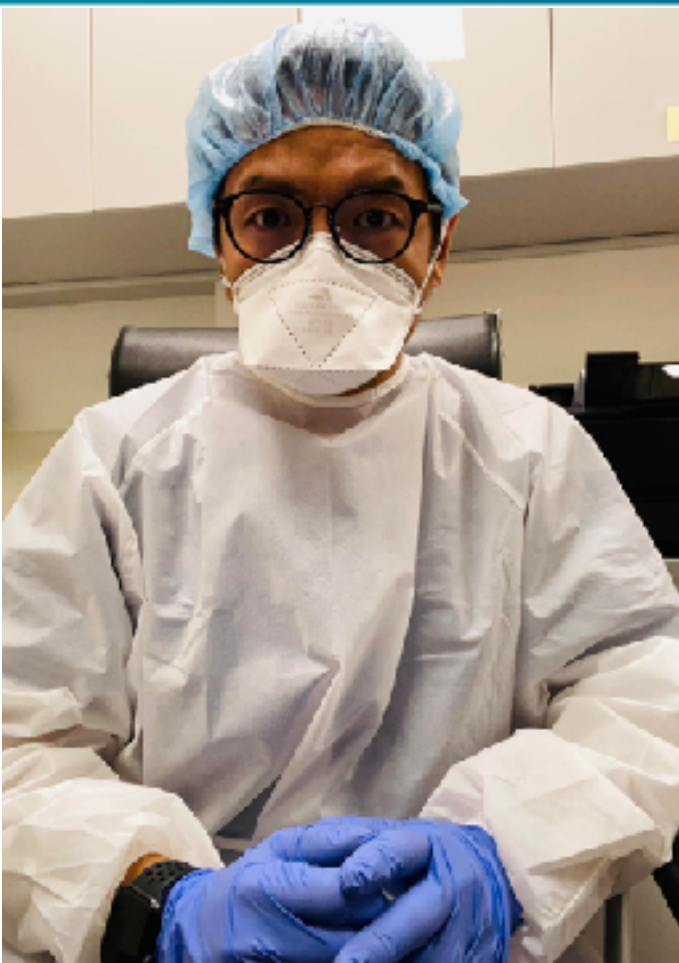




衛生福利部雙和醫院  
(委託臺北醫學大學興建經營)  
Taipei Medical University · Shuang Ho Hospital,  
Ministry of Health and Welfare



# POCUS Training Program



陳國智醫師

雙和醫院 急診醫學科



**LE joint effusion**

01/07

**Airway**

01/14

**Needling**

01/21

**VExUS protocol**

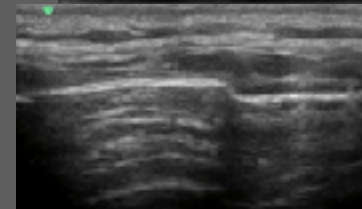
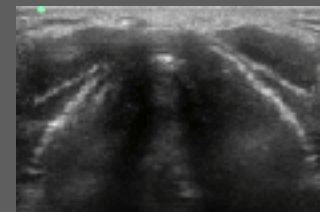
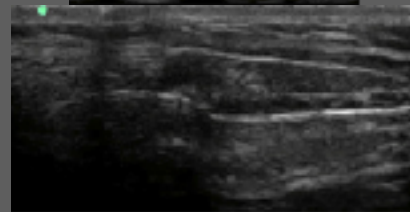
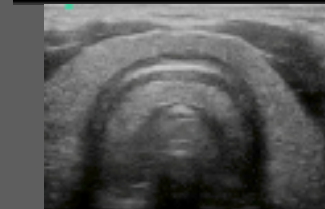
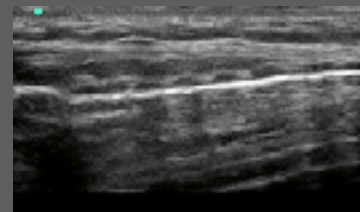
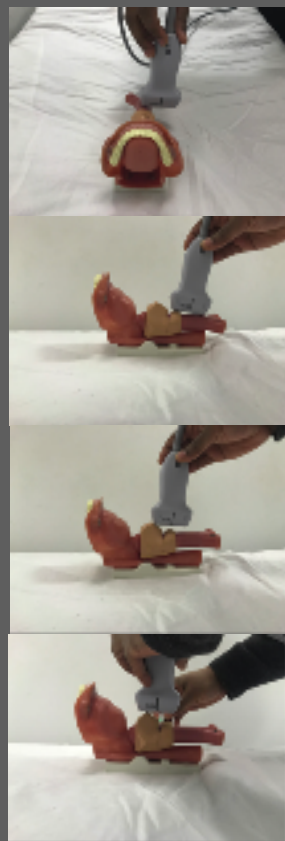
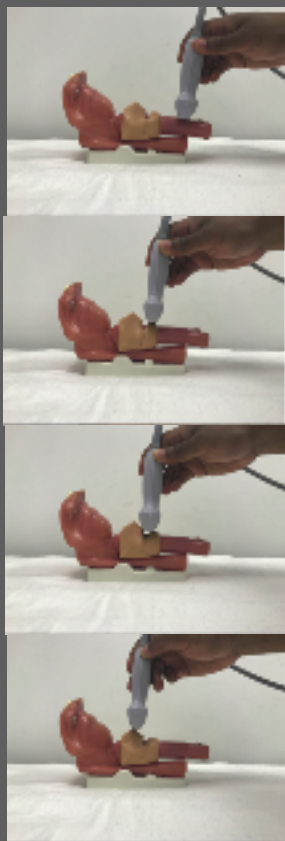
01/28

# 雙和急診POCUS訓練規劃



# AIRWAY MANAGEMENT

# Match !!



1

5

A

E

2

6

B

F

3

7

C

G

4

8

D

H

# How good you are ?

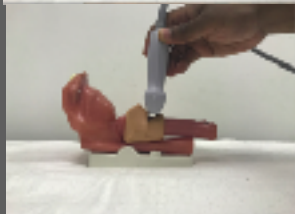
1



2



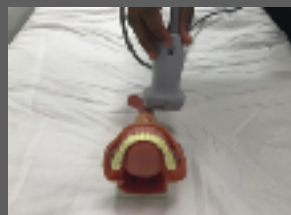
3



4



5



6



7



8



B



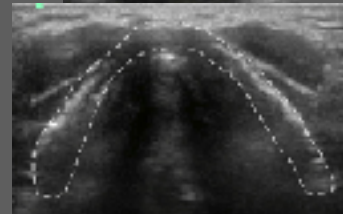
G



D



E



H



A



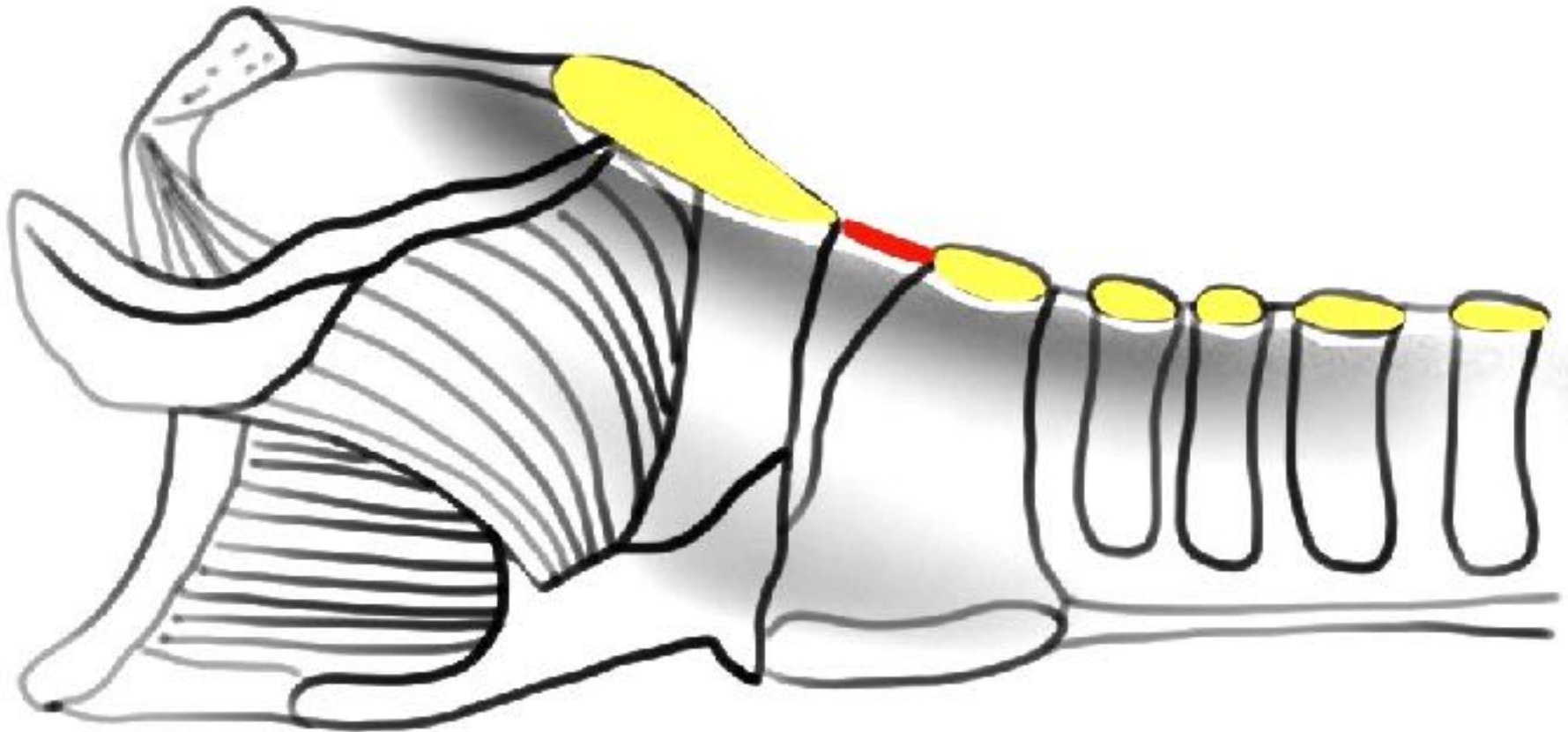
F



C



# Airway management





# Airway management

Anatomical structure examined	Clinical indications	Type of study*
Cricothyroid membrane and trachea	Pre-anesthetic airway evaluation to be prepared for emergency front of neck airway access <sup>6,8</sup>	Randomized-controlled trial, prospective cohort, narrative review
	For elective tracheostomy <sup>9</sup> and other kinds of access to the airway via the anterior neck <sup>1</sup>	Randomized-controlled trial, prospective cohort
Tracheal placement of endotracheal tube	Evaluation of the placement of a breathing tube, in trachea, main-stem bronchus or esophagus <sup>10,11</sup>	Randomized-controlled trial, prospective cohort and observational, systematic review, meta-analysis
Trachea	Predicting the optimal size of endotracheal, double-lumen, and tracheostomy-tubes <sup>12-14</sup>	Randomized-controlled trial, prospective cohort and observational, case series
Vocal cords	Identification of vocal cord palsy and other pathology <sup>15,16</sup>	Prospective cohort and observational

**Airway**

**Breathing**

**Circulation**

**Diaphragm**

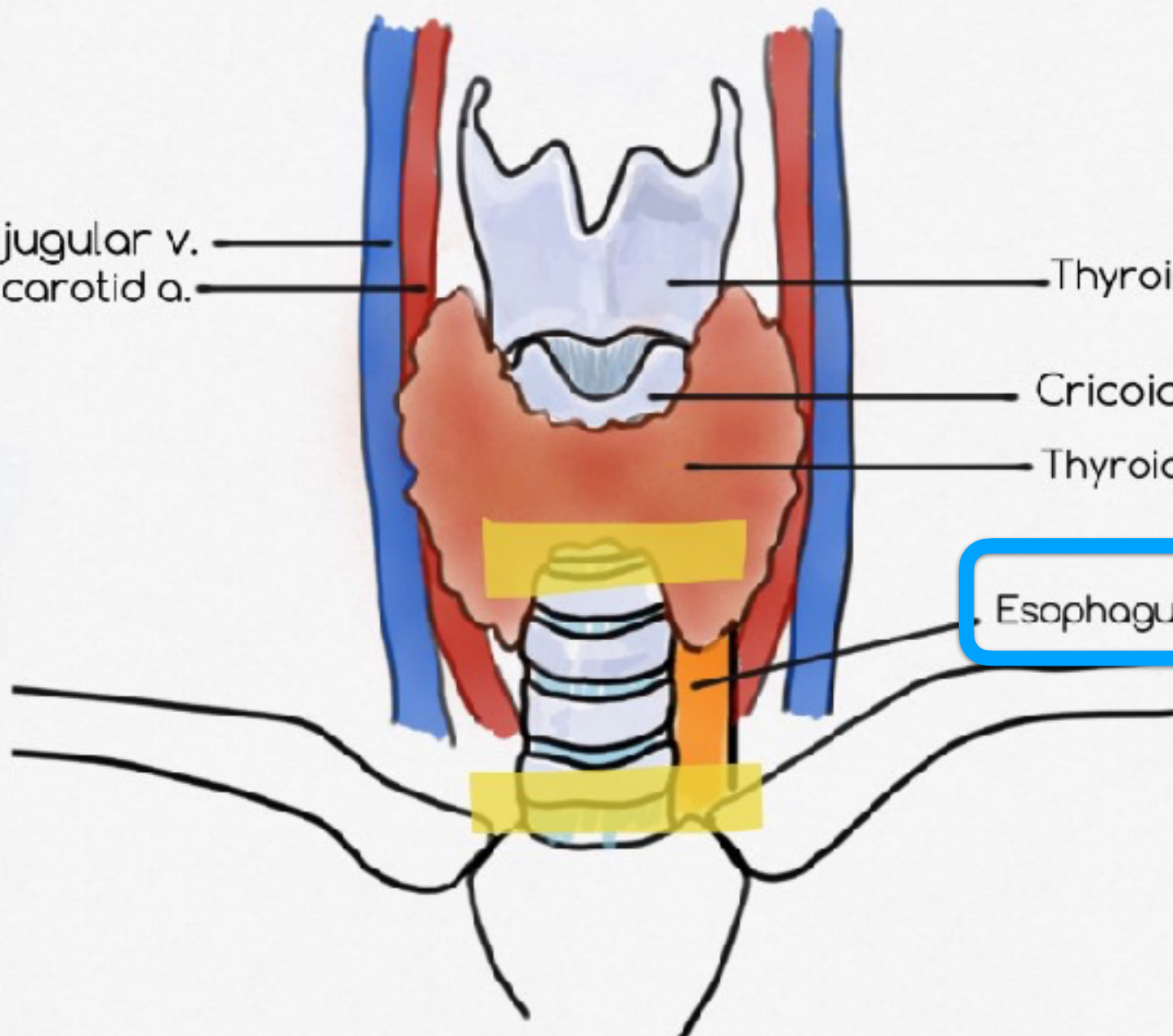
**Esophagus**

**Fasting**





Internal jugular v.  
Common carotid a.

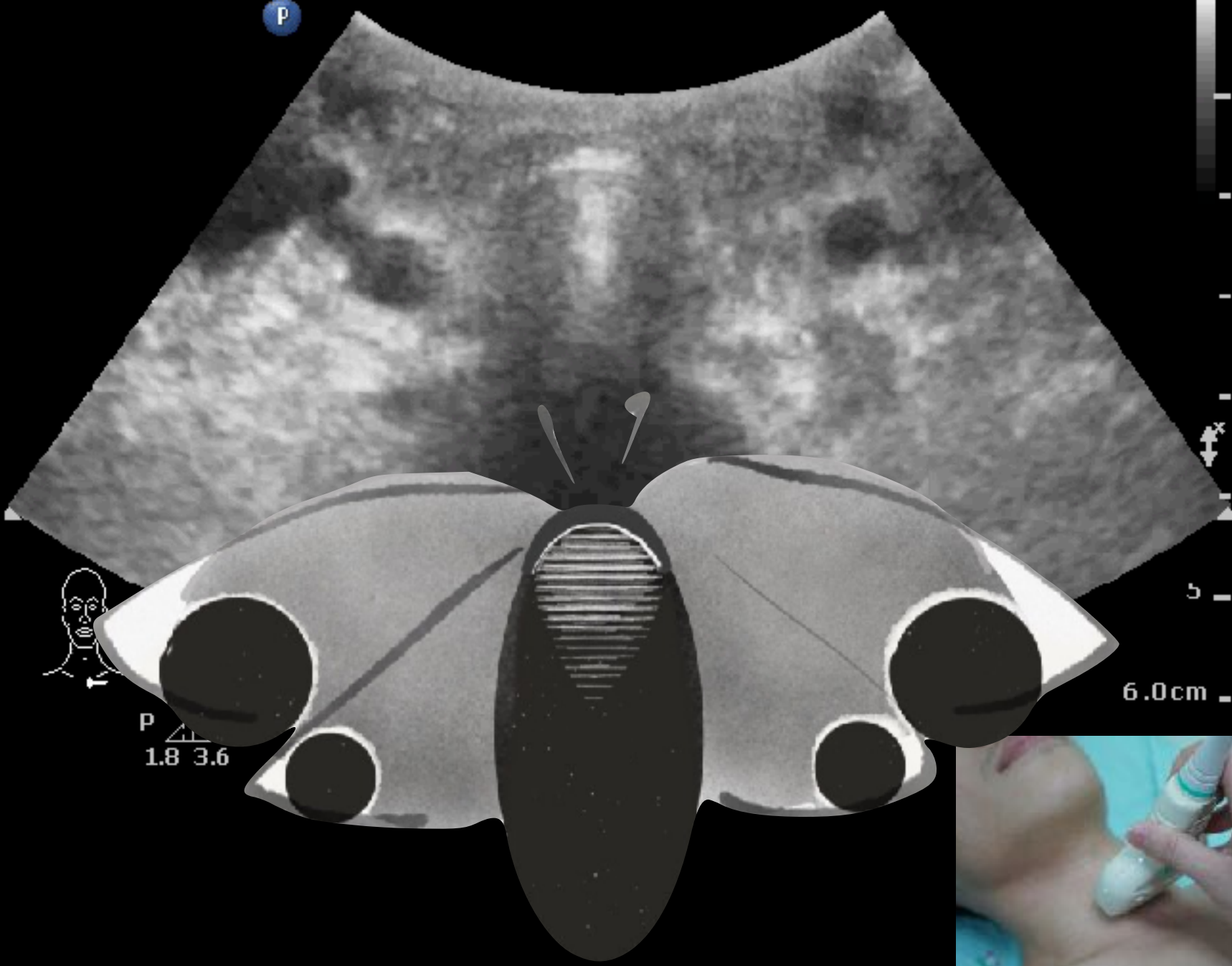


Thyroid cartilage

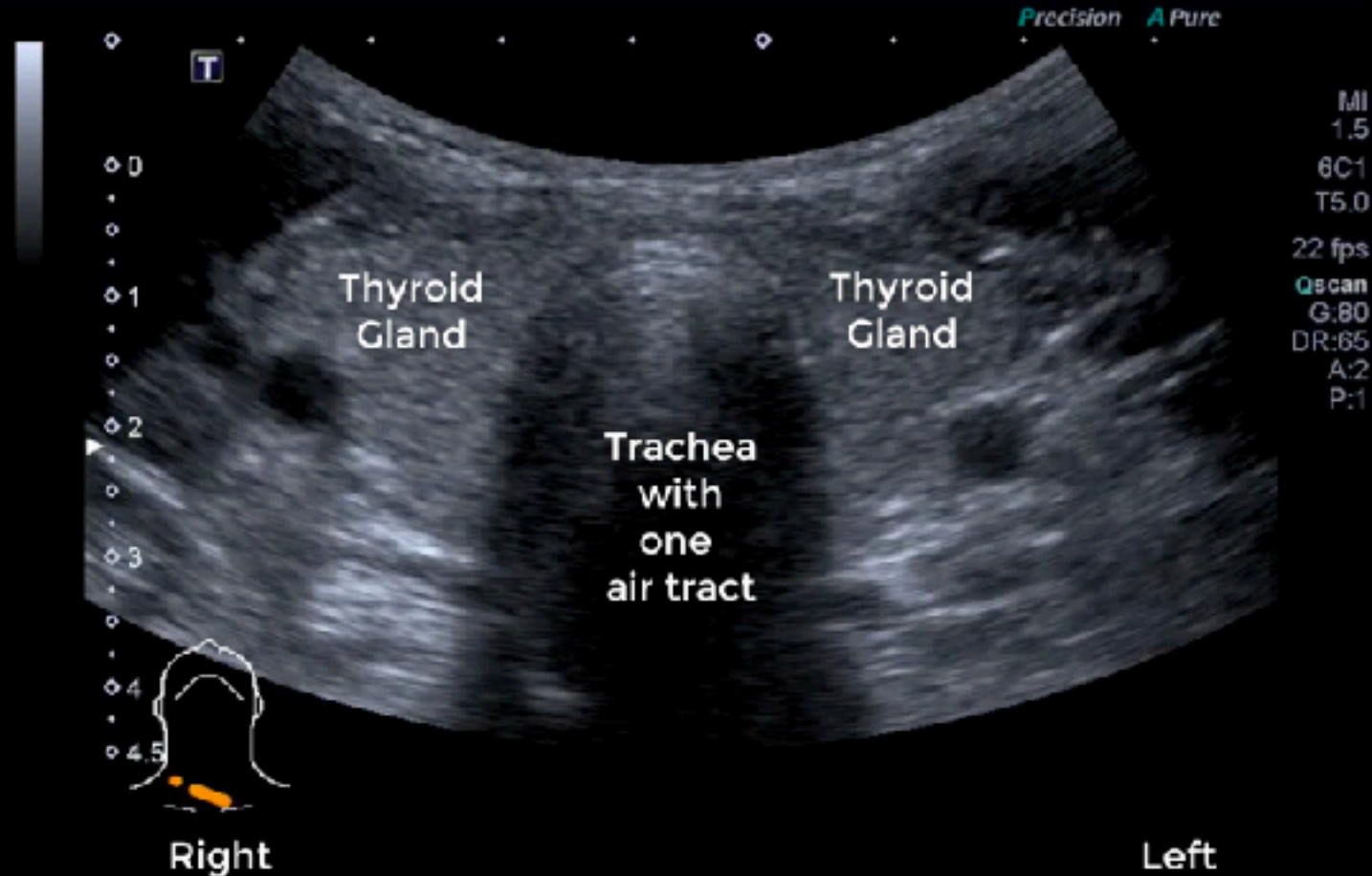
Cricoid cartilage

Thyroid gland

Esophagus



# Airway -curve (one tract)



# Airway - linear (one tract)



TIS: 0.01, MI: 0.45, Soft Tissue

8



# Airway - linear (compression)



TIS: 0.01, MI: 0.45, Soft Tissue

B





# Airway - linear

L3-12A / SmallParts / FPS40 / MI0.96 / TIs0.1 / 01-09-2016 10:30:16 AM  
2D G53/DR58/FA4/P90/2.7/Frq Pen./3.5cm



SAMSUNG  
RS80A





# Airway scanning (intubation)

Small part1  
L12-3  
37 Hz  
4.5cm

2D  
HGen  
Gn 100  
C 56  
3/3/4

P

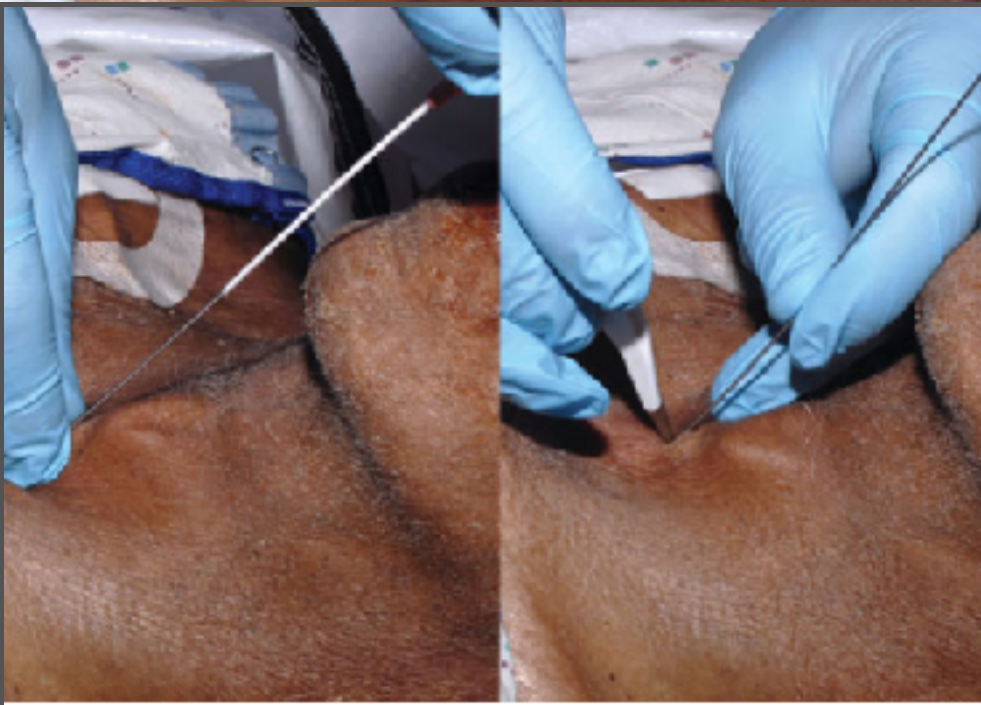


Right

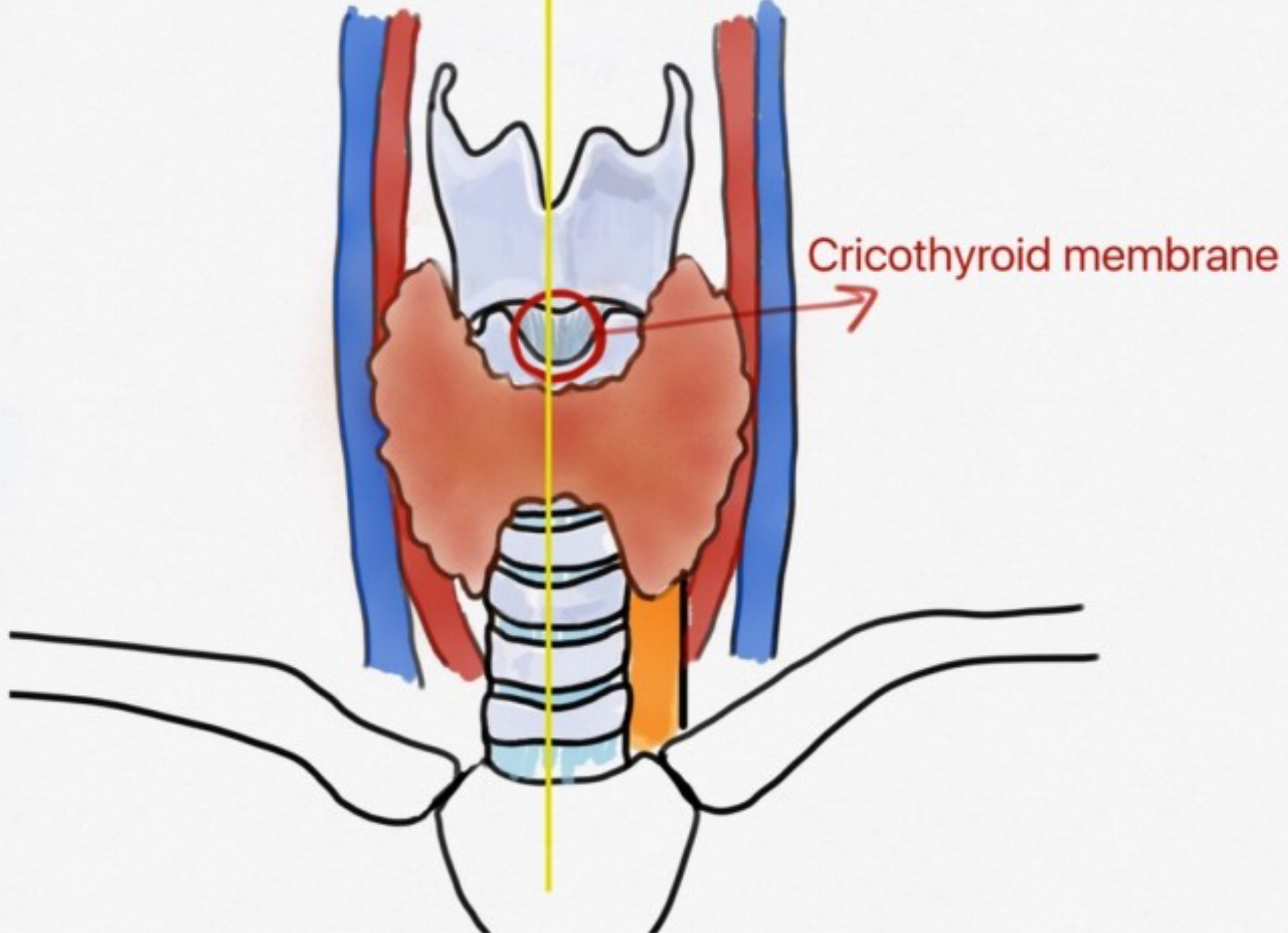
Left



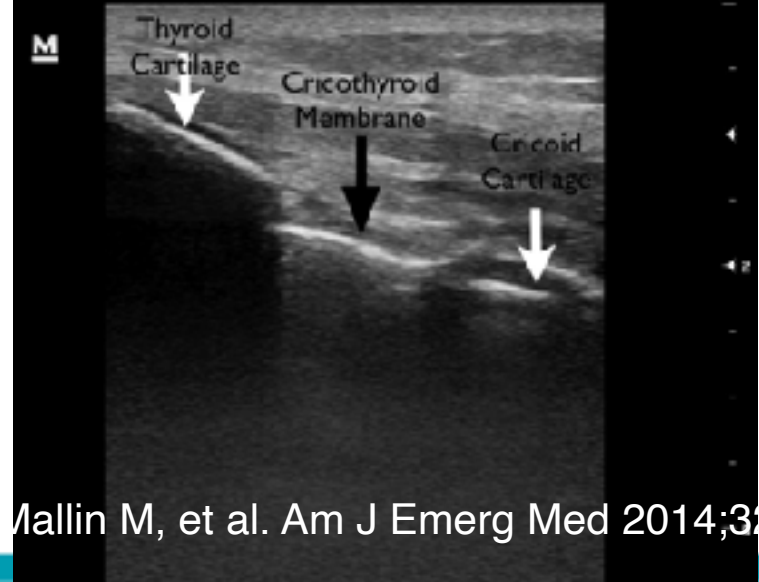
# Cricothyrotomy







# US marking for CTM before intubation is accurate

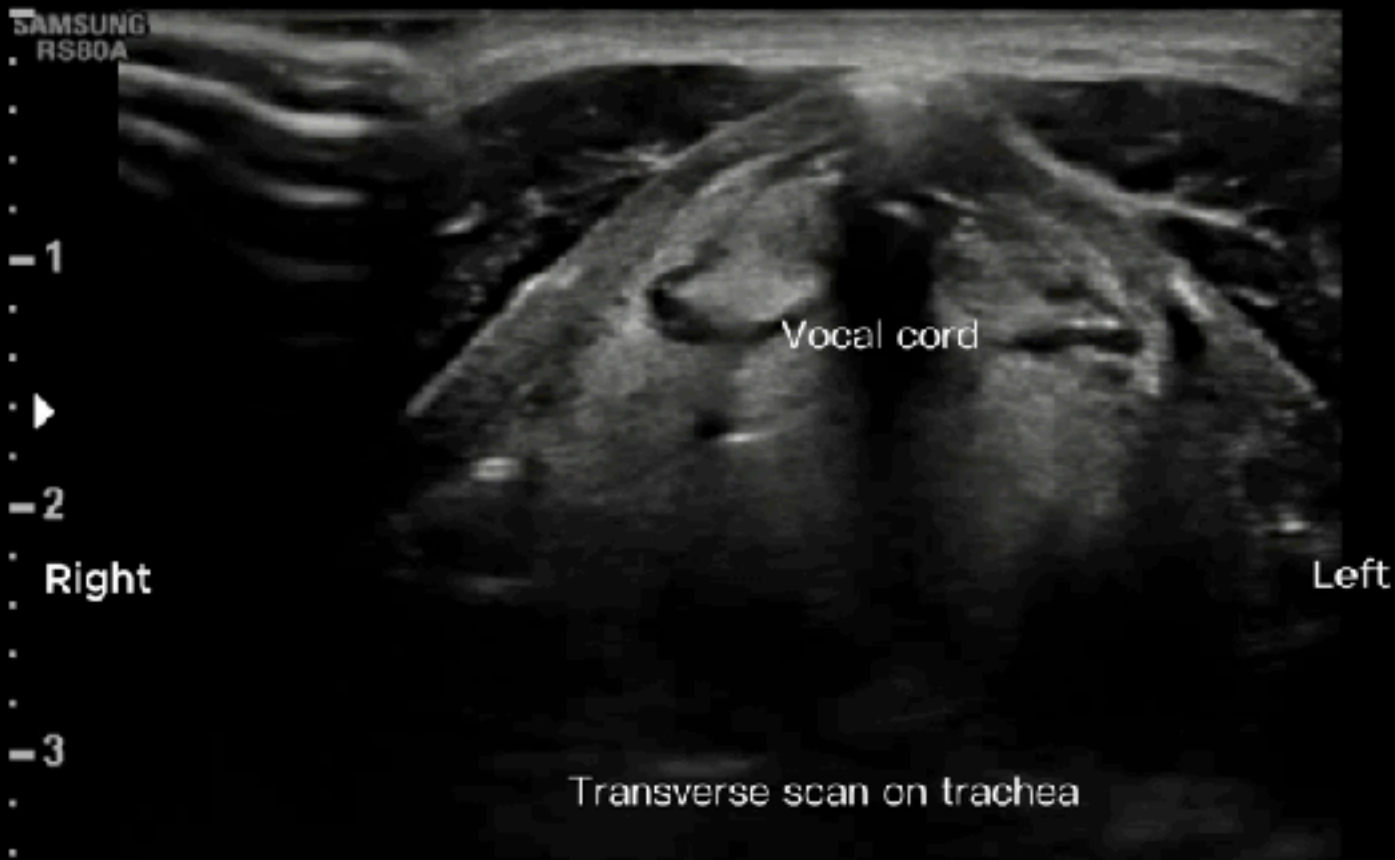




# Cricothyroid membrane 定位

L3-12A / SmallParts / FPS40 / MI0.96 / TI0.1 / 01-09-2016 10:29:39 AM

2D G53/DR58/FA4/P90/2.7/Frq Pen./3.5cm



# Esophageal intubation (2 tracts)



Superficial P  
L12-3  
46 Hz  
3.0cm  
  
2D  
Res  
Gn 60  
C 56  
3 / 2 / 1

Tract 1  
(Trachea)

Tract 2  
(ET tube in  
Esophagus)



G  
P R  
3.0 12.0

Right

Left

3.0cm

# Esophageal intubation (removed)



PHILIPS Temporary ID-20160605001143

MI 0.5 6/5/2016

16-06-05-001143

SKH ER

TIS 0.1 12:30:52 AM

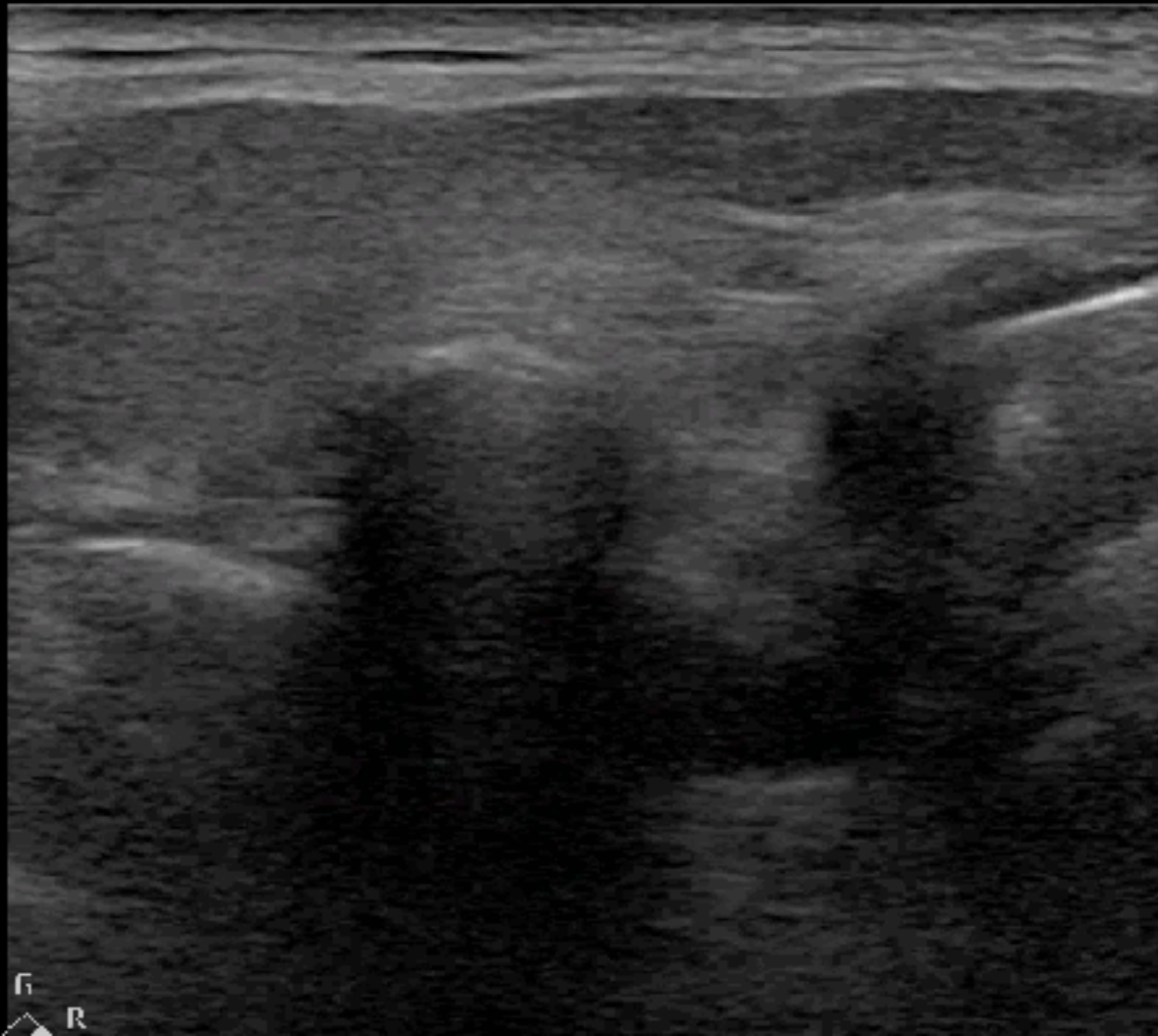
Superficial

L12-3  
46 Hz  
3.5cm

2D

Res  
Gn 60  
C. 56  
3/2/1

P



P R

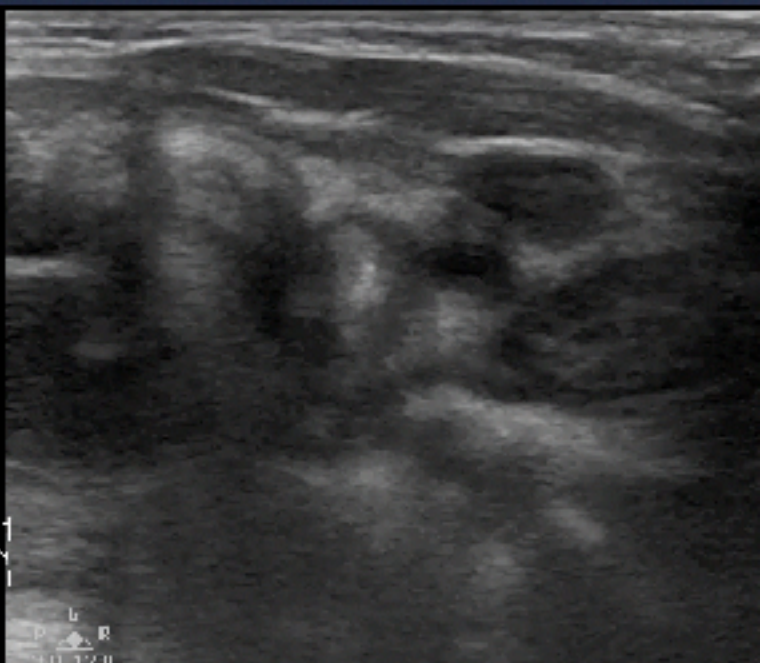


# 4 month girl, SpO2 70%

TemporaryID 20151030134802 MI 0.8 10/30/2015 PHILIPS TemporaryID 20151030134802 MI 0.8 10/30/2015  
15-10-30-13 1802 SKI1 CR TIS 0.1 1:46:17 PM 15-10-30-13 1802 SKI1 CR TIS 0.1 1:50:00 PM



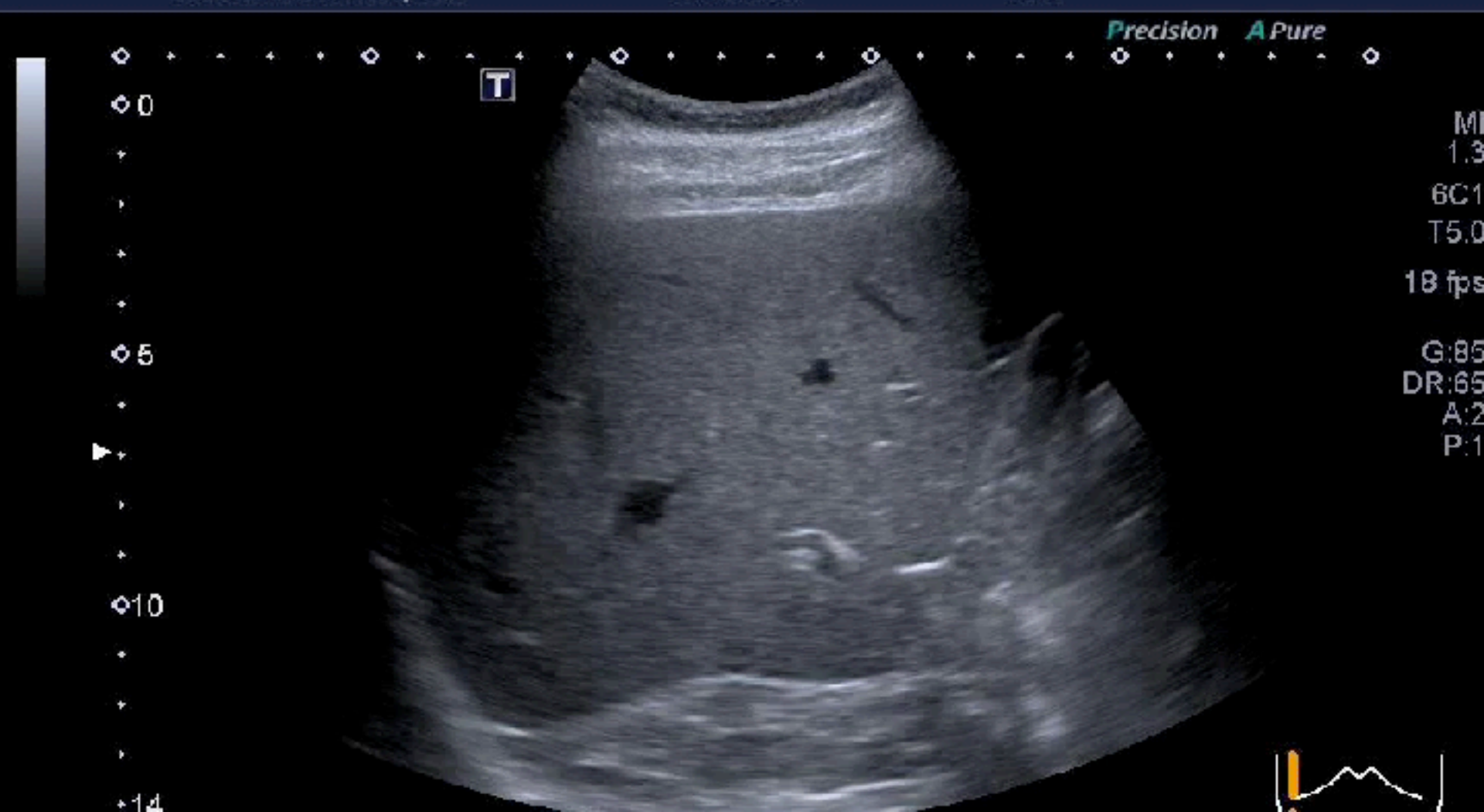
Superficial P  
L12 3  
31 H7  
3.0cm  
2D  
Gen  
Gn 1011  
C 52  
4/3/2  
1  
2  
1.0cm



# Curtain sign & Diaphragm movement



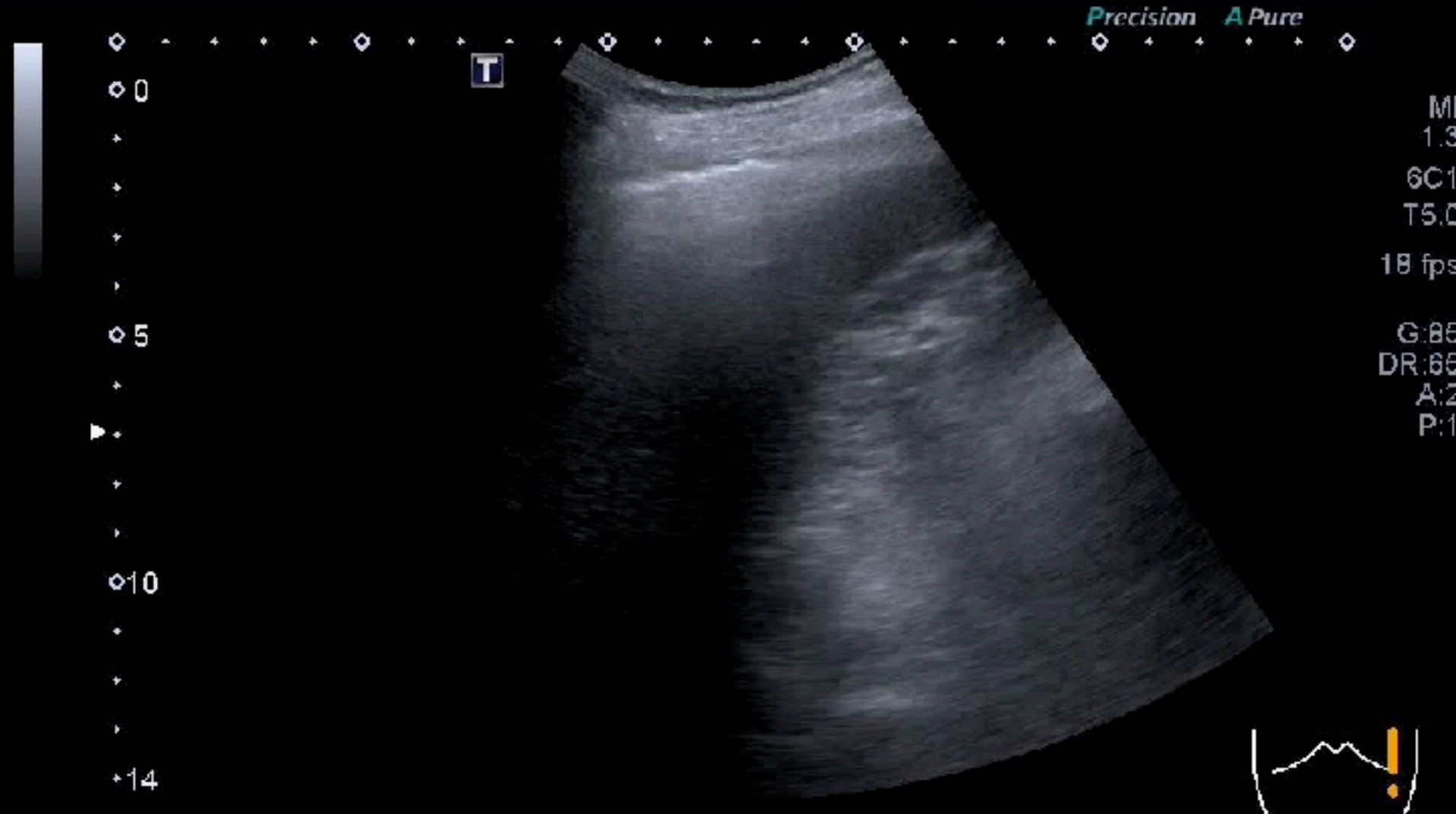
TOSHIBA Xario 200 West Garden Hospital Abdomen 3158 2017/05/09 9:17:06 AM



# Greatest motion



TOSHIBA Xario 200 West Garden Hospital Abdomen 3158 2017/05/09 9:17:41 AM





# Respiratory drive



TOSHIBA

Karlo 200

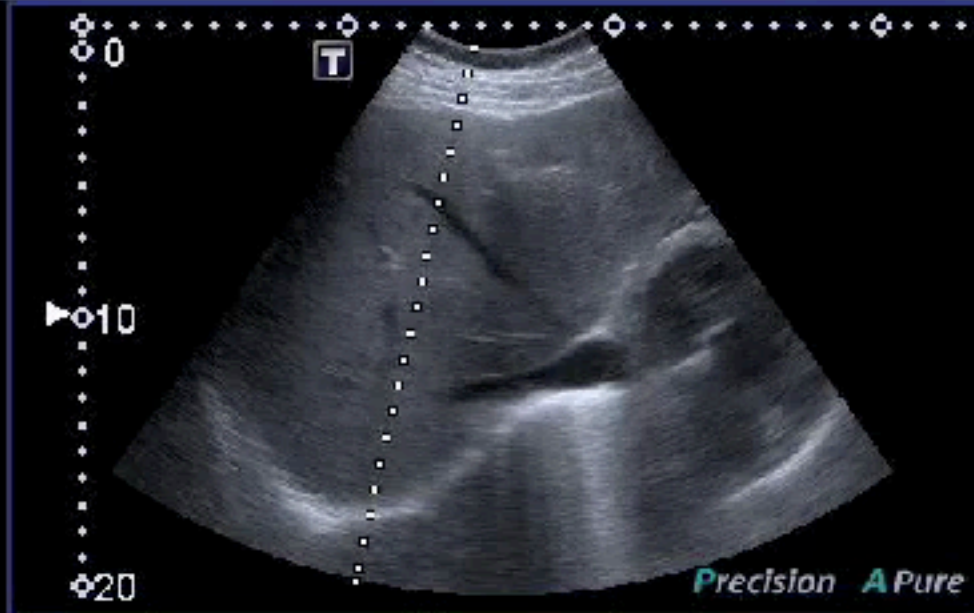
West Garden Hospital

Abdomen

3158

2017/05/09

9:20:39 AM



MI:1.3  
6C1  
T5.0  
11 fps  
G:85  
DR:65  
A:2  
P:1

**Diaphragm excursion**  
**Diaphragm velocity**



# Respiratory drive



TOSHIBA

Xario 200

West Garden Hospital

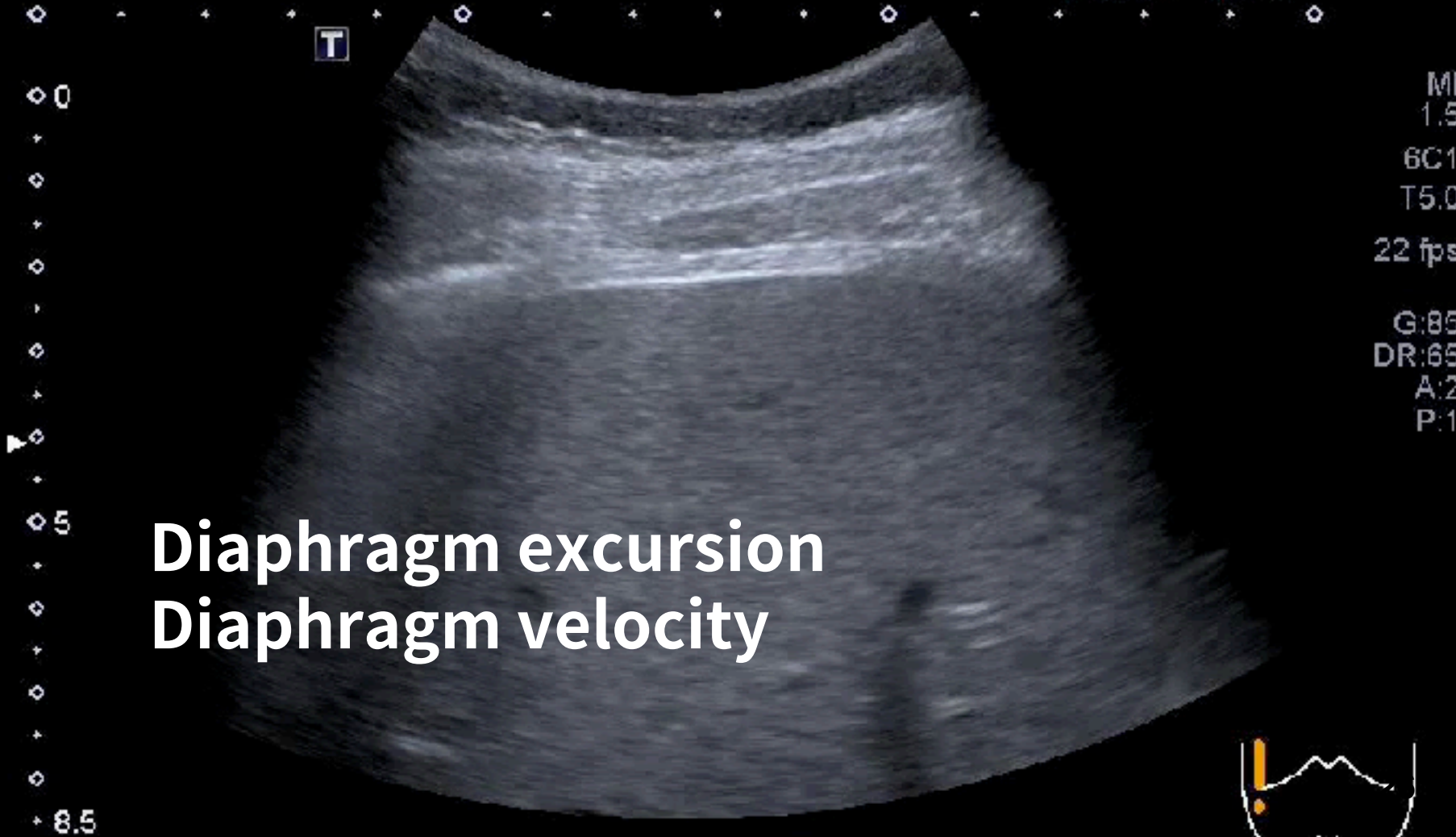
Abdomen

3158

2017/05/09

9:16:47 AM

Precision A Pure



Diaphragm excursion  
Diaphragm velocity

# PED & Thin



TOSHIBA

2017/05/27

Xario 200

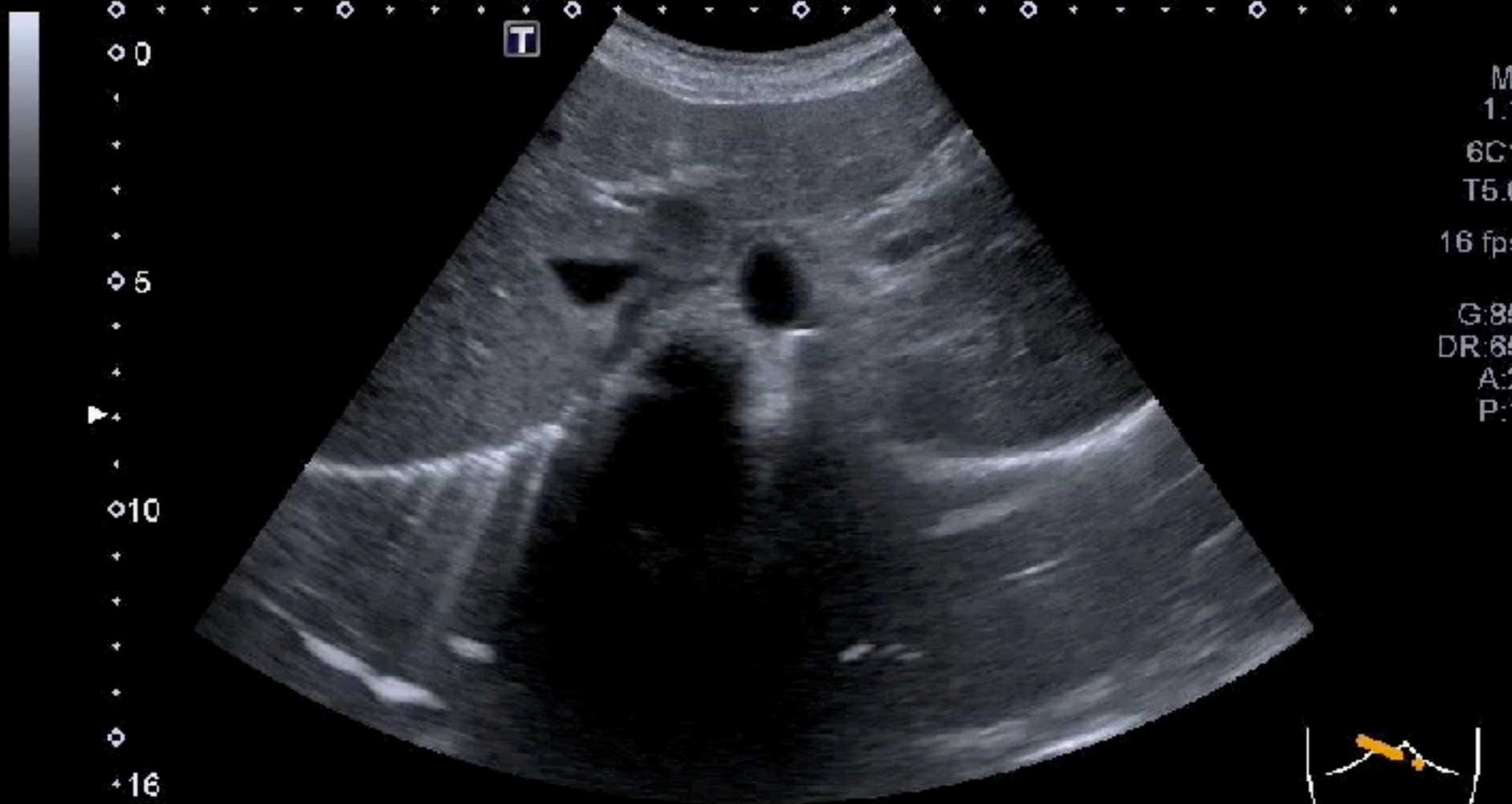
West Garden Hospital

Abdomen

3158

9:02:27 PM

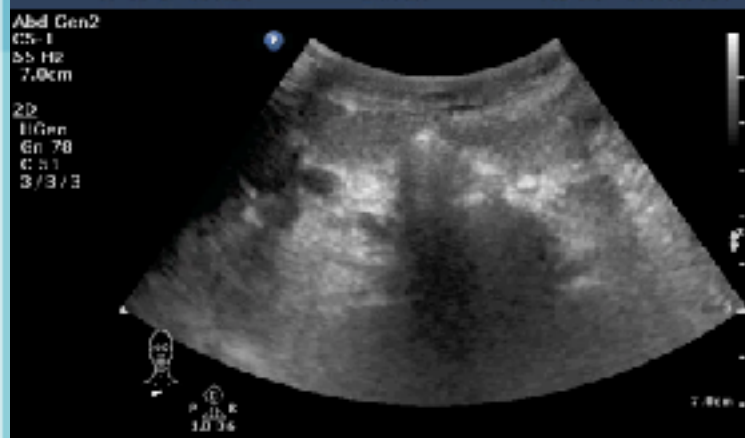
Precision A Pure



# Truth



PHILIPS Temporary ID: 20170607084121 ME L.0 6/7/2017  
 17-06-07-084121 SKH FR FR 0.1 8:49:17 AM



Emergency rapid sequence induction  
 endotracheal intubation

Preoxygenation

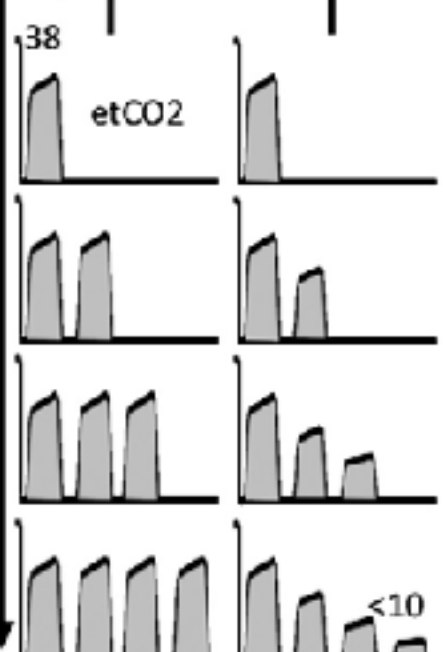
Intubation

Tracheal and Lung  
 Ultrasound

Capnometry  
 Capnography

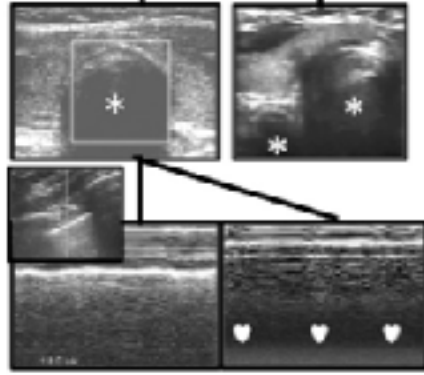
TIME  
 (Sec)

0  
 6  
 12  
 18  
 24



TIME  
 (Sec)

0  
 6  
 12  
 18  
 24



# TRUST



## Tracheal Rapid Ultrasound Saline Test confirming correct ET Depth in children

20160410190238

MT 0.5

4/10/2016

20160410190238

MT 0.5

-190238

SKH ER

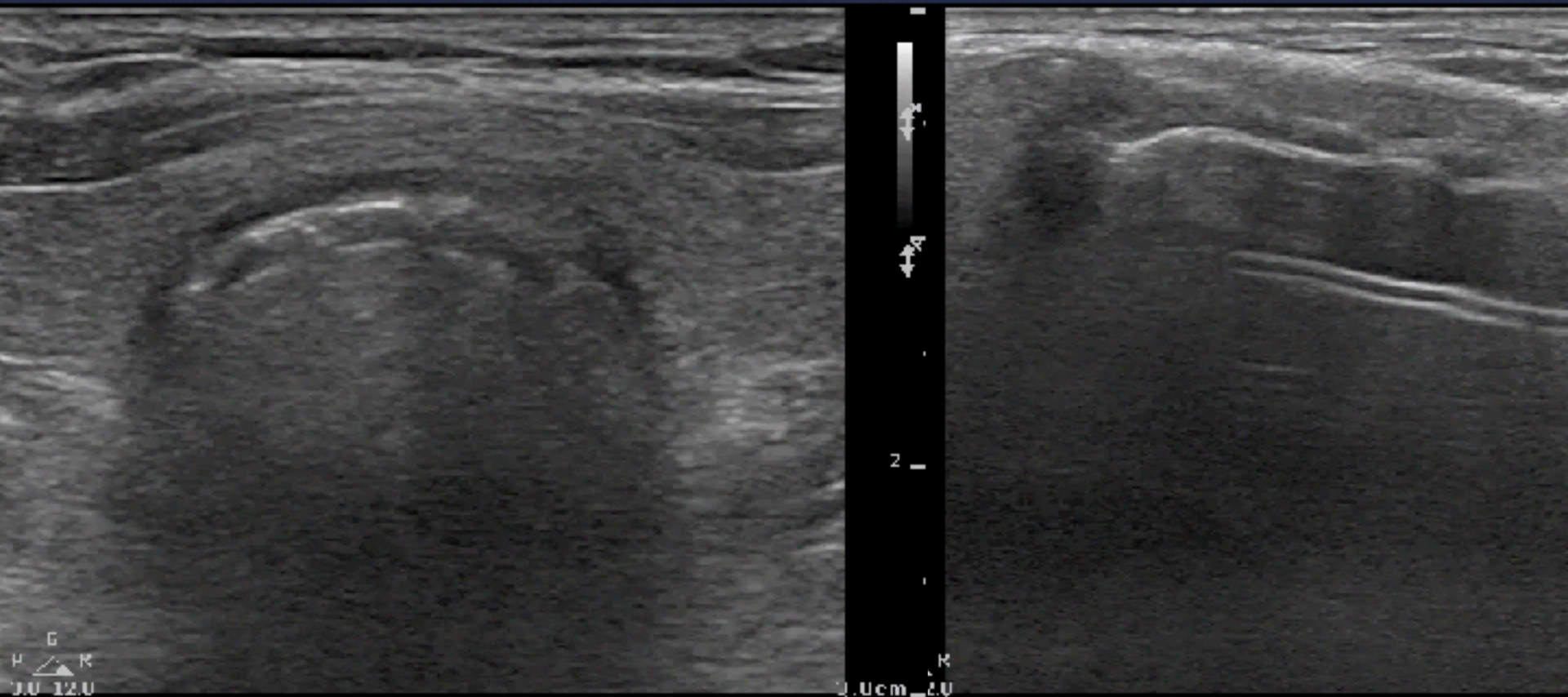
118 0.1

7:24:17 PM

238

SKH ER

118 0.1



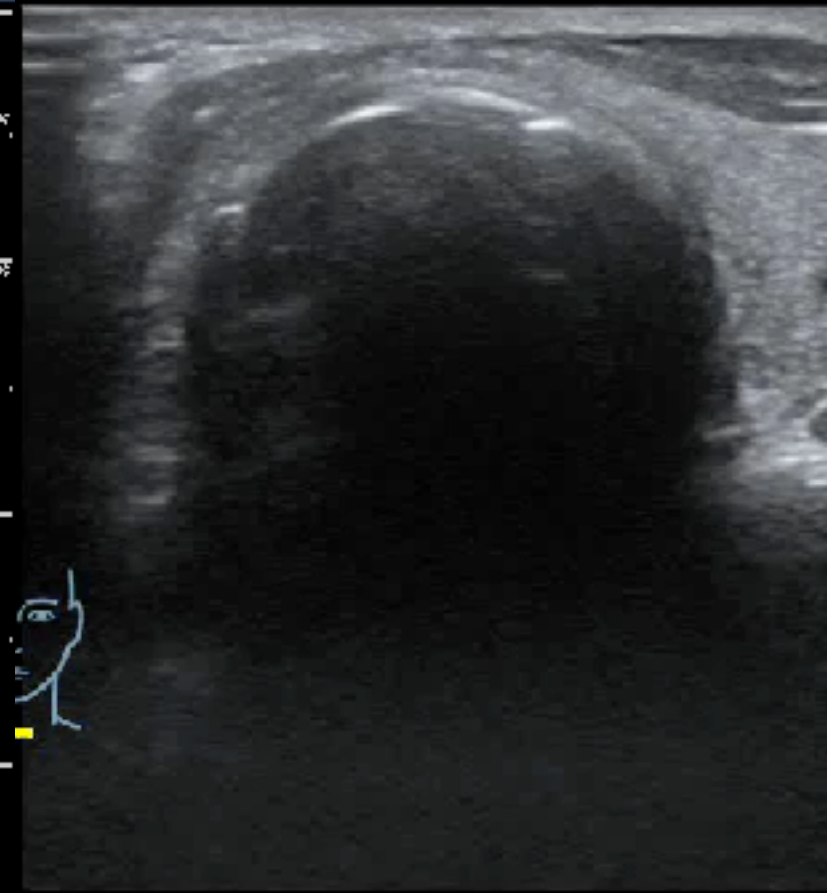
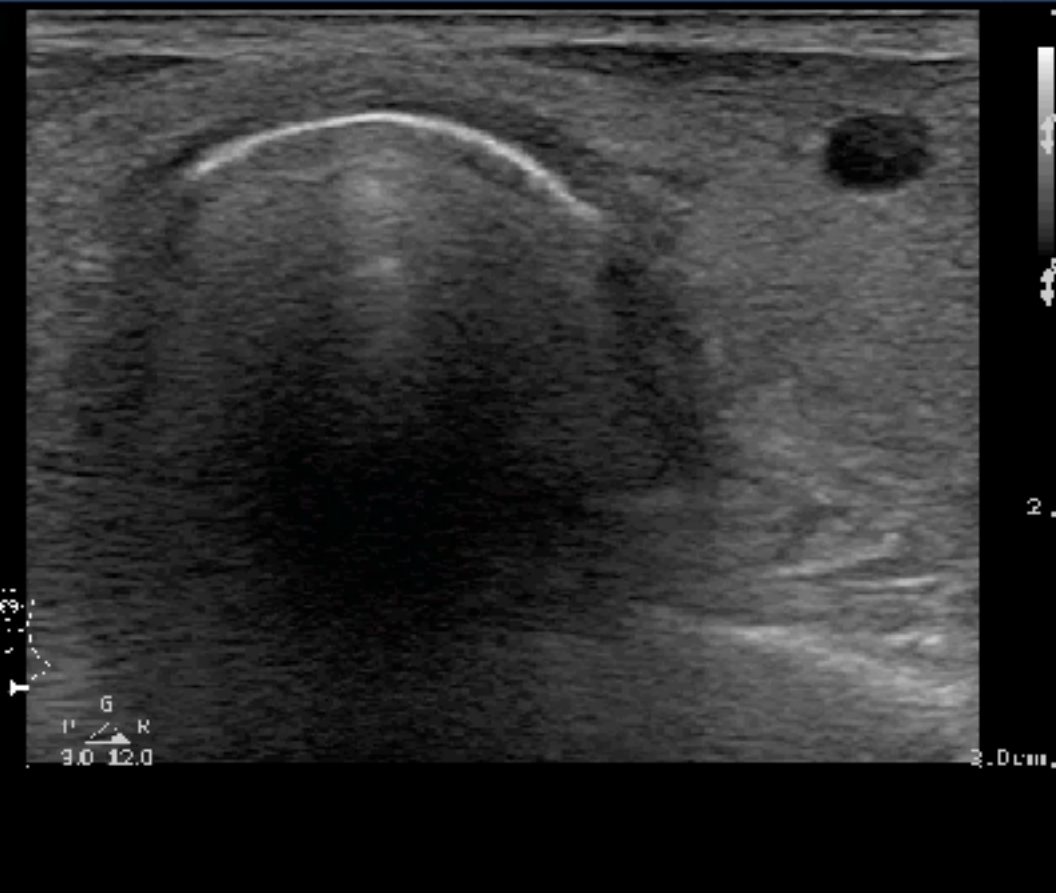
# Tracheal compression

## Direct visualization of ETT



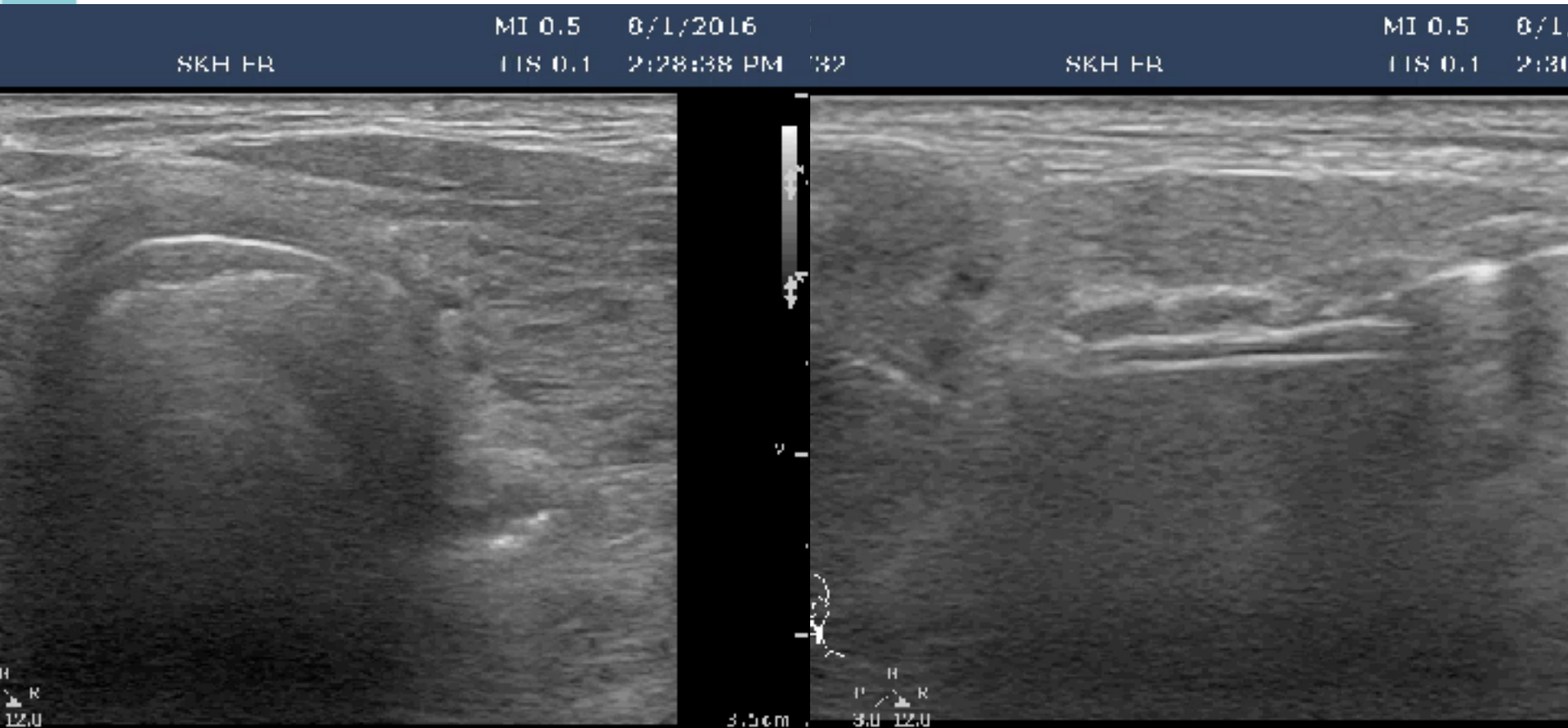
MI 0.5 11/21/2016  
TIS 0.1 1:39:10 AM

20160207-164506-34EA Superficial 07-02-2018 10:02:29



# Tracheal compression

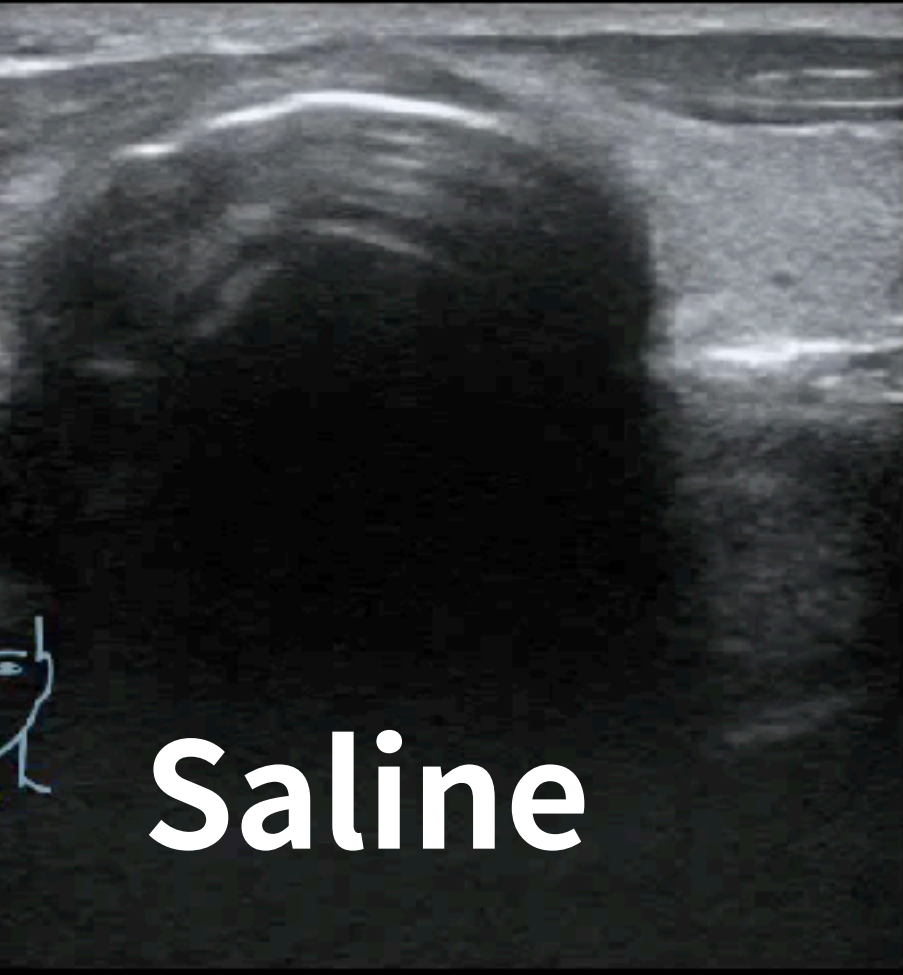
## Direct visualization of ETT





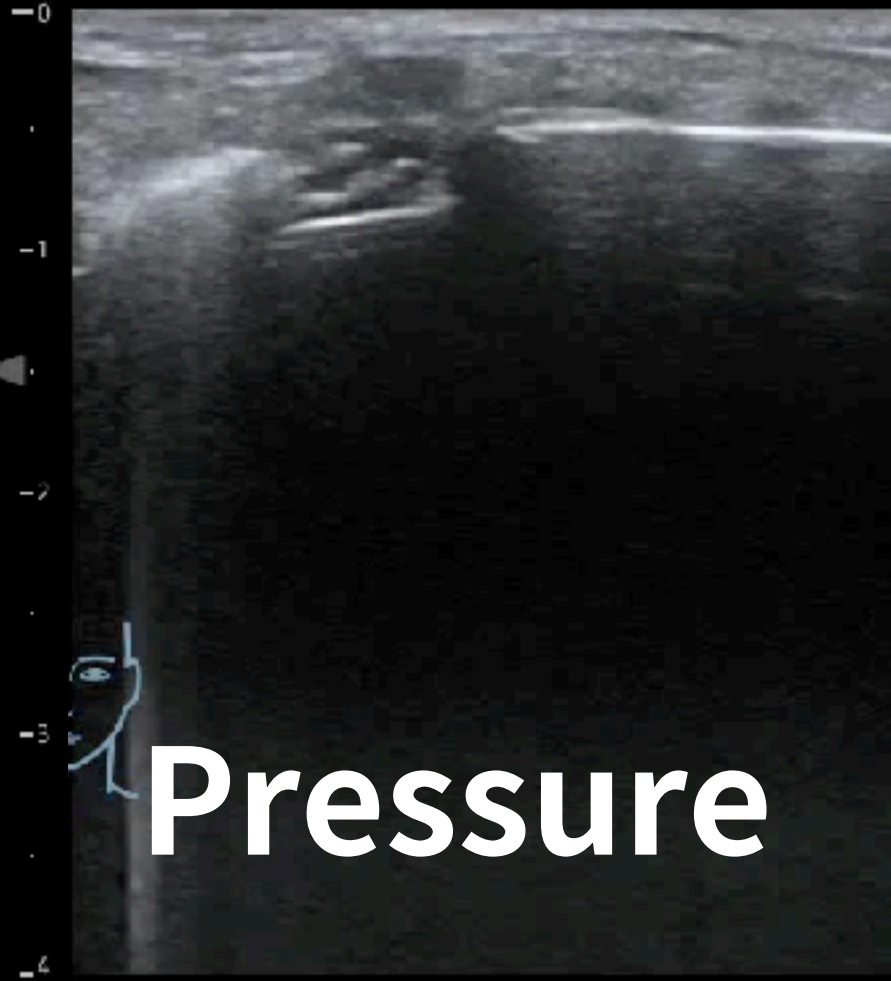
# True Tube Confirmation

0180207-164506-34EA Superficial 07-02-2018 10:02:57



Saline

20180207-164506-34EA Superficial 07-02-2018 10:03:51



Pressure

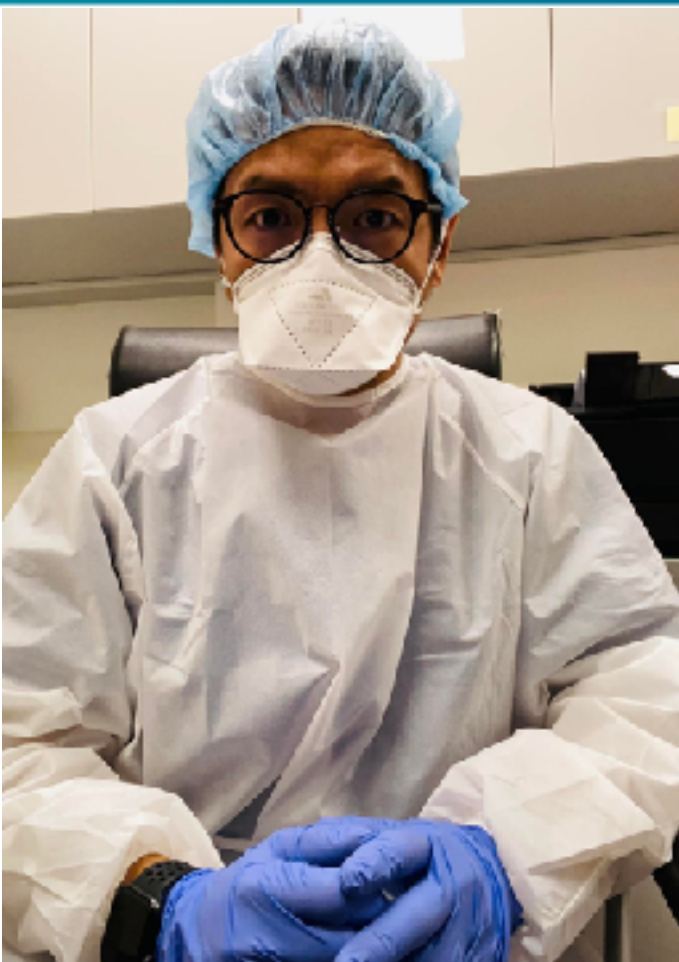




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Taipei Medical University · Shuang Ho Hospital,  
Ministry of Health and Welfare

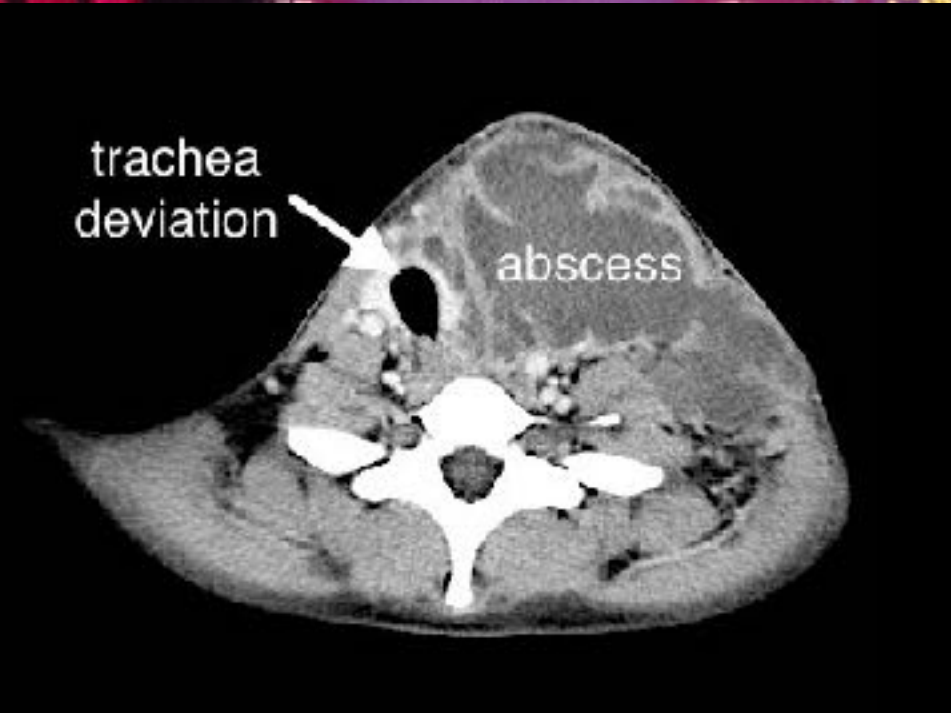


# POCUS Imaging Reading



陳國智醫師

雙和醫院 急診醫學科



4cm

# Neck hematoma

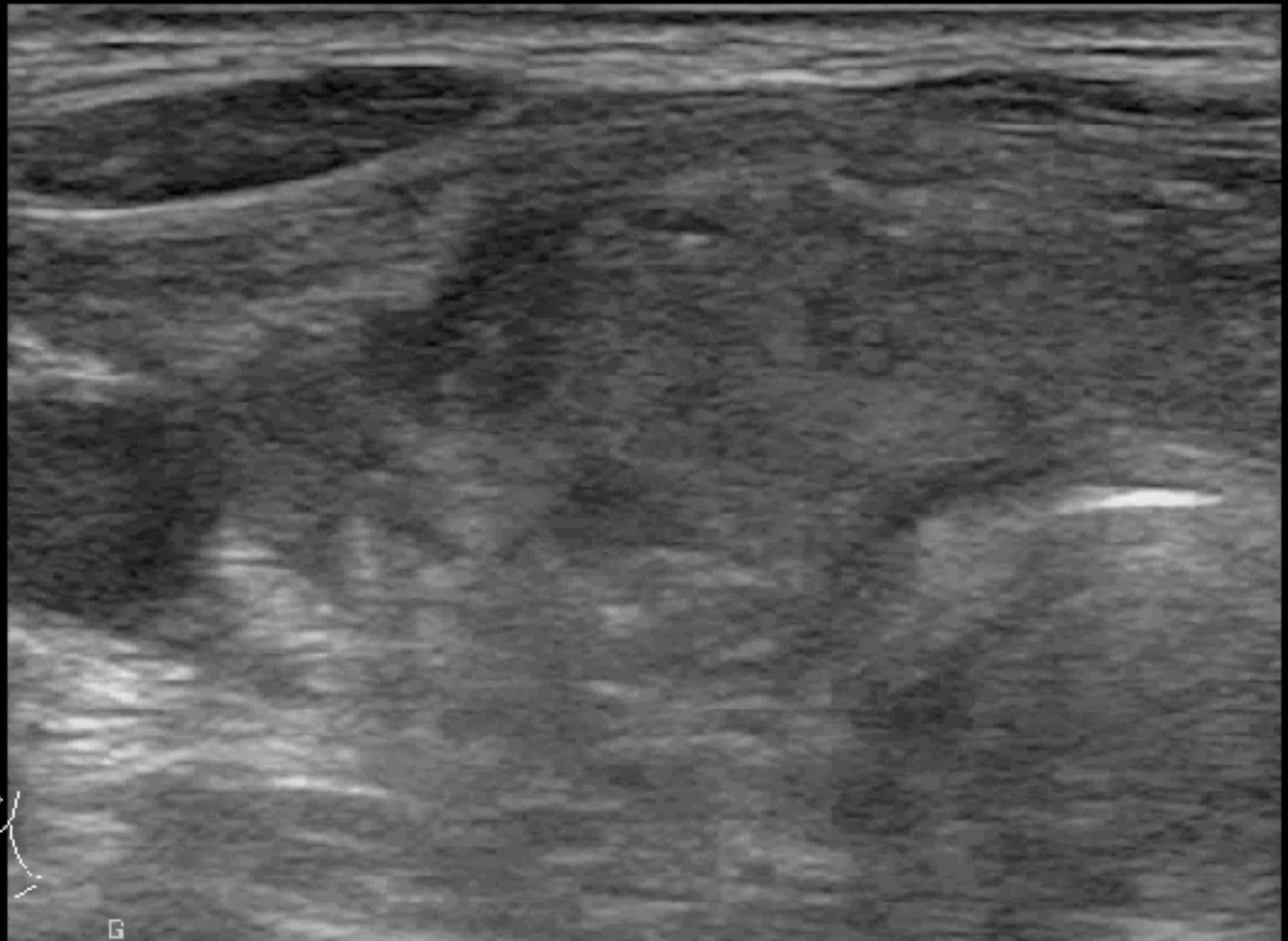


PHILIPS YEH  
11660227

SKH ER

MI 0.5 4/12/2016  
TIS 0.1 5:43:13 PM

Superficial P  
12 3  
46 Hz  
3.0cm  
2D  
Res  
Gn 60  
C 56  
3 / 2 / 1



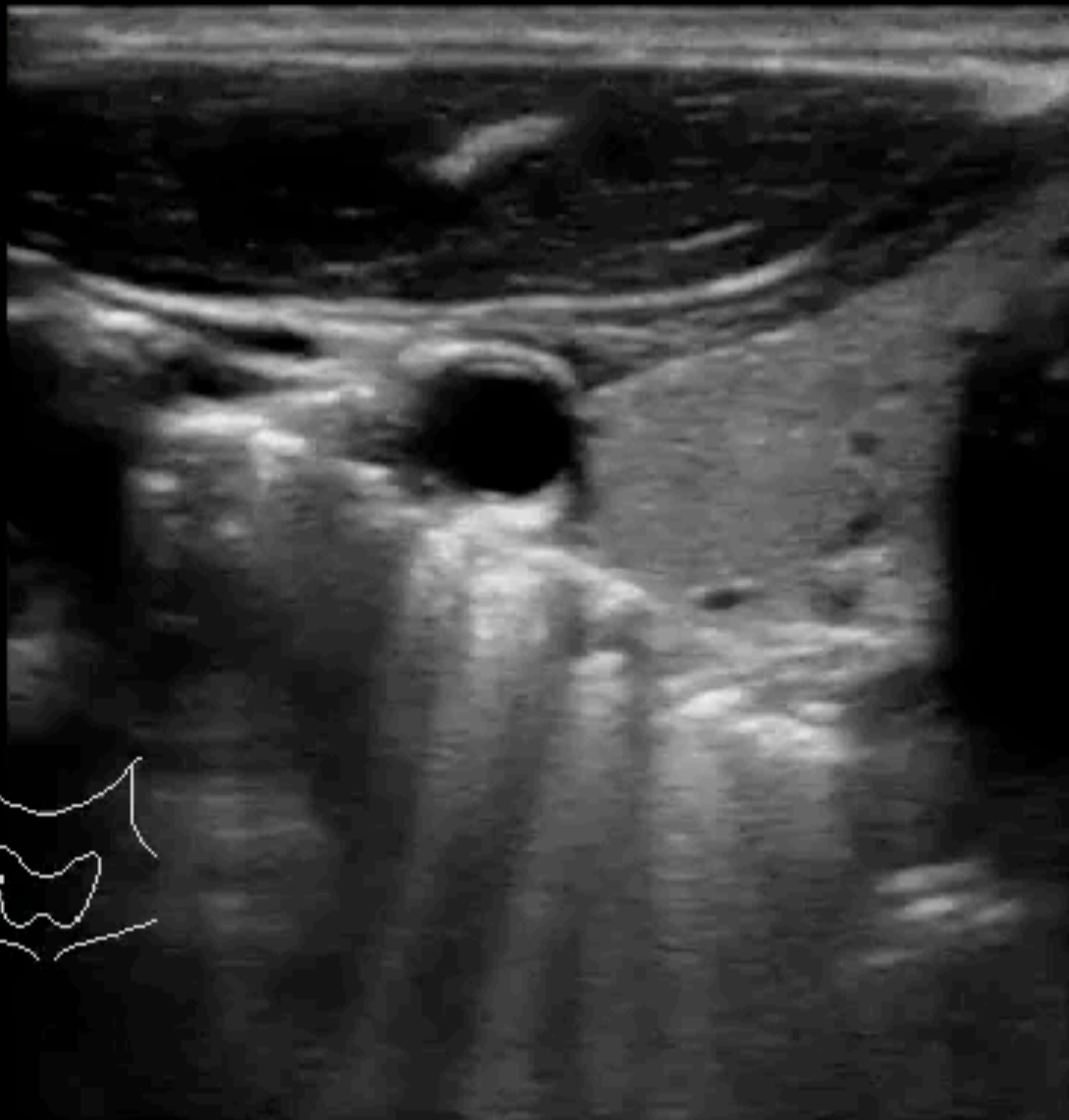
G

# Abnormal gas



Gen  
S

MB



SmP  
HFL



40%

MI  
0.7

TIS  
0.1

A

B



4.0

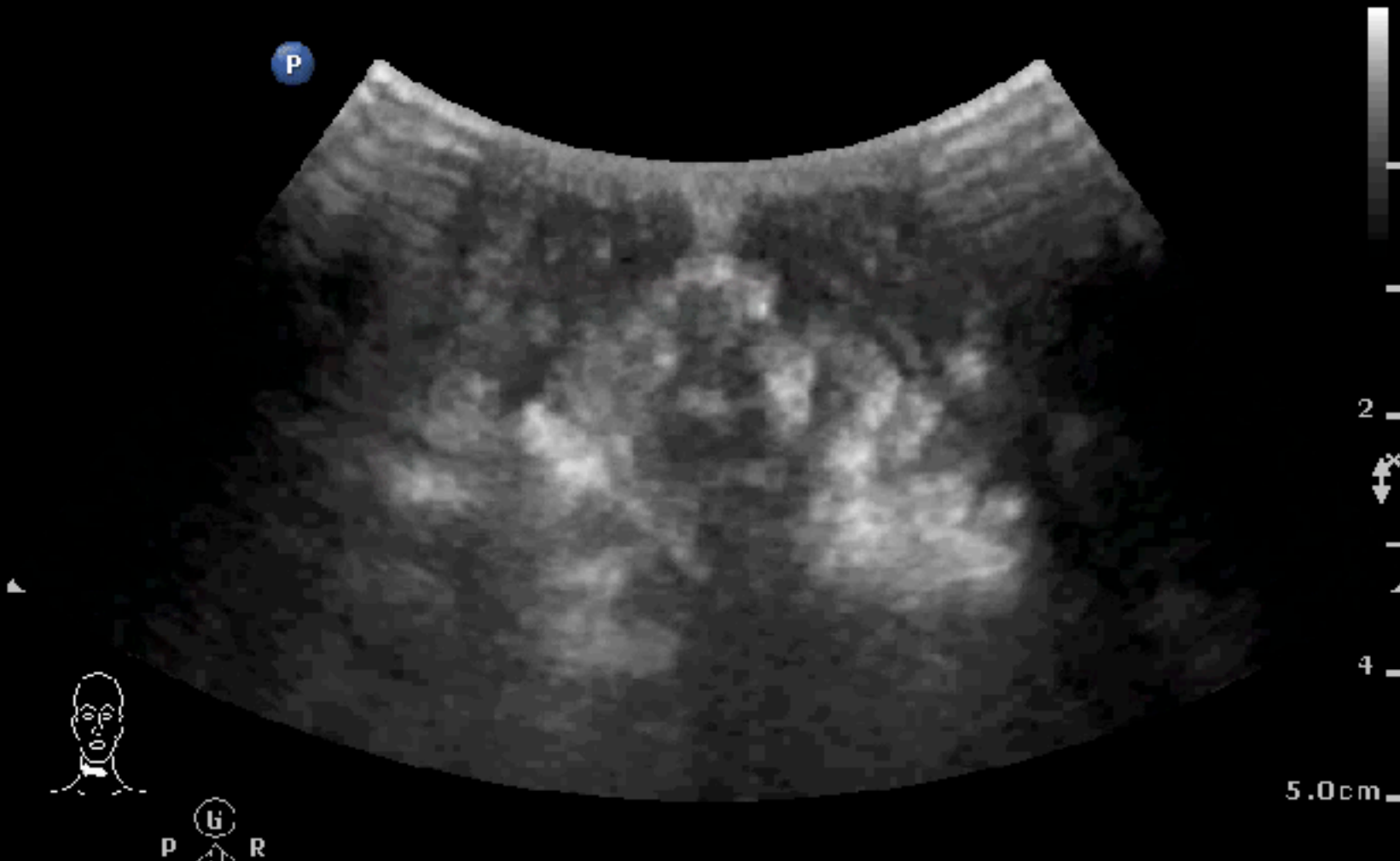
# Stridor & Dyspnea



PHILIPS CHIU MI 0.8 1/6/2016  
03190/10 SKH FR FIS 0.1 6:33:17 PM

Abd Gen  
C5-1  
64 Hz  
5.0cm

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



# Stridor & Dyspnea



PHILIPS CHIU  
03190710

SKI | ER

MI 0.9 1/6/2016  
TIS 0.2 6:37:25 PM

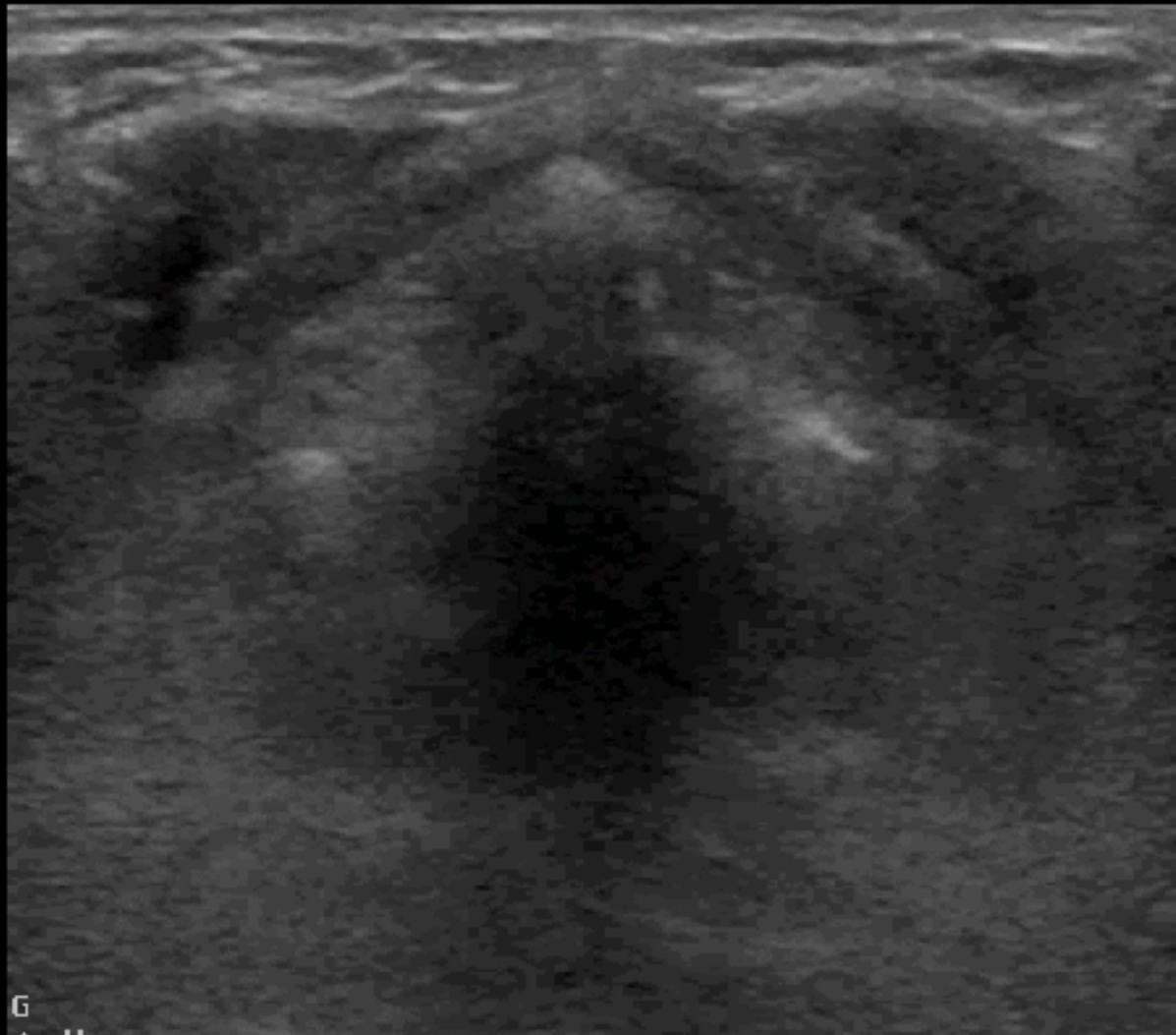
Superficial

L12-3  
31 Hz  
3.5cm

2D

Gen  
Gn 93  
C 52  
4/3/2

P



G

# How to manage this airway ?



PHILIPS CHIU  
03190710

SKI I ER

MI 0.9 1/6/2016  
TIS 0.2 6:39:42 PM

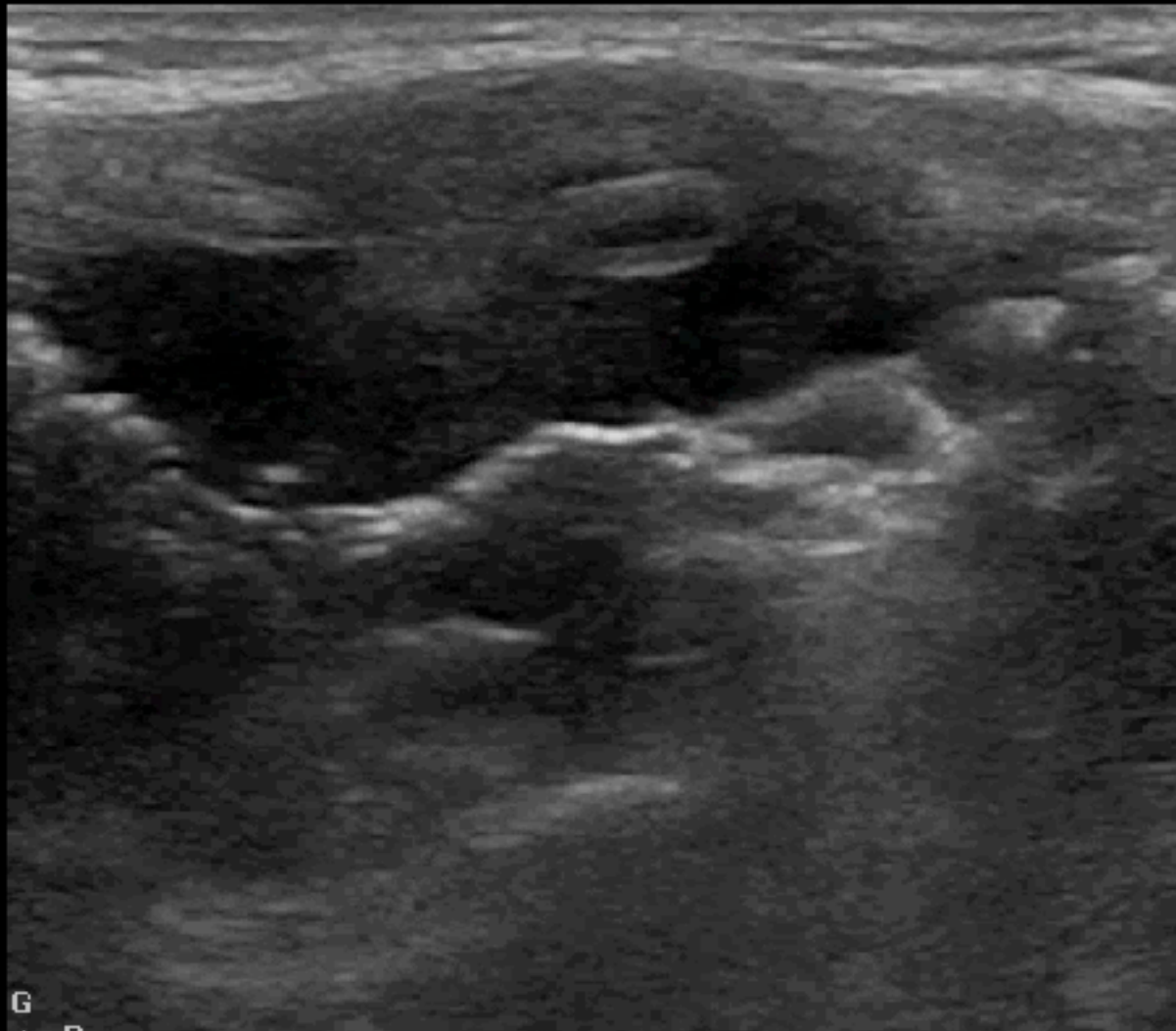
Superficial

L12-3  
31 Hz  
3.5cm

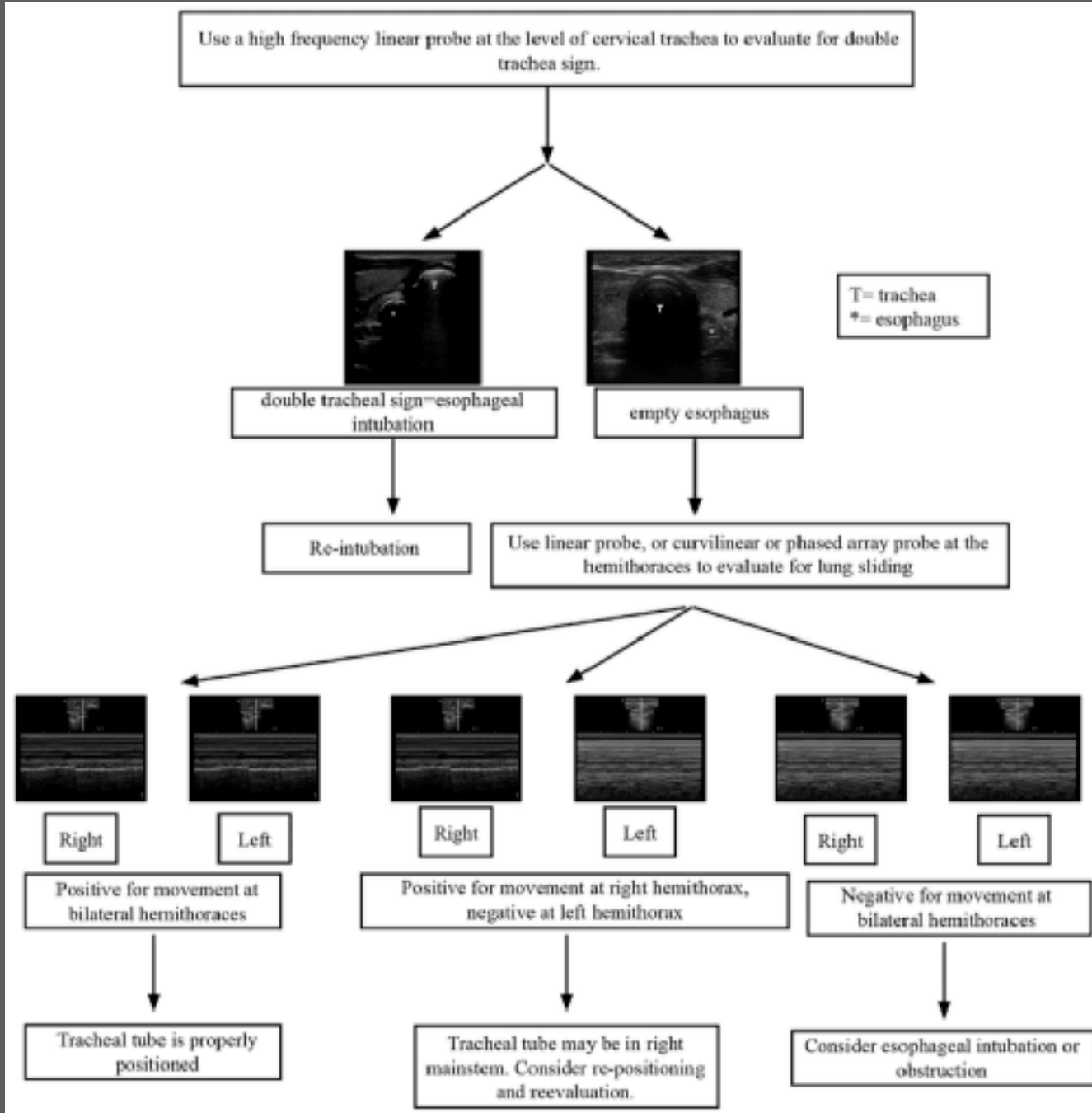
2D

Gen  
Gn 93  
C 52  
4/3/2

P



G





# 72F, R hip pain



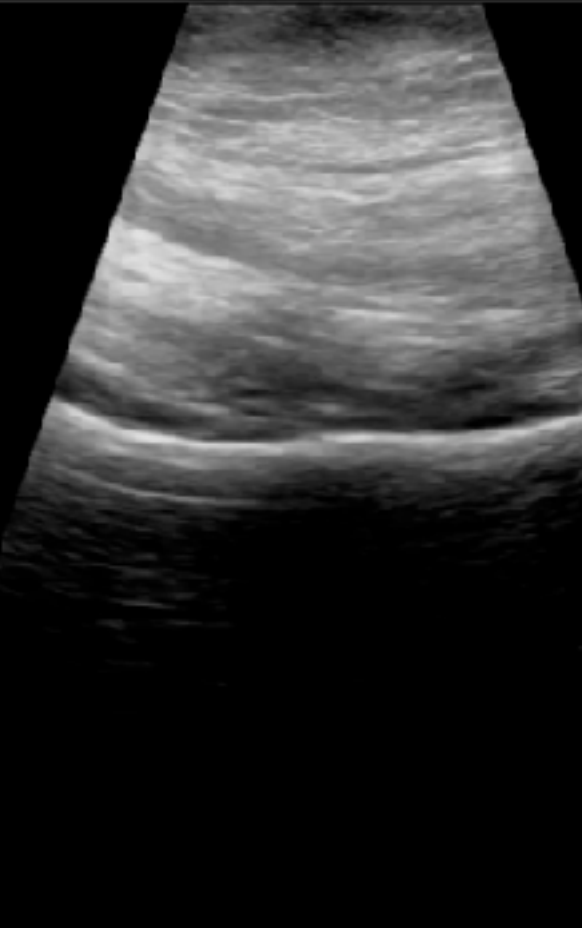
TIS: 0.01, MI: 0.28, Musculoskeletal

R



TIS: 0.01, MI: 0.28, Musculoskeletal

R



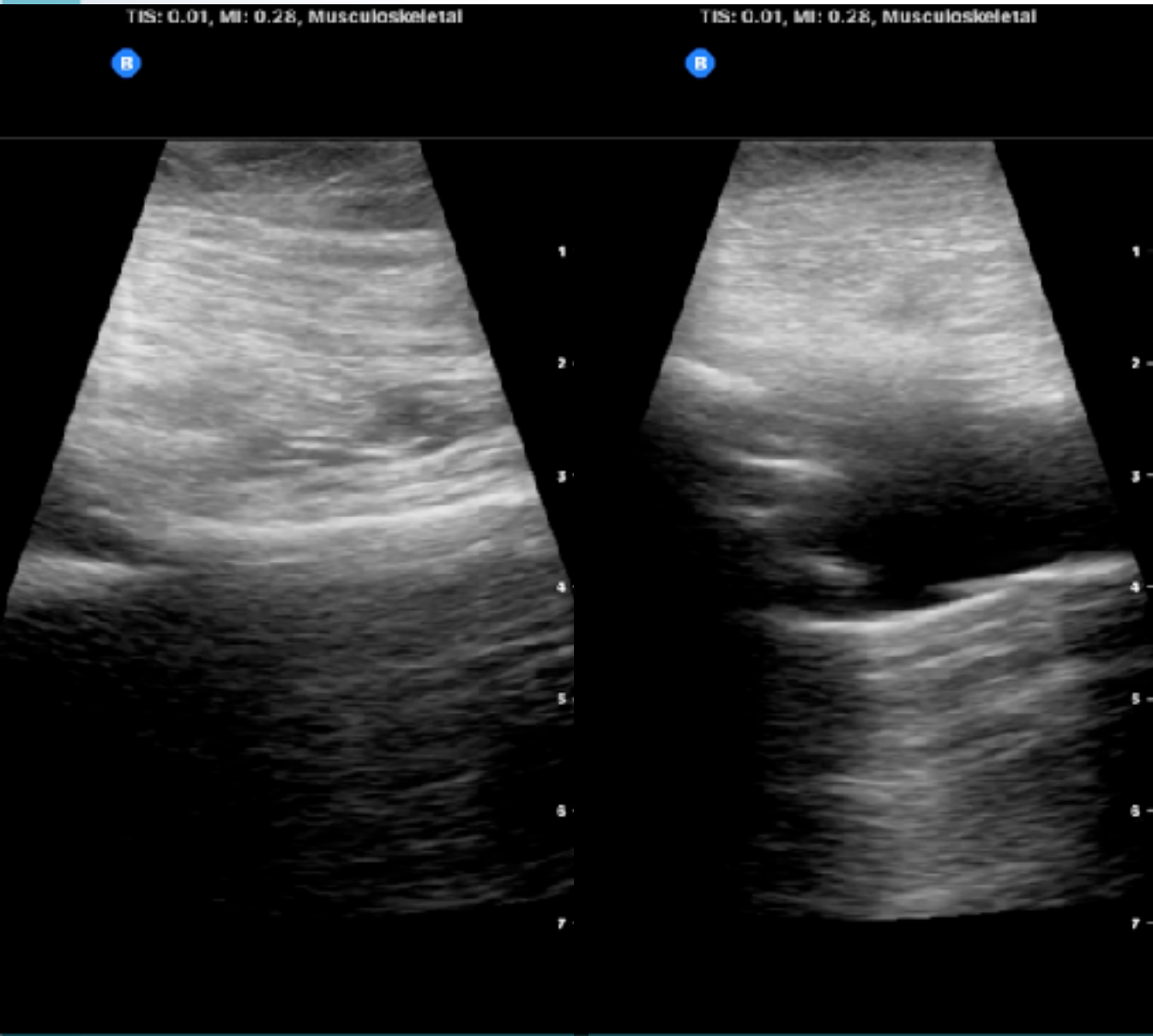
TIS: 0.01, MI: 0.28, Musculoskeletal

R





# 72F, R hip pain



對比

骨頭

植入物

臨床整合

# 43F, painful anal lesion



TIS: 0.01, MI: 0.28, MSK-Soft Tissue

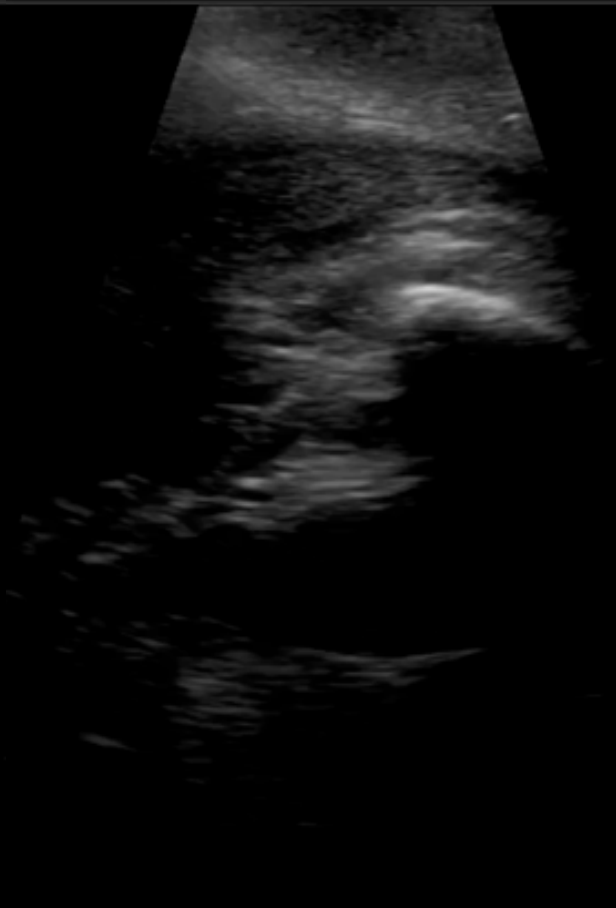
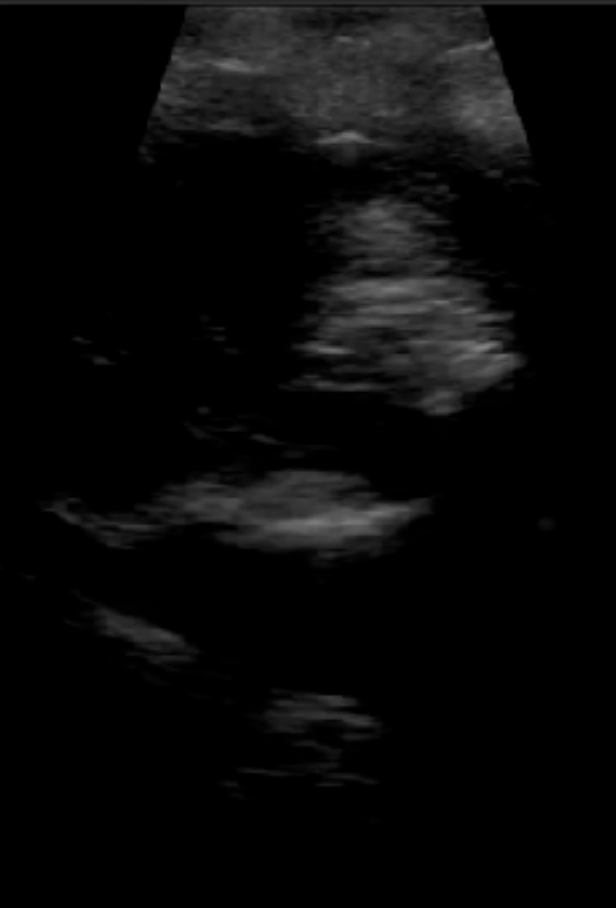
B

TIS: 0.01, MI: 0.28, MSK-Soft Tissue

B

TIS: 0.01, MI: 0.28, MSK-Soft Tissue

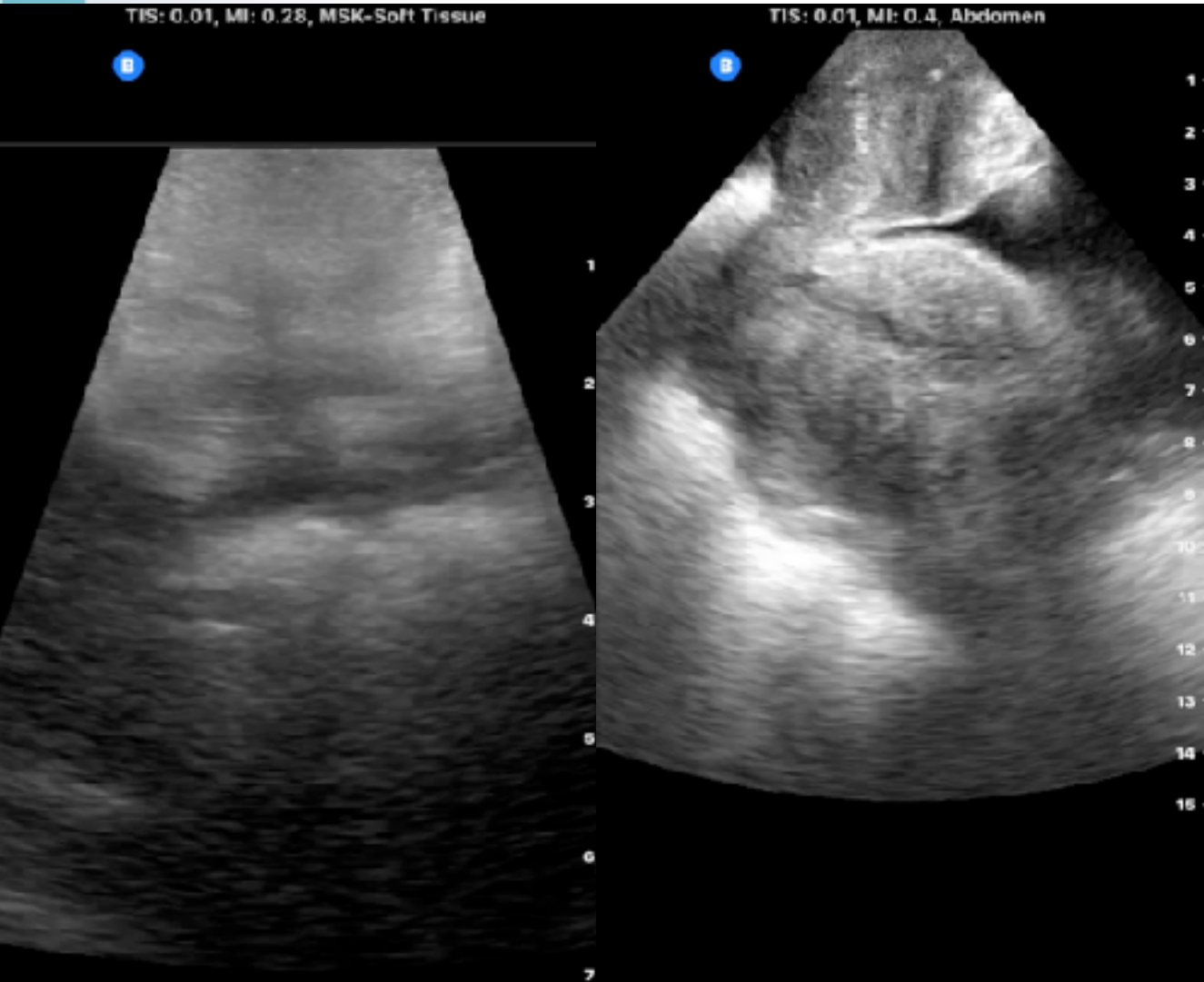
B



1  
2  
3  
4  
5  
6  
7



# 43F, painful anal lesion



型態辨識

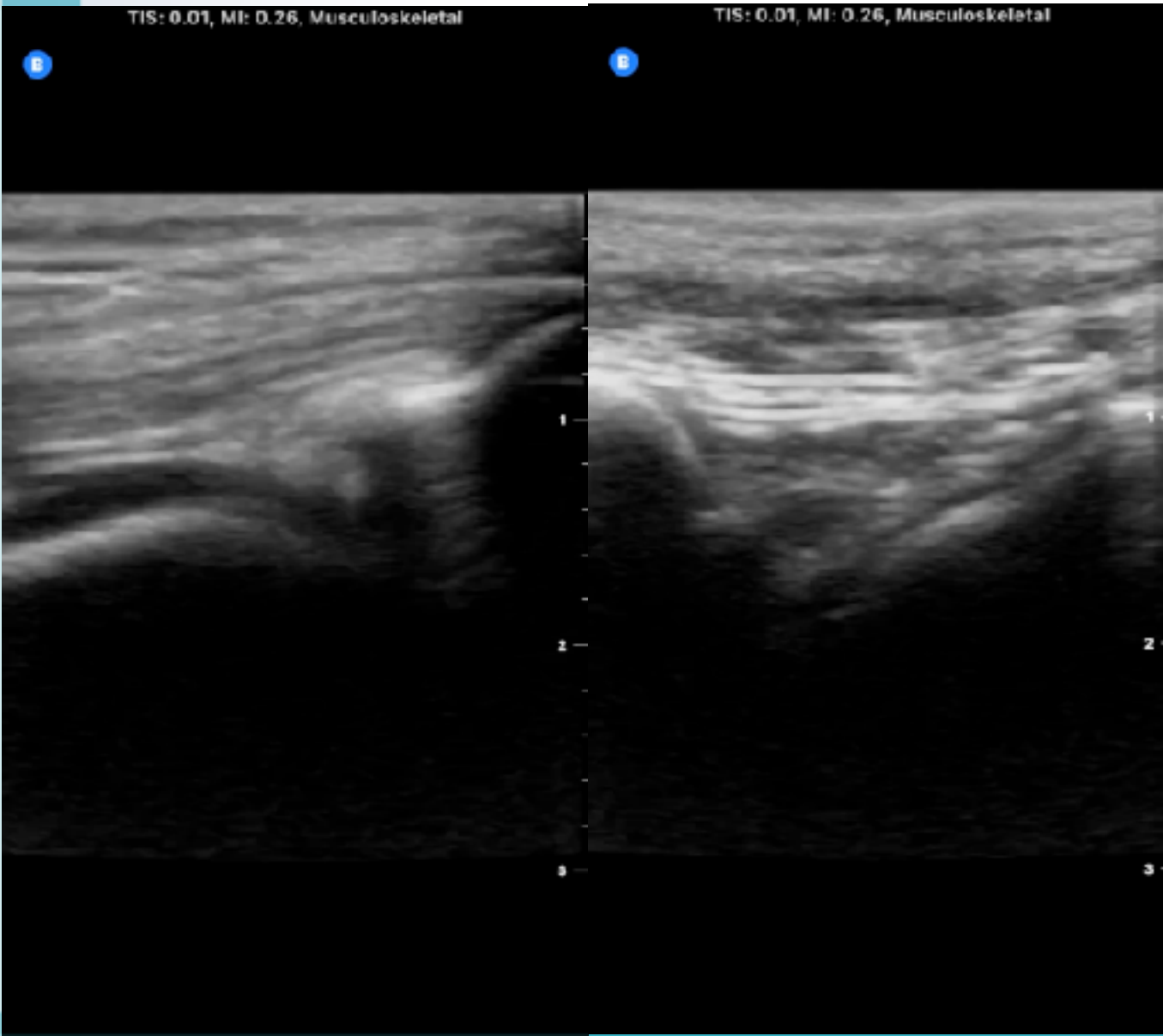
構造確認

切開引流

CT ??



# 21F, TA with knee injury



關節積血

QT

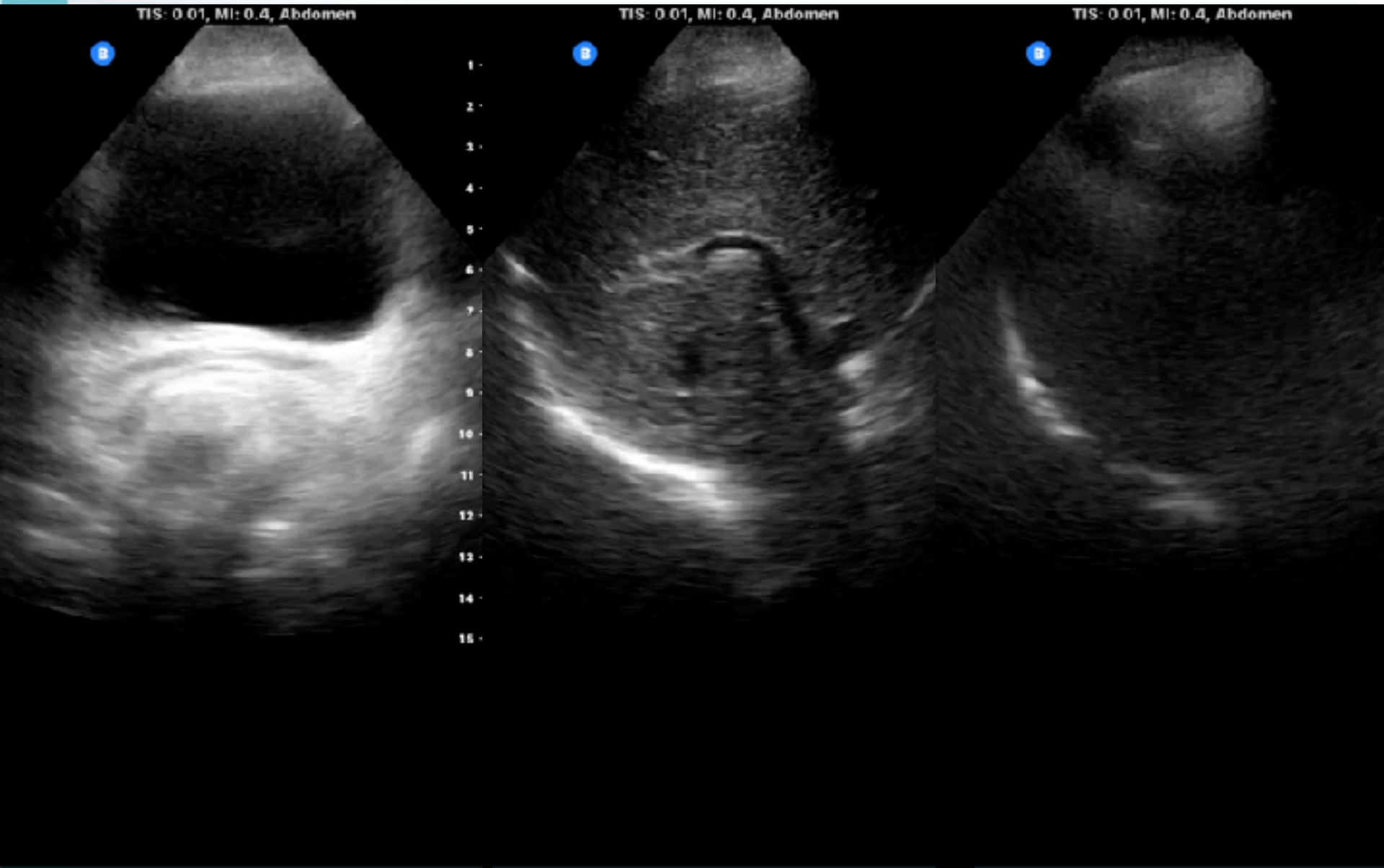
PT

Patella

安心感確認

醫病關係提升

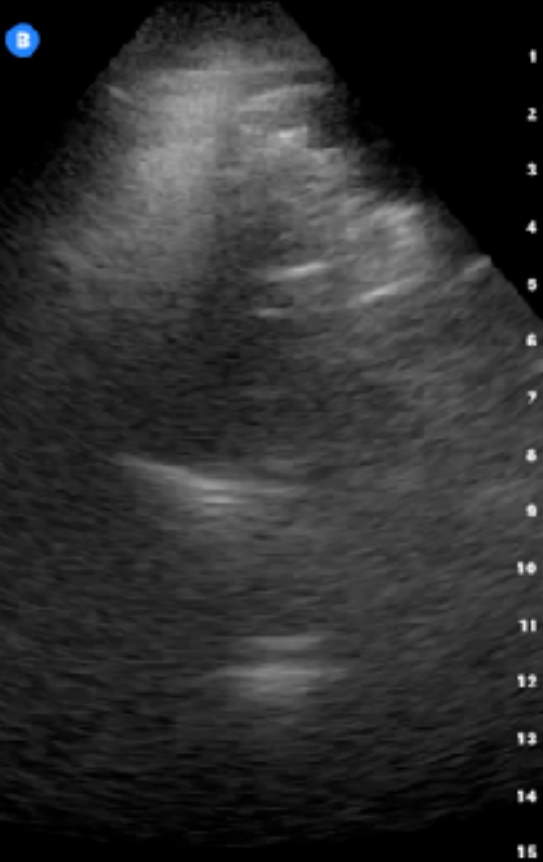
# 80F, leiomyosarcoma, no urine



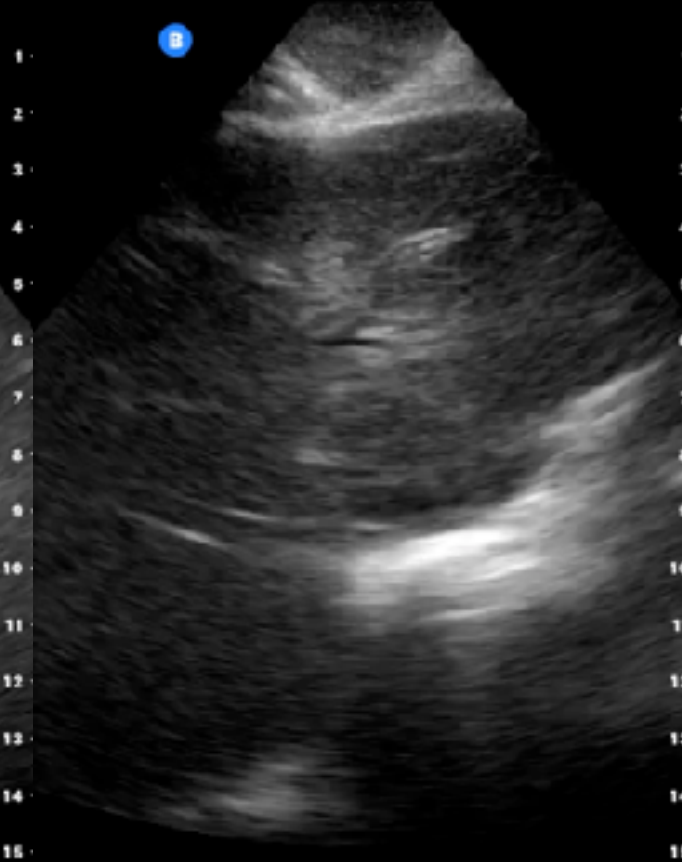
# 80F, leiomyosarcoma, no urine



TIS: 0.01, MI: 0.4, Abdomen



TIS: 0.01, MI: 0.4, Abdomen



TIS: 0.01, MI: 0.23, Musculoskeletal





# 80F, leiomyosarcoma, no urine



確認主要問題

評估會的部位

軟組織腫瘤型態



# 54M, oral cancer, LN meta / redness



TIS: 0.01, MI: 0.47, MSK-Soft Tissue

TIS: 0.01, MI: 0.47, MSK-Soft Tissue

TIS: 0.04, MI: 0.46, MSK-Soft Tissue

B

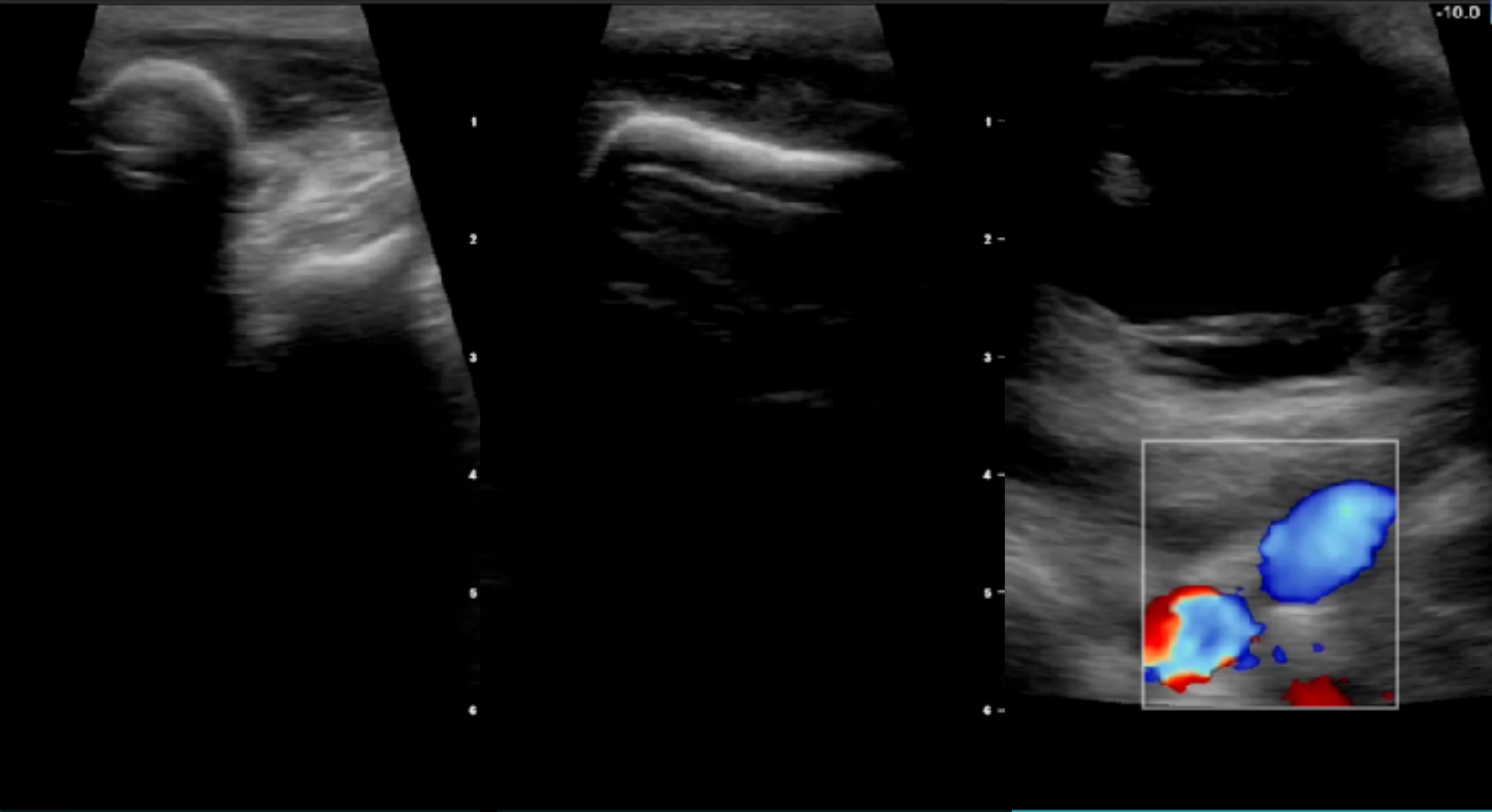
B

B

+10.0

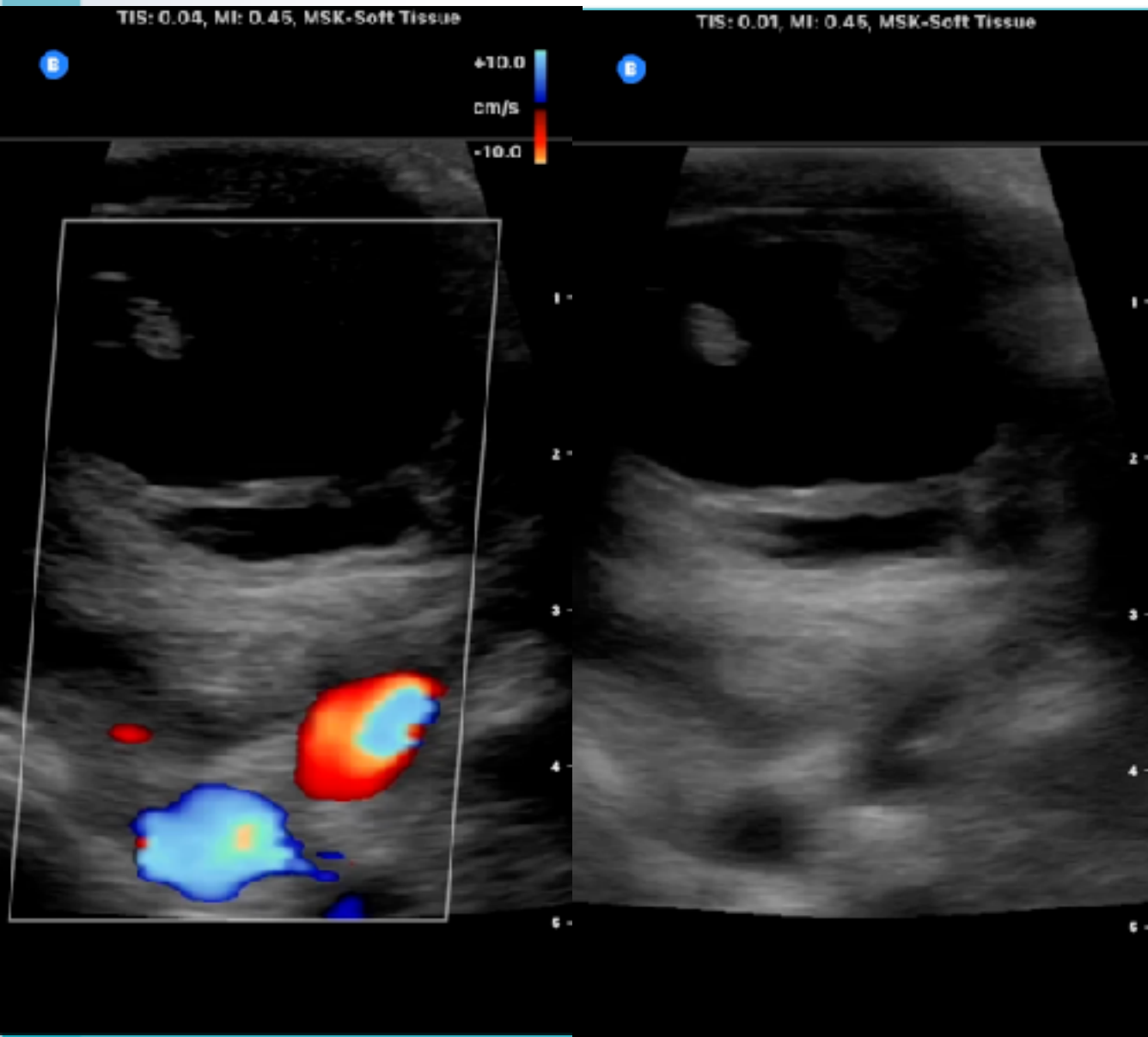
cm/s

-10.0





# 54M, oral cancer, LN meta / redness



內位定位

型態辨識

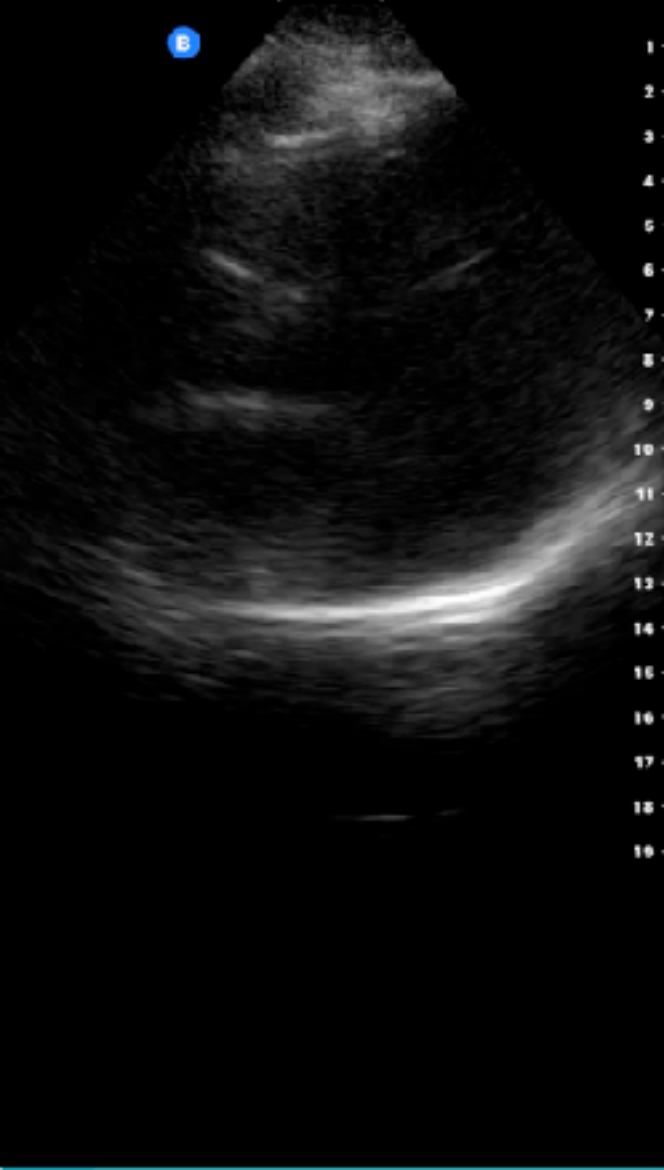
Red flag辨識

# 99M, IHCA



TIS: 0.01, MI: 0.38, Abdomen

B



TIS: 0.01, MI: 0.45, MSK-Soft Tissue

B



TIS: 0.01, MI: 0.45, MSK-Soft Tissue

B



# 99M, IHCA



TIS: 0.01, MI: 0.4, Abdomen

B

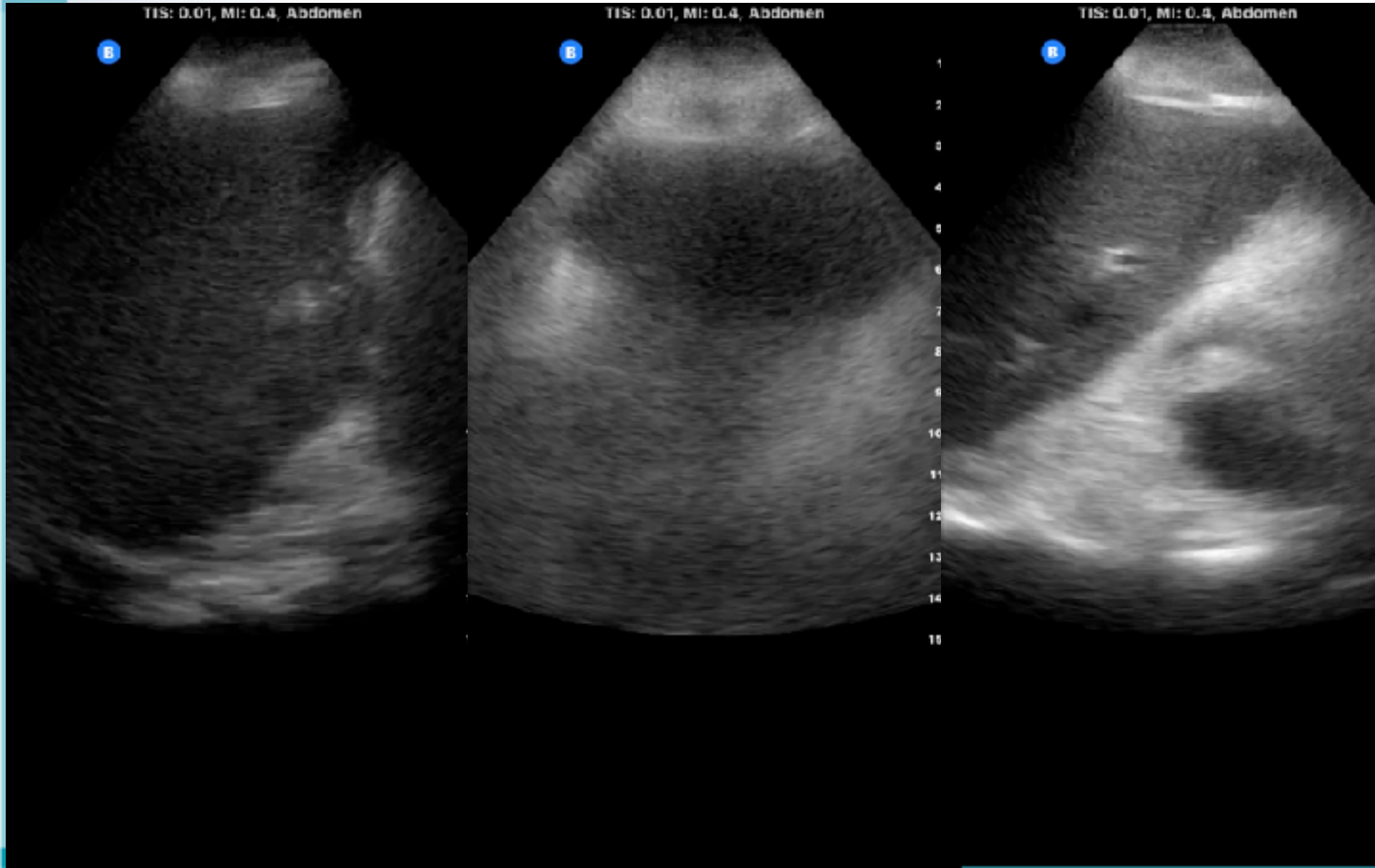
TIS: 0.01, MI: 0.4, Abdomen

B

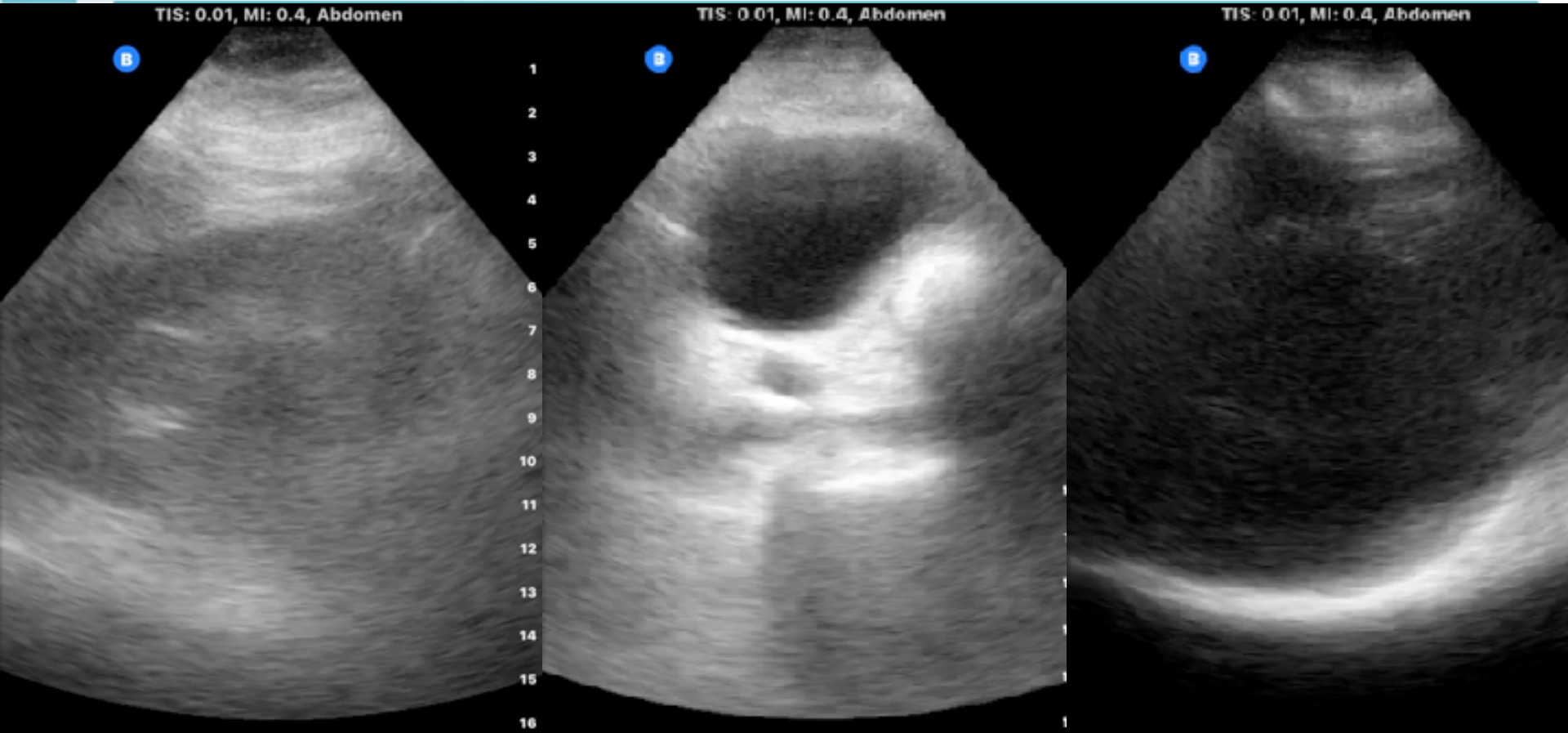
TIS: 0.01, MI: 0.4, Abdomen

R

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# 99M, IHCA



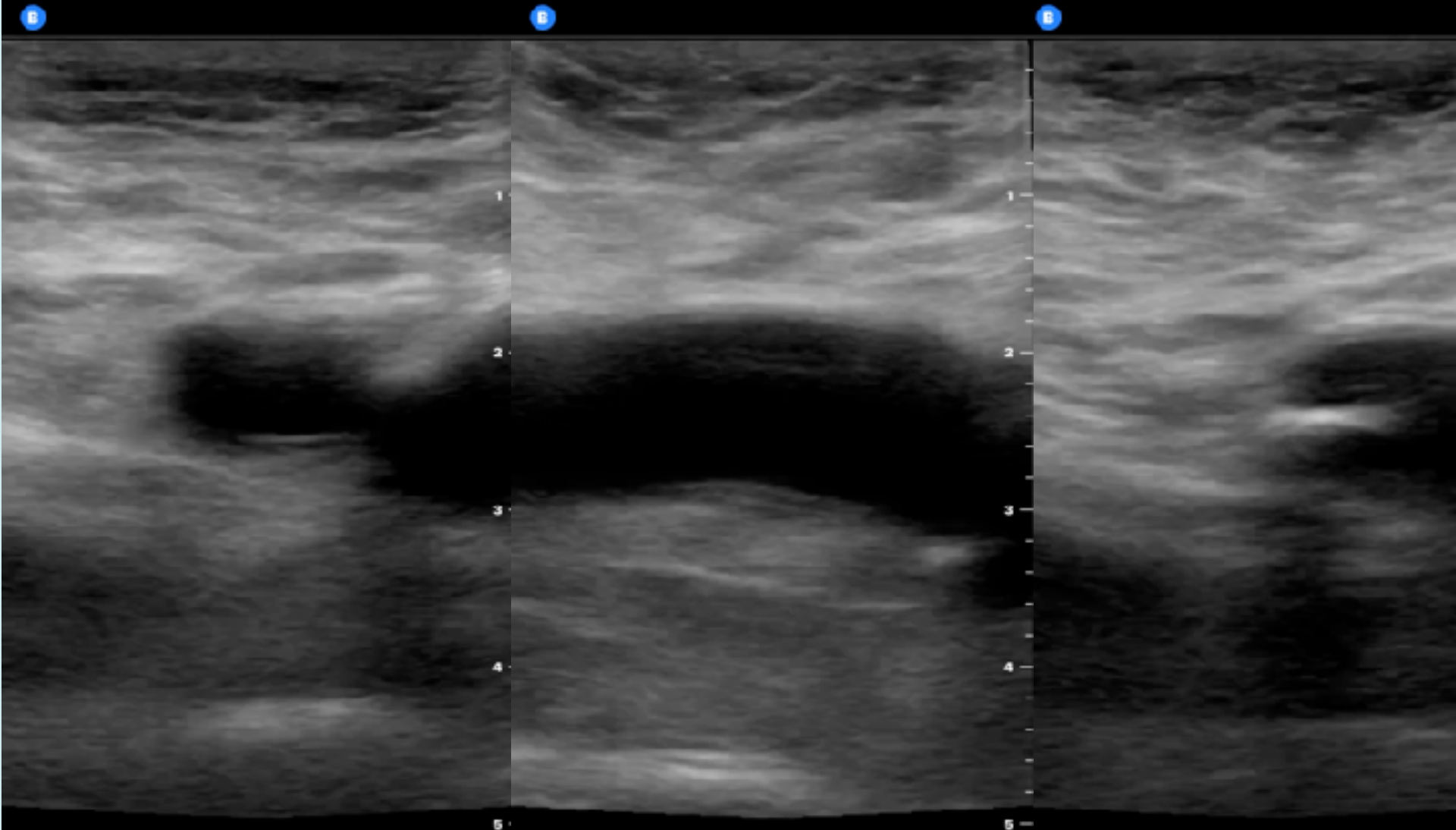
# 99M, IHCA



TIS: 0.01, MI: 0.45, Vascular: Access

TIS: 0.01, MI: 0.45, Vascular: Access

TIS: 0.01, MI: 0.45, Vascular: Access

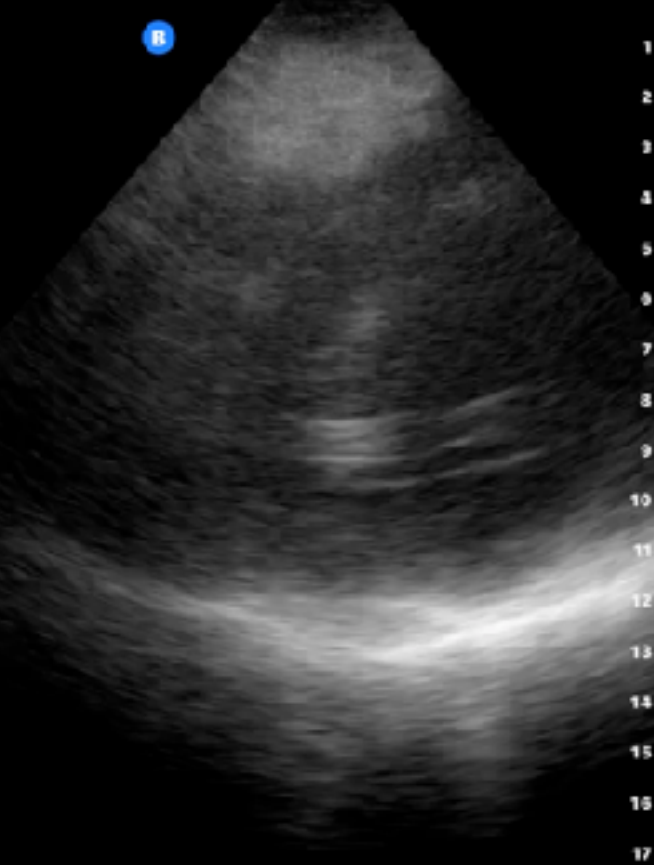


# 99M, IHCA



TIS: 0.01, MI: 0.38, Abdomen

R



TIS: 0.01, MI: 0.38, Abdomen

R

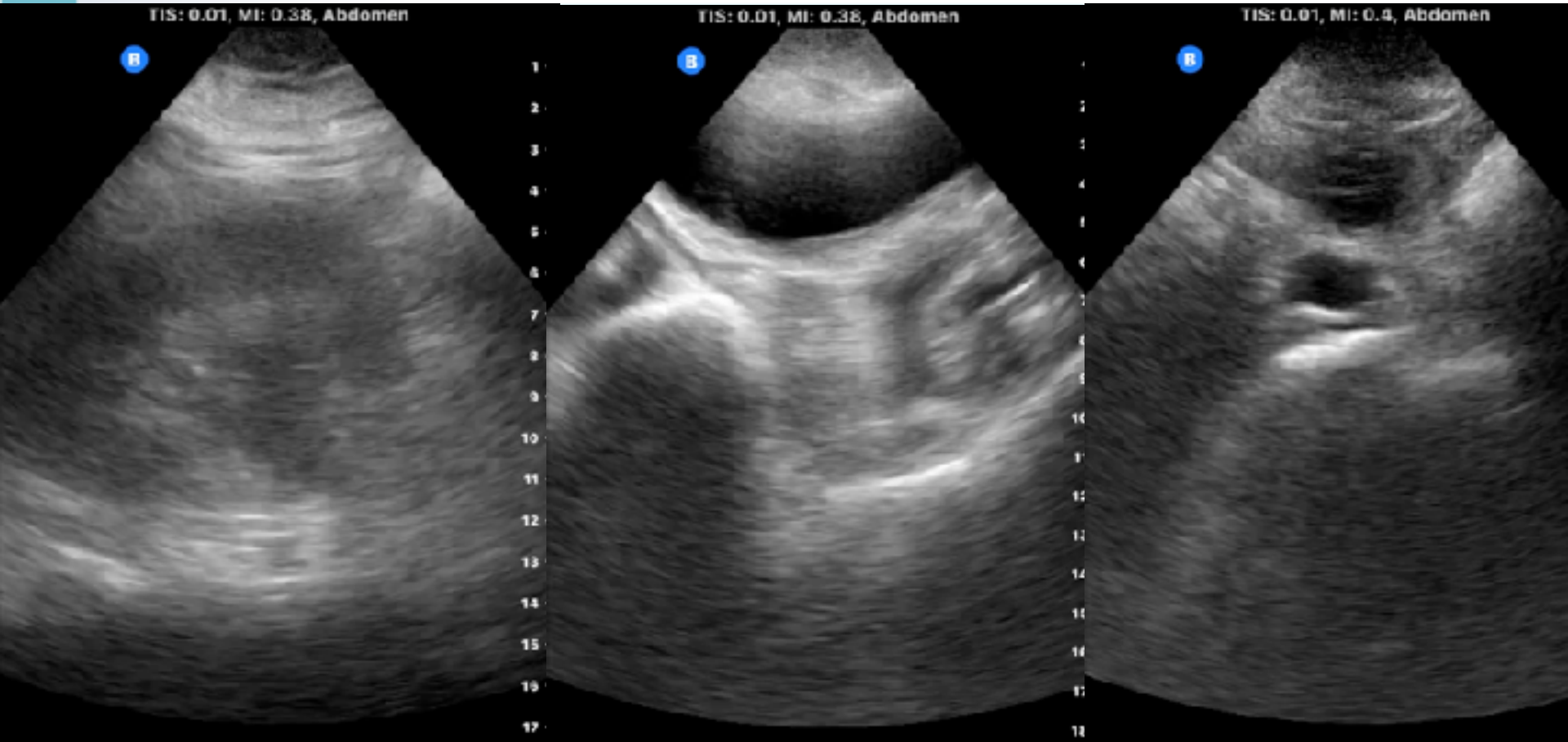


TIS: 0.01, MI: 0.38, Abdomen

R



# 99M, IHCA





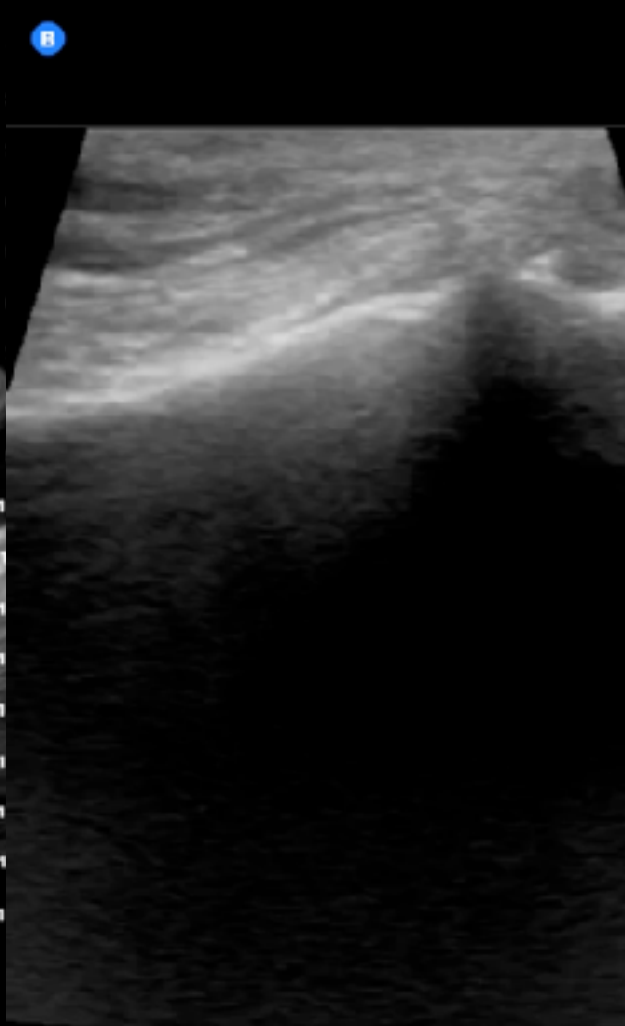
# 99M, IHCA



TIS: 0.02, MI: 0.48, Cardiac



TIS: 0.01, MI: 0.35, Musculoskeletal



TIS: 0.01, MI: 0.4, Abdomen

