



雙和急診POCUS訓練

陳國智 醫師



急診超音波臨床評核醫師
醫用超音波學會指導醫師
雙和急診超音波教學負責人
WINFOCUS director / instructor

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
急救加護醫學會重症超音波負責人

診
斷

監
測

介
入

POINT OF CARE ULTRASOUND

~ 存在於臨床需求之所在 ~



LE joint effusion

01/07

Airway

01/14

Needling

01/21

VExUS protocol

01/28

雙和急診POCUS訓練



Central access

02/11

Peripheral access

02/18

EFAST

02/25

雙和急診POCUS訓練



Basic ECHO

03/04

Nerve block-UE(1)

03/11

Nerve block-LE(1)

03/25

雙和急診POCUS訓練



Aorta & IVC

04/01

Liver & Biliary

04/08

Kidney & UB

07/08

Pancreas & Spleen

07/22

雙和急診POCUS訓練



GI tract scan

08/05

Basic lung & heart (PGY)

08/05

Sternum & Ribs

08/19

UE joint effusion

08/26

雙和急診POCUS訓練



急診臨床掃描指導

09/16

CVC工作坊 (1)

09/16

8 POCUS skills for PGY

09/23

Ocular US

09/30

雙和急診POCUS訓練



8 POCUS skills for PGY

10/07

急診臨床掃描指導

10/14

CVC工作坊 (2)

10/14

ENT US

10/21

雙和急診POCUS訓練



8 POCUS skills for PGY

11/04

急診臨床掃描指導

11/11

CVC工作坊 (3)

11/11

ECD in ER

11/25

雙和急診POCUS訓練



Basic TEE

12/09

急診臨床掃描指導

12/16

CVC工作坊 (4)

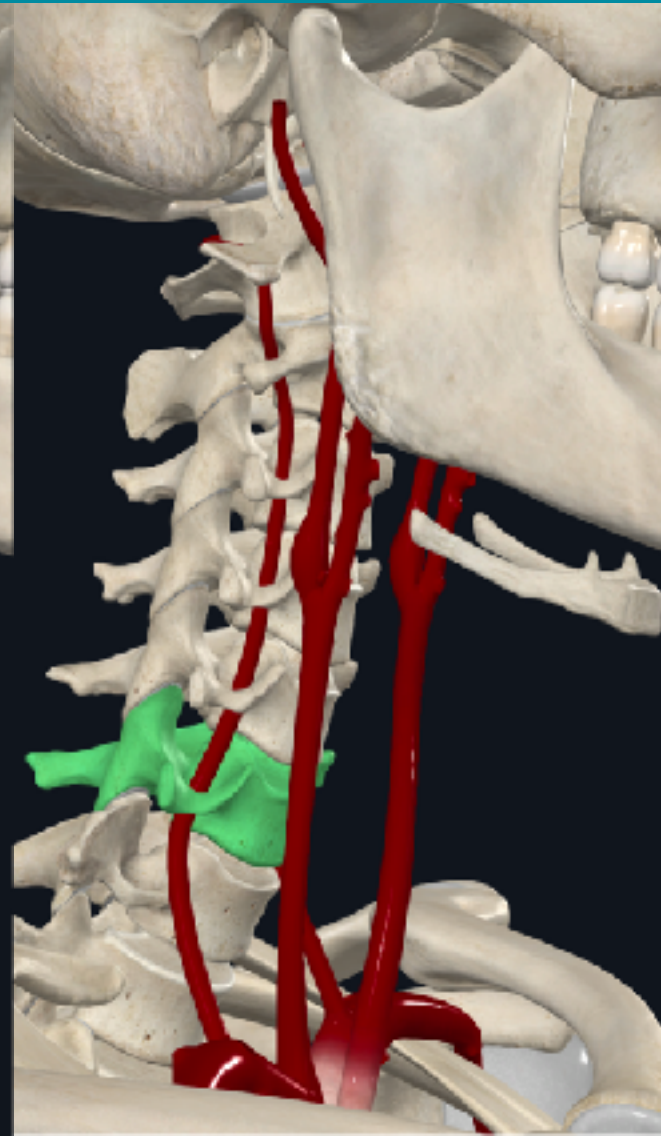
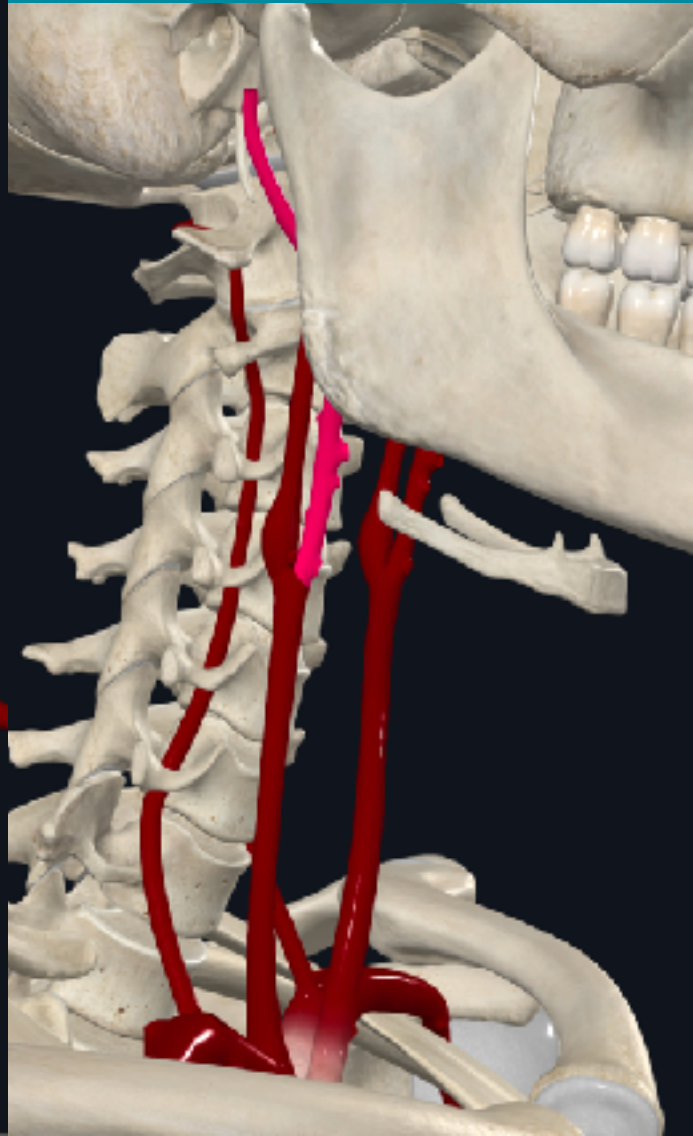
12/16

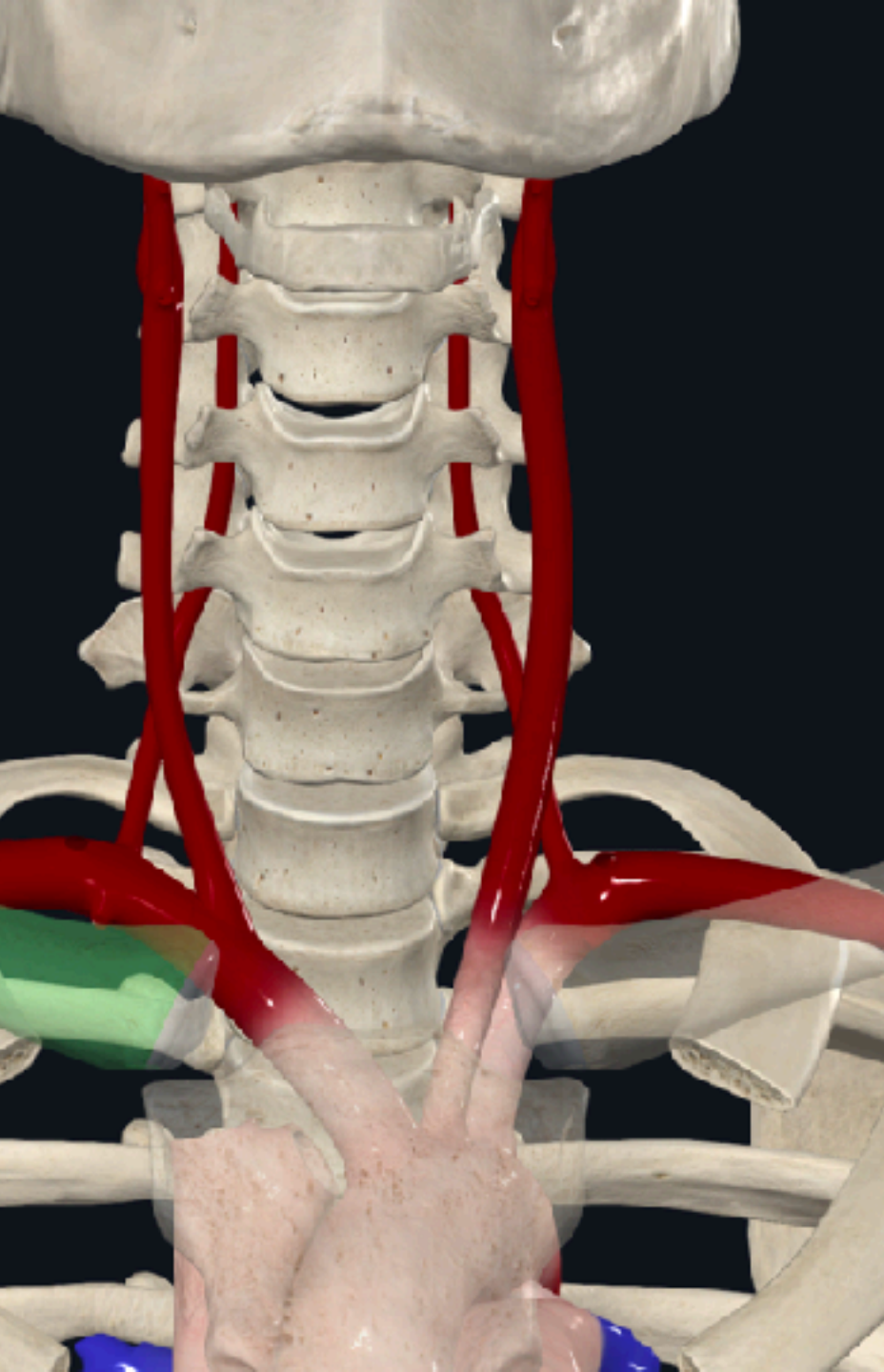
TEE in ER

12/30

雙和急診POCUS訓練

BASIC ECD IN ER





Anatomy

CCA/ICA/ECA/VA

Function

CD/PW/Flow

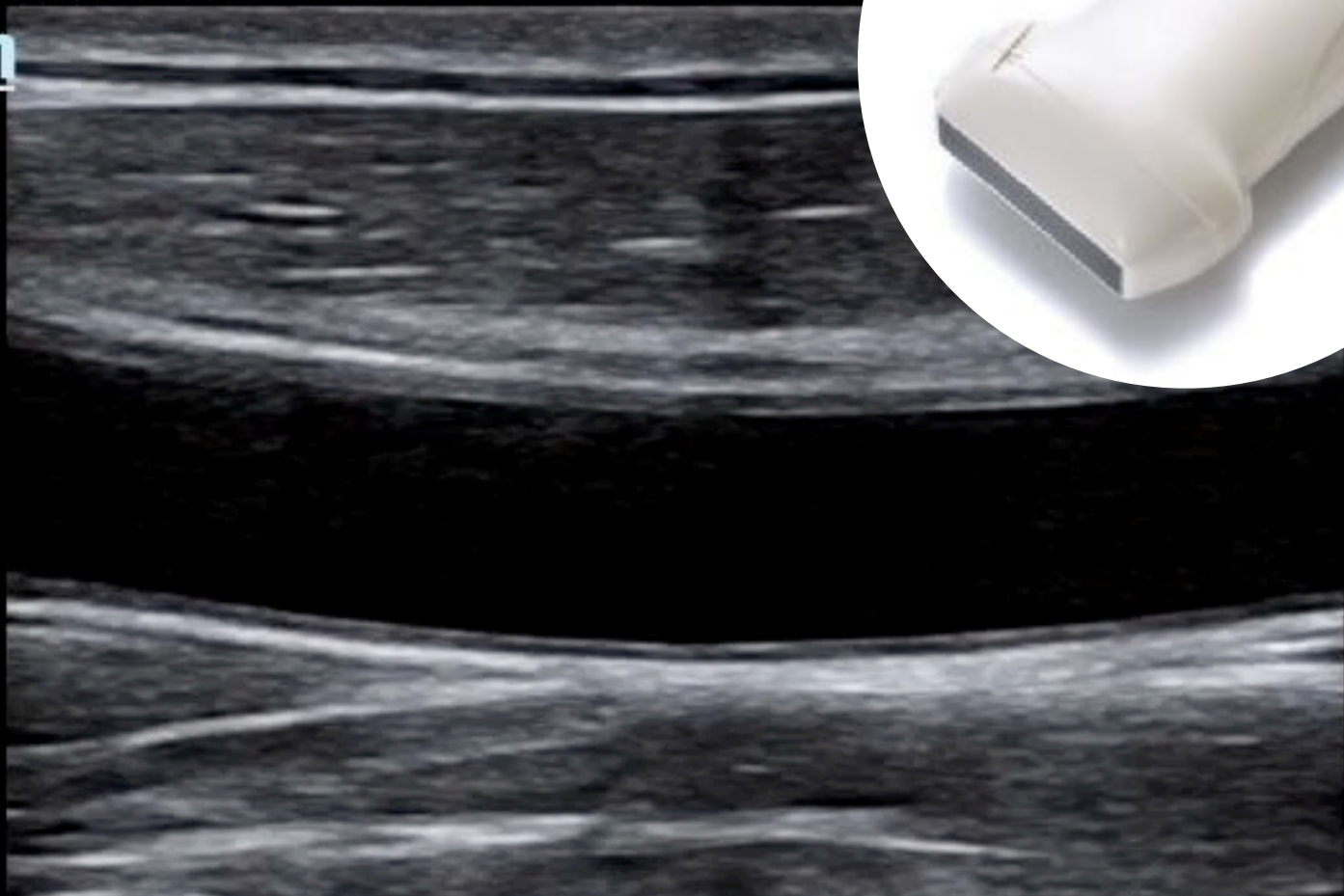
L12-4s

AP 96.6%

MI 135

TIS 0.2

B
FH10.0
DR 105
FR 40
D 3.5
G 50



-1

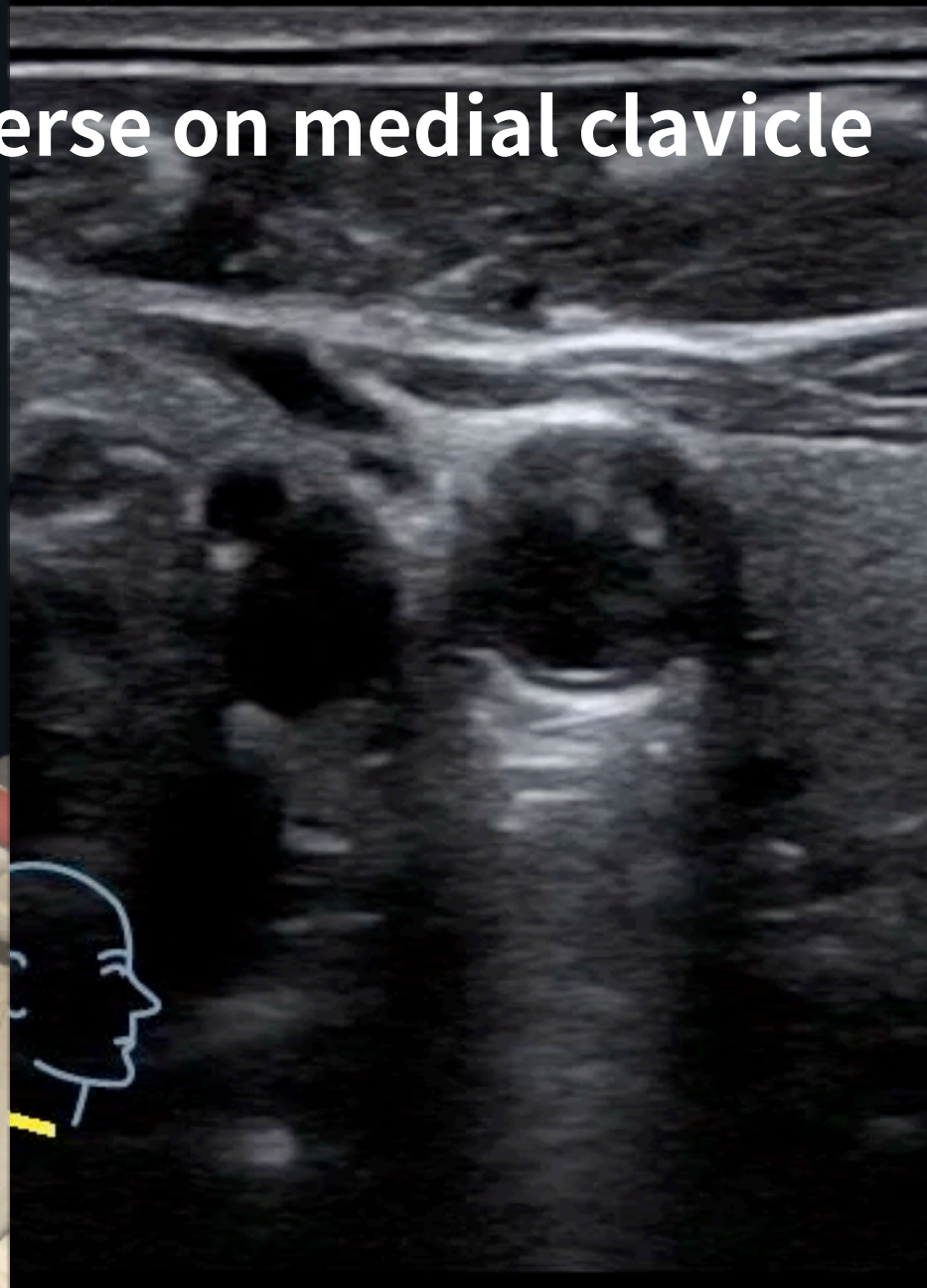
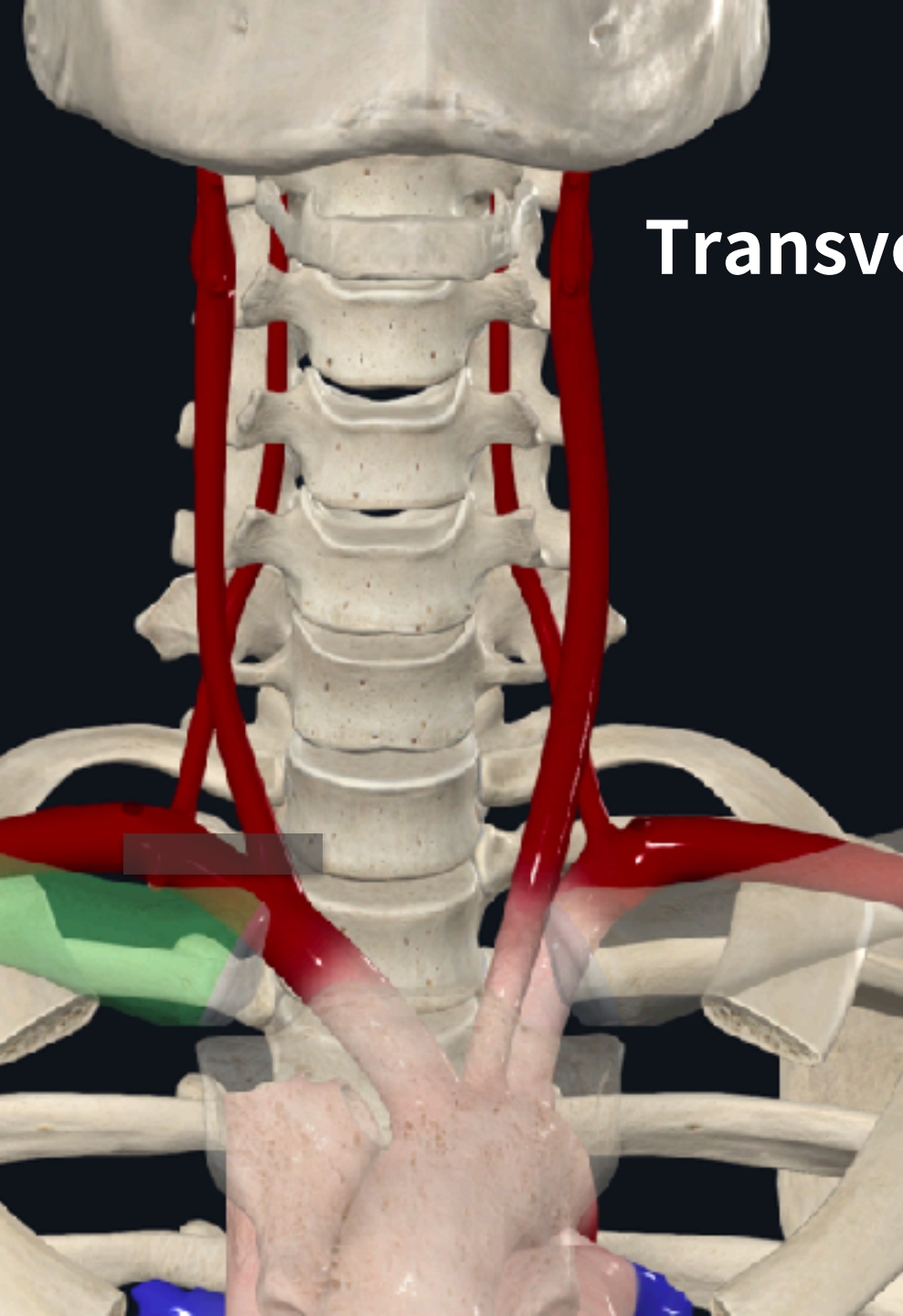


-2

iNeedle

SONOANATOMY

Transverse on medial clavicle



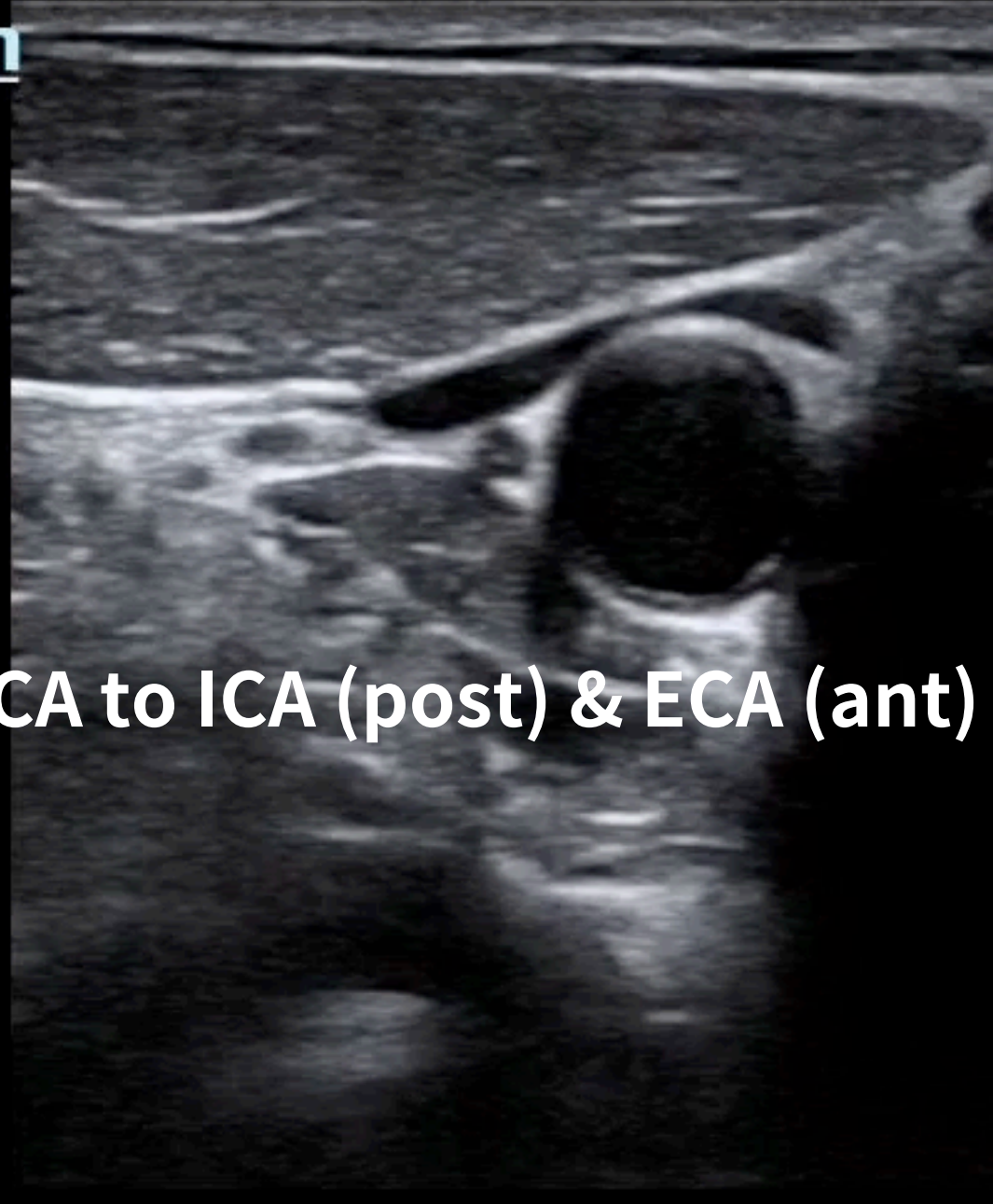
TE7 ACE

CHEN
13556011

24-11-2022
Carotid 15:27:08

L12-4s AP 96.6% MI 135 TIS 0.2

B
FH10.0
DR 105
FR 40
D 3.5
G 50



CCA to ICA (post) & ECA (ant)

iNeedle

iTouch



TE7 ACE

CHEN

24-11-2022

13556011

Carotid

15:27:21

L12-4s

AP 96.6%

MI 135

TIS 0.3

B

FH10.0

DR 105

FR 22

D 35

G 50

C

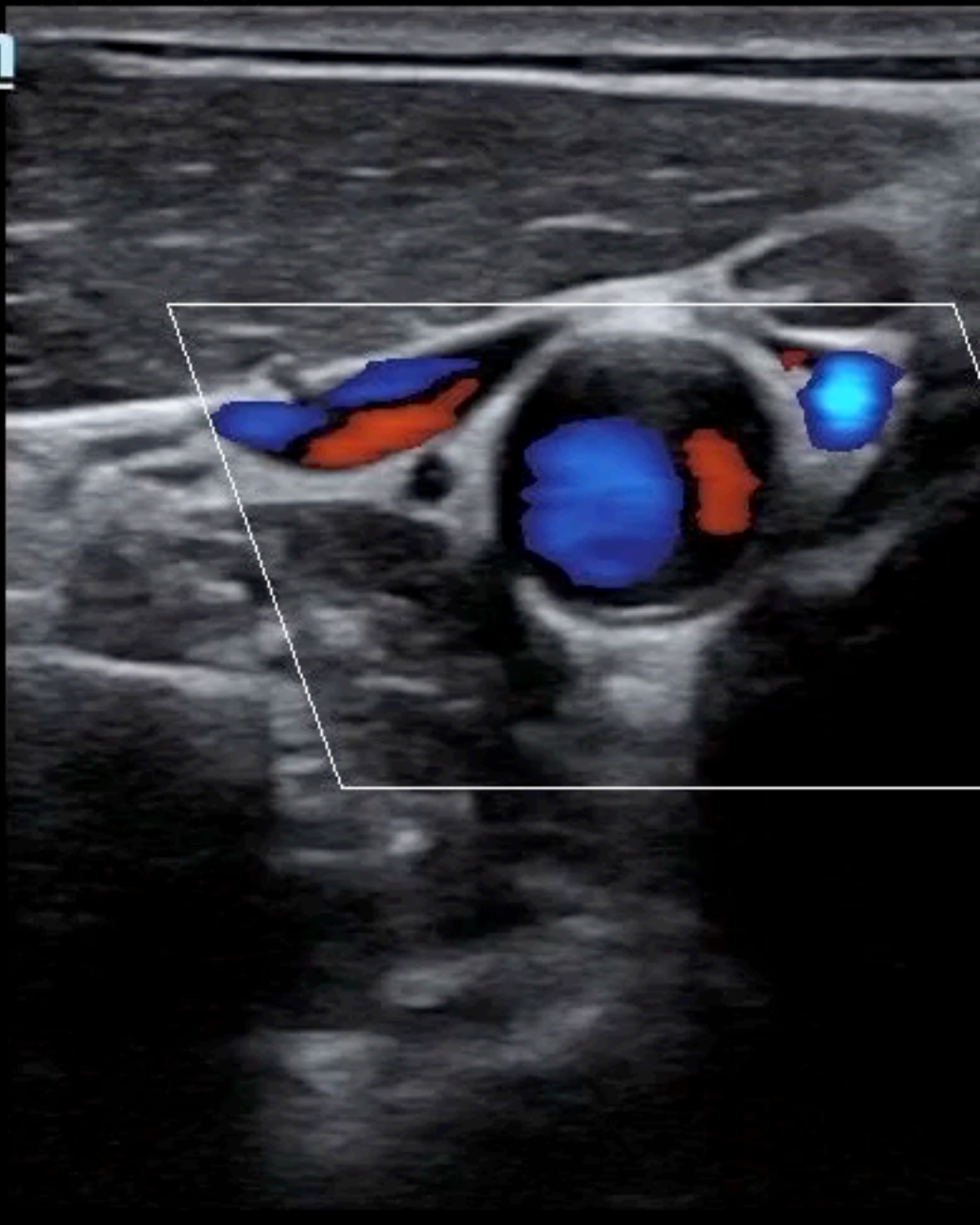
F5.0 /G 50

WF 497

PRF3.0k

233

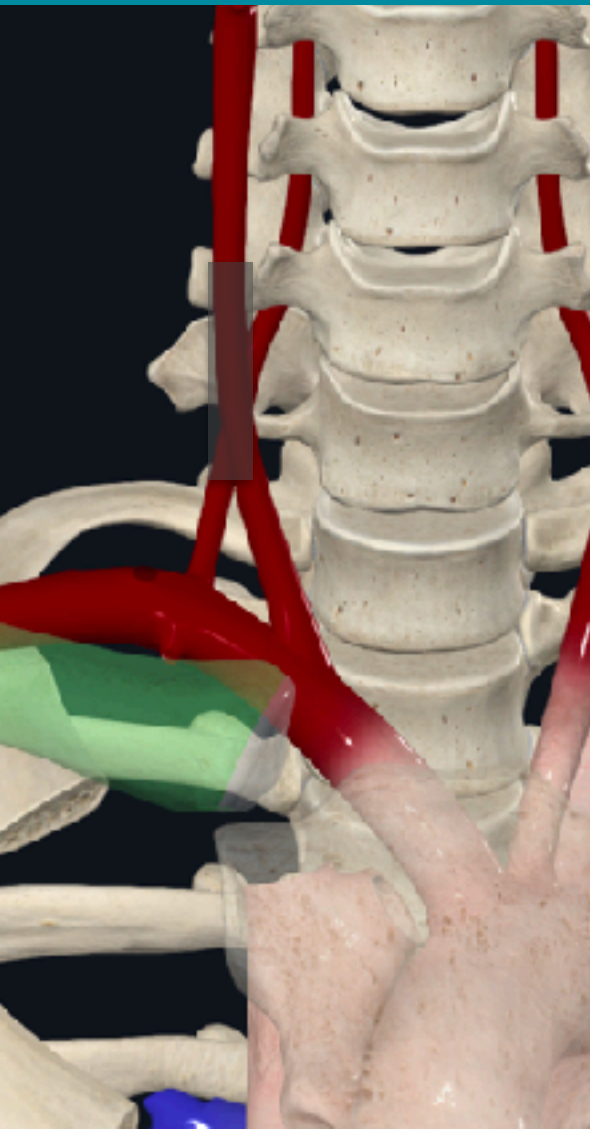
-233



iNeedle

iTouch

COMMON CAROTID ARTERY

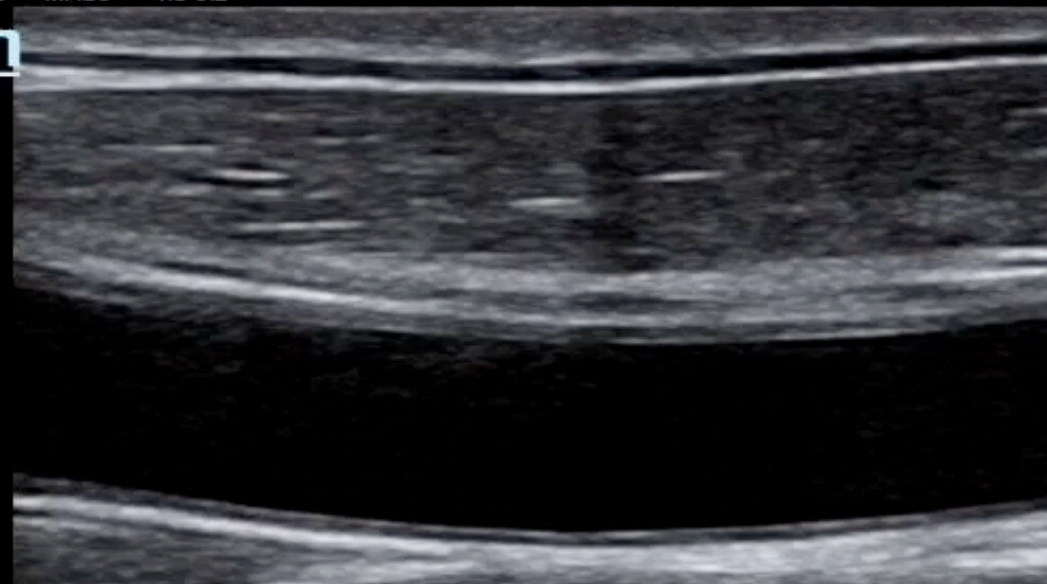


TE7 ACE

L12-4s
B
FH10.0
DR 105
FR 40
D 3.5
G 50

13556011
AP 96.6% MI 135 TIS 0.2

23-11-2022
Carotid 14:09:50



Intima
Thick wall
Pulsation
No variation
Arterial waveform



CCA WITH CD



TE7 ACE

L12-4s

AP 96.6%

13556011

23-11-2022

Carotid

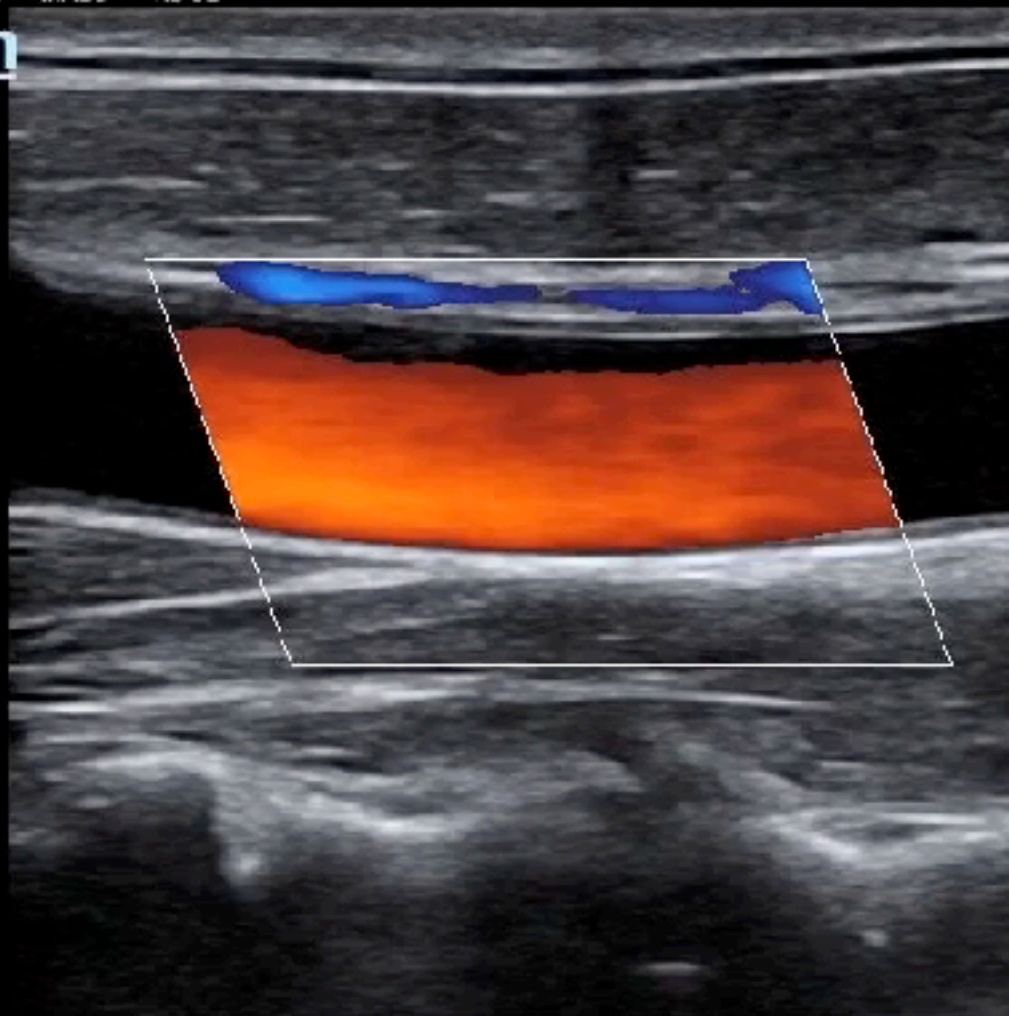
14:10:01

B

F H10.0
DR 105
FR 22
D 3.5
G 5.0

C

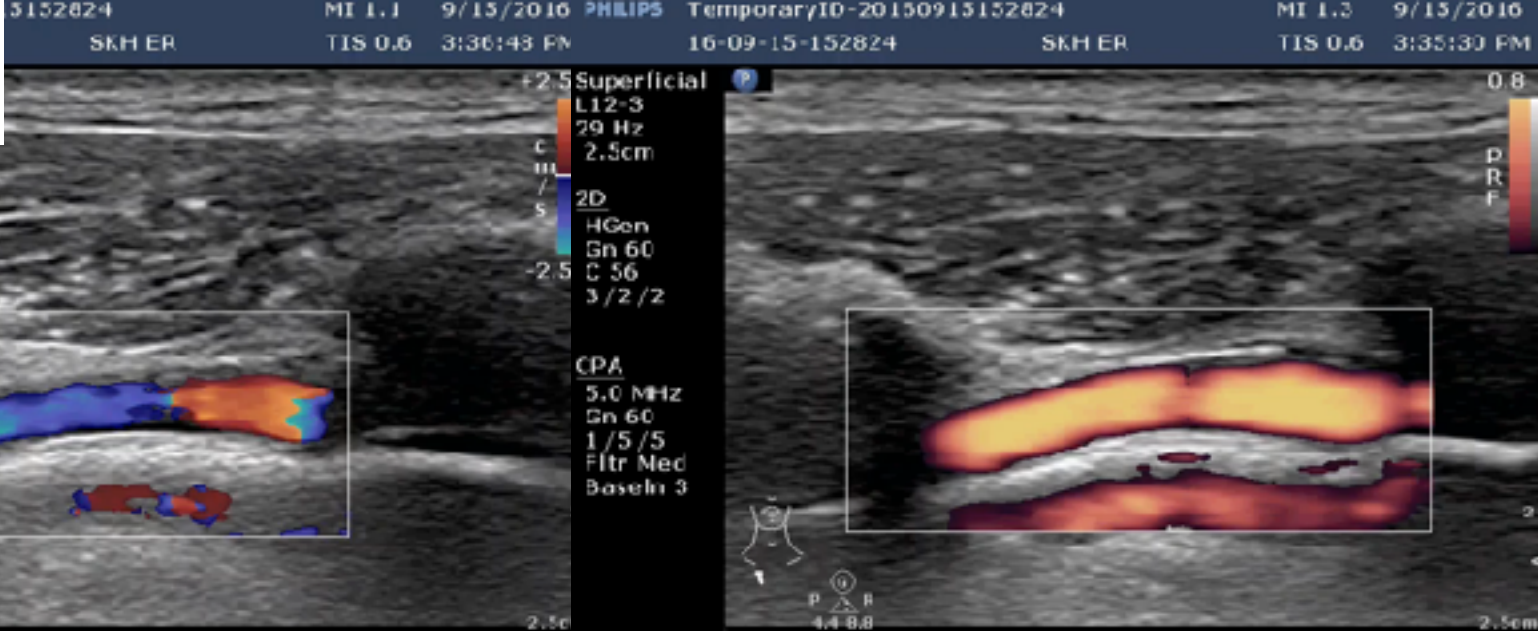
F 5.0 / 6.50
WF 497
PRI 3.0k



Needle

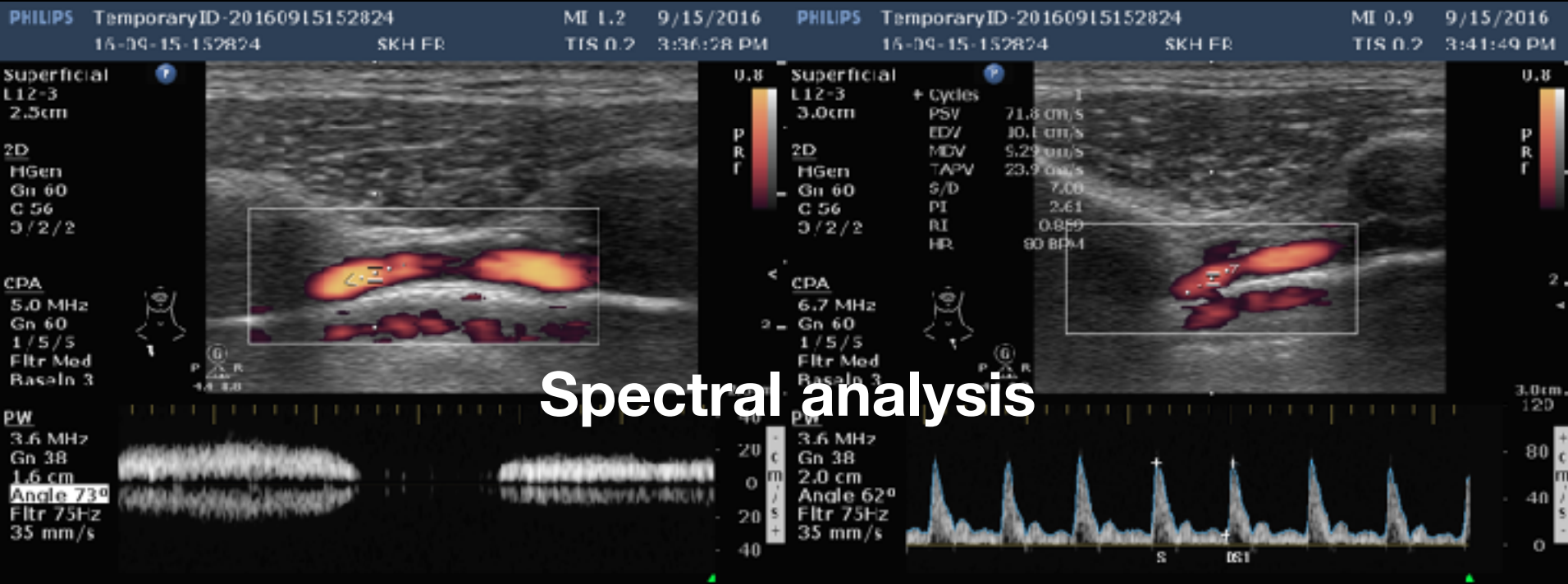
Touch

BART

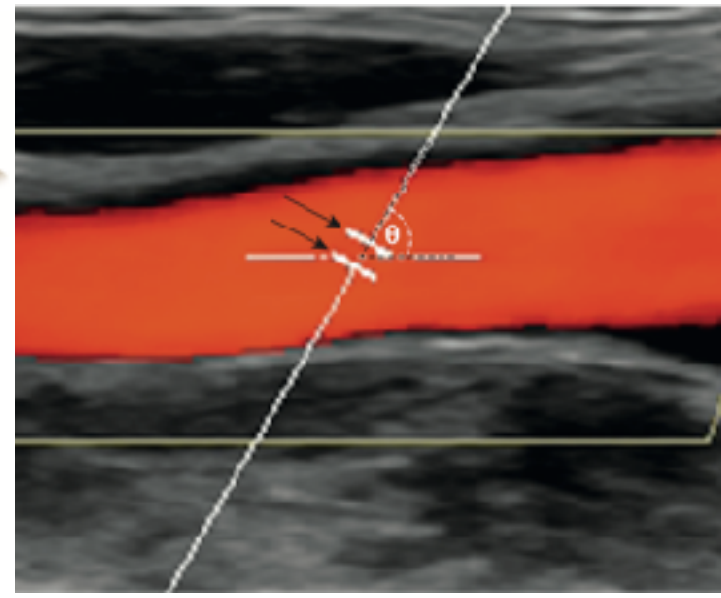
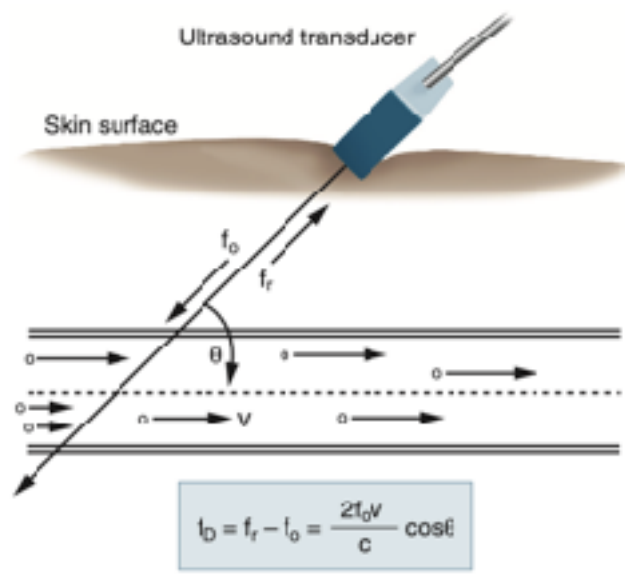
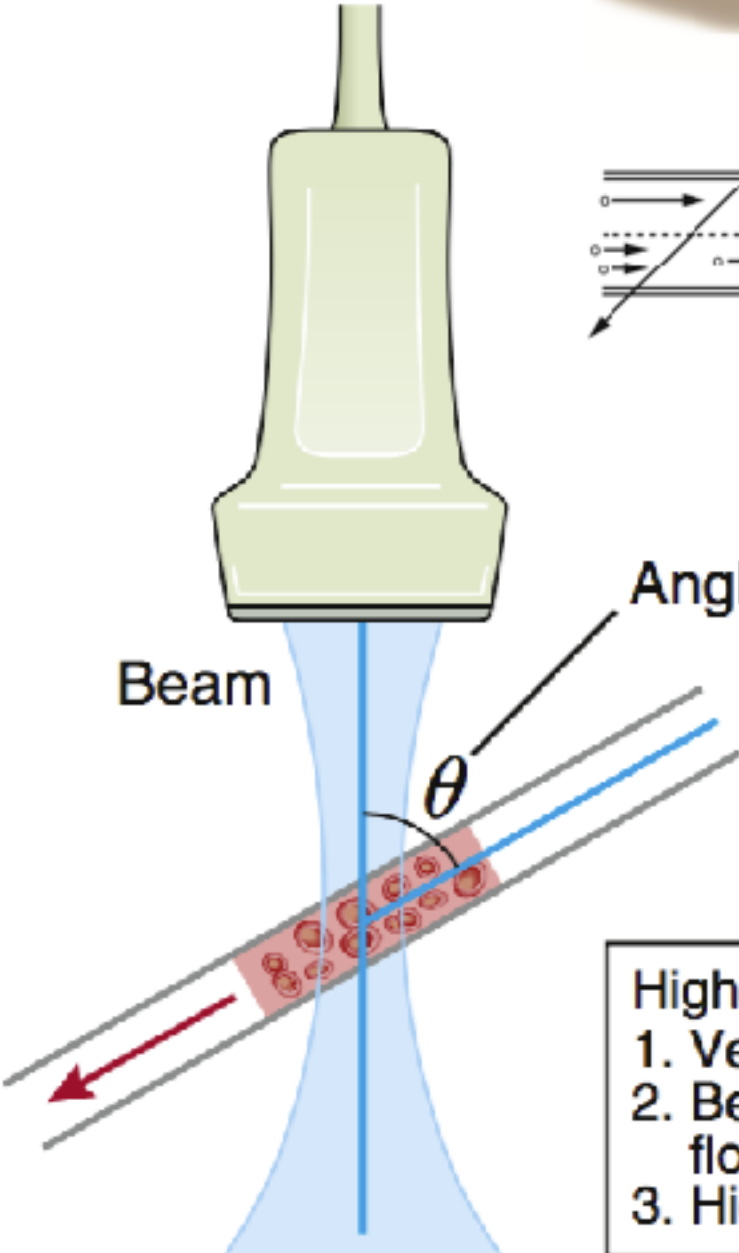


Color Doppler

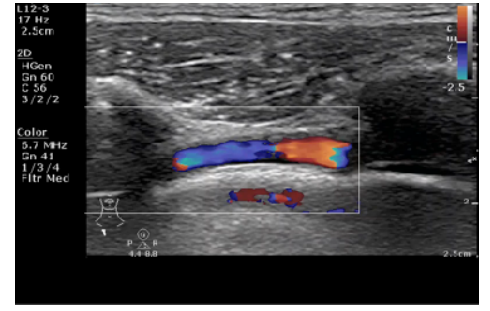
Power Doppler



Spectral analysis



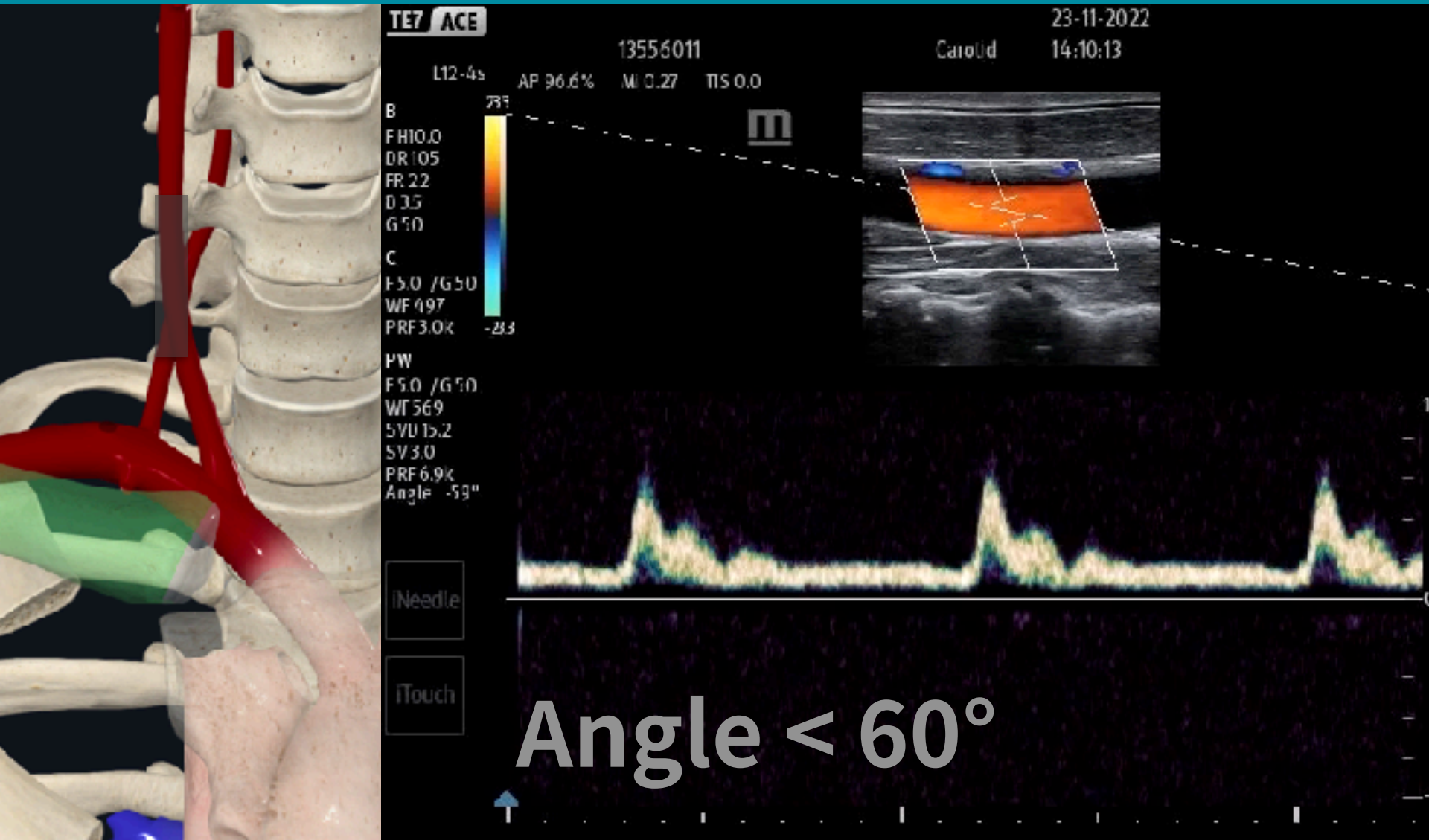
30 ~ 60°

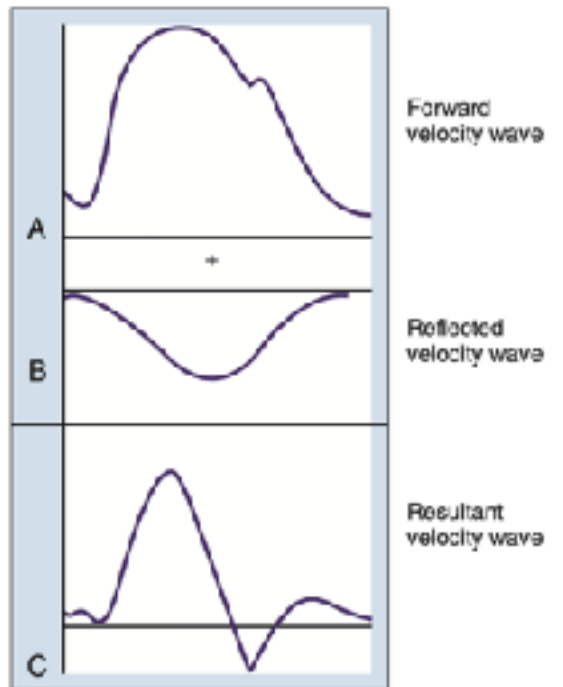
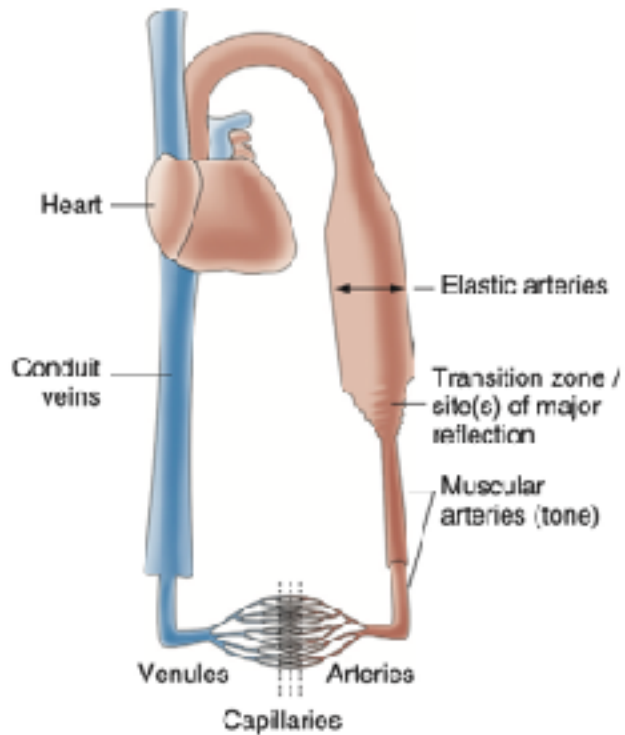
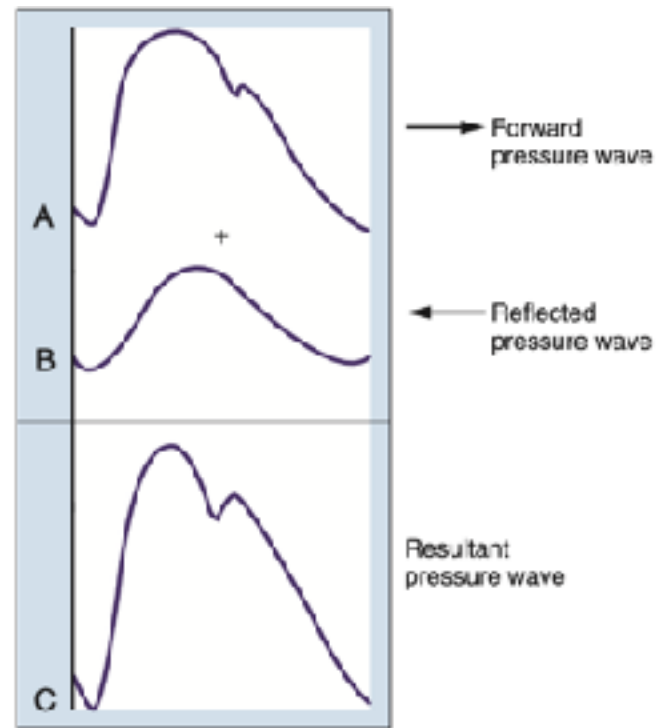
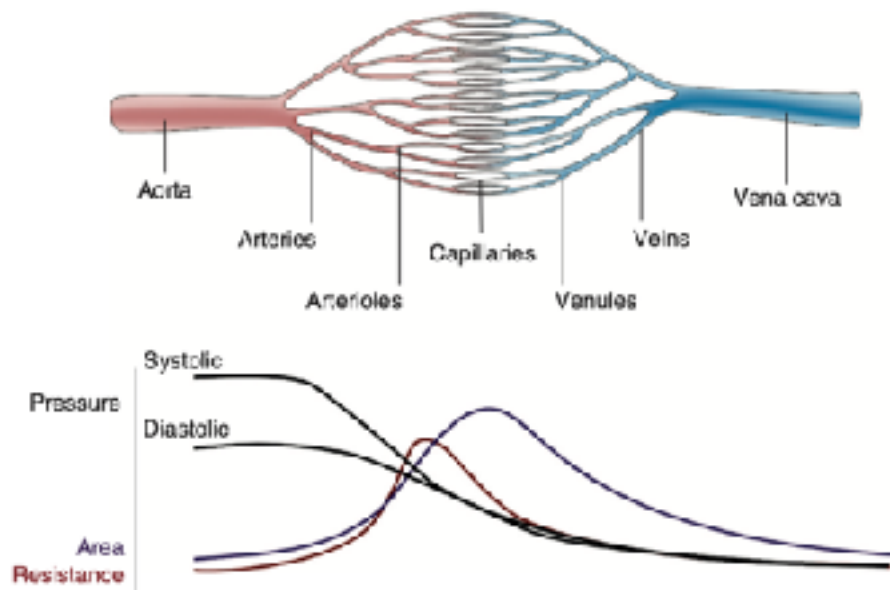


Higher Doppler frequency obtained if:

1. Velocity is increased
2. Beam is aligned parallel to flow direction
3. Higher frequency is used

CCA WITH PW



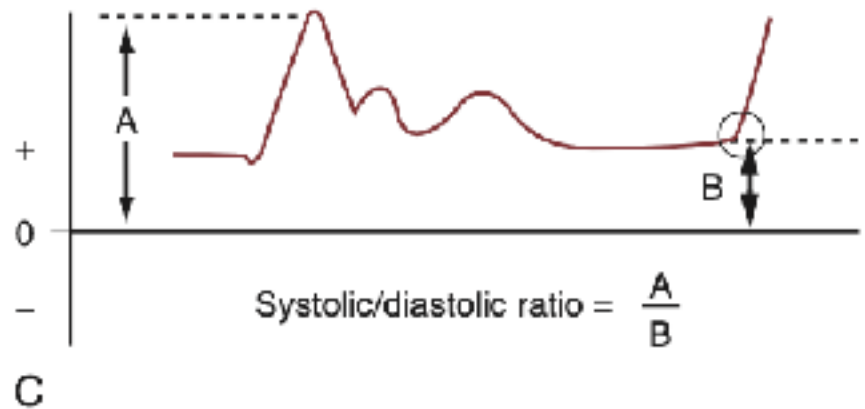
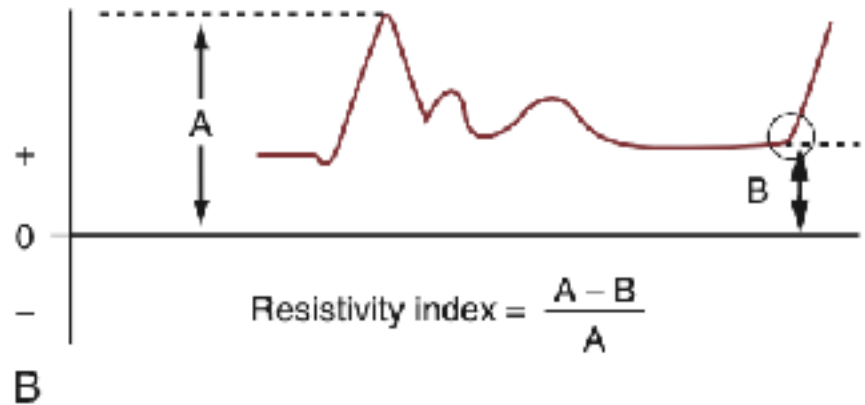
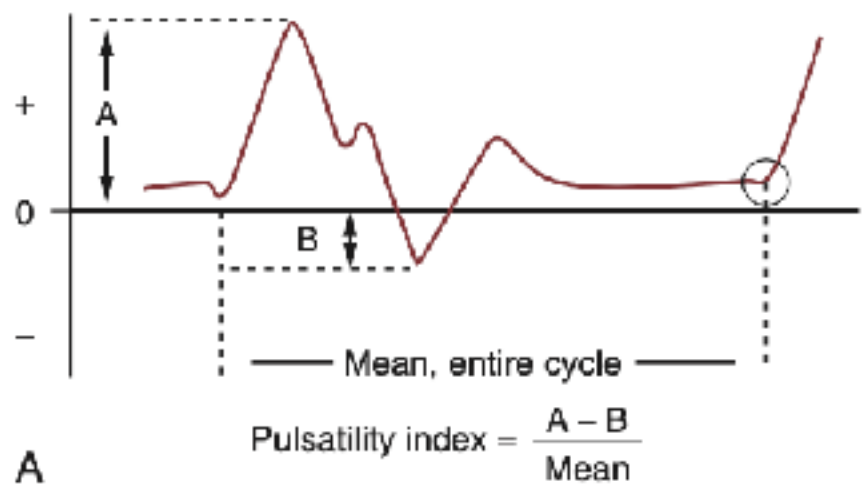


Pulsatility Measurement

正常波形分析

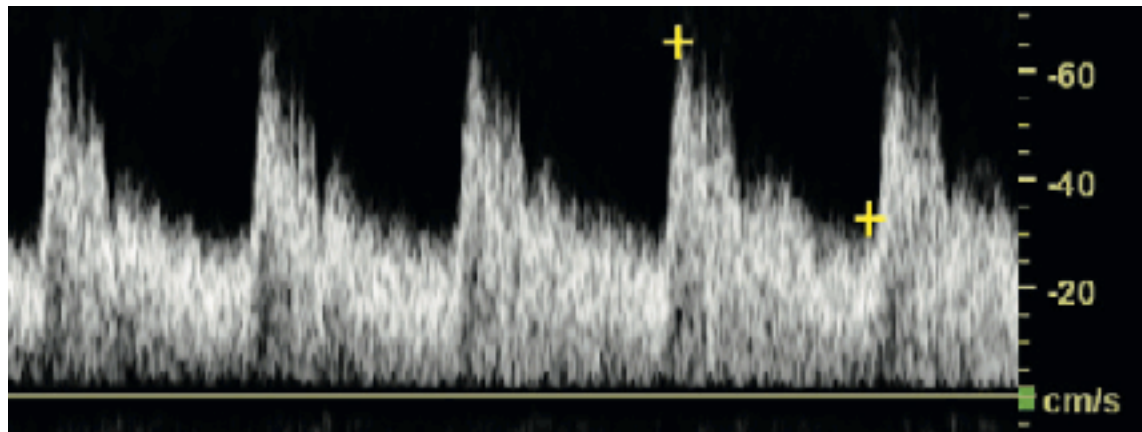
生理狀態變異

心臟功能影響

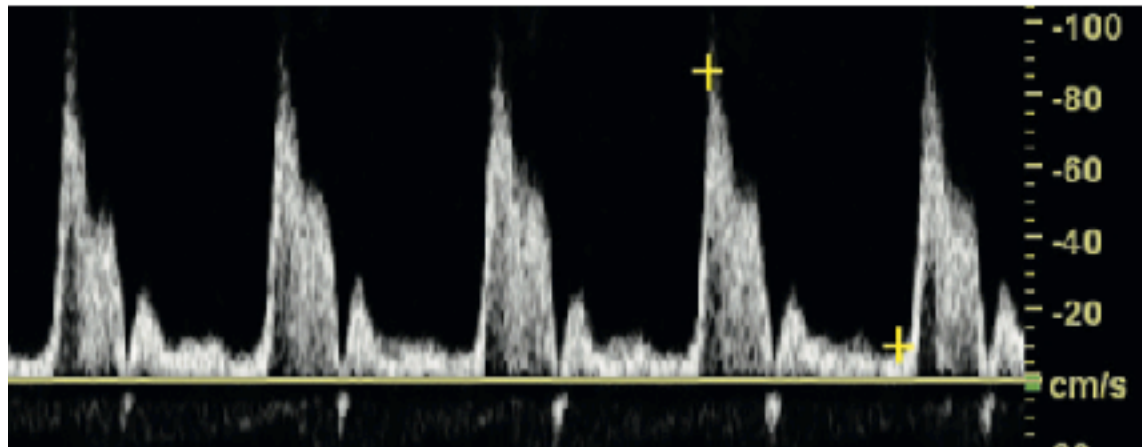


Pulsatility

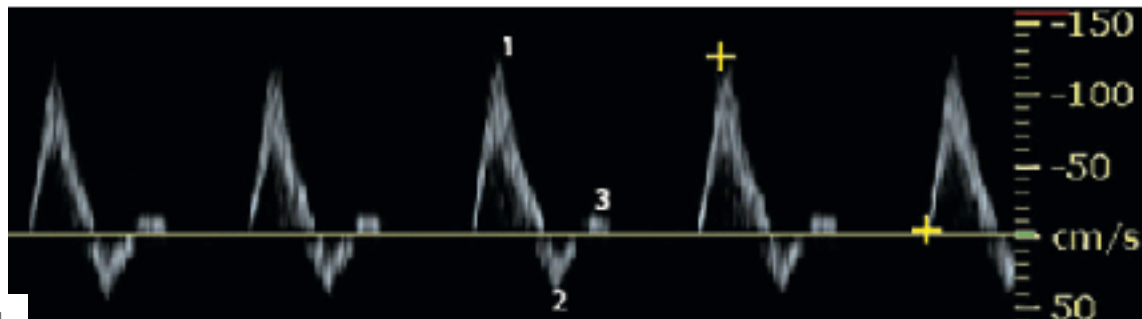
低



中

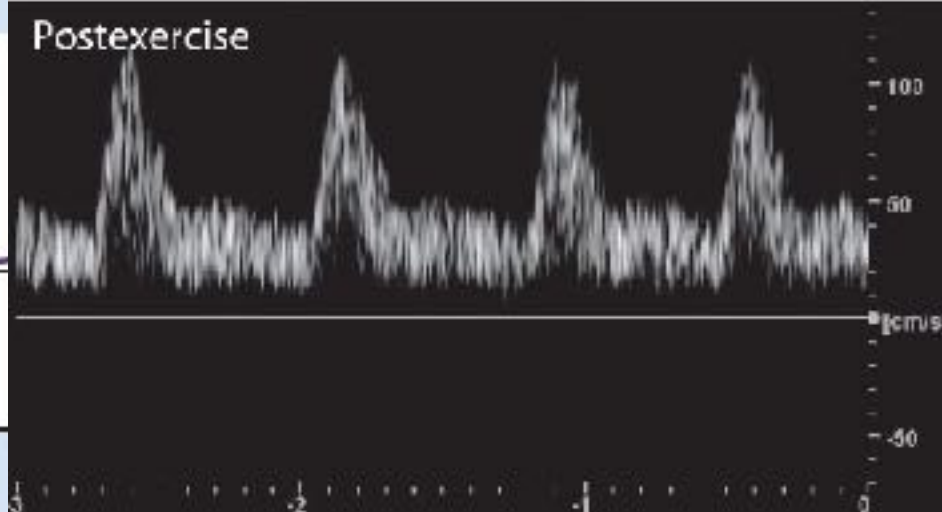
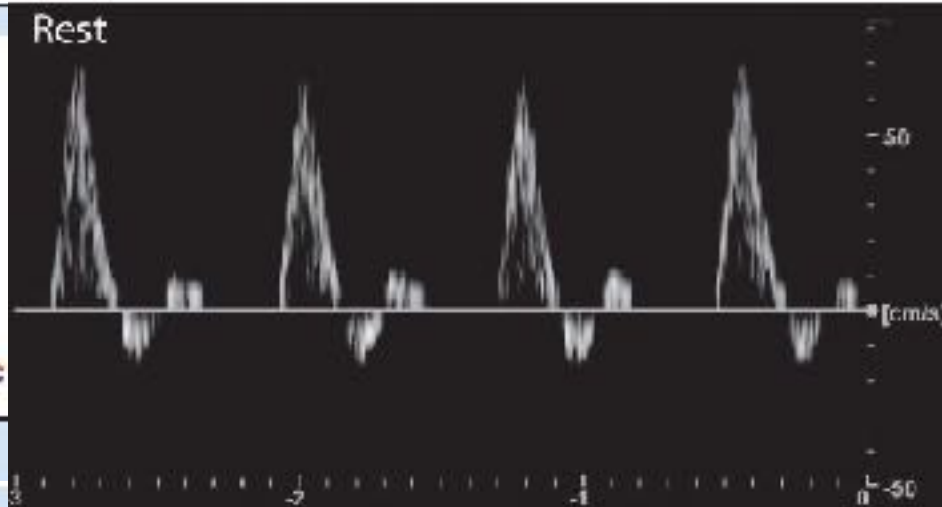
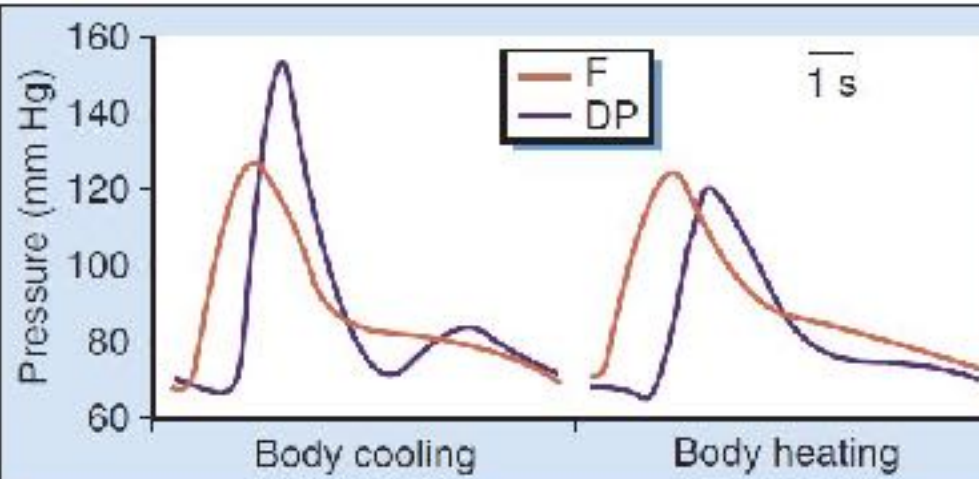


高

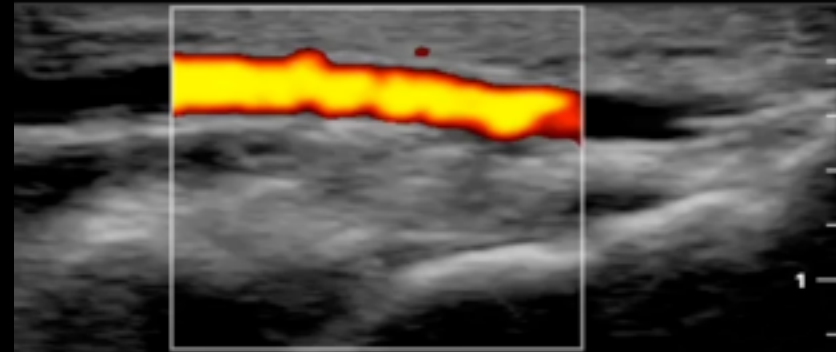
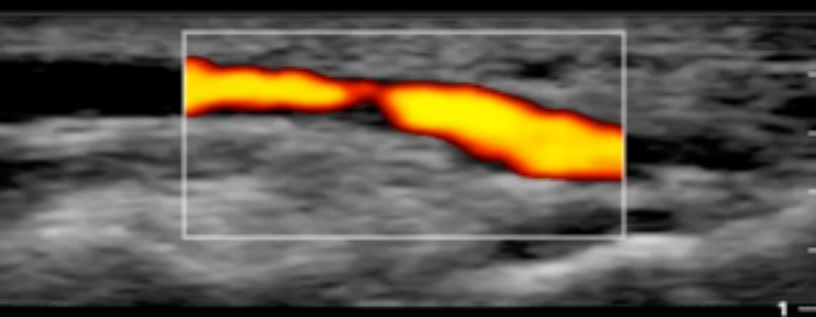


生理狀態的影響

溫度上升，阻力下降，血流增加



RA

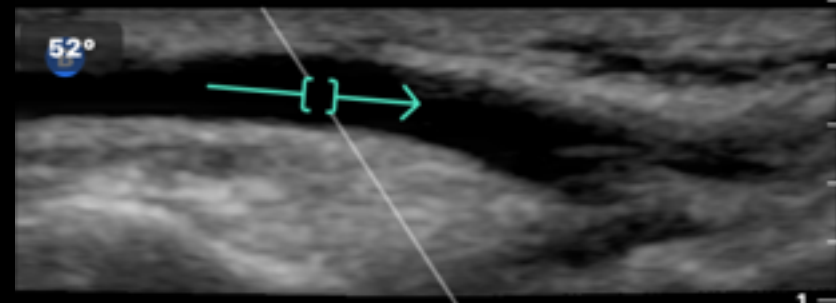
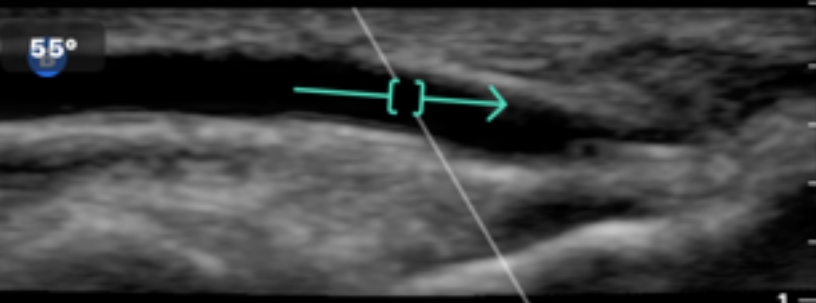


TIS: 0.01, MI: 0.06, Vascular: Access

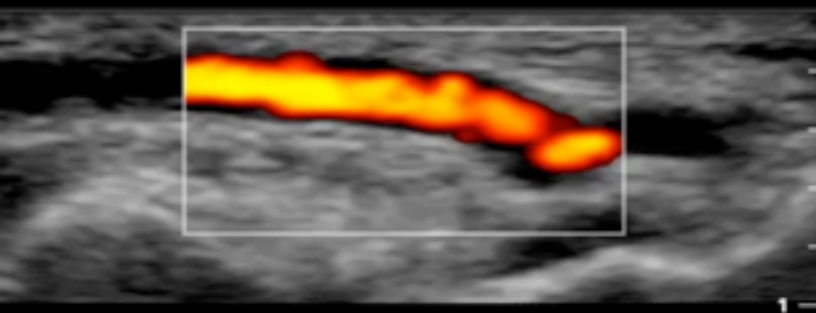
TIS: 0.11, MI: 0.19, Vascular: Access

At rest

Run 6K

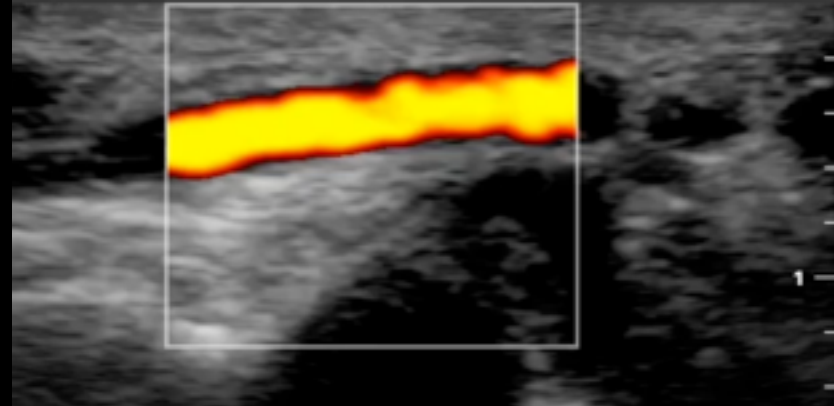
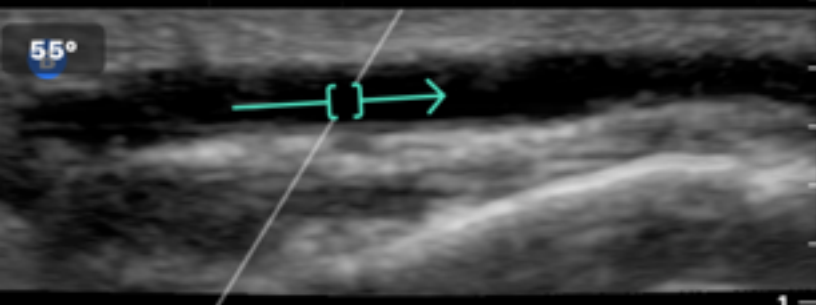
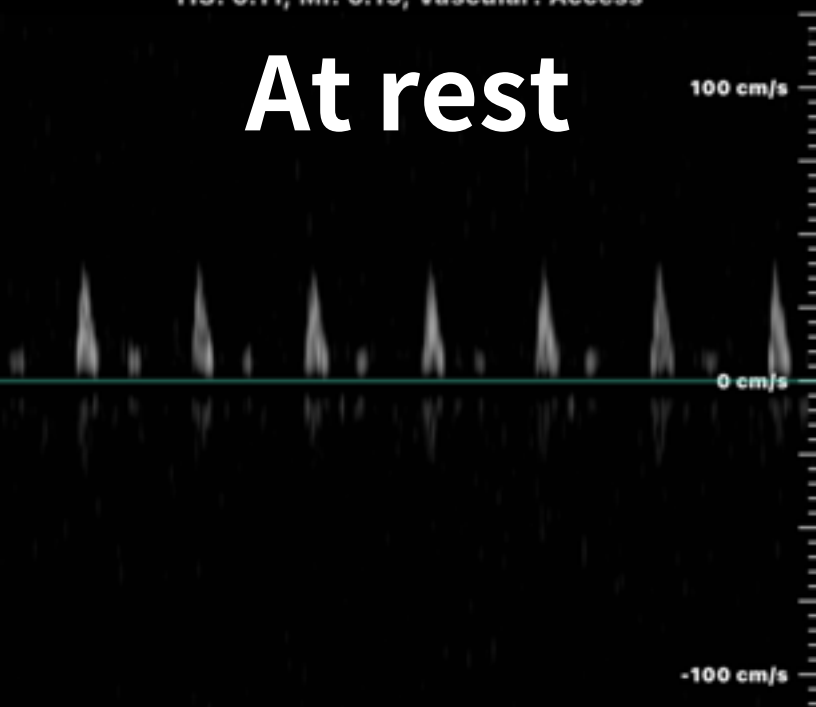


DPA



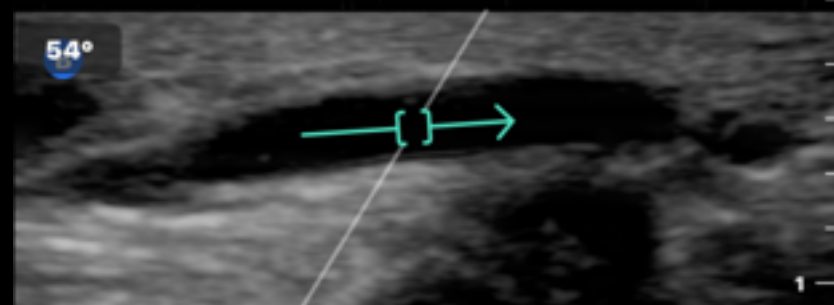
TIS: 0.11, MI: 0.19, Vascular: Access

At rest

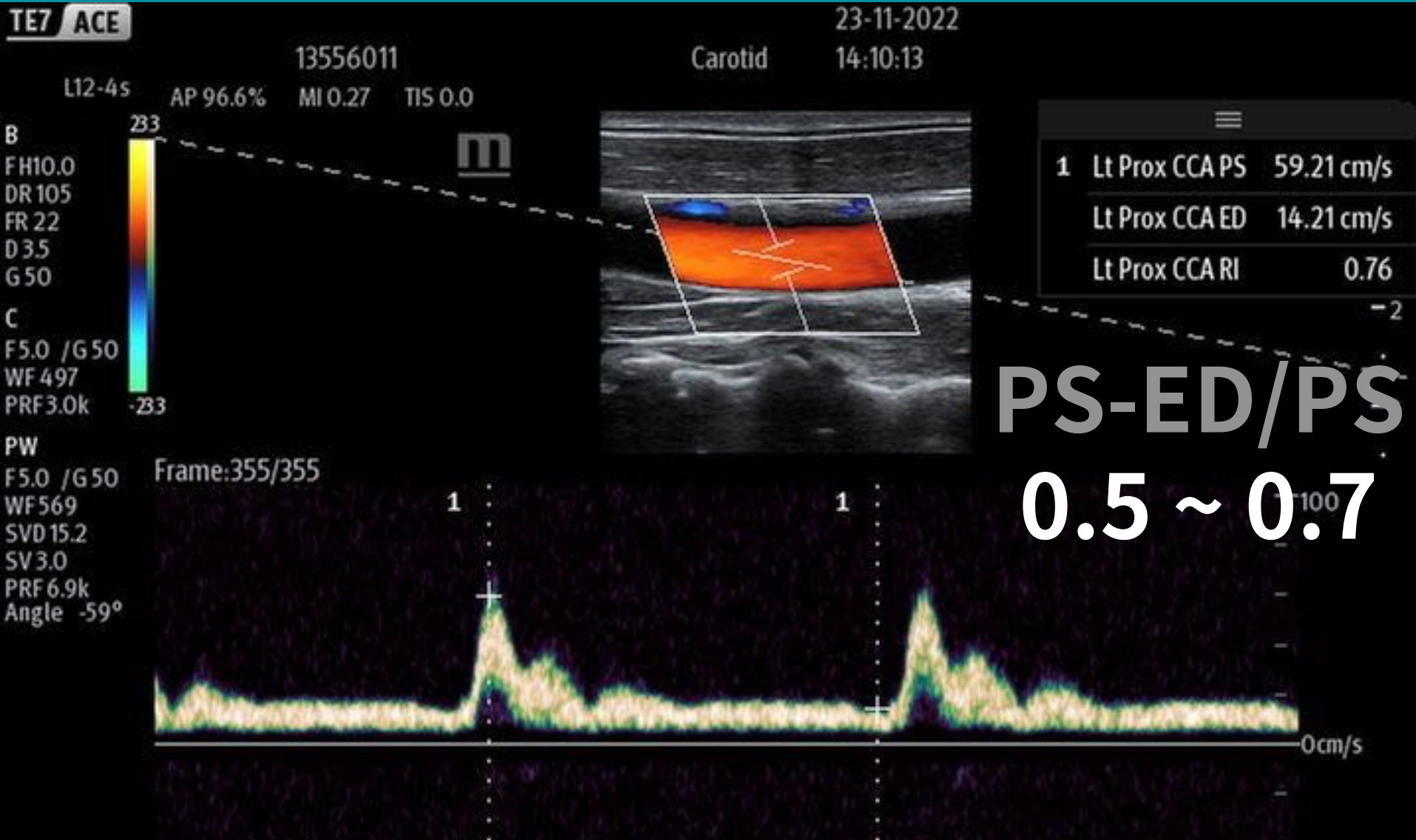


TIS: 0.11, MI: 0.19, Vascular: Access

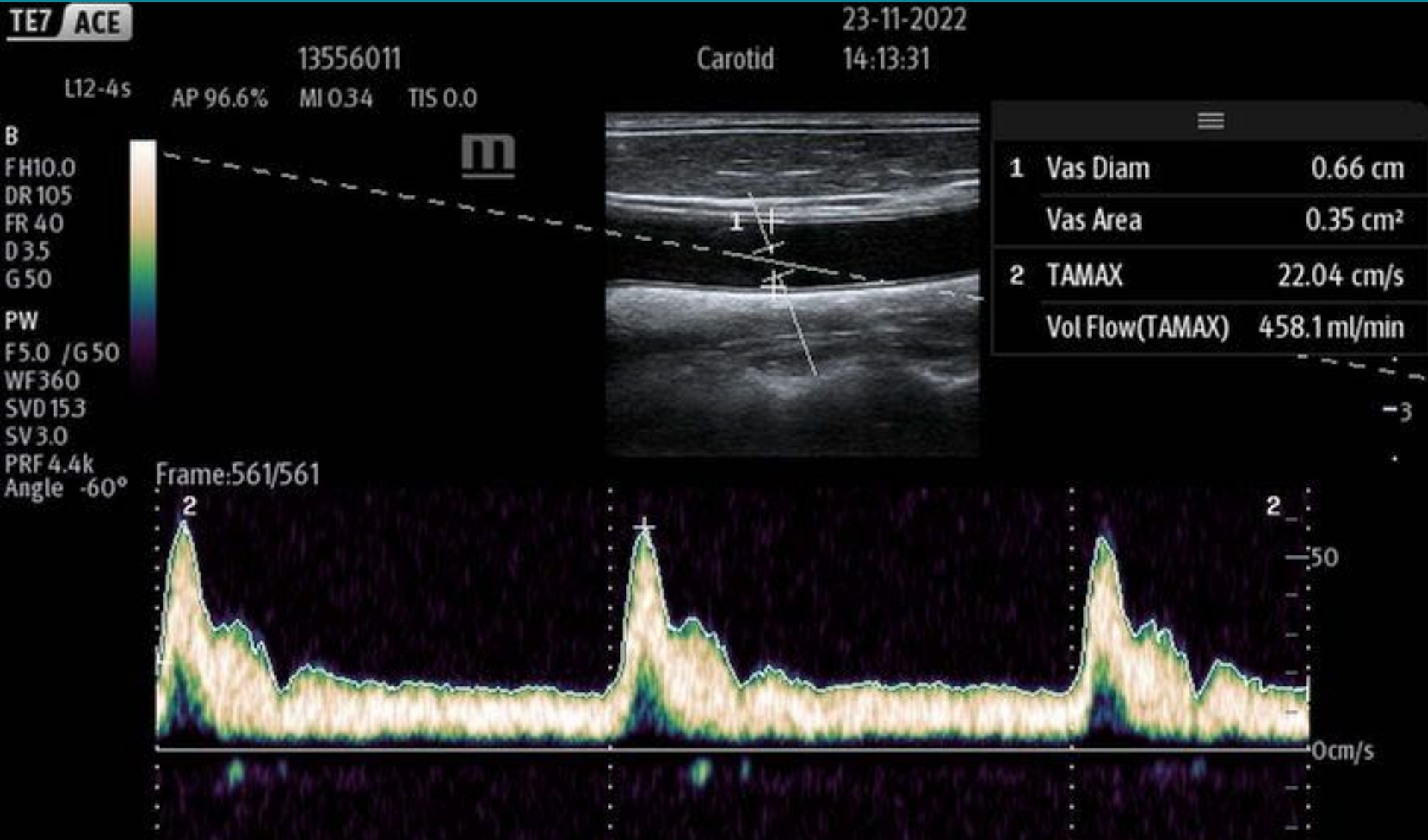
Run 6K



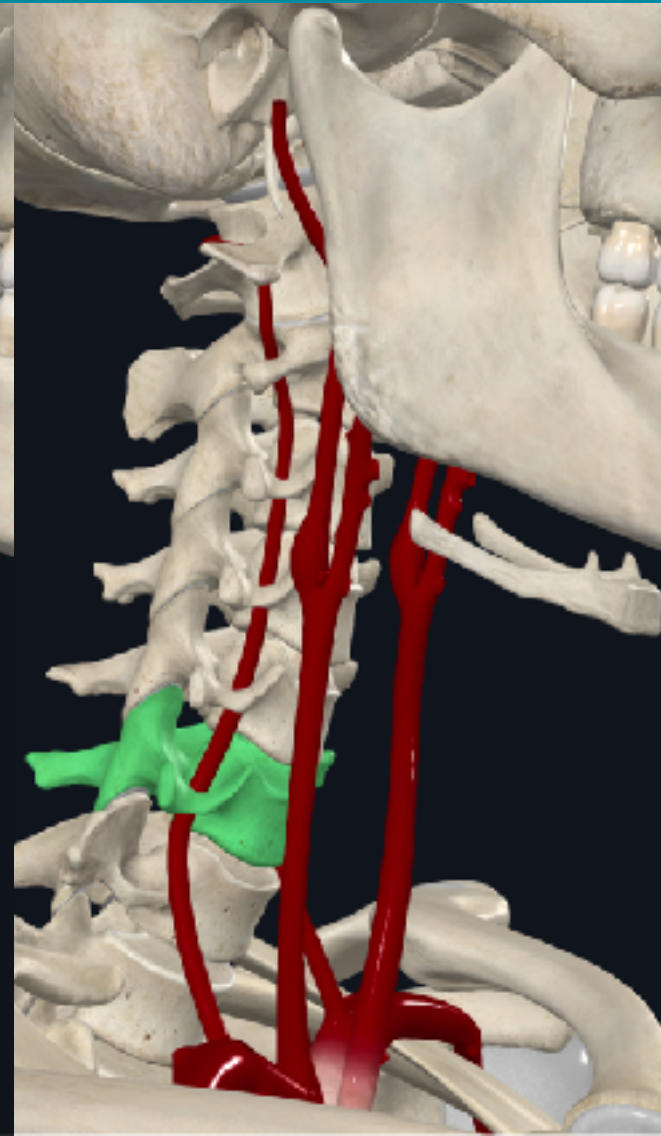
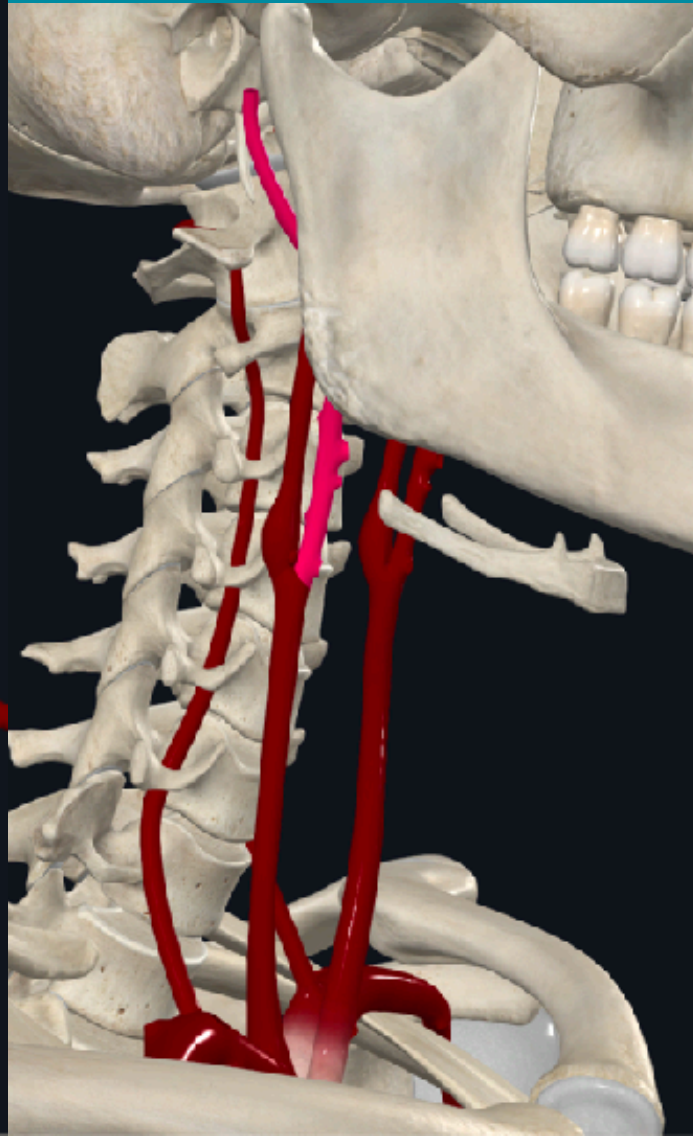
RESISTANCE INDEX (阻力係數)



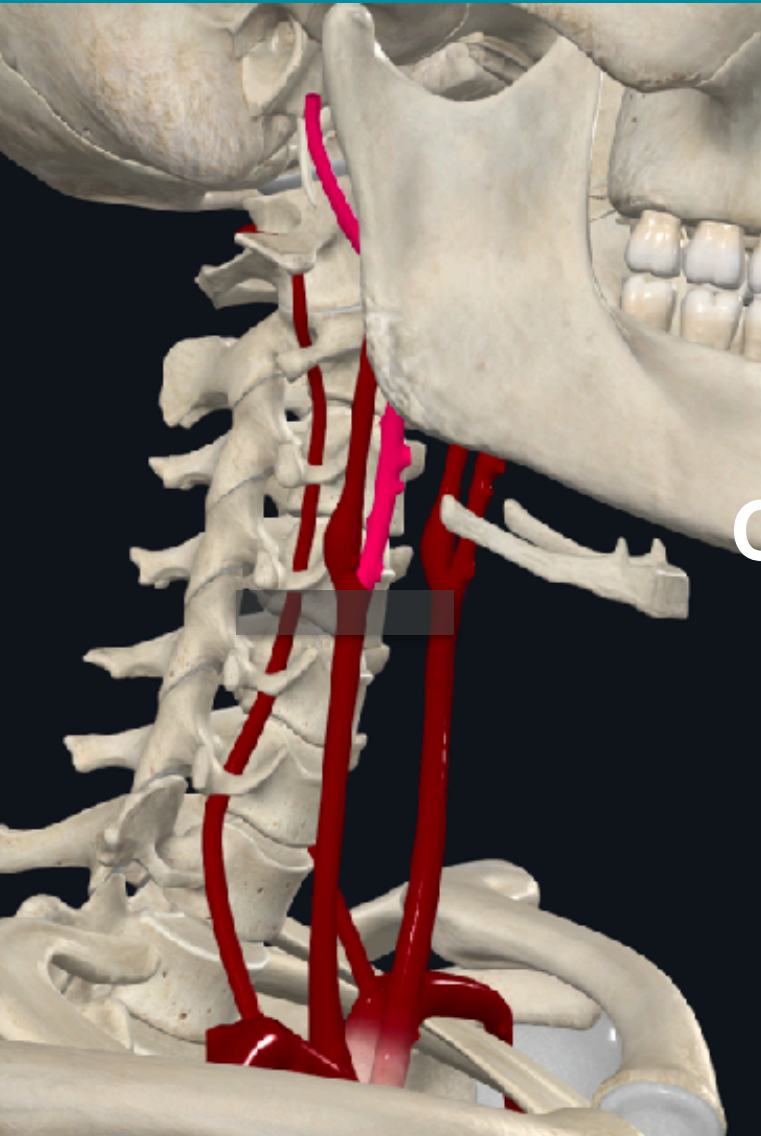
CCA FLOW



CCA TO ICA & ECA



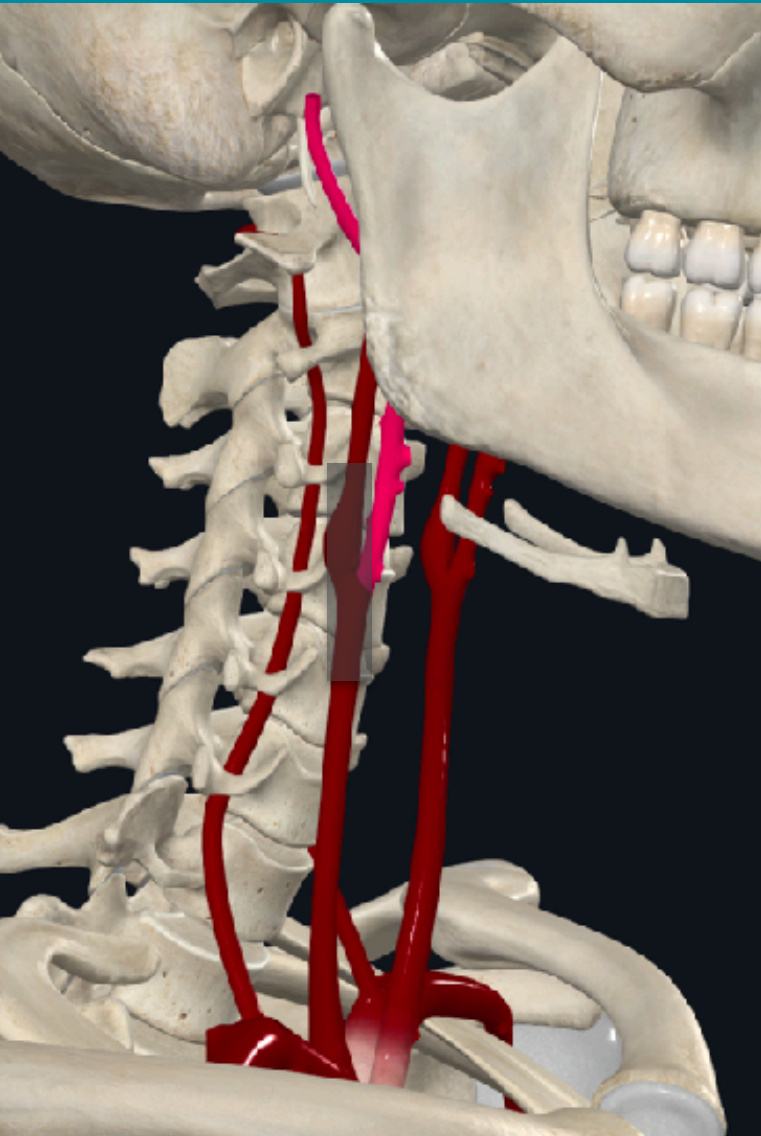
CCA TO ICA & ECA



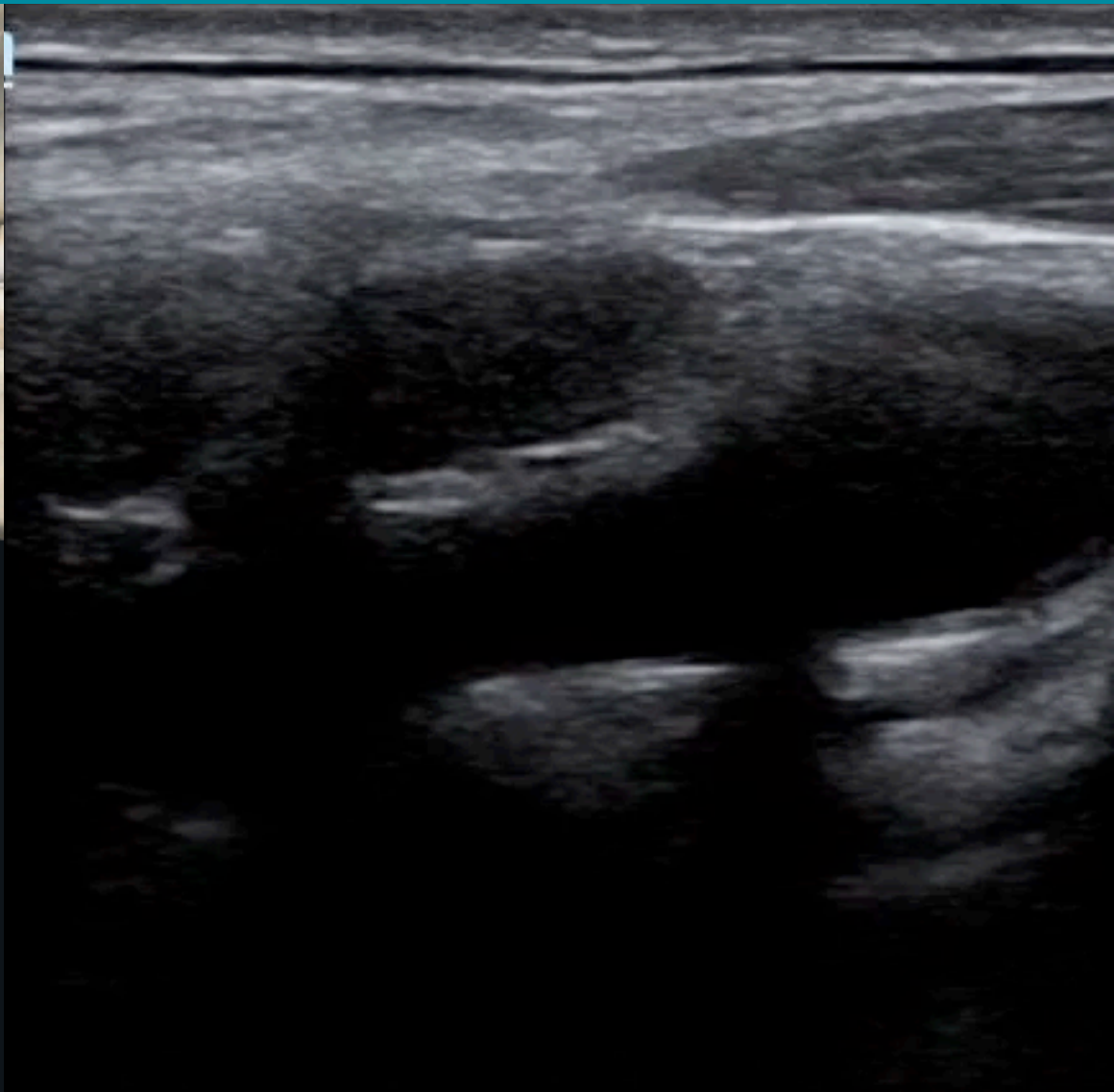
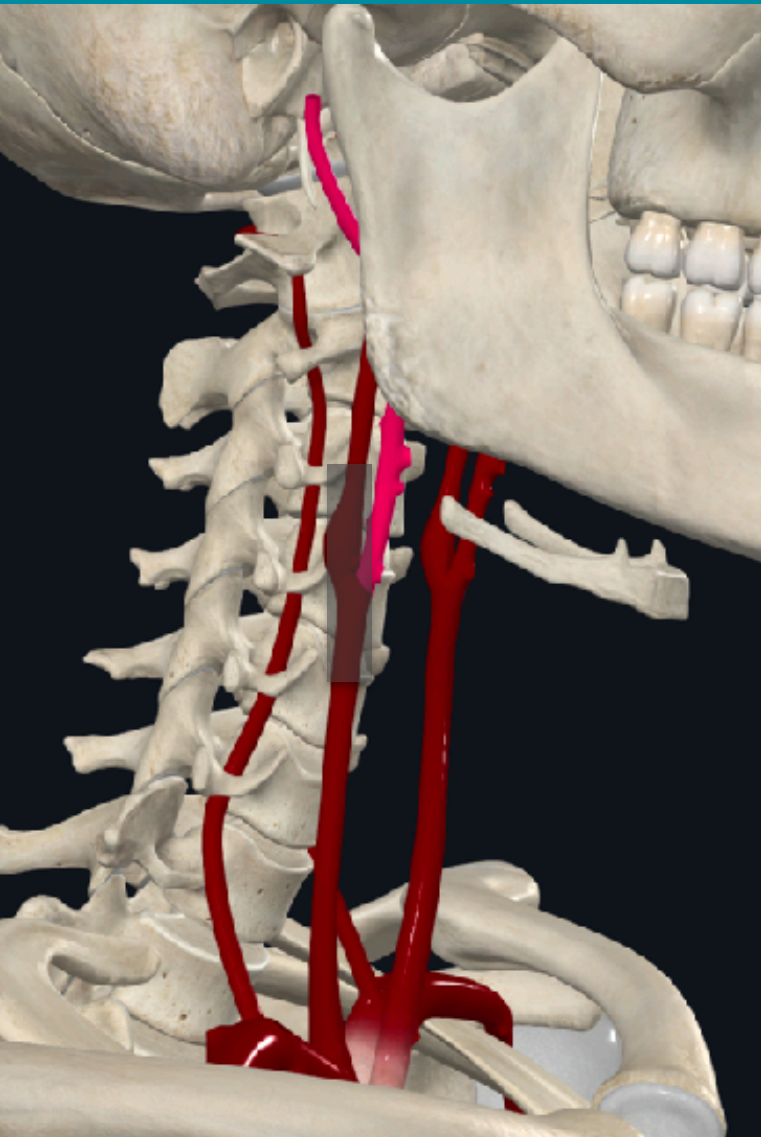
CCA to ICA (post) & ECA (ant)



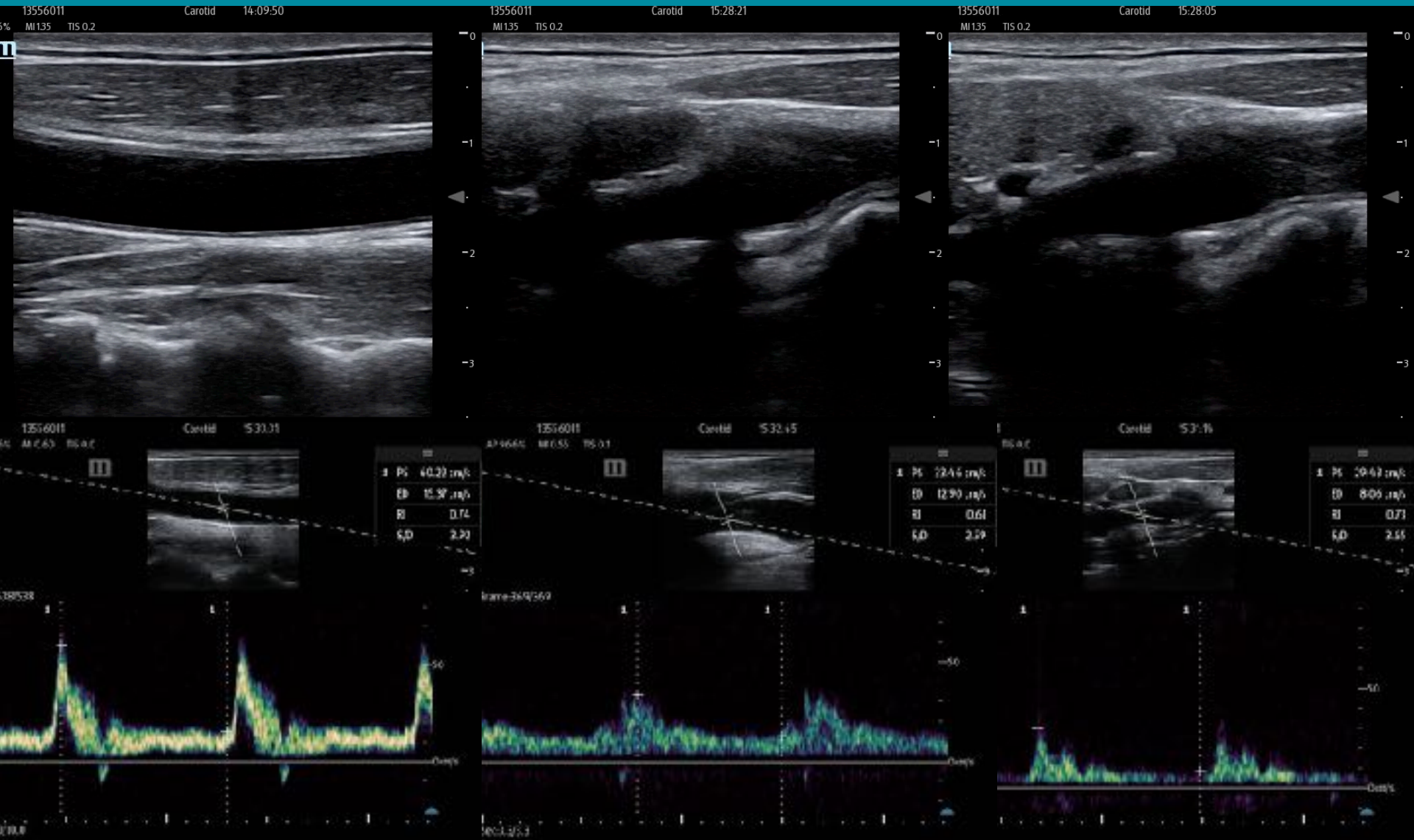
CCA TO ECA (ANT TILT)



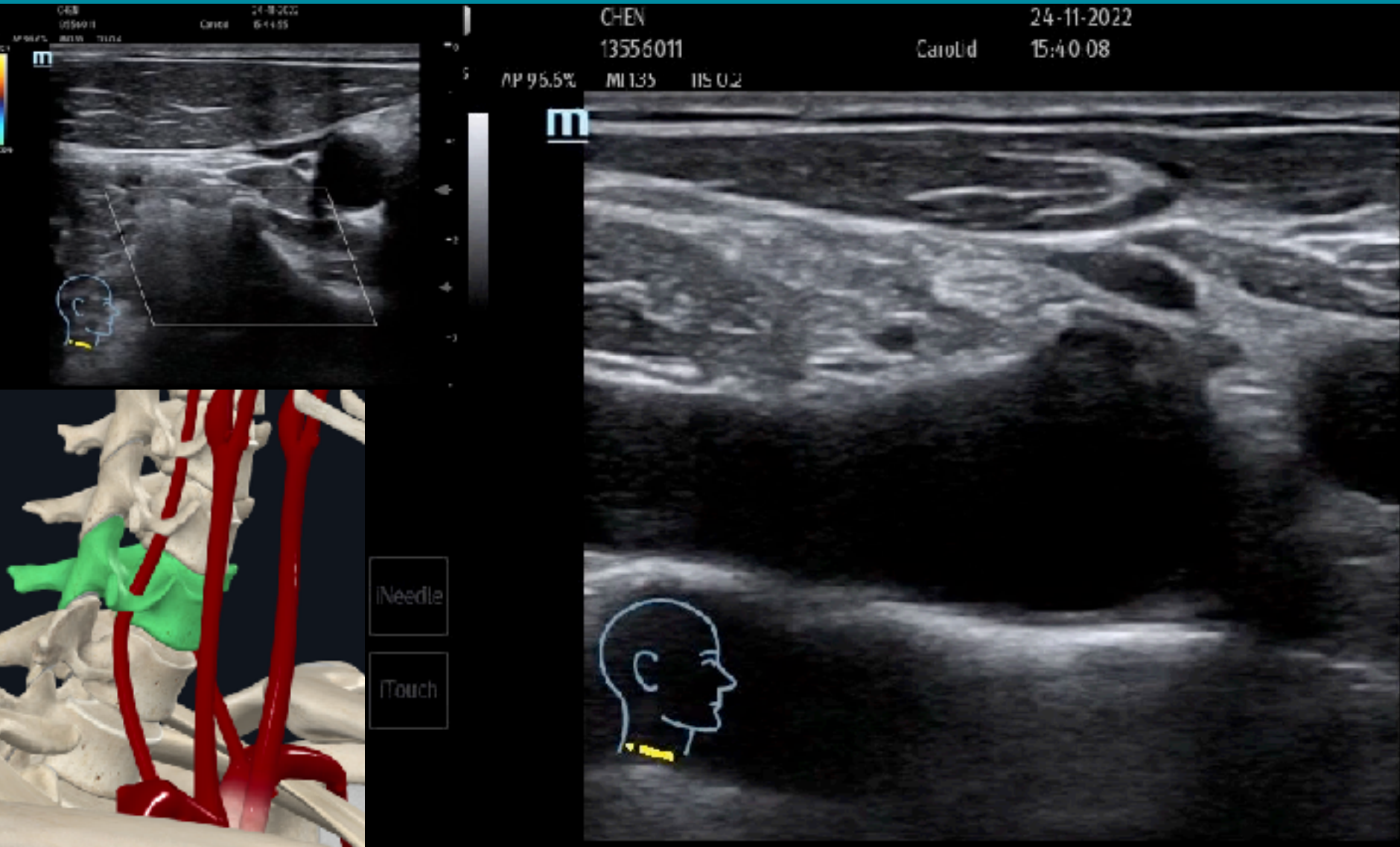
CCA TO ICA (POST TILT)



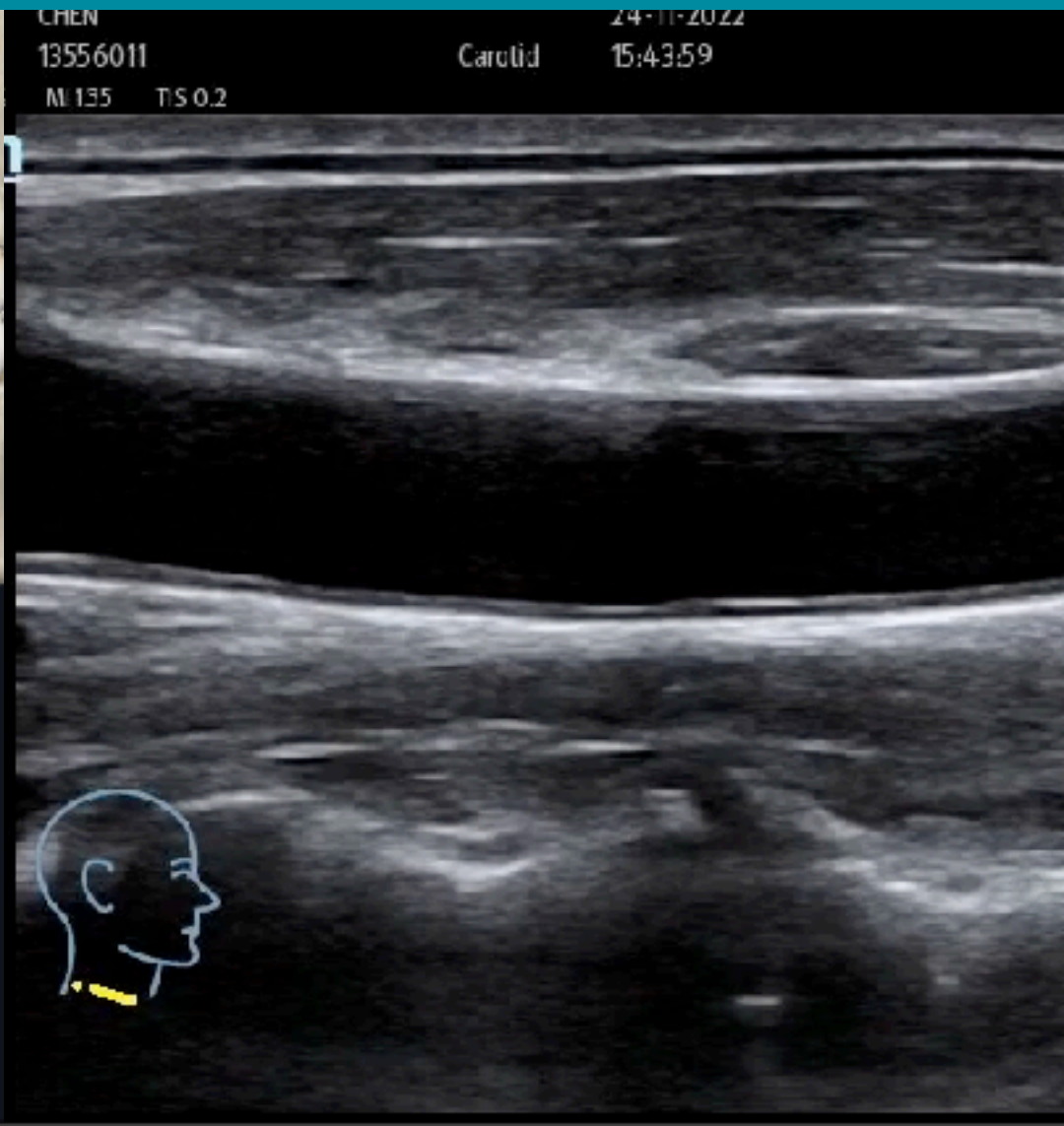
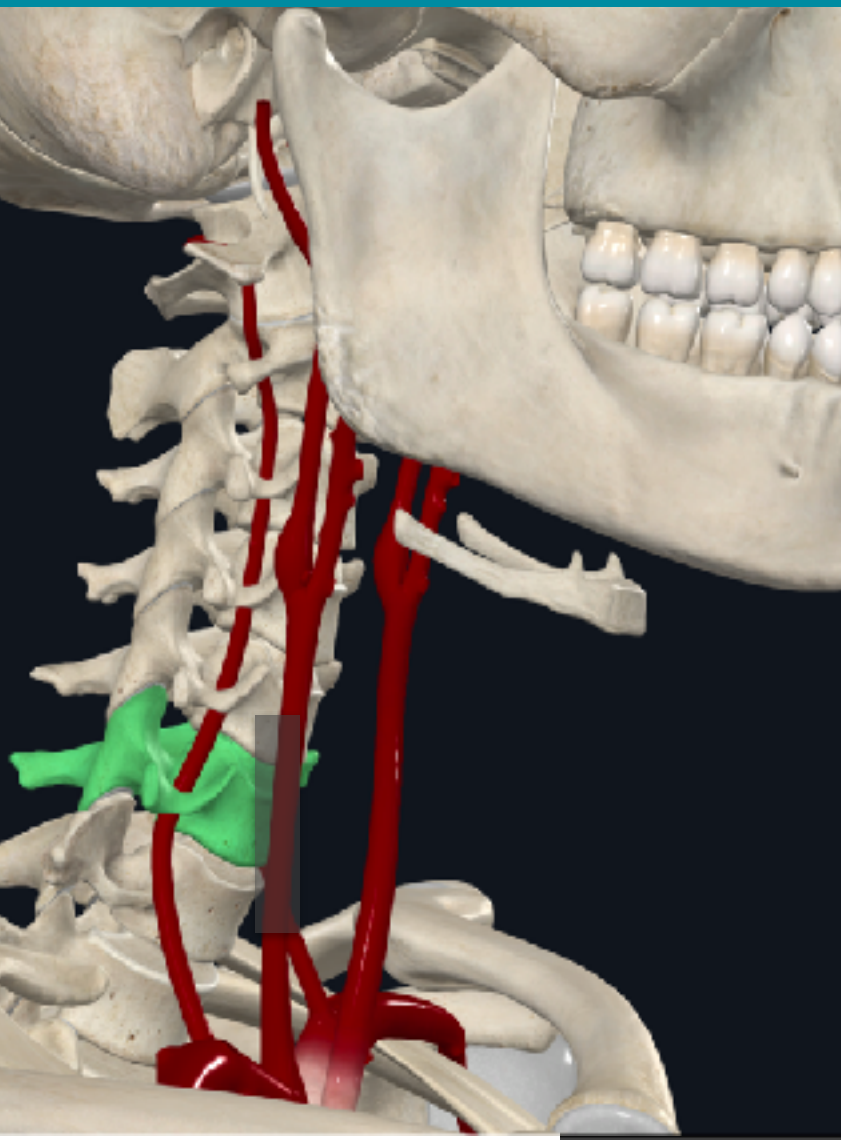
CCA - ICA - ECA



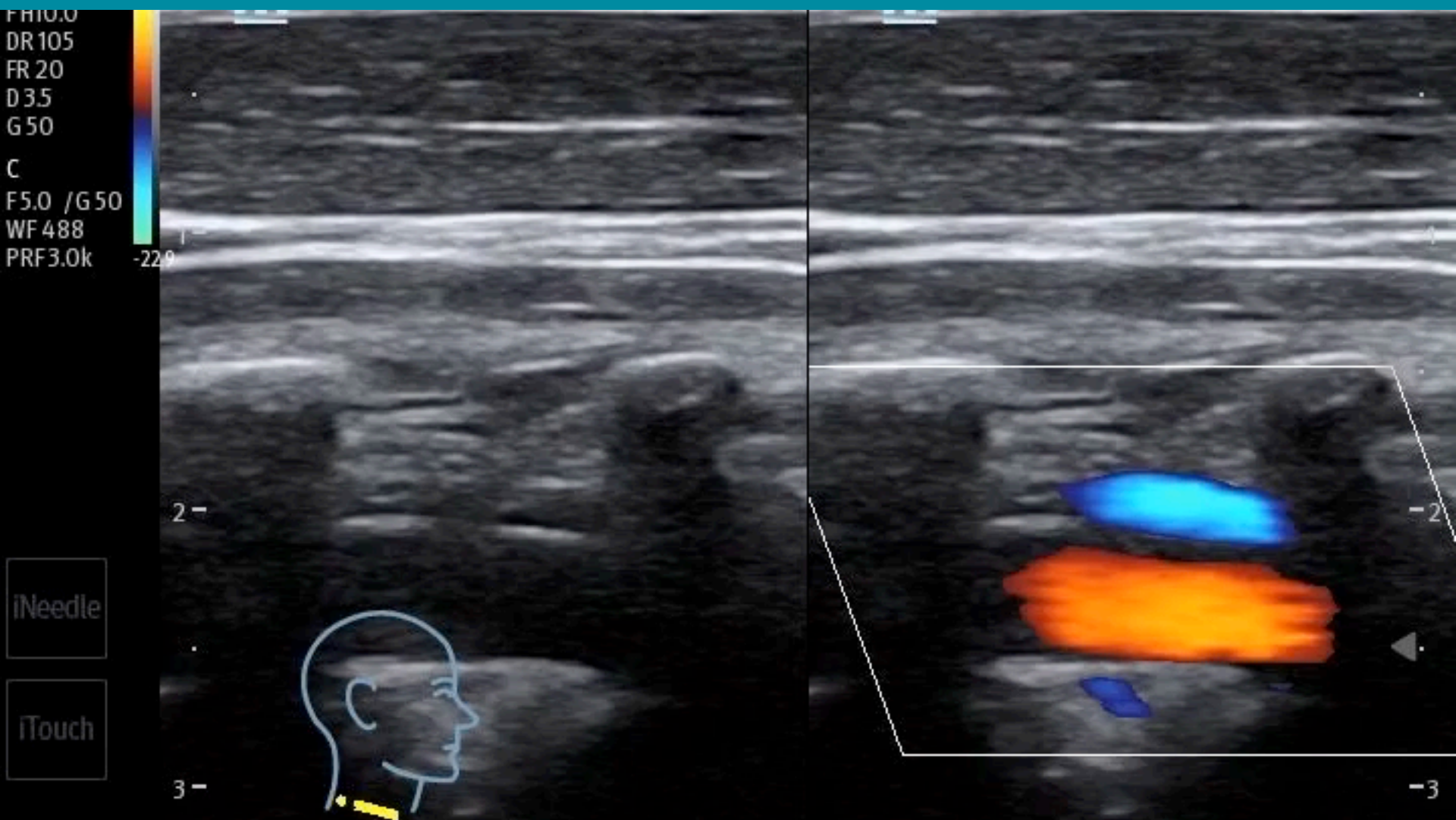
VA (FROM SUBCLAVIAN A)



CCA TO VA (TILT):建議的手法

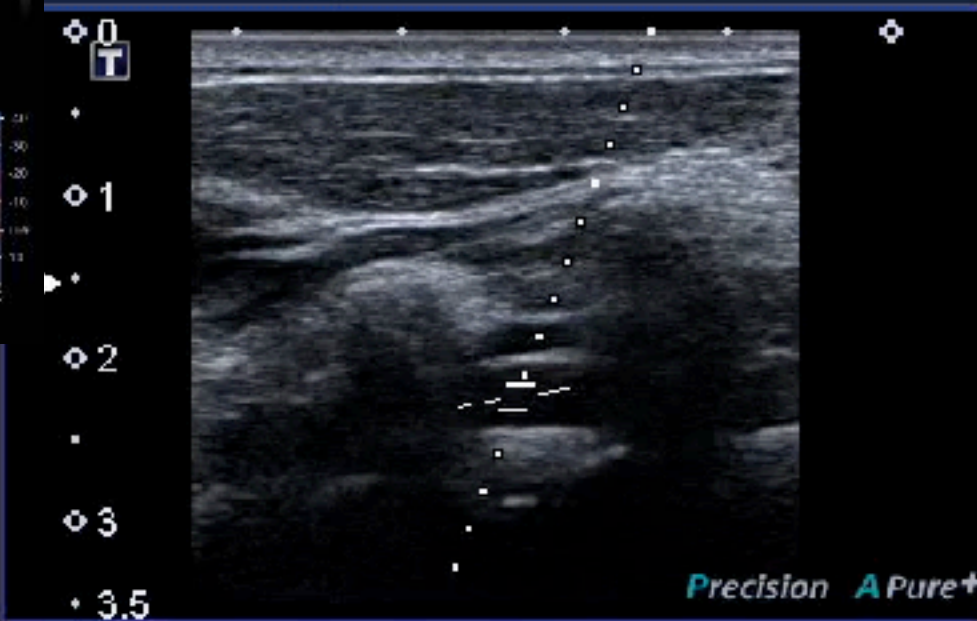
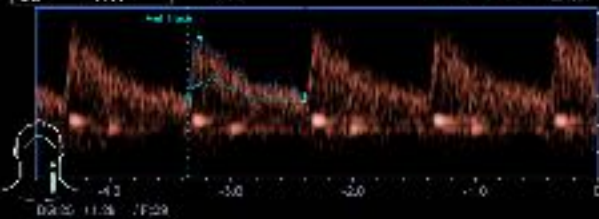


VA



Carotid

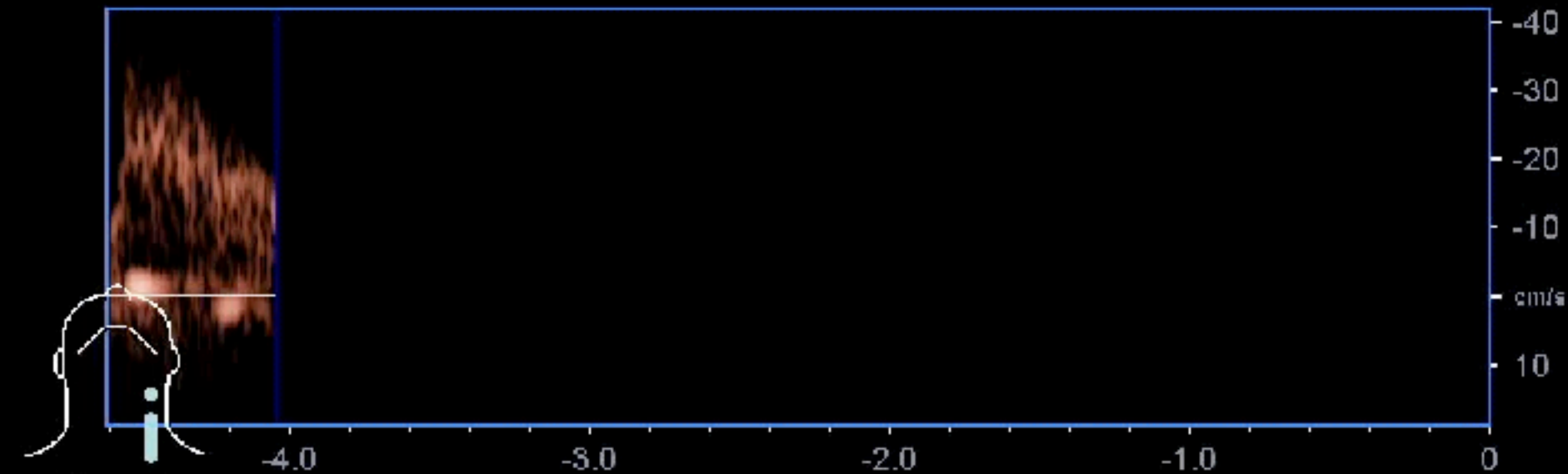
3158



MI:1.5
 11L4
 diffT8.0
 31 fps
 Qscan
 G:91
 DR:60
 A:5
 P:1

60" $\frac{1}{2}$ 1.5
 2.4cm

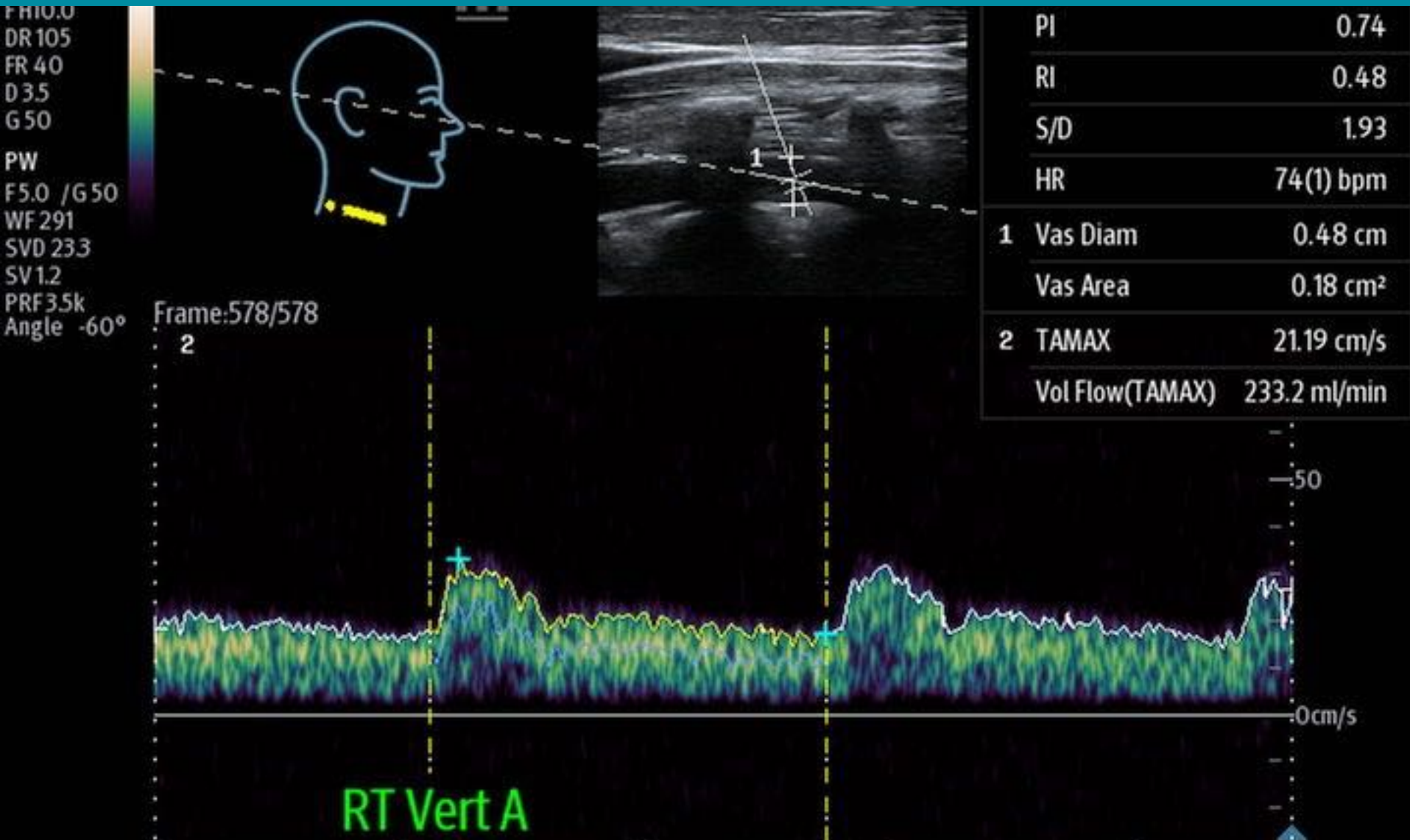
Flow Volume



DG:25 / 1.2k / F:29

VBI: < 100 ml/min

VA FLOW MEASUREMENT



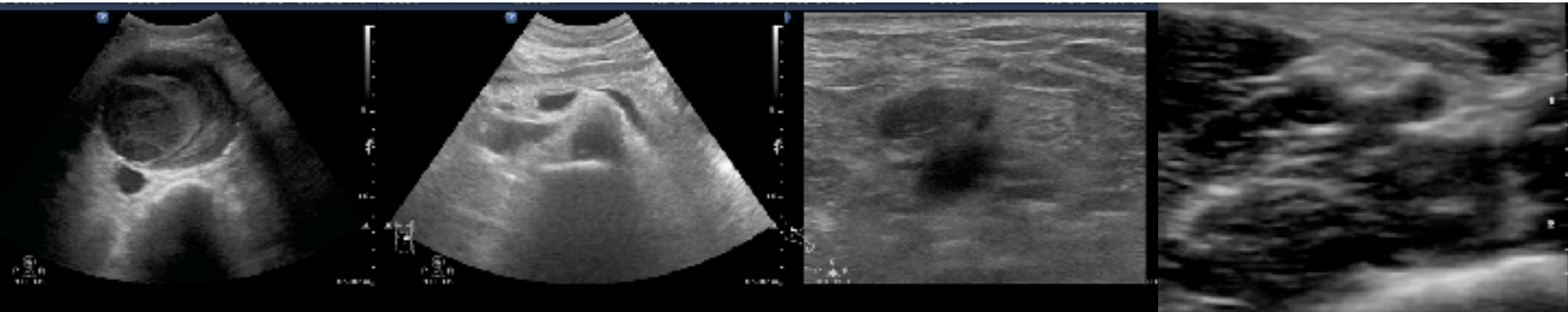
Vascular POCUS

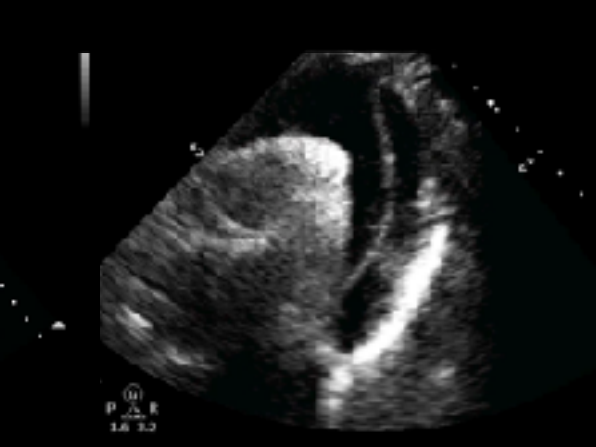
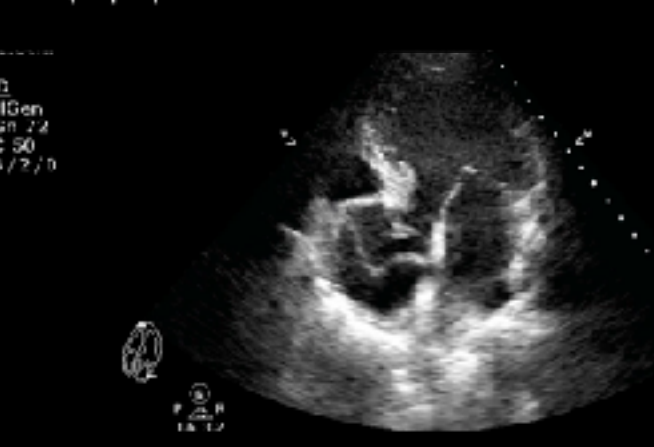
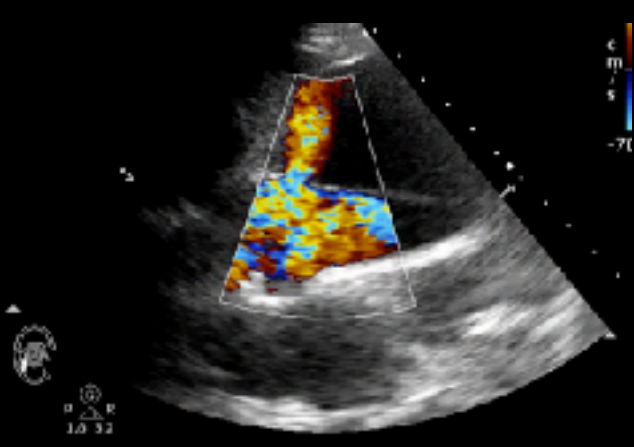
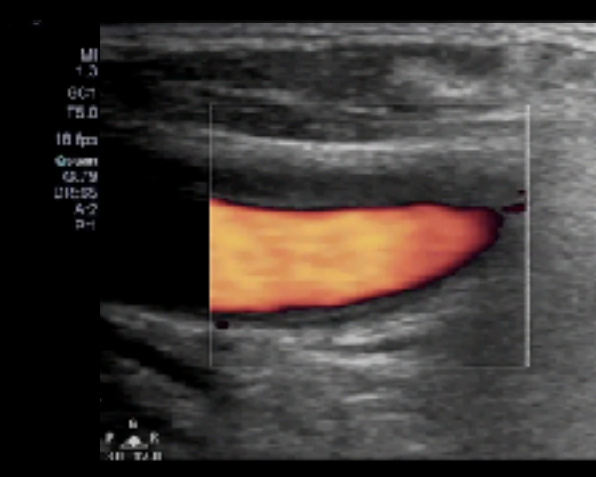
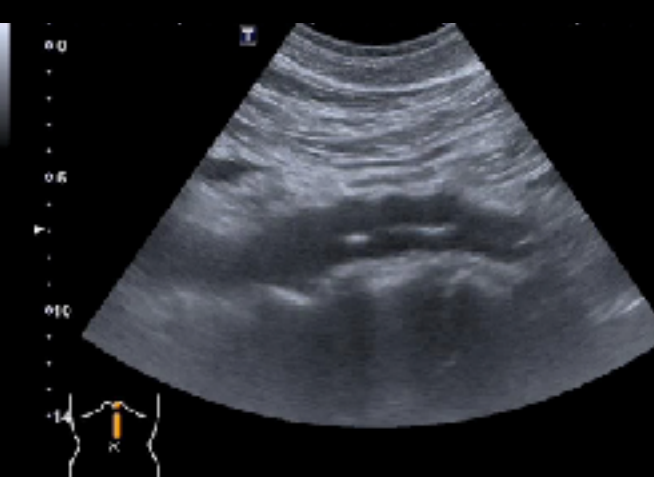
AAA

AD

DVT

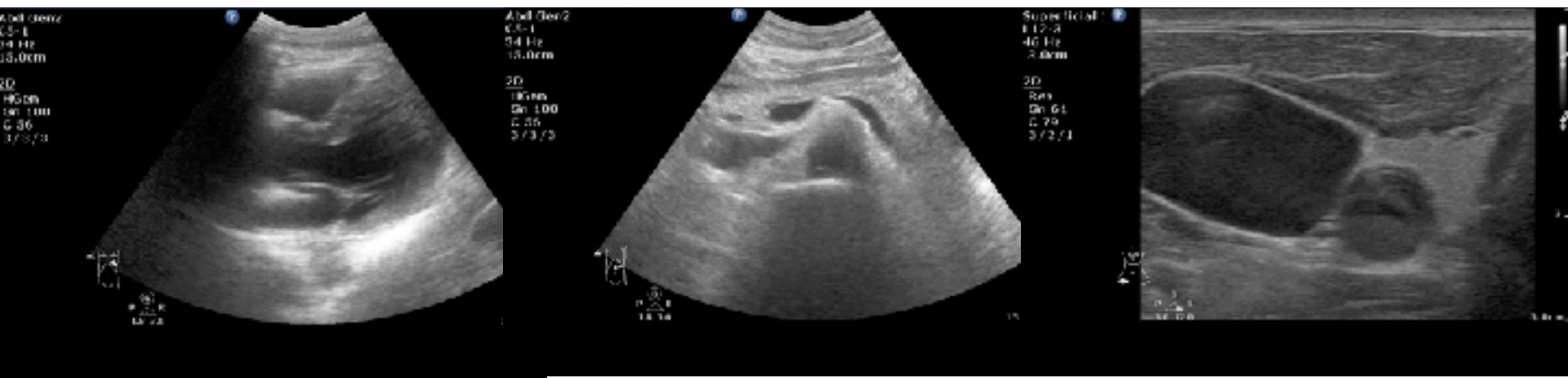
Line





懷疑AD時的POCUS:PAC

CTA仍是最重要的檢查



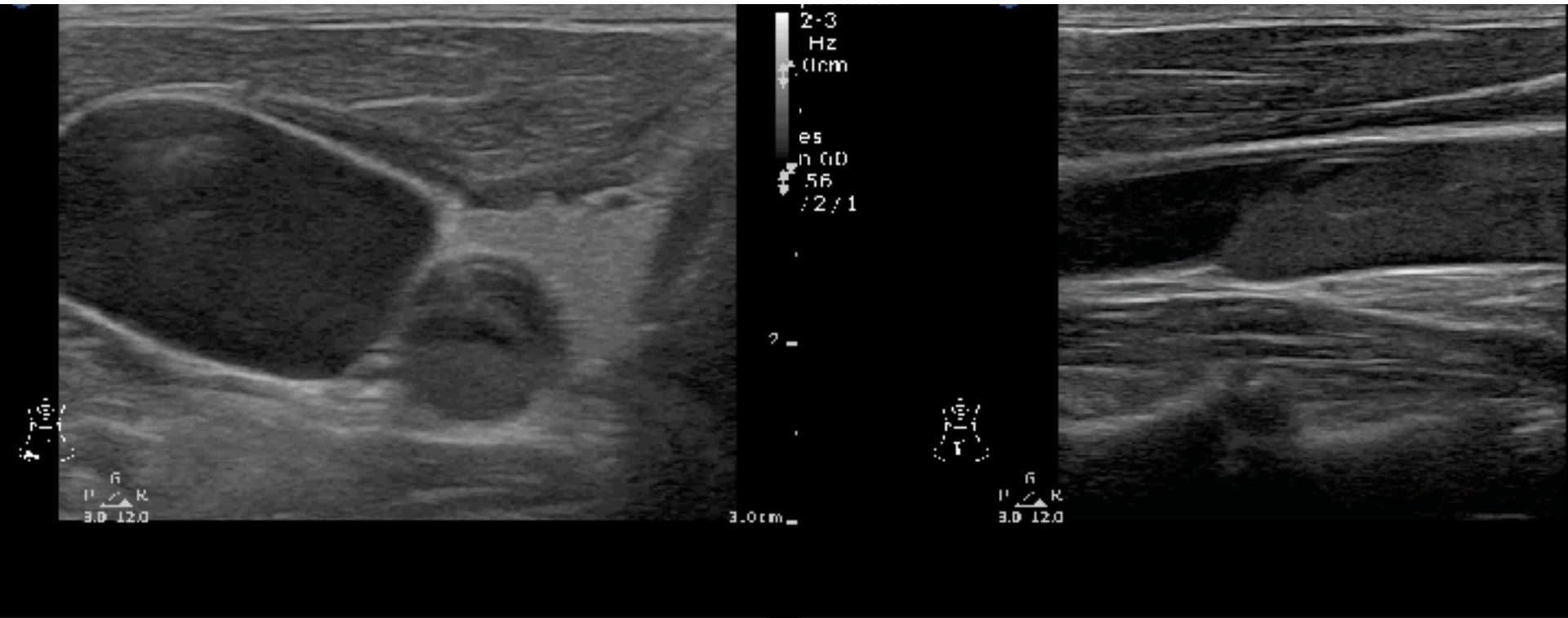
Pericardium

ABD Aorta

CCA

Acute stroke prior to tPA

Bil CCA是最重要的檢查

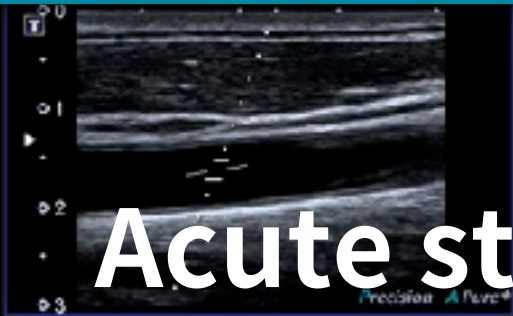


Occlusion or Flap ==> CTA來排除AD

ECD in ER

CCA

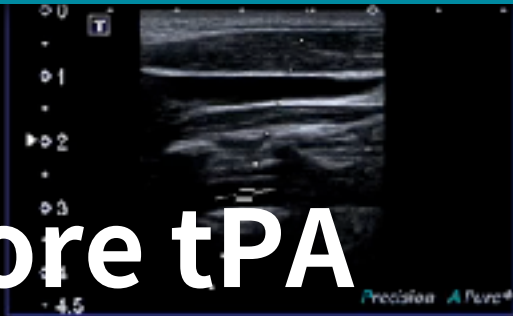
Vmax
Ved
PI
MI
SID
Vmin
Vm_peak
Vm_mean



MI:1.4
11L4
diffT0.0
19 fps
Cscan
G:92
DR:80
A:6
P:1
1.7cm

VA

Vmax
Ved
PI
MI
SID
Vmin
Vm_peak
Vm_mean

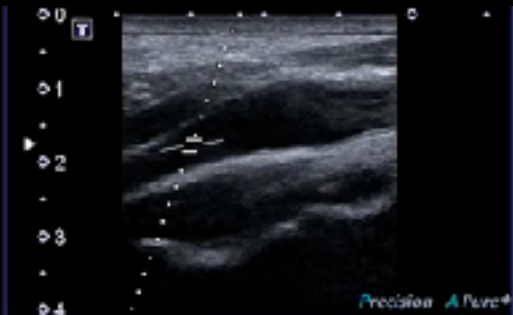


MI:1.4
11L4
diffT0.0
22 fps
Cscan
G:95
DR:80
A:6
P:1
-4.5
1.5
3.0cm

Acute stroke before tPA
Suspect Aortic dissection
Suspect VBI

ICA

Vmax
Ved
PI
MI
SID
Vmin
Vm_peak
Vm_mean



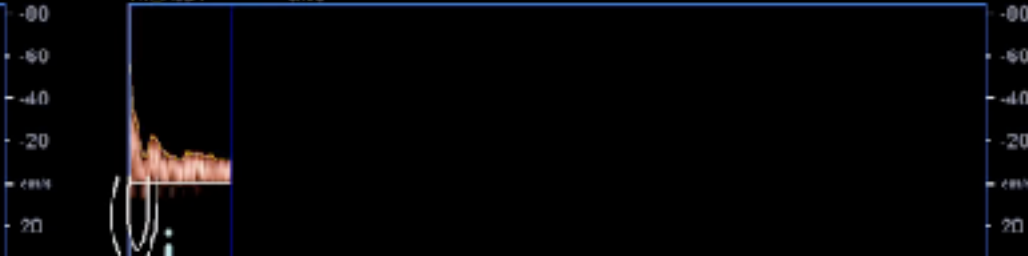
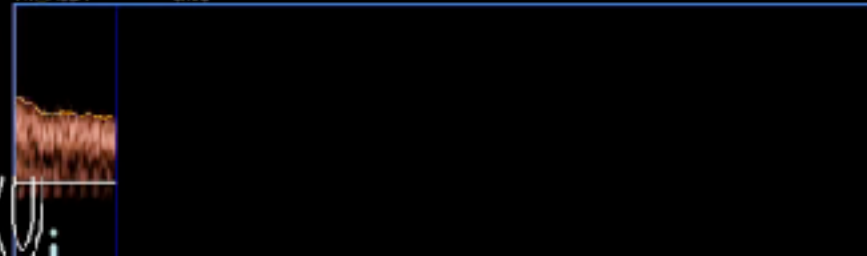
MI:1.4
11L4
diffT0.0
15 fps
Cscan
G:92
DR:80
A:6
P:1
1.9cm

ECA

Vmax
Ved
PI
MI
SID
Vmin
Vm_peak
Vm_mean

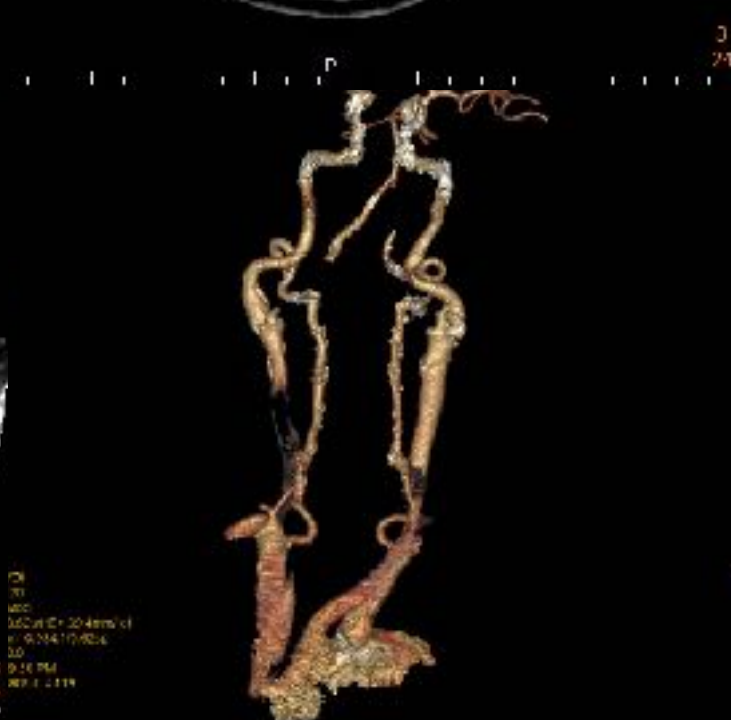
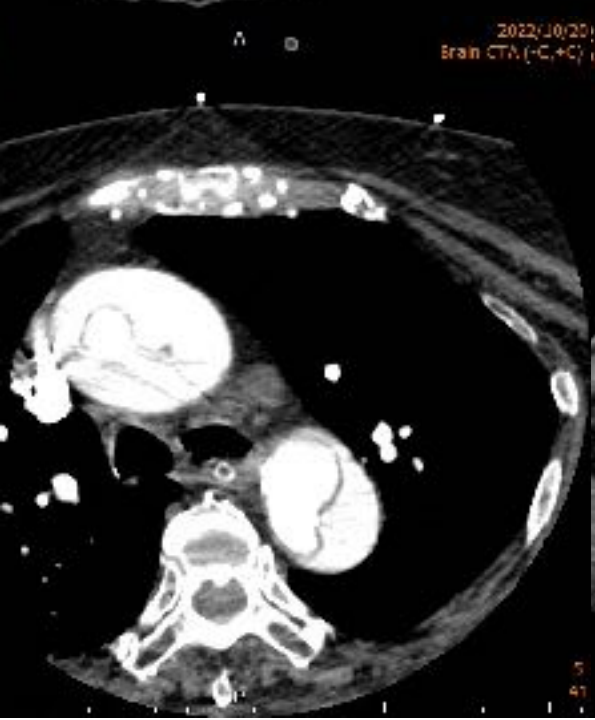
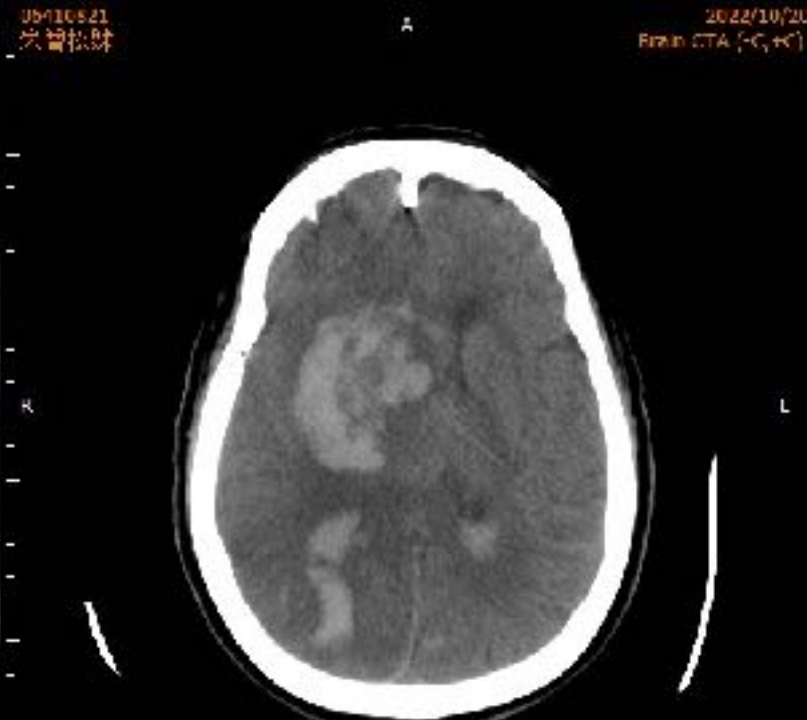
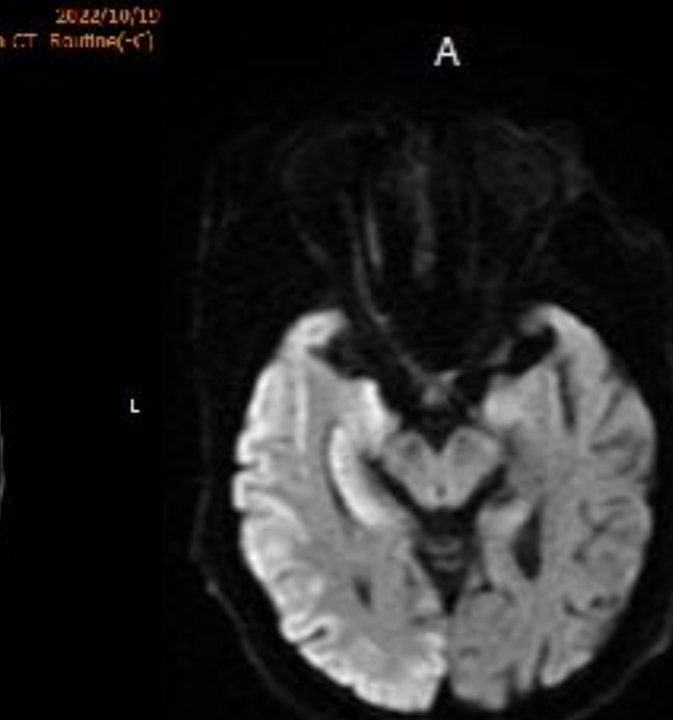


MI:1.4
11L4
diffT0.0
15 fps
Cscan
G:92
DR:80
A:6
P:1
1.9cm

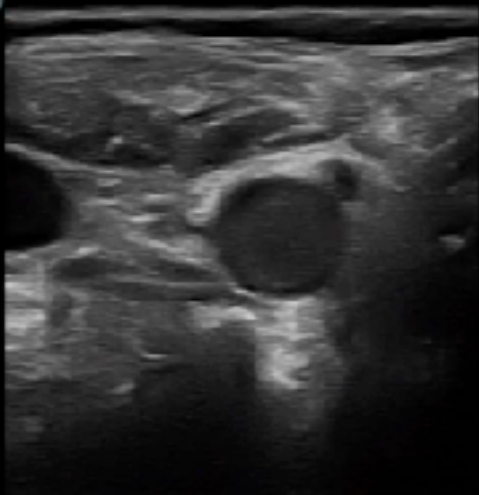


85F, AMS, L weak, eye to R

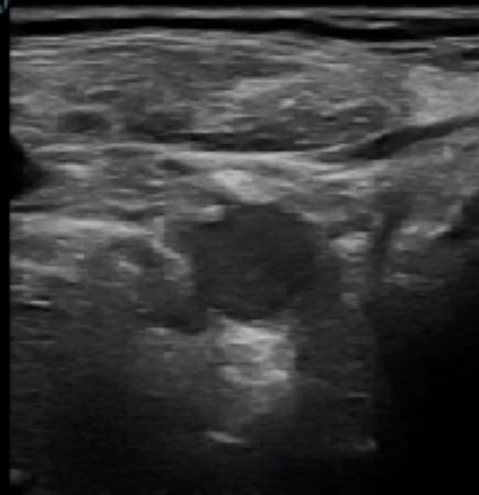




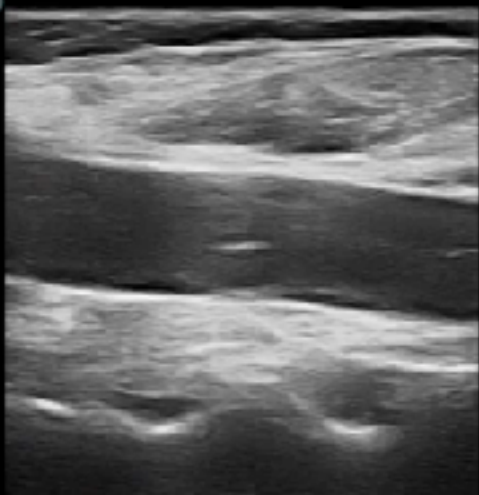
CT
100
152mCi 30-40ml of
i. 9/14/10/2024
10
0.16 mCi
REF: 1114



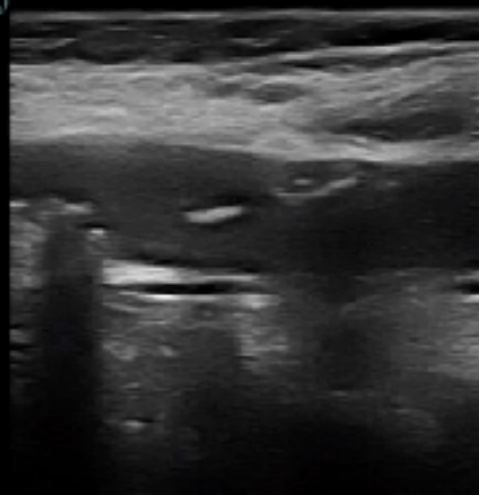
T10
 0.01
 T16
 0.01
 M1
 2+3
 Preset
 cm, 5s
 T19
 15.00
 Depth
 40.00
 Focus
 M1
 NRE
 2.001



T10
 0.01
 T16
 0.01
 M1
 2+3
 Preset
 cm, 5s
 T19
 15.00
 Depth
 40.00
 Focus
 M1
 NRE
 2.001



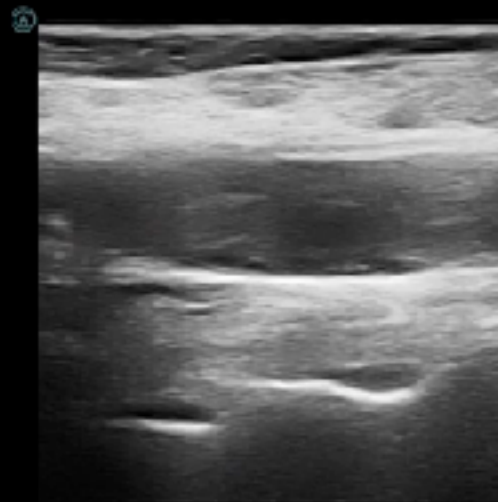
T10
 0.01
 T16
 0.01
 M1
 2+3
 Preset
 cm, 5s
 T19
 15.00
 Depth
 40.00
 Focus
 M1
 NRE
 2.001



T10
 15.00
 Depth
 40.00
 Focus
 M1
 NRE
 2.001



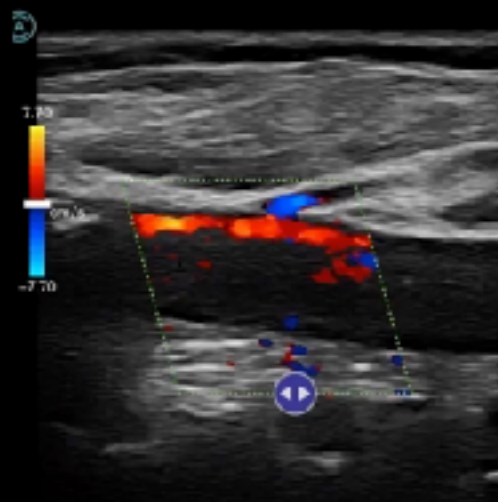
6cm, 6
171
15.00
100%
0.7 10
Focus
M
RF
3.00



6cm, 6
171
15.00
100%
0.7 10
Focus
M
RF
3.00

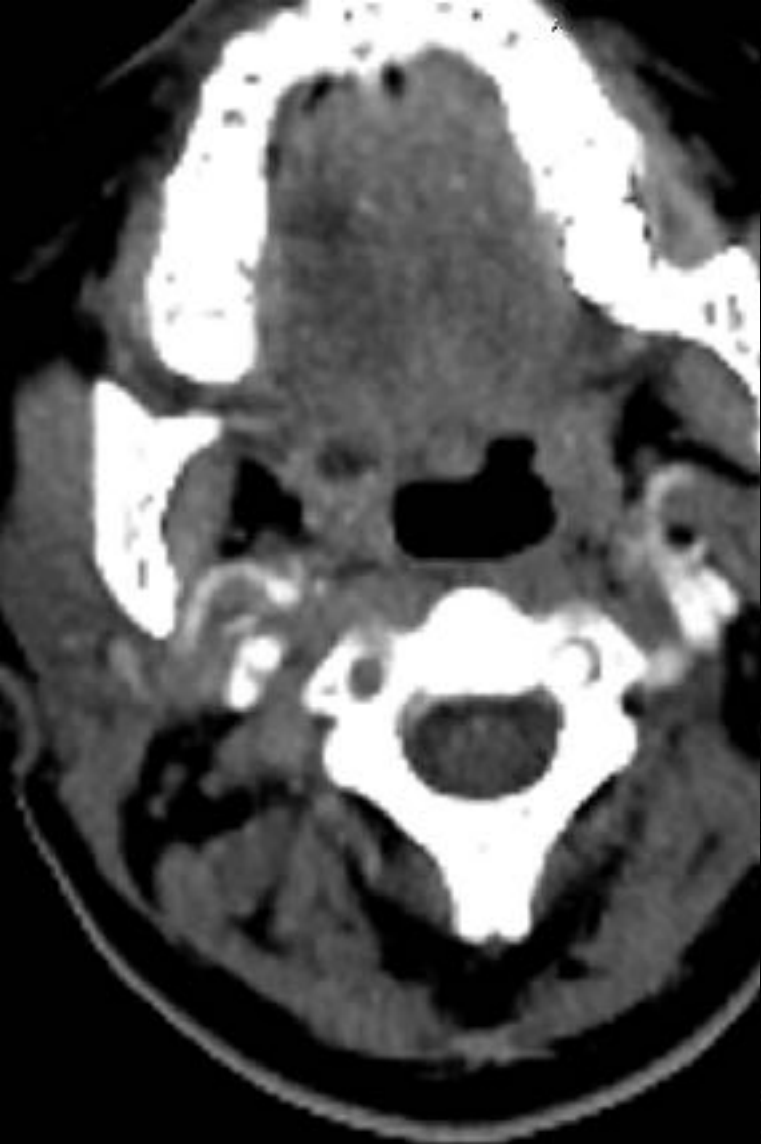


710
3.31
710
3.31
M
0.51
15.00
100%
0.7 10
Focus
M
RF
1.30



710
3.31
710
3.31
M
0.50
15.00
100%
0.7 10
Focus
M
RF
1.30

**44F, persistent dizziness
(L hand weak & neck pain 1d)**



M7

B1

FH11.0 / D3.7

G50 / FR26

IP5 / DR127

C

F4.4 / G59

IP5 / WF609

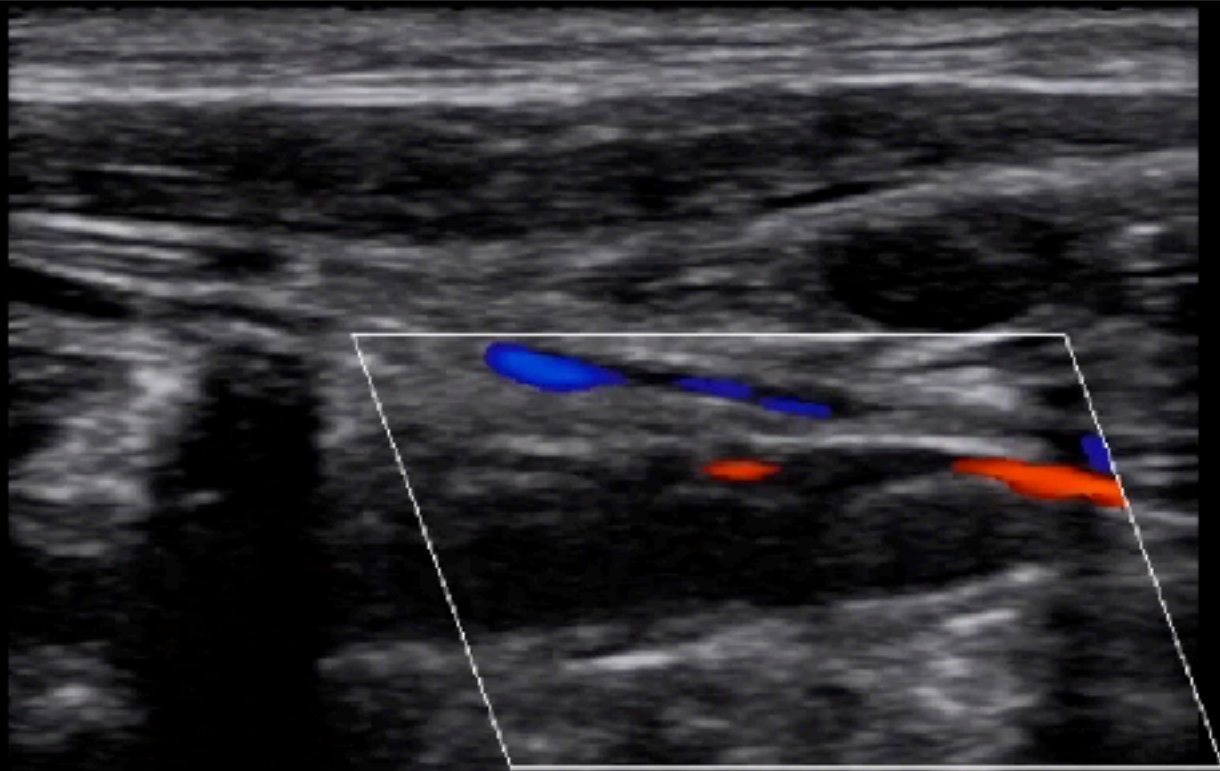
PRF2.7k

23.5



-23.5

M



1

2

3



M7

31

FH11.0 / D3.7

S50 / FR26

P5 / DR127

≥

4.4 / G59

P5 / WF609

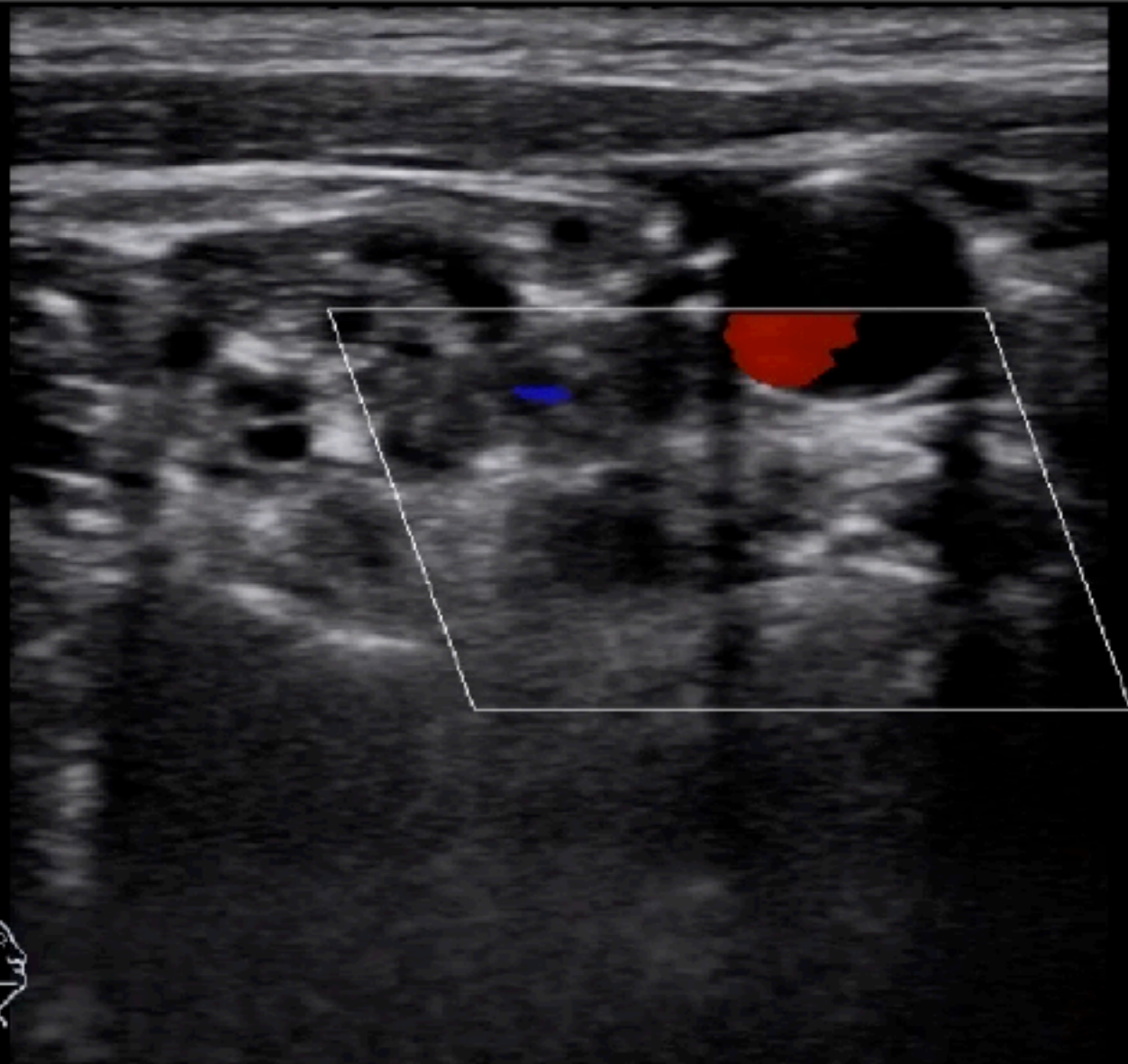
PRF2.7k

23.5



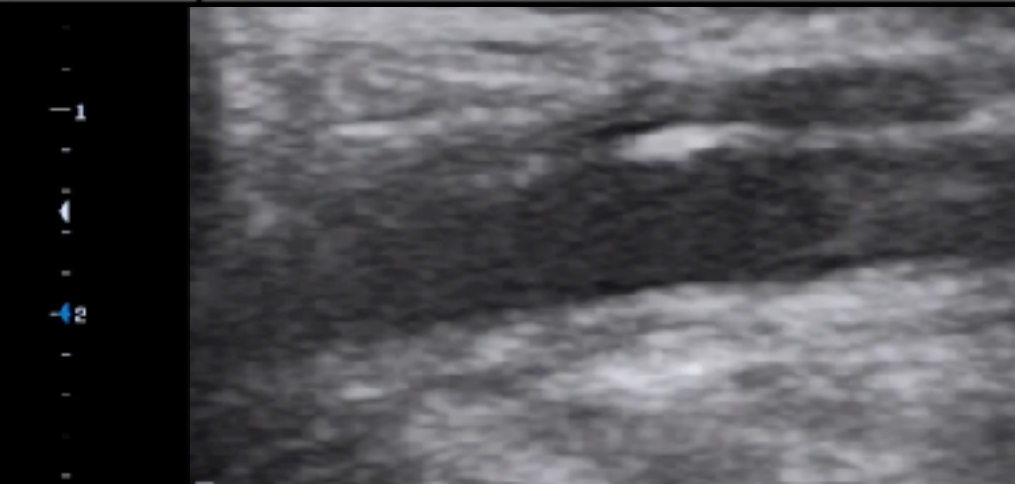
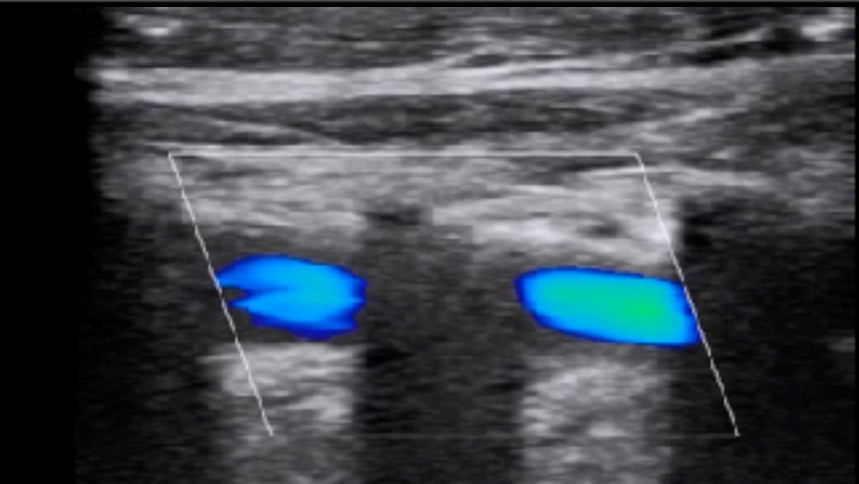
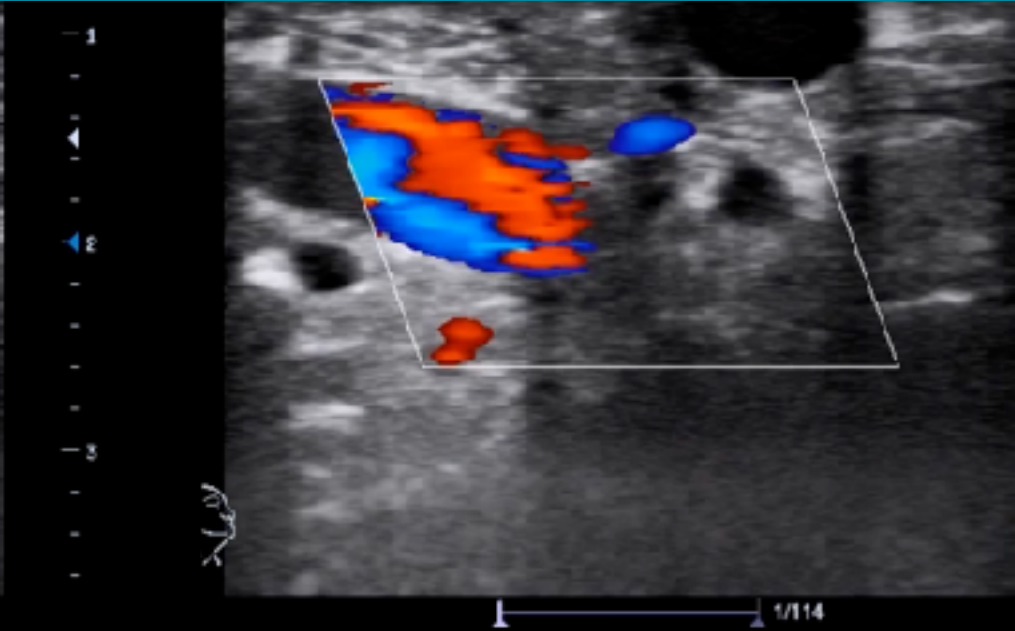
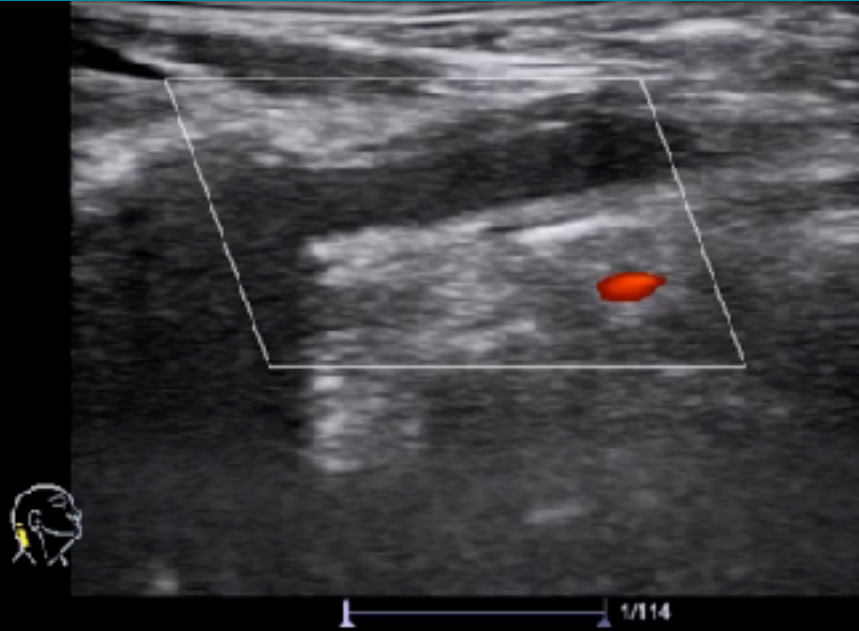
-23.5

M



176

VA



VA dissection

