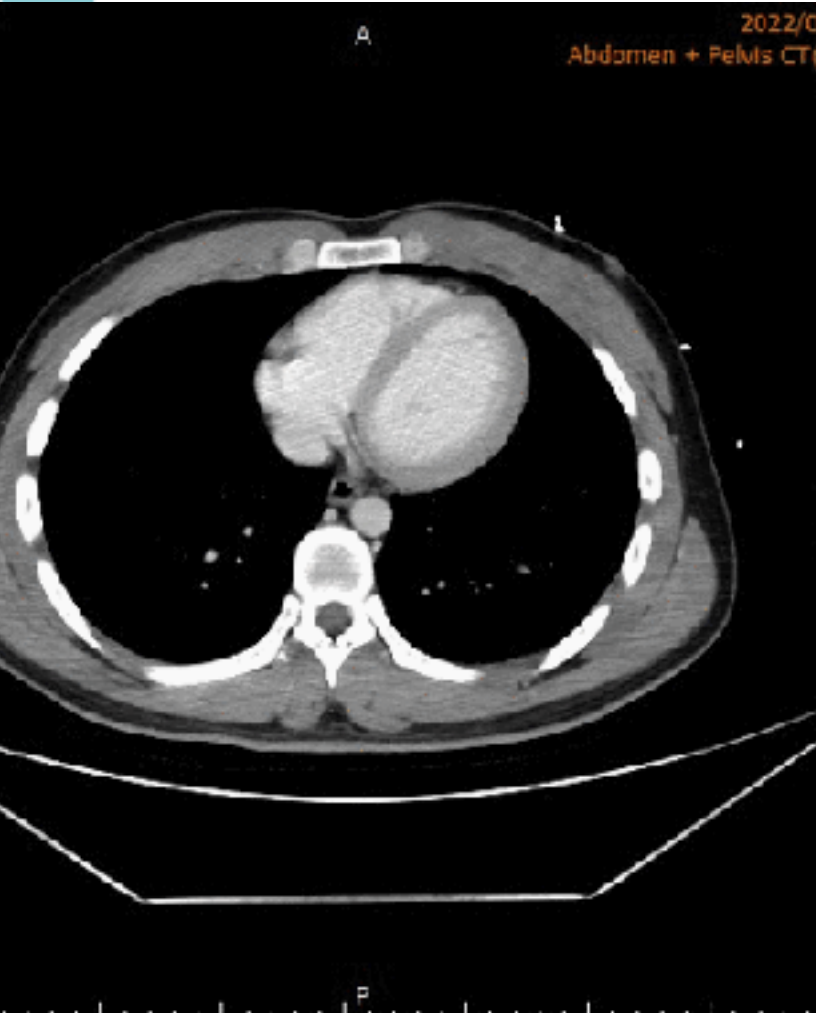
23M, trauma with abdominal pain



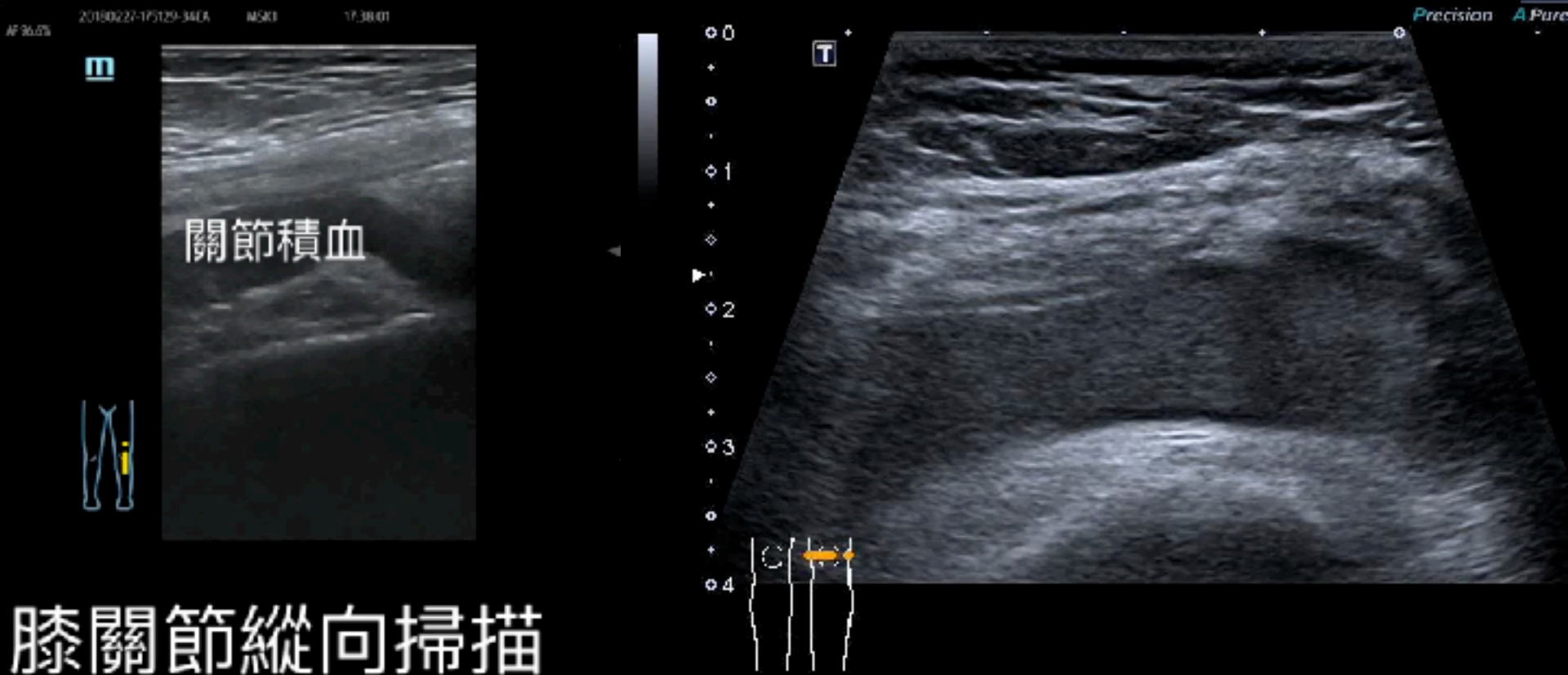
Ⓐ

0.4
Prese
èß
FP
60.0
Dept
16.0
Gai
50.0
Powe
M
PR
0.0

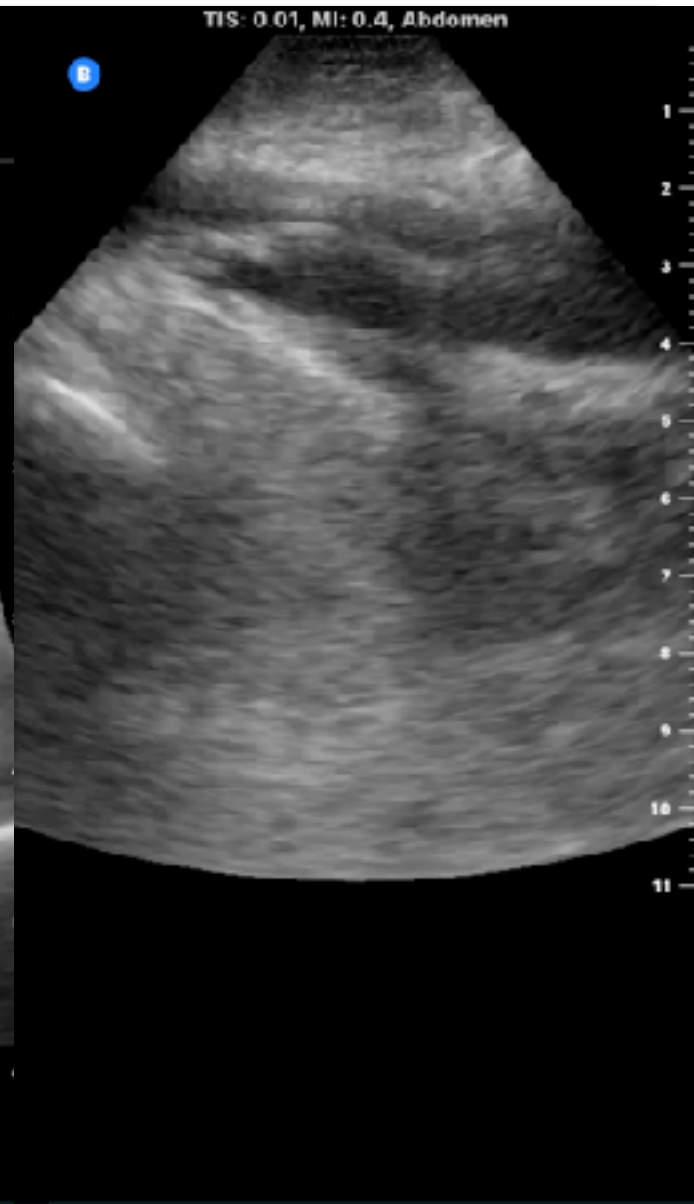
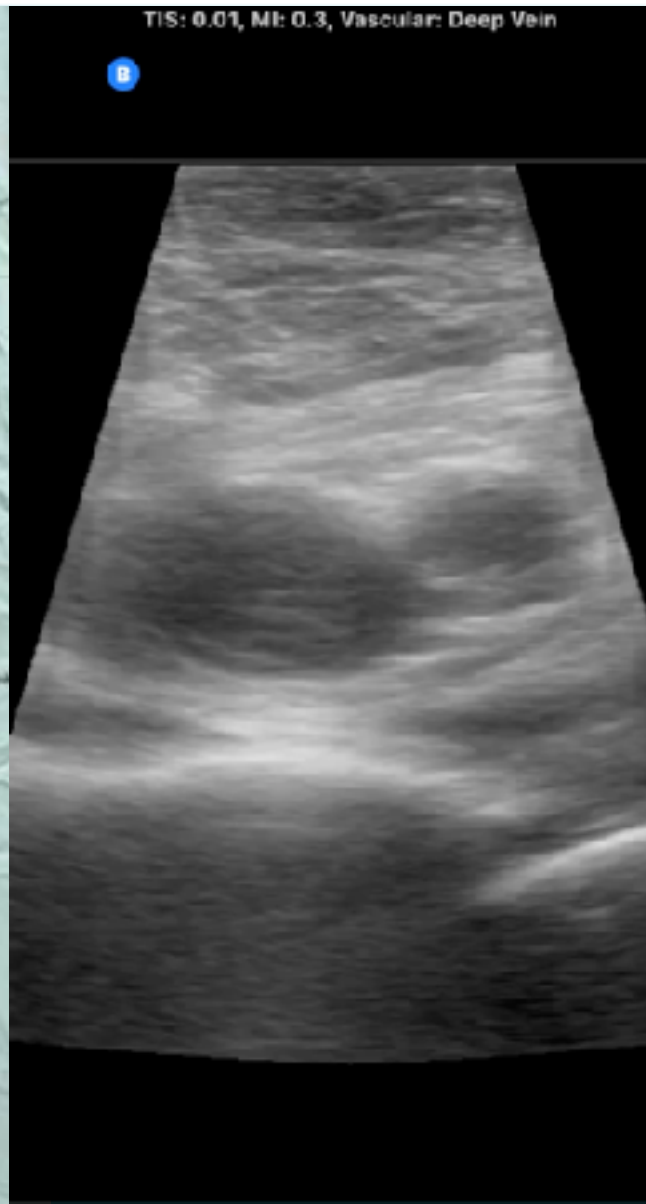
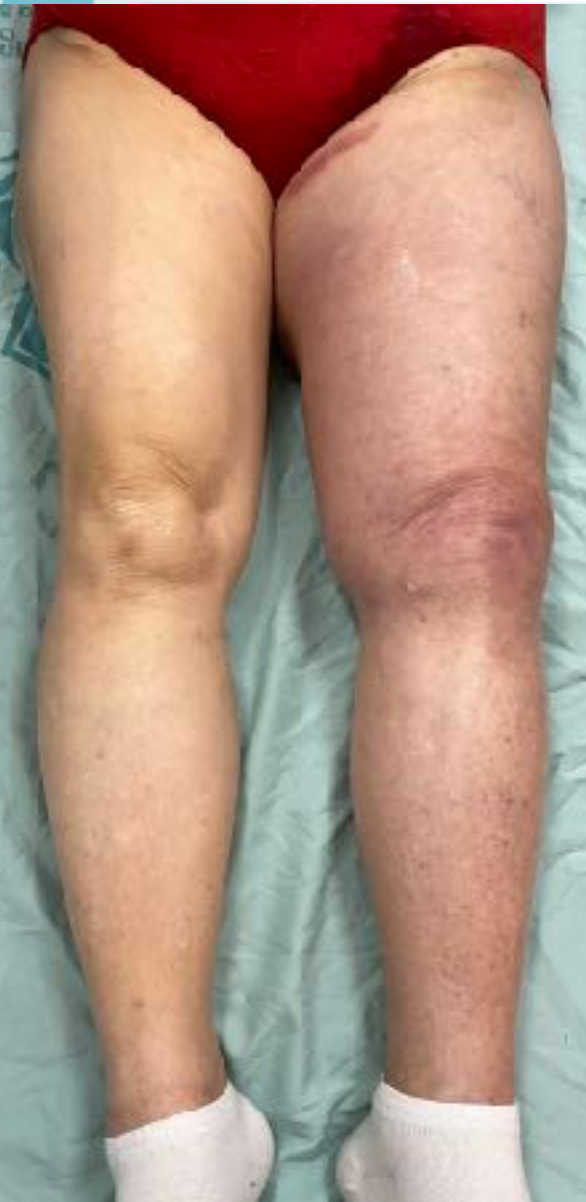
Splenic laceration & TAE



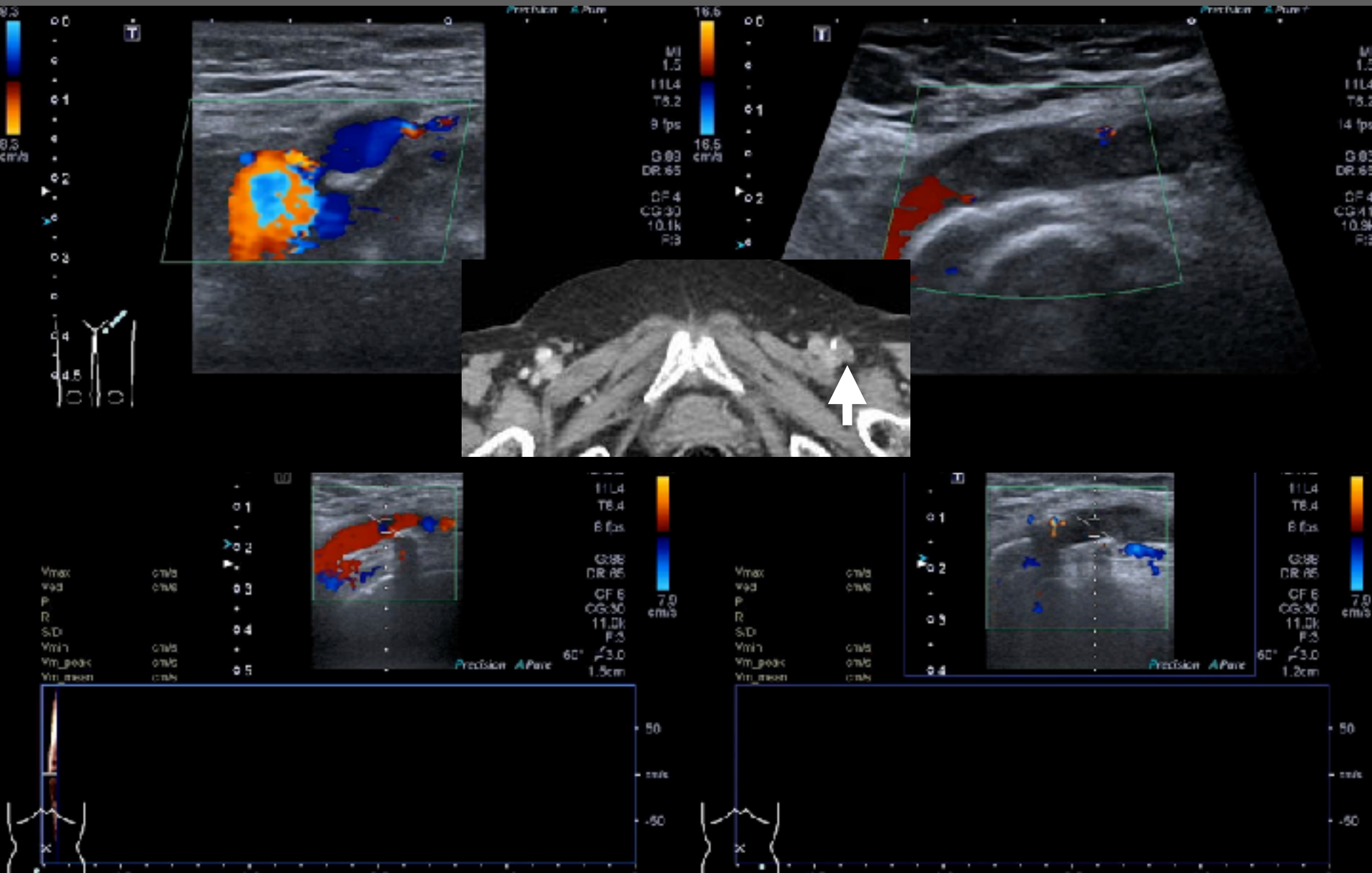
Joint effusion & aspiration



83, left leg swelling for 3 days



86F，腹痛3-4天了，今天腹痛改善，今天早上9點左右開始左腳無力且疼痛不適 (ER 0814; AZ0615)



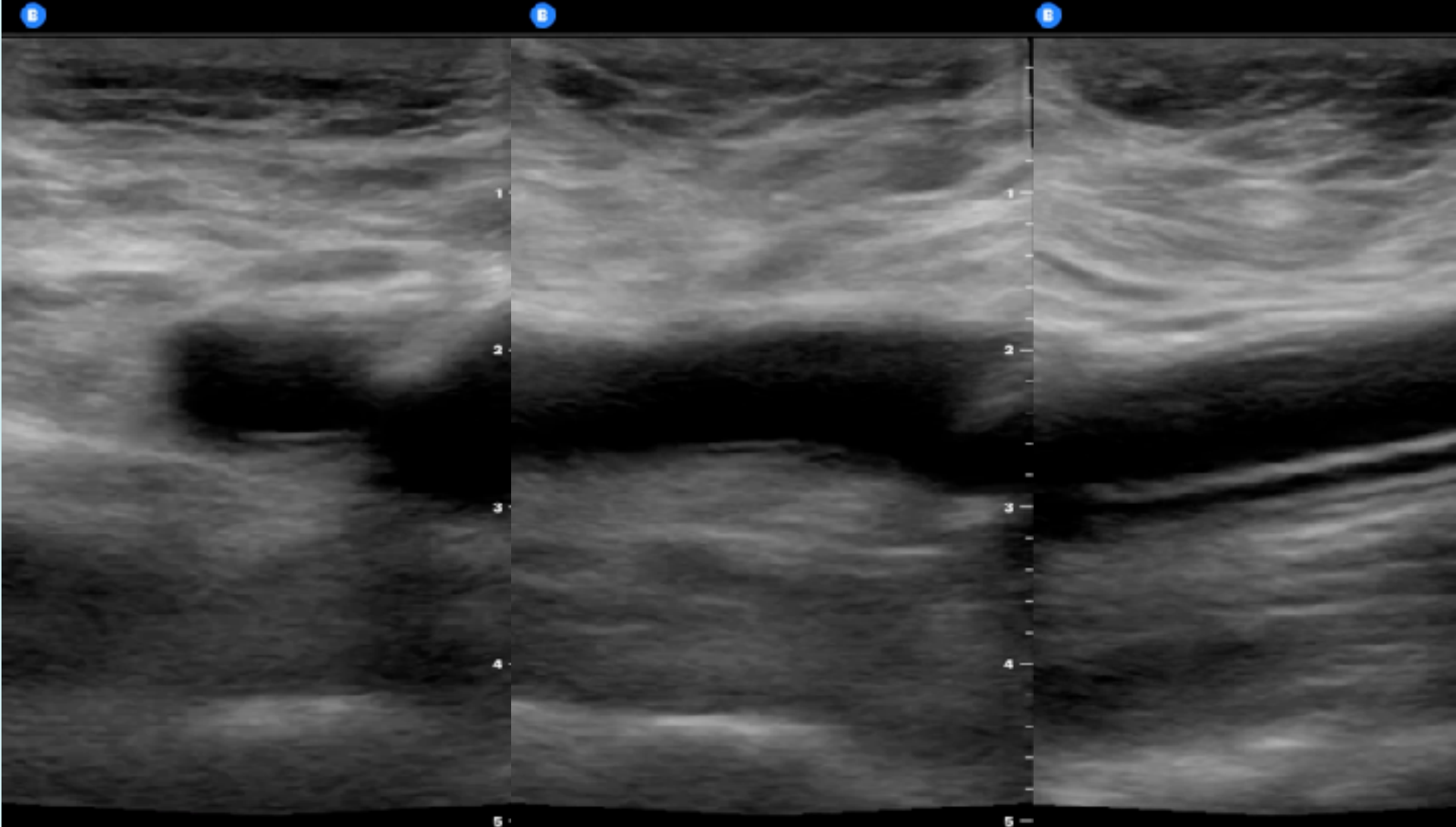
99M, IHCA, A line insertion



TIS: 0.01, MI: 0.45, Vascular: Access

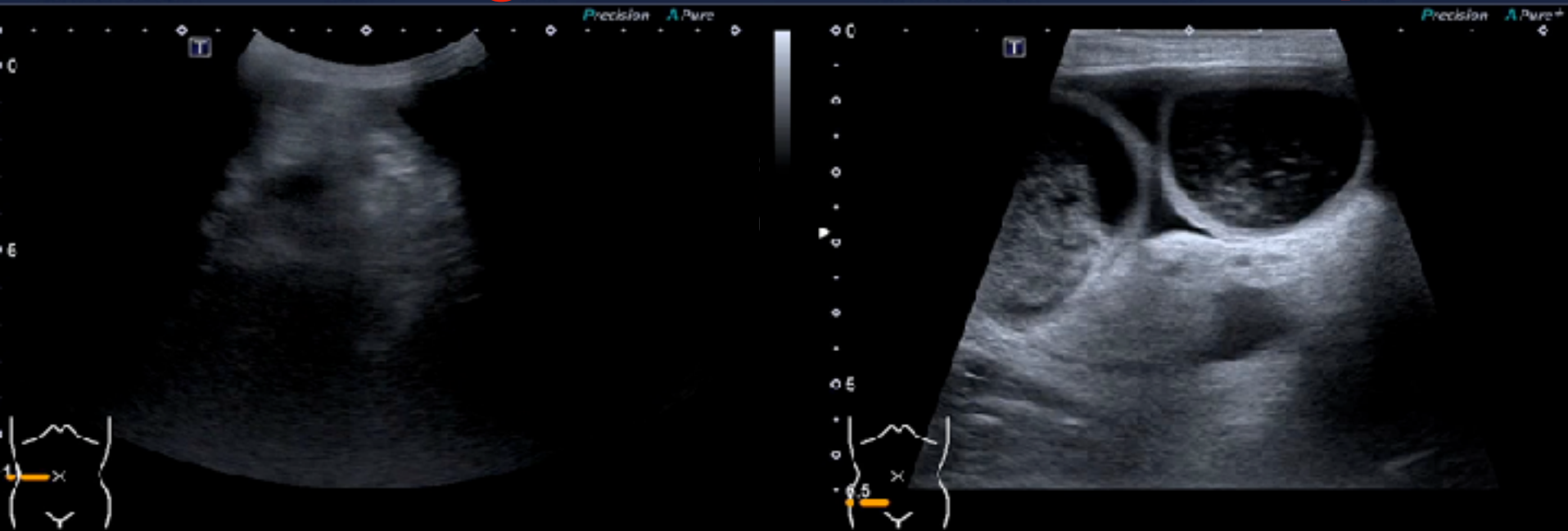
TIS: 0.01, MI: 0.45, Vascular: Access

TIS: 0.01, MI: 0.45, Vascular: Access

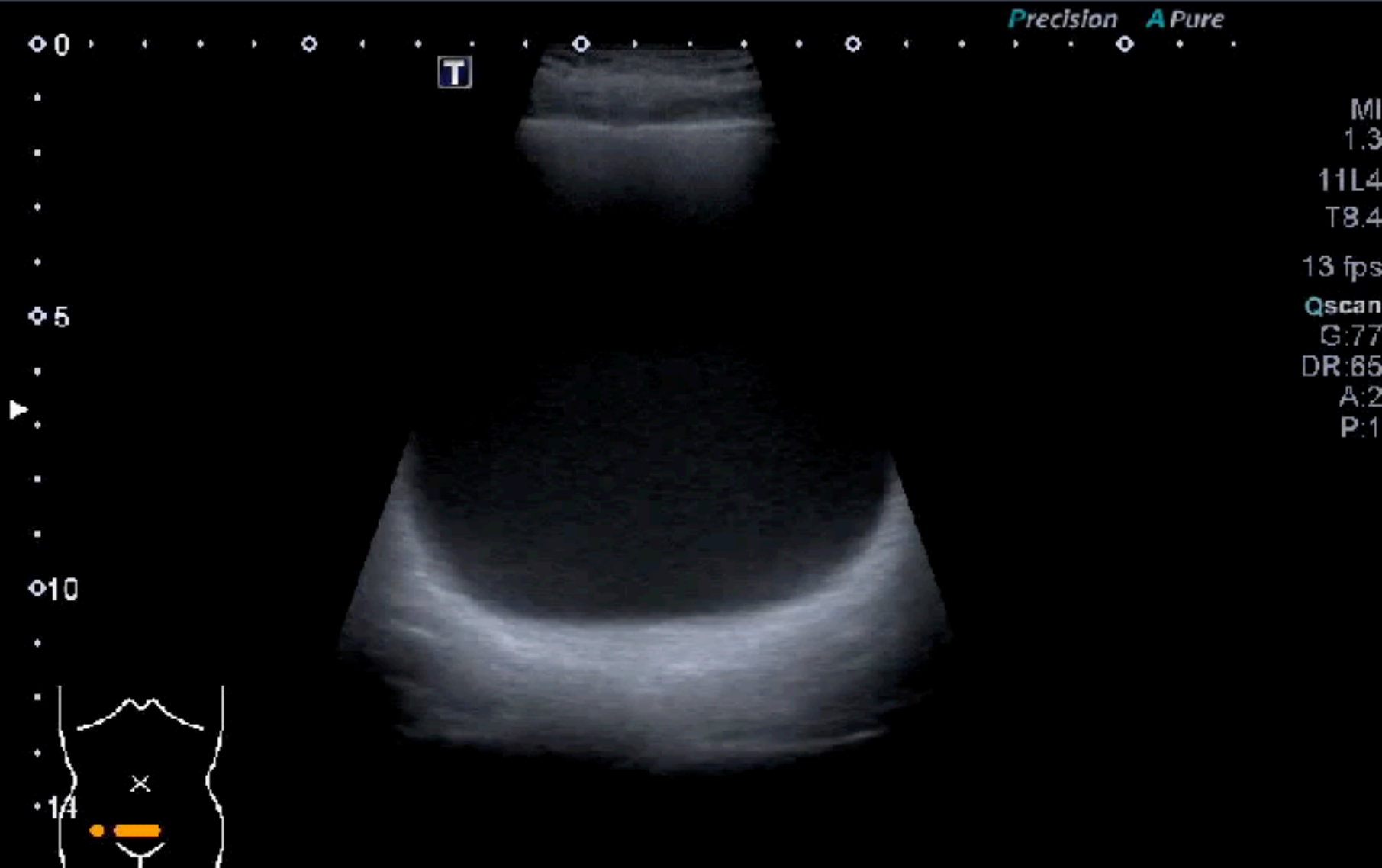


69M, right inguinal pain

Hernia diagnosis & find best reduction path



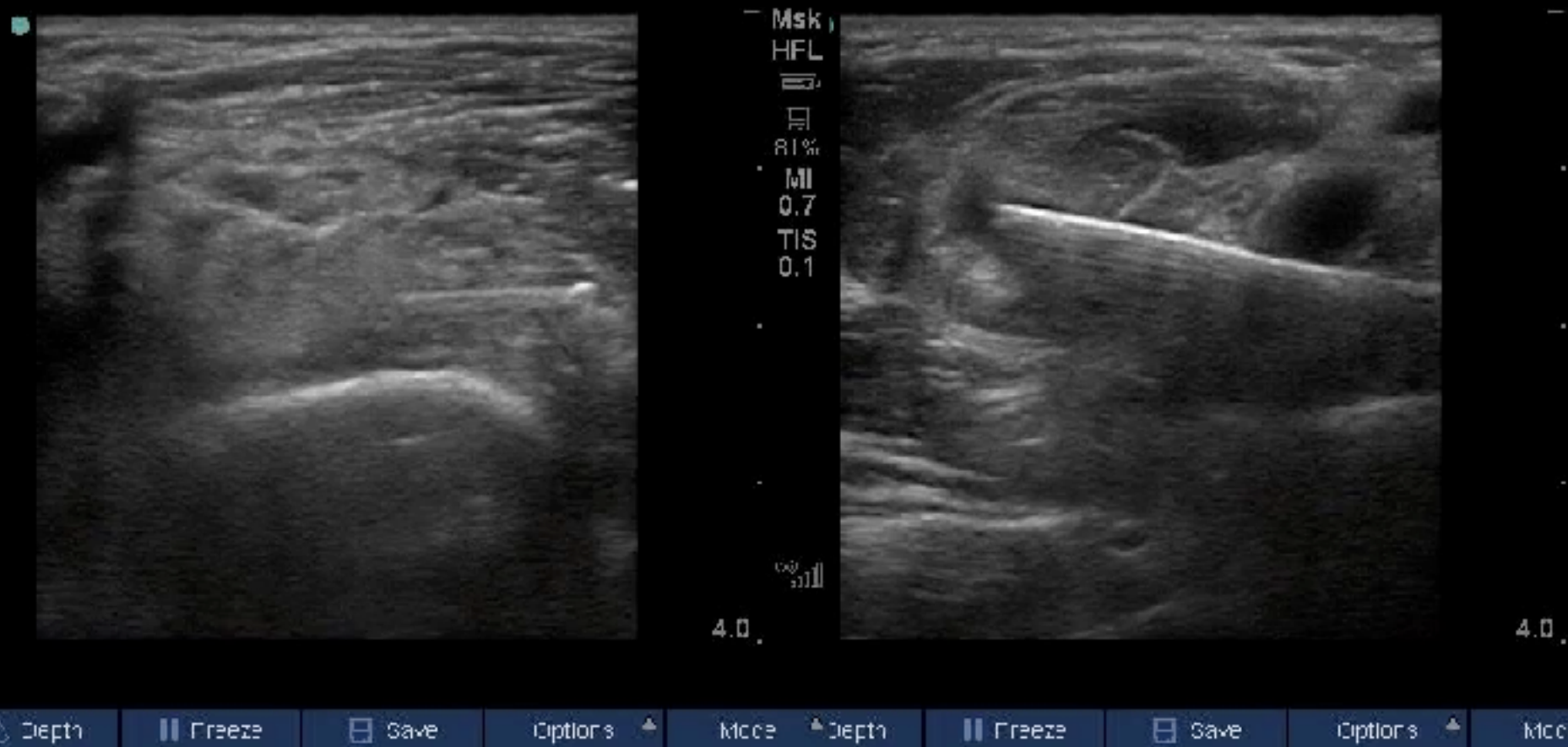
76M, AUR & urethral stricture



64M, left elbow FB



64M, left elbow FB



64M, left elbow FB removal



64M, left elbow FB removal



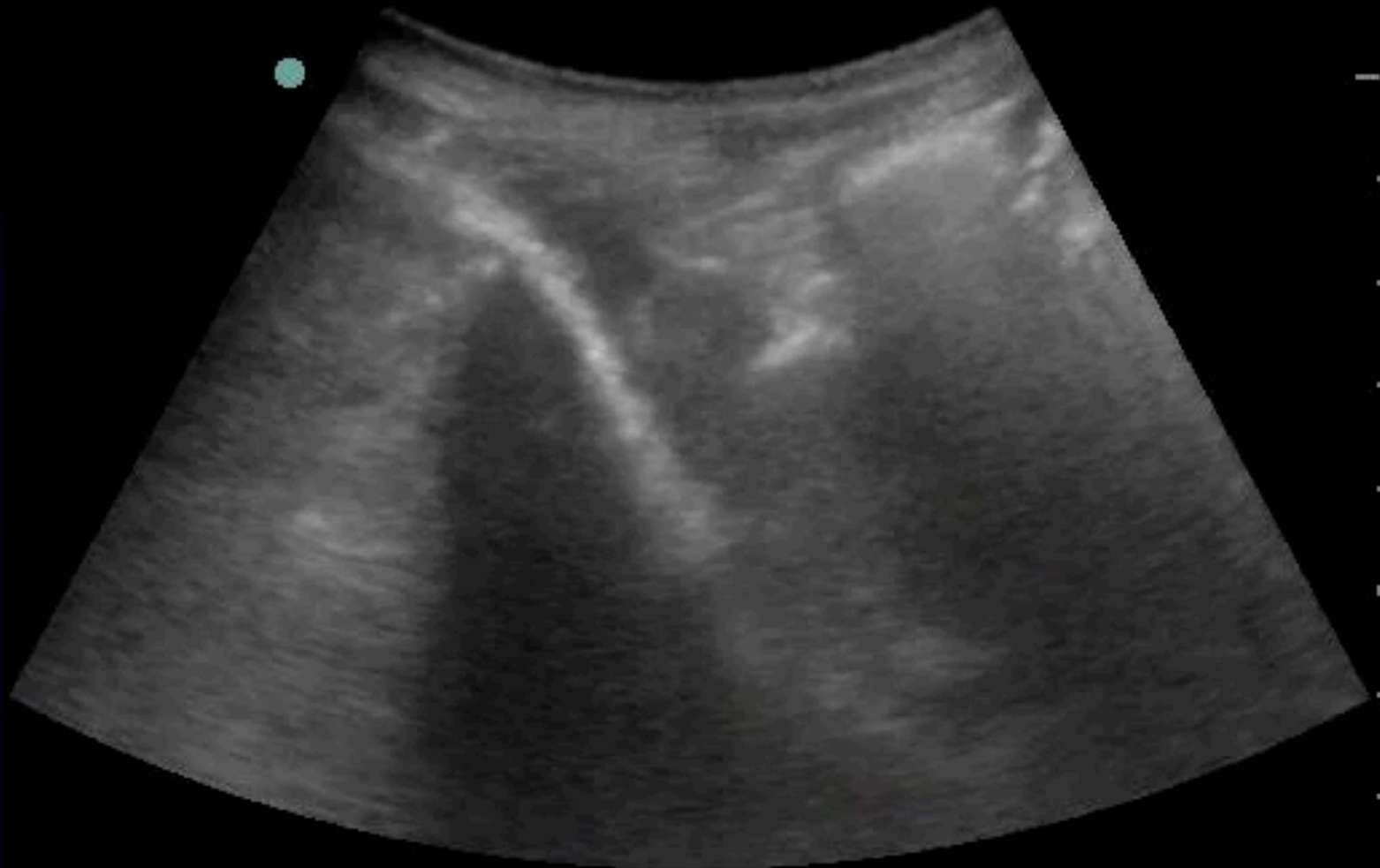
85, Psoas muscle abscess



85, Psoas muscle abscess



GenTHI MB



Abd

C60



85%

MI

0.8

TIS

0.2



Patient



Auto Gain



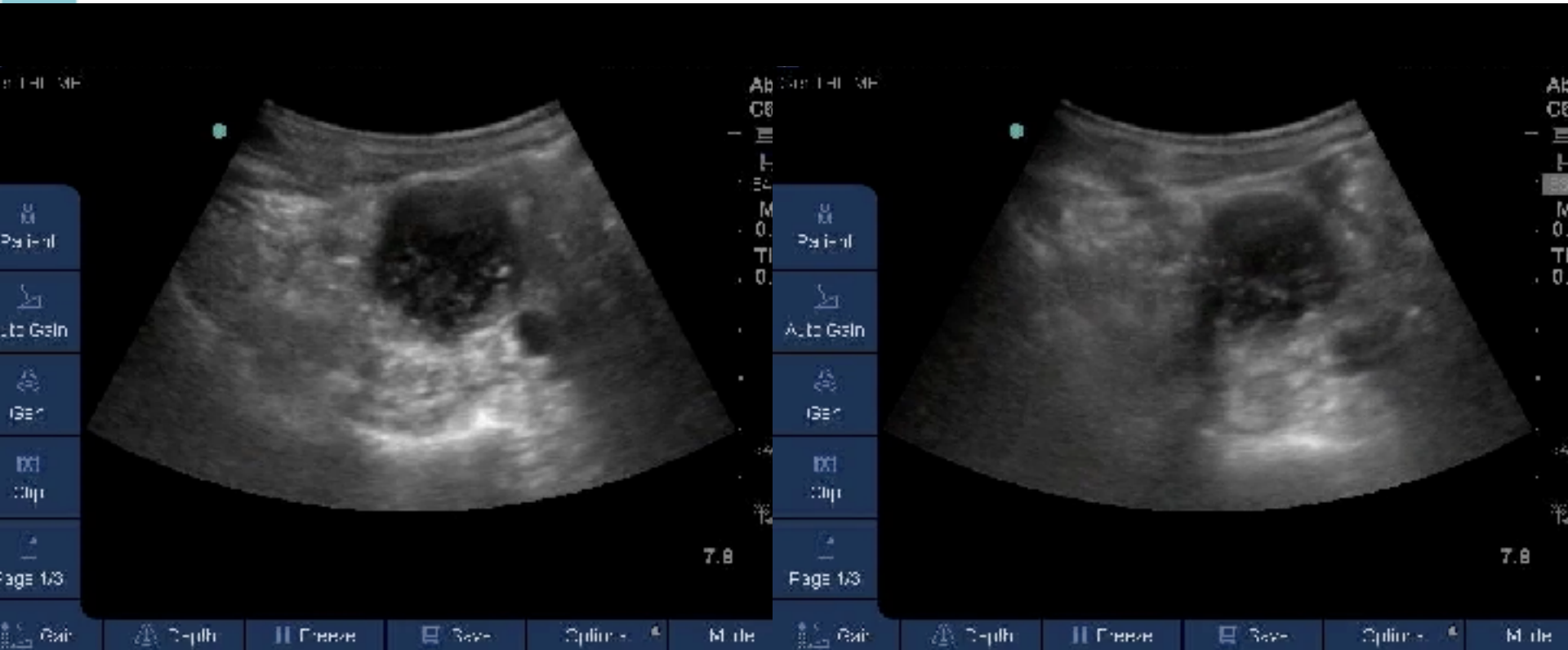
Gen



Clip



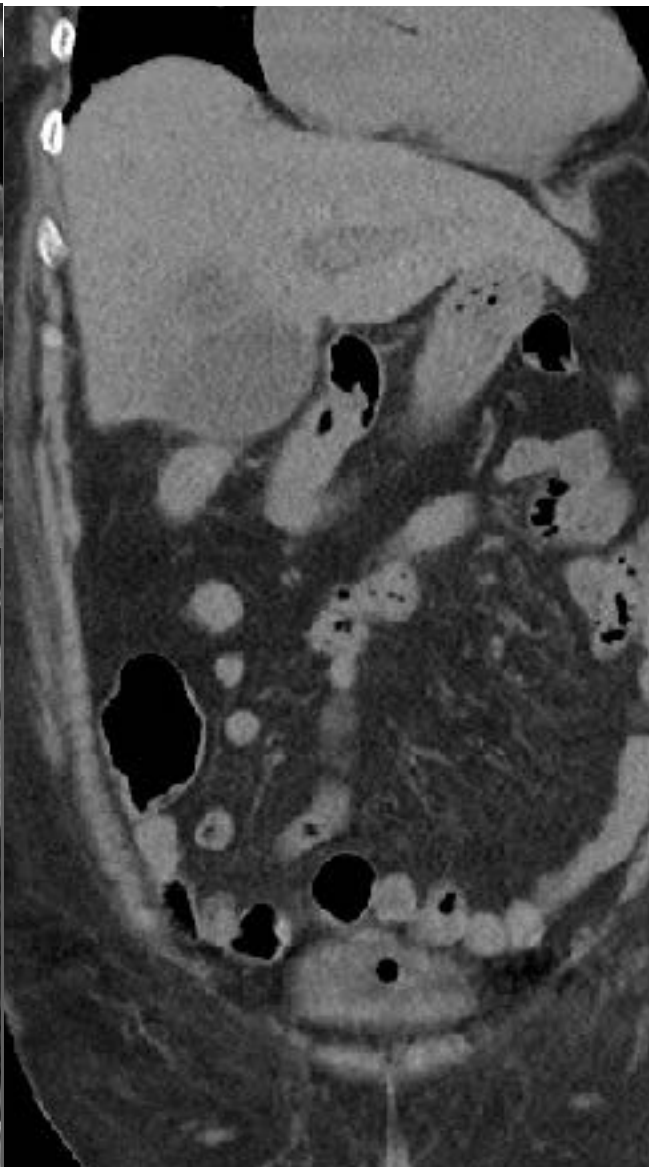
85, Psoas muscle abscess



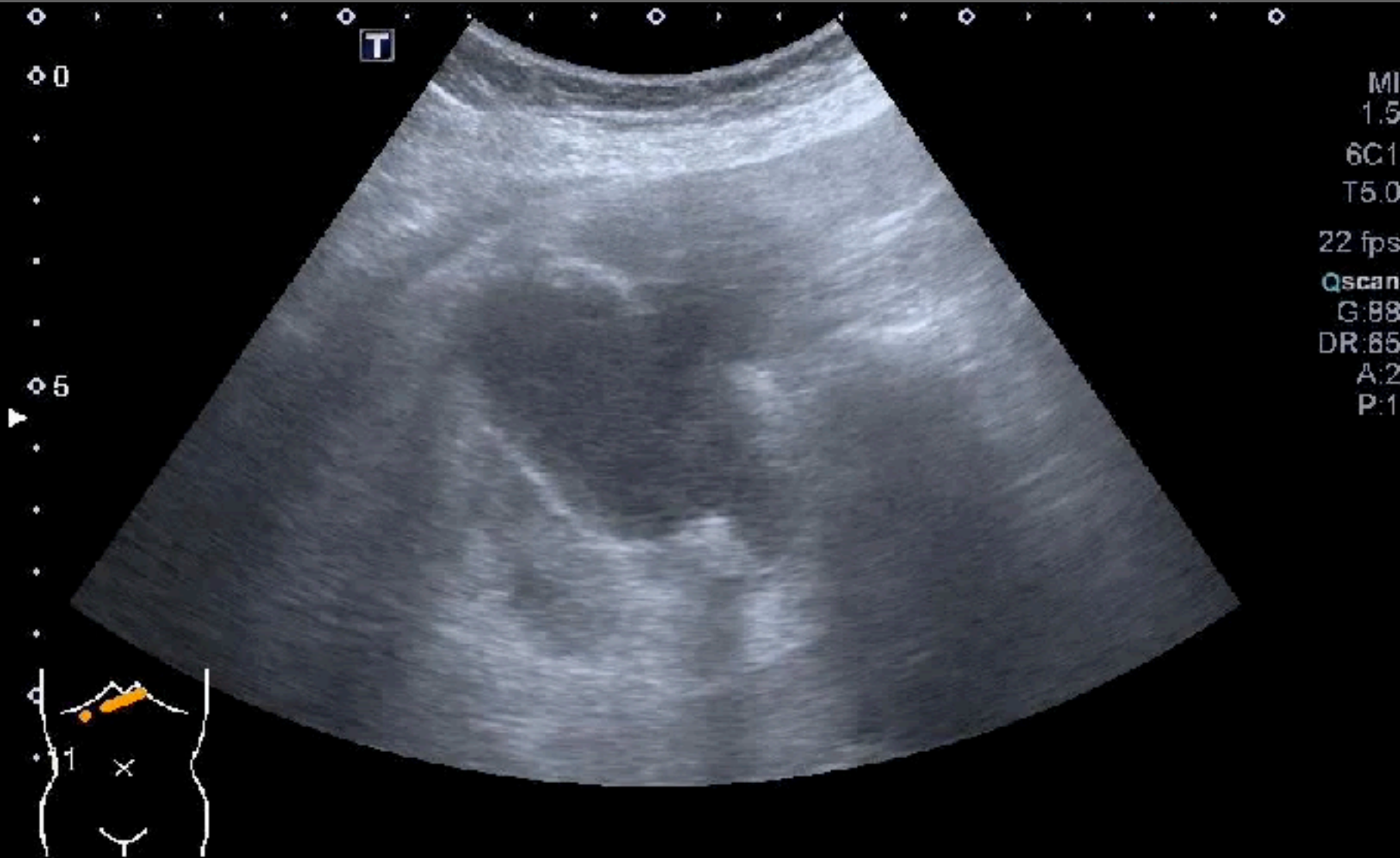
85, Psoas muscle abscess



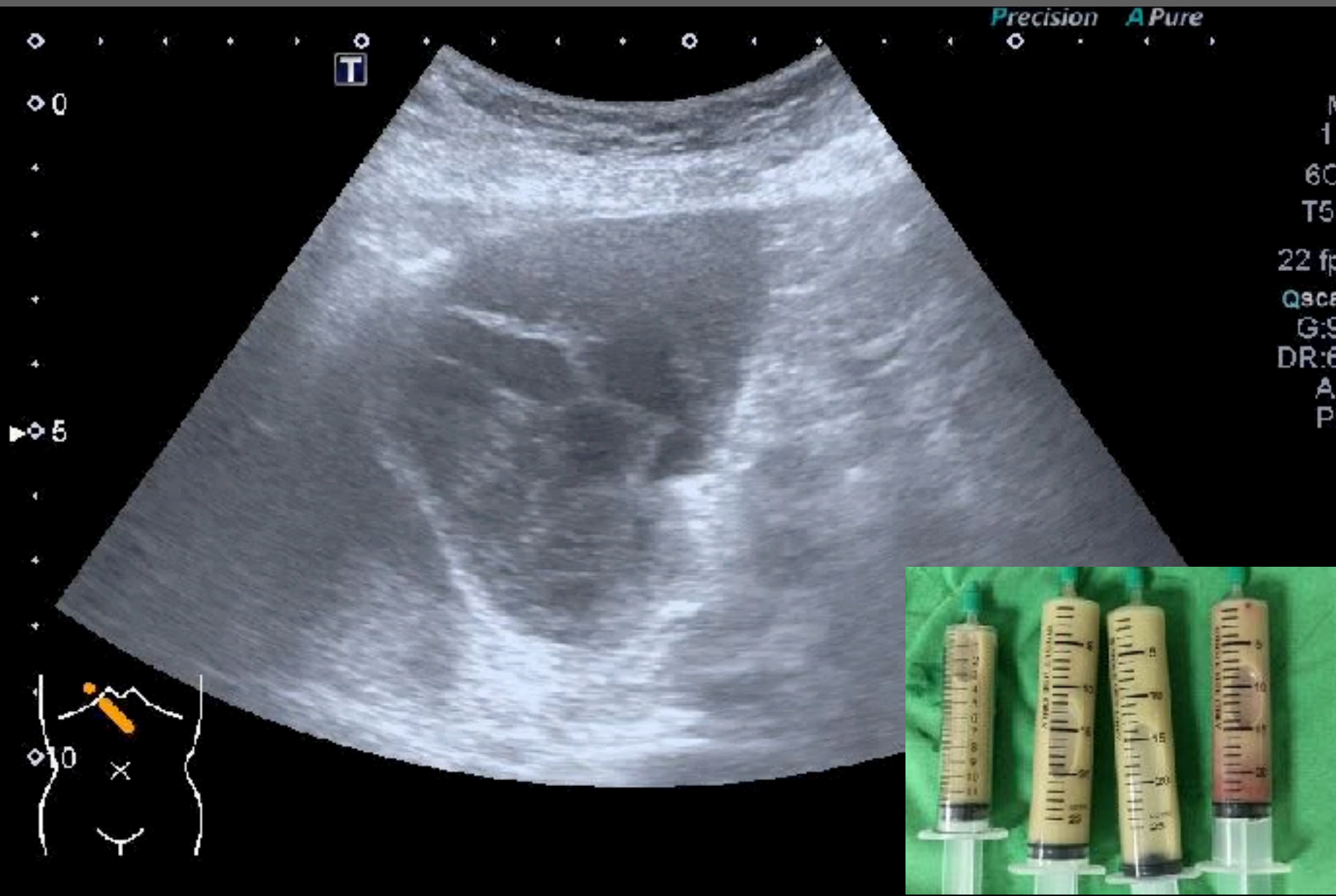
94F, right abdominal pain with fever



94F, right abdominal pain with fever



GB empyema with rupture





努力可能會說謊，
但努力不會白費。

羽生結弦

HOLISTIC ULTRASOUND

juice119@gmail.com / POCUSacademy.com