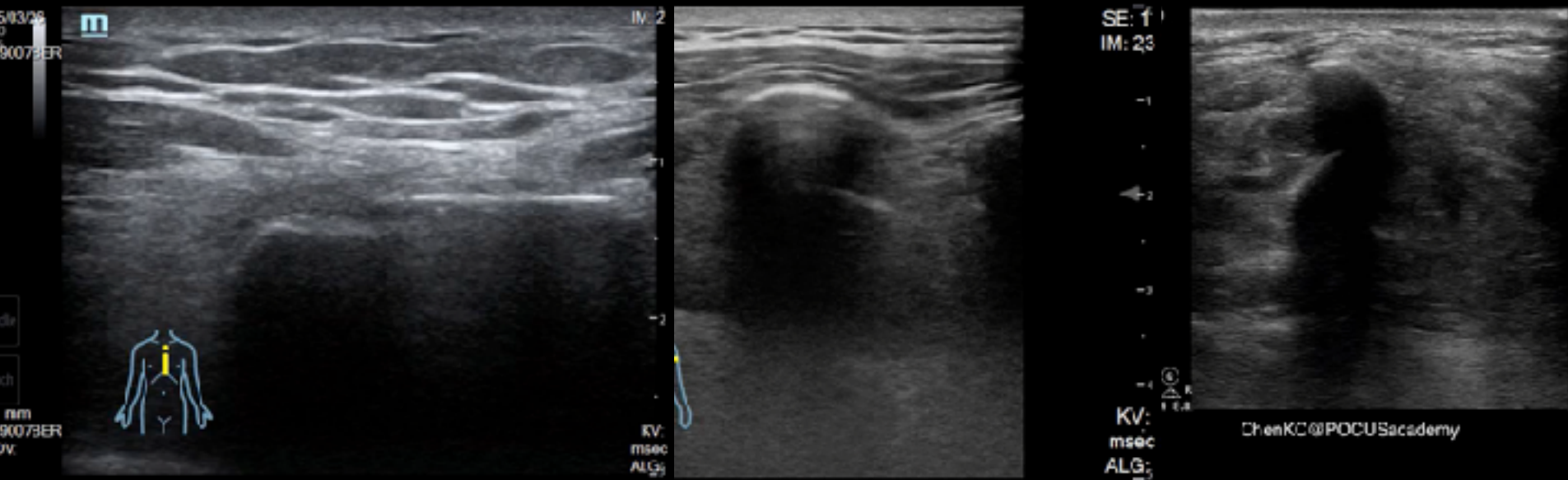




STERNUM / RIB / CLAVICLE FRACTURE & PAIN CONTROL

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

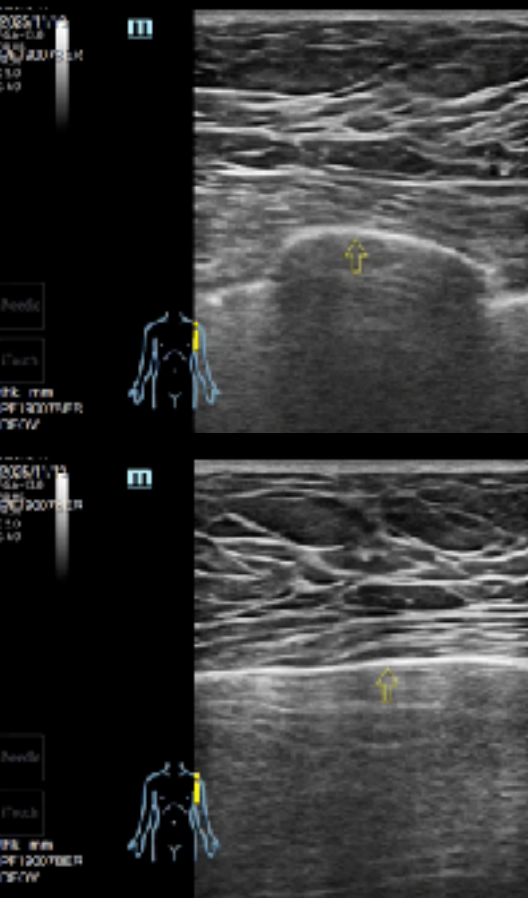
Urinary tract

Pregnancy

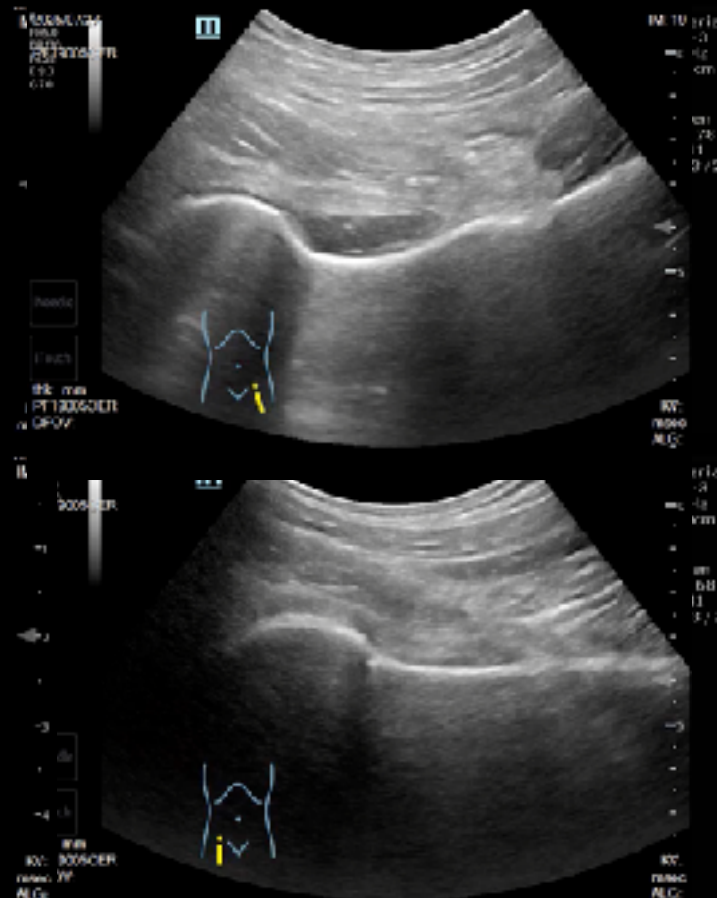
Bowel

MSK

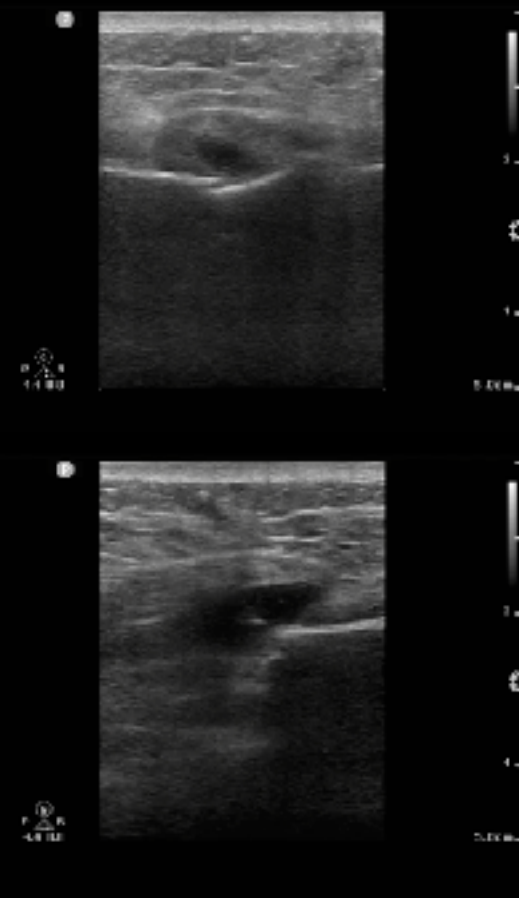
Bi-plane & Pain oriented

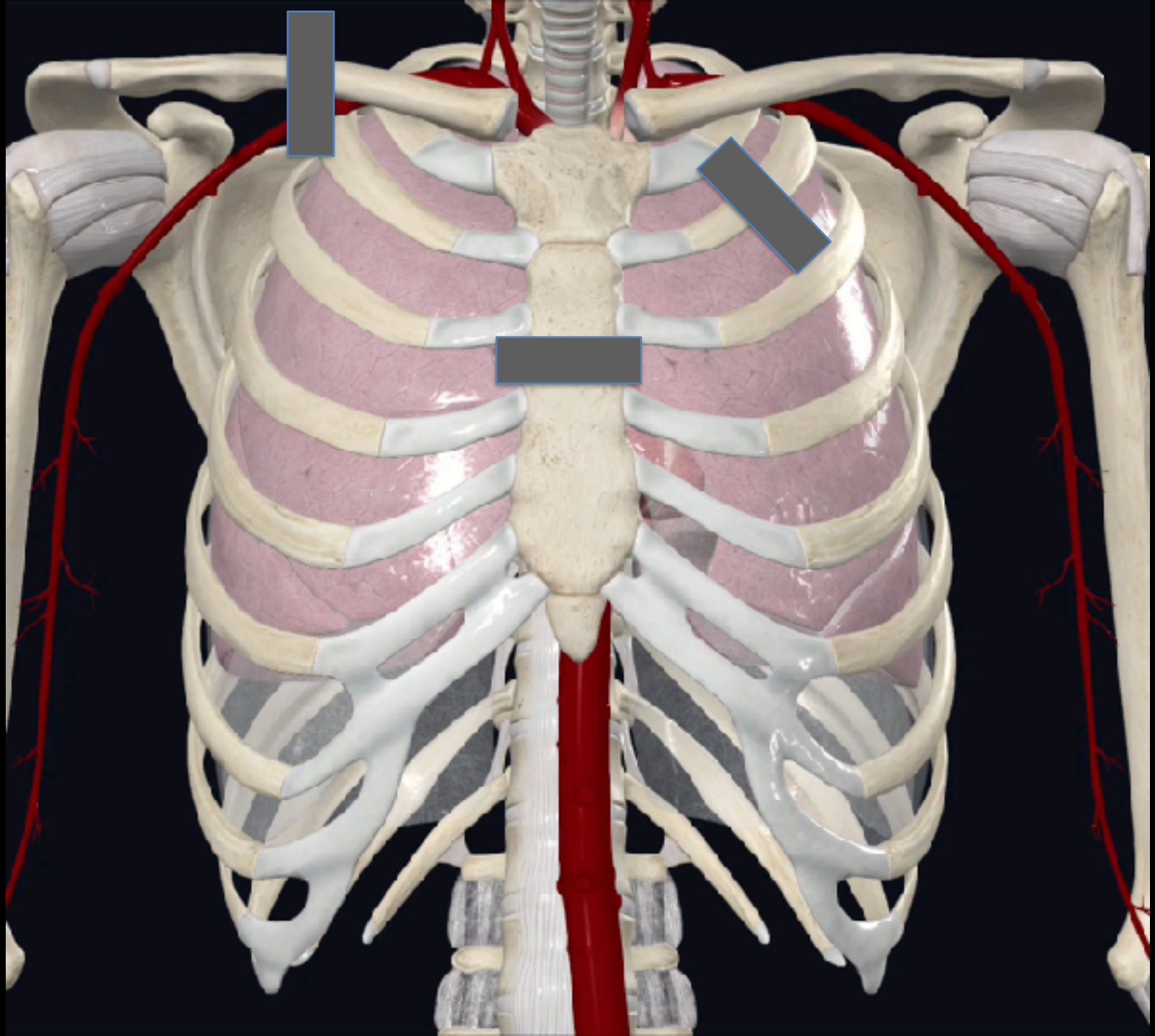


Right probe & Comparison

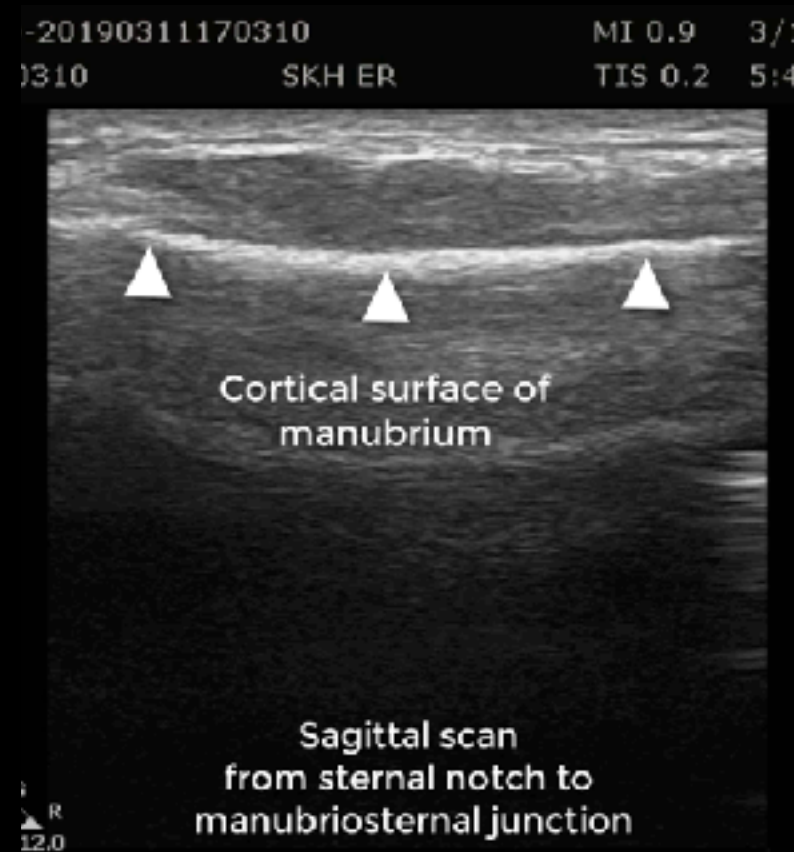
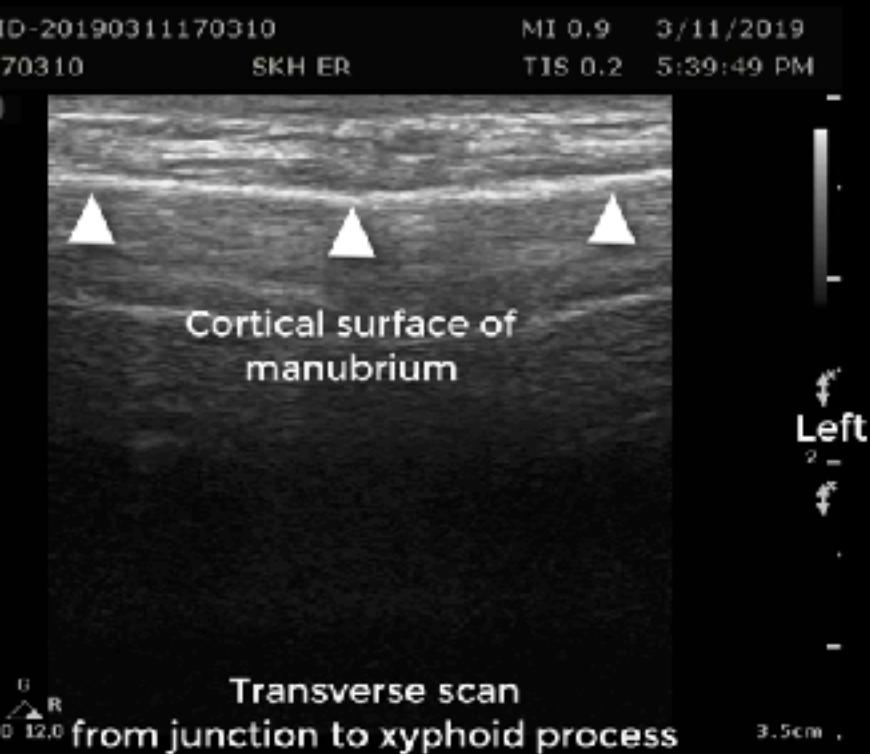


Needling for accuracy





Normal sternum



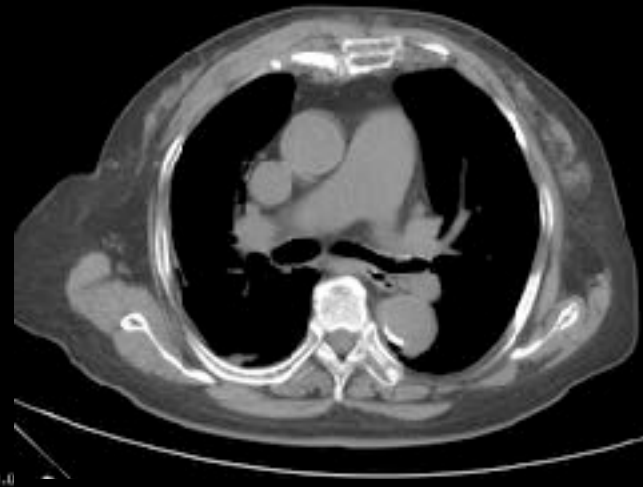
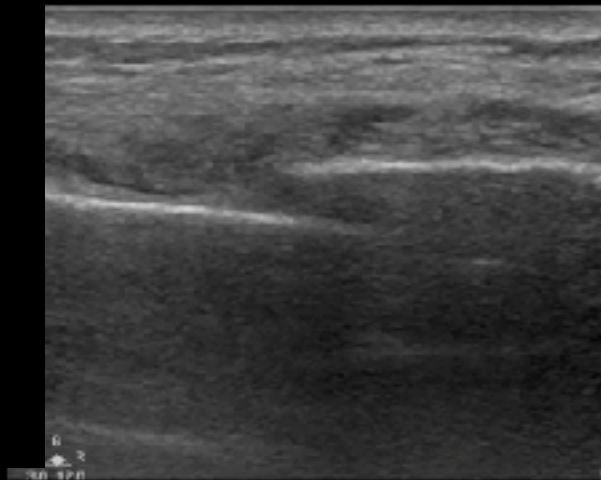
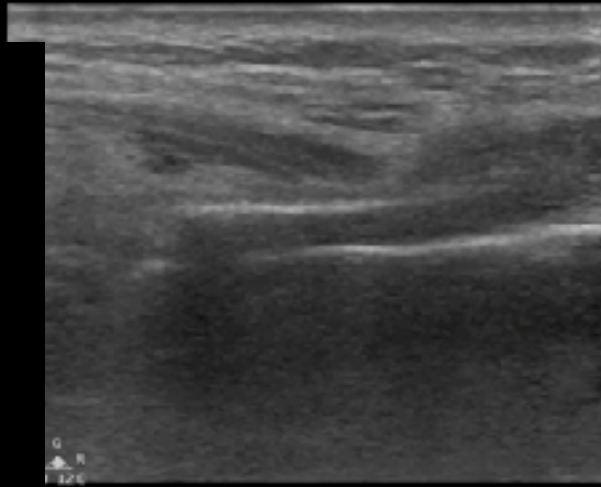
Fracture : long & flat bone



高低落差

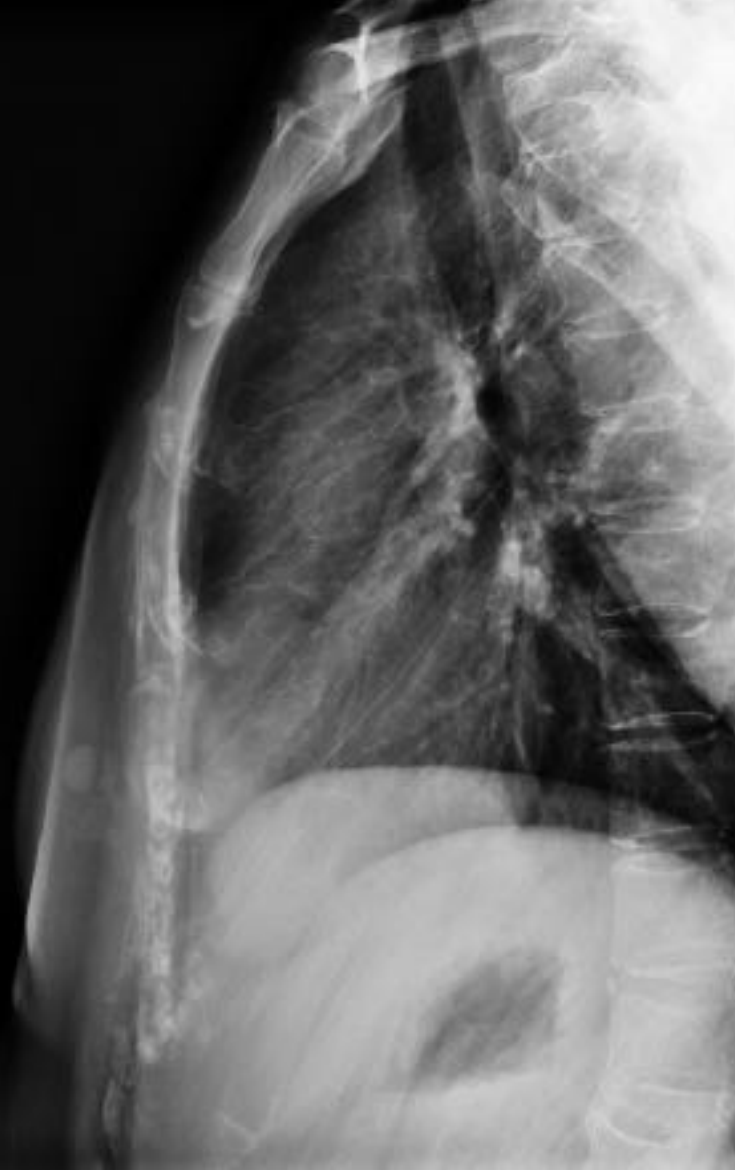
不連續

血腫



53F, anterior chest injury

R



R

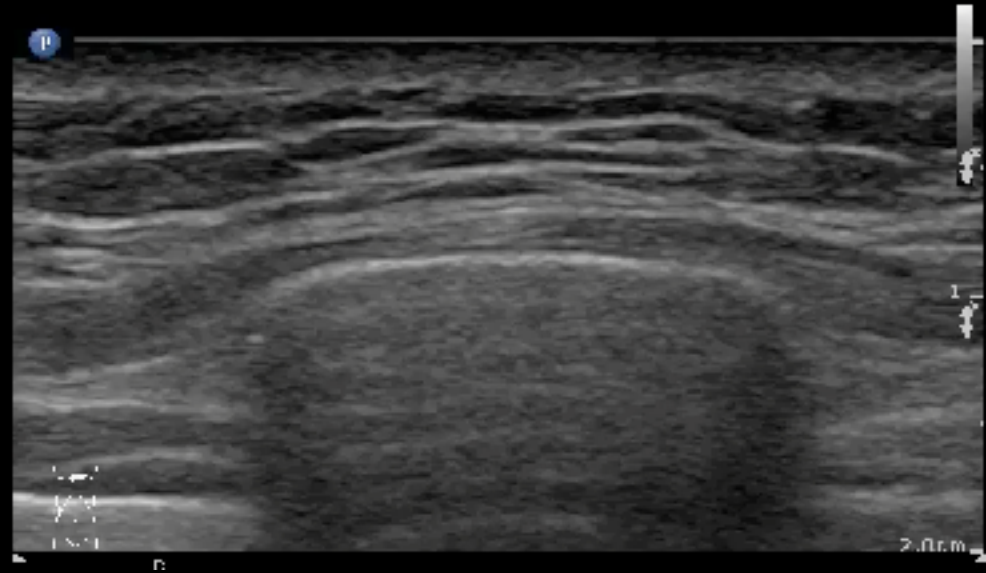


53F, anterior chest injury



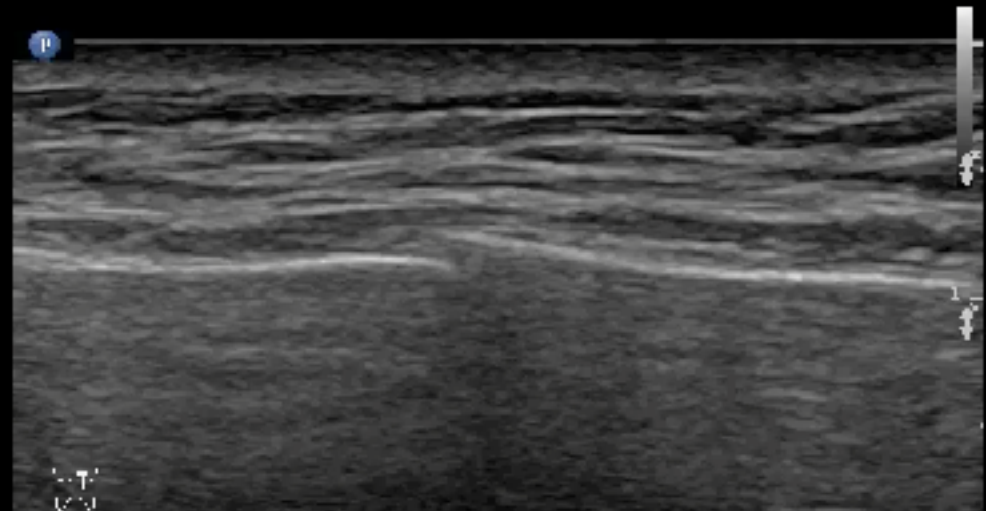
Superficial
L12 3
50 H7
2.0cm

20
Res
Gn 60
C 56
3/2/1



Superficial
L12 3
50 H7
2.0cm

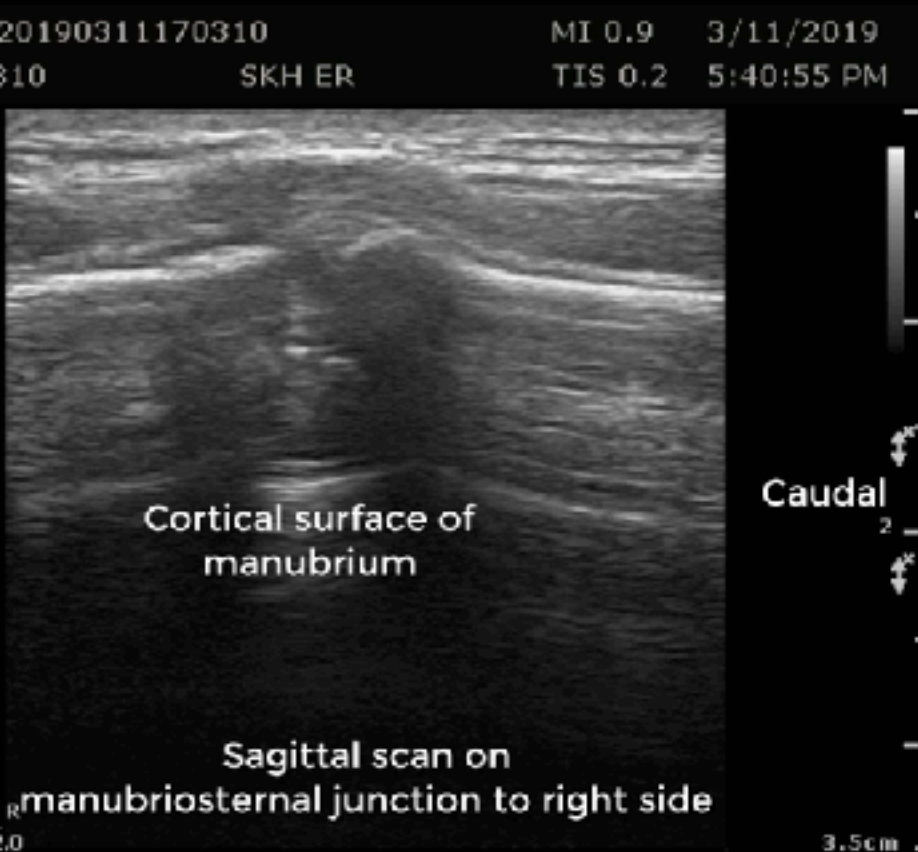
20
Res
Gn 60
C 56
3/2/1



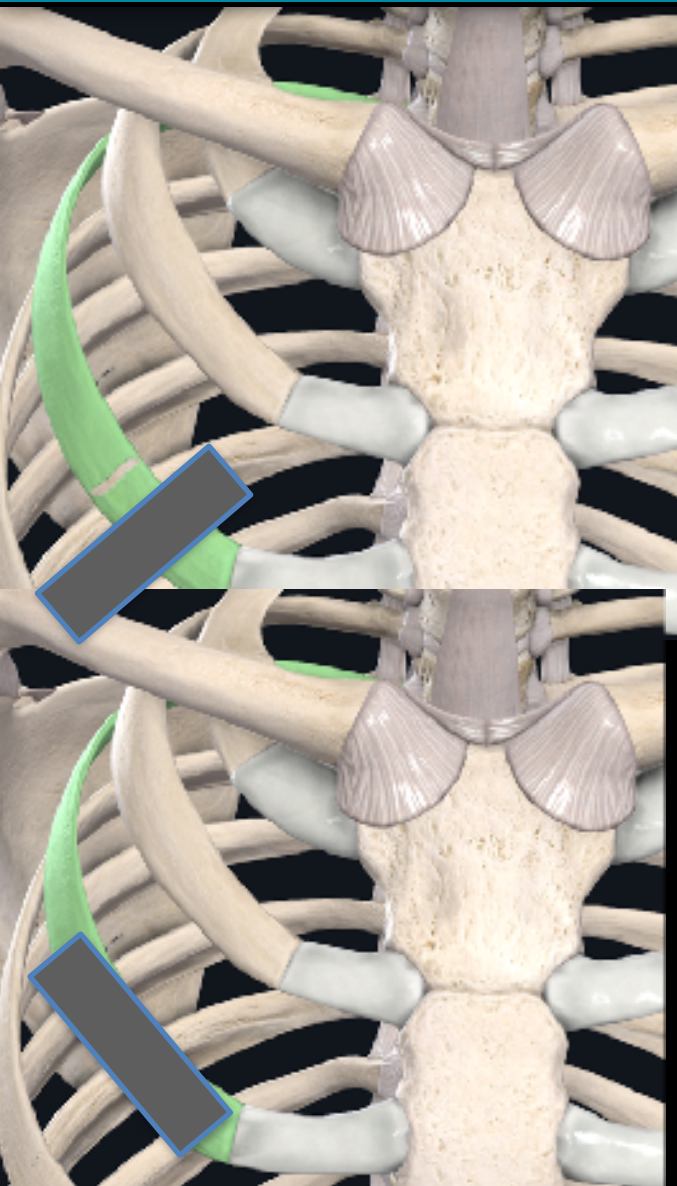
Sternal fracture, occult



Normal rib : 2nd

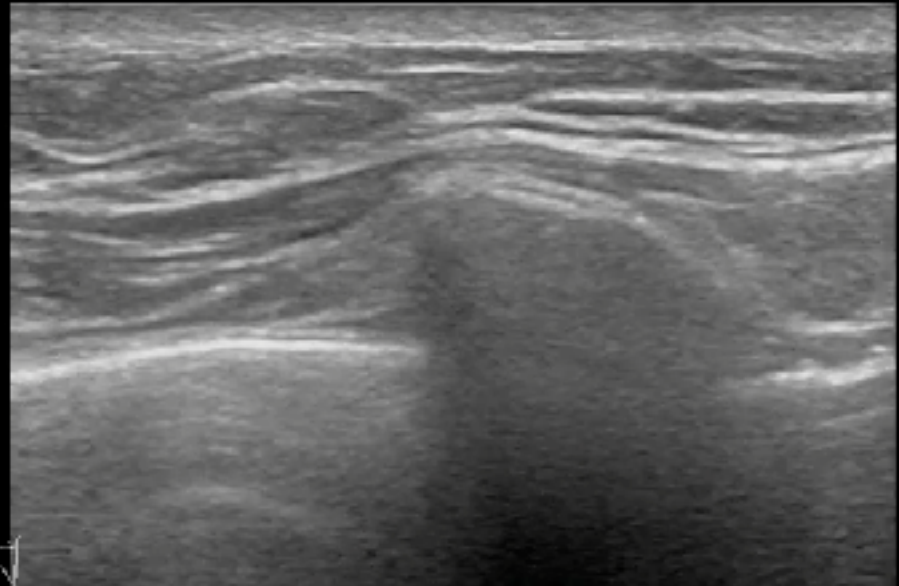


Rib fracture



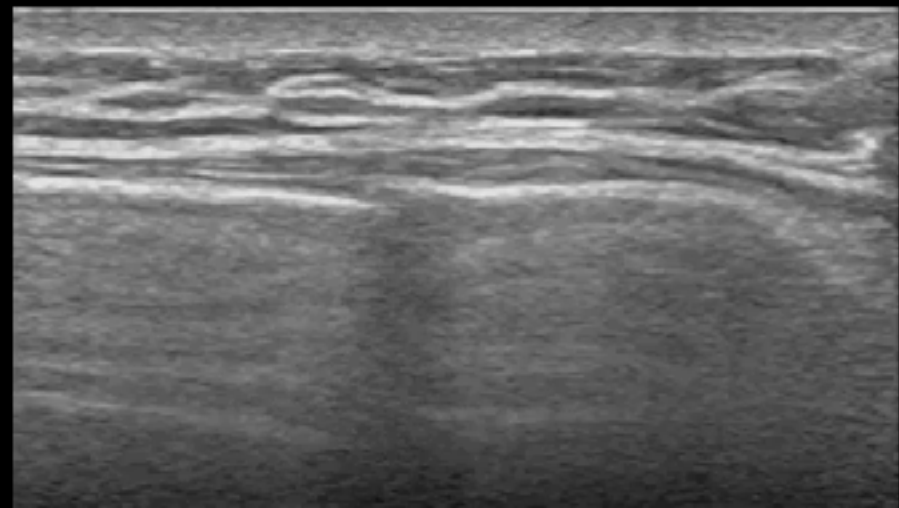
Superficial 
I 12 3
4G Hz
3.0cm

2D
Res
Gn 96
C 56
3/2/1

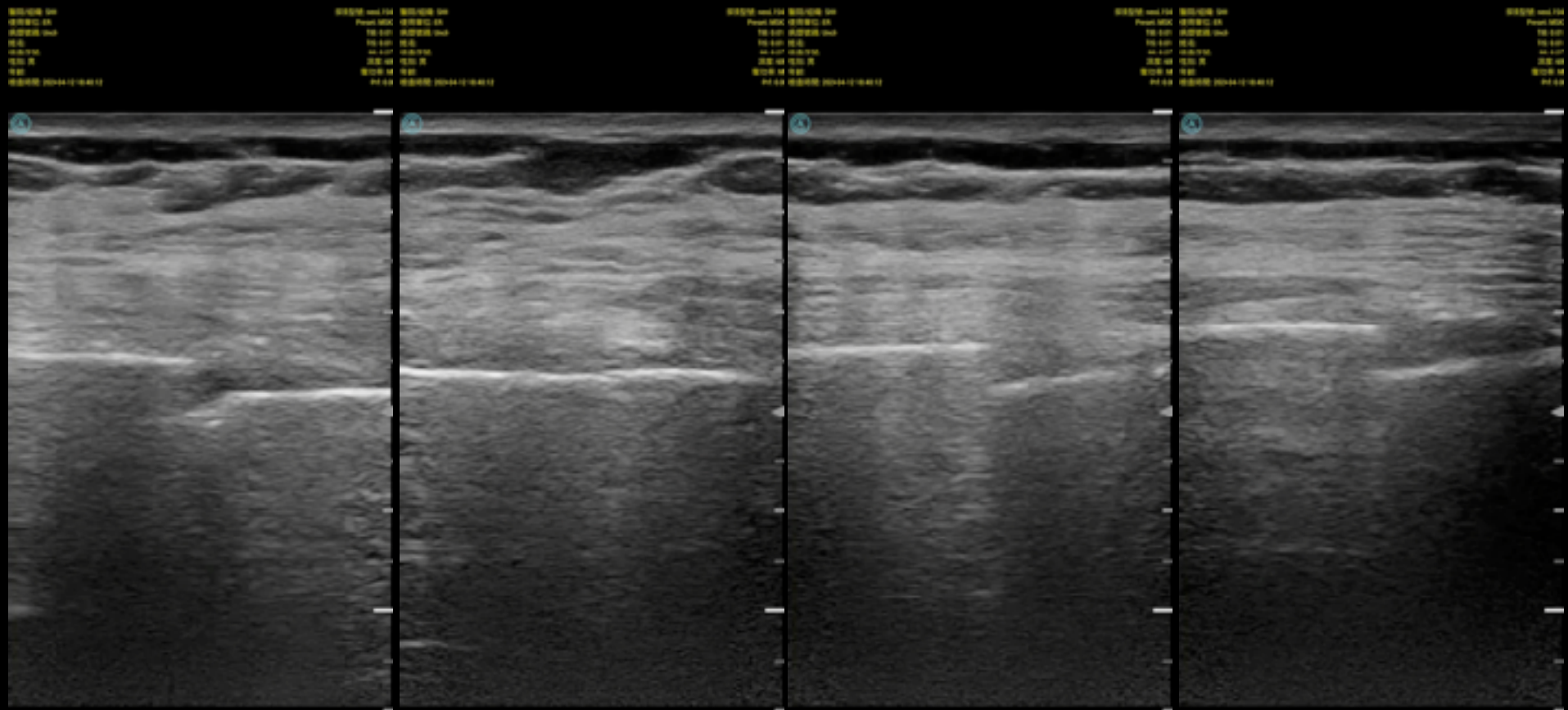


Superficial 
I 12 3
4G Hz
3.0cm

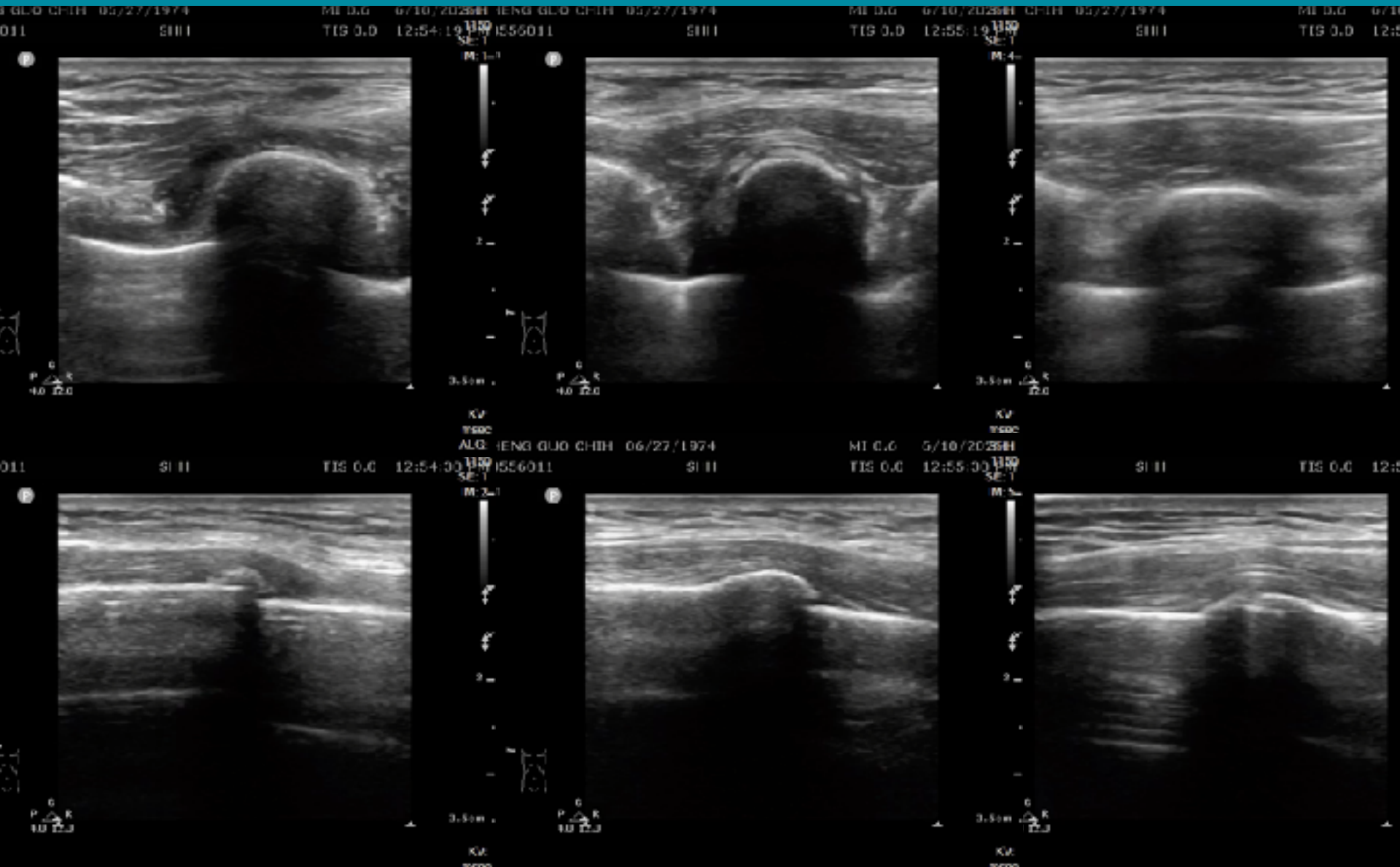
2D
Res
Gn 96
C 56
3/2/1



Chest contusion injury



Rib fracture / Callus formation

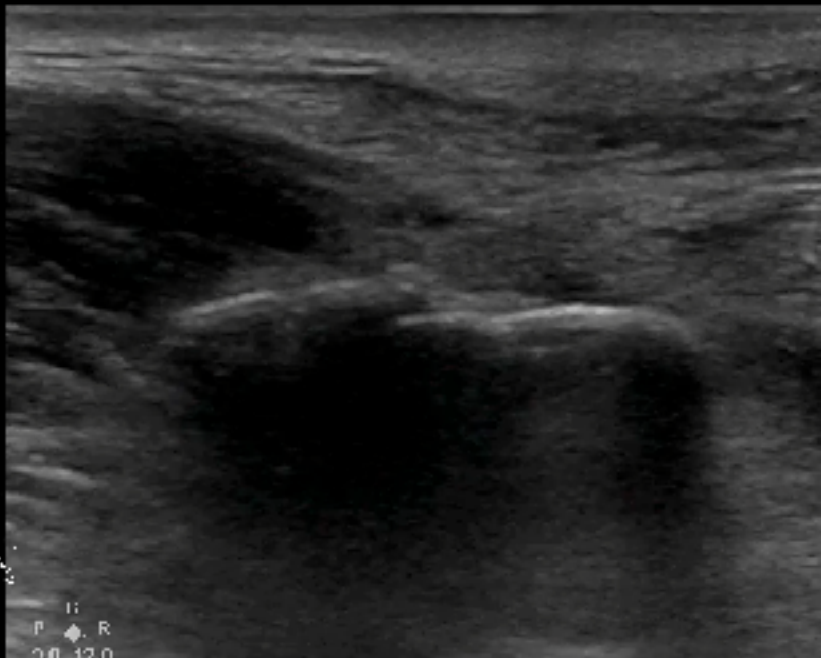


Clavicle fracture

R



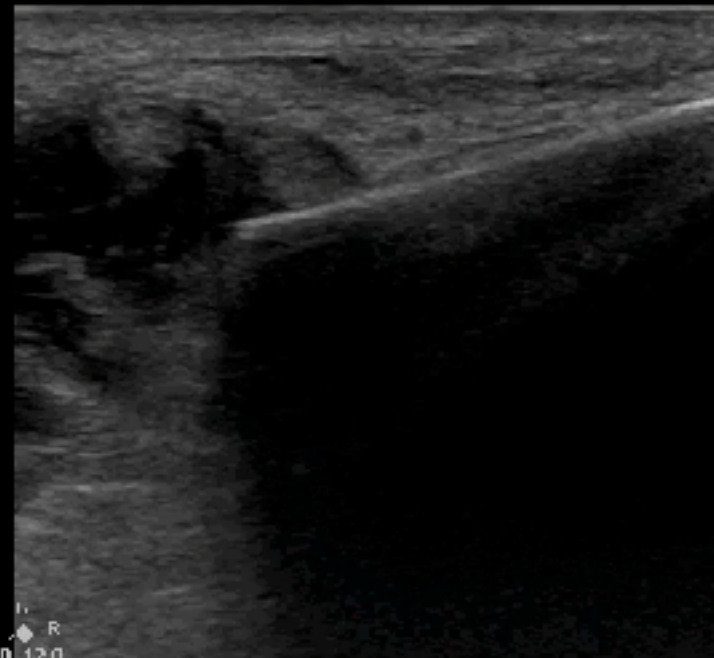
P



Superficial
112-3
31112
3.5cm

2D
Gen
Gn 60
C 12
1/3/2

P



P R
0.0 12.0

P R
0.0 12.0



熟悉解剖

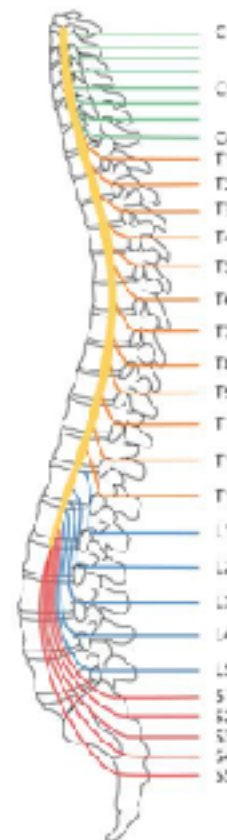
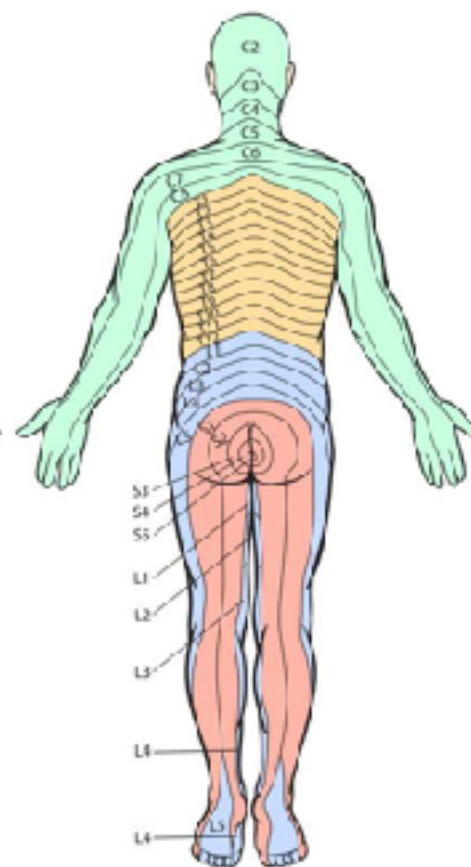
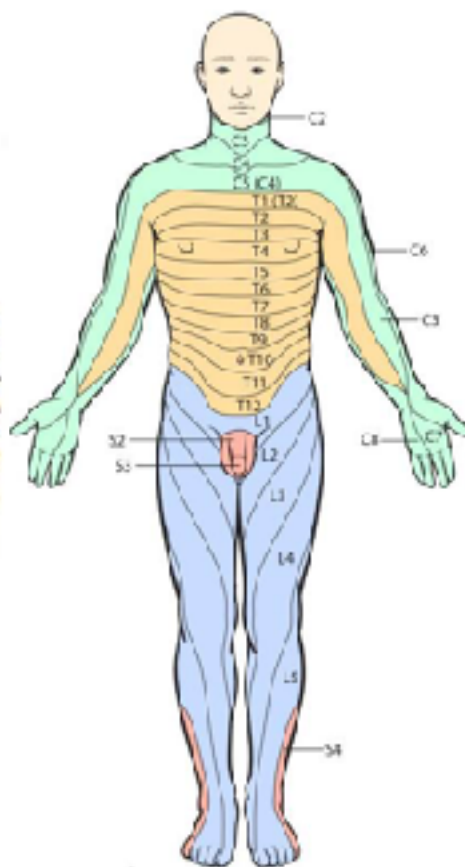
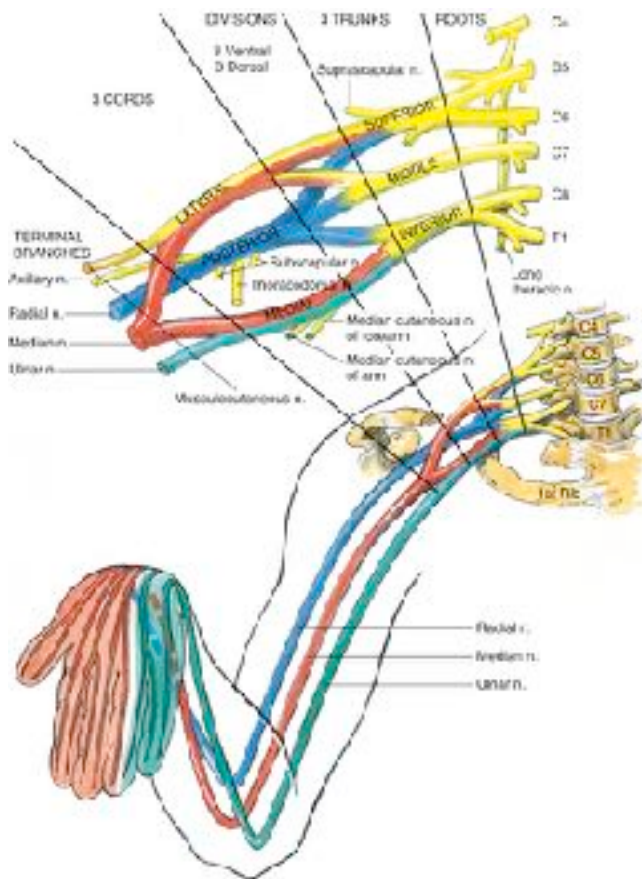
臨床情境

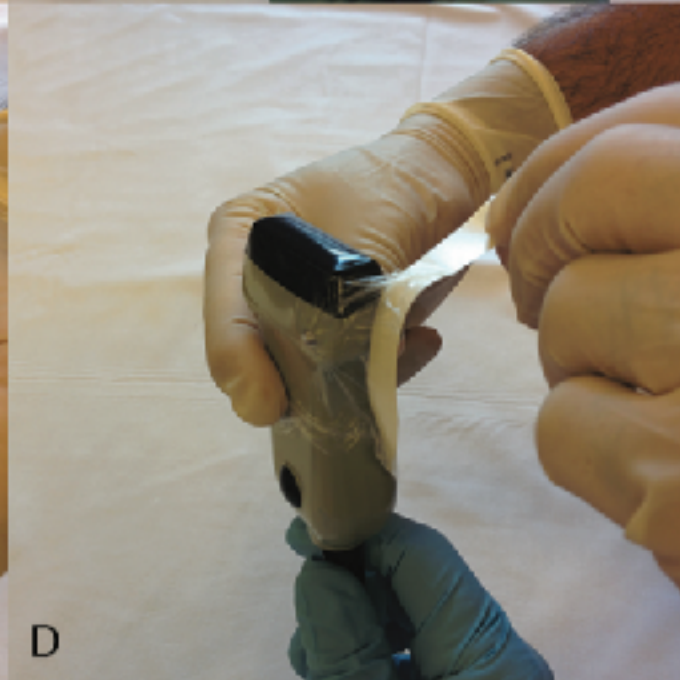
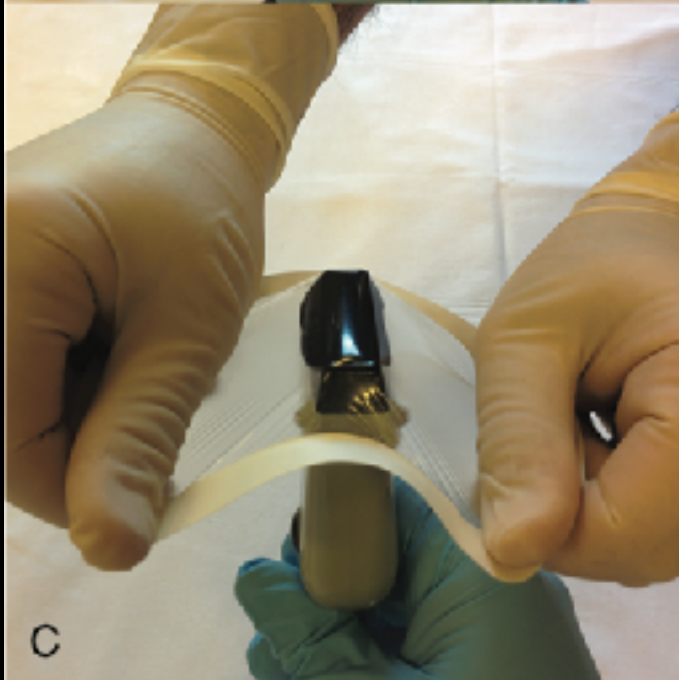
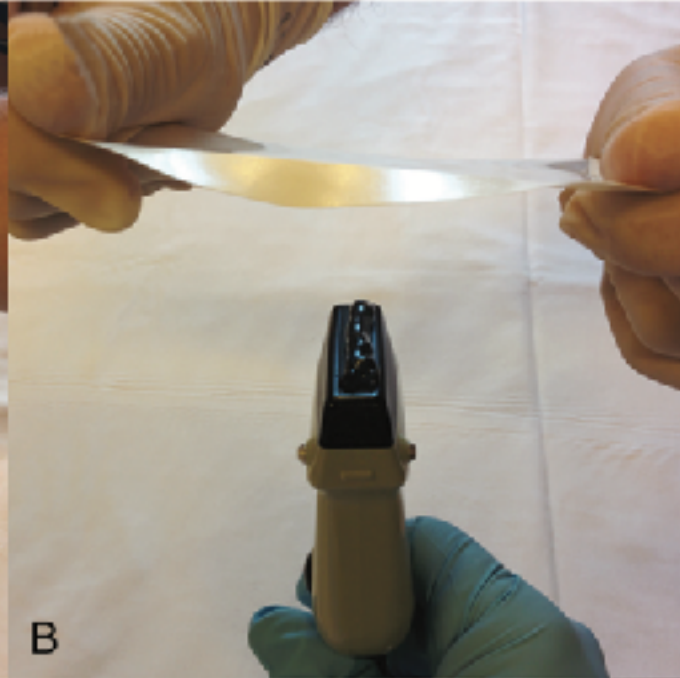
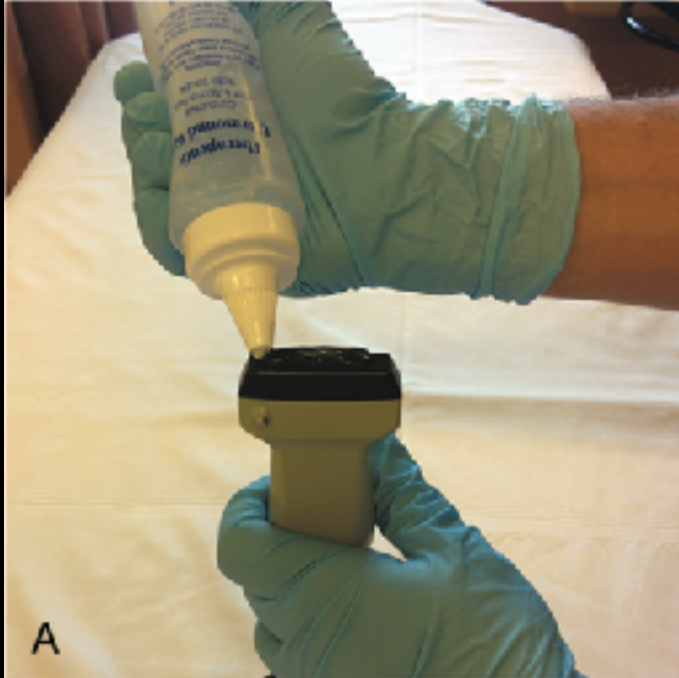
穩定運針

辨識血管

利弊分析

小心LAST





NIPRO

単位使用皮下注射用針

ニプロ カテラン針 GA

無菌状態を維持
ガンマ線照射済 使用1回限り

100本入

本製品は使用中、用防止包装損傷、
及び時時包装不良等無針針具が
出た場合、
上層部、品名、有青龍針及び無針針具等之保証。

ニプロ カテラン針 GA
21G x 70mm | 3CA

NIPRO

単位使用皮下注射用針

ニプロ カテラン針 GA

無菌状態を維持
ガンマ線照射済 使用1回限り

100本入

1. 包装及使用中、用防止包装損傷、
2. 露出部分に無針針具が
3. 露出部分に無針針具が



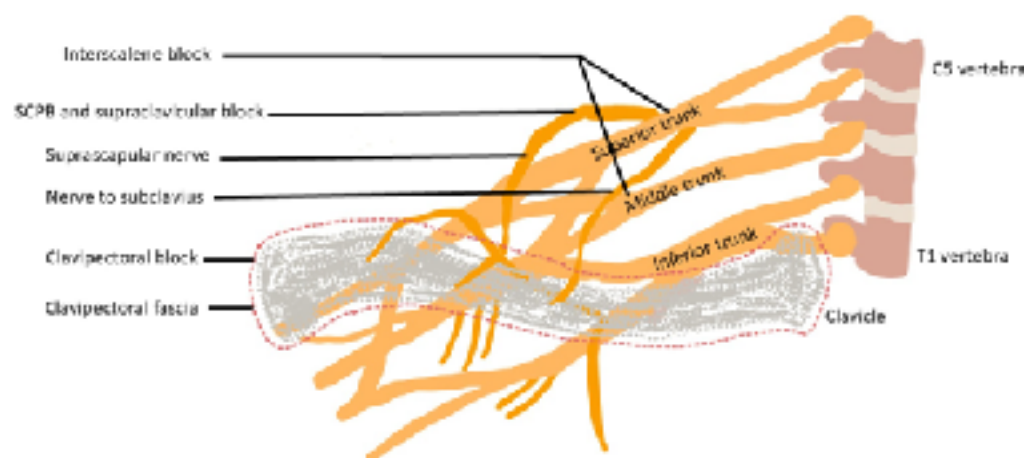
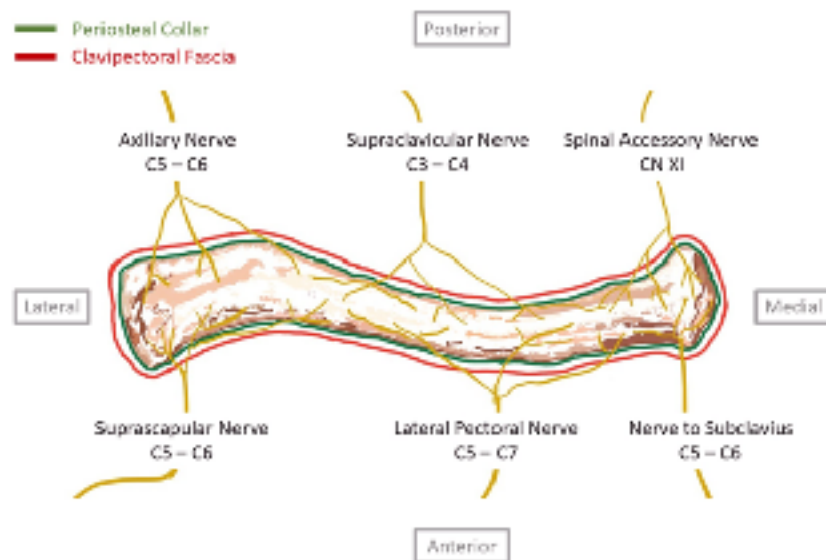
46M, left clavicle deformity after MBA



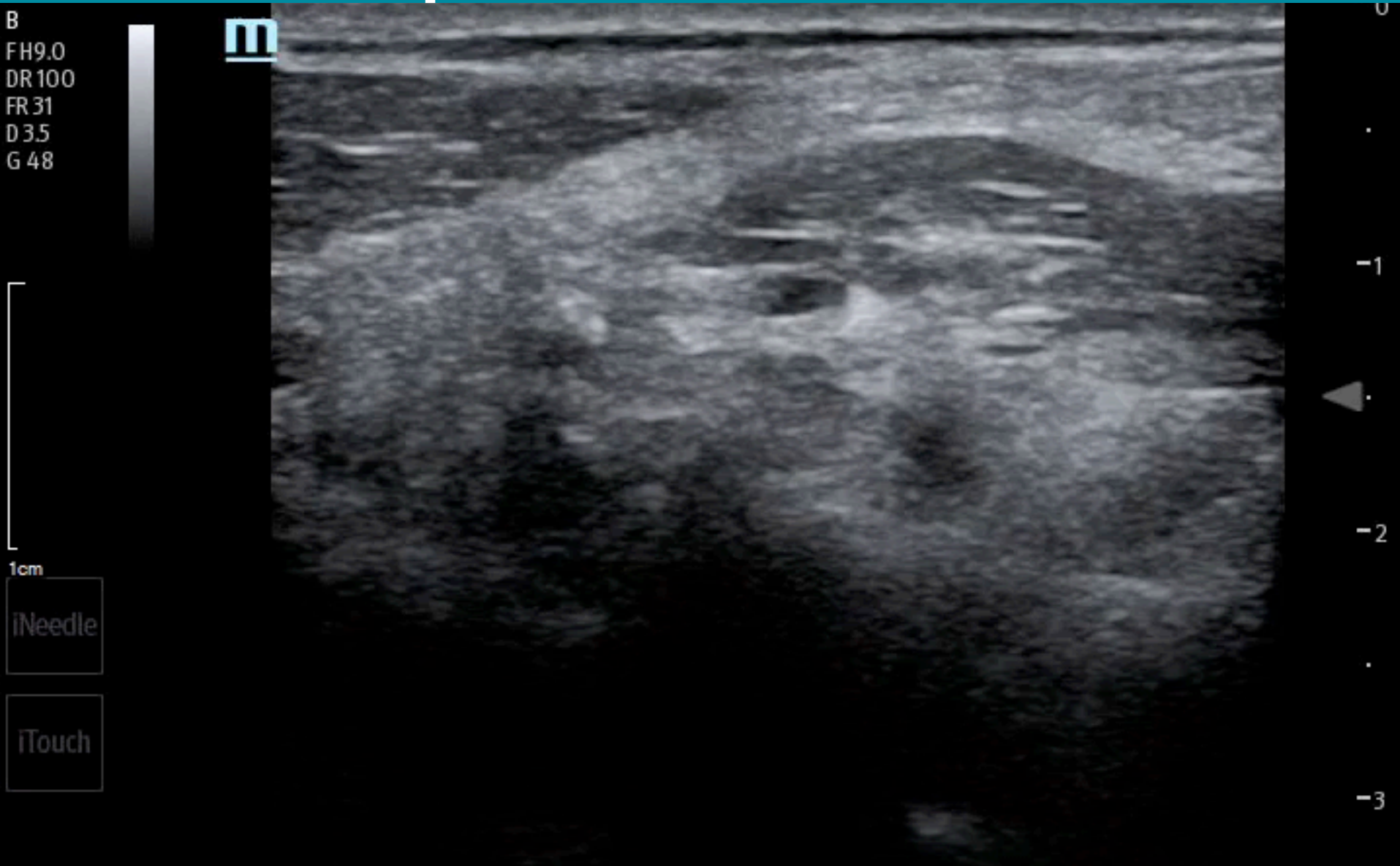
SYSTEMATIC REVIEW

Regional anesthesia for clavicle fractures in emergency medicine: A scoping review

En-Hsien Su¹ | Cheng-Chien Chen¹ | Kuo-Chih Chen² | Su Weng Chau^{1,3} |
Yi-Kung Lee^{1,3} | Tou-Yuan Tsai^{1,3} 



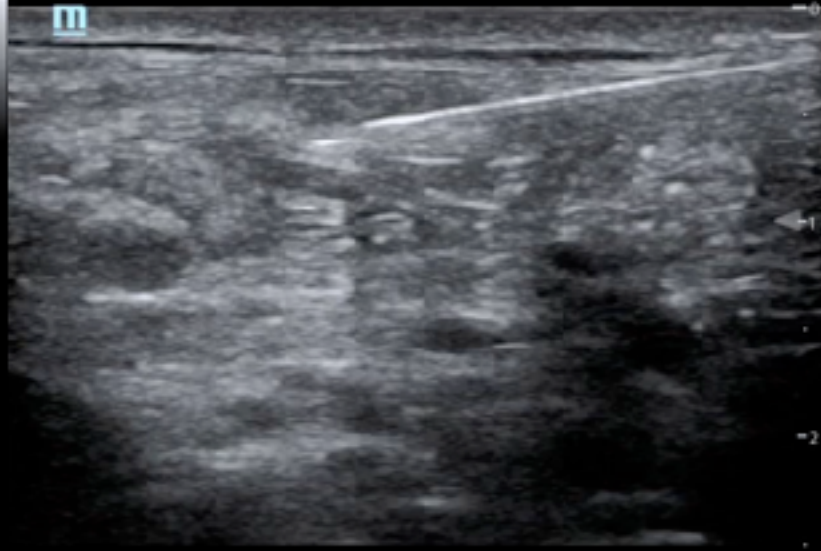
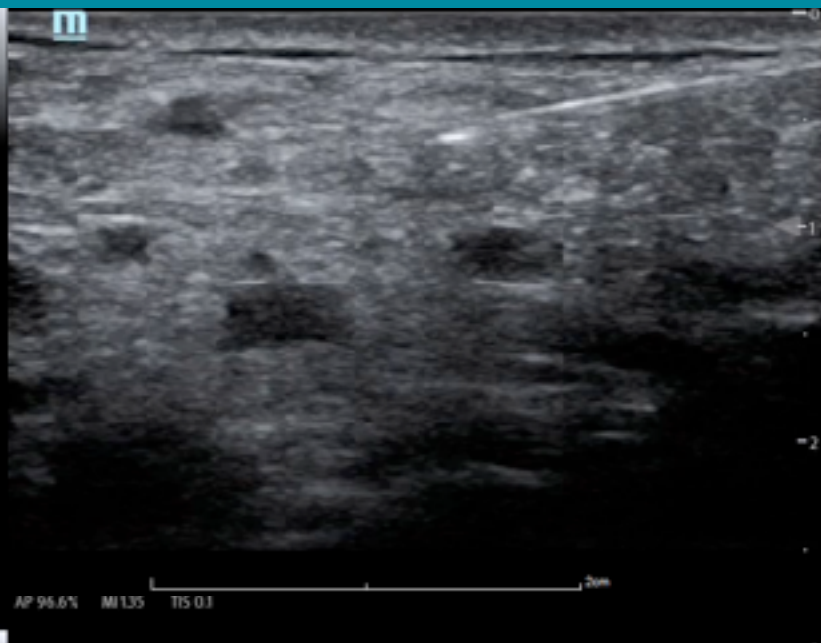
Superficial cervical plexus to Supraclavicular nerve



Clavipectoral fascial plane block

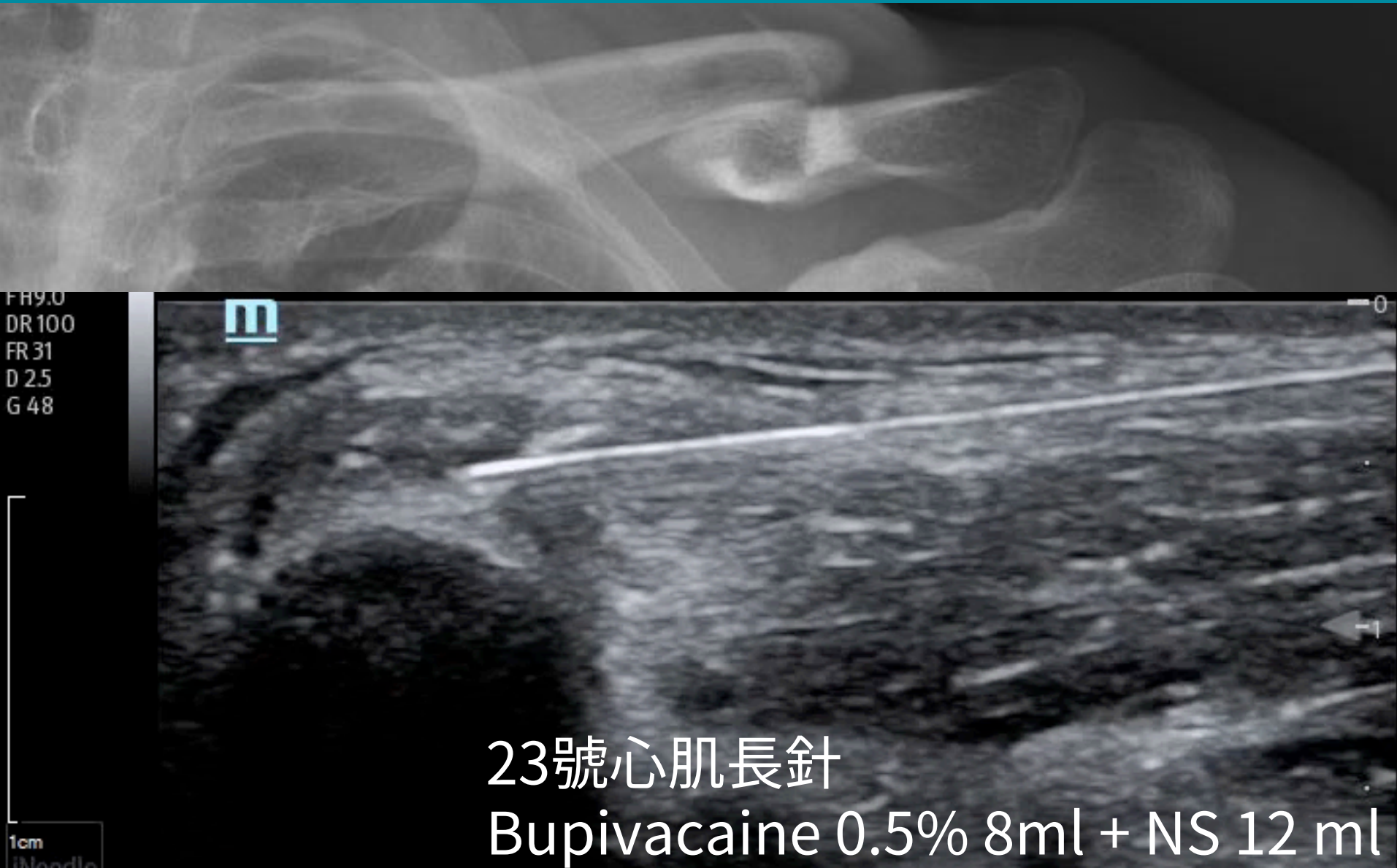


Supraclavicular nerve block

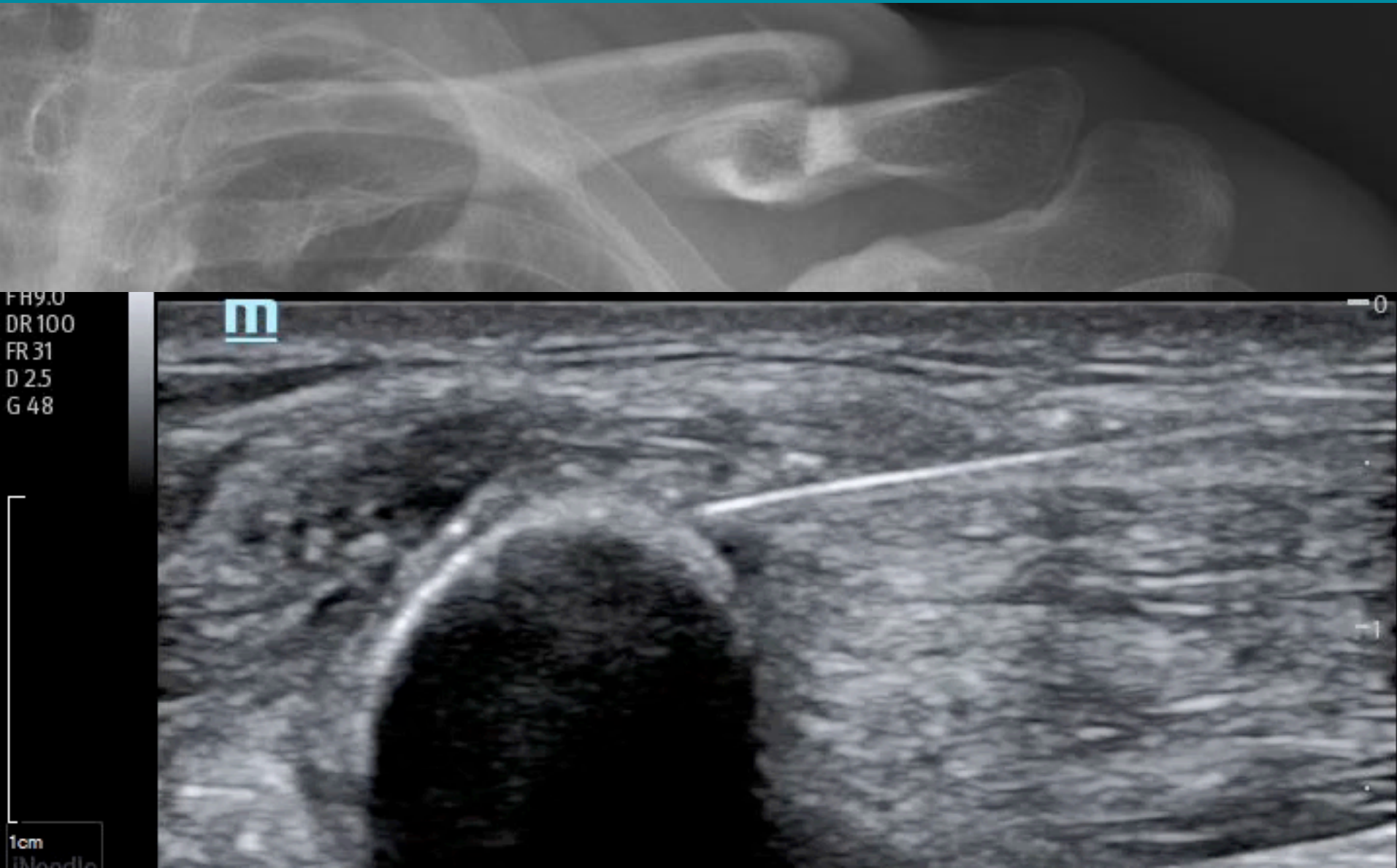


23號心肌長針
Bupivacaine 0.5% 3ml

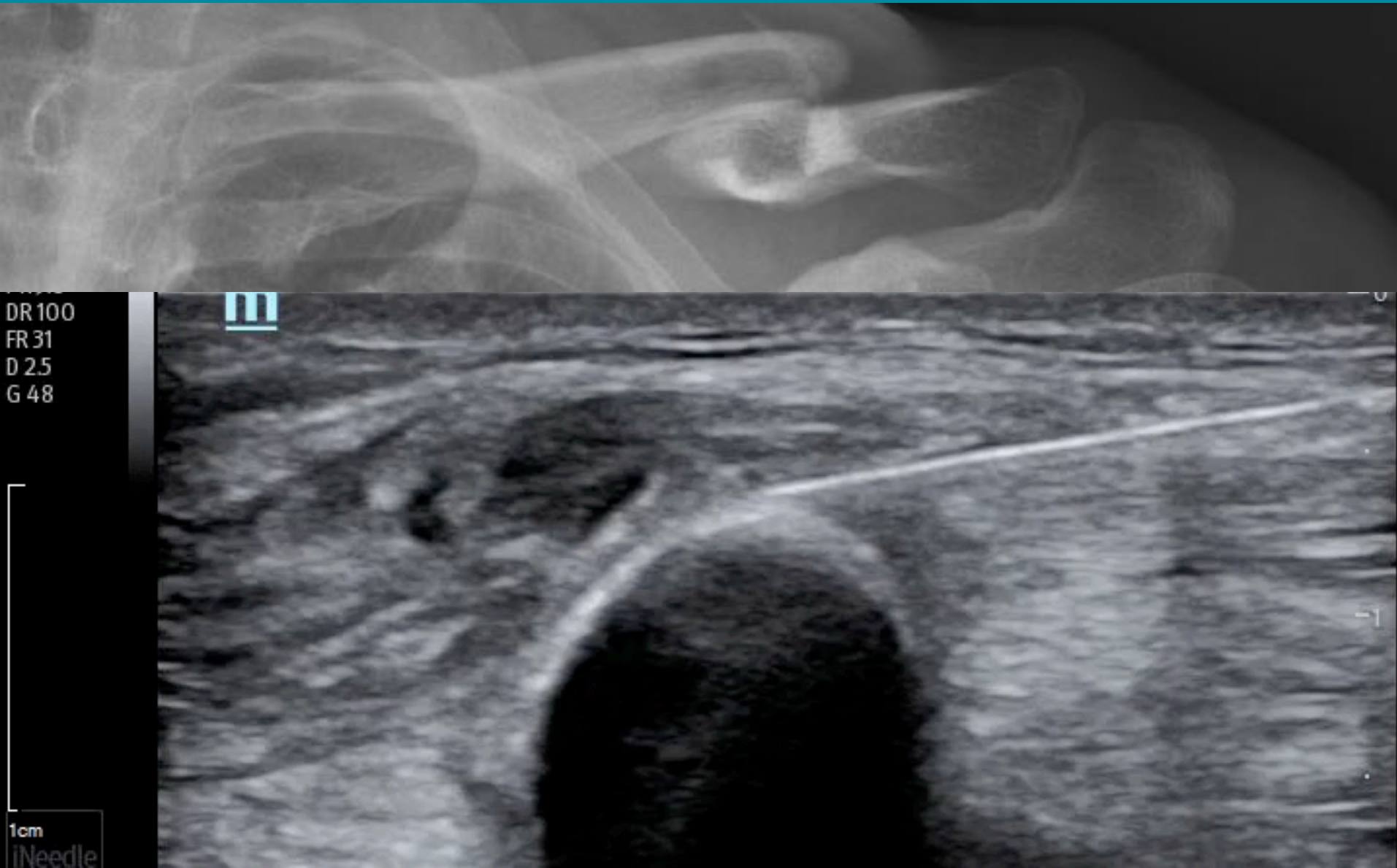
Clavipectoral fascial plane block



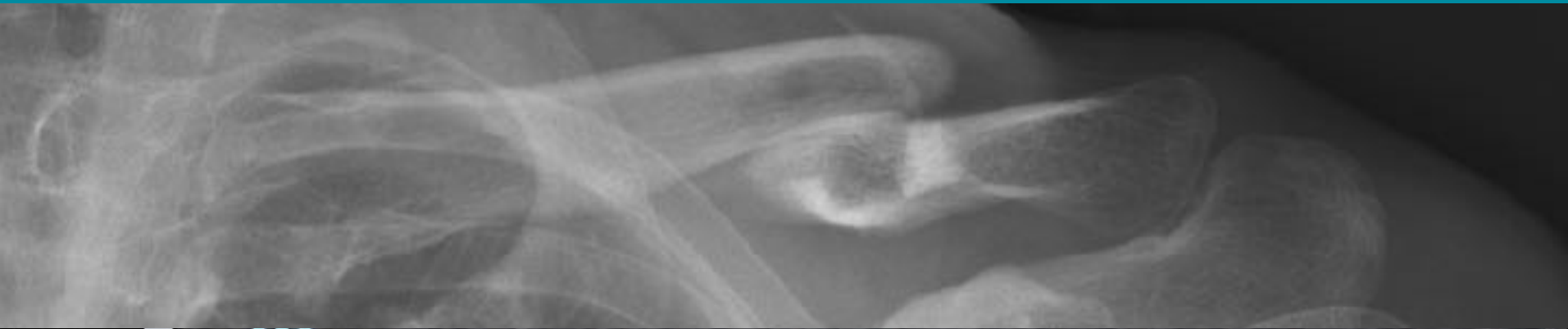
Clavipectoral fascial plane block



Clavipectoral fascial plane block



Clavipectoral fascial plane block

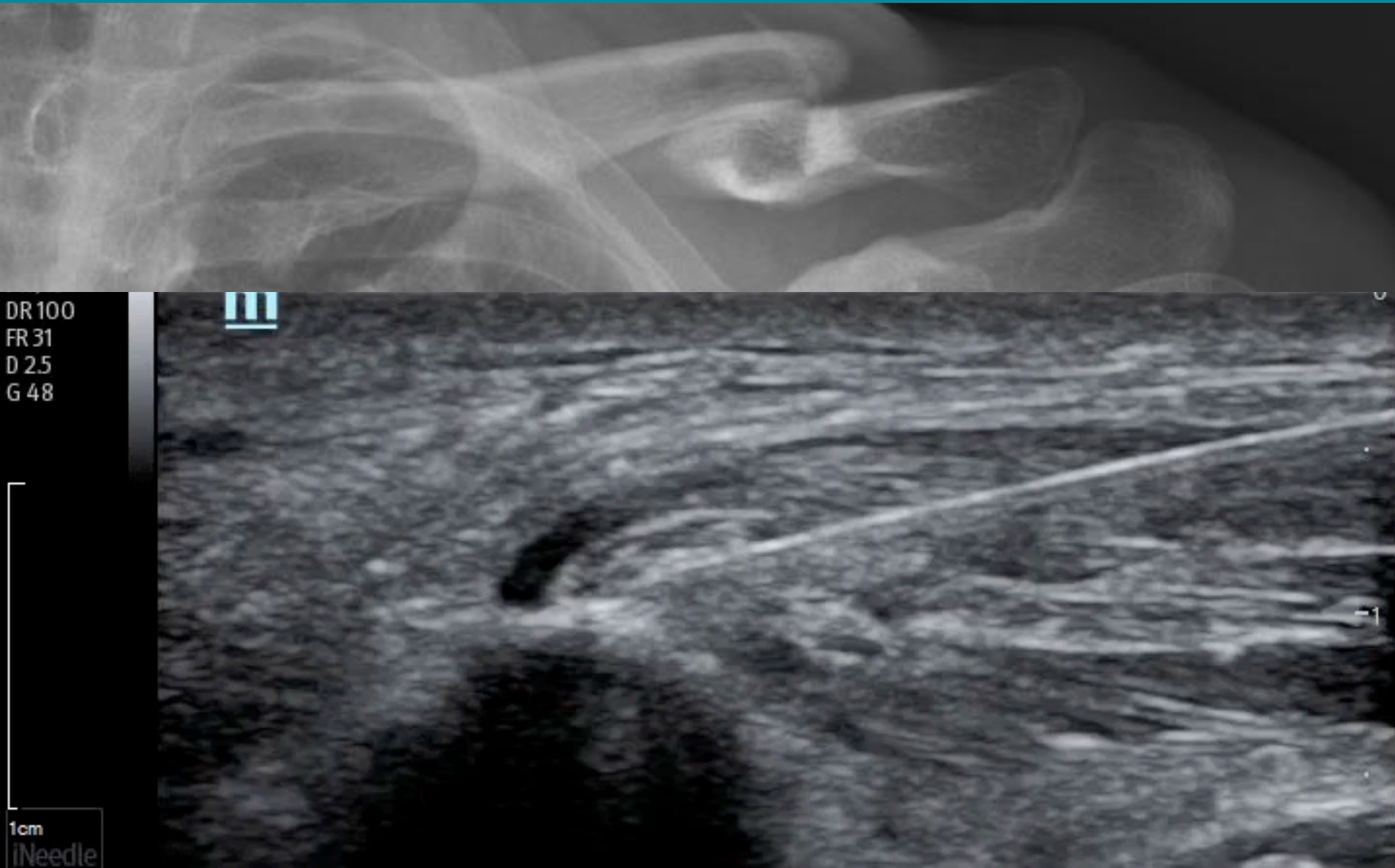


DR 100
FR 31
D 2.5
G 48



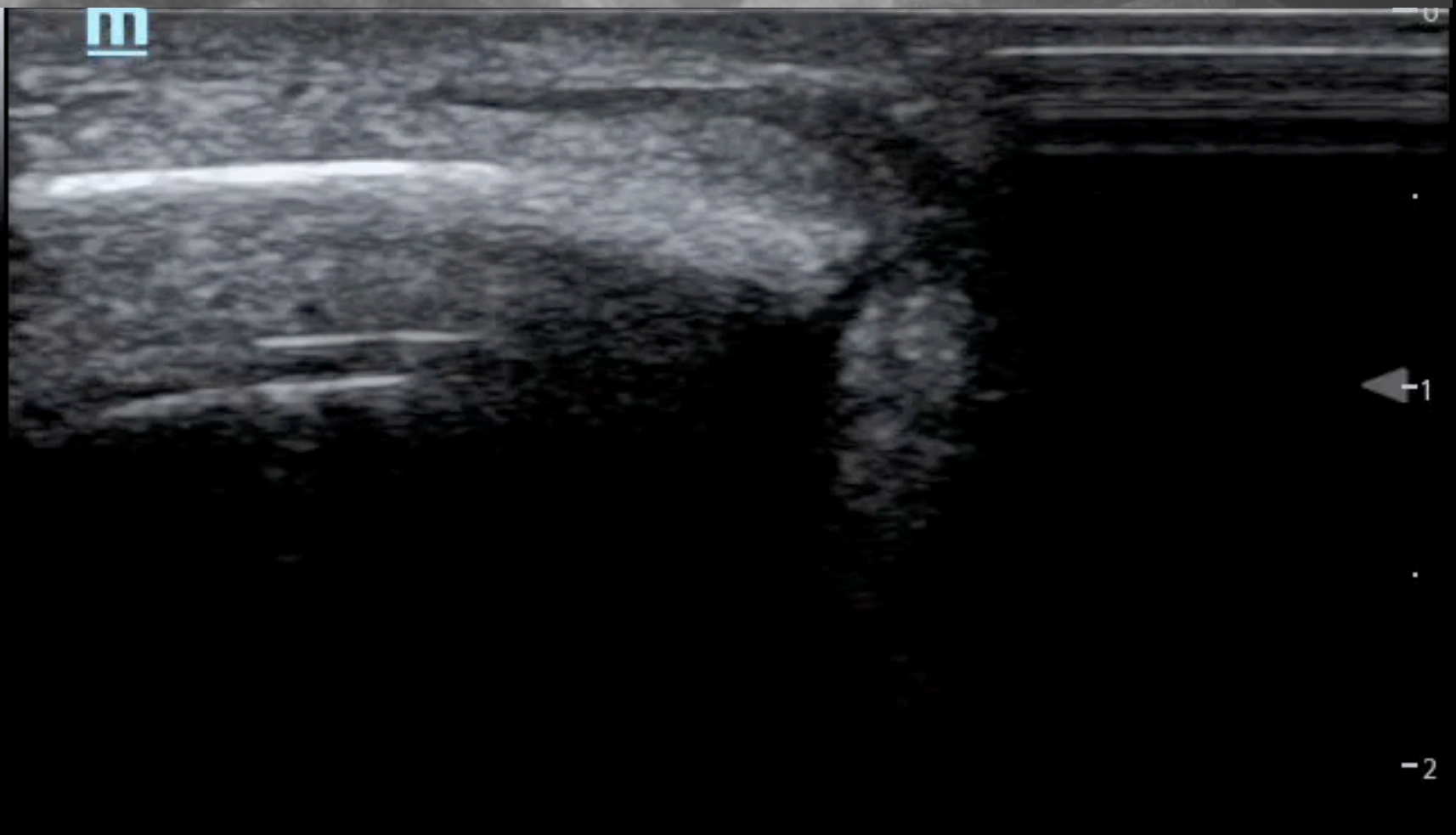
23號心肌長針
Bupivacaine 0.5% 8ml + NS 12 ml

Clavipectoral fascial plane block





DR 100
FR 31
D 2.5
G 48

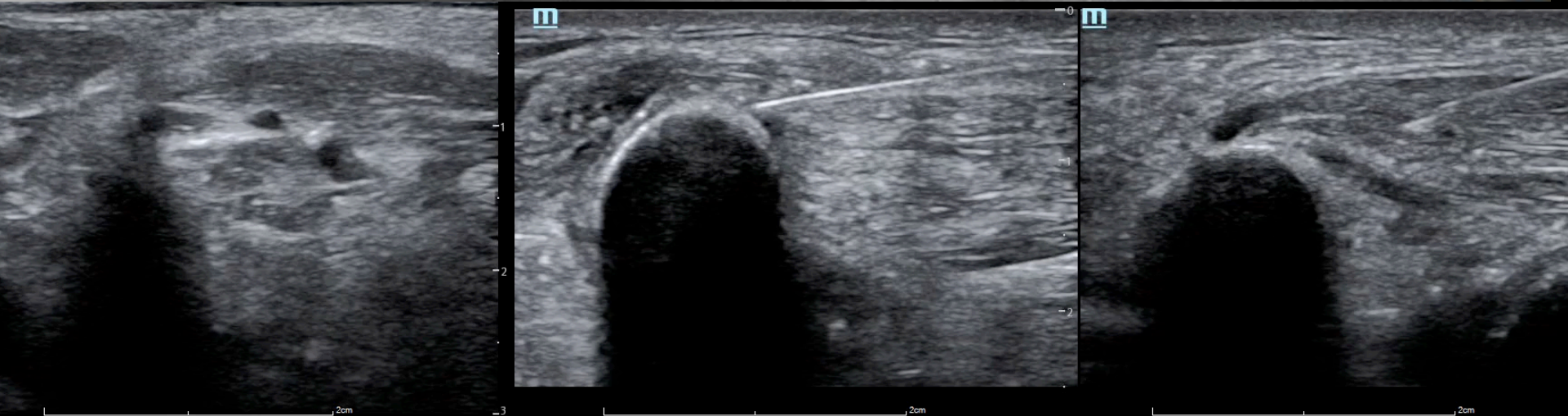


1cm
iNeedle

iTouch

-2

Supraclavicular nerve block + Clavipectoral fascial plane block



79M, falling injury from bed



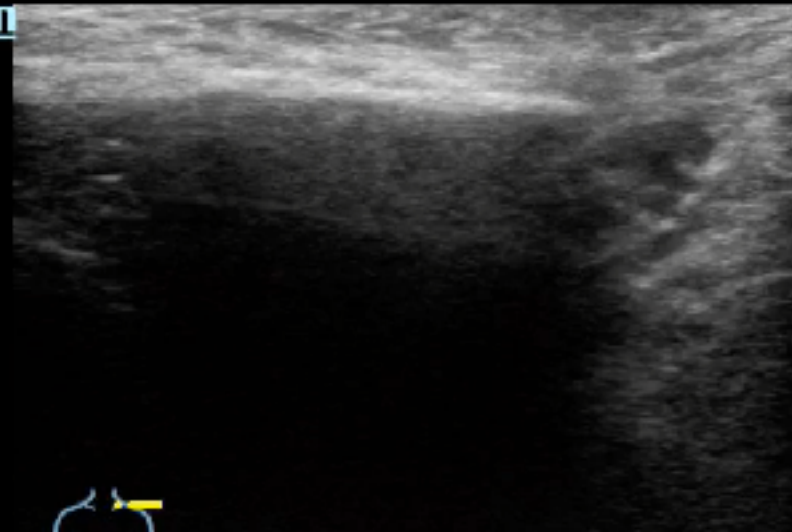
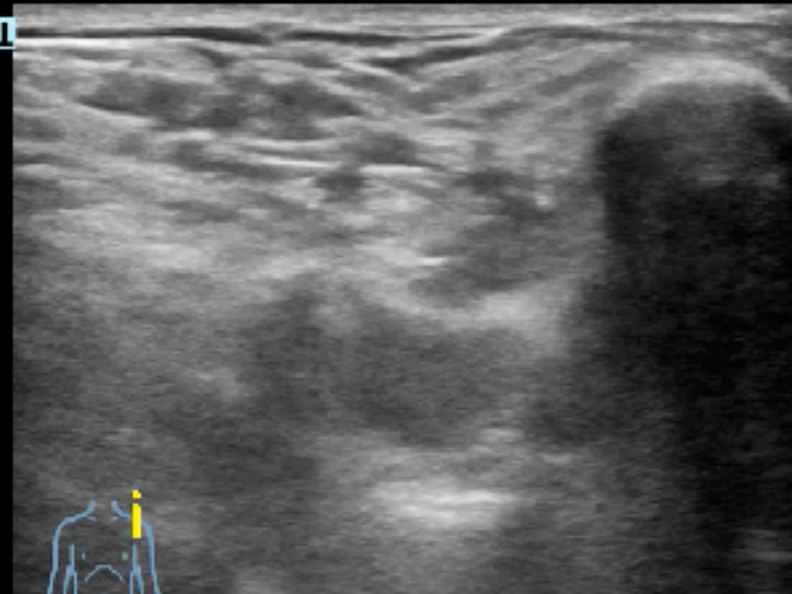
40025/08/28
166-130
0015
1351900/8ER
0.35
G72

Needle

Touch

90025/08/28
166-130
0015
1351900/8ER
0.35
G72

Needle



Clavipectoral fascial plane block



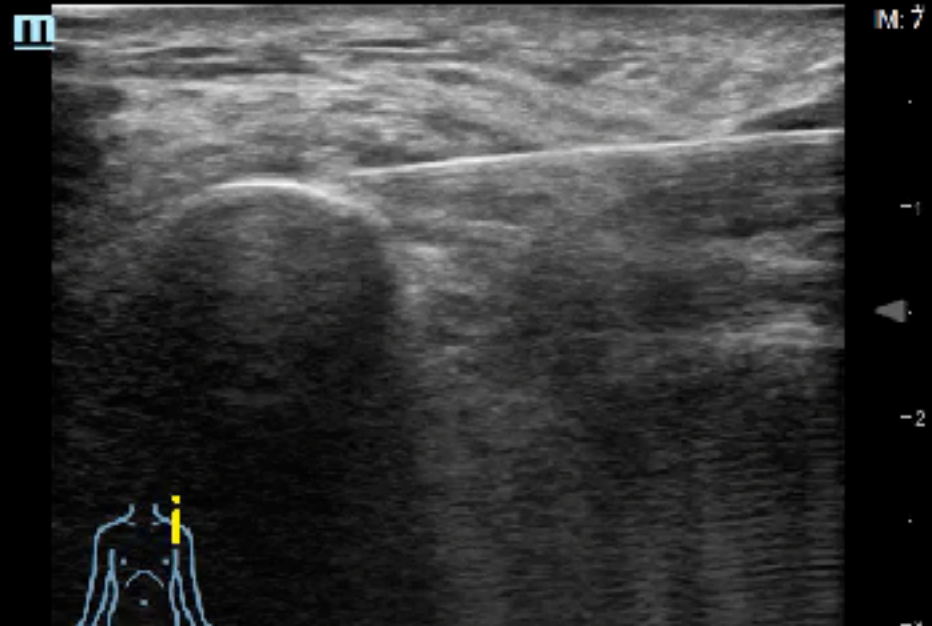
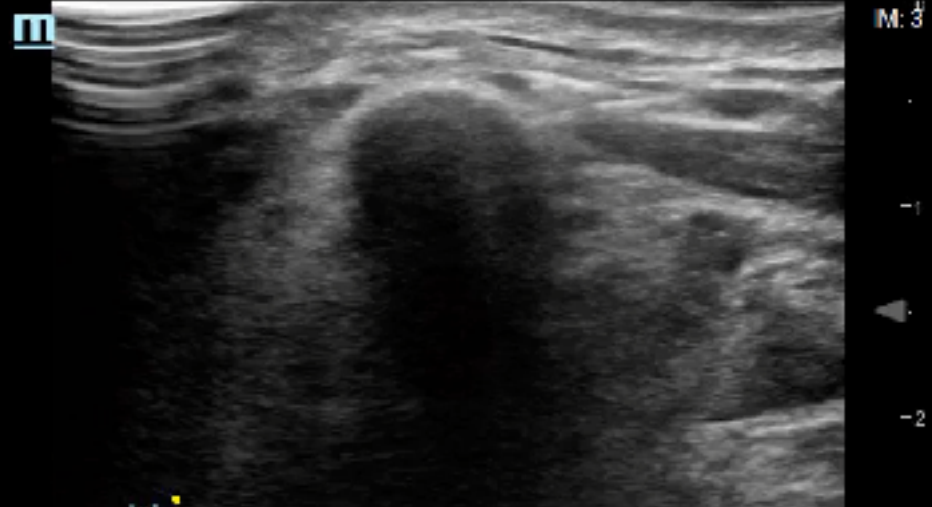
4/2025/06/20
F06-11.0
05.01
PC:19007577
0.75
673

iNeedle

4/2025/06/20
F06-11.0
05.01
PC:19007577
0.75
673

iNeedle

iTouch



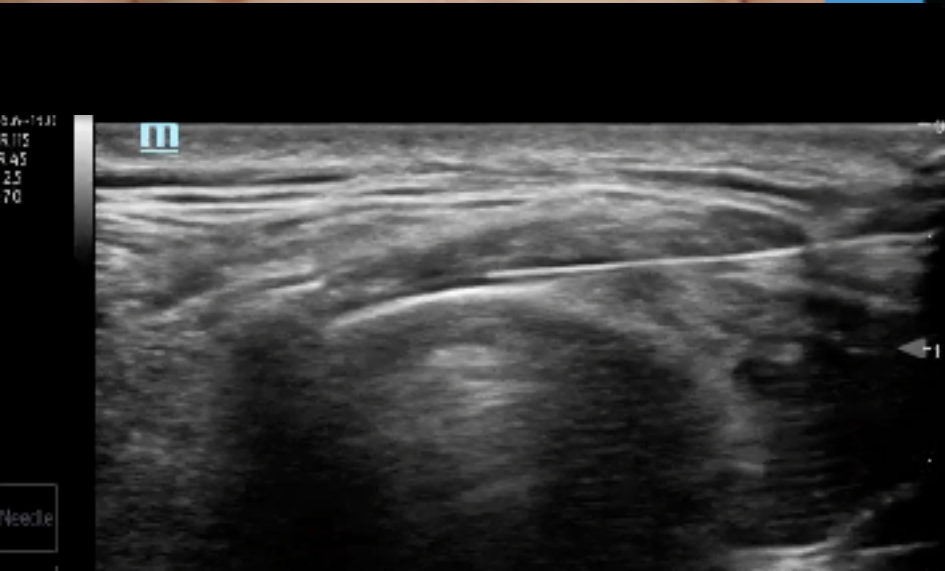
Clavipectoral fascial plane block



Clavicle

Pectoralis Major Muscle

Subclavius Muscle

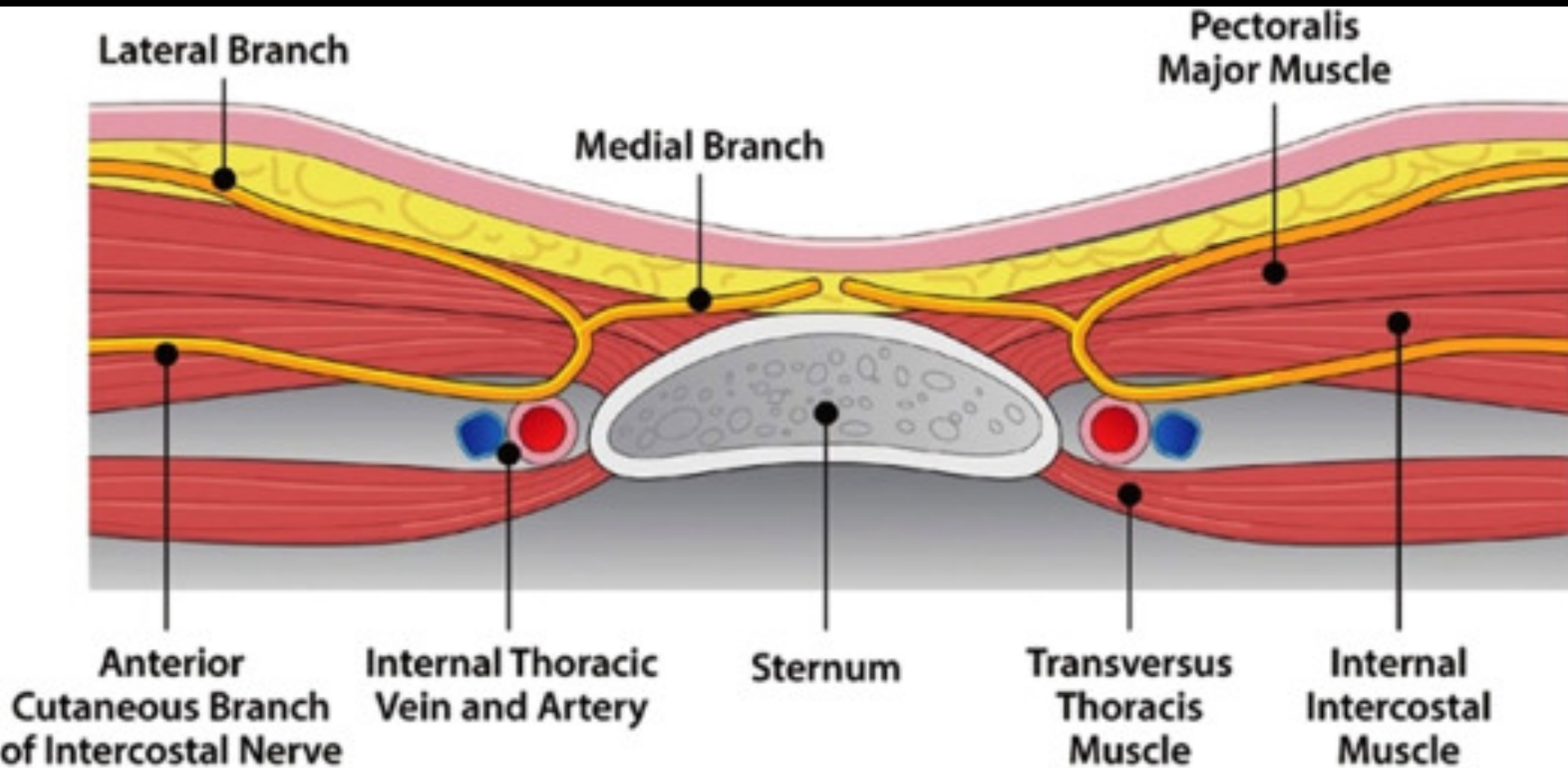


Anesthetic

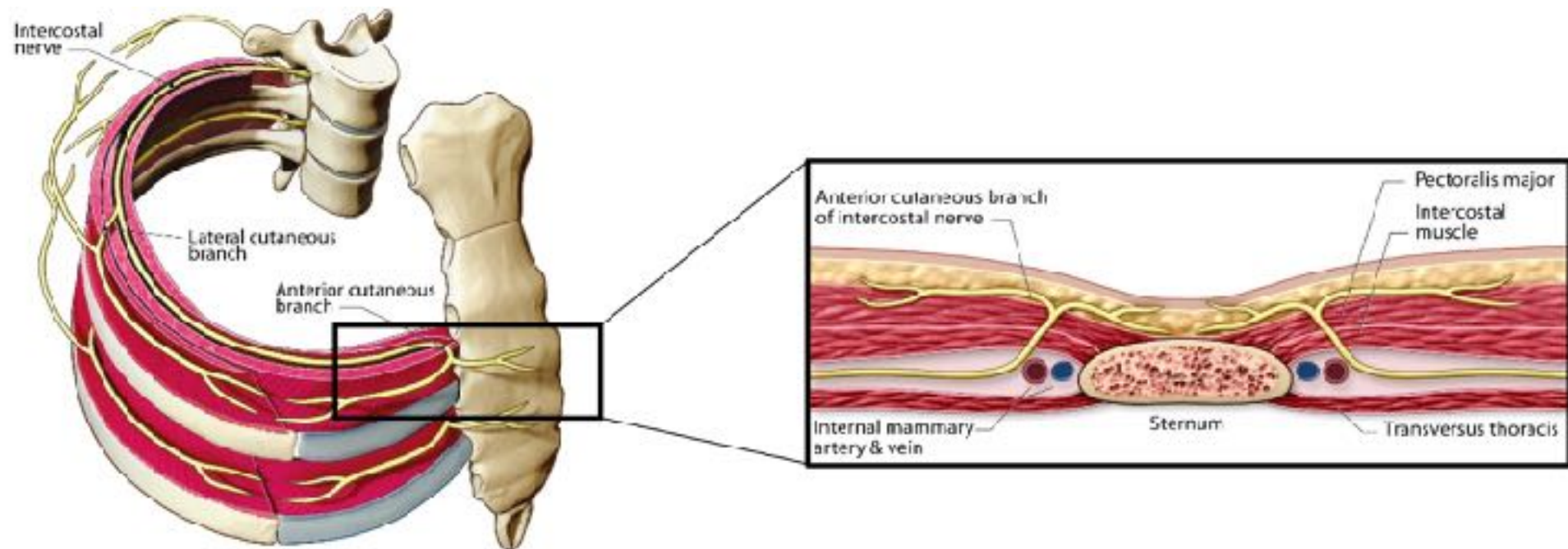
Needle Tip

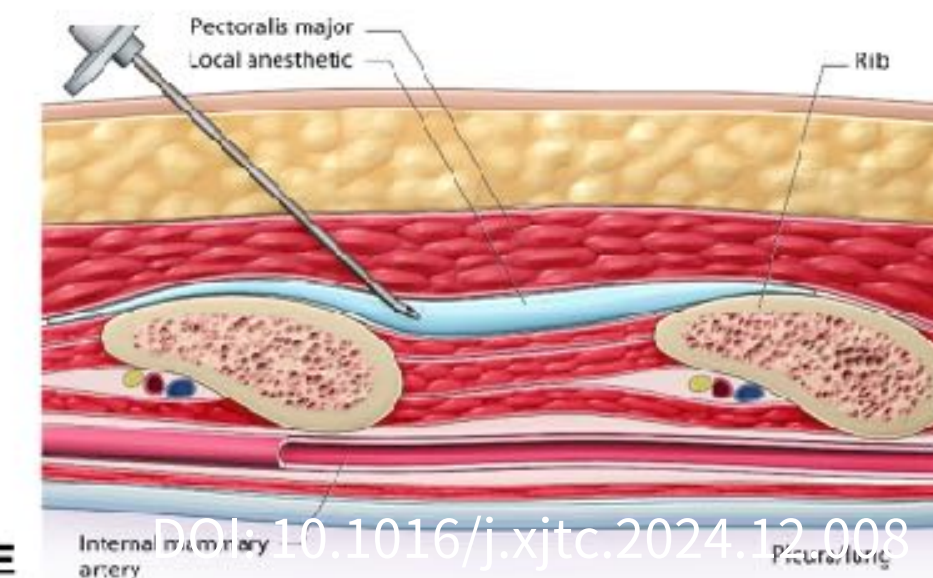
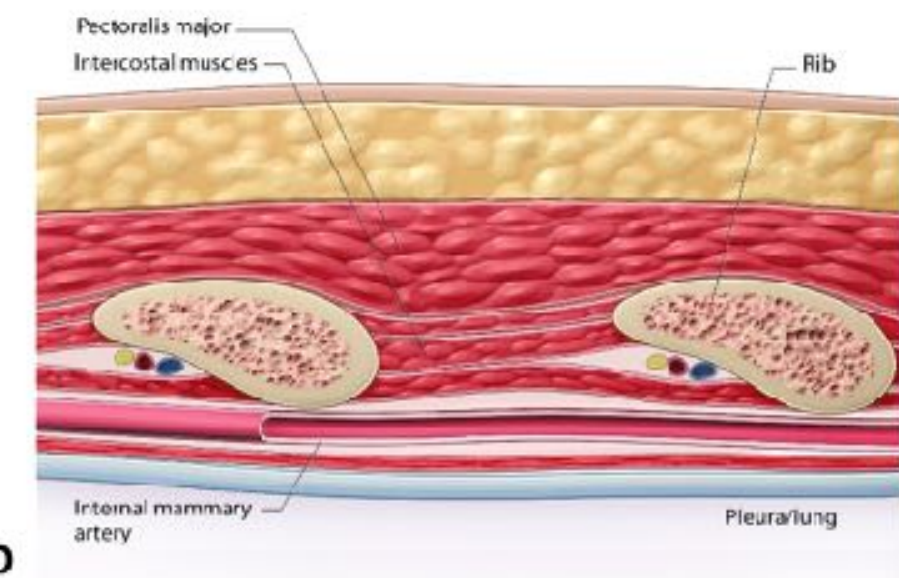
@NagdevArjun

Parasternal block

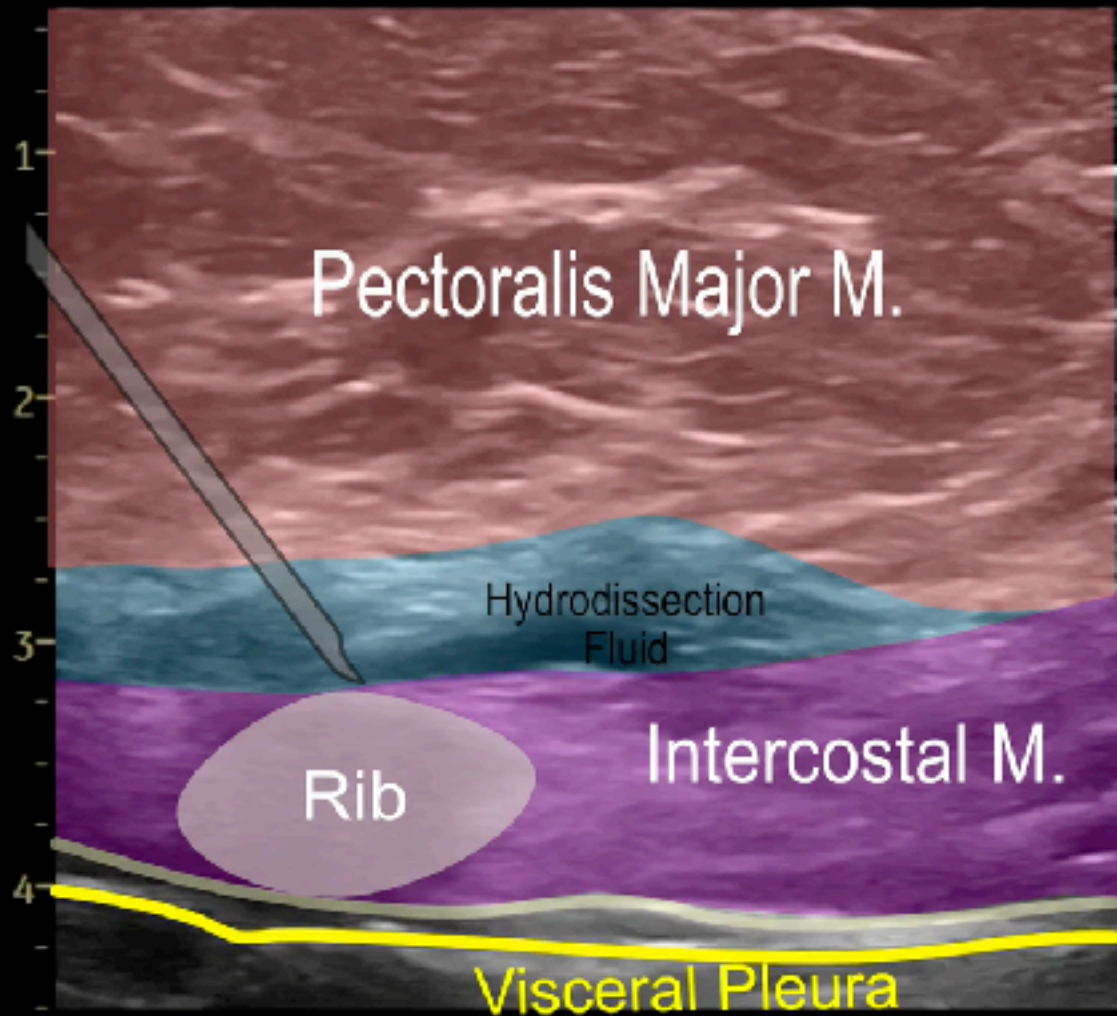


Parasternal block

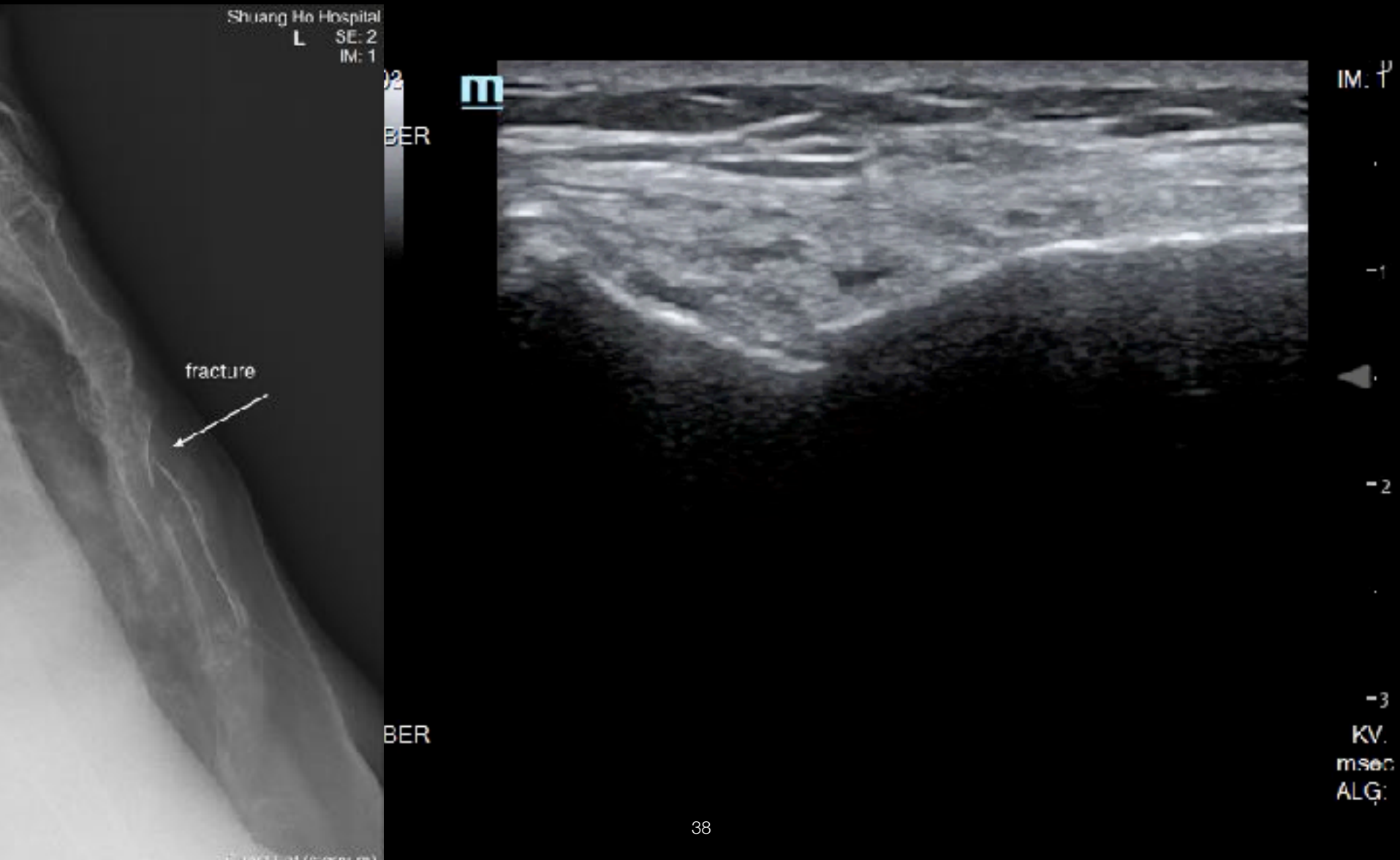




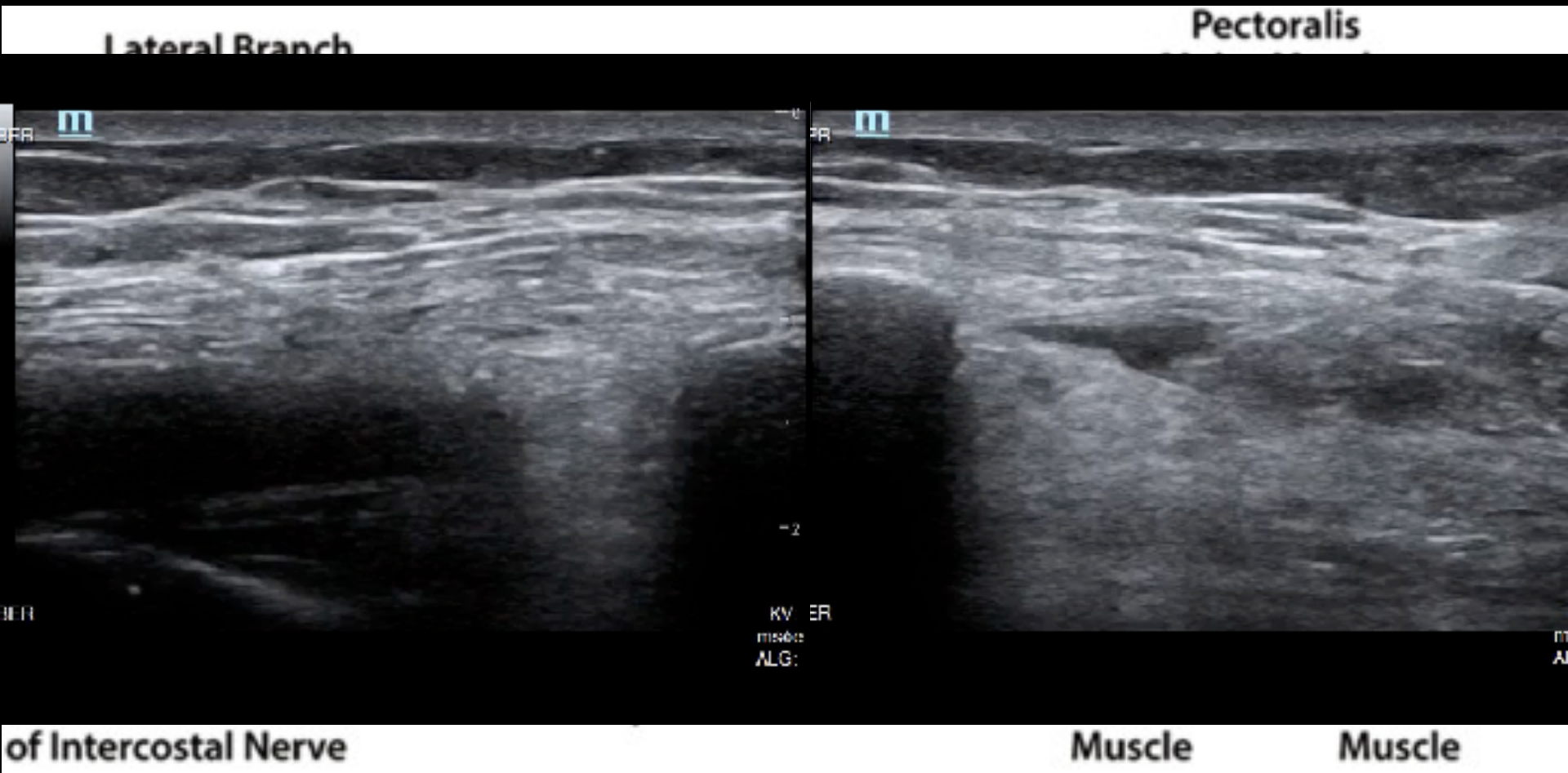
Parasternal block



95M, falling injury, anterior chest injury



Parasternal nerve block

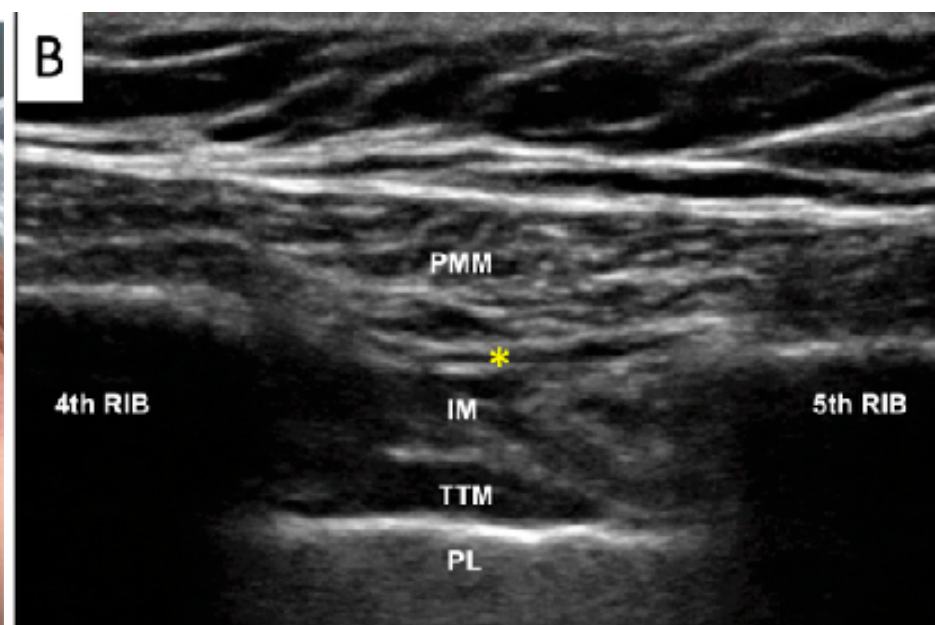
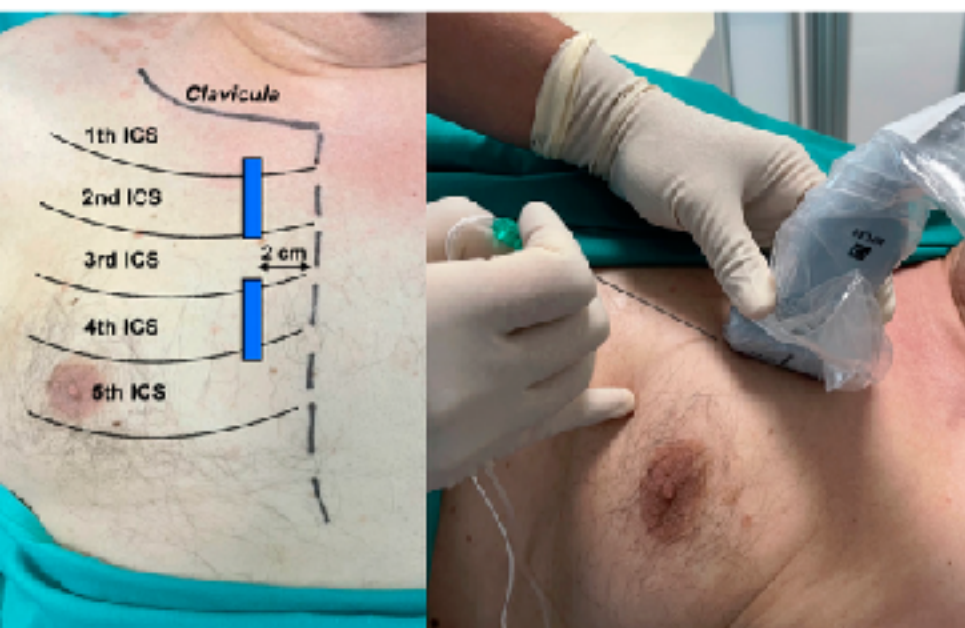




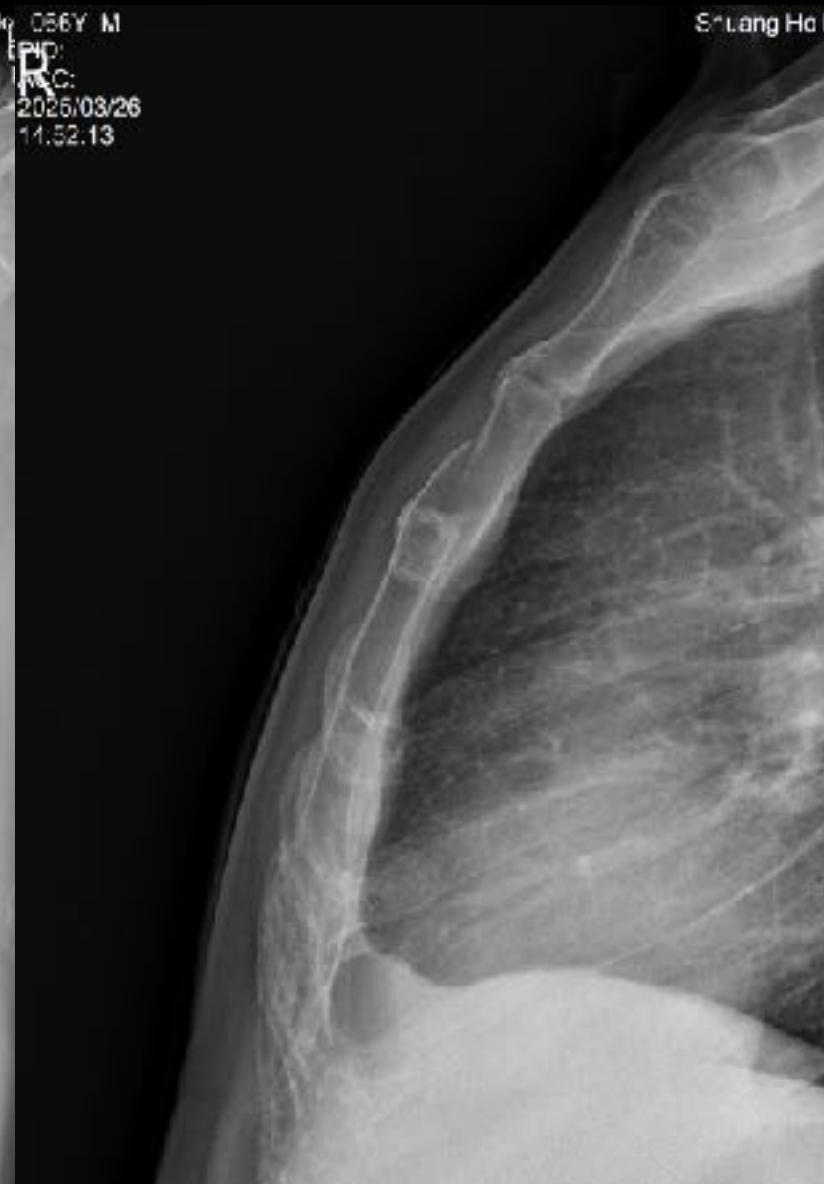
Article

Ultrasound Guided Parasternal Block for Perioperative Analgesia in Cardiac Surgery: A Prospective Study

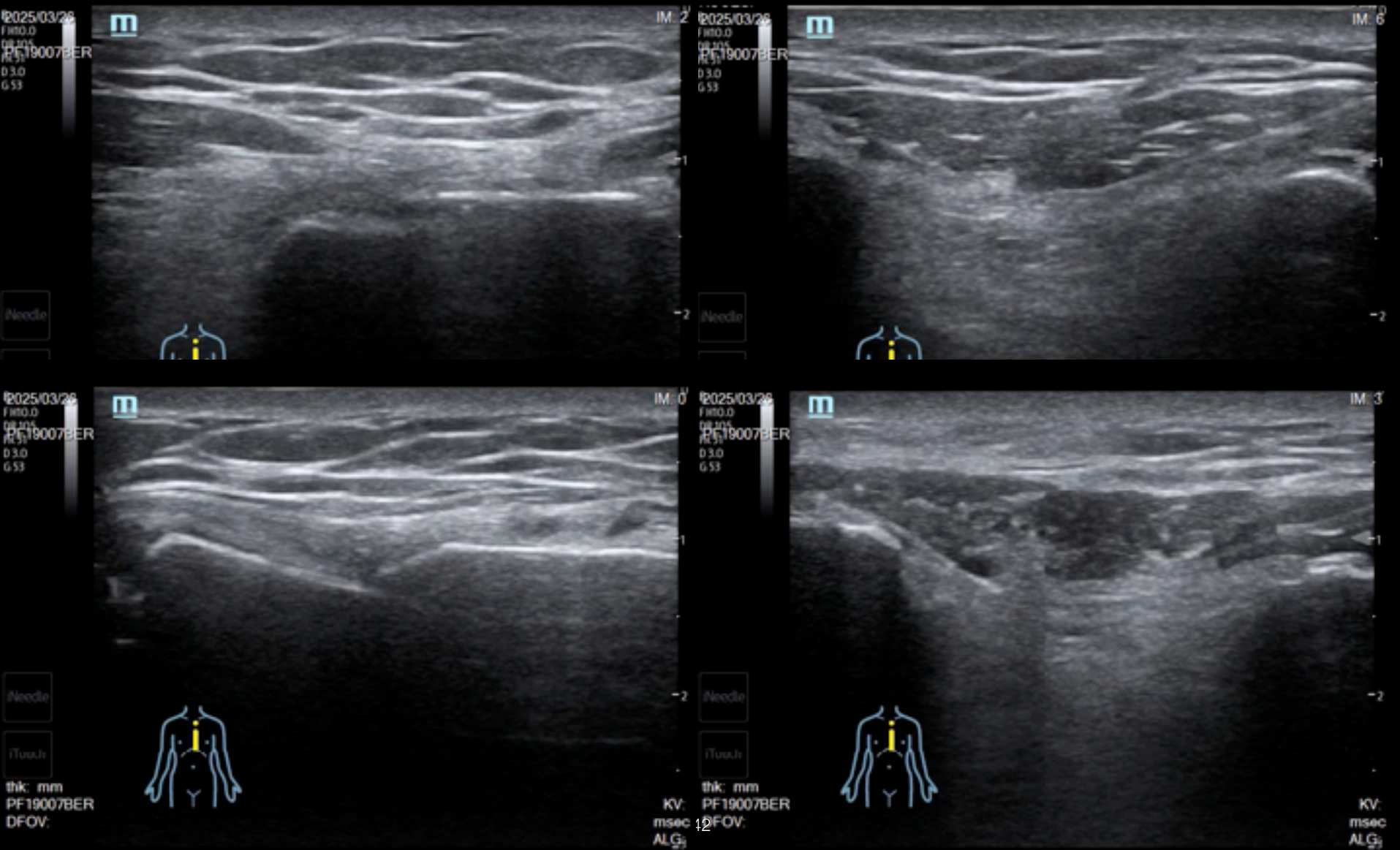
Giuseppe Pascarella ¹, Fabio Costa ¹, Giulia Nonnis ², Alessandro Strumia ^{1,*}, Domenico Sarubbi ¹, Lorenzo Schiavoni ¹, Annalaura Di Pumpo ¹, Lara Mortini ¹, Stefania Grande ¹, Andrea Attanasio ³, Giovanni Gadotti ⁴, Alessandro De Cassai ⁵, Alessia Mattei ¹, Antonio Nenna ⁶, Massimo Chello ⁶, Rita Cataldo ¹, Felice Eugenio Agrò ¹ and Massimiliano Carassiti ¹



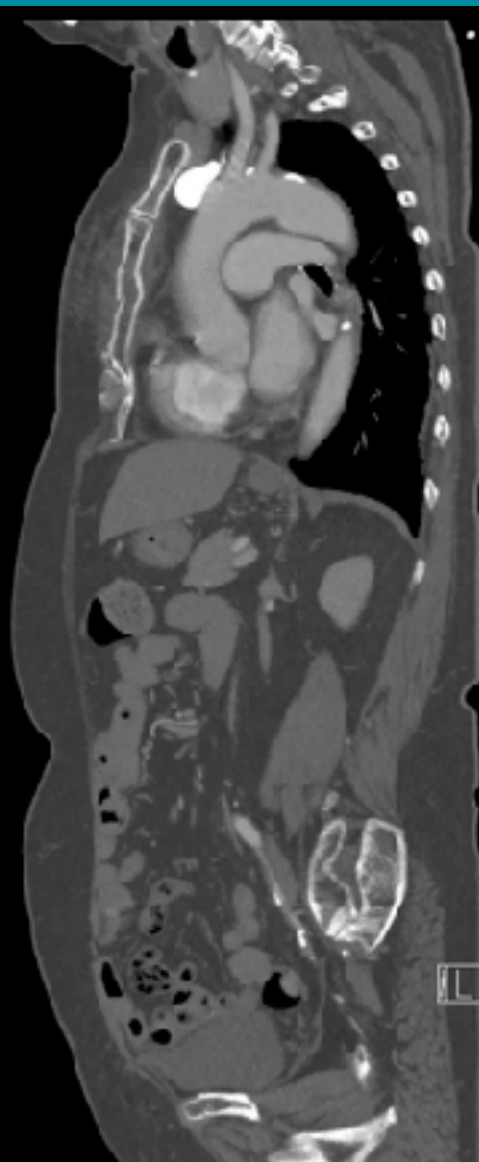
66M, TA, direct chest impact on motorcycle



Parasternal nerve block for sternal fracture

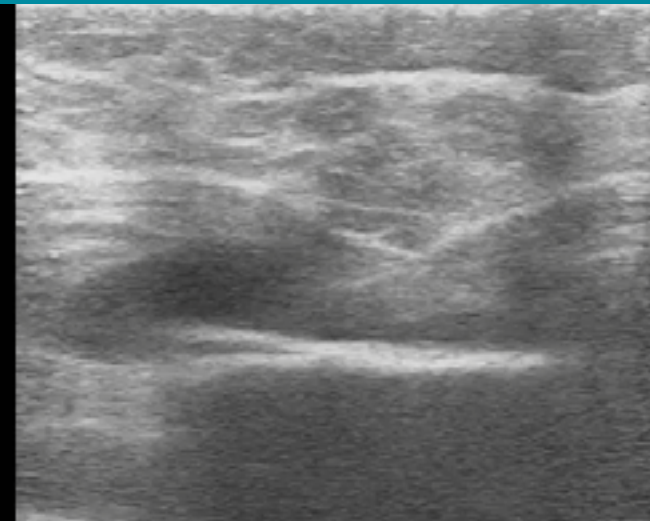


Hematoma block for sternal fracture



L12-3
37 Hz
4.0cm

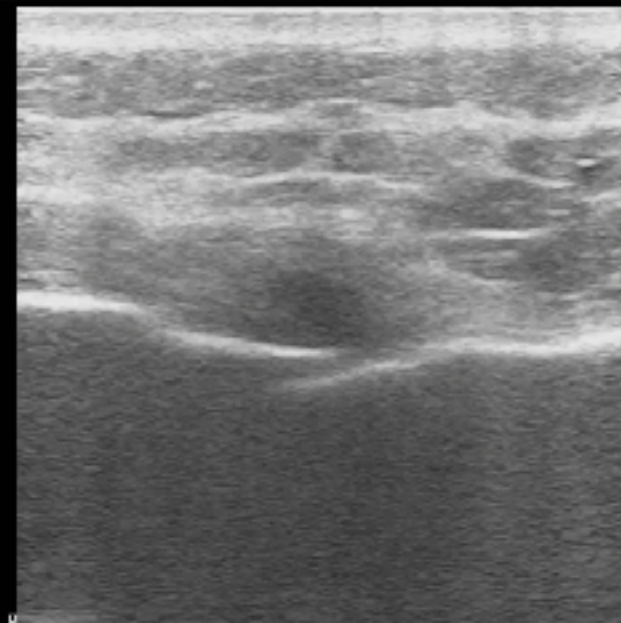
2D
HGen
Gn 98
C 39
3/3/2



2
4
6

Arterial
L12 3
37 Hz
4.0cm

2D
HGen
Gn 98
C 39
3/3/2



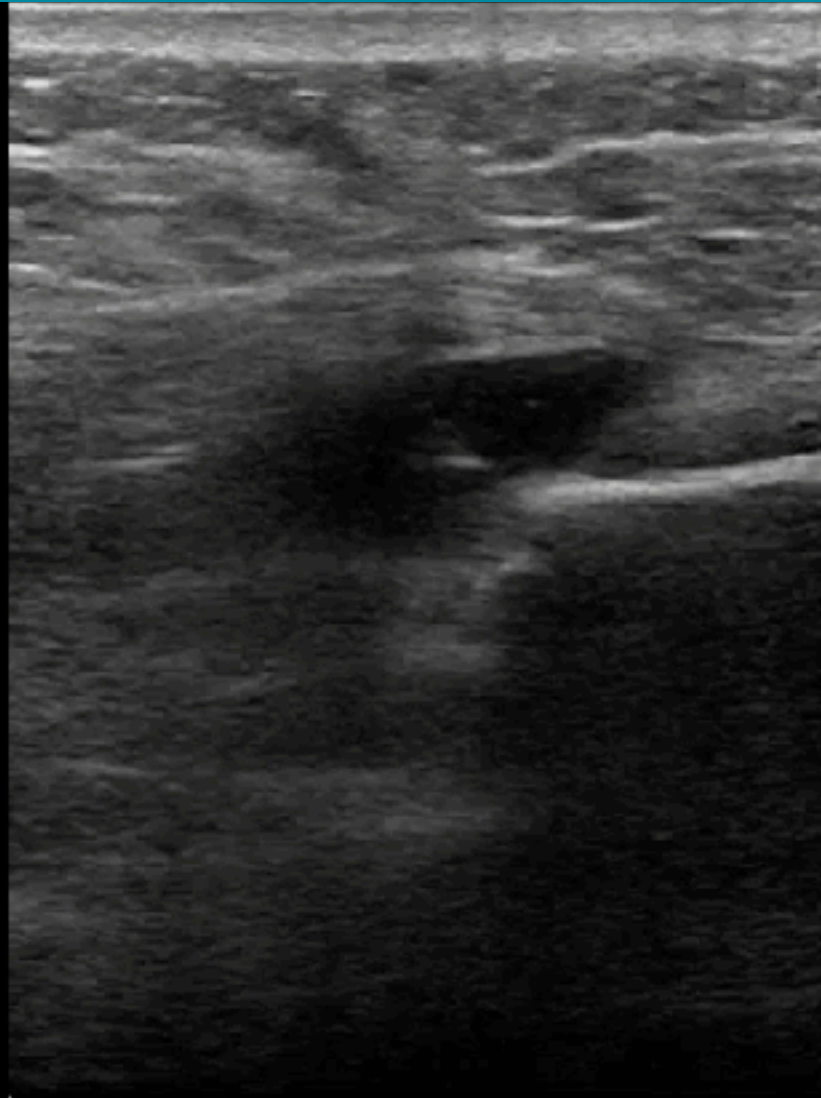
2
4
6

Hematoma block for sternal fracture



P

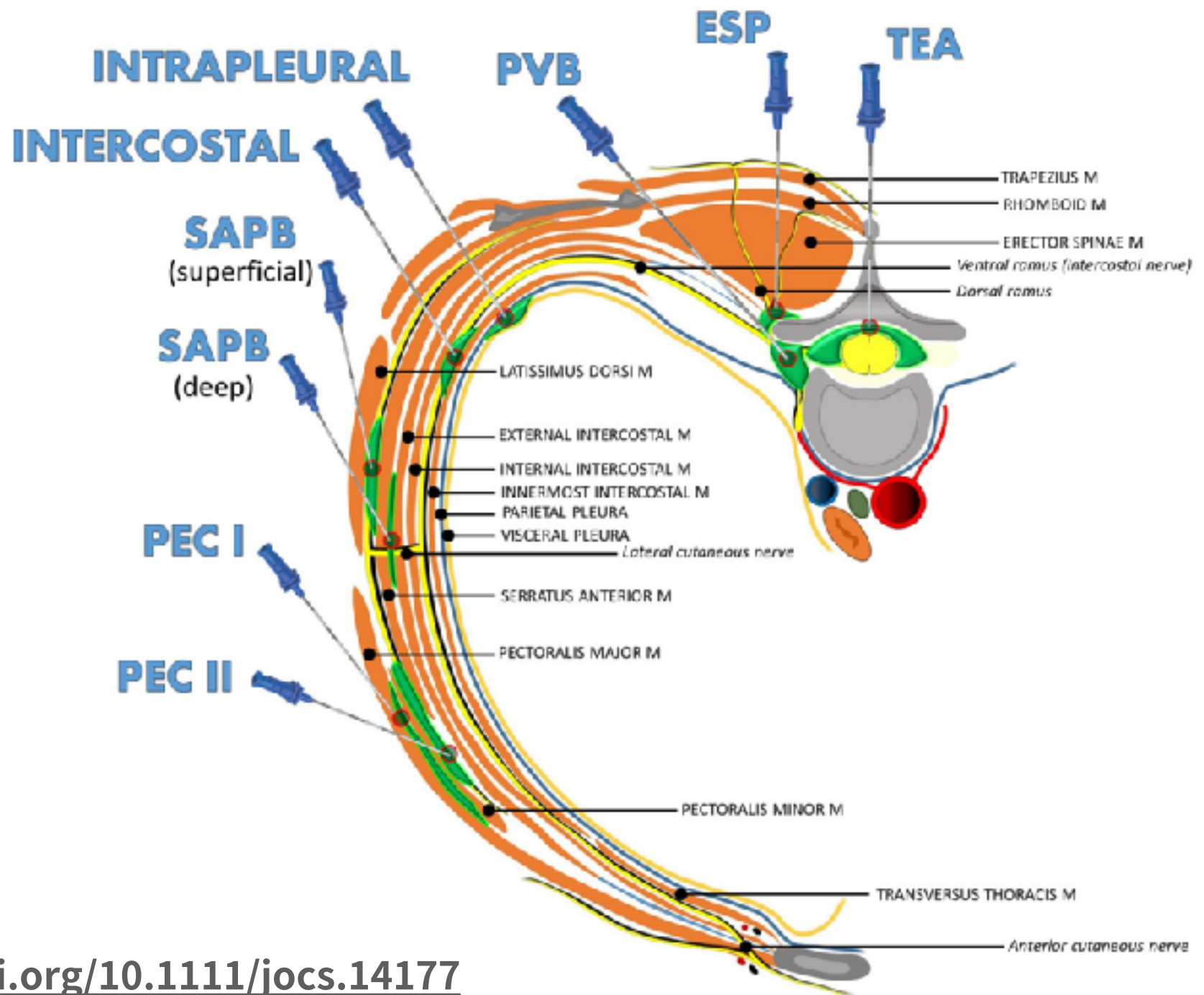
G
R
8.8



2

4

5.0cm



Intercostal Block

► QUICK FACTS

Indications: Analgesia for rib fractures, postsurgical analgesia for chest and upper abdominal surgery (i.e., thoracotomy, thoracostomy, mastectomy, gastrostomy, and cholecystectomy), herpes zoster or post-herpetic neuralgia.

Goal: Local anesthetic spread in the intercostal sulcus around the intercostal nerve.

Patient position: An intercostal nerve block can be performed with the patient in the seated, lateral decubitus, or prone positions.

Landmarks: The US transducer is placed parasagittal to identify the ribs.



Linear

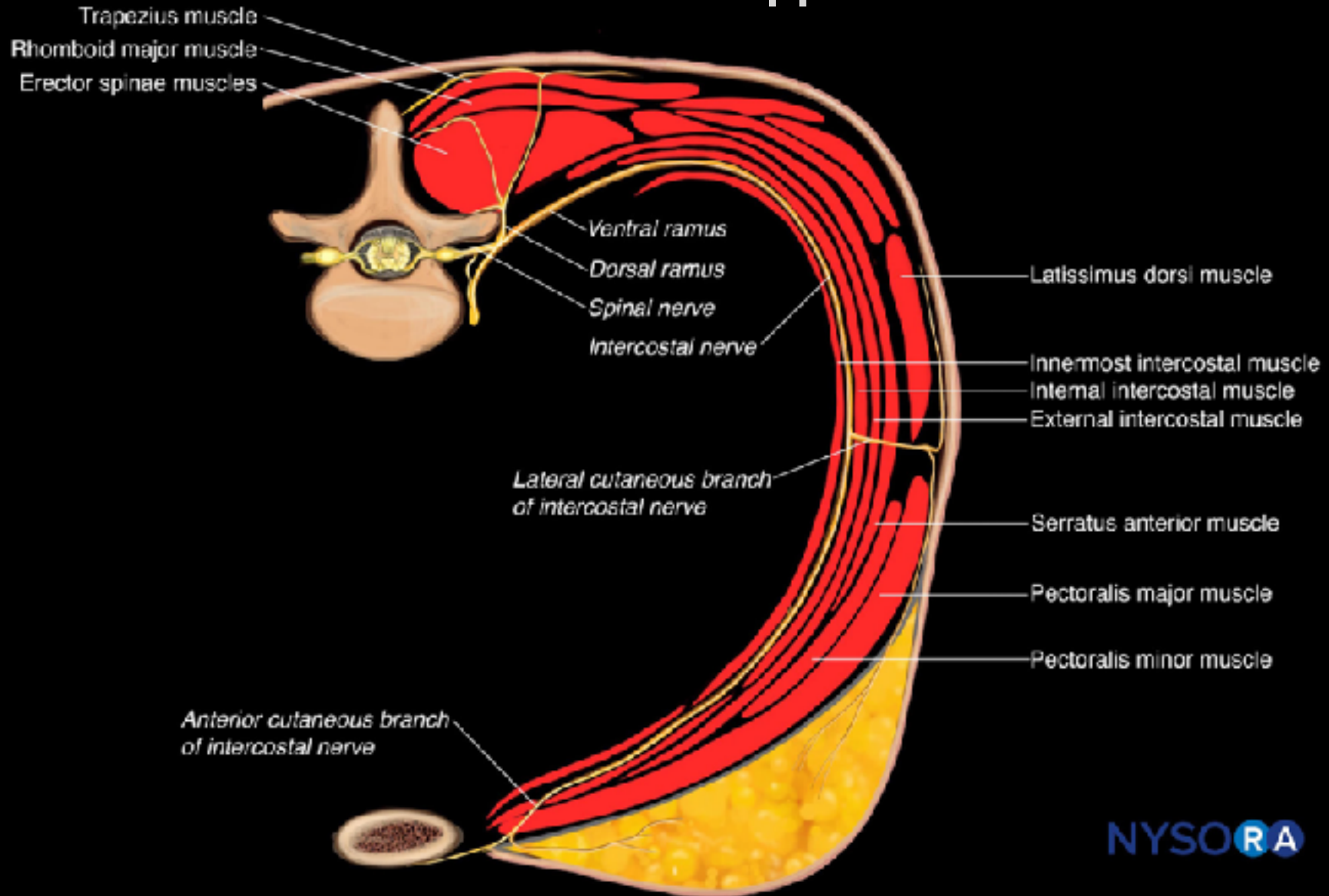


22-25 gauge,
3-5 cm



3-5 mL at each level

T2-T12 spinal nerve - thoracic wall & upper abdomen



NYSORA

Fig-1. Anatomy of the thoracic spinal and intercostal nerves.

Erector spinae
muscles

Dorsal ramus of
thoracic nerve

Internal intercostal
membrane

Intercostal nerve, artery
and vein

Sympathetic trunk
and ganglion

Thoracic aorta

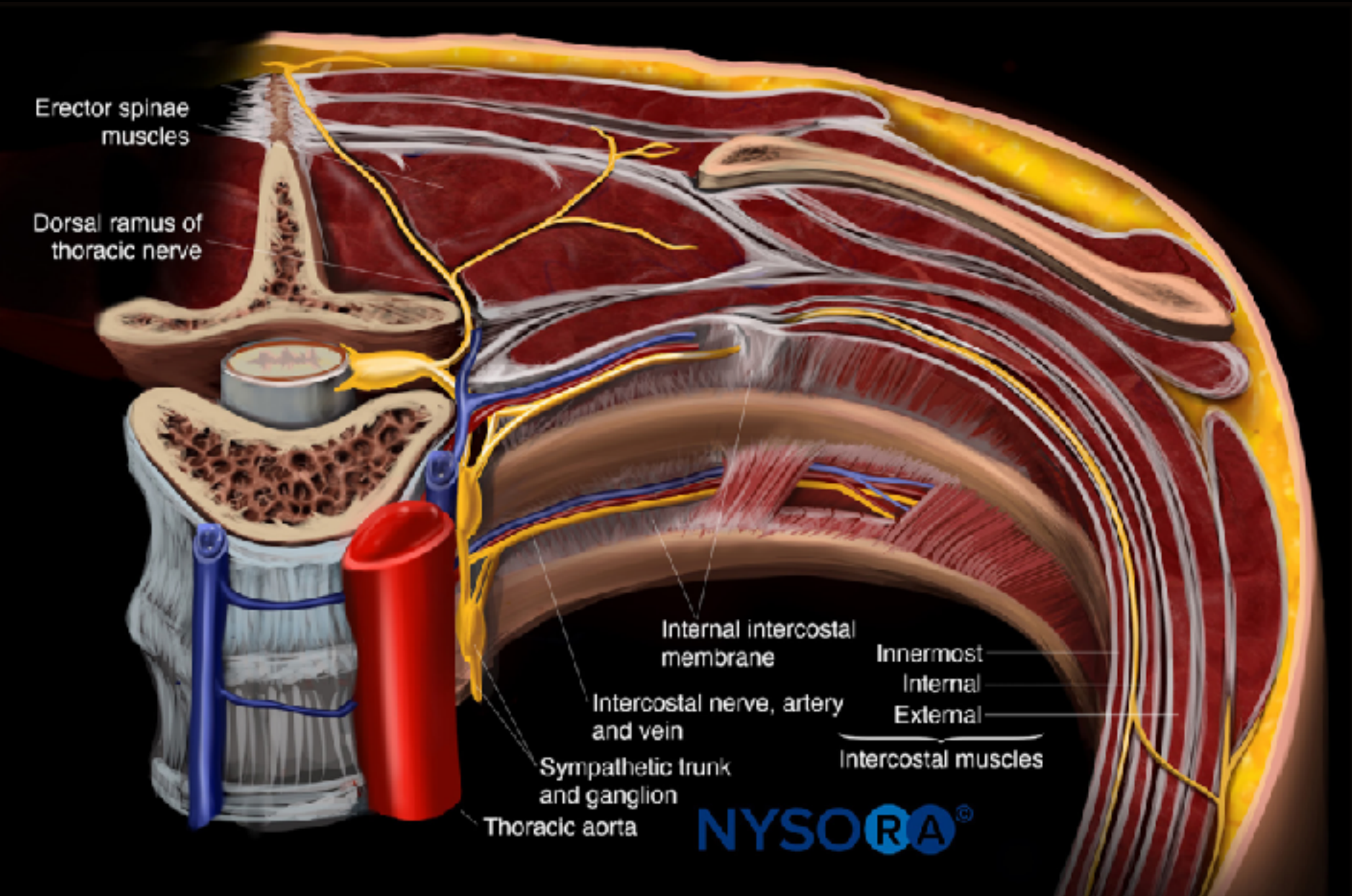
Innermost

Internal

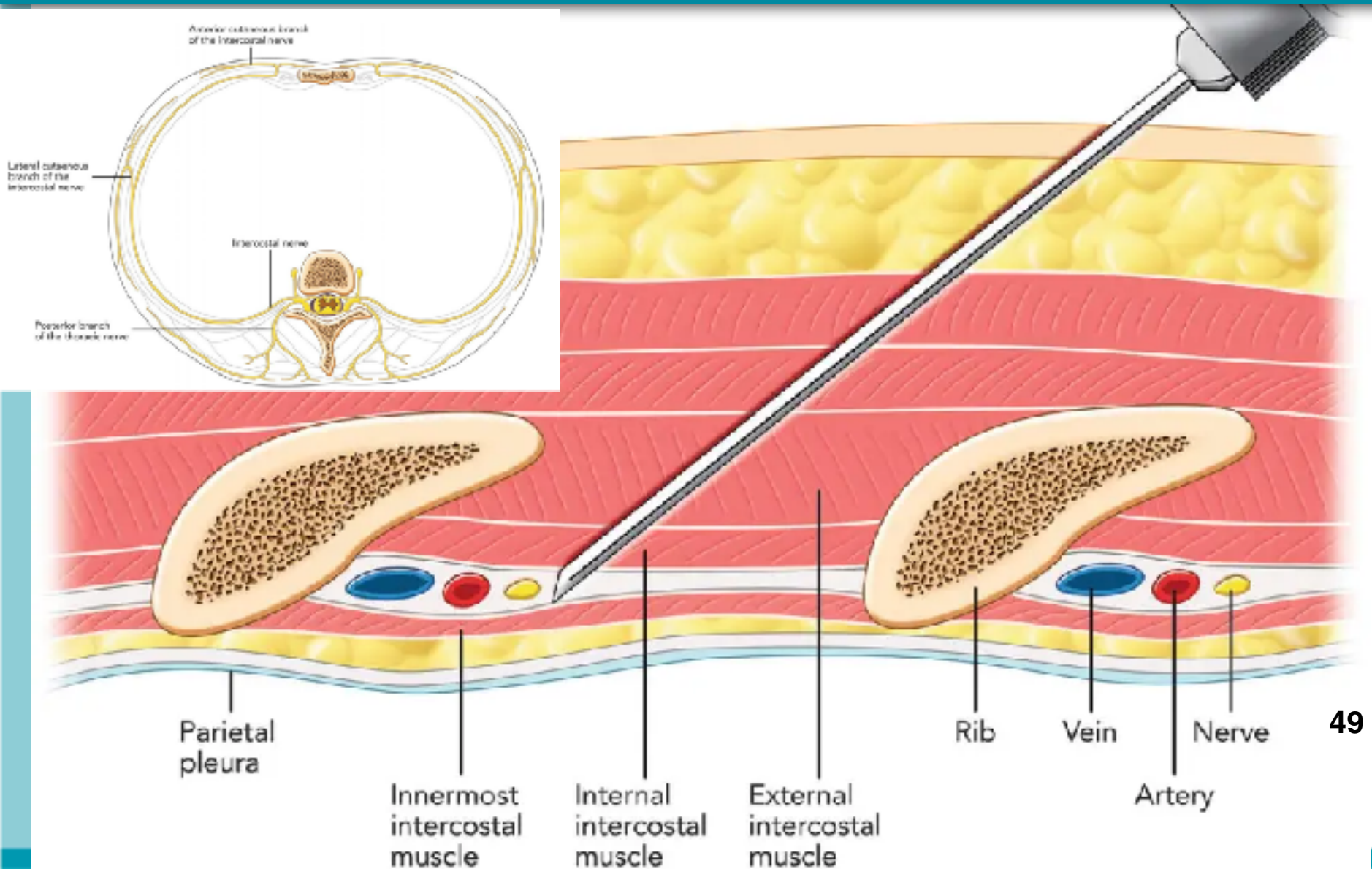
External

Intercostal muscles

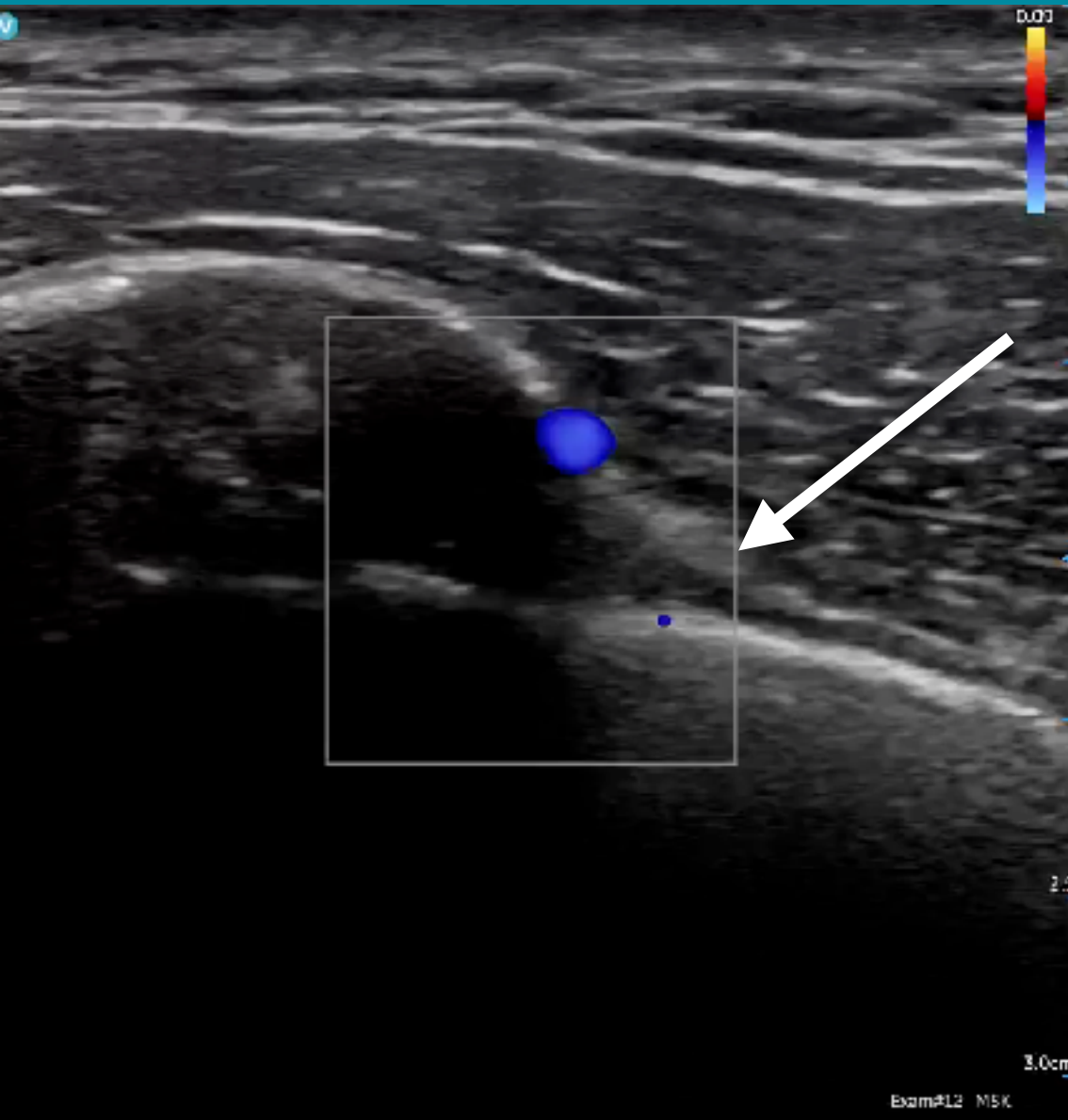
NYSORA®



Intercostal nerve block



Intercostal nerve block



Correct level

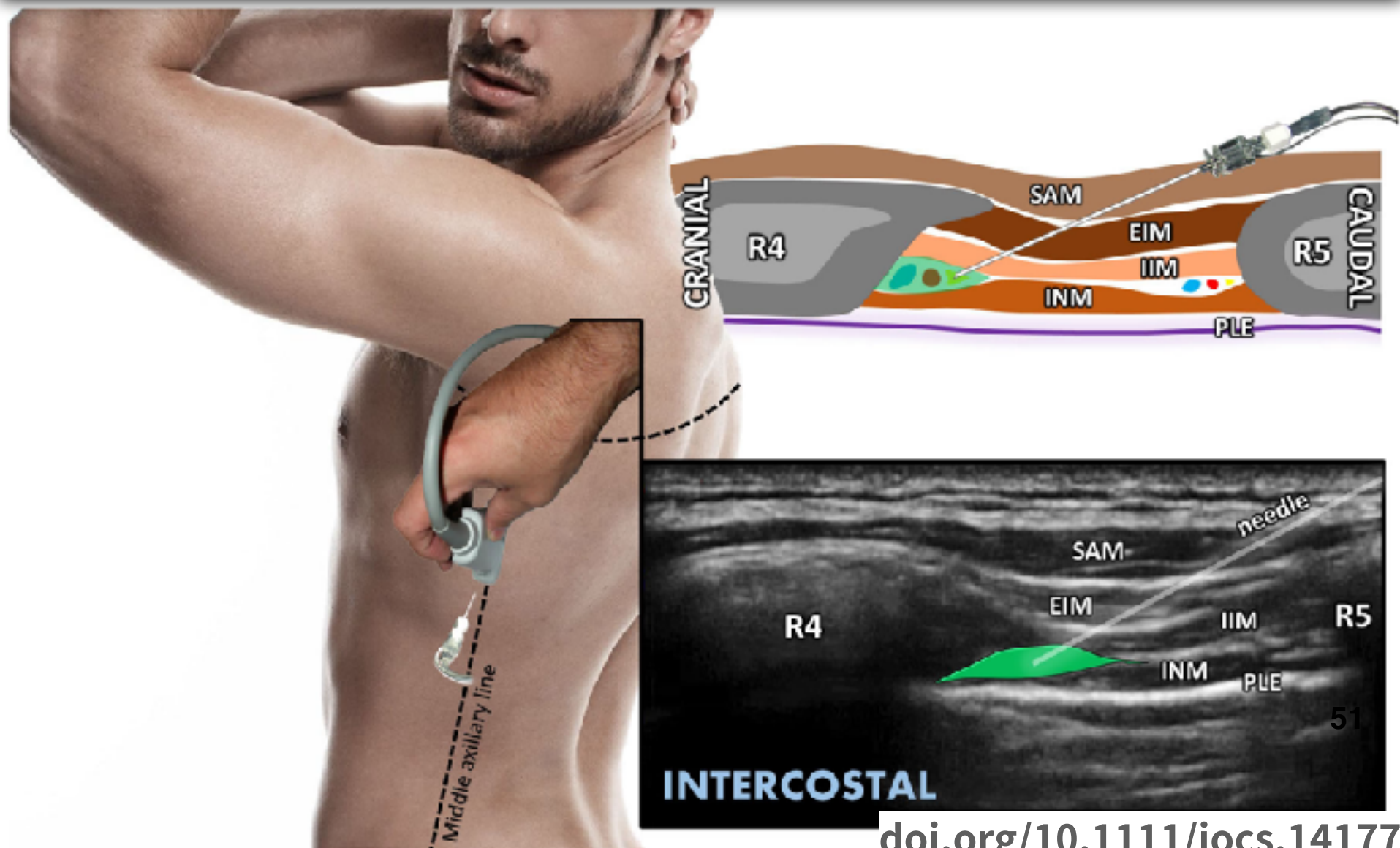
Inferior border

3-5ml/IC level

Hydrodissection

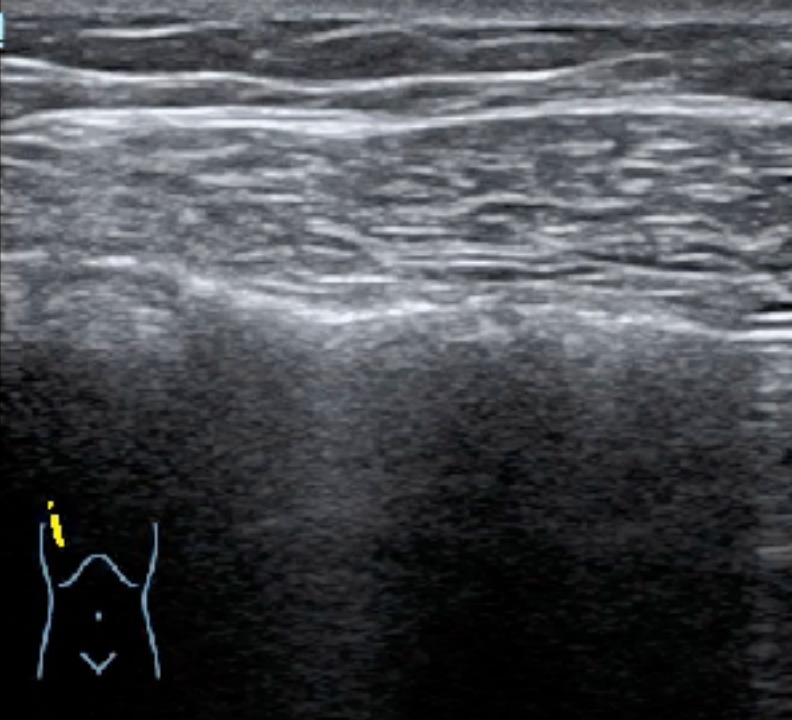
Consider 3 levels

Intercostal nerve block





U
F-P5.0
DB 11.0
FR 70
D 3.5
G A 8



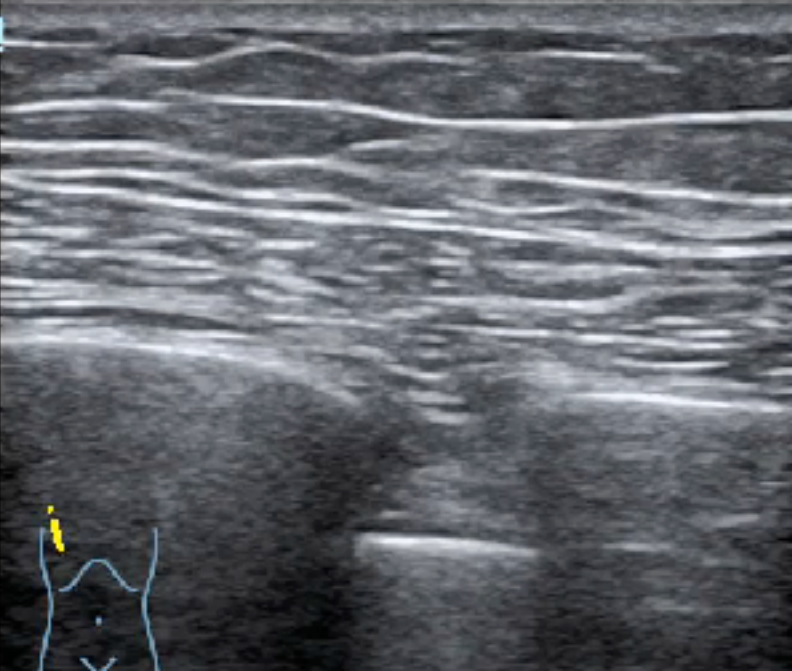
iNeedle

iTouch



L12 45 AP 96.6% M155 IS 0.1

U
F-P5.0
DB 11.0
FR 70
D 3.5
G A 8



iNeedle

iTouch



Pectoralis / Serratus Plane block

Indications: PEC I: Analgesia for breast surgery, clavicle, and acromioclavicular procedures.

PEC II: Extensive breast surgery, thoracic wall procedures, sentinel node excision.

Serratus anterior plane: Anterolateral thoracic wall surgery and rib fractures.

Goal: Injection of local anesthetic in the fascial planes between the pectoral muscles and the serratus anterior muscle.

Patient position: Supine or semi-lateral position with the ipsilateral arm abducted 90 degrees.

Landmarks: The clavicle, pectoralis major muscle, anterior and midaxillary lines.



Linear



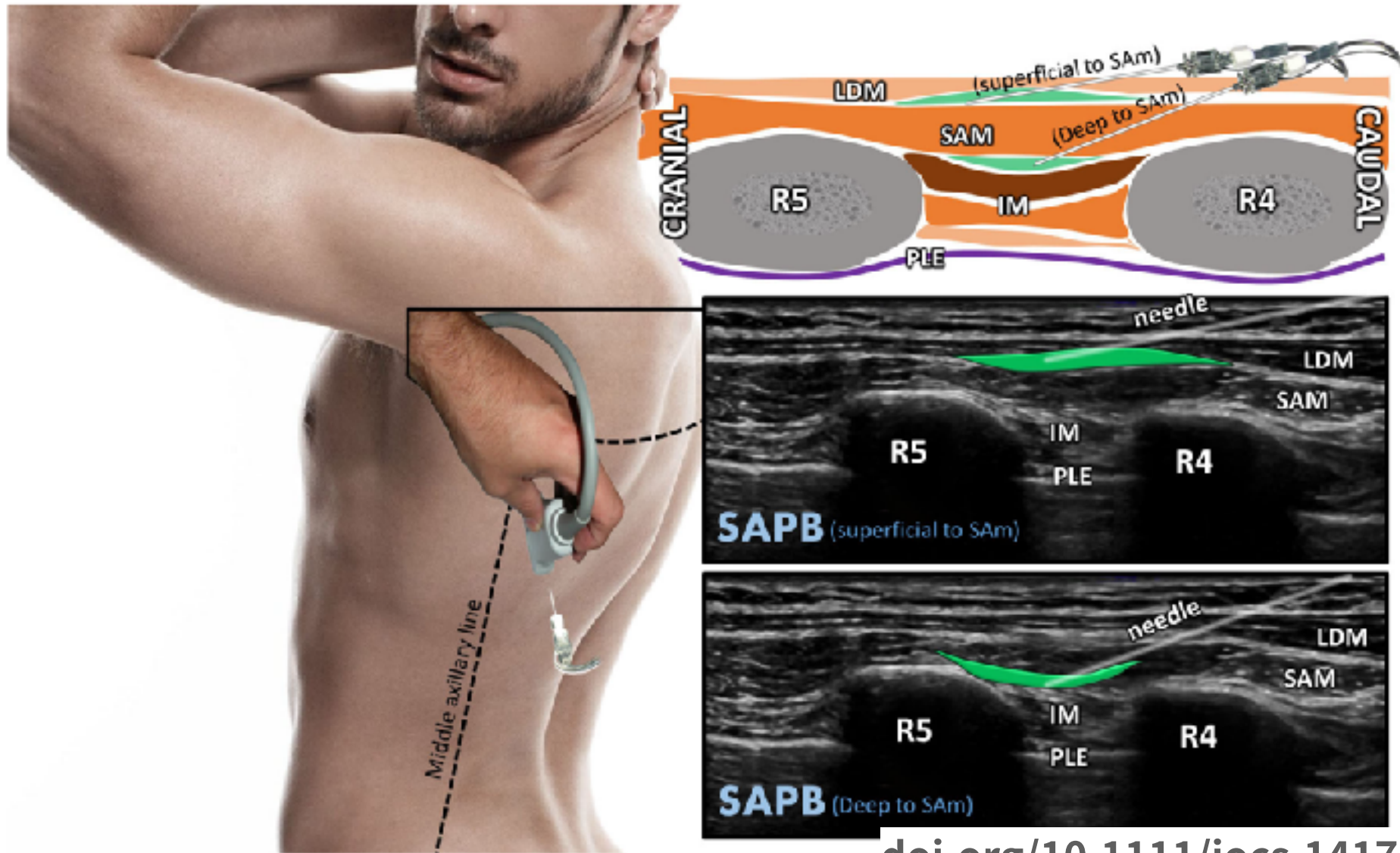
22 gauge,
5-10 cm short bevel



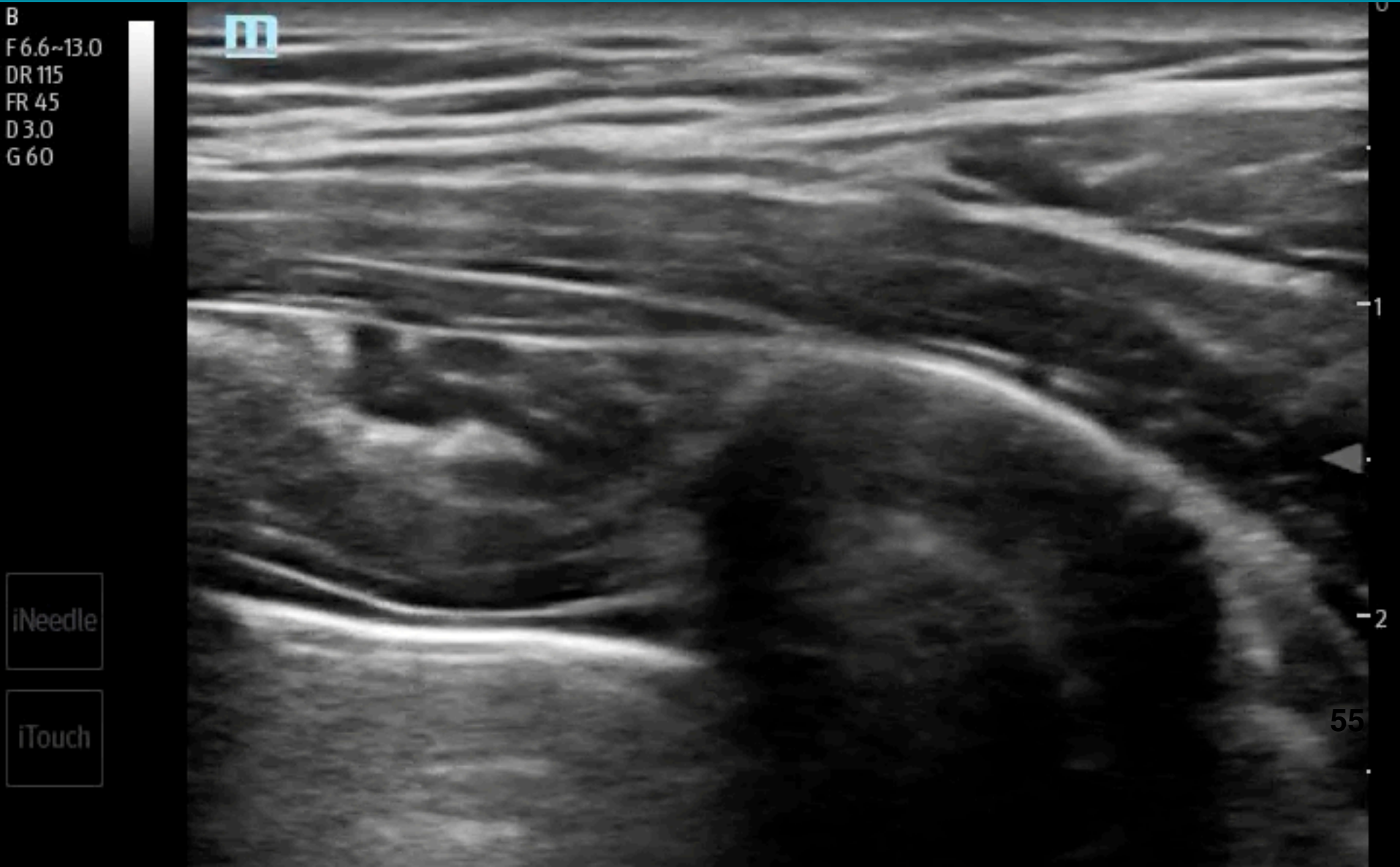
10-20 mL



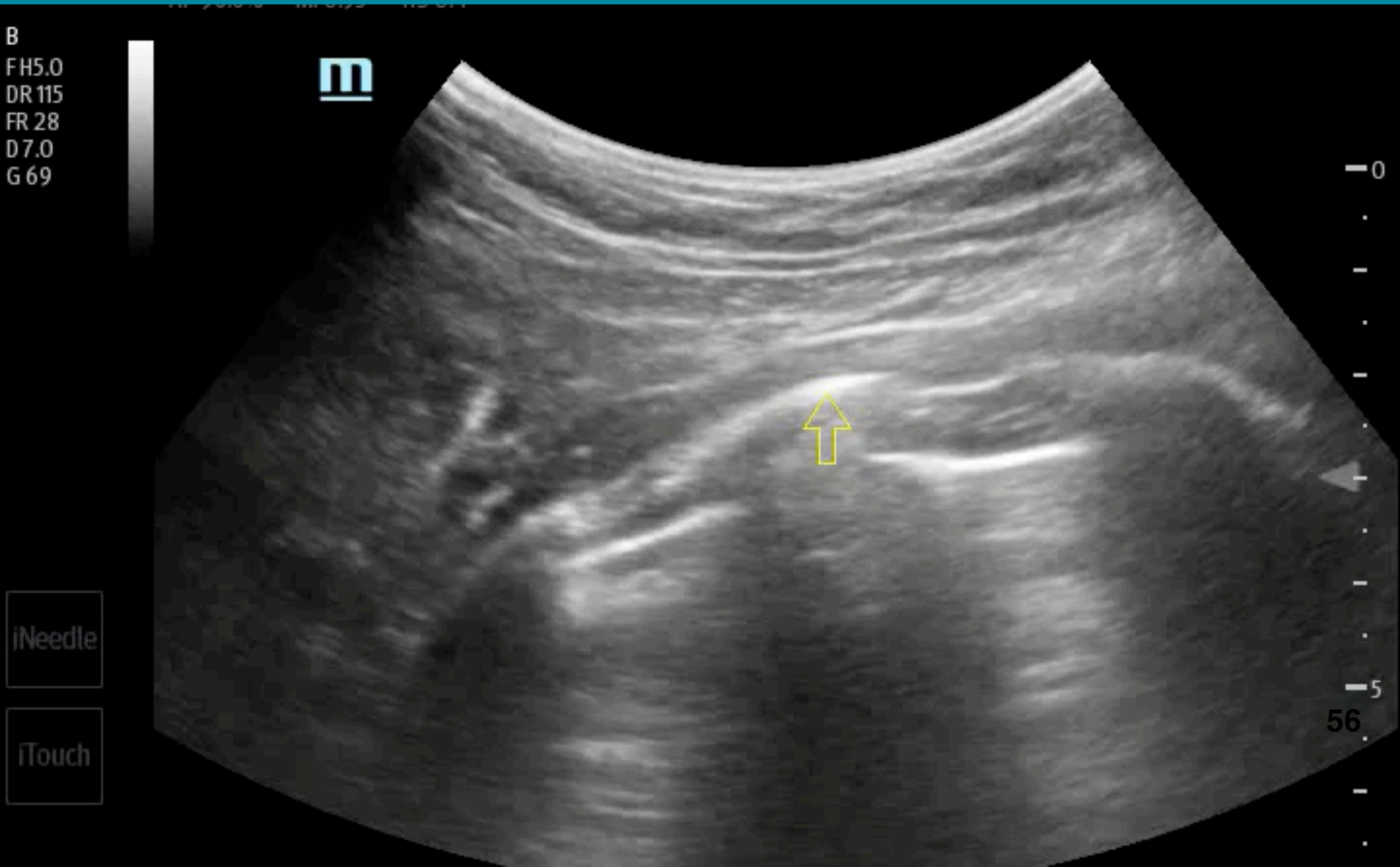
SAPB (serratus anterior plane block)



SAPB (serratus anterior plane block)

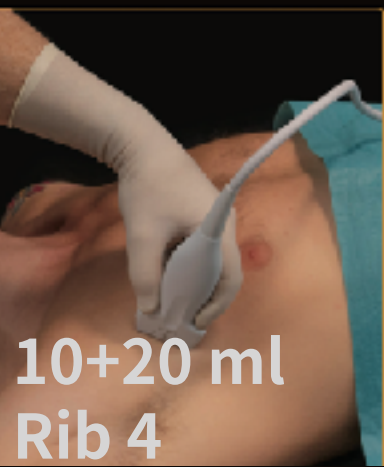
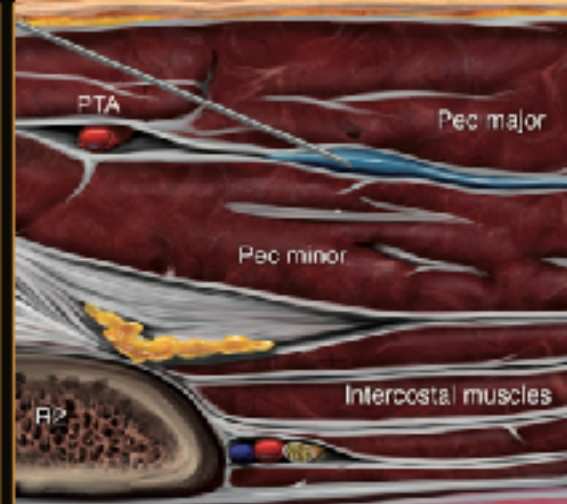
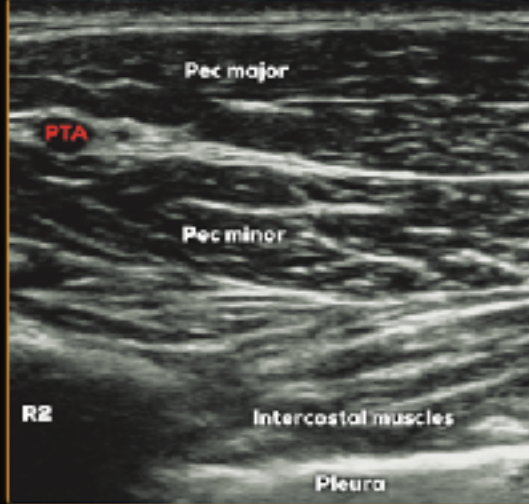


SAPB (serratus anterior plane block)

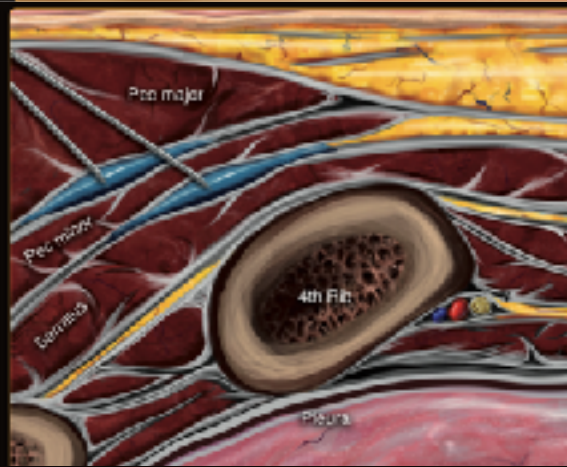
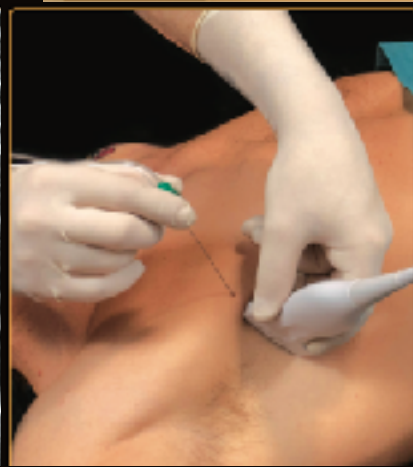
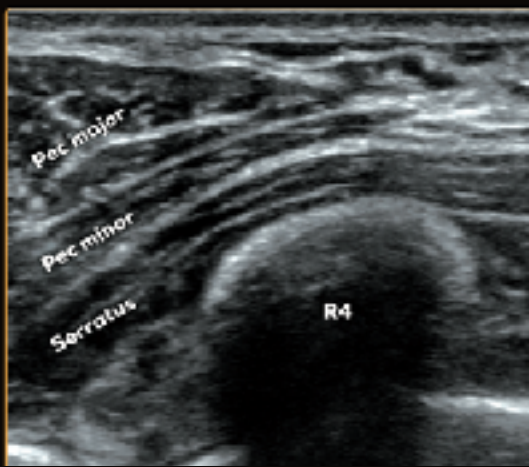




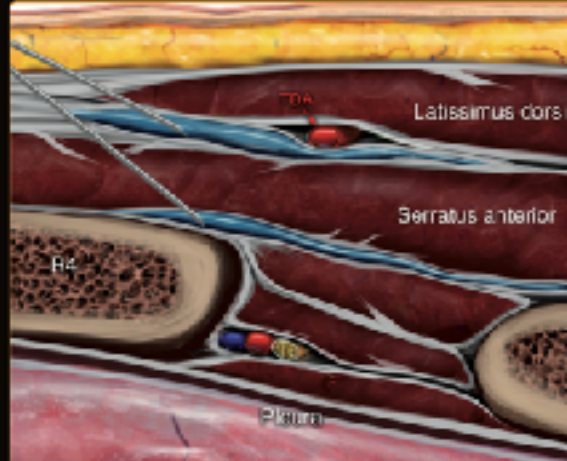
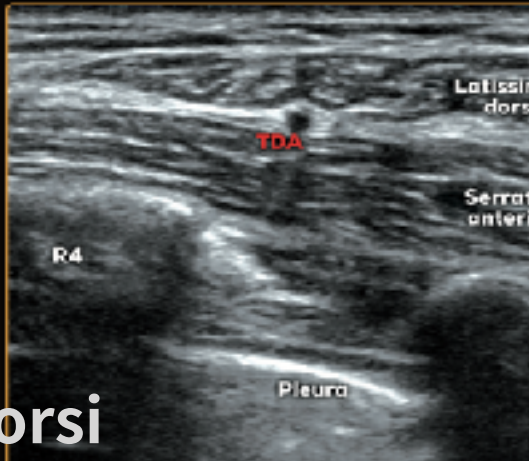
20 ml
Rib 2



10+20 ml
Rib 4



20 ml
Rib 5
Mid-axillary
Latissimus dorsi



ESPB (erector spinae plane block)

Indications: Analgesia for rib fractures, back and chest wall surgeries.

Goal: Injection of local anesthetic in the plane deep to the erector spinae muscles and superficial to the transverse processes, to achieve a craniocaudal distribution along several vertebral levels.

Patient position: The patient is best positioned in a sitting, lateral decubitus or prone position. Identify the desired level for injection by counting down from the first rib (with ultrasound), or by taking into account the bony landmarks of the back, and their corresponding vertebral levels.

Landmarks: Midpoint of the clavicle and the coracoid process.



Linear or curved



22 - gauge,
5-10 cm short bevel

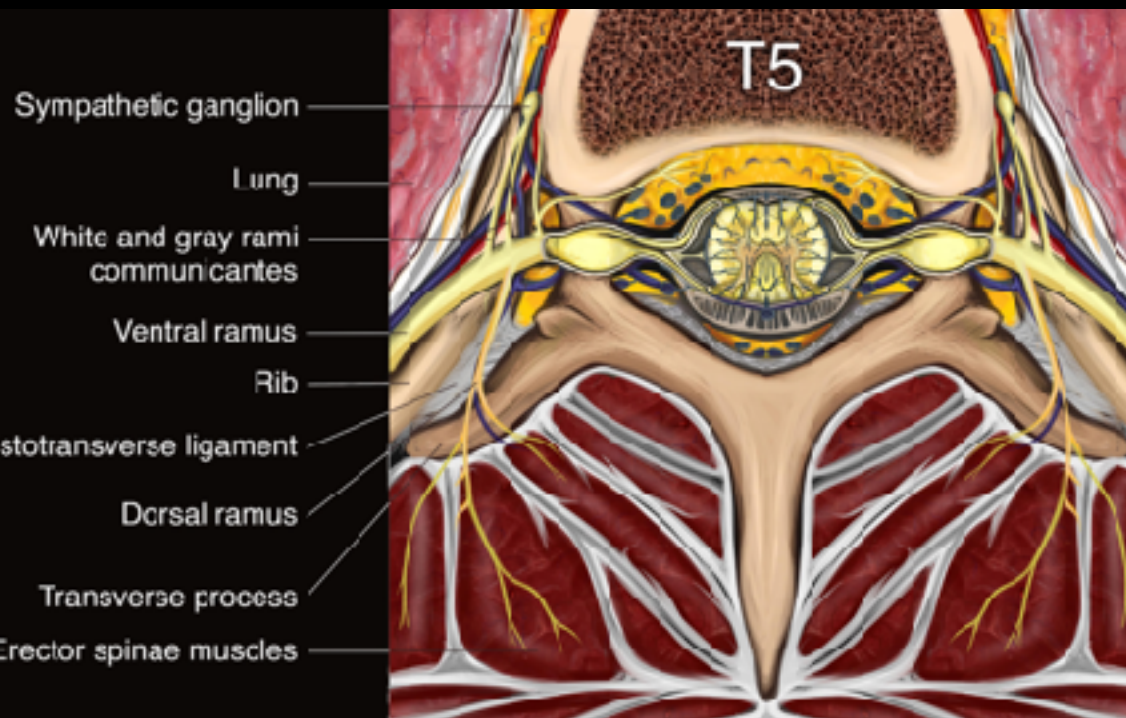


20-30 mL



ESPB (erector spinae plane block)

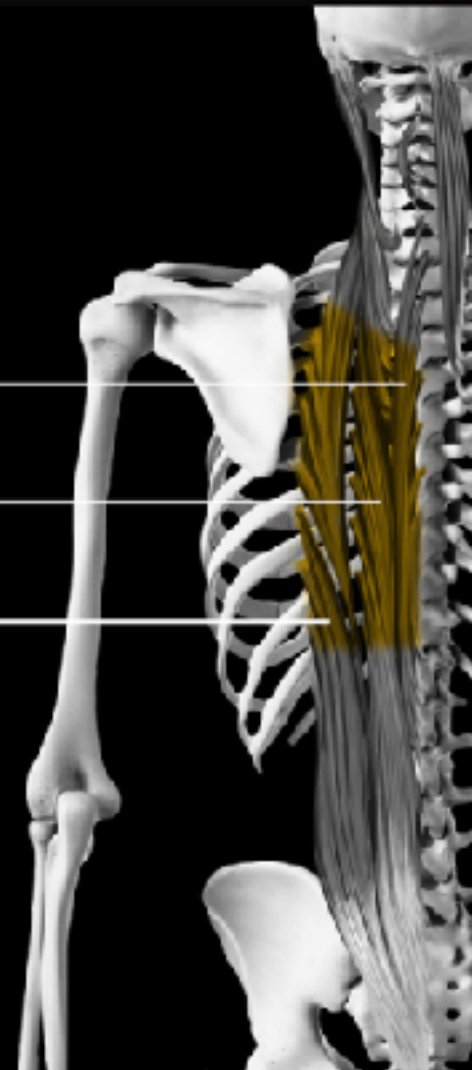
Interfascial spreading



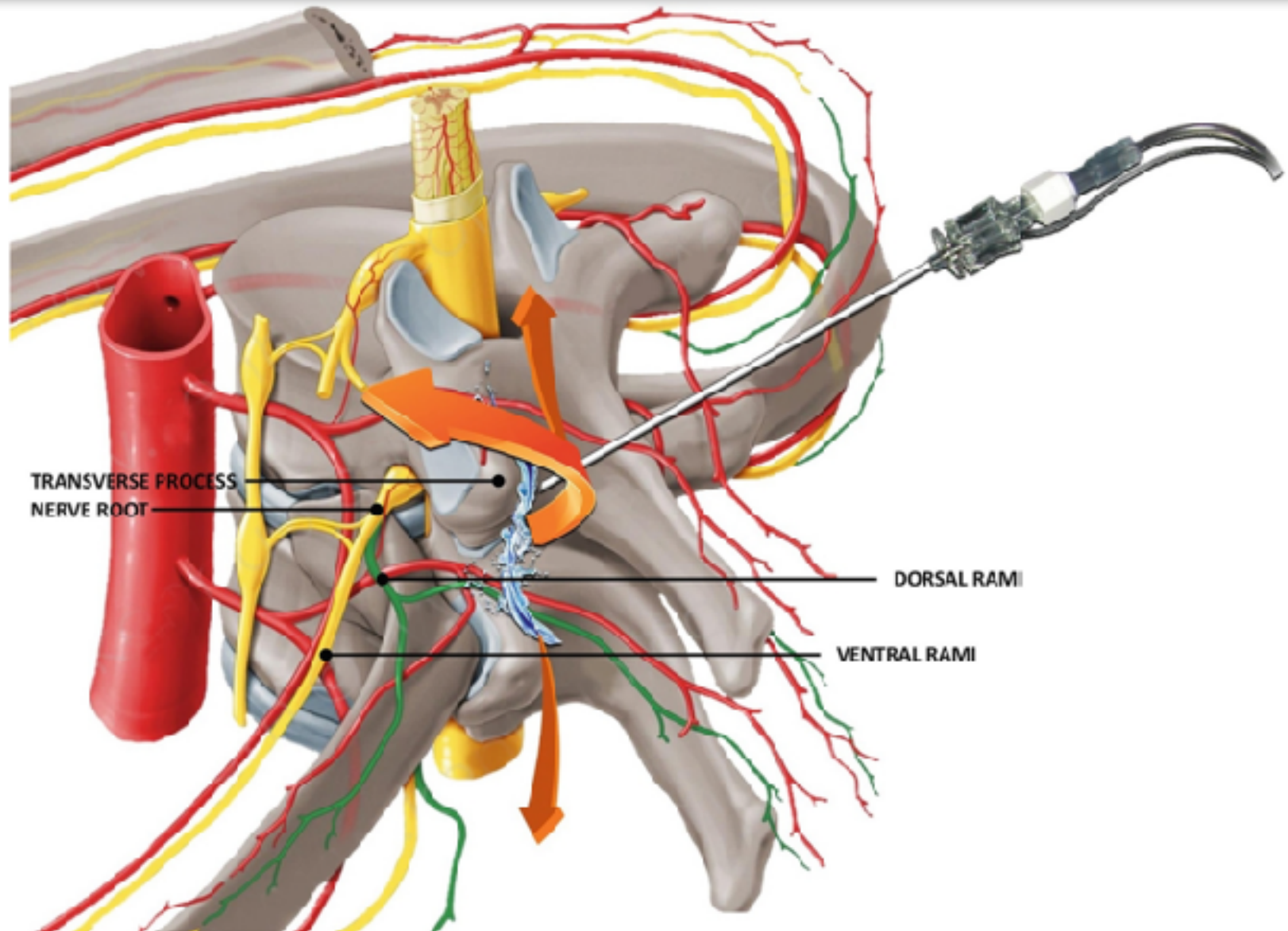
Spinalis

Longissimus

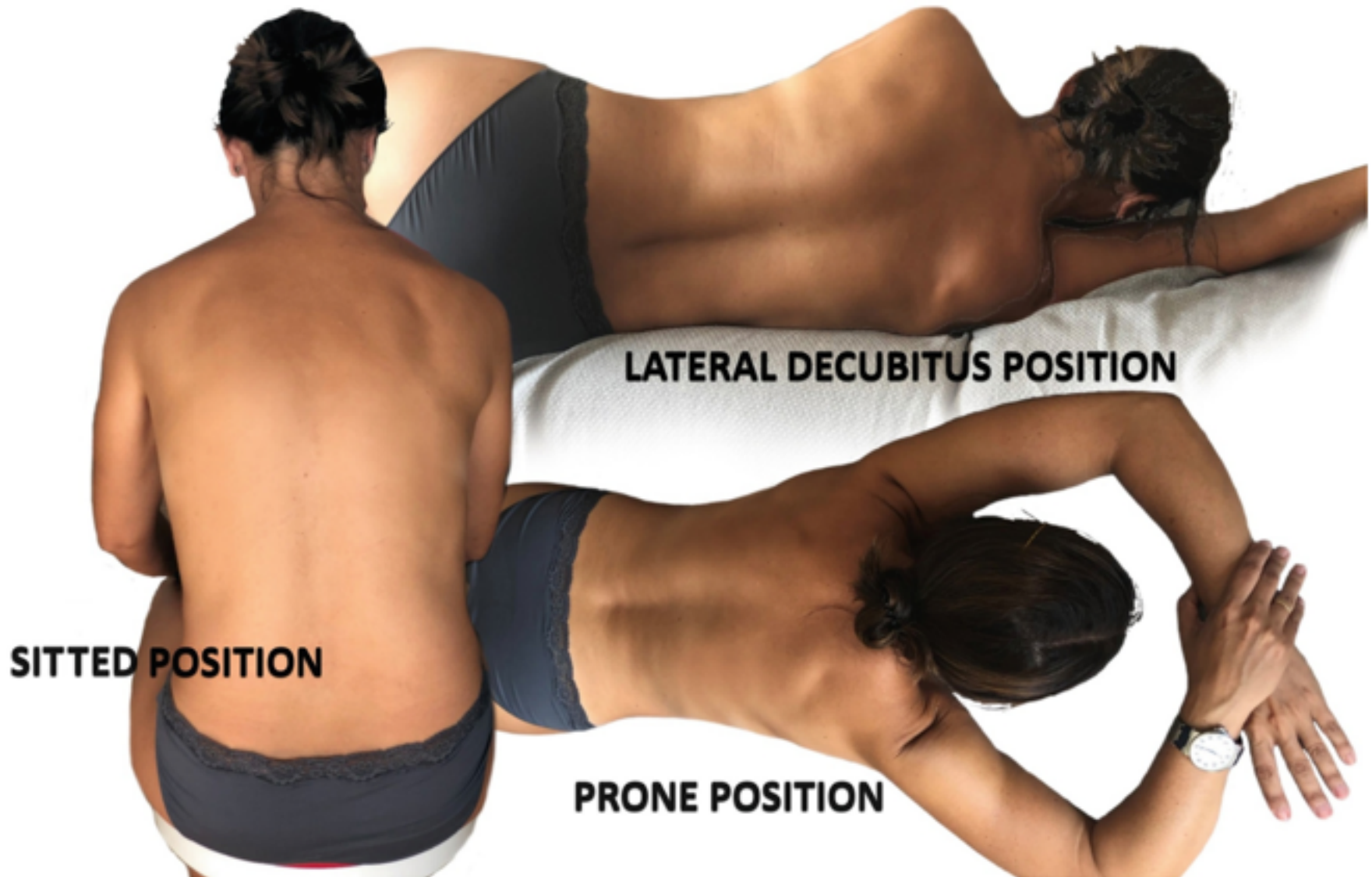
Iliocostalis



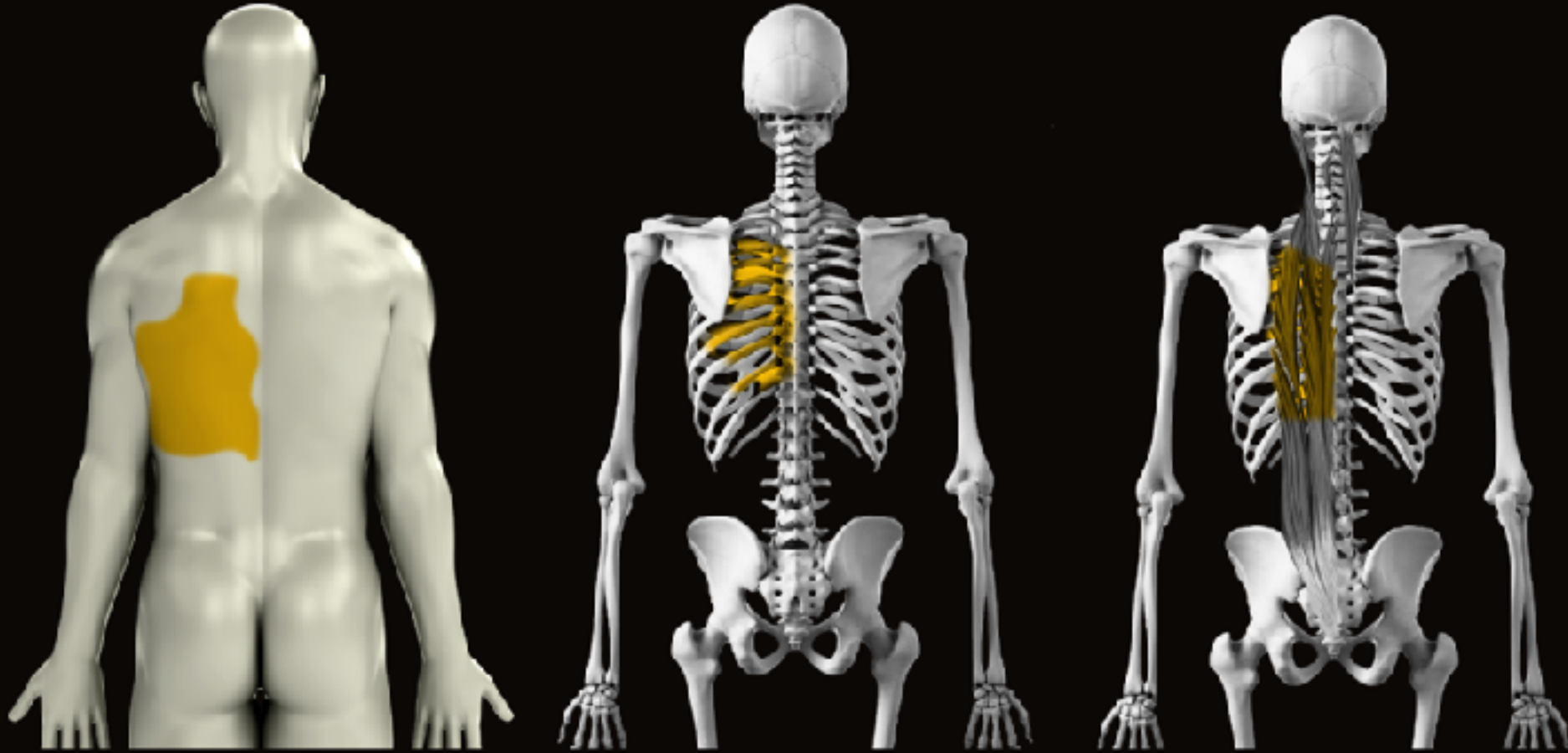
ESPB (Interfascial spreading)



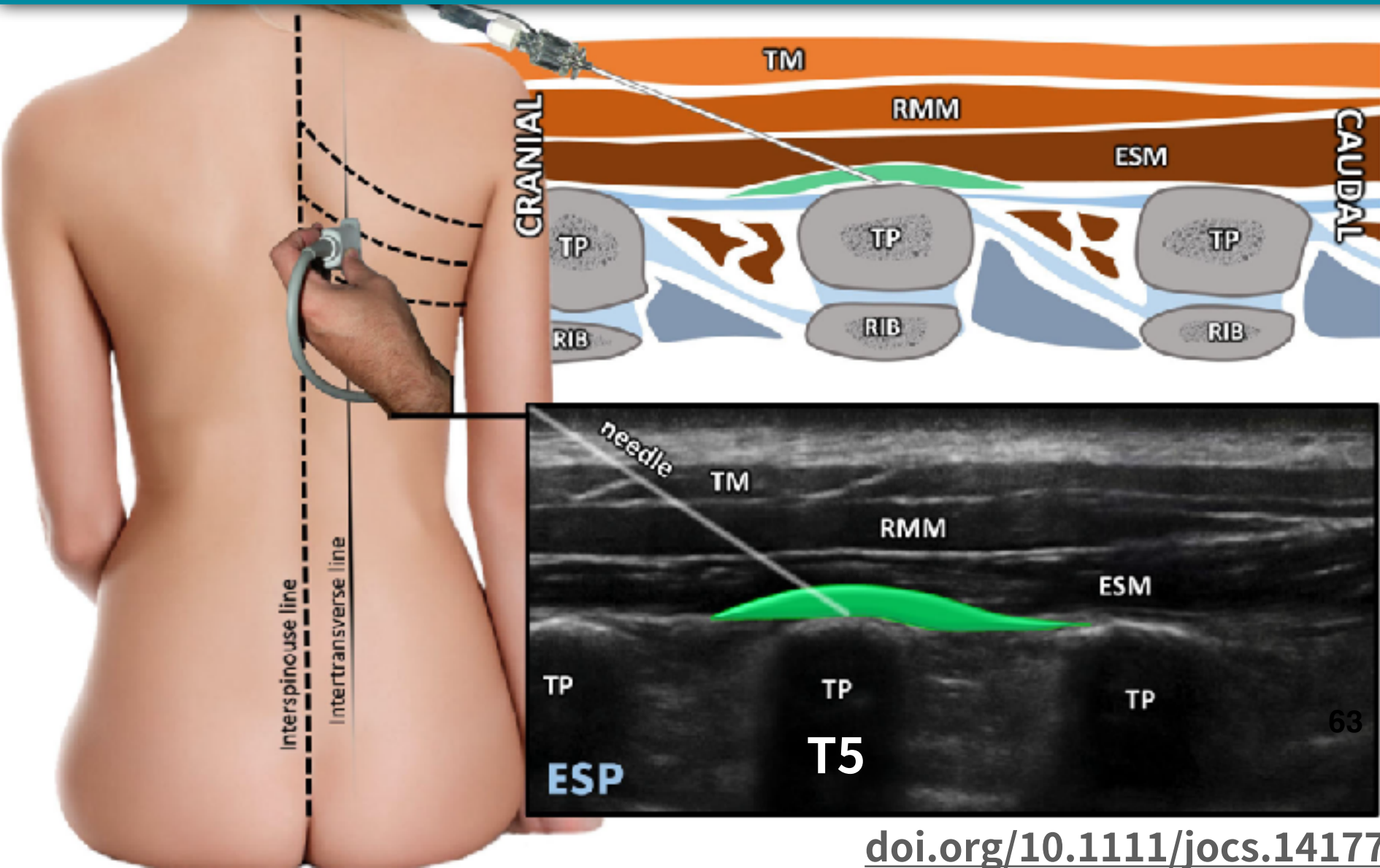
ESPB (erector spinae plane block)



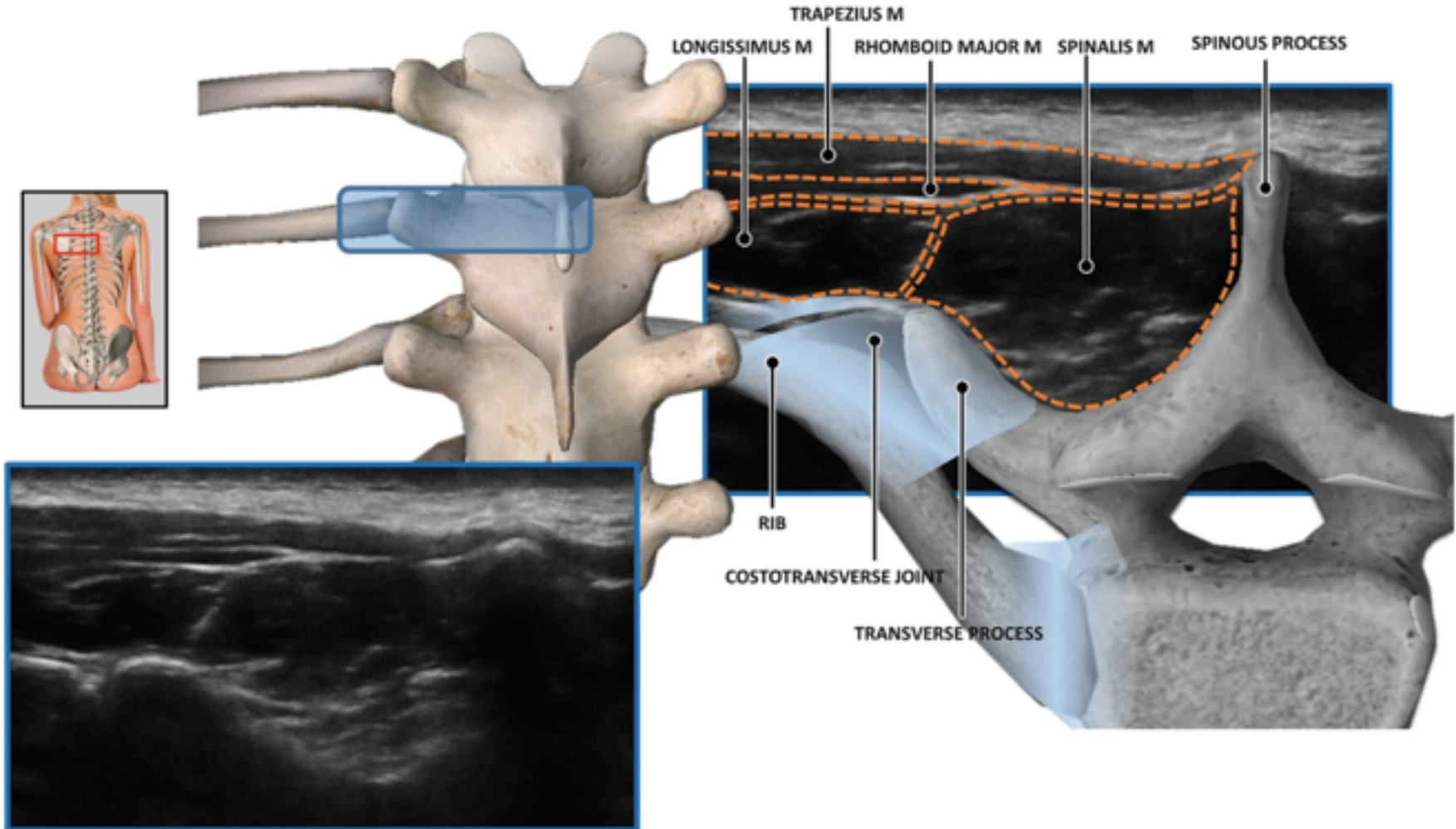
ESPB (erector spinae plane block)



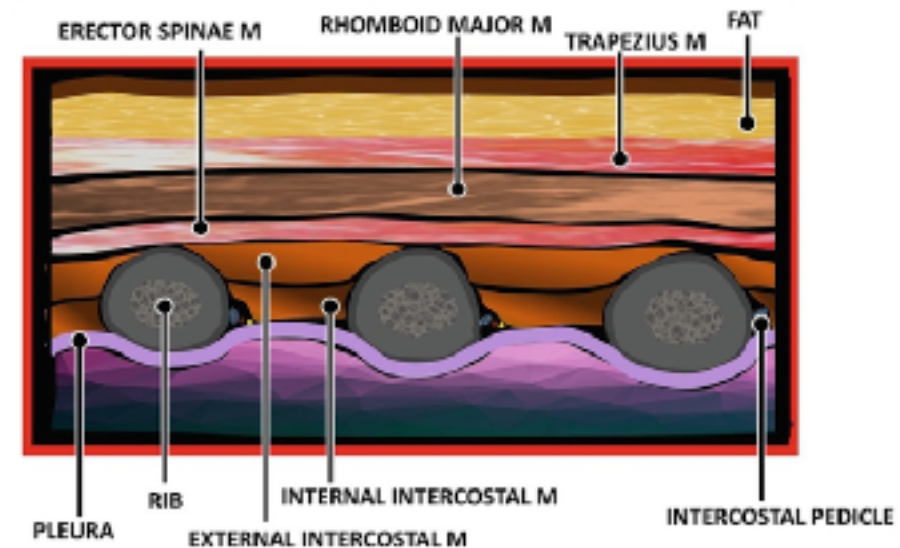
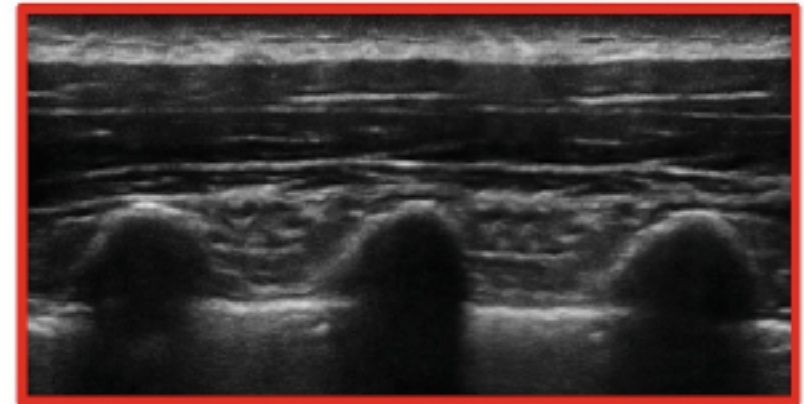
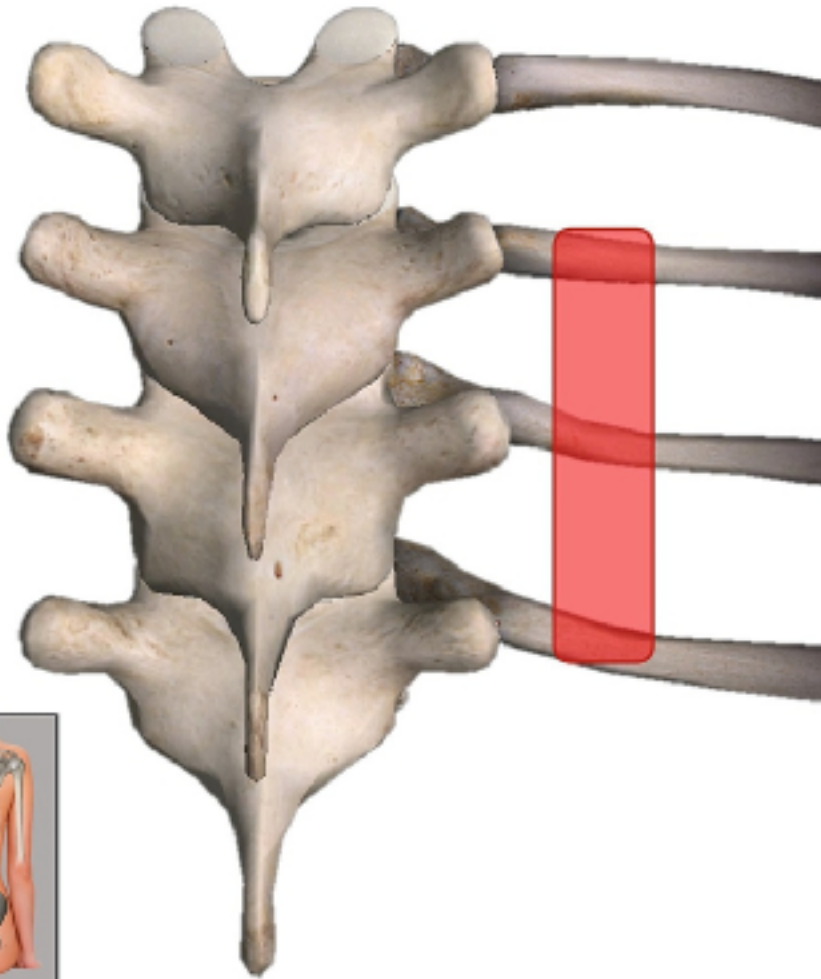
ESPB (erector spinae plane block)



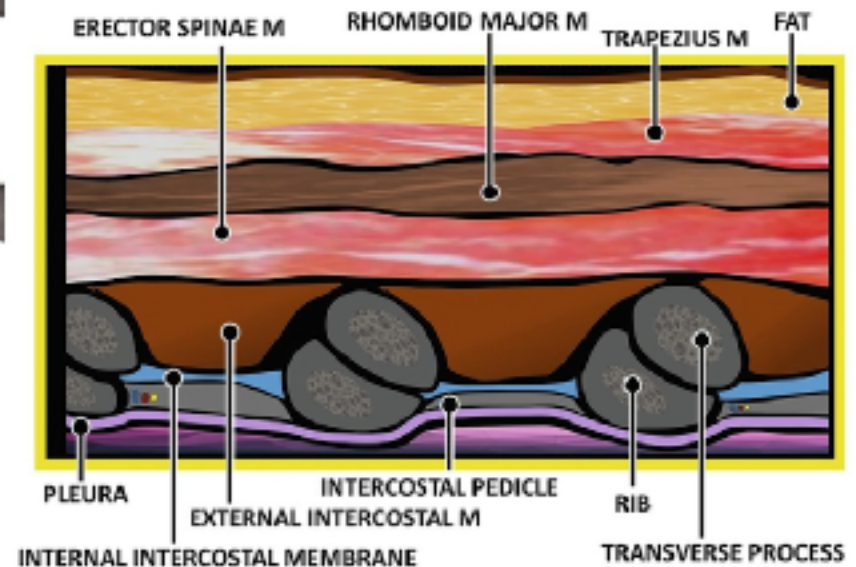
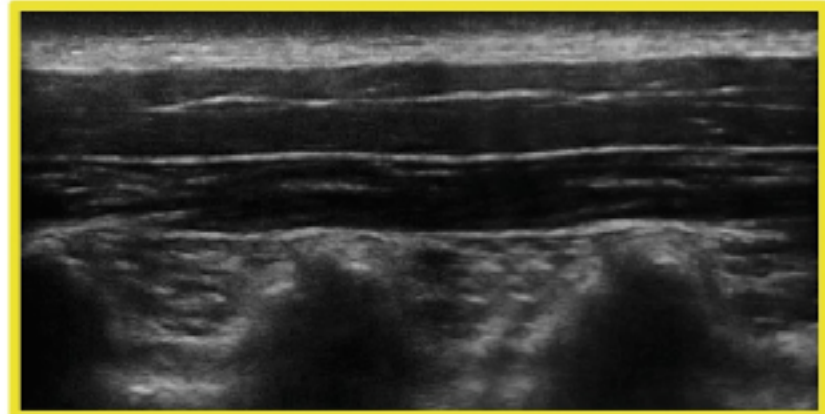
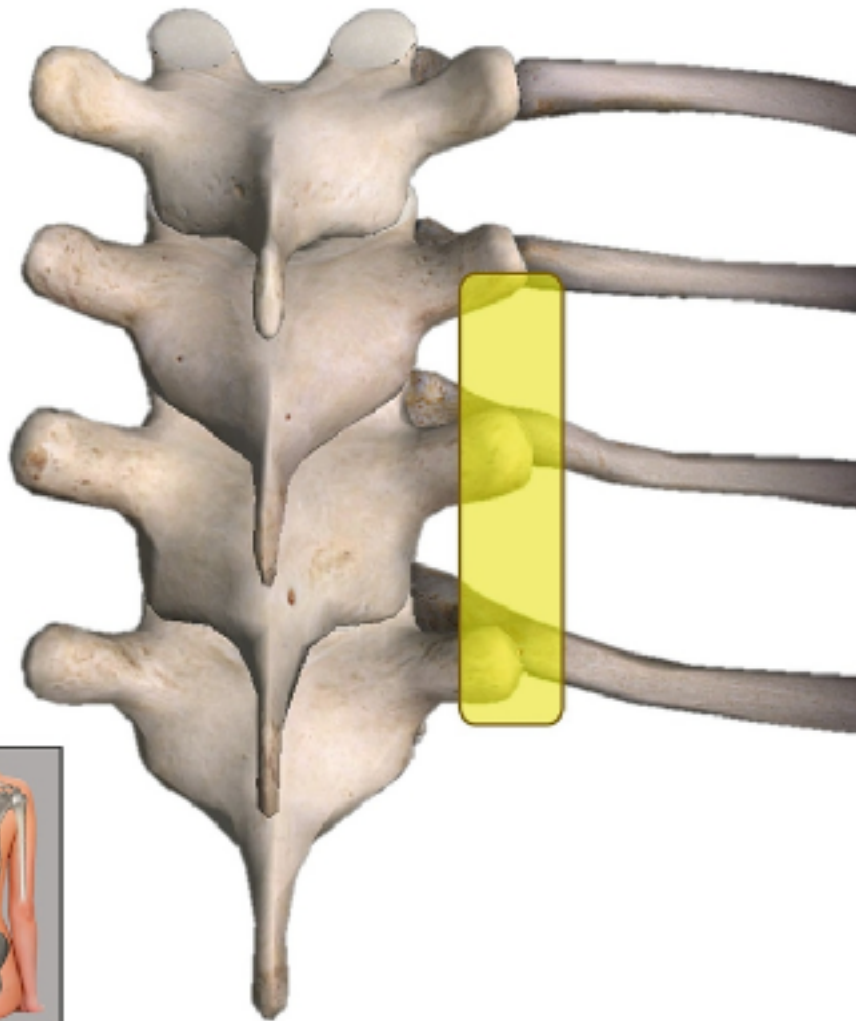
ESPB (erector spinae plane block)



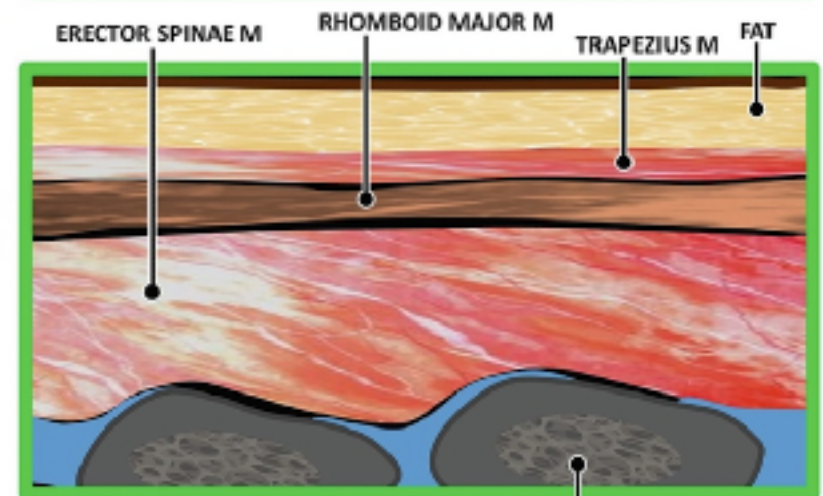
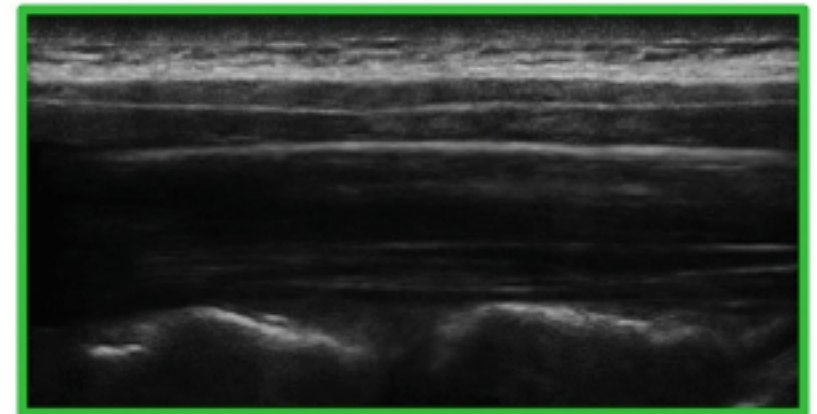
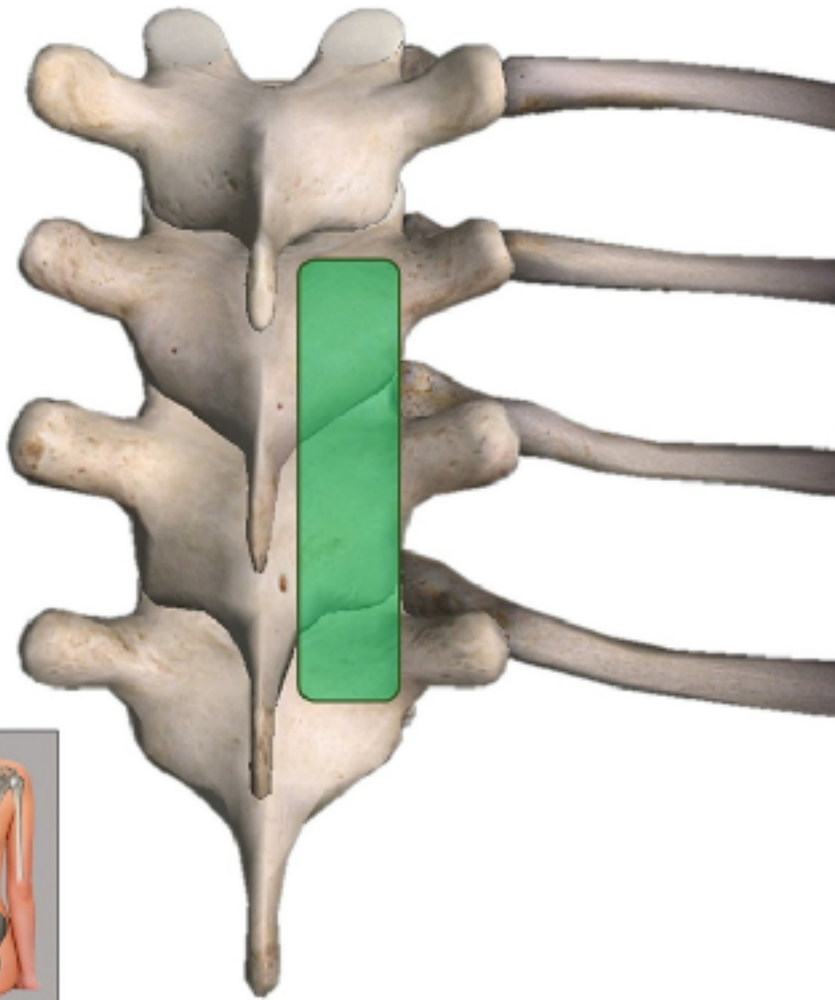
ESPB (Rib level)



ESPB (Rib / TP level)

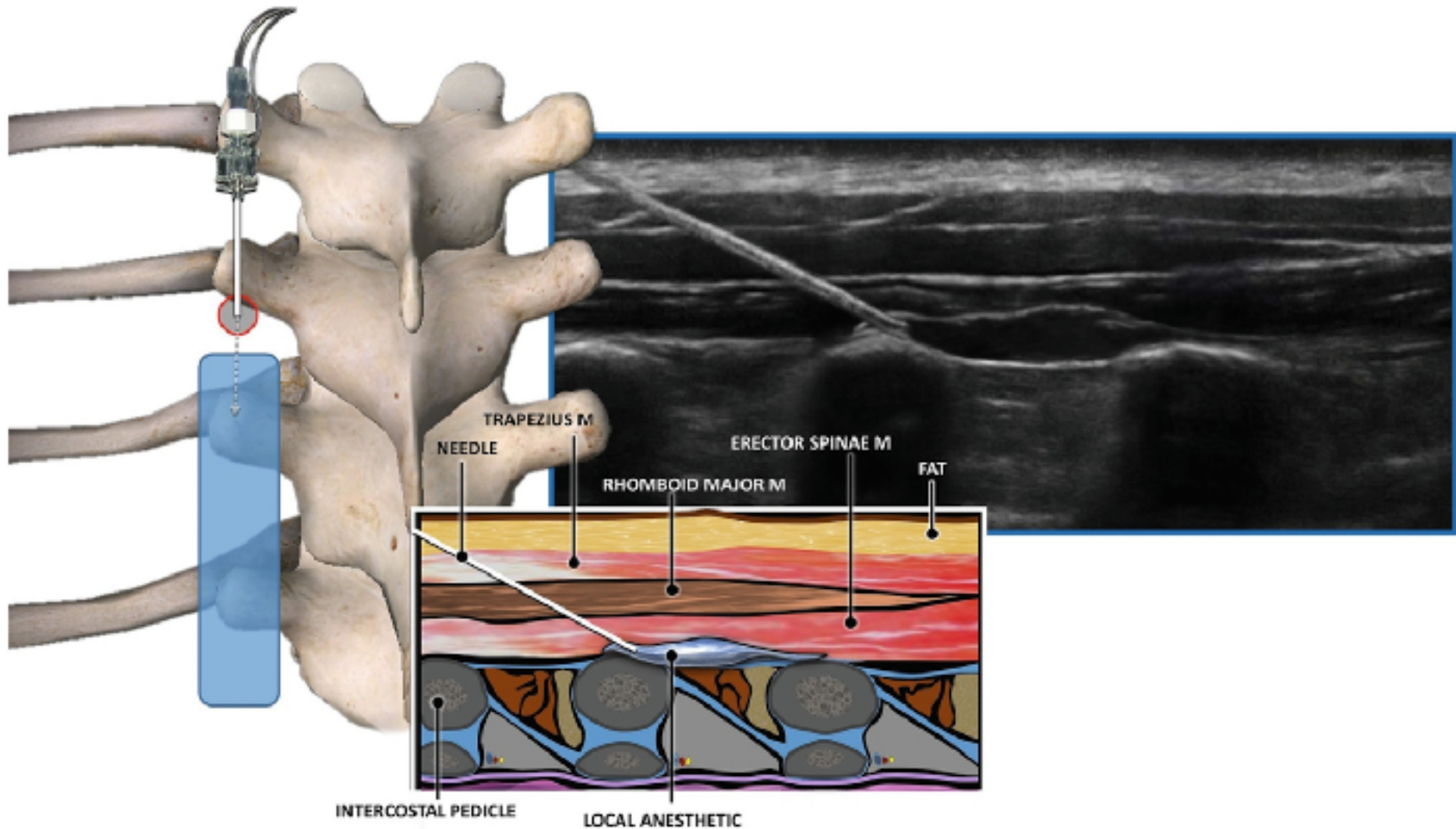


ESPB (lamina level)

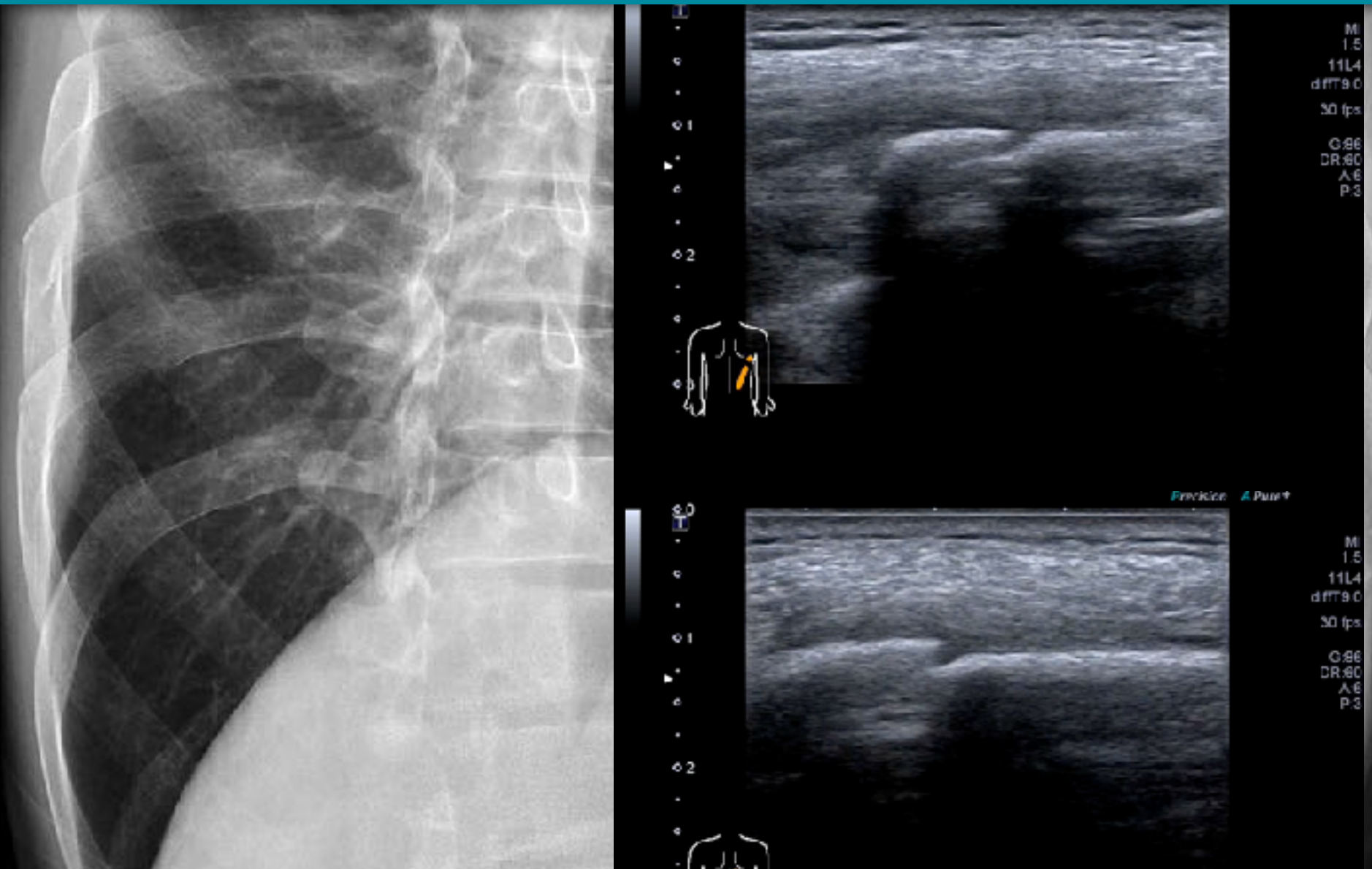


INTERCOSTAL PEDICLE

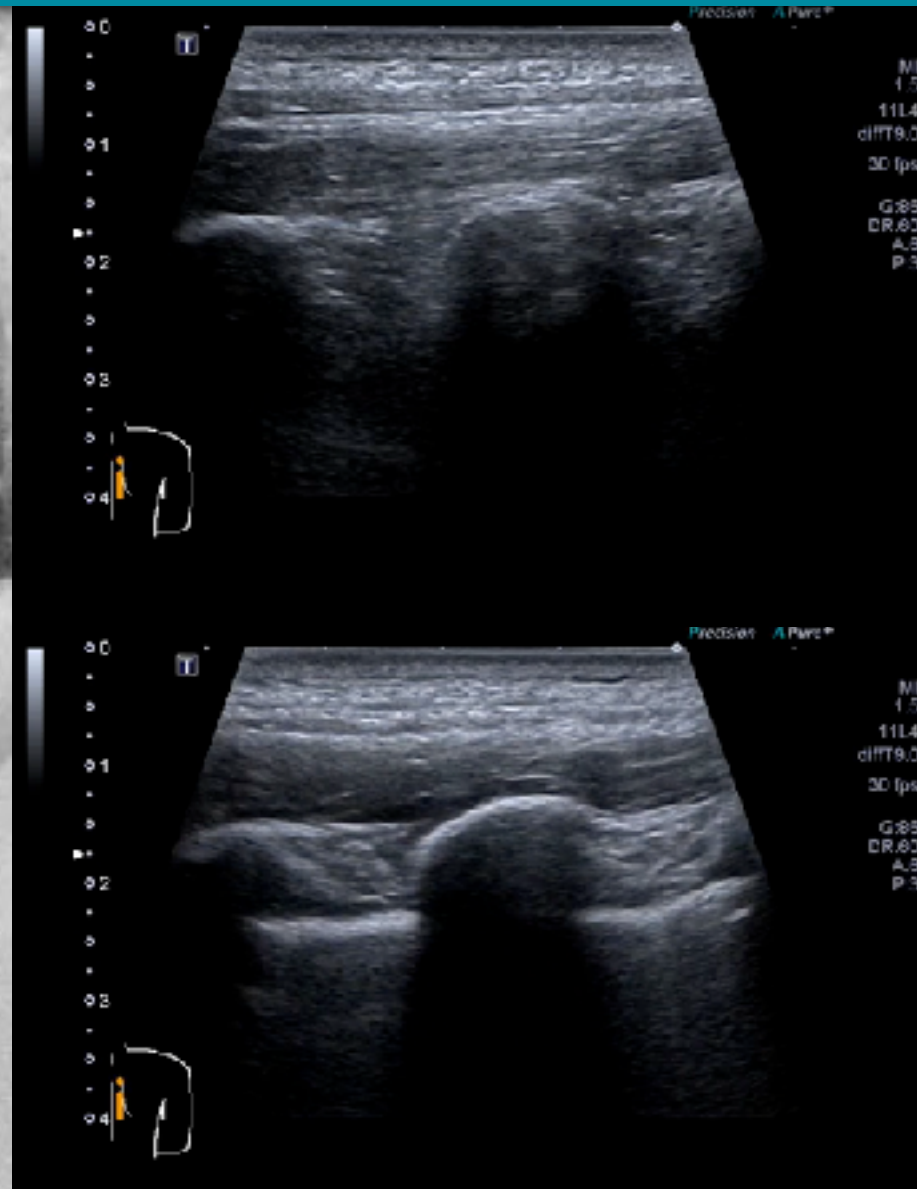
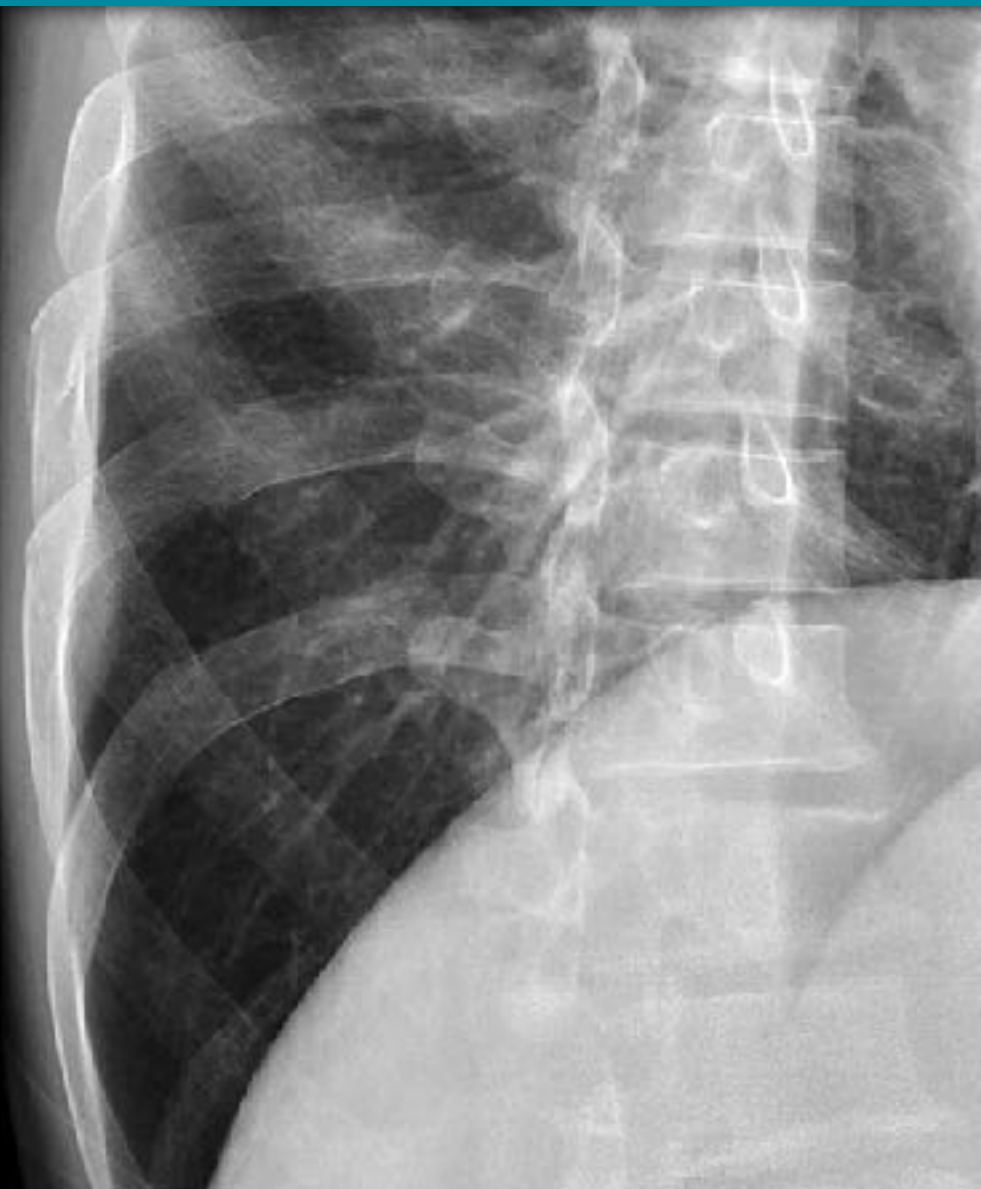
ESPB (TP level - target of ESPB)



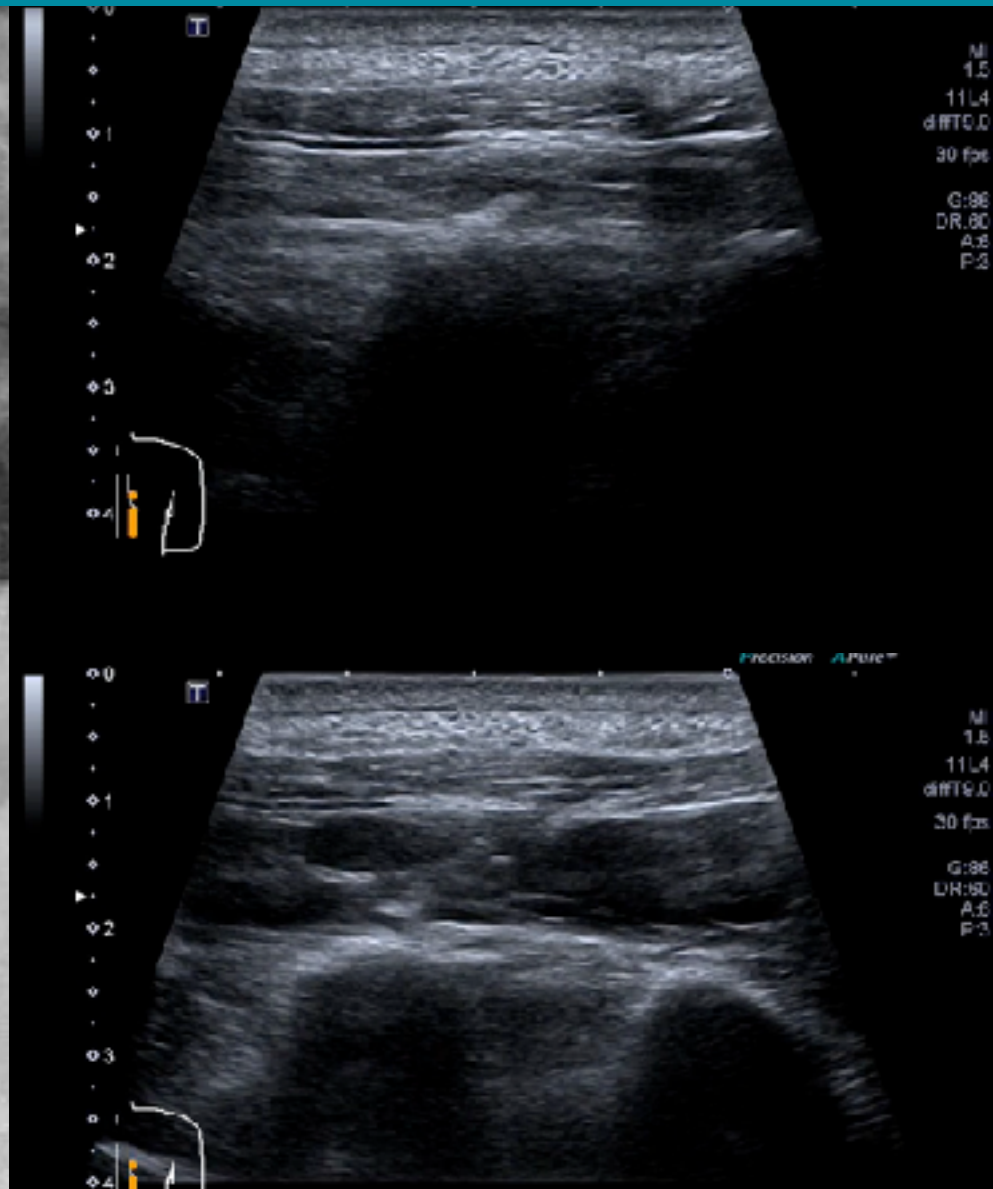
ESPB (TP level - target of ESPB)



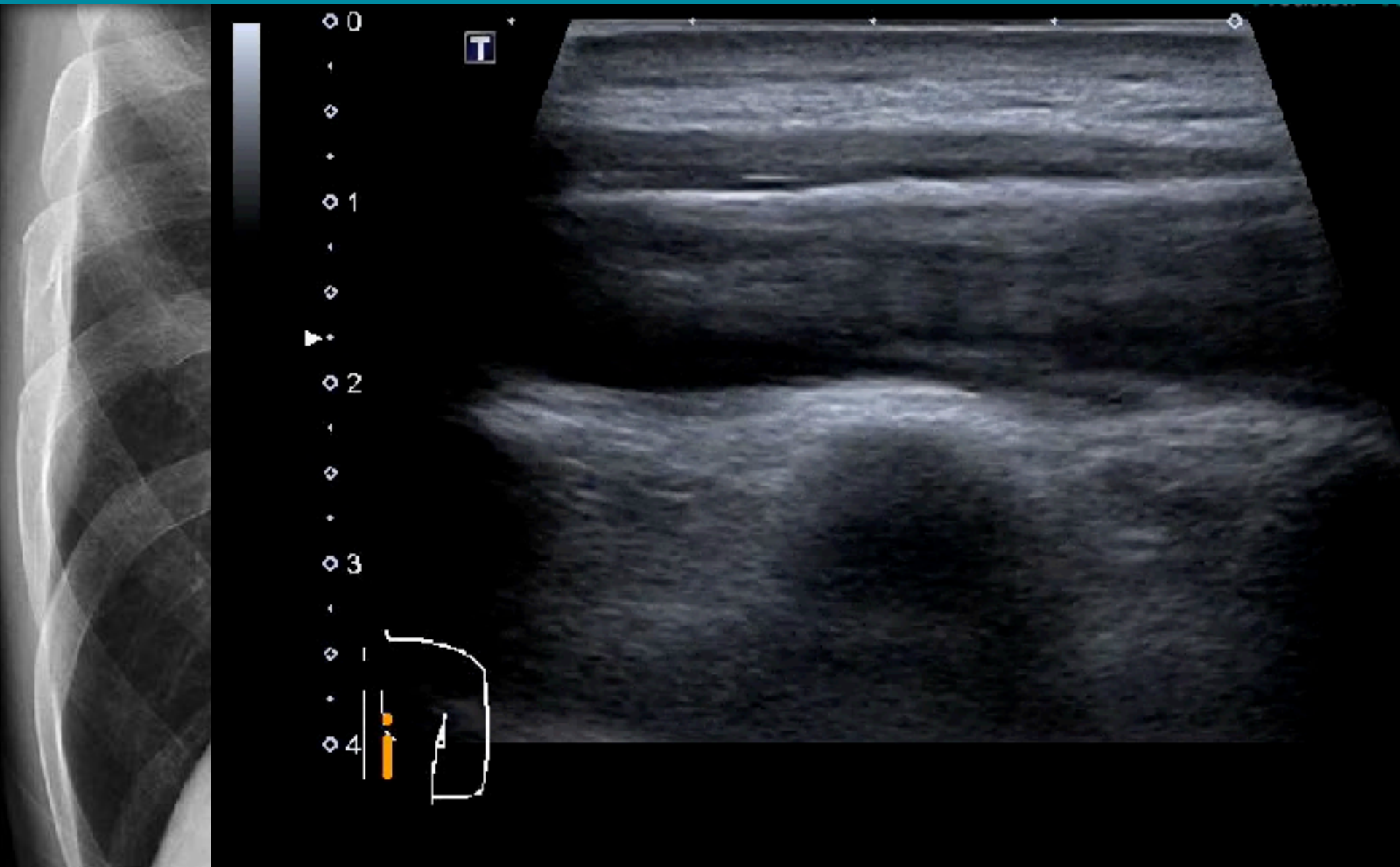
ESPB (TP level - target of ESPB)



ESPB (TP level - target of ESPB)

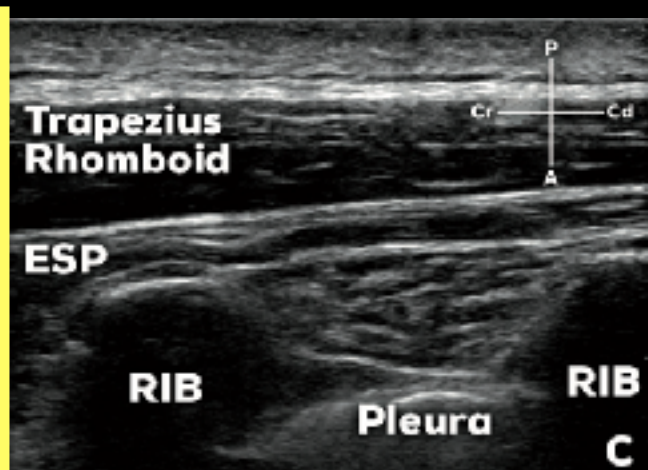
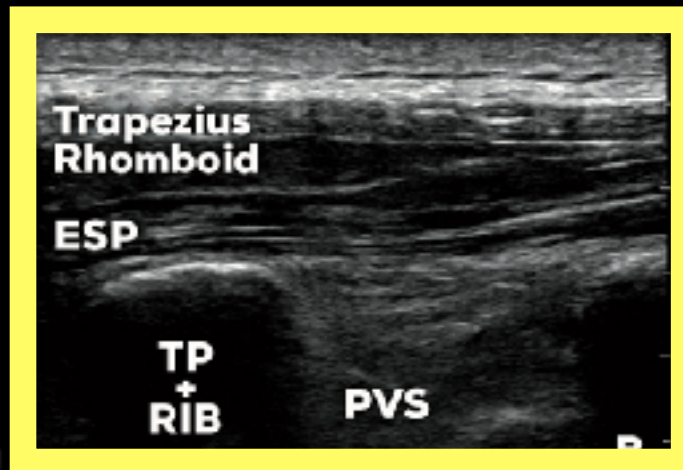
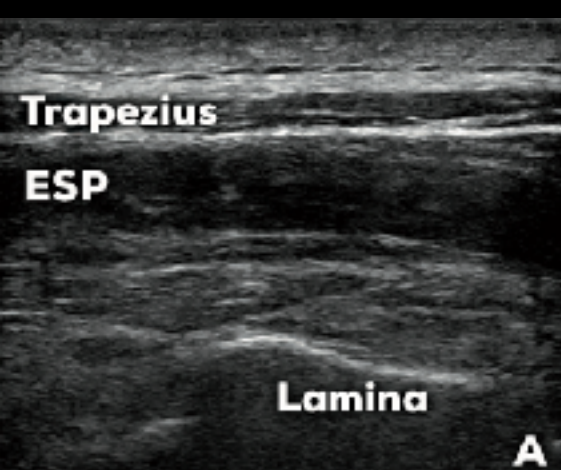
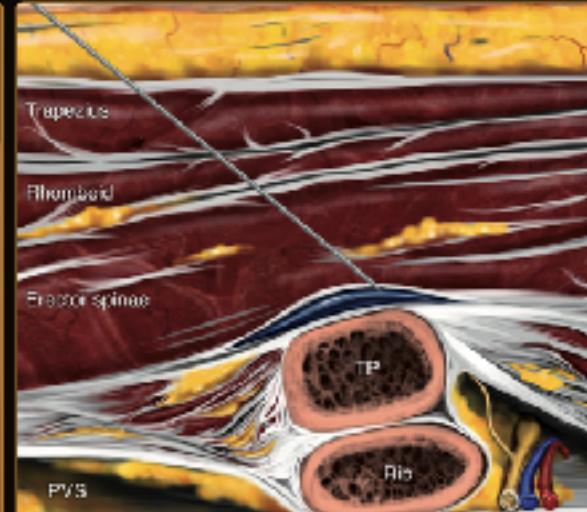
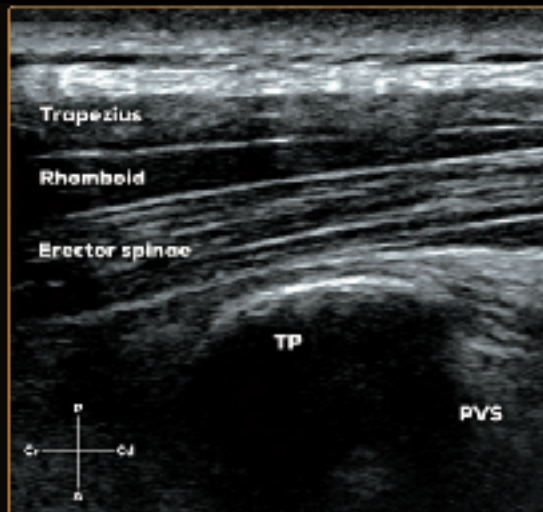


ESPB (TP level - target of ESPB)



ESPB (TP level - target of ESPB)

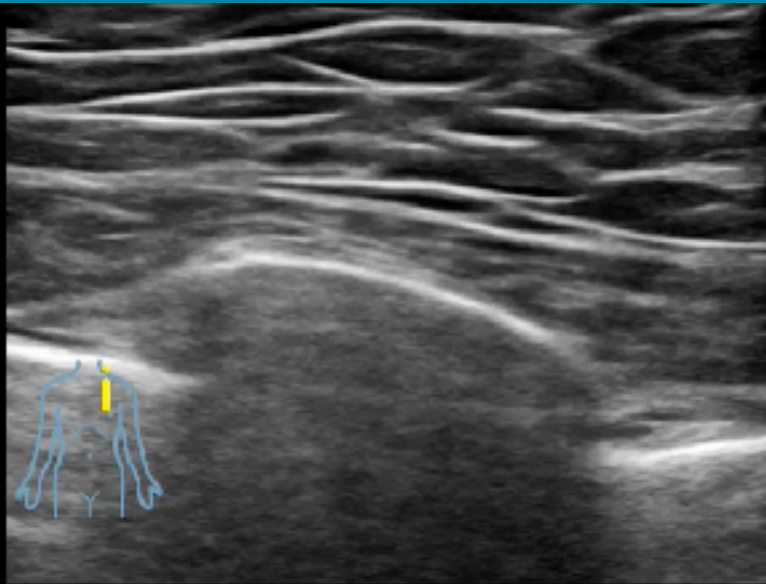
Fascial block: at least 20 ml



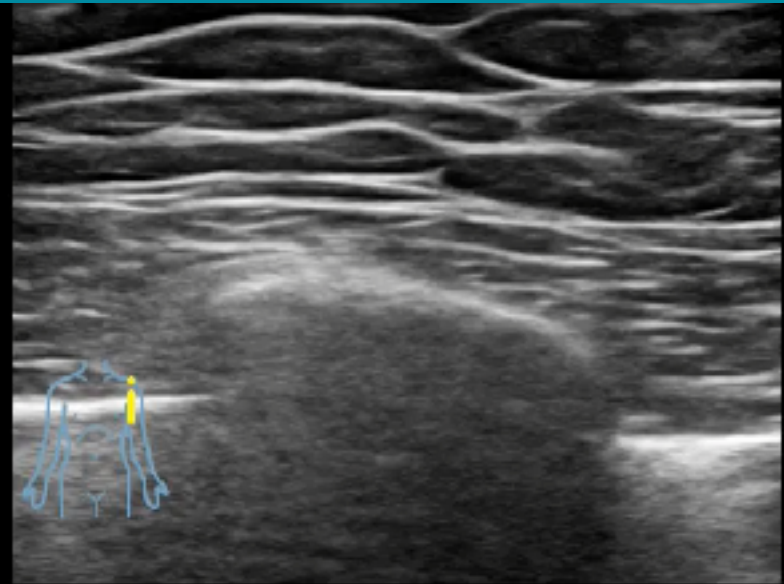
55M, slipped down, L chest pain



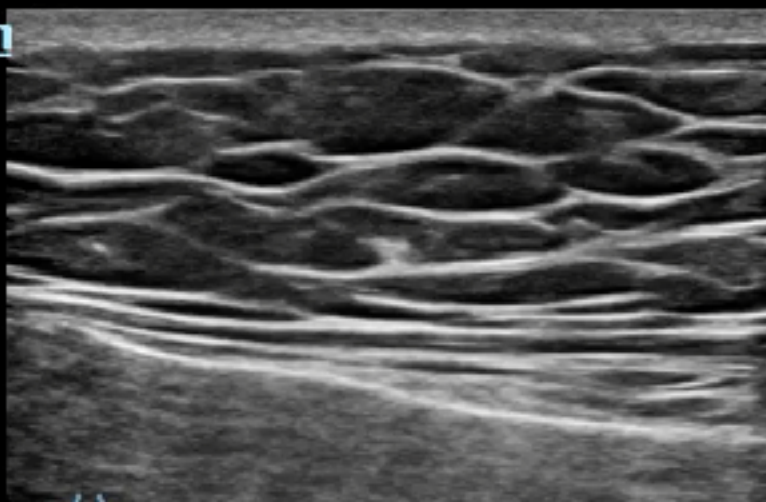
L rib fracture, 3-4-5-6



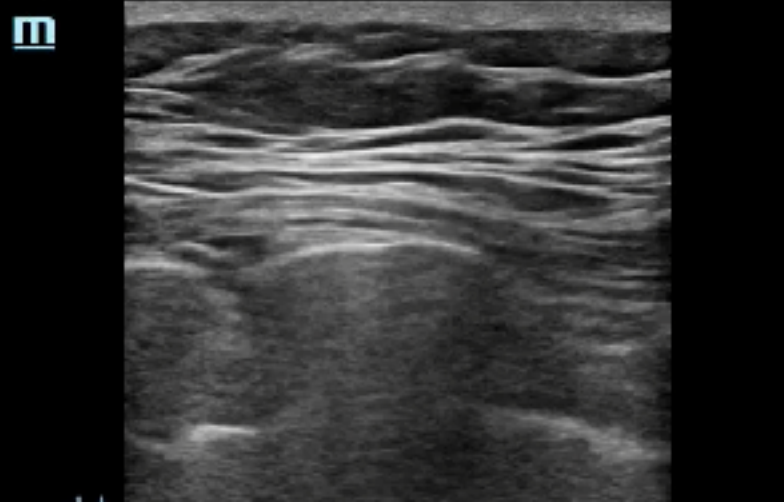
-1
-2
-3
m
KV. 07BER
msec
ALQ.



-1
-2
-3
m
KV.
msec
ALQ.



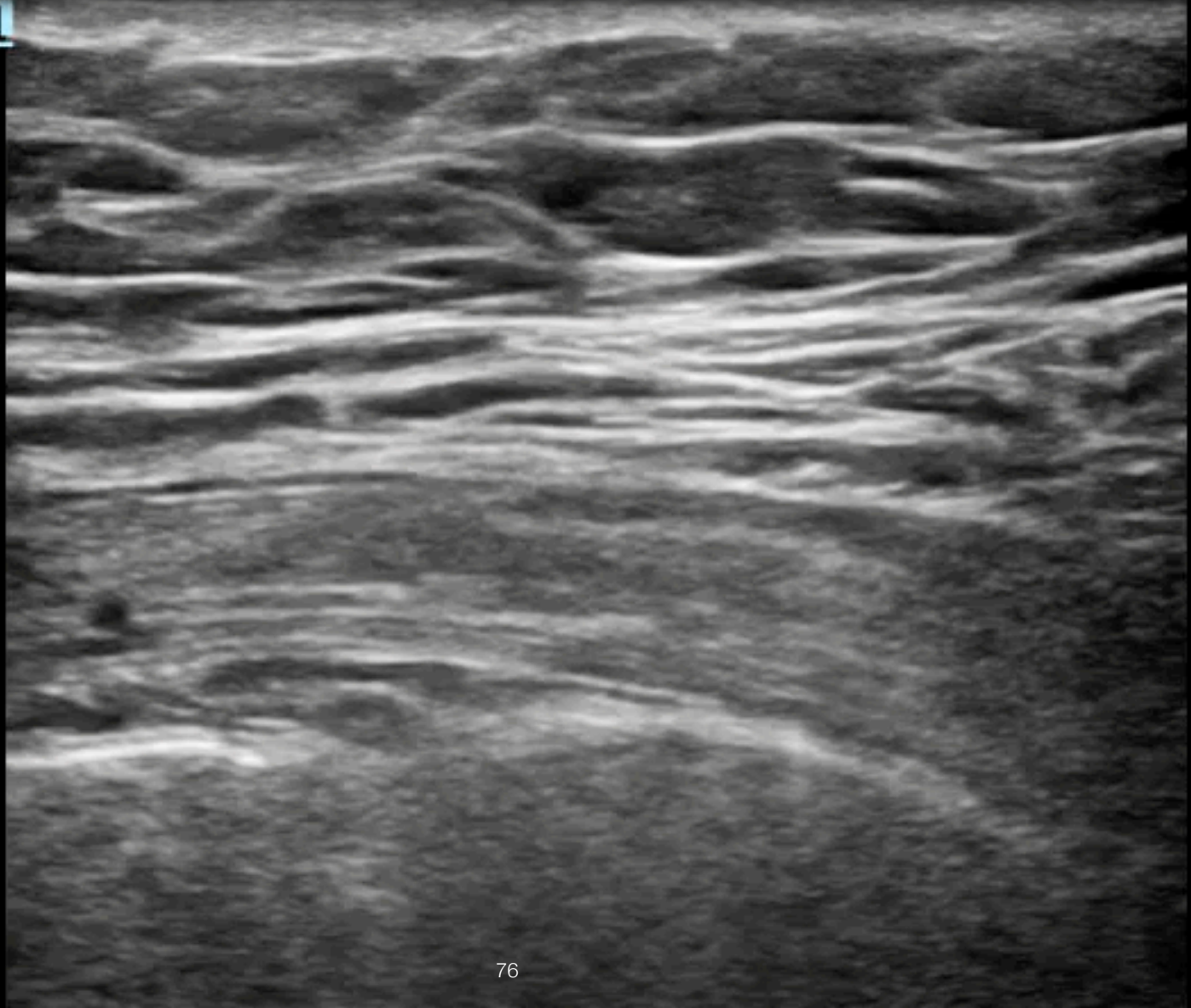
2025/11/12
F0.6-150
KV. 07BER
msec
ALQ.



m
KV. 10
msec
ALQ.

SAP block for multiple rib fractures

42023/11/13
F6.6~13.0
DB 115
PF19007BER
PR 43
D3.5
G72



IMV. 12

-1

-2

-3

KV:

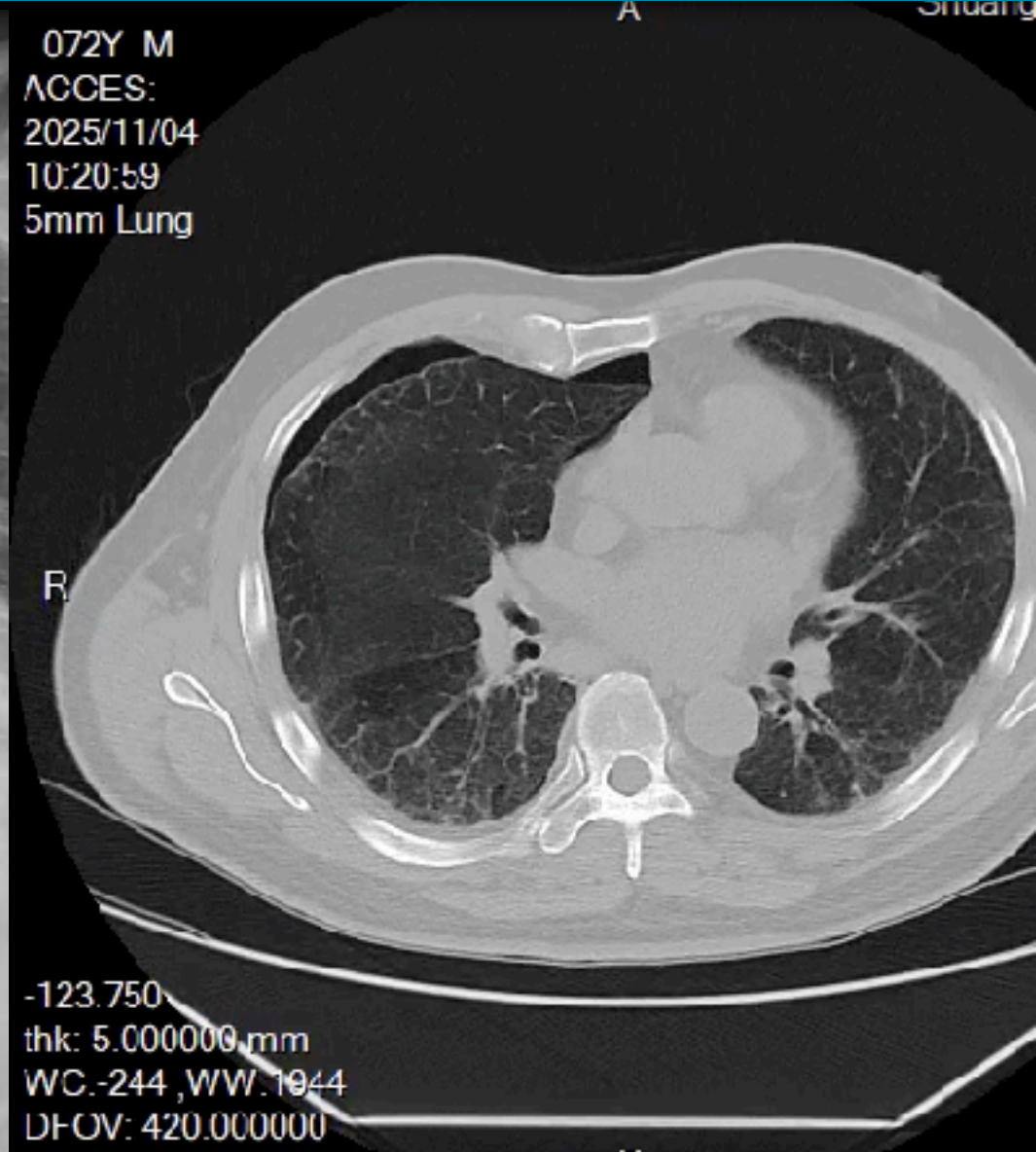
msec

iNeedle

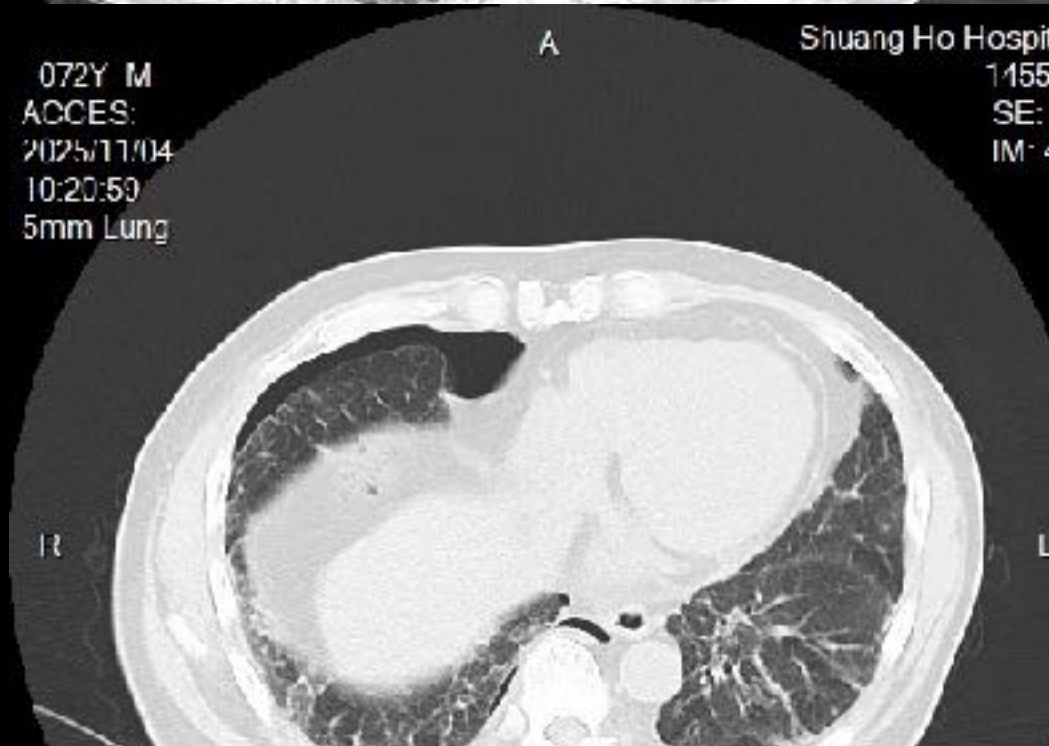
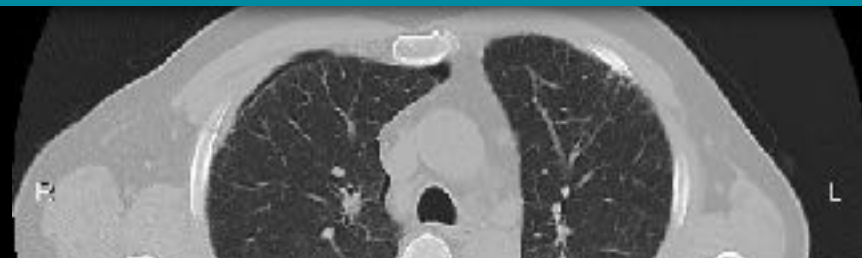
iTouch

thk: mm
PF19007BER
DEOV:

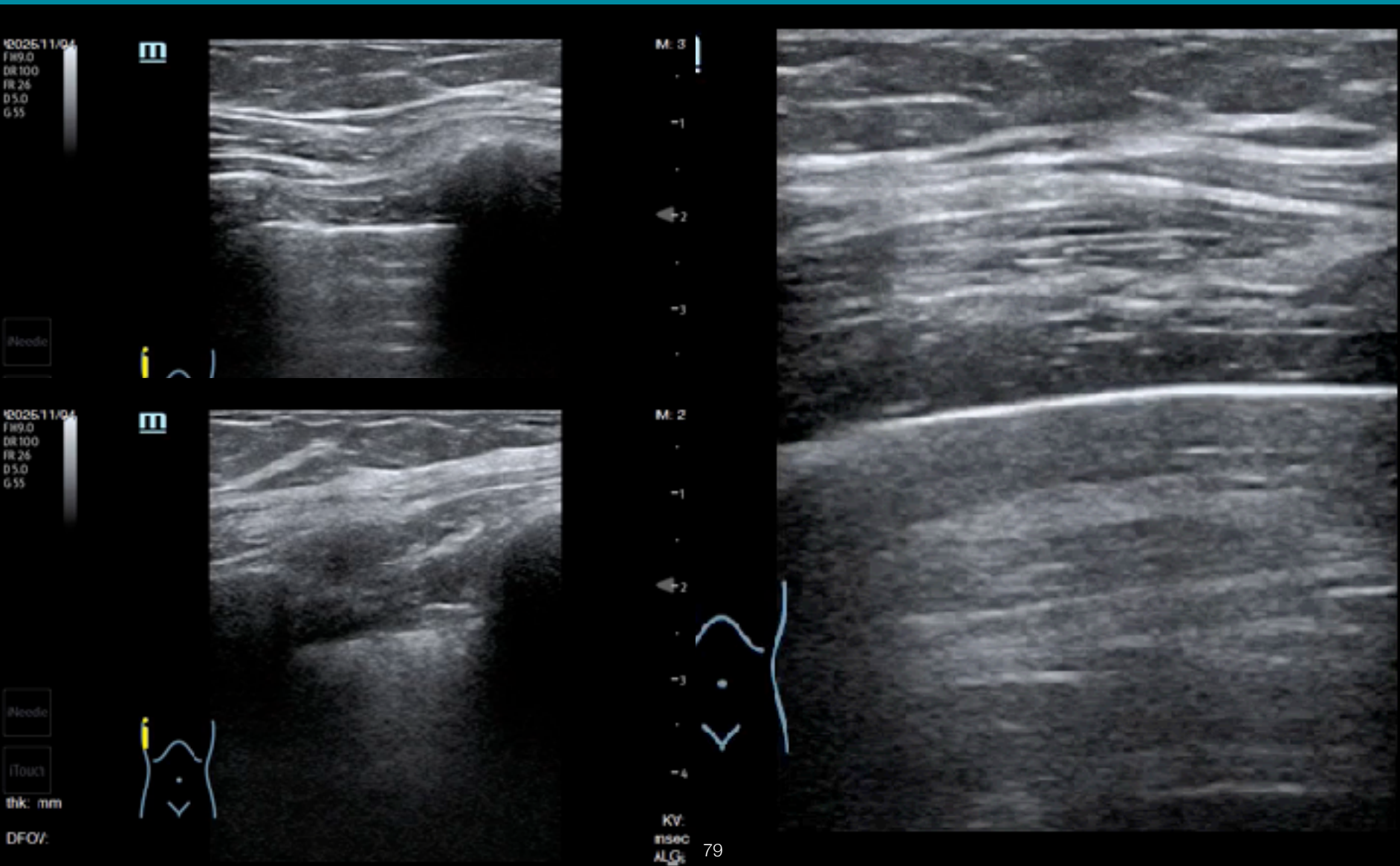
72M, TA, right chest injury



PTX / Multiple rib fx



Pneumothorax



ESPB - Counting ribs

2025/11/04
FH5.0
DR130
DE19007BER
PR30
D 8.0
G 40

m

IM: 0

— 0

.

—

.

—

.

—

.

—

.

— 5

.

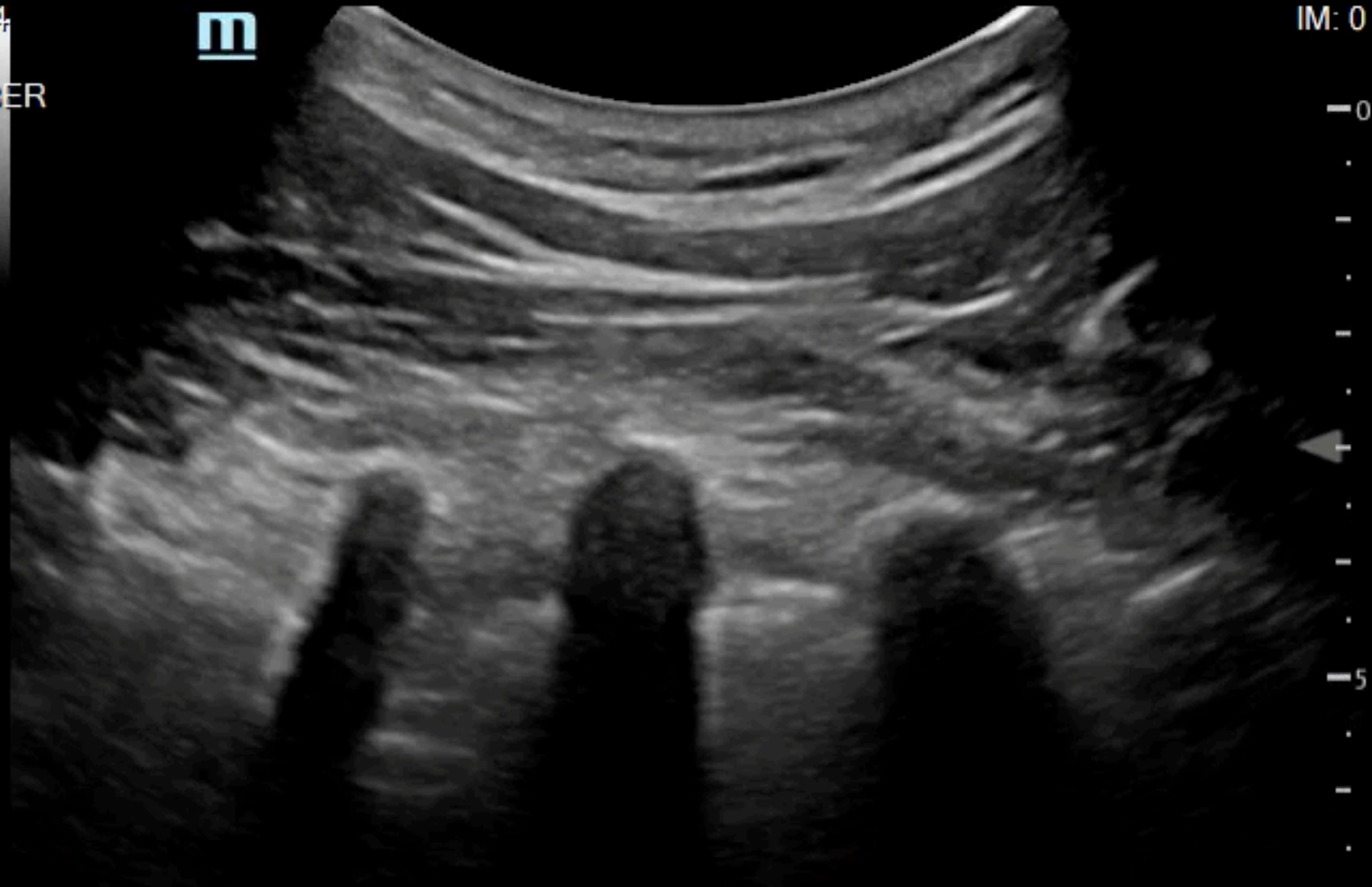
—

.

iNeedle

iTouch

thk: mm



2025/11/24
15.0
PR18007BGR
18.0
18.0

Needle

Touch

mm
PR18007BGR
FOV:

2025/11/24
18.0
PR18007BGR

Needle

Touch

mm
PR18007BGR
FOV:

m

IM. 1

-0

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

KV
msec
ALC.

IM. 2

-0

-

-

-

-

-

-

-

-

-

-

KV
msec
ALC.

2025/11/24
18.0
PR18007BGR
18.0
18.0

m

IM. 3

-0

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

-

Needle

2025/11/24
18.0
PR18007BGR
18.0
18.0

m

IM. 4

-0

-

-

-

-

-

-

-

-

-

-

-

-

-

-

Needle

2025/11/24
18.0
PR18007BGR
18.0
18.0

m

IM. 5

-0

-

-

-

-

-

-

-

Needle

Touch