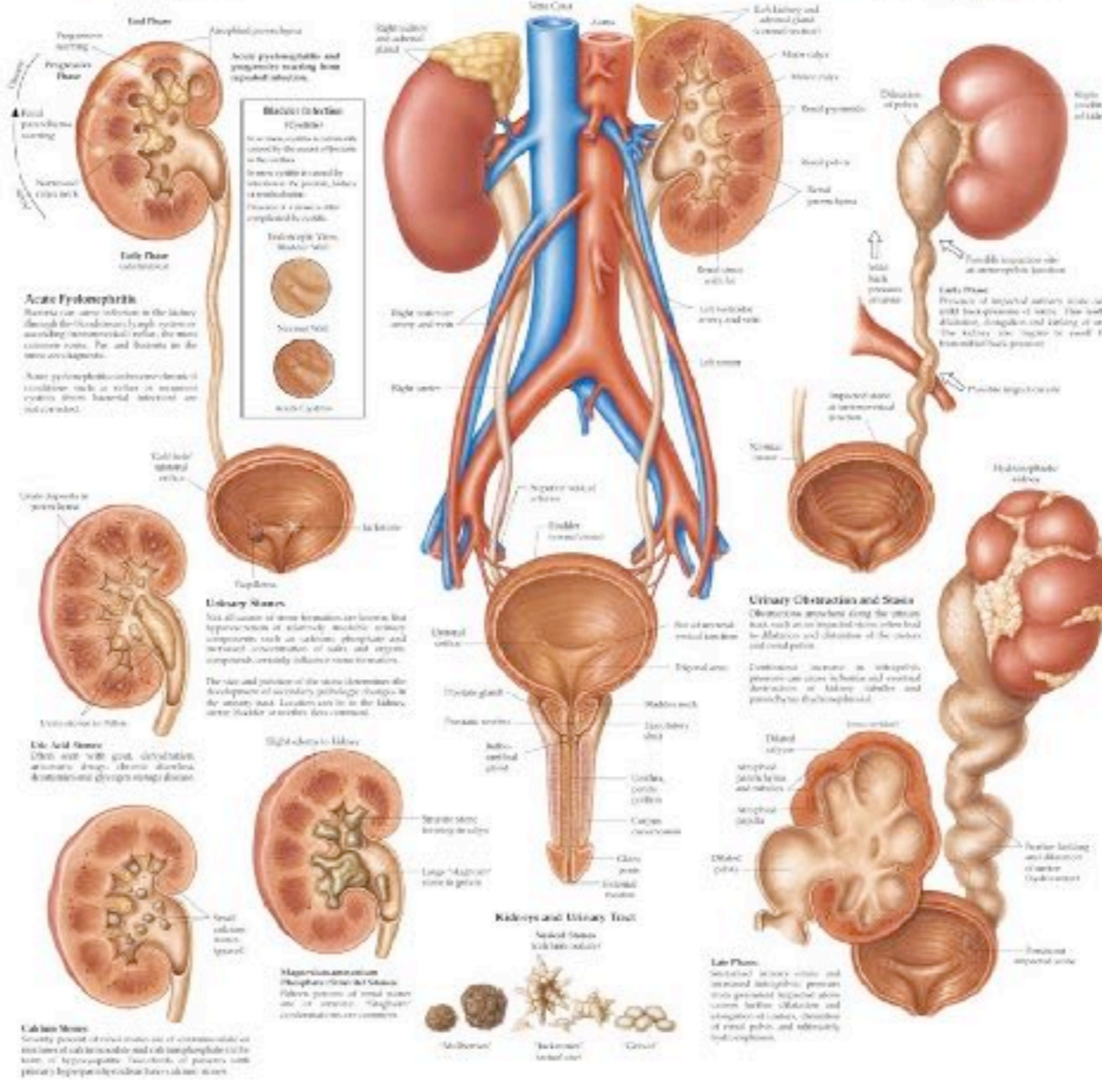
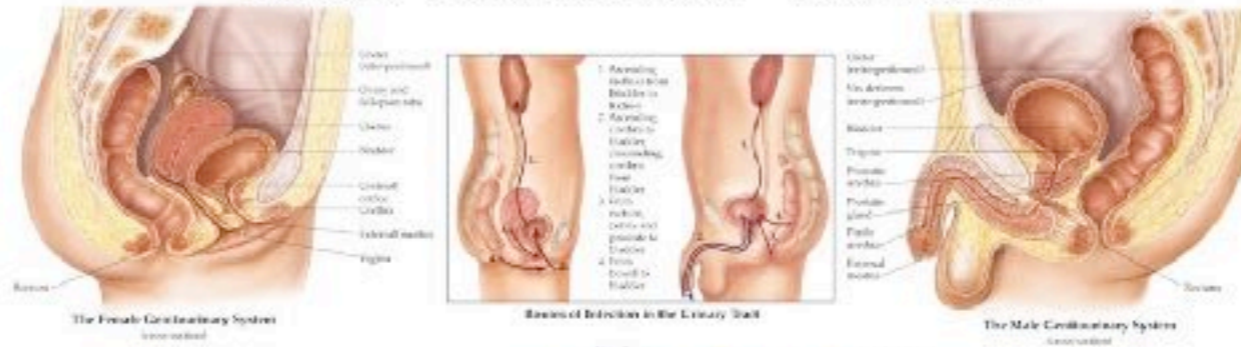


What

THE URINARY TRACT



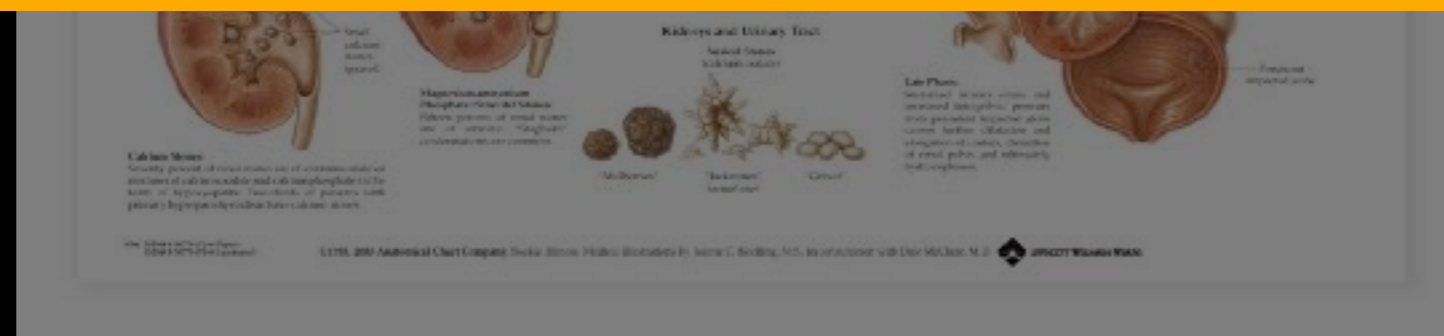
What



Is there evidence of a urinary tract stone?



Are there any bladder findings?



Why

Why

Helps support diagnosis

Helps rule out bad mimics

No ionizing radiation

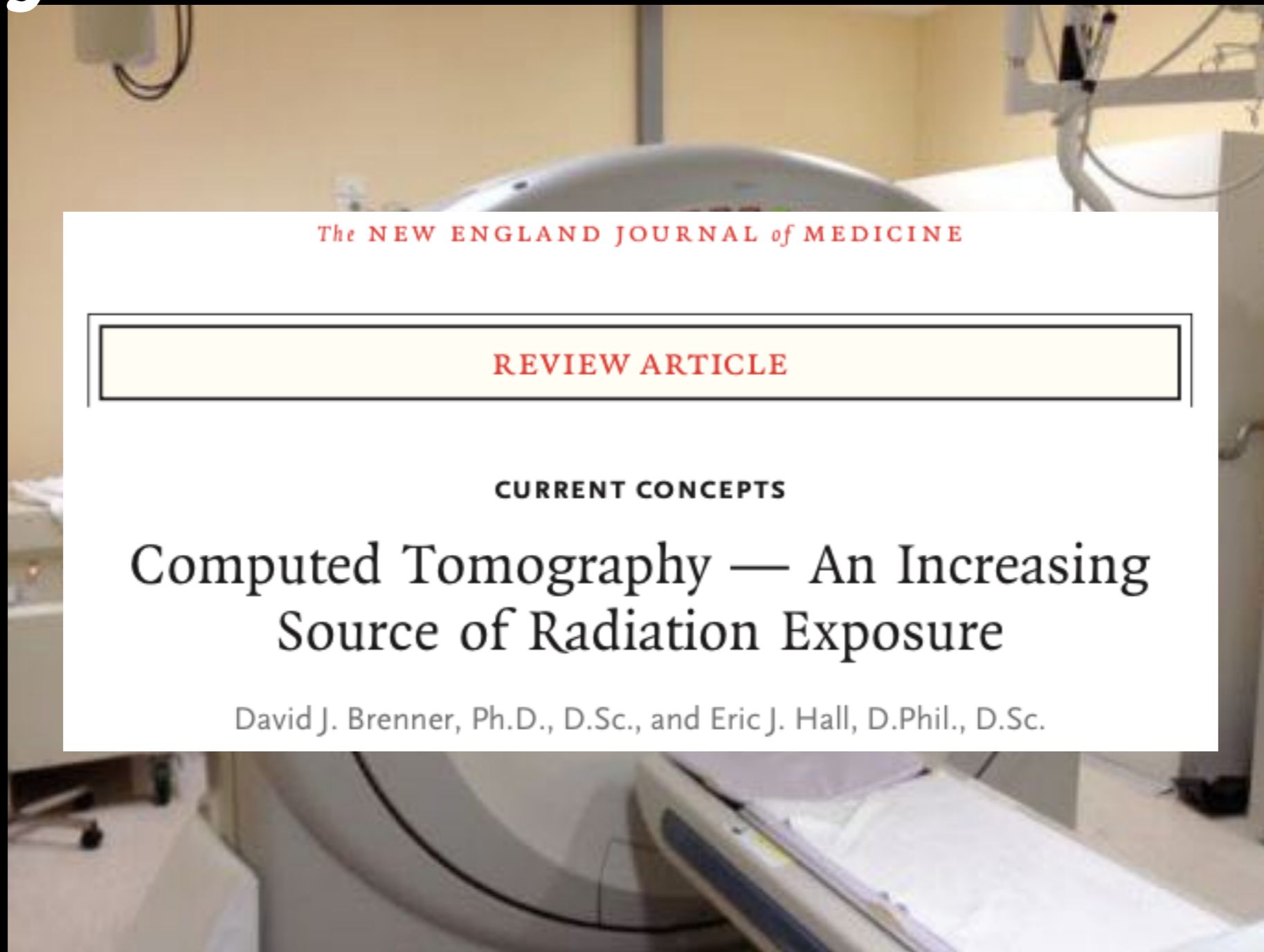
Repeatable

Why

Why not



Why not



The NEW ENGLAND JOURNAL of MEDICINE

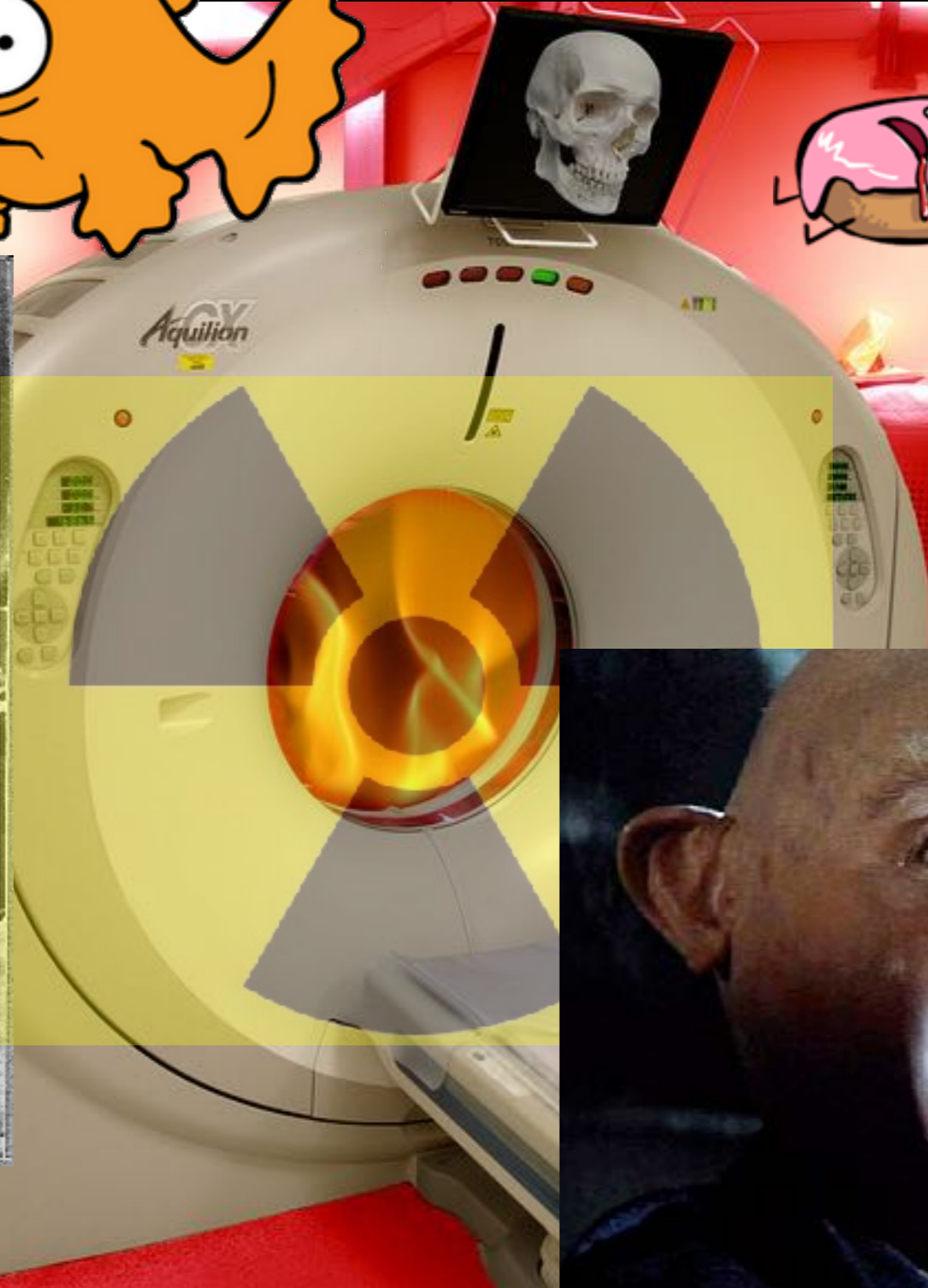
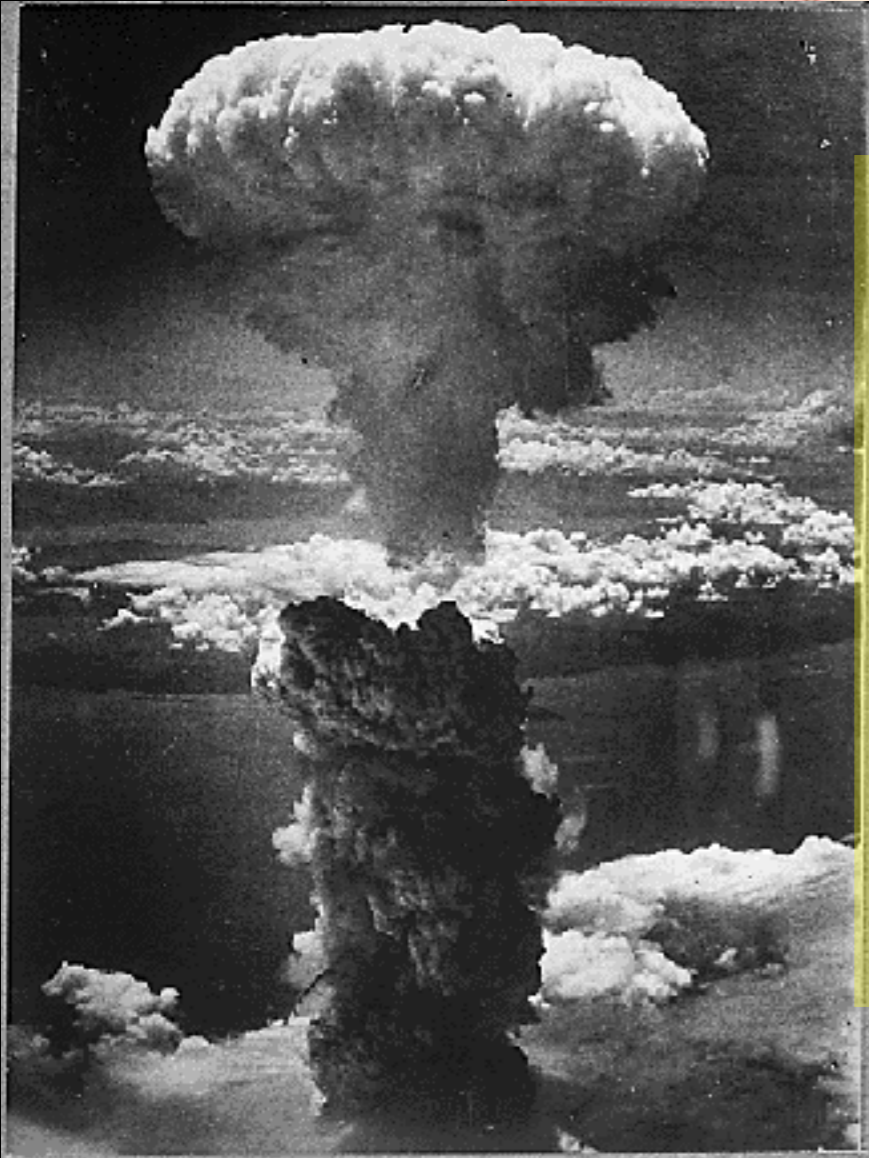
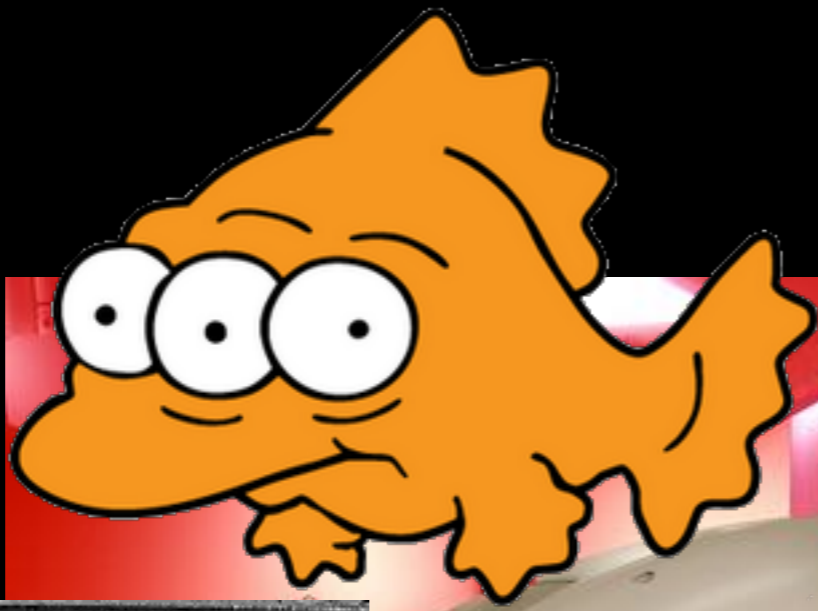
REVIEW ARTICLE

CURRENT CONCEPTS

Computed Tomography — An Increasing Source of Radiation Exposure

David J. Brenner, Ph.D., D.Sc., and Eric J. Hall, D.Phil., D.Sc.

Why

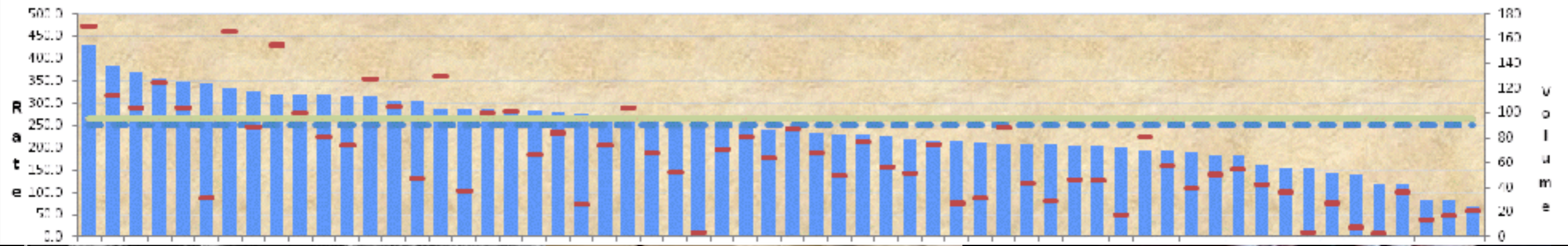


Why



Modality by PRC, Provider report for SCL ER CT, CT TOTAL 2017Q1 (graph 4)

Rate per 1,000 members Dept Avg Region Avg Volume (numerator)



CLINICAL PRACTICE

CME

Radiological Imaging of Patients With Suspected Urinary Tract Stones: National Trends, Diagnoses, and Predictors

Antonio C. Westphalen, MD, Renee Y. Hsia, MD, MSc, Judith H. Maselli, MSPH, Ralph Wang, MD, and Ralph Gonzales, MD, MSPH

CLINICAL PRACTICE

CME

Radiological Imaging of Patients With Suspected Urinary Tract Stones: National Trends, Diagnoses, and Predictors

Antonio C. Westphalen, MD, Renee Y. Hsia, MD, MSc, Judith H. Maselli, MSPH, Ralph Wang, MD, and Ralph Gonzales, MD, MSPH

From 1996-2007, 10-fold increase in use of CT for suspected stone

No change in proportion of kidney stone Dx or significant alternate Dx, or admission

CLINICAL PRACTICE

CME

Radiological Imaging of Patients With Suspected Urinary Tract Stones: National Trends, Diagnoses, and Predictors

Antonio C. Westphalen, MD, Renee Y. Hsia, MD, MSc, Judith H. Maselli, MSPH, Ralph Wang, MD, and Ralph Gonzales, MD, MSPH

ORIGINAL ARTICLE

Ultrasonography versus Computed Tomography for Suspected Nephrolithiasis

R. Smith-Bindman, C. Aubin, J. Bailitz, R.N. Bengiamin, C.A. Camargo, Jr., J. Corbo, A.J. Dean, R.B. Goldstein, R.T. Griffey, G.D. Jay, T.L. Kang, D.R. Kriesel, O. J. Ma, M. Mallin, W. Manson, J. Melnikow, D.L. Miglioretti, S.K. Miller, L.D. Mills, J.R. Miner, M. Moghadassi, V.E. Noble, G.M. Press, M.L. Stoller, V.E. Valencia, J. Wang, R.C. Wang, and S.R. Cummings

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ED US vs Rads US vs CT

Primary outcomes: Missed diagnoses w/
complications and radiation exposure

ORIGINAL ARTICLE

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2759 patients

Exclusions: High suspicion for serious alternate Dx, pregnancy, morbid obesity

ORIGINAL ARTICLE

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	ED US	RAD US	CT
Radiation	10.1 mSv	9.2 mSv	17.2 mSv
Missed Complications	0.7%	0.3%	0.2%

Why



Why



Why



Why



Why



P

Why



Why



How



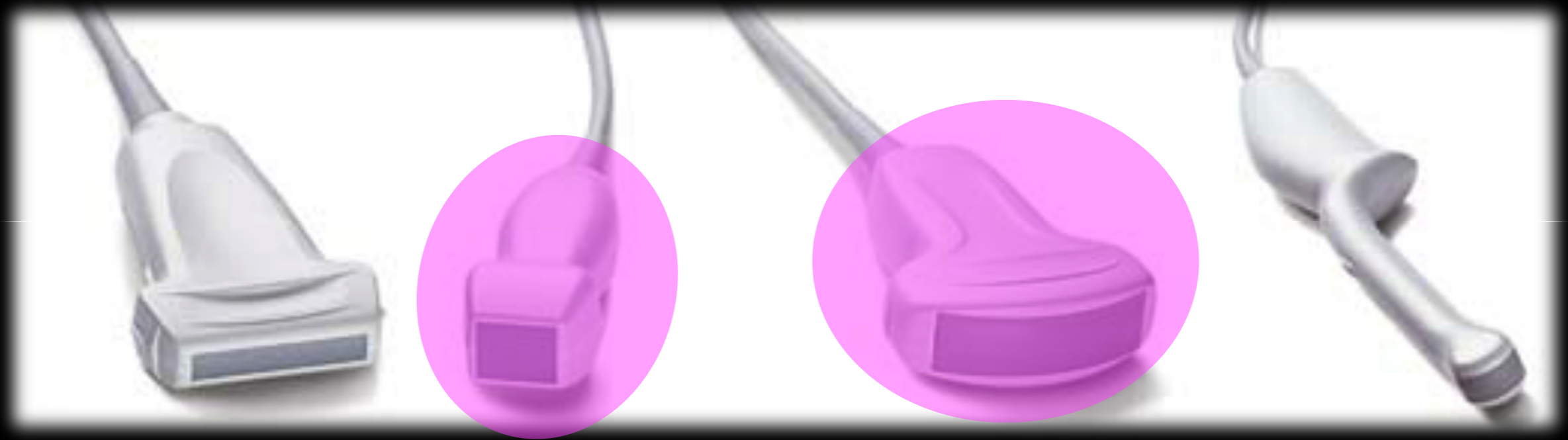
How



Probe

Approach

Scanning technique

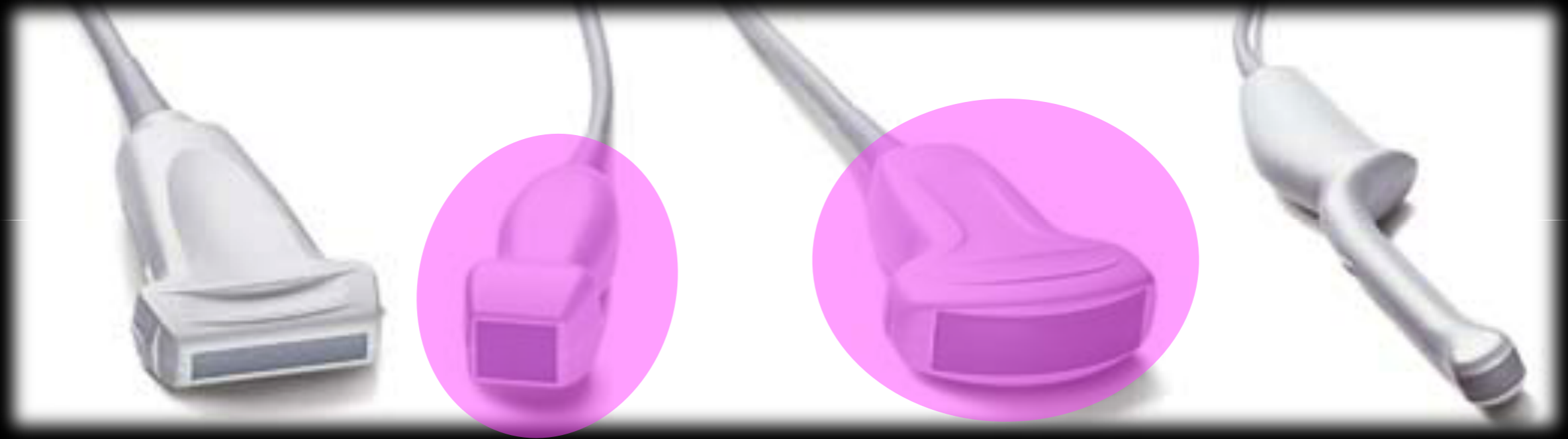


Probe

Low frequency probe

Approach

Scanning technique

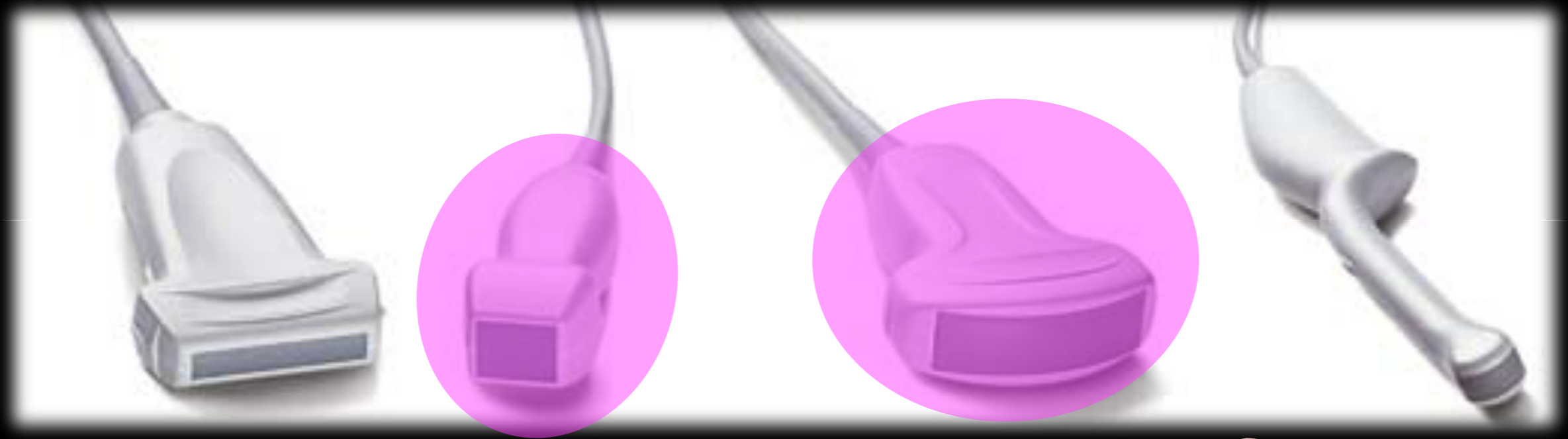


Probe

Approach

Think FAST

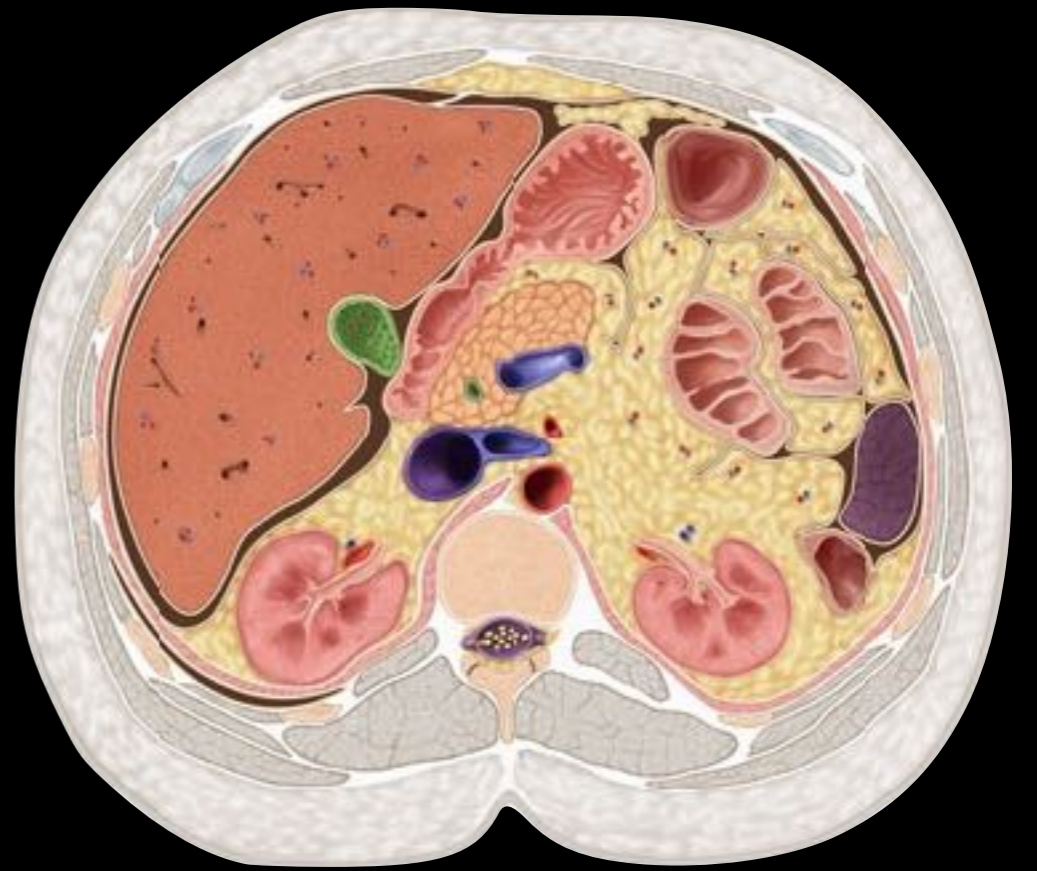
Scanning technique

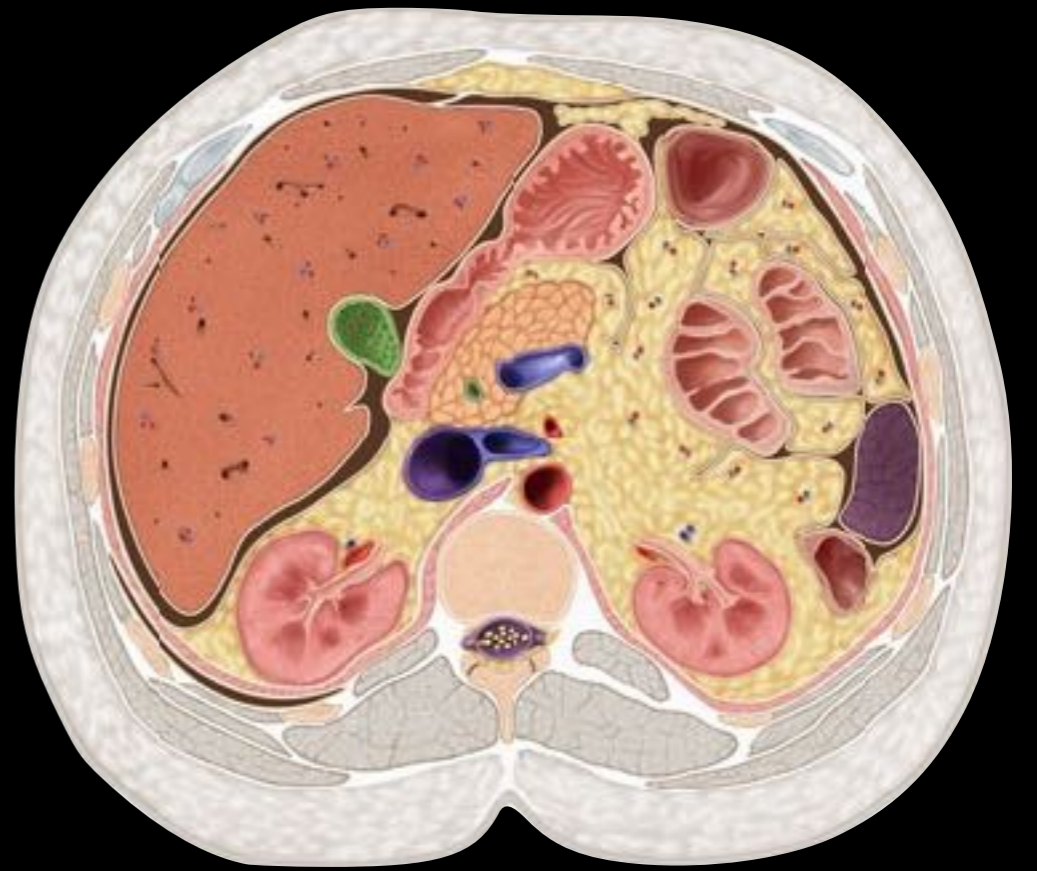
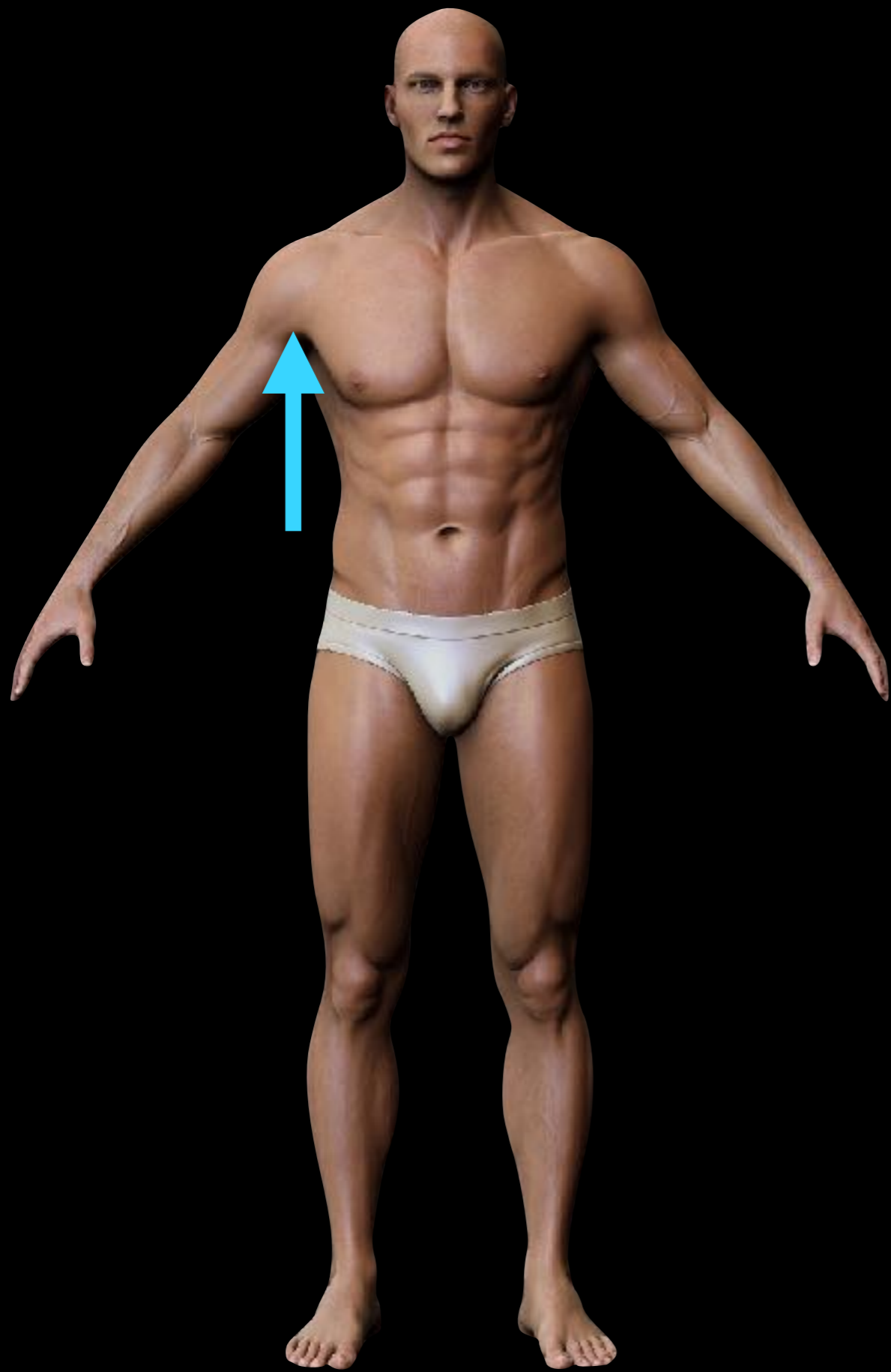


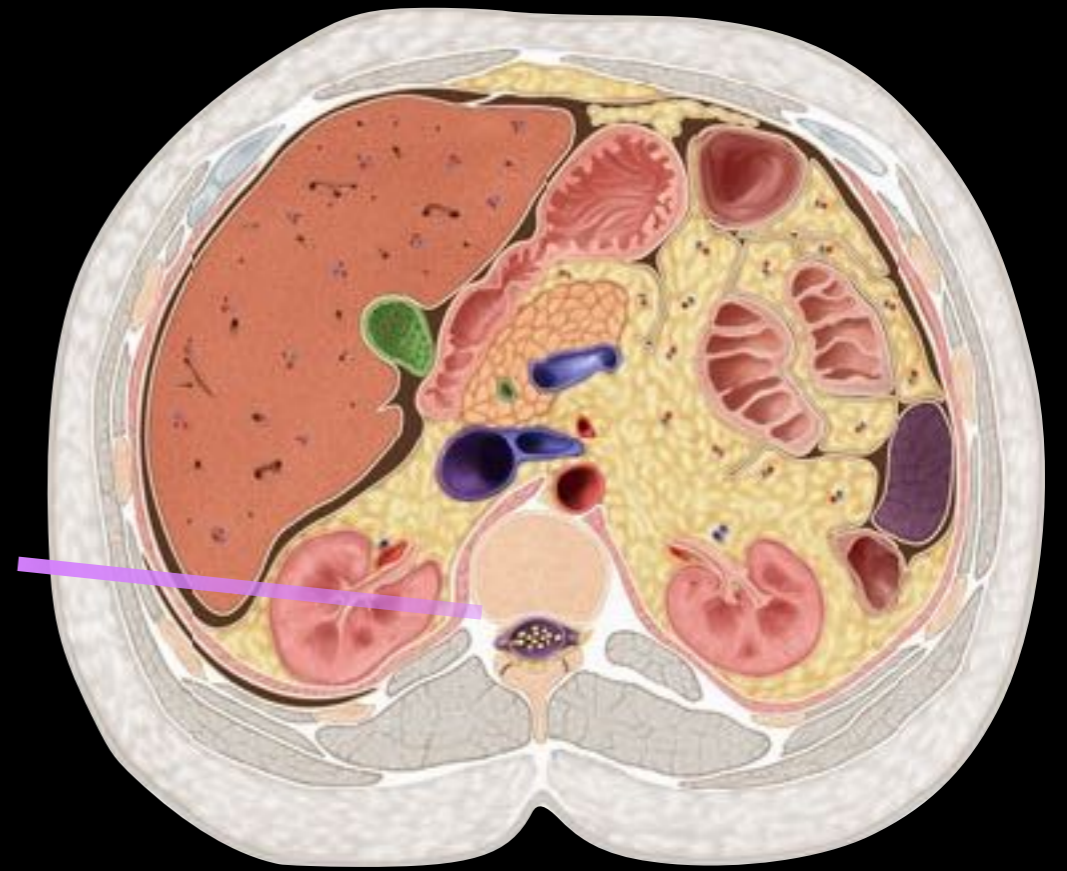
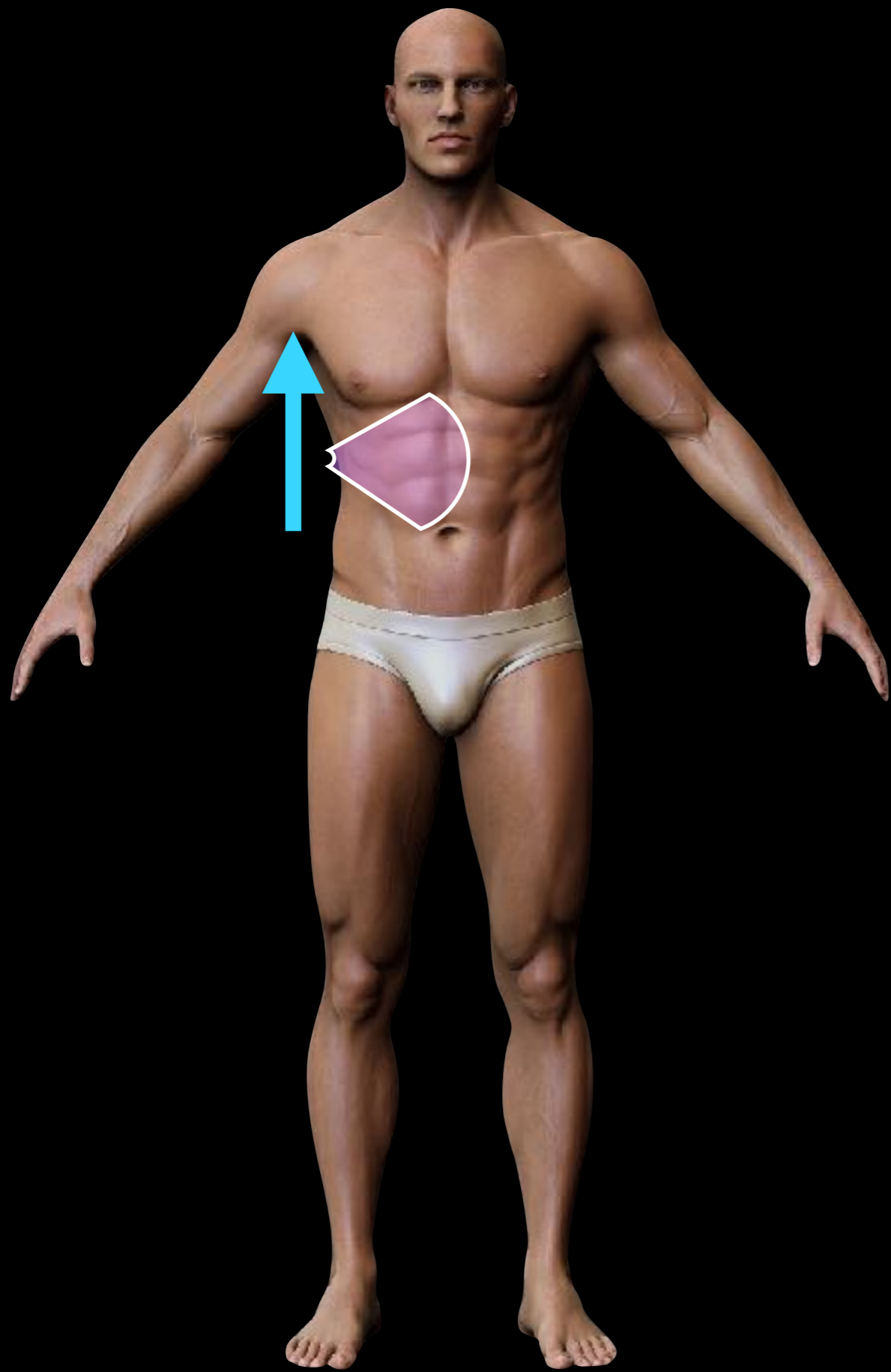
Probe

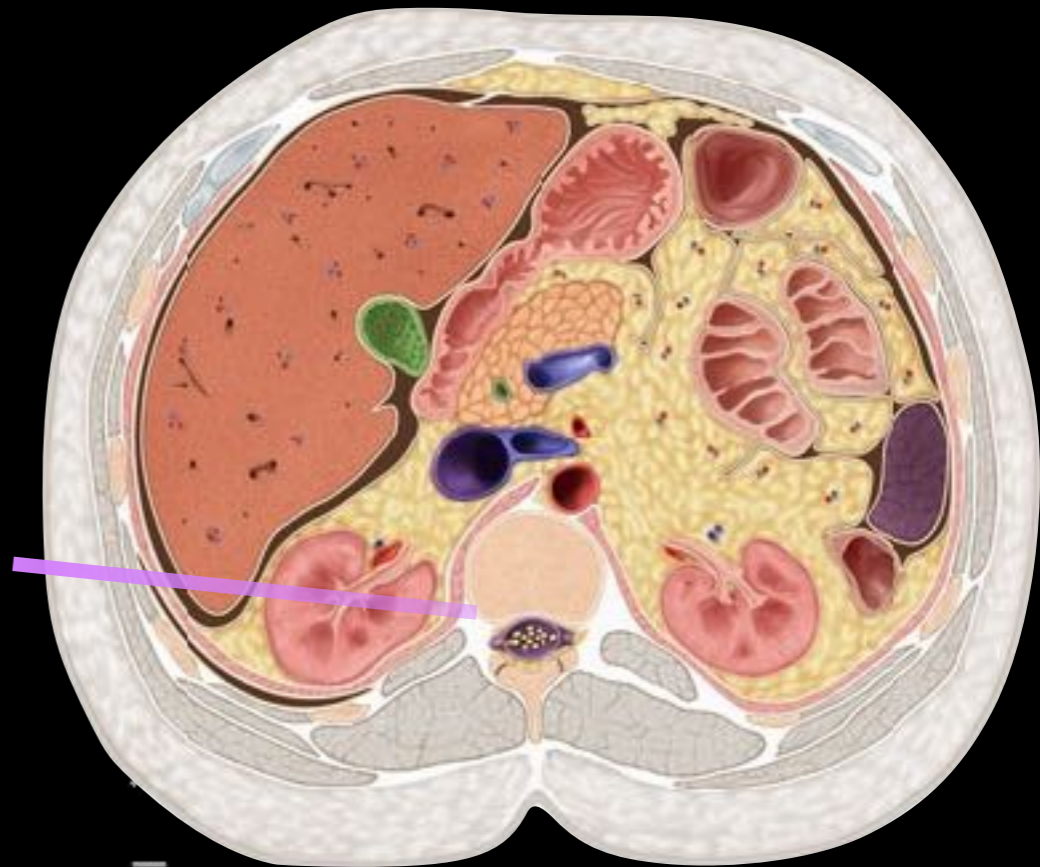
Approach

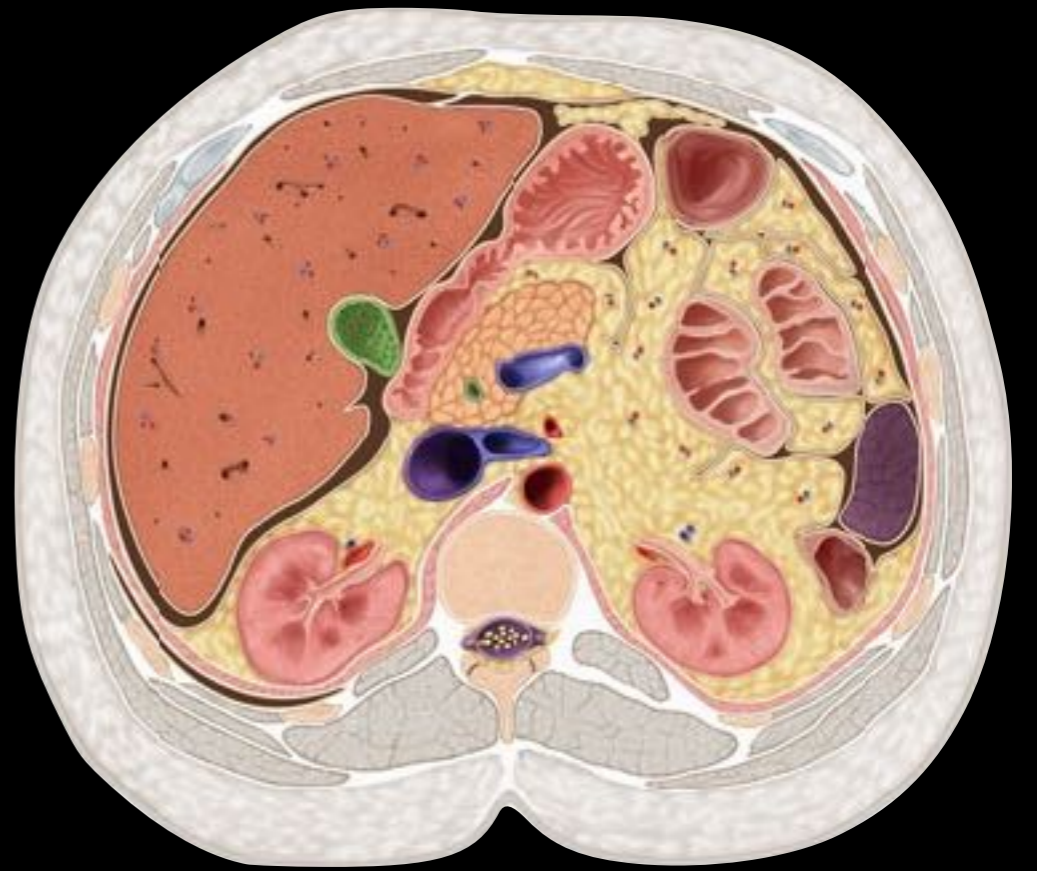


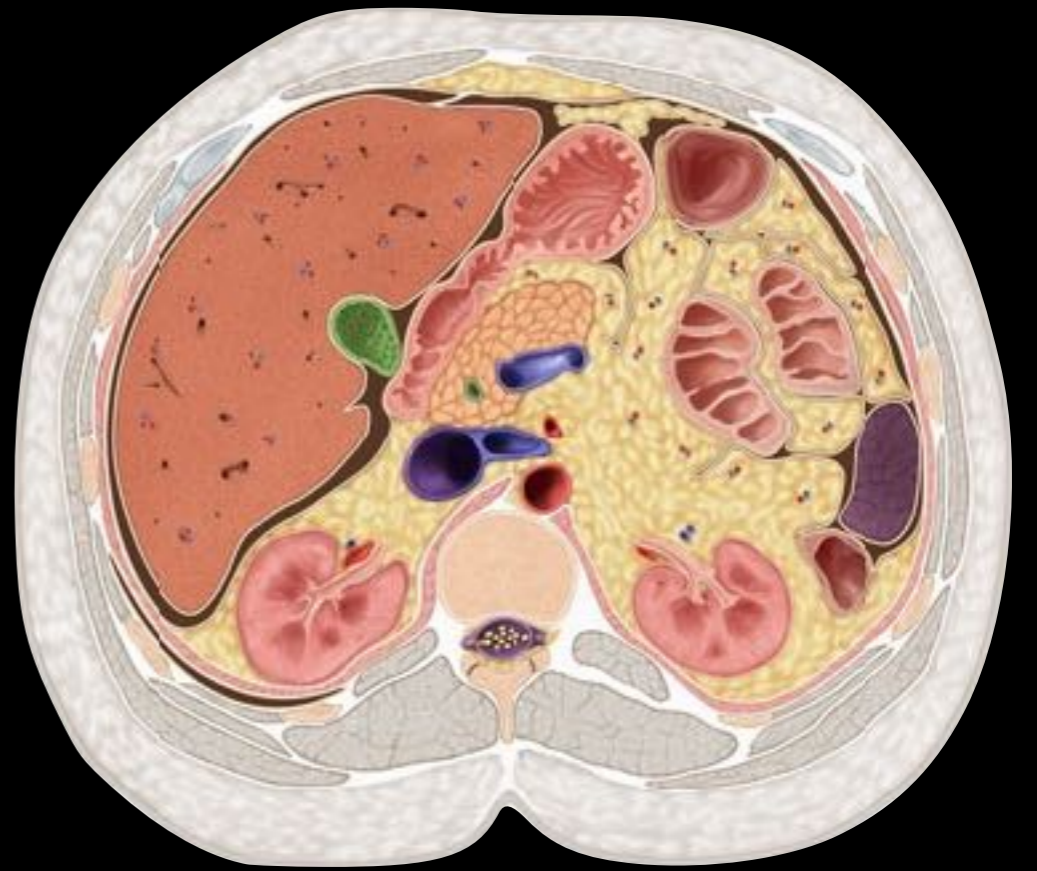
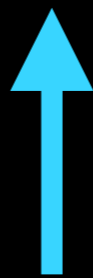


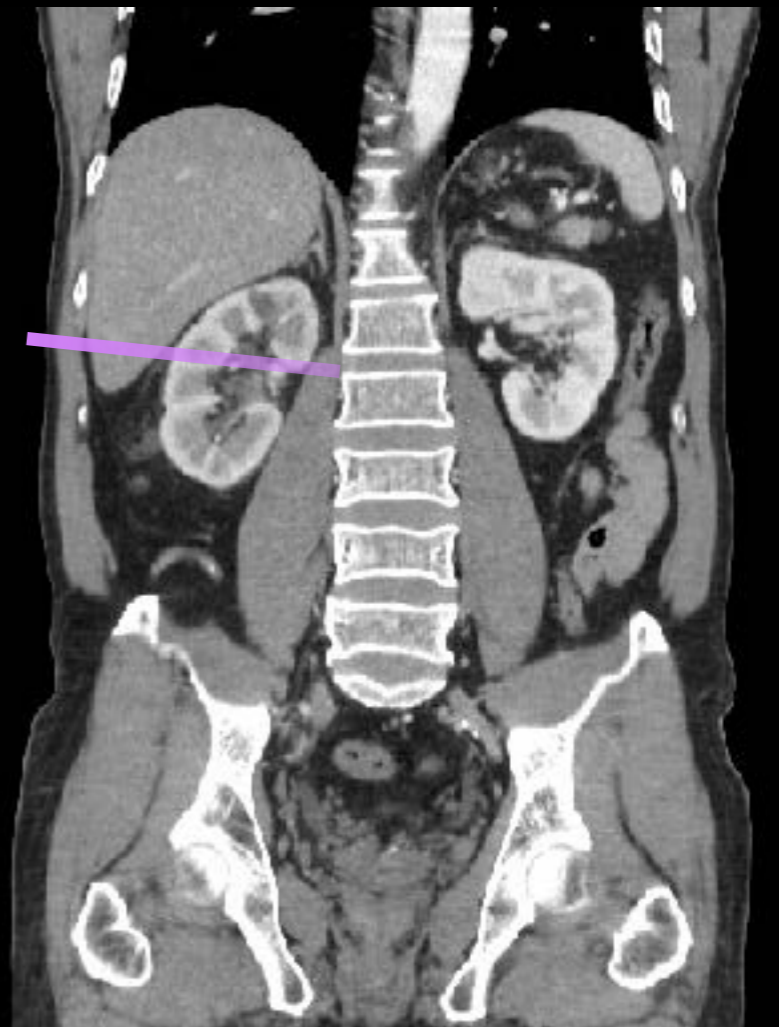
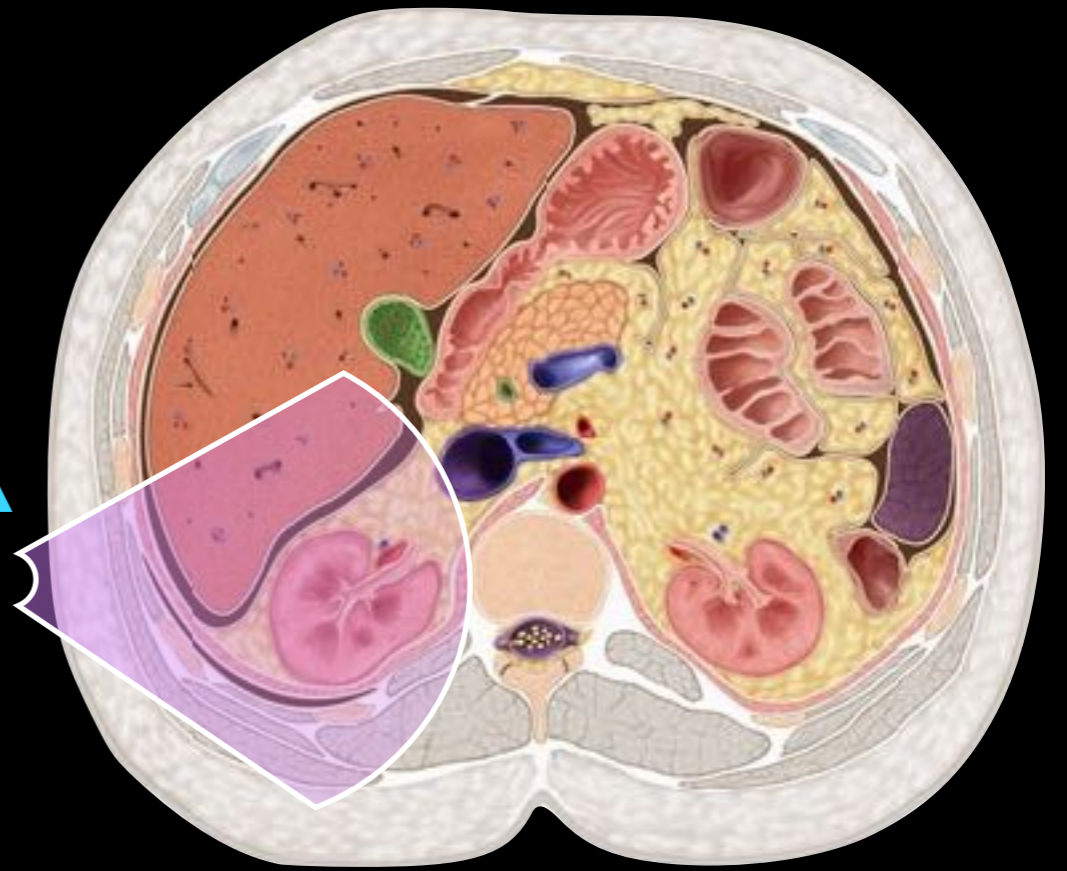
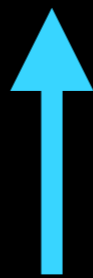


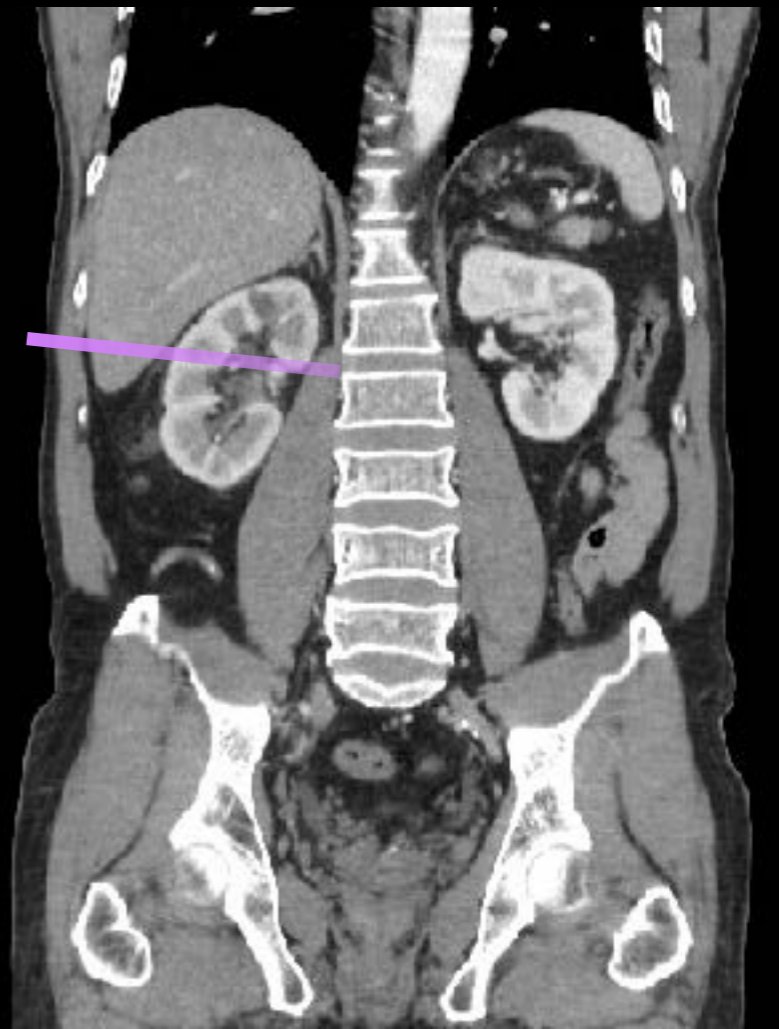
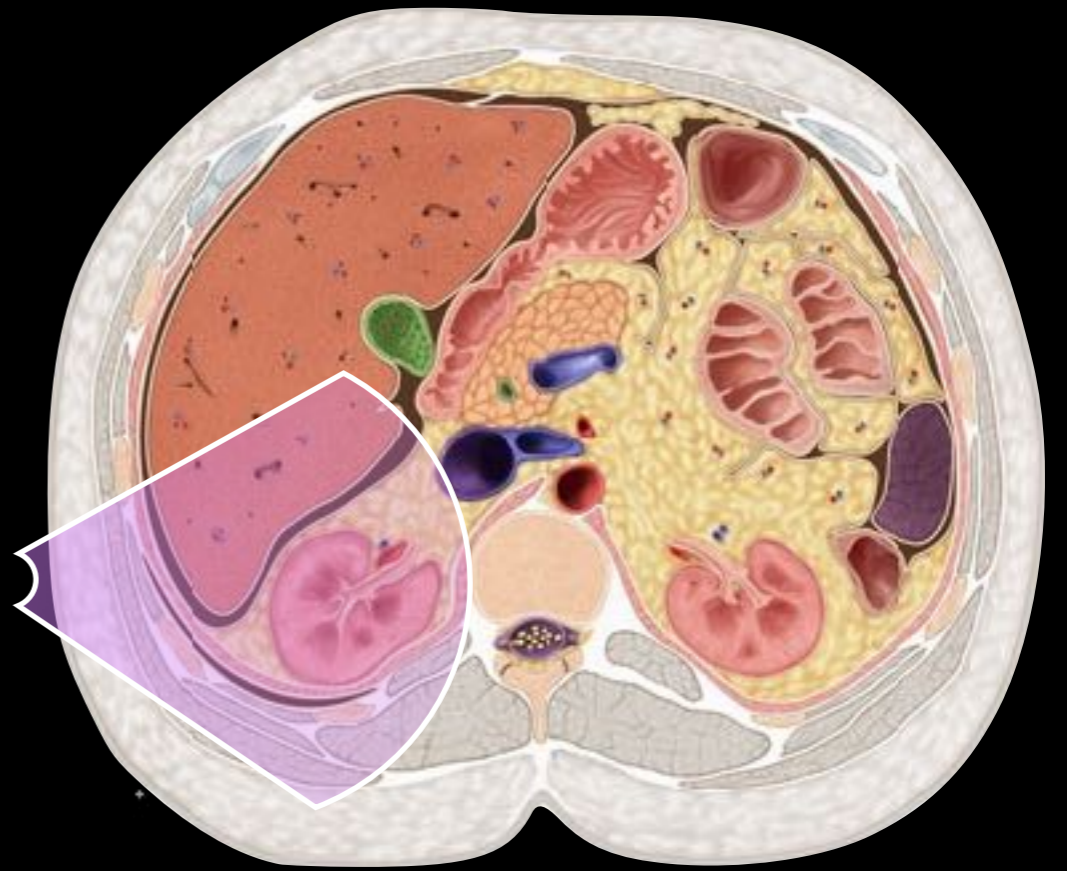


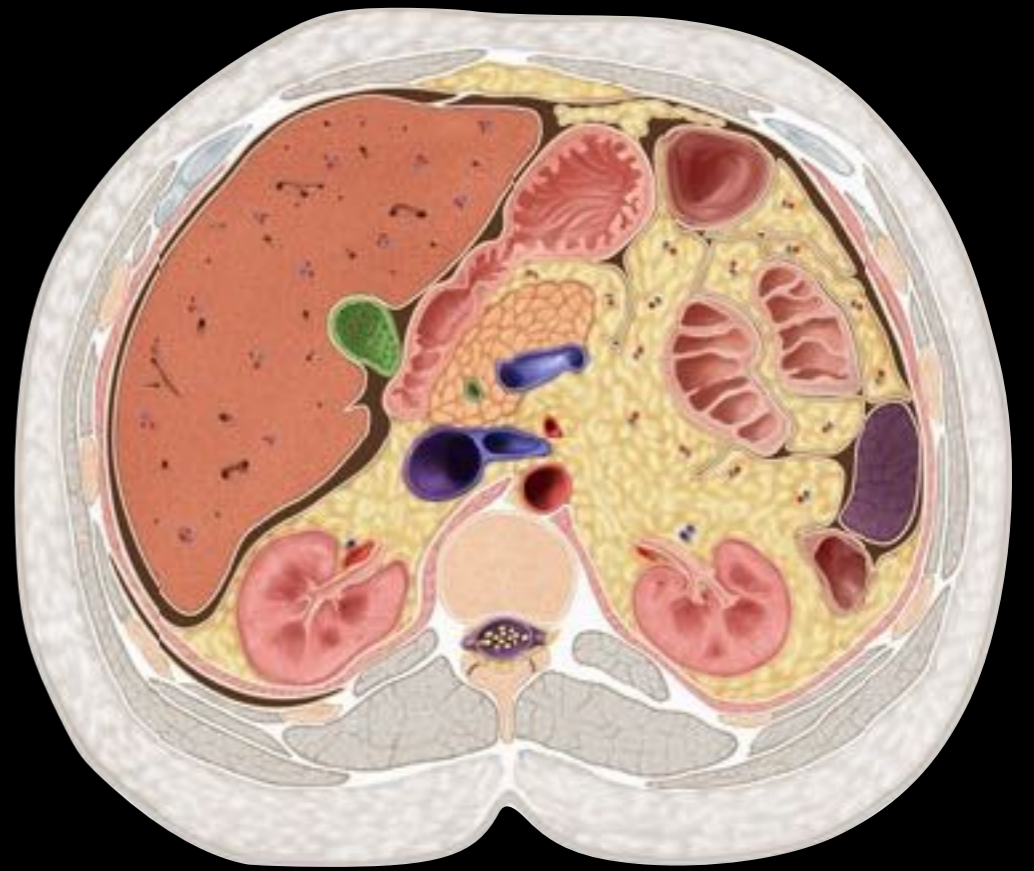


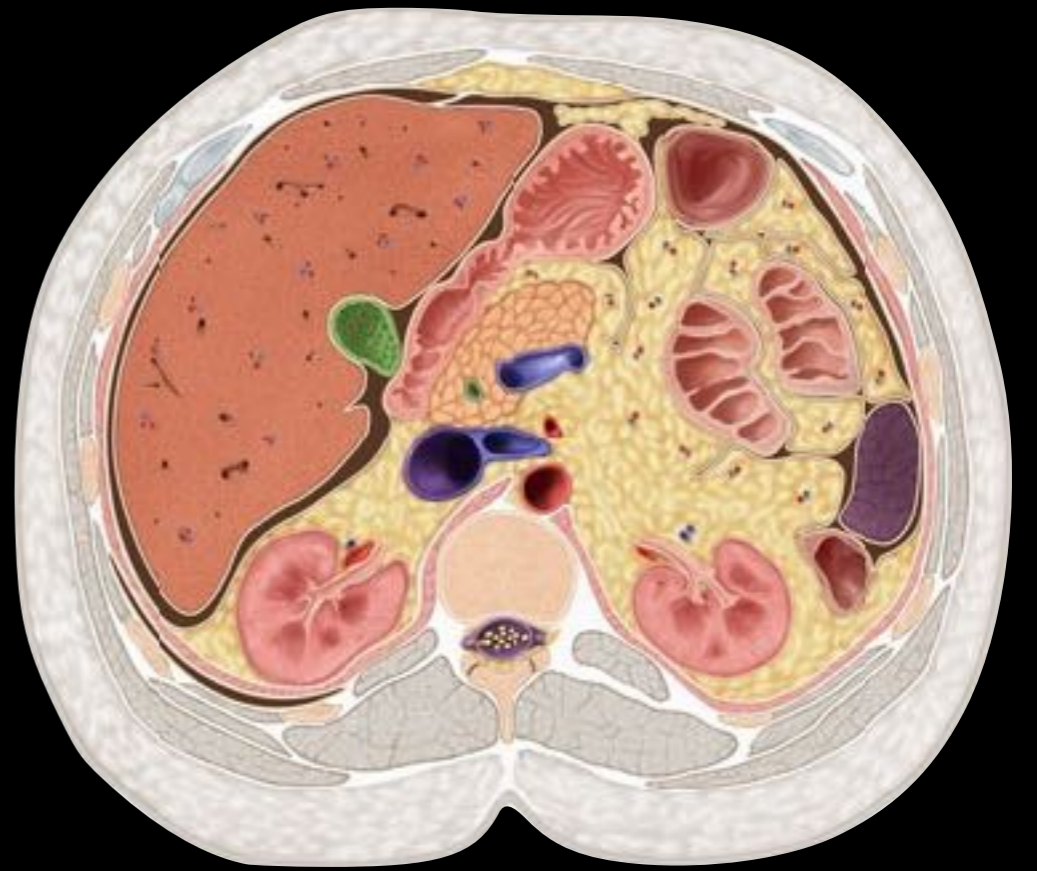
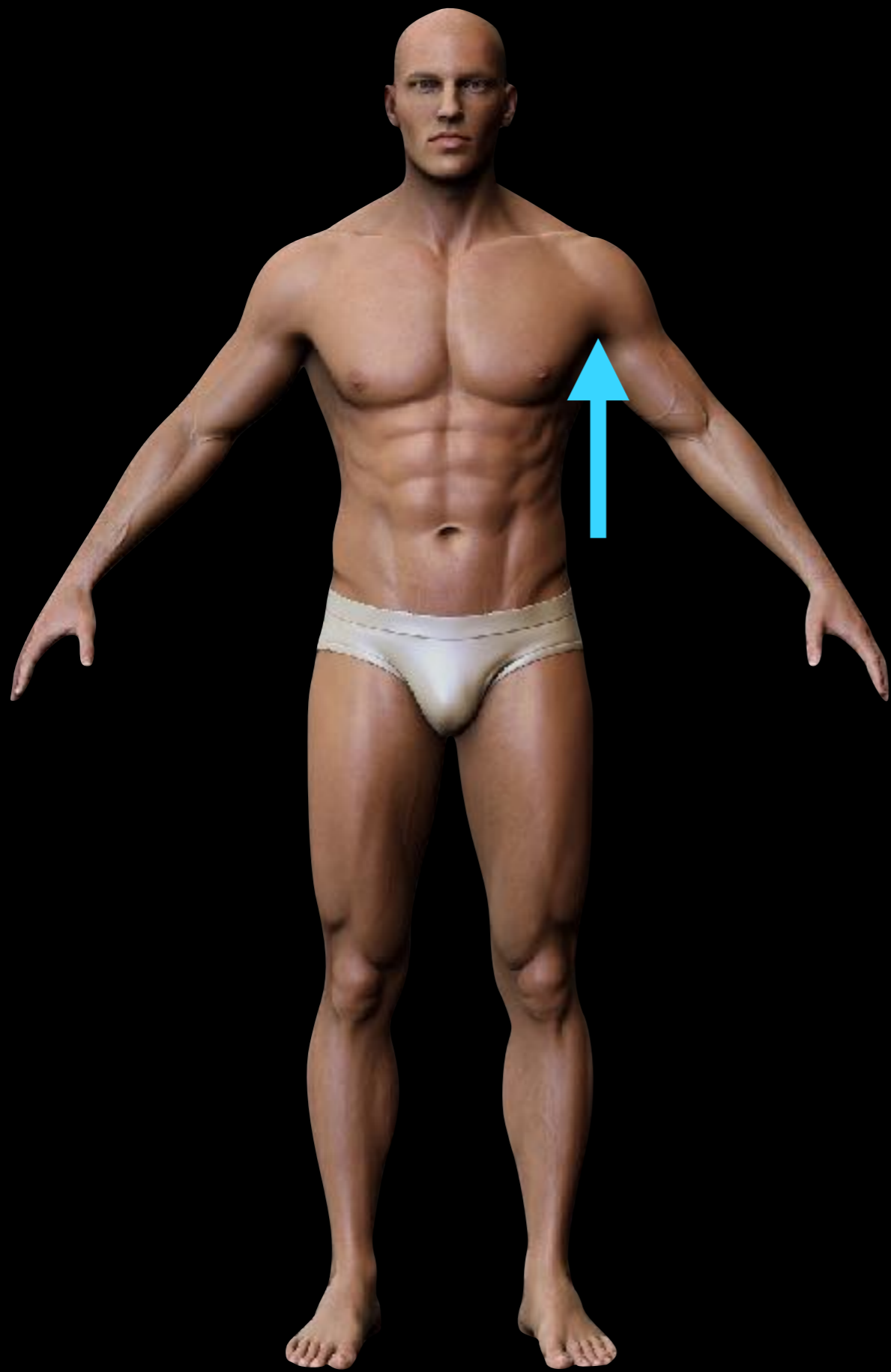


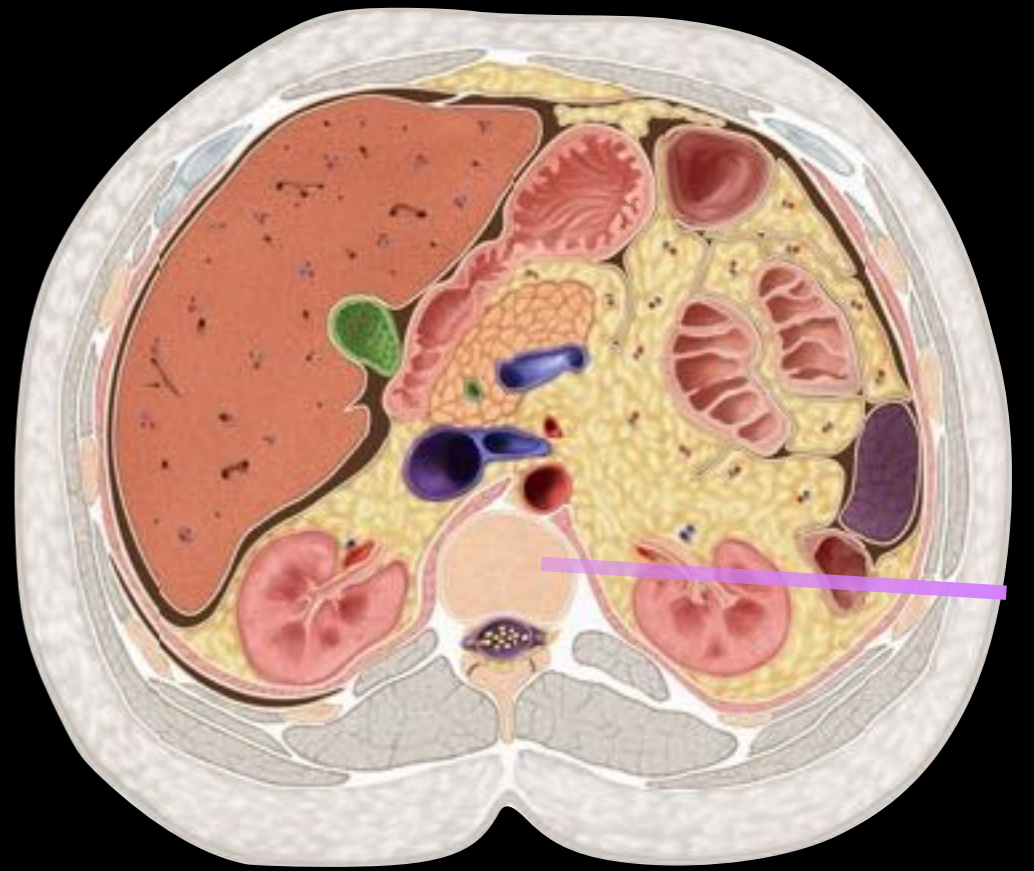
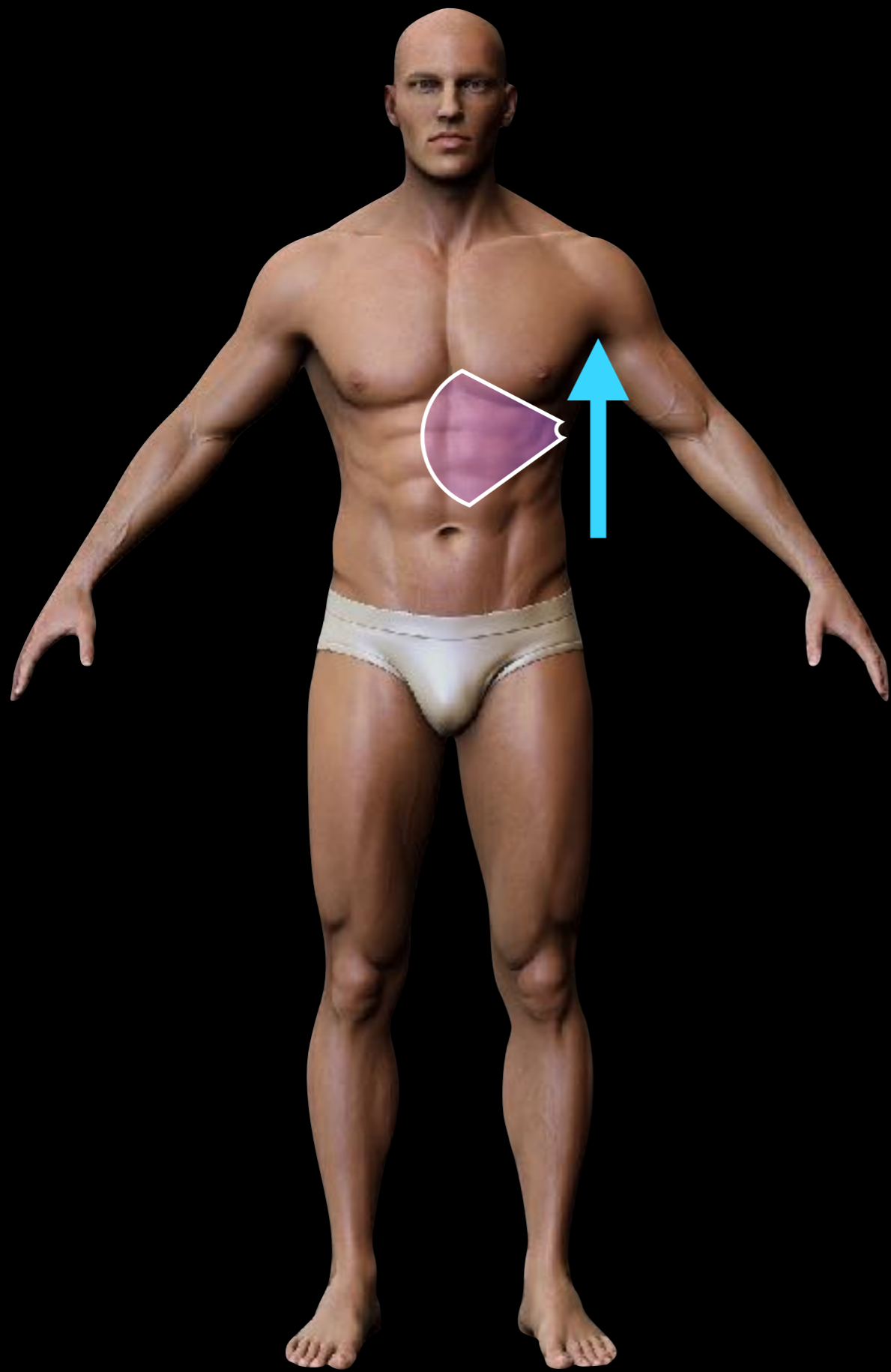


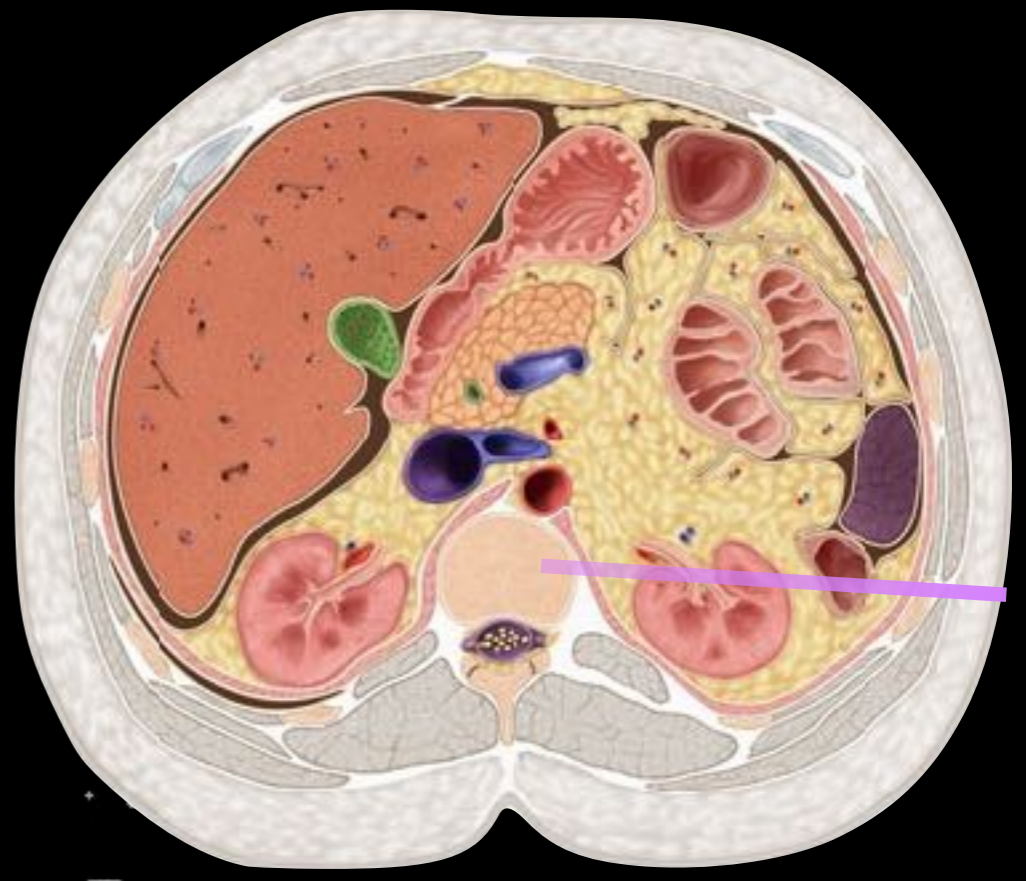


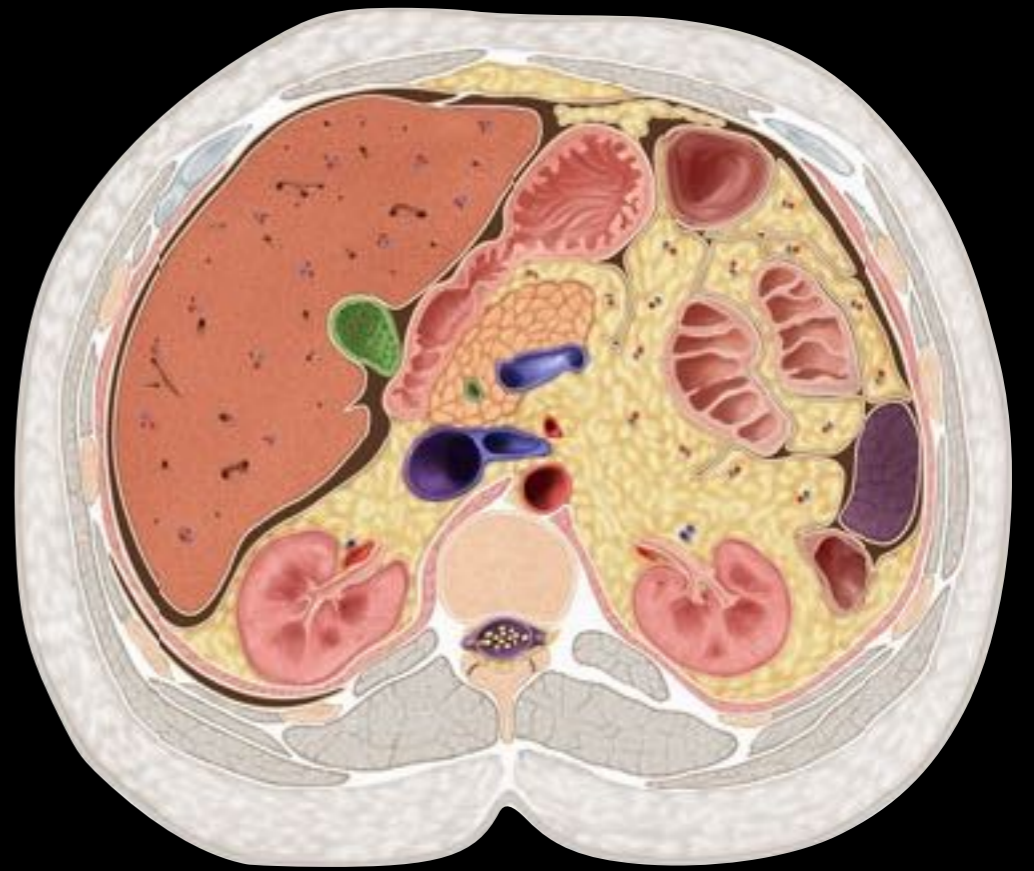


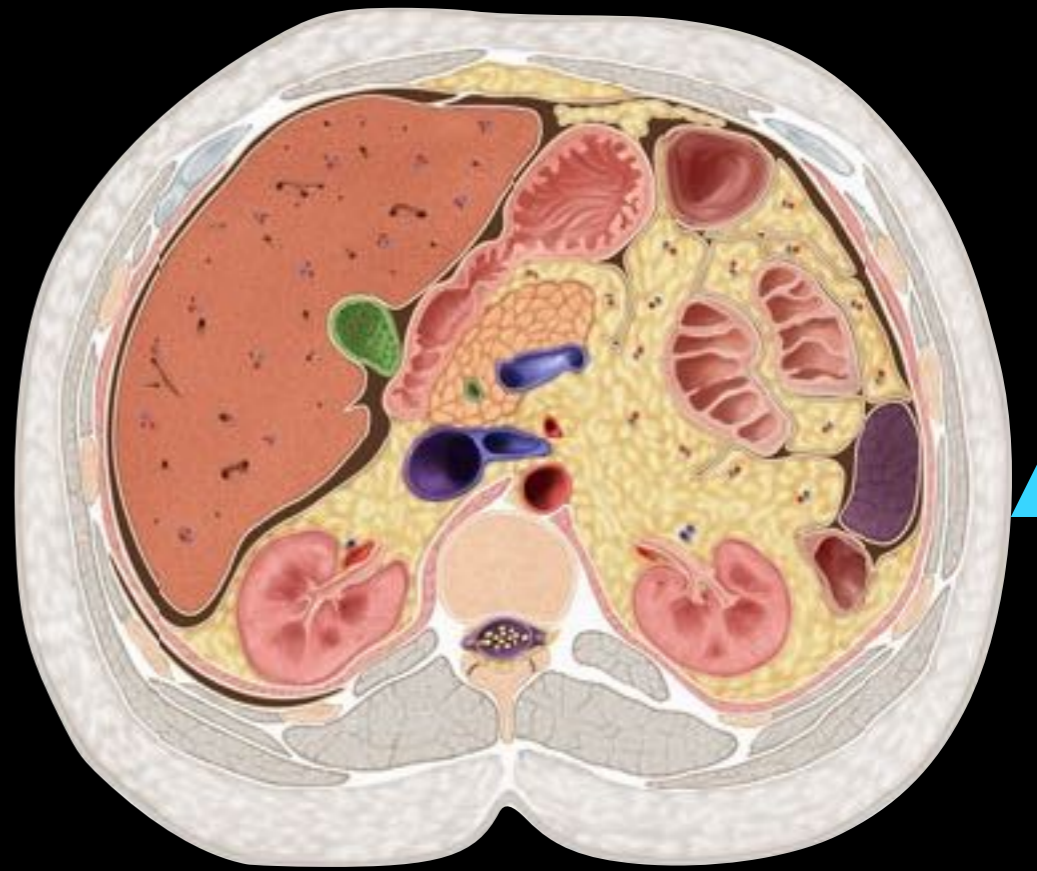


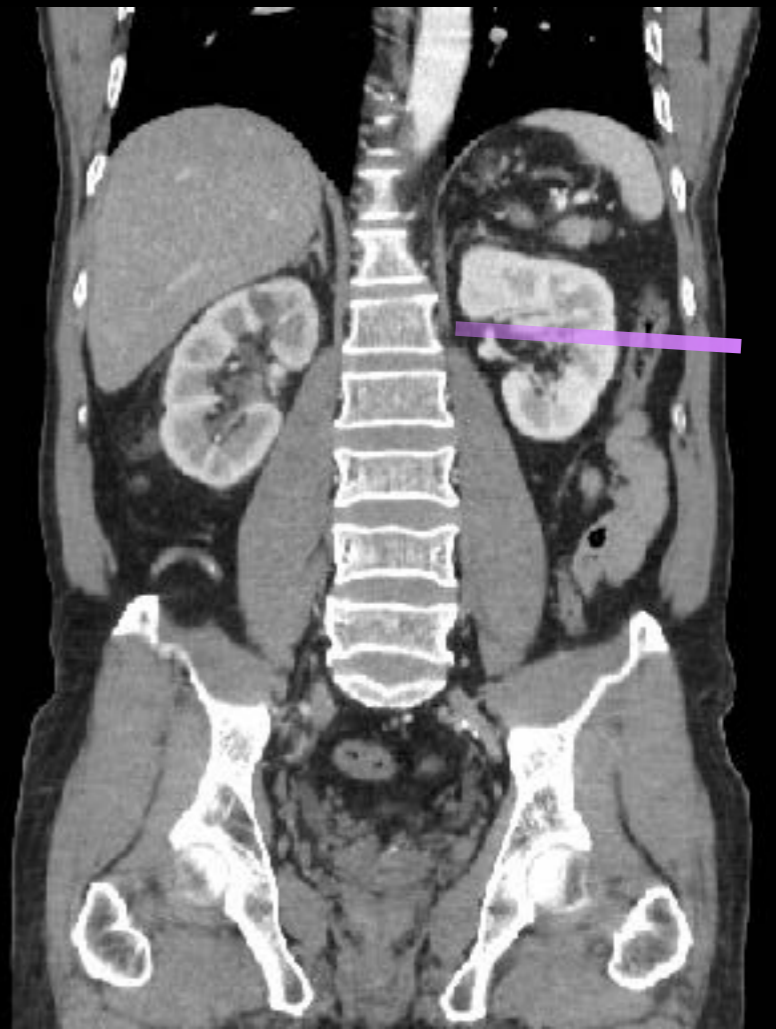
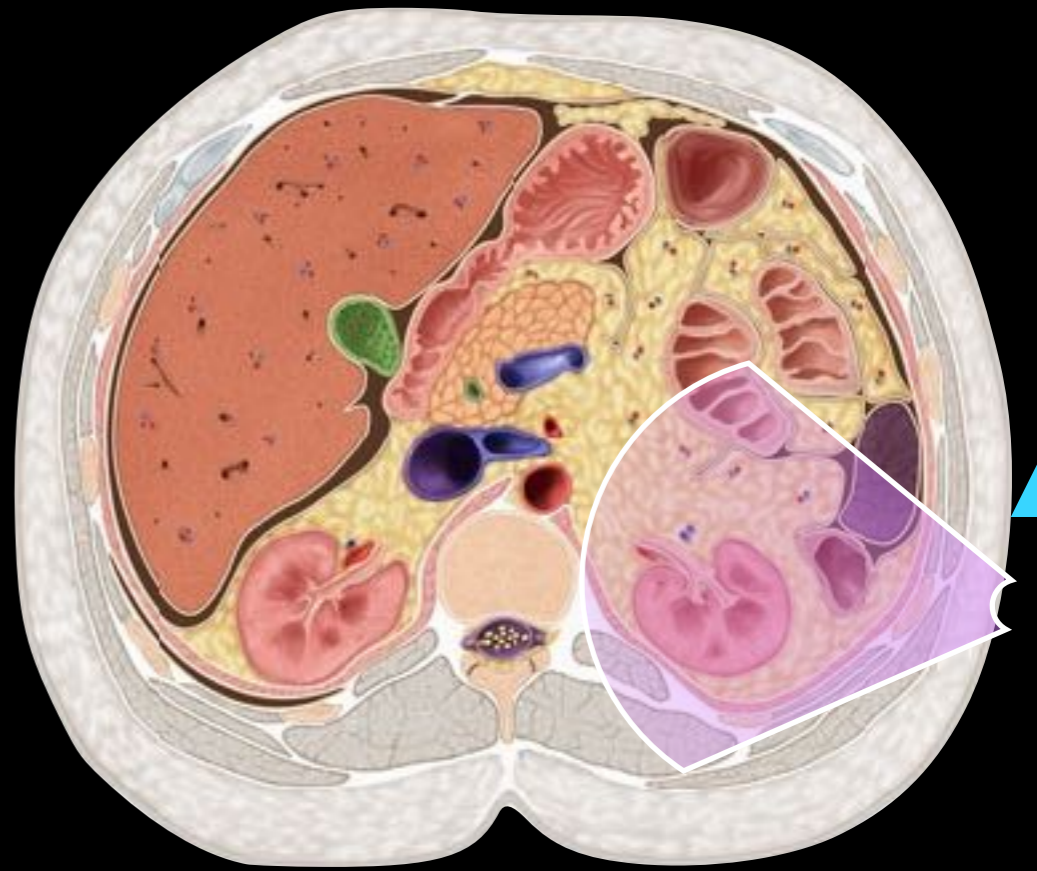
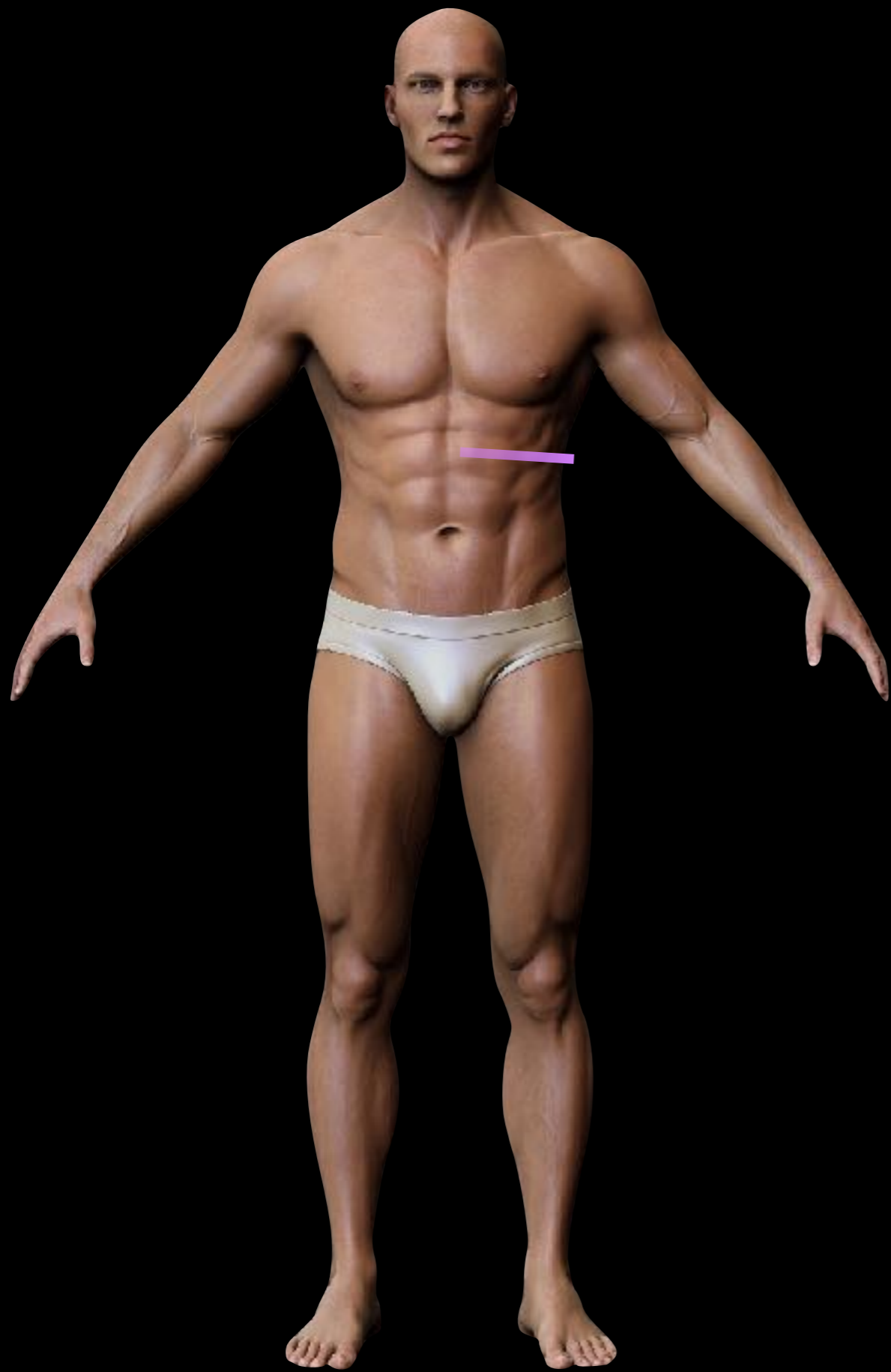




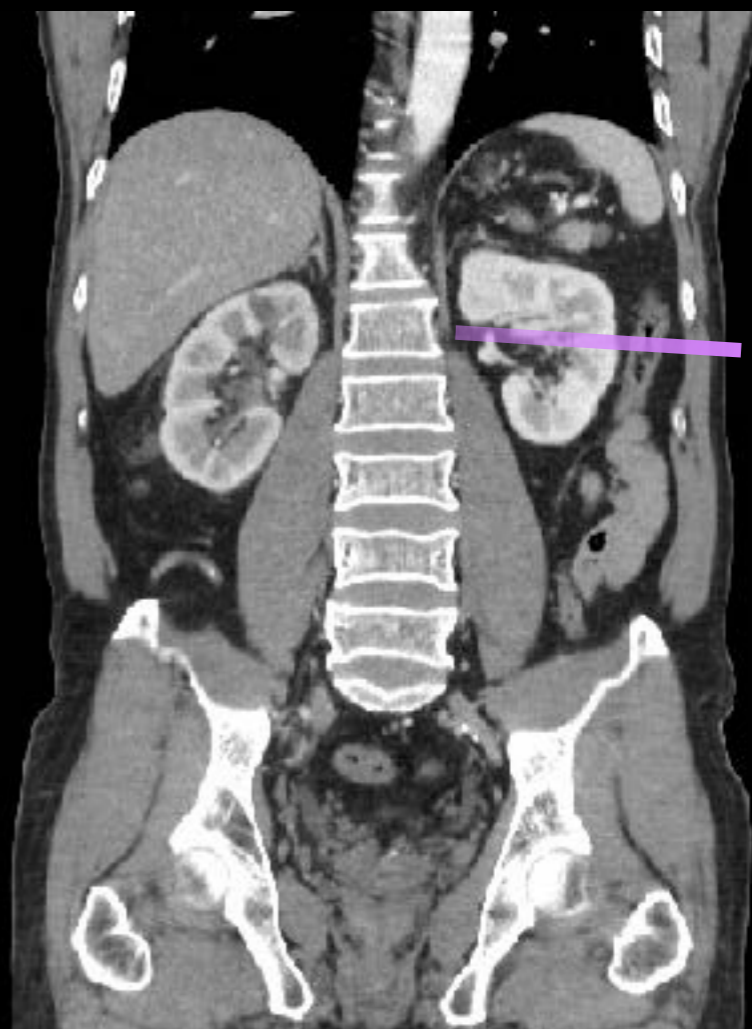
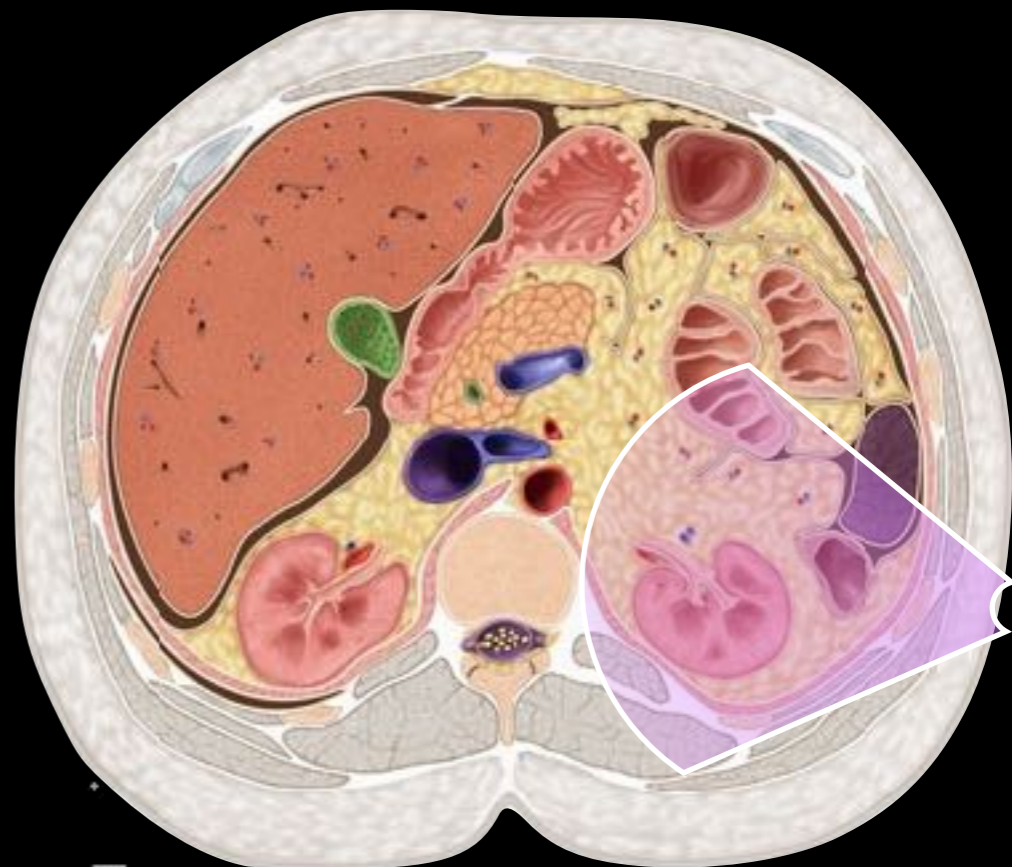




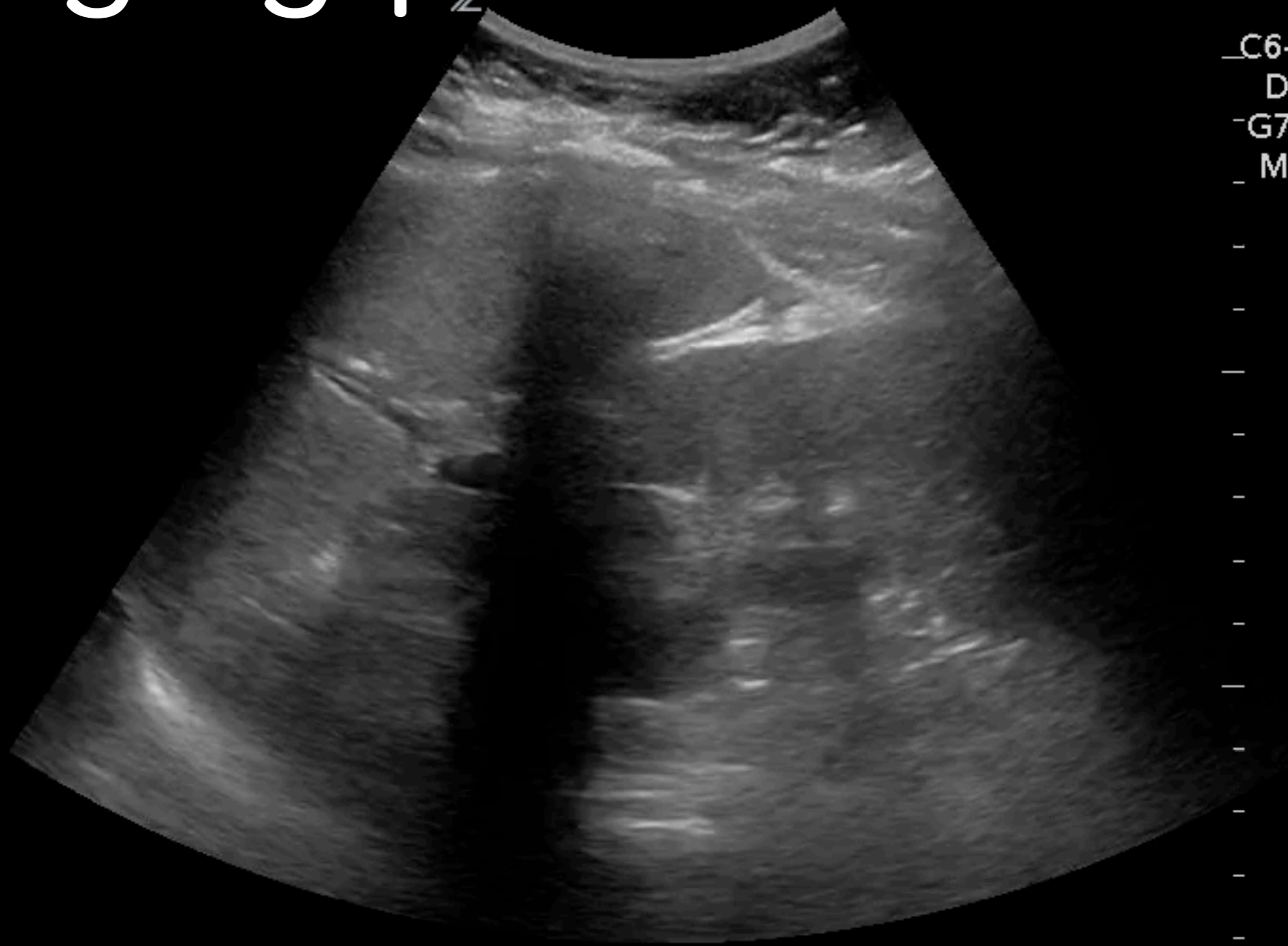




Z

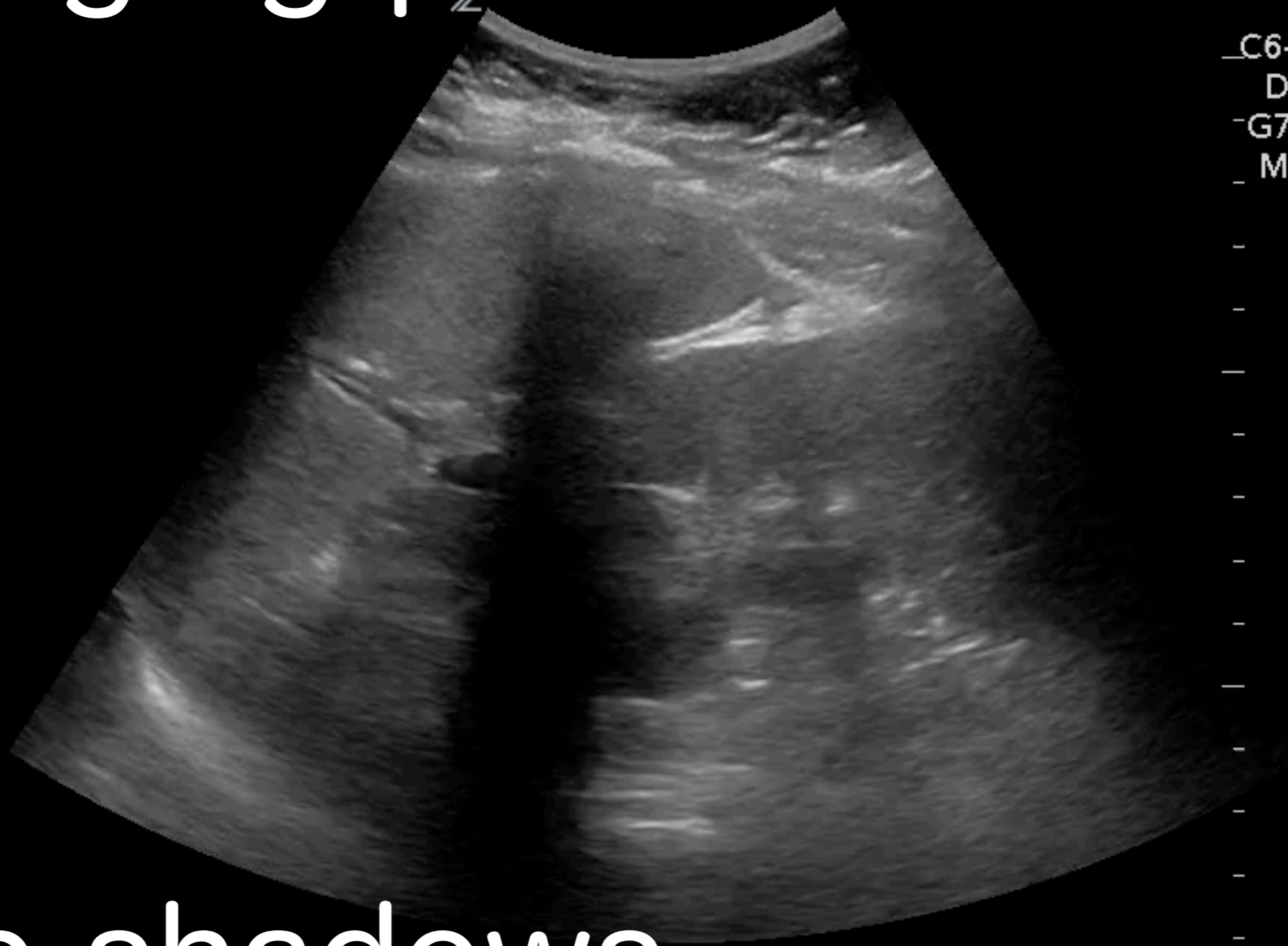


Imaging pearl



Abd/Renal
_C6-2/CH4MHz
DR55/M2/P3
-G74/E1/100%
MI1.3 TIs0.4
14.0 cm
12 Hz
△ ZSI 0

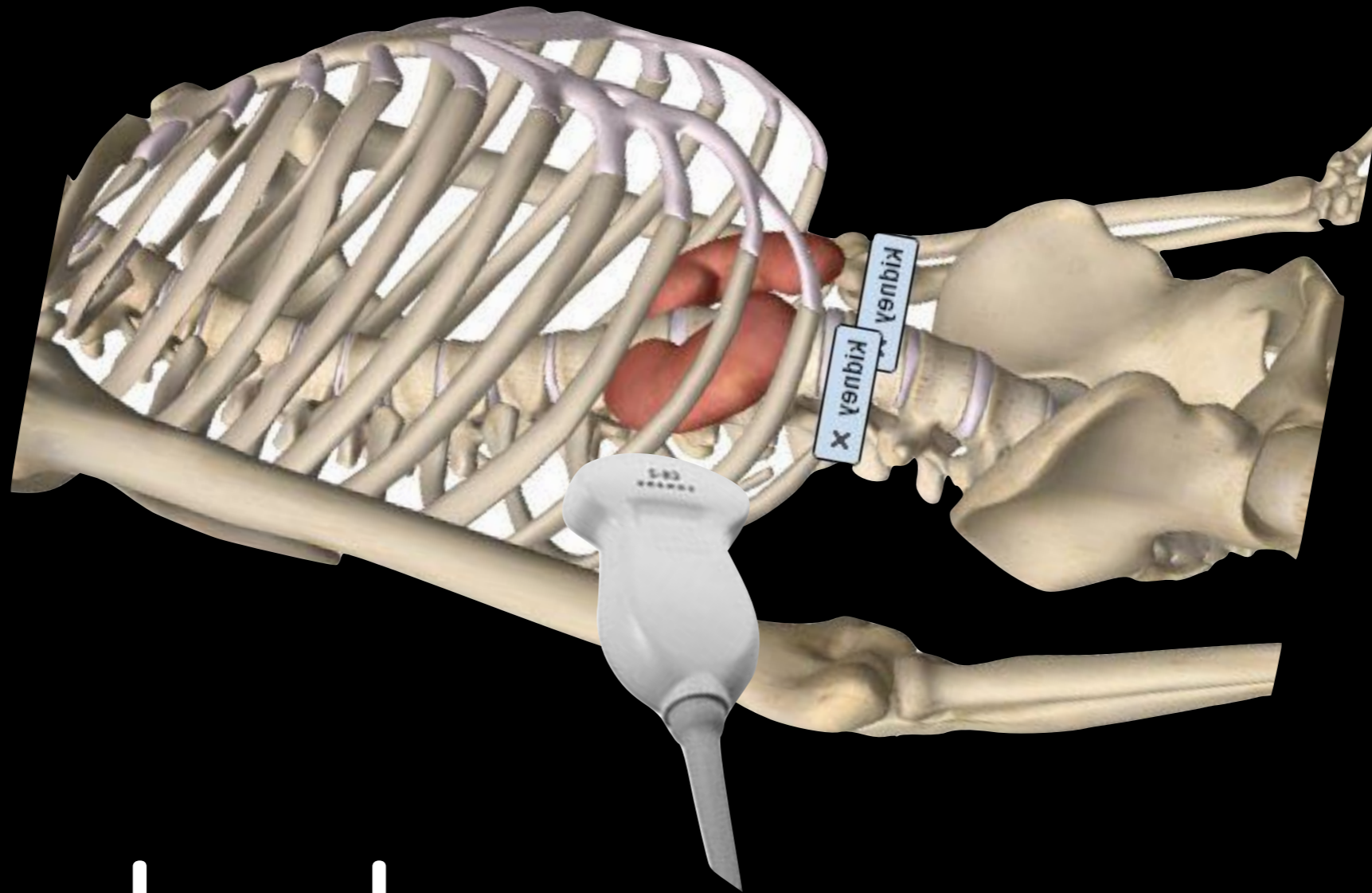
Imaging pearl



Abd/Renal
_C6-2/CH4MHz
DR55/M2/P3
-G74/E1/100%
MI1.3 TIs0.4
14.0 cm
12 Hz
△ ZSI 0

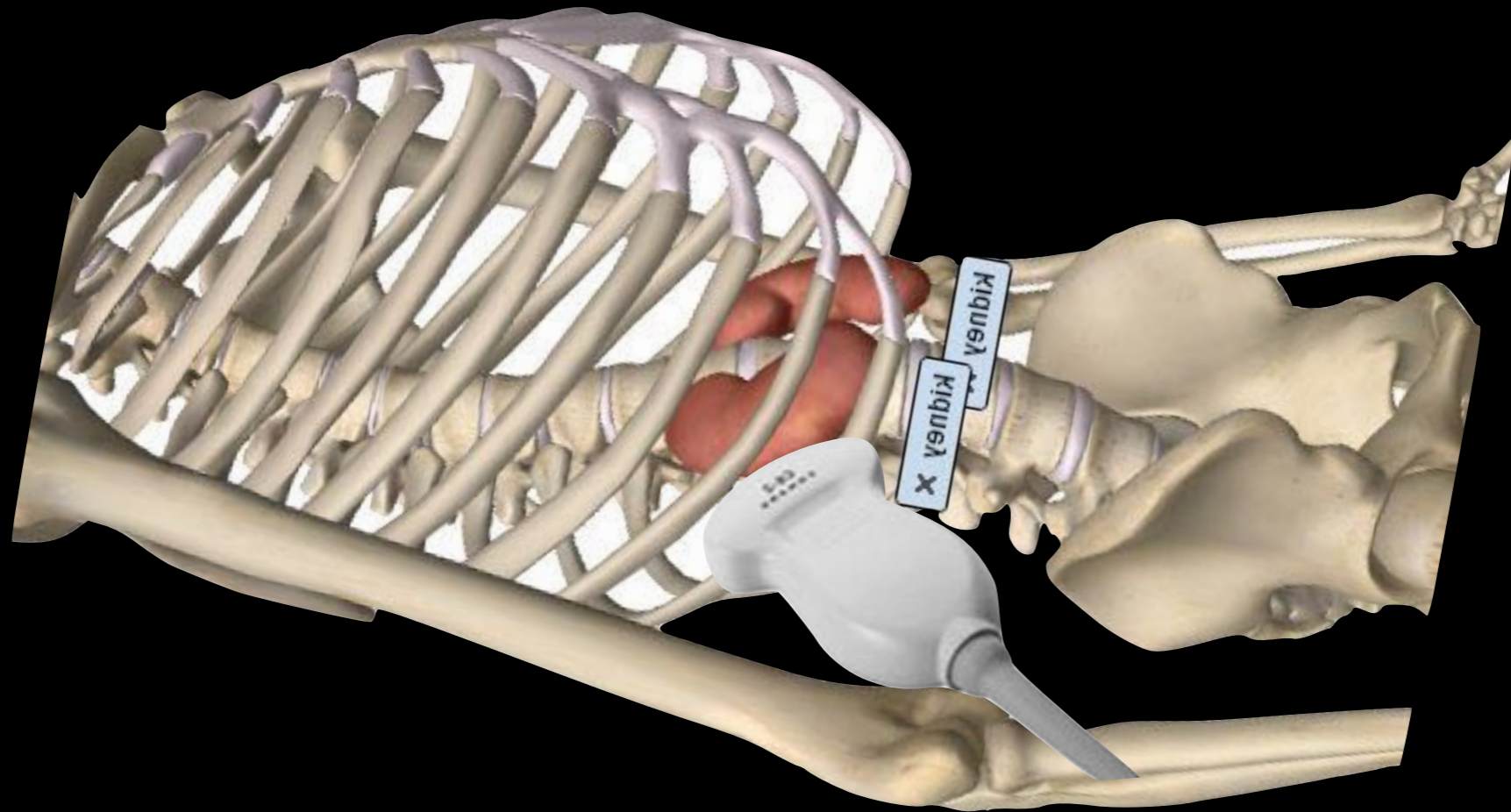
Rib shadows
Turn probe obliquely

Imaging pearl



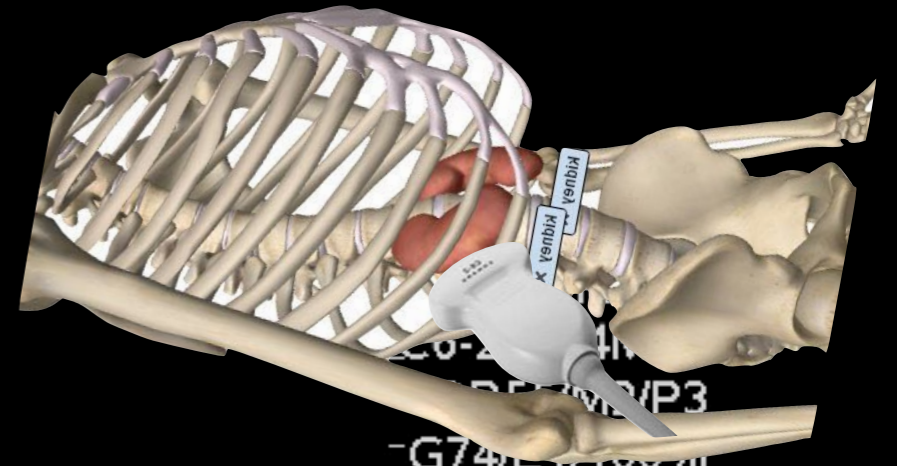
Rib shadows
Turn probe obliquely

Imaging pearl



Rib shadows
Turn probe obliquely

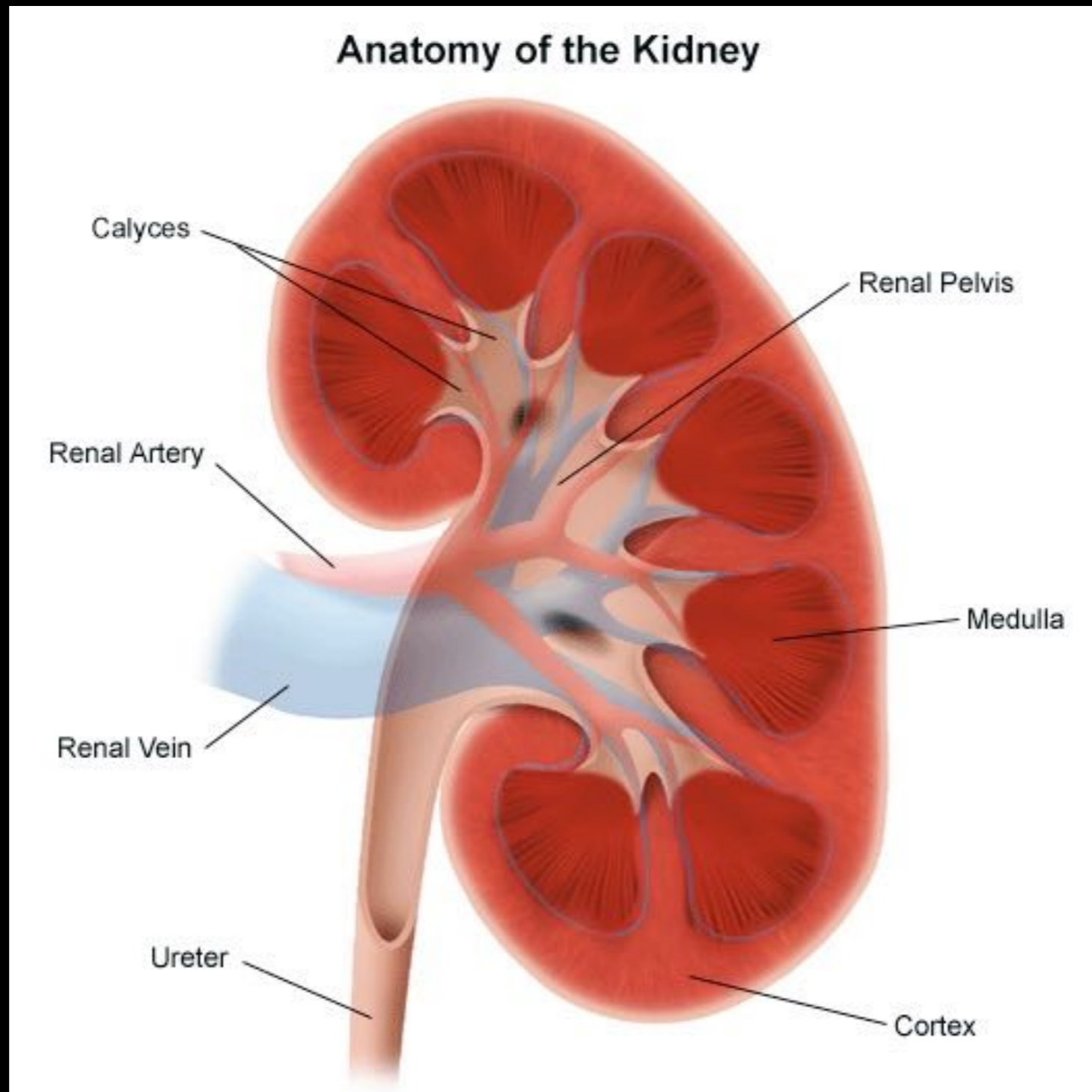
Imaging pearl



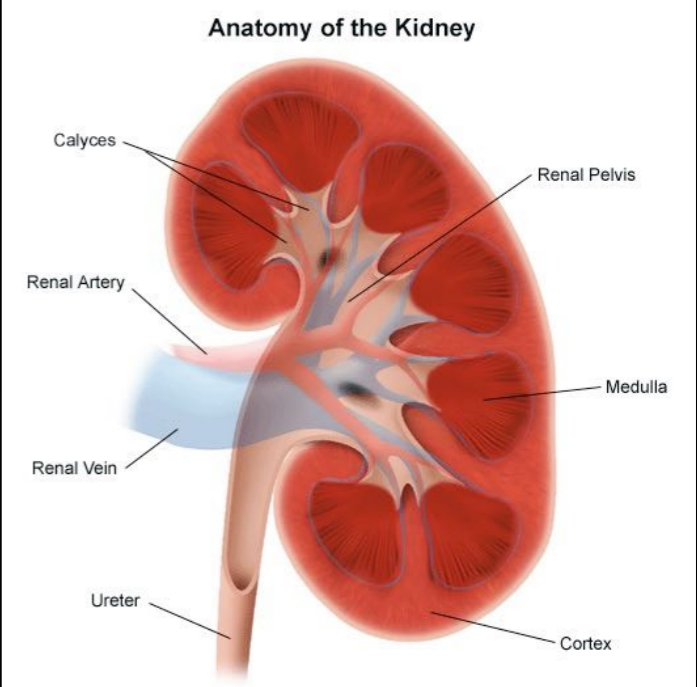
-G74LE110070
MI1.3 TIs0.4
14.0 cm
12 Hz
ZSI 0

Rib shadows
Turn probe obliquely

Anatomy

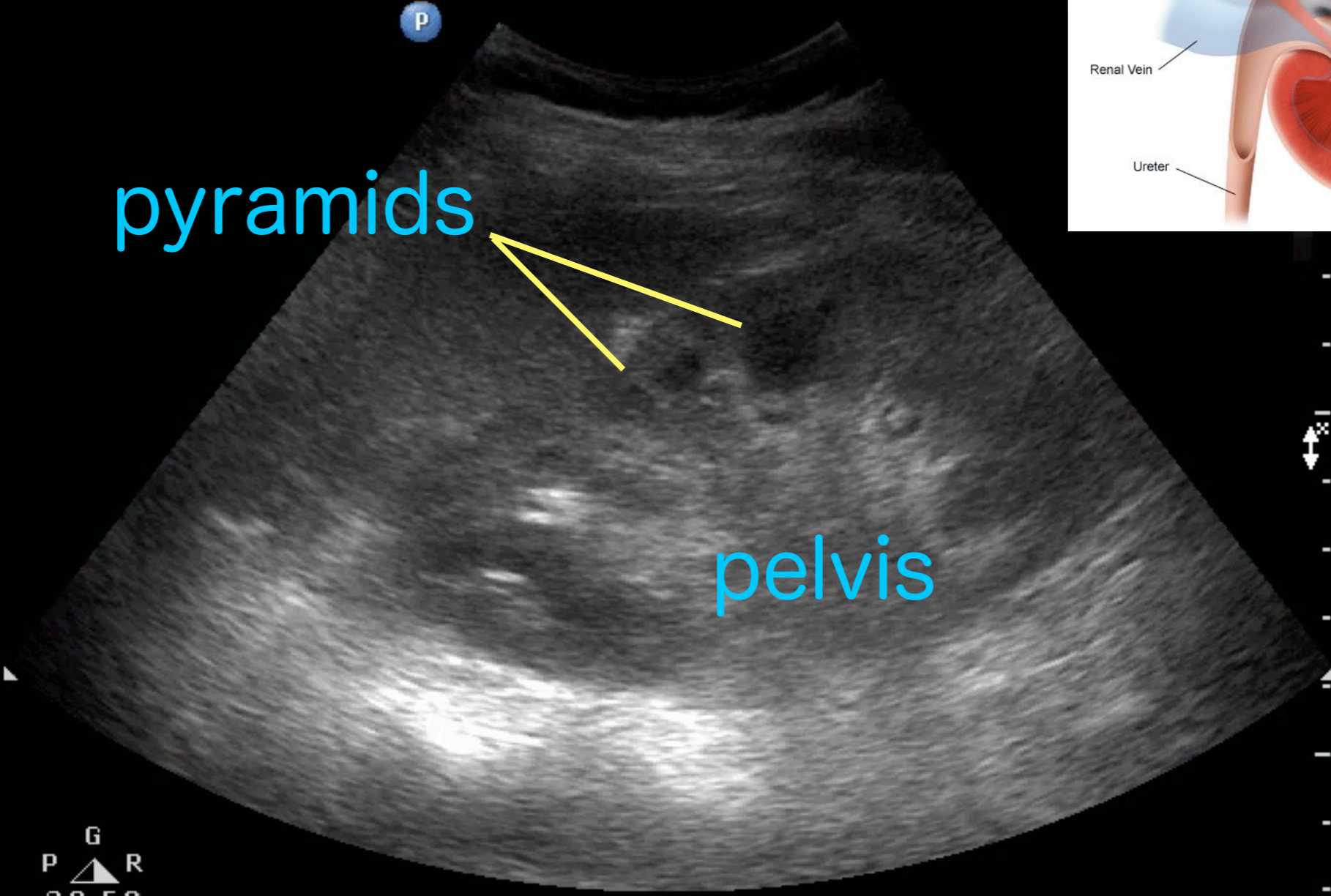


Anatomy



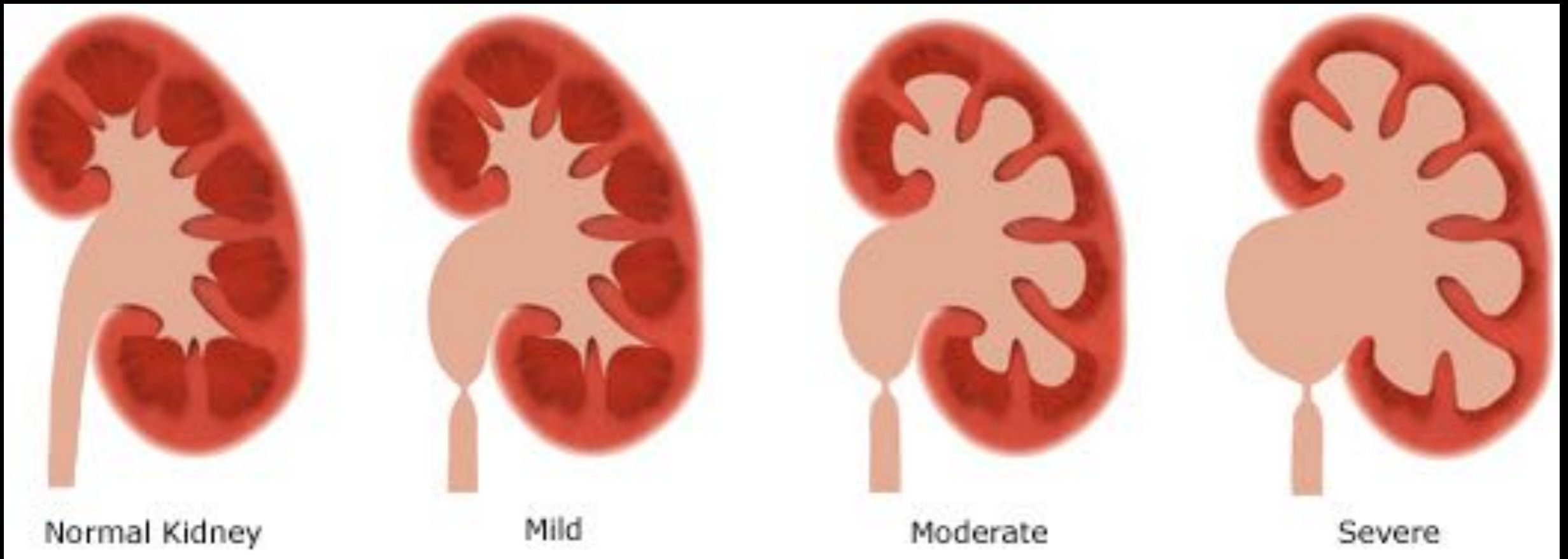
Renal
C5-2
37Hz
12cm

2D
F4
Gn 67
232dB/C5
F/2/2



G
P R
2.0 5.0

Hydronephrosis



None

Severe

Mild

Moderate

None

Severe

Mild

Moderate



Severe

Mild

Moderate



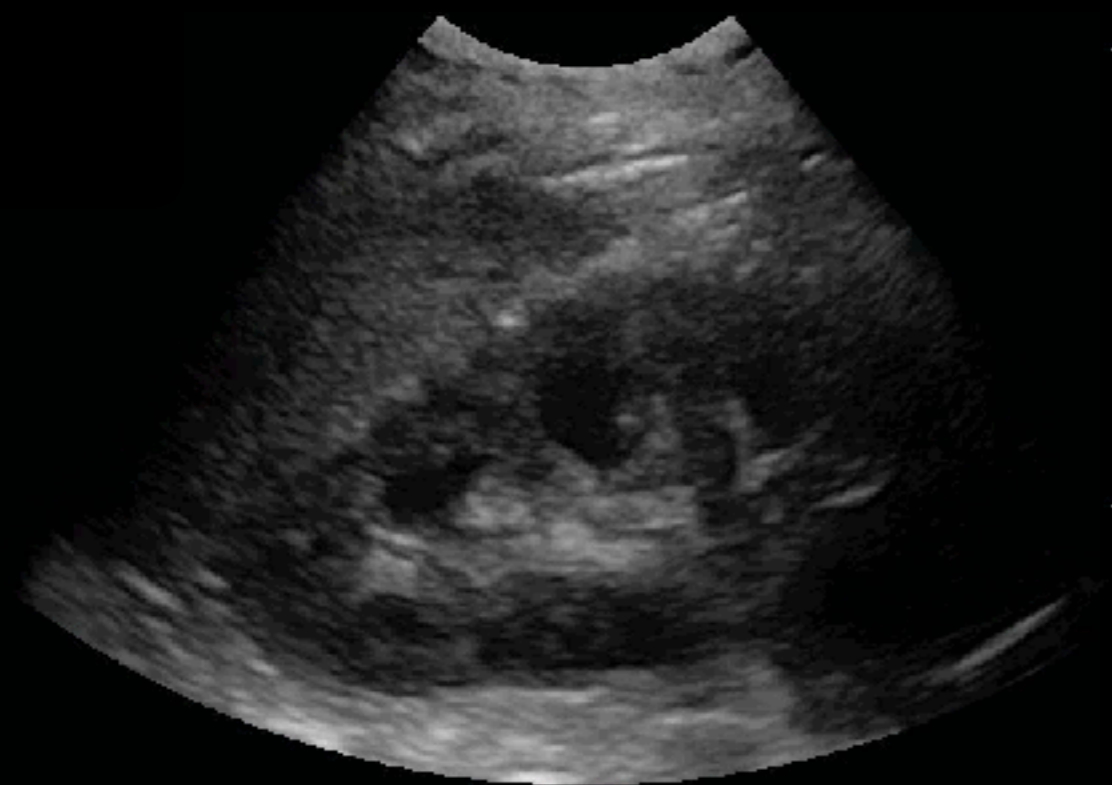
Severe



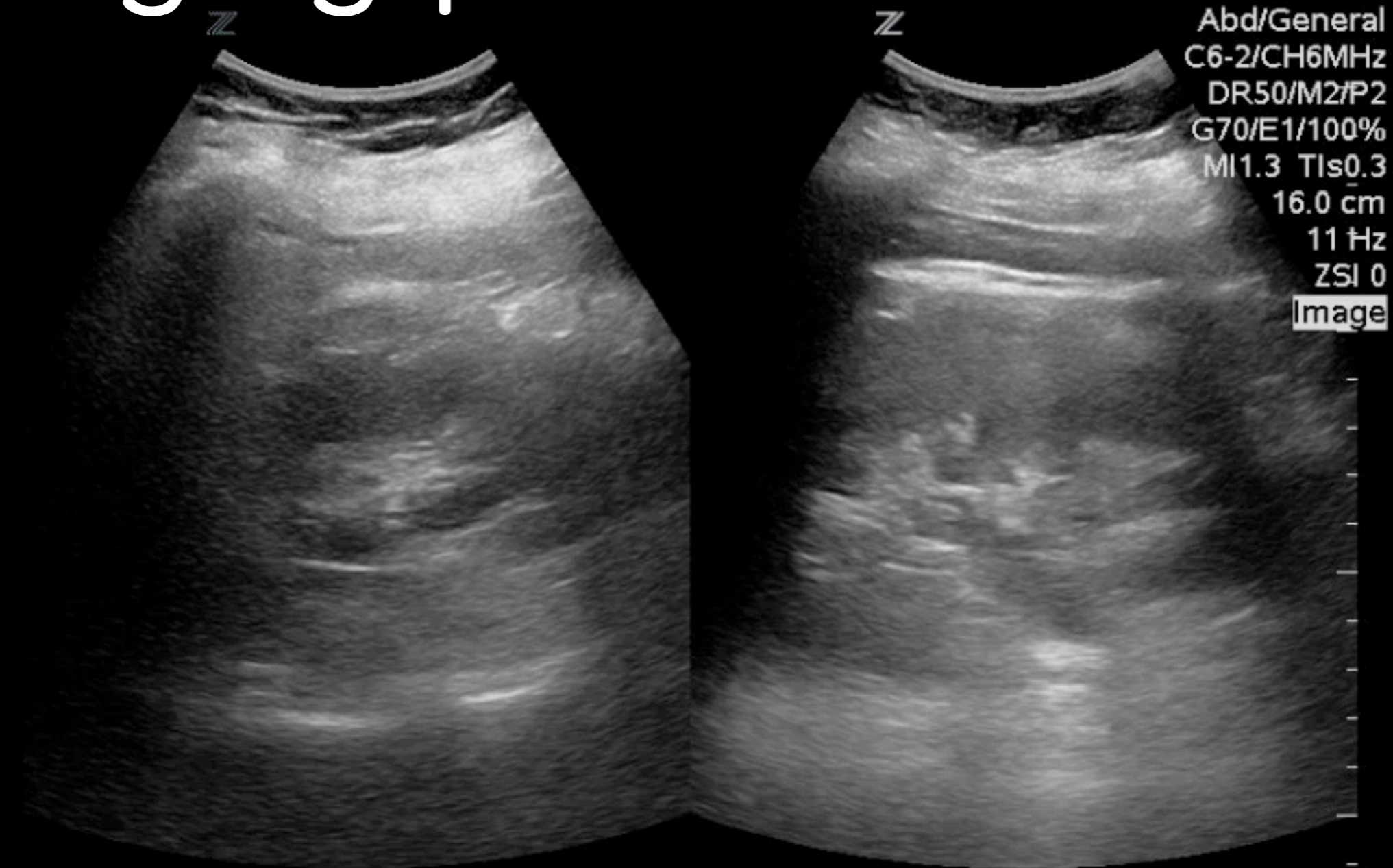
Moderate

Severe

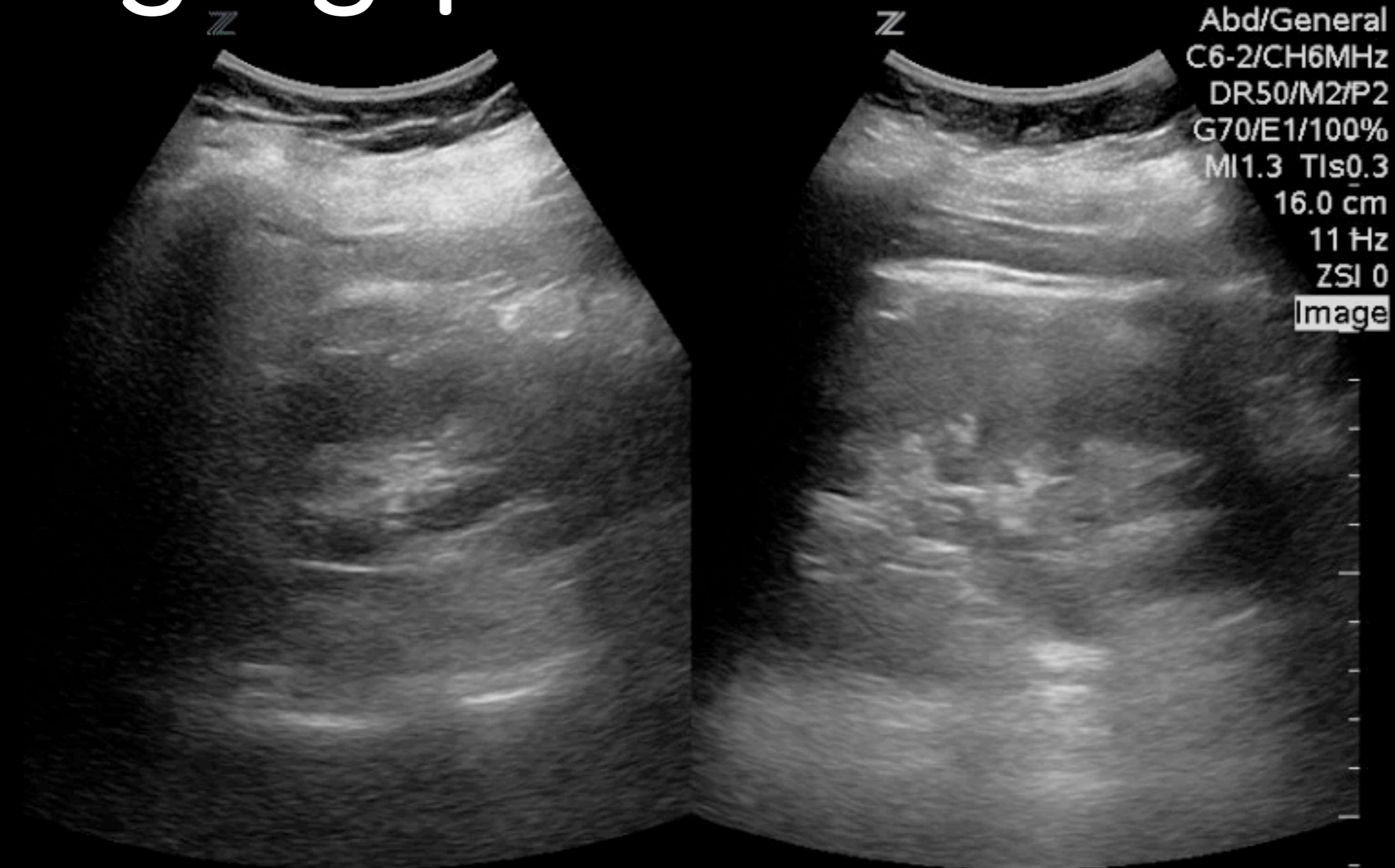




Imaging pearl



Imaging pearl



Judging hydronephrosis
Compare to the other kidney

Imaging pearl

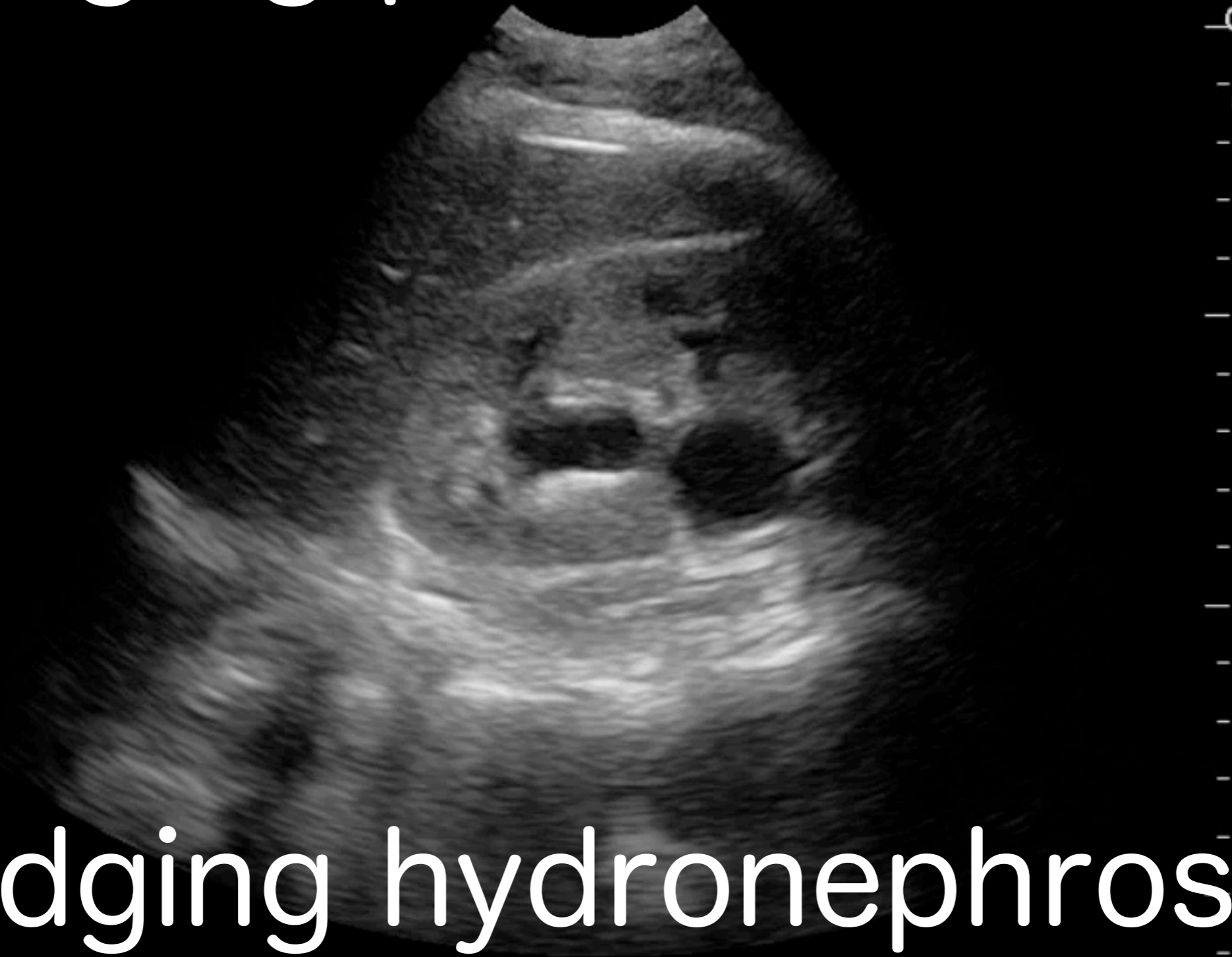


Abd/General
_C4-1/CH4MHz
DR60/M3/P2
- G74/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
- \triangle ZSI 0

Imaging pearl

Abd/General
_C4-1/CH4MHz
DR60/M3/P2
- G74/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
- Δ ZSI 0

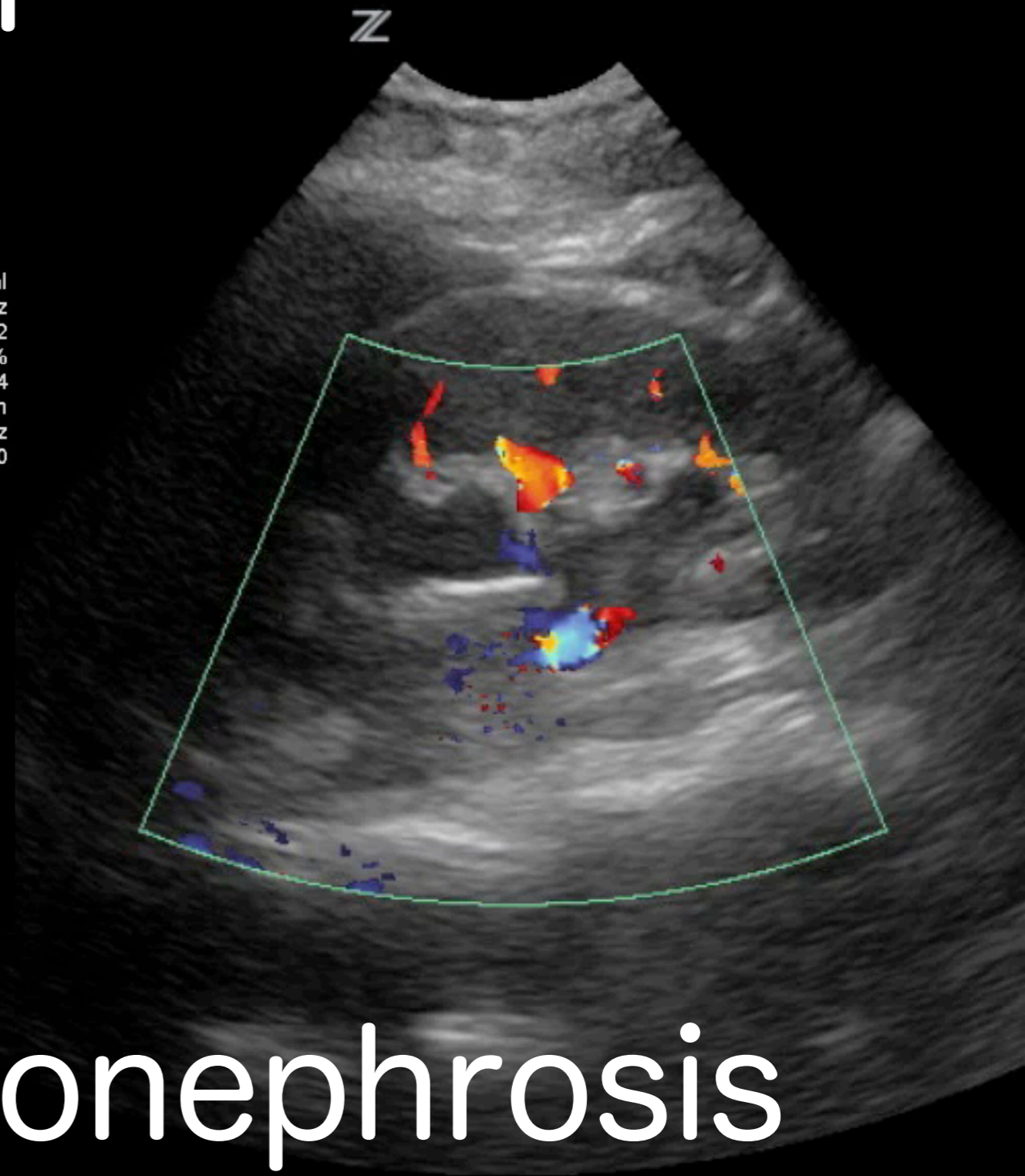
Judging hydronephrosis
Utilize color Doppler



Imaging pearl



Abd/General
C4-1/CH4MHz
DR60/M3/P2
G74/E1/100%
MI1.3 TIs0.4
16.0 cm
11 Hz
ZSI 0



Judging hydronephrosis
Utilize color Doppler

Z



Abd/General
C4-1/CH4MHz
- DR60/M3/P2
G70/E1/100%
MI1.3 TIs0.4
- 16.0 cm
- 14 Hz
- ZSI 0



Abd/General
C4-1/CH4MHz
- DR60/M3/P2
G70/E1/100%
MI1.3 TIs0.4
- 16.0 cm
- 14 Hz
- ZSI 0

Hydronephrosis
Moderate

Z

Abd/General
C4-1/CH4MHz
- DR60/M3/P2
G70/E1/100%
MI1.3 TIs0.4
- 16.0 cm
- 14 Hz
ZSI 0



Hydronephrosis

Moderate




Abd/General
C4-1/CH4MHz
- DR60/M3/P2
G70/E1/100%
MI1.3 TIs0.4
- 16.0 cm
- 14 Hz
ZSI 0


Hydronephrosis
Moderate

Z



Abd/General
-C6-2/CH6MHz
- DR50/M2/P2
- G76/E1/100%
- MI1.3 TIs0.3
- 16.0 cm
- 11 Hz
-  ZSI 0
- **Image**


Z

Abd/General
-C6-2/CH6MHz
- DR50/M2/P2
- G76/E1/100%
- MI1.3 TIs0.3
- 16.0 cm
- 11 Hz
-  ZSI 0
- **Image**

Hydronephrosis






Abd/General
-C6-2/CH6MHz
- DR50/M2/P2
- G76/E1/100%
- MI1.3 TIs0.3
- 16.0 cm
- 11 Hz
-  ZSI 0
- **Image**

Hydronephrosis


Severe

Z




Abd/General
-C6-2/CH6MHz
- DR50/M2/P2
- G78/E1/100%
- MI1.3 TIs0.3
- 16.0 cm
- 11 Hz
-  ZSI 0
- **Image**



Abd/General
-C6-2/CH6MHz
- DR50/M2/P2
- G78/E1/100%
- MI1.3 TIs0.3
- 16.0 cm
- 11 Hz
-  ZSI 0
- **Image**

Hydronephrosis



Abd/General
-C6-2/CH6MHz
- DR50/M2/P2
- G78/E1/100%
- MI1.3 TIs0.3
- 16.0 cm
- 11 Hz
-  ZSI 0
- **Image**

Hydronephrosis
Moderate



Abd/General
-C5-2/CH4MHz
DR60/M3/P2
G72/E1/100%
- MI0.9 TIs0.1
16.0 cm
13 Hz
△ ZSI 0

Hydronephrosis



Abd/General
-C5-2/CH4MHz
DR60/M3/P2
G72/E1/100%
- MI0.9 TIs0.1
16.0 cm
13 Hz
△ ZSI 0

Hydronephrosis



Abd/General
-C5-2/CH4MHz
DR60/M3/P2
G72/E1/100%
- MI0.9 TIs0.1
16.0 cm
13 Hz
△ ZSI 0

Hydronephrosis

Severe




Abd/General
-C5-2/CH4MHz
-DR60/M3/P2
-G72/E1/100%
-MI0.9 TIs0.1
-16.0 cm
-13 Hz
-ZSI 0

Pitfall
Renal cyst


Imaging pearl



Abd/General
- C4-1/CH4MHz
- DR60/M3/P2
- G68/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
-  ZSI 0
- **Image**

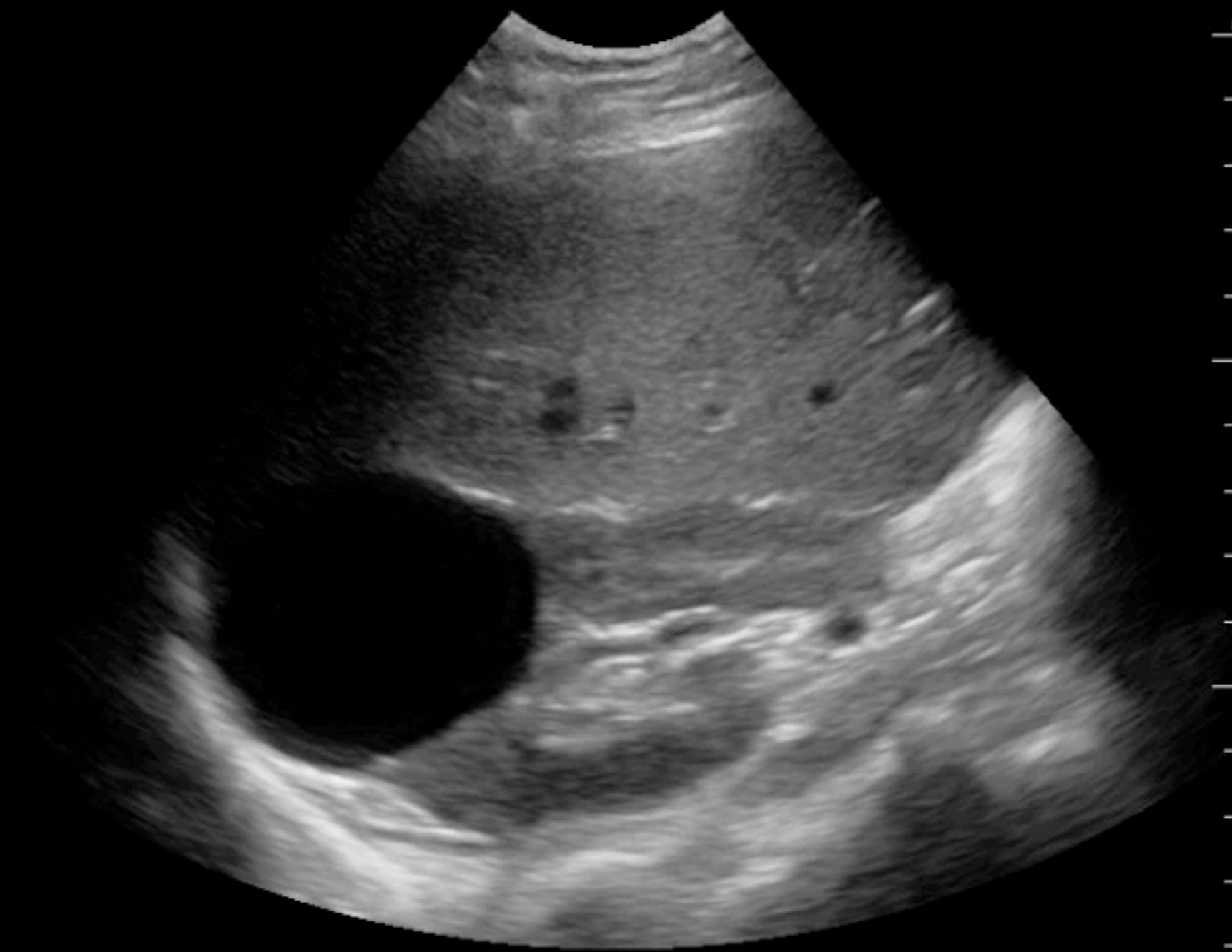
Imaging pearl



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
G68/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
-  ZSI 0
- **Image**

Hydronephrosis vs Cysts
Look at transverse plane

Z



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
~G76/E1/100%
_ MI1.2 TIs0.4
14.0 cm
- 12 Hz
△ ZSI 0
Image



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
~G76/E1/100%
_ MI1.2 TIs0.4
14.0 cm
12 Hz
△ ZSI 0
Image

Renal cyst
Circumscribed

Z



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
- G64/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 14 Hz
△ ZSI 0
Text



Z

Abd/General
C4-1/CH4MHz
DR60/M3/P2
G64/E1/100%
MI1.3 TIs0.4
16.0 cm
14 Hz
ZSI 0
Text

Renal cyst
Polycystic kidney



Z

Abd/General
-C5-2/CH4MHz
- DR60/M3/P2
- G82/E1/100%
- MI0.9 TIs0.1
- 16.0 cm
- 13 Hz
- Δ ZSI 0



Abd/General
-C5-2/CH4MHz
-DR60/M3/P2
-G82/E1/100%
-MI0.9 TIs0.1
-16.0 cm
-13 Hz
-△ ZSI 0

Parapelvic cyst

Difficult to discern from hydronephrosis



Abd/Renal
-C6-2/CH4MHz
-DR55/M2/P3
-G94/E1/100%
-MI1.5 TIs0.4
-16.0 cm
-13 Hz
-△ ZSI 0
Image

Pathology



Abd/Renal
-C6-2/CH4MHz
-DR55/M2/P3
-G94/E1/100%
-MI1.5 TIs0.4
-16.0 cm
-13 Hz
-△ ZSI 0
Image

Pathology



Abd/Renal
-C6-2/CH4MHz
-DR55/M2/P3
-G94/E1/100%
-MI1.5 TIs0.4
-16.0 cm
-13 Hz
-△ ZSI 0
-Image

Pathology
Kidney stone



Z

Abd/General
_C4-1/CH4MHz
DR60/M3/P2
- G80/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
△ ZSI 0
Image

Pathology



Z

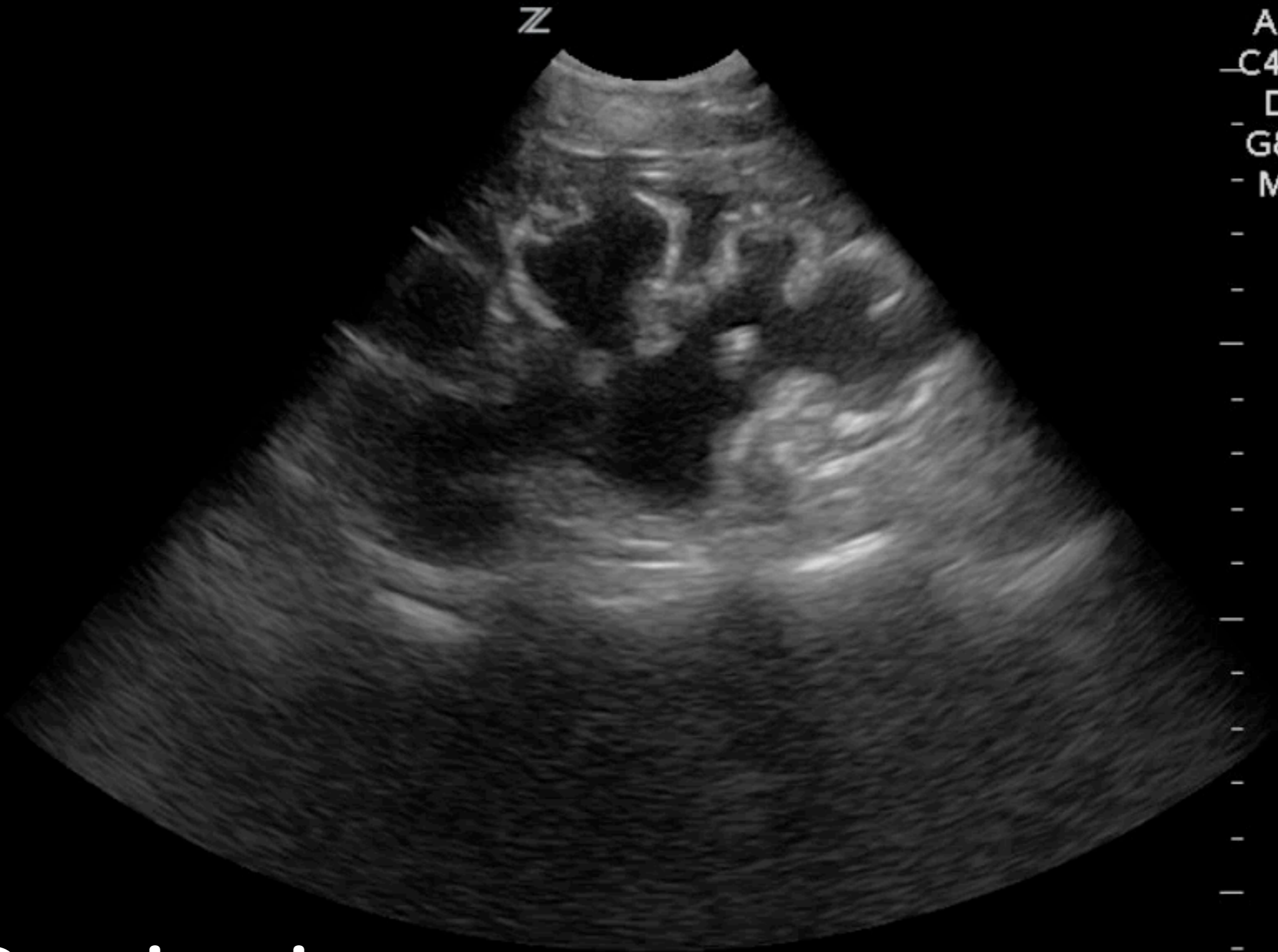
Abd/General
_C4-1/CH4MHz
DR60/M3/P2
G80/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
11 Hz
△ ZSI 0
Image

Pathology



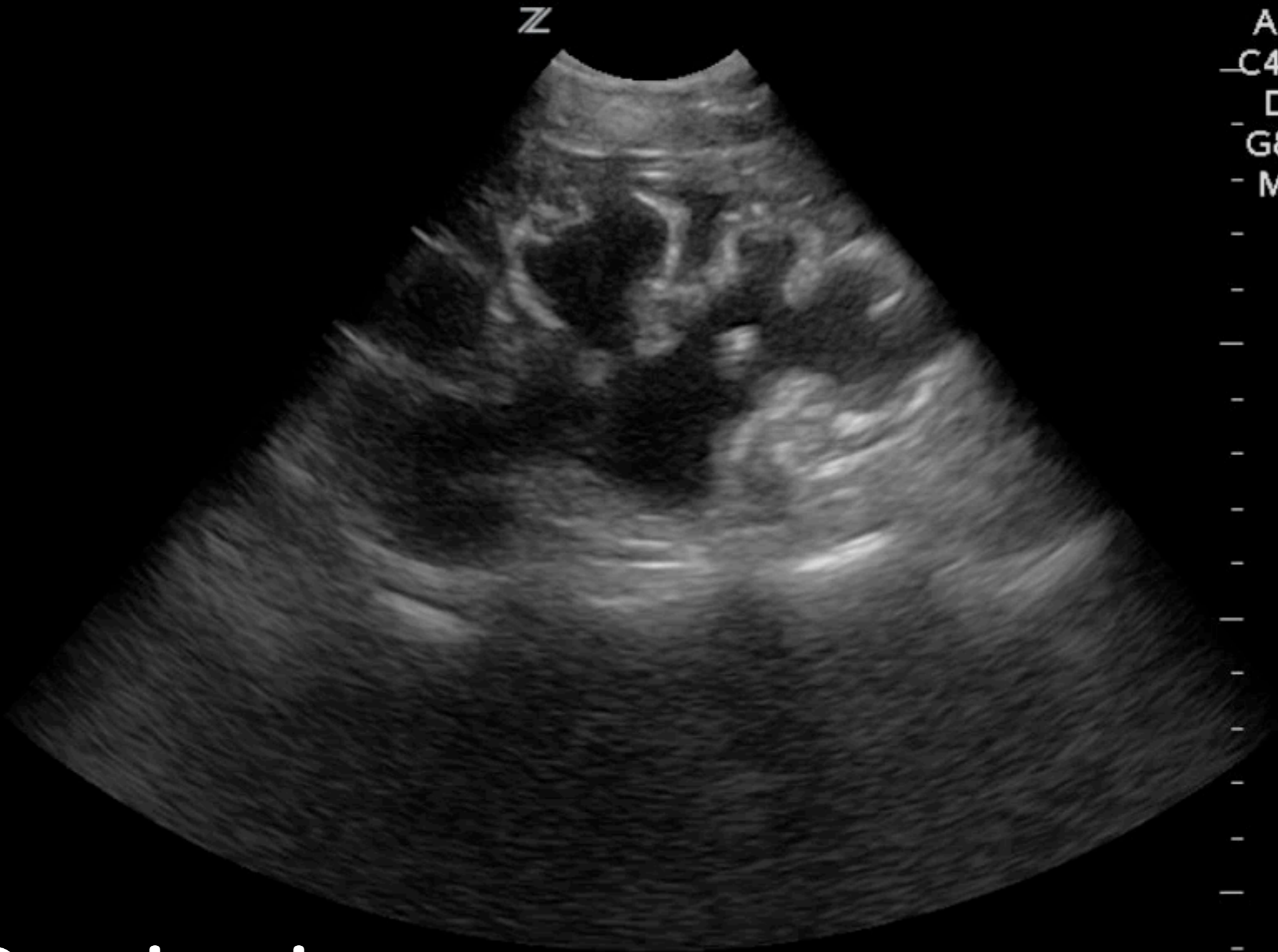
Abd/General
_C4-1/CH4MHz
DR60/M3/P2
- G80/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
△ ZSI 0
Image

Pathology
Kidney stone



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
- G80/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
△ ZSI 0
Image

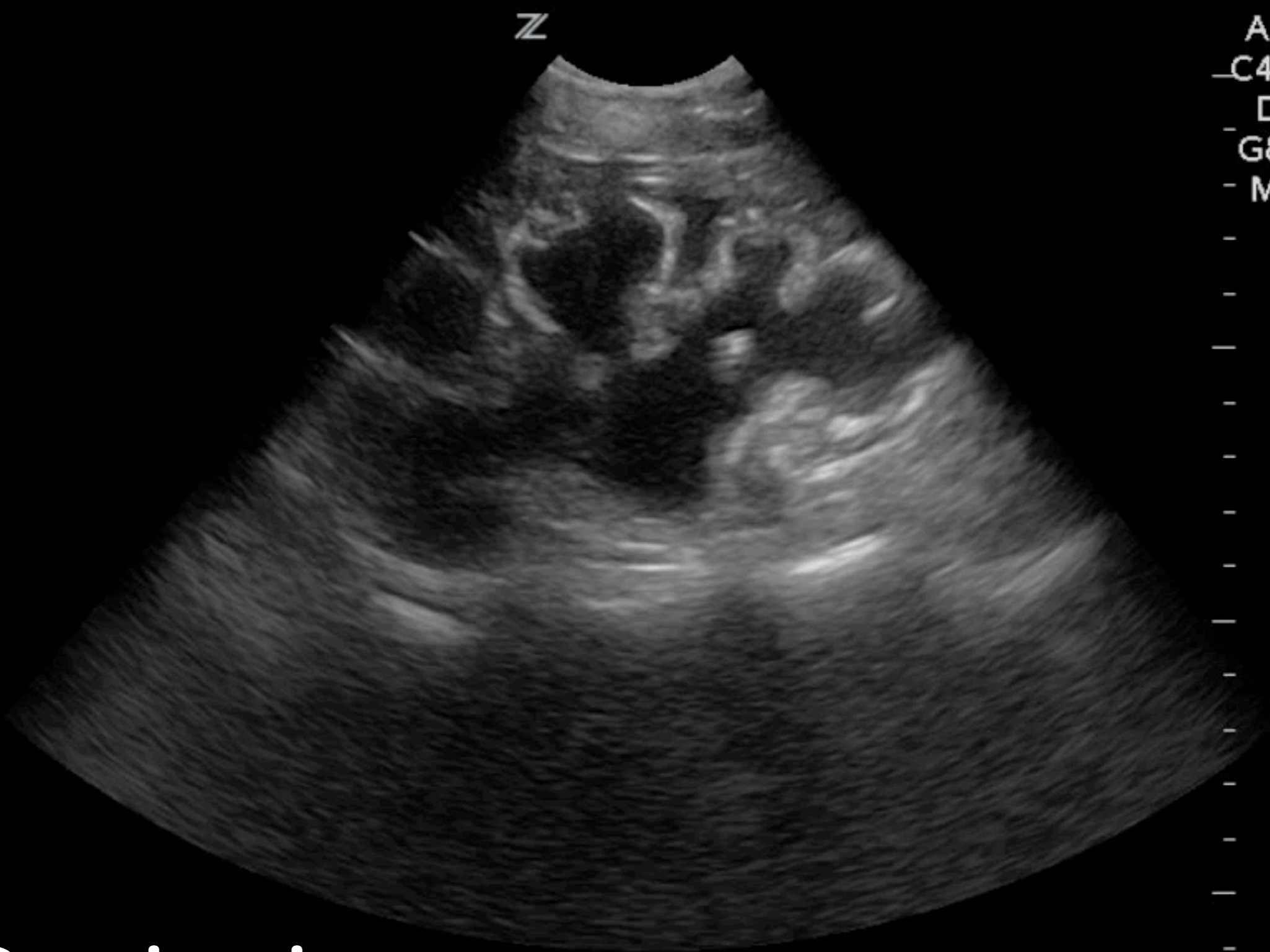
Pathology



Z

Abd/General
_C4-1/CH4MHz
DR60/M3/P2
- G80/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
△ ZSI 0
Image

Pathology



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
- G80/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
△ ZSI 0
Image

Pathology

Medullary sponge kidney with hydro



C6-2/CSH6
DR70/M2/P2
G70/E2/100%
MI1.1 TIs0.4
16.0 cm
13/13 Hz
ZSI 0
Image

Pathology



C6-2/CSH6
DR70/M2/P2
G70/E2/100%
MI1.1 TIs0.4
16.0 cm
13/13 Hz
ZSI 0
Image

Pathology



C6-2/CSH6
DR70/M2/P2
G70/E2/100%
MI1.1 TIs0.4
16.0 cm
13/13 Hz
ZSI 0
Image

Pathology

Nephrocalcinosis

L LONG

Z

Abd/Renal
_C4-1/CH4MHz
DR60/M3/P2
~G70/E1/100%
_ MI1.2 TIs0.4
14.0 cm
- 12 Hz
- ZSI 0
- Text

Pathology

L LONG

Z

Abd/Renal
_C4-1/CH4MHz
DR60/M3/P2
-G70/E1/100%
_ MI1.2 TIs0.4
14.0 cm
- 12 Hz
- ZSI 0
Text

Pathology



L LONG

Z

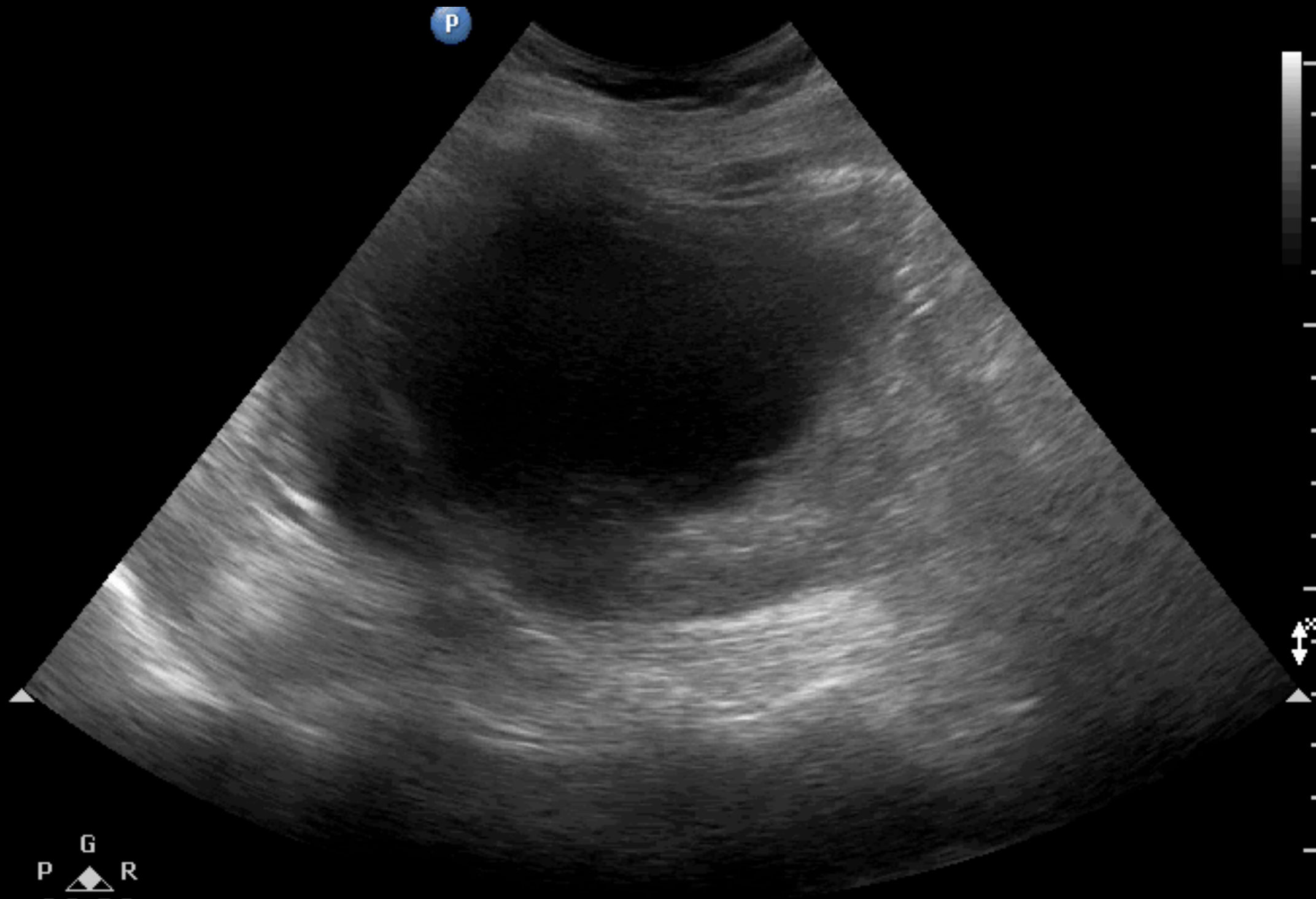
Abd/Renal
_C4-1/CH4MHz
DR60/M3/P2
~G70/E1/100%
_ MI1.2 TIs0.4
14.0 cm
- 12 Hz
- ZSI 0
- **Text**

Pathology

Nephrocalcinosis w/ hydro

ED FAST
C5-2
30Hz
16cm

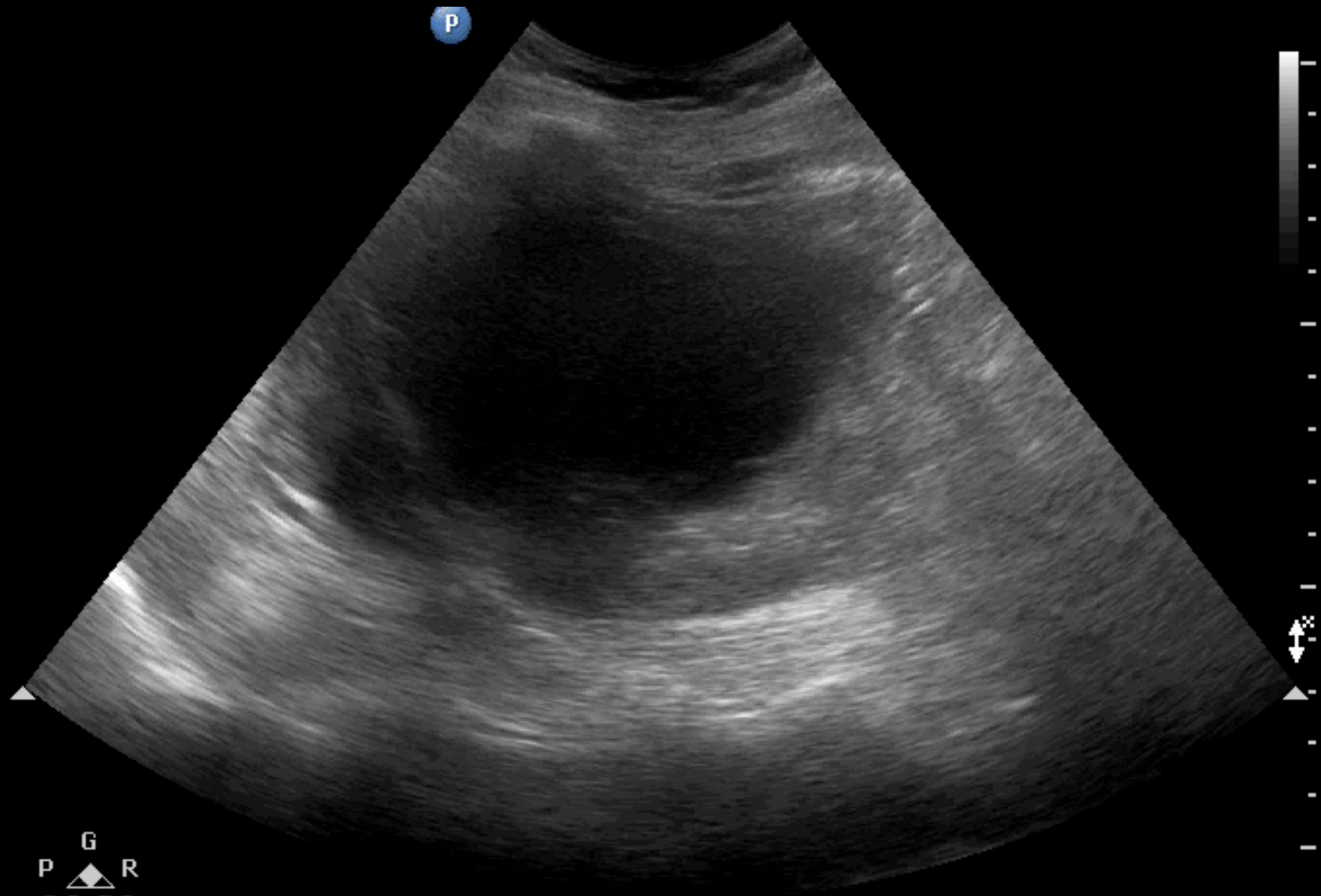
2D
F3
Gn 60
232dB/C5
G/3/2



Pathology

ED FAST
C5-2
30Hz
16cm

2D
F3
Gn 60
232dB/C5
G/3/2

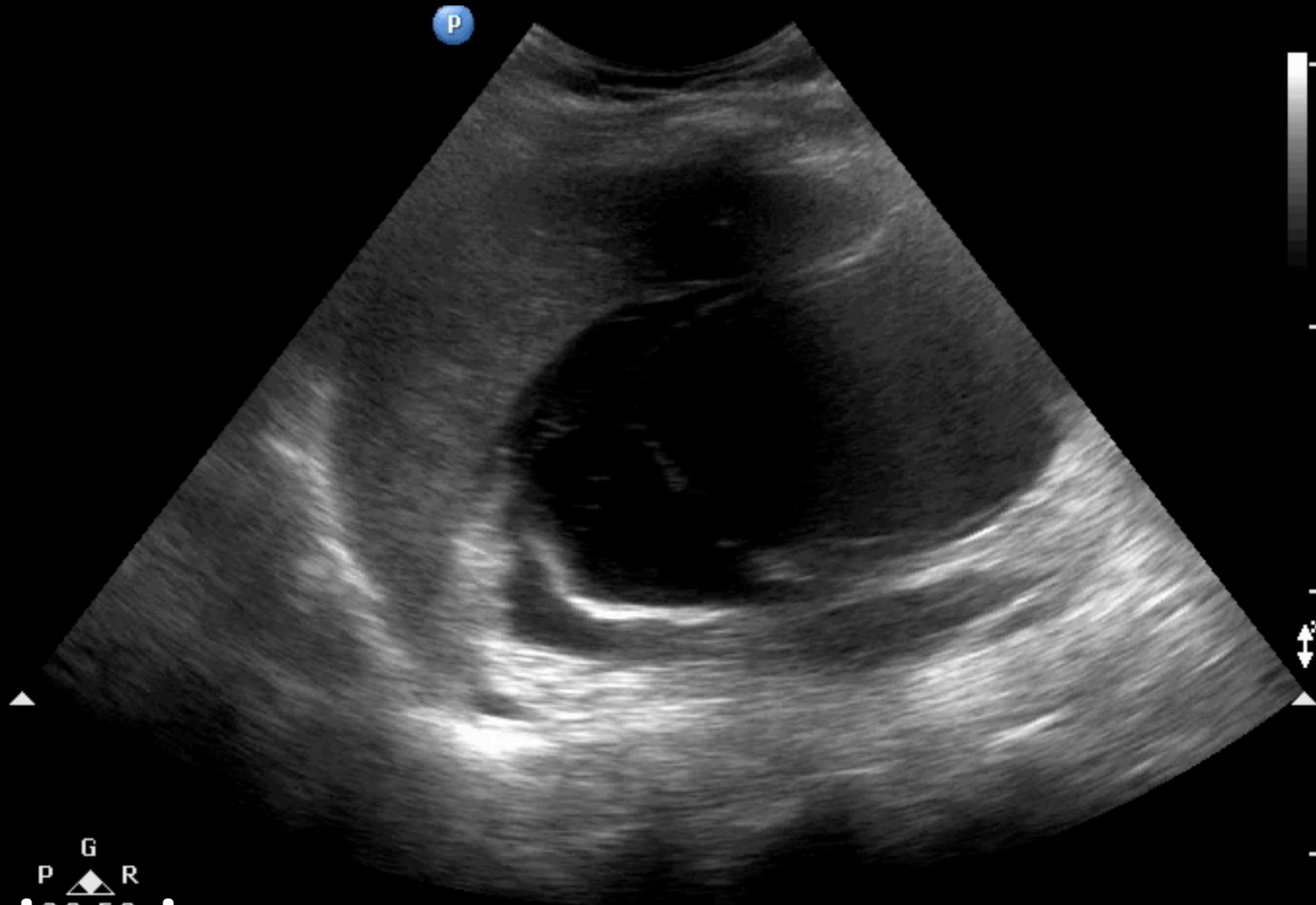


G
P ▲ R
2.0 5.0

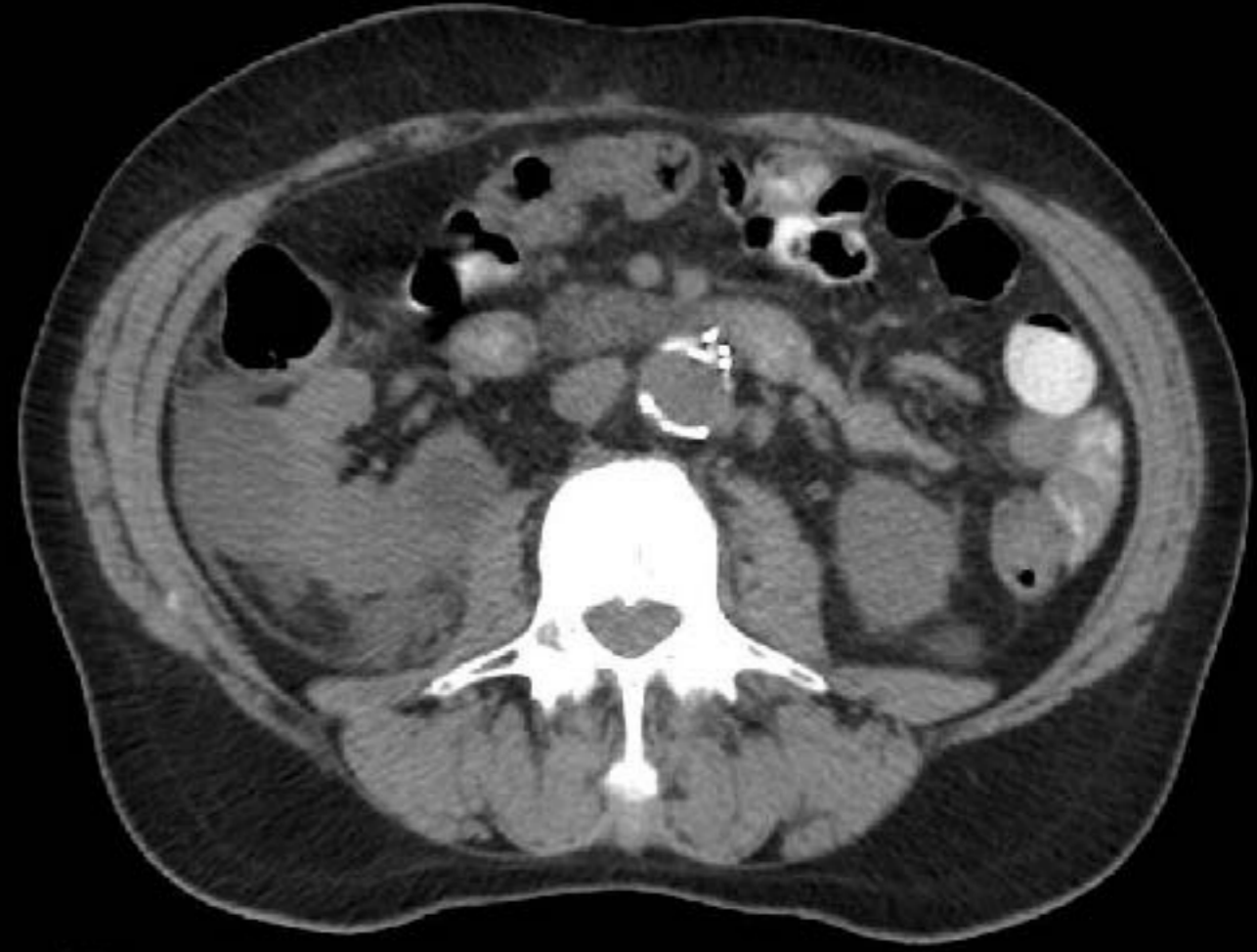
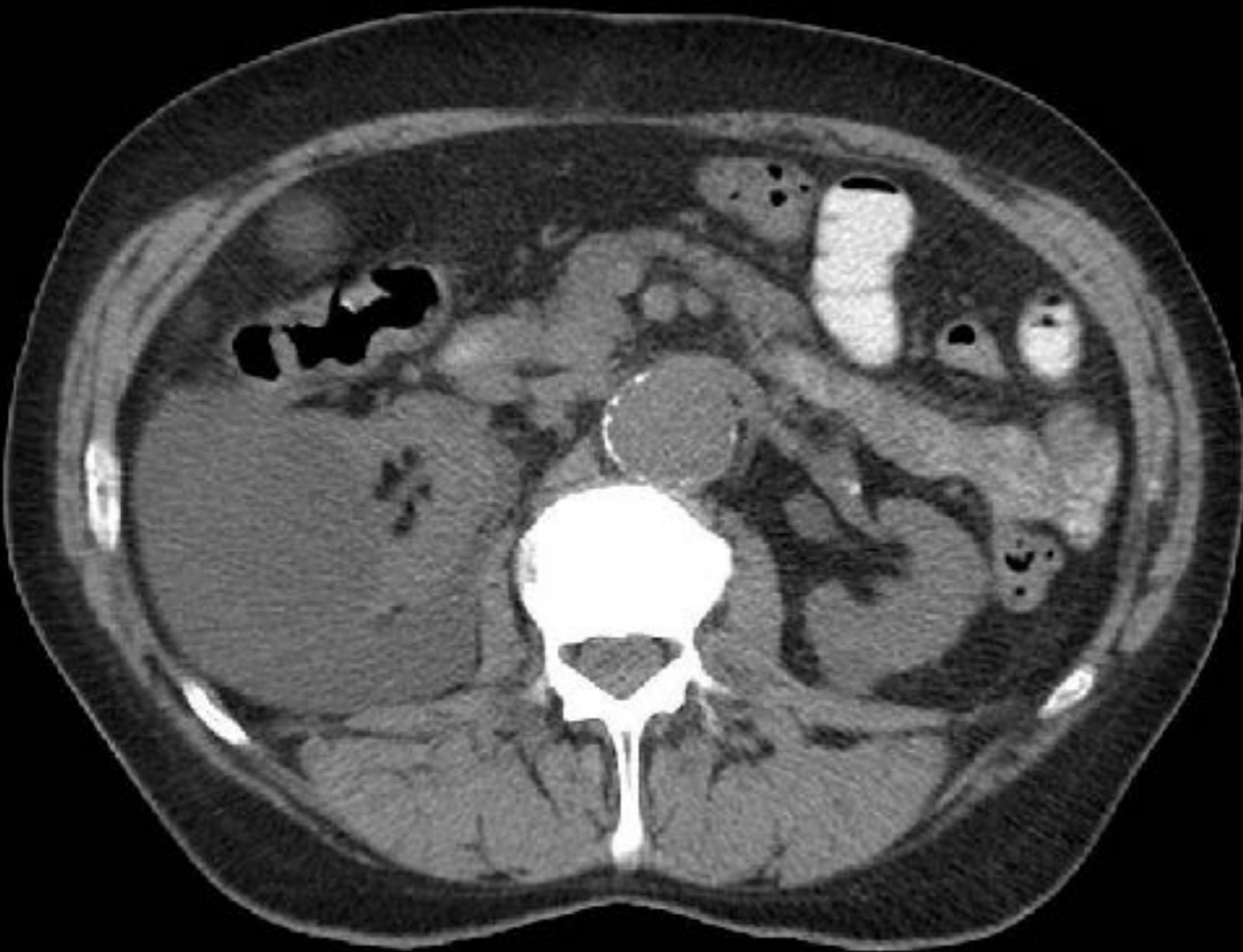
Pathology

ED FAST
C5-2
30Hz
16cm

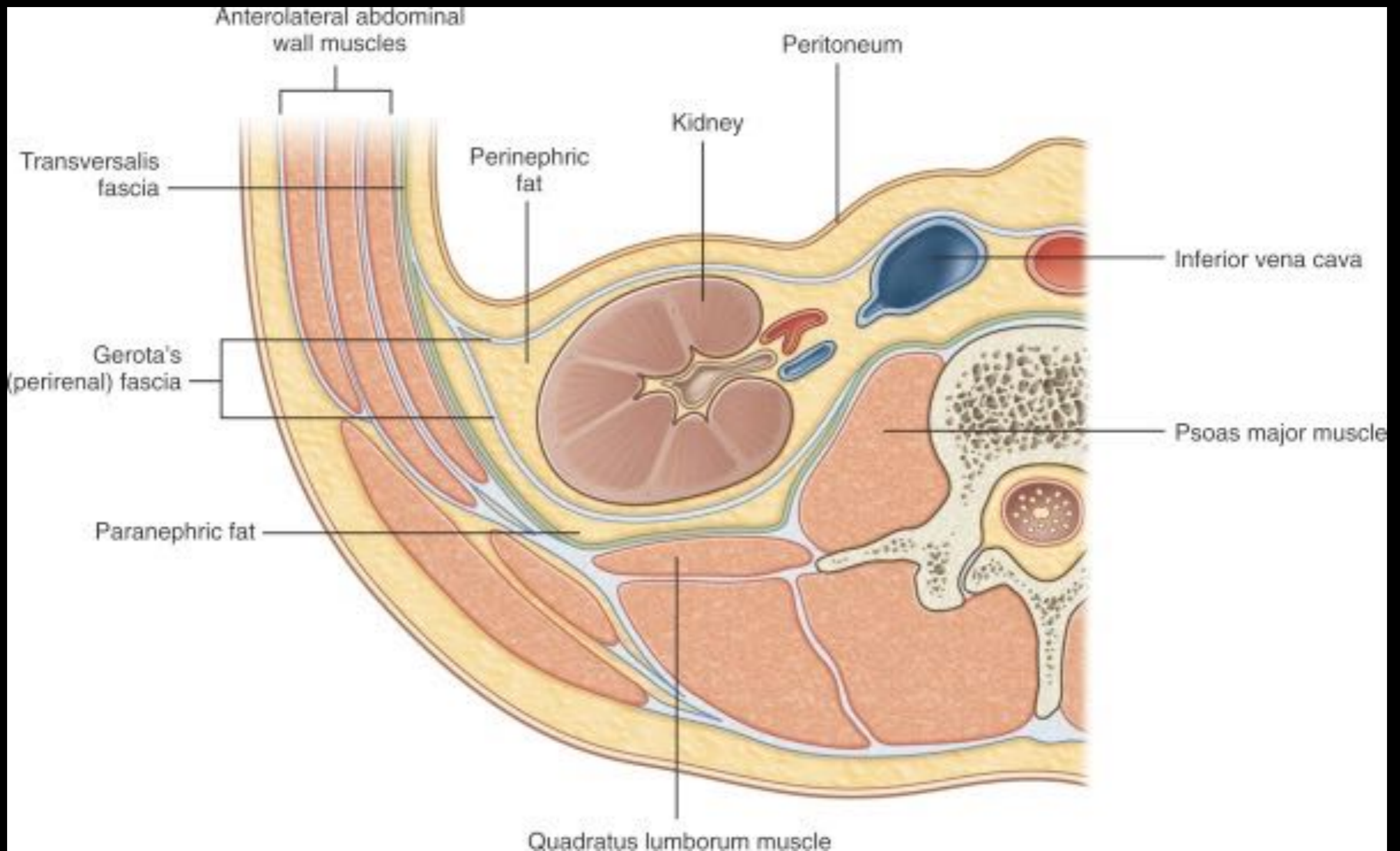
2D
F3
Gn 60
232dB/C5
G/3/2



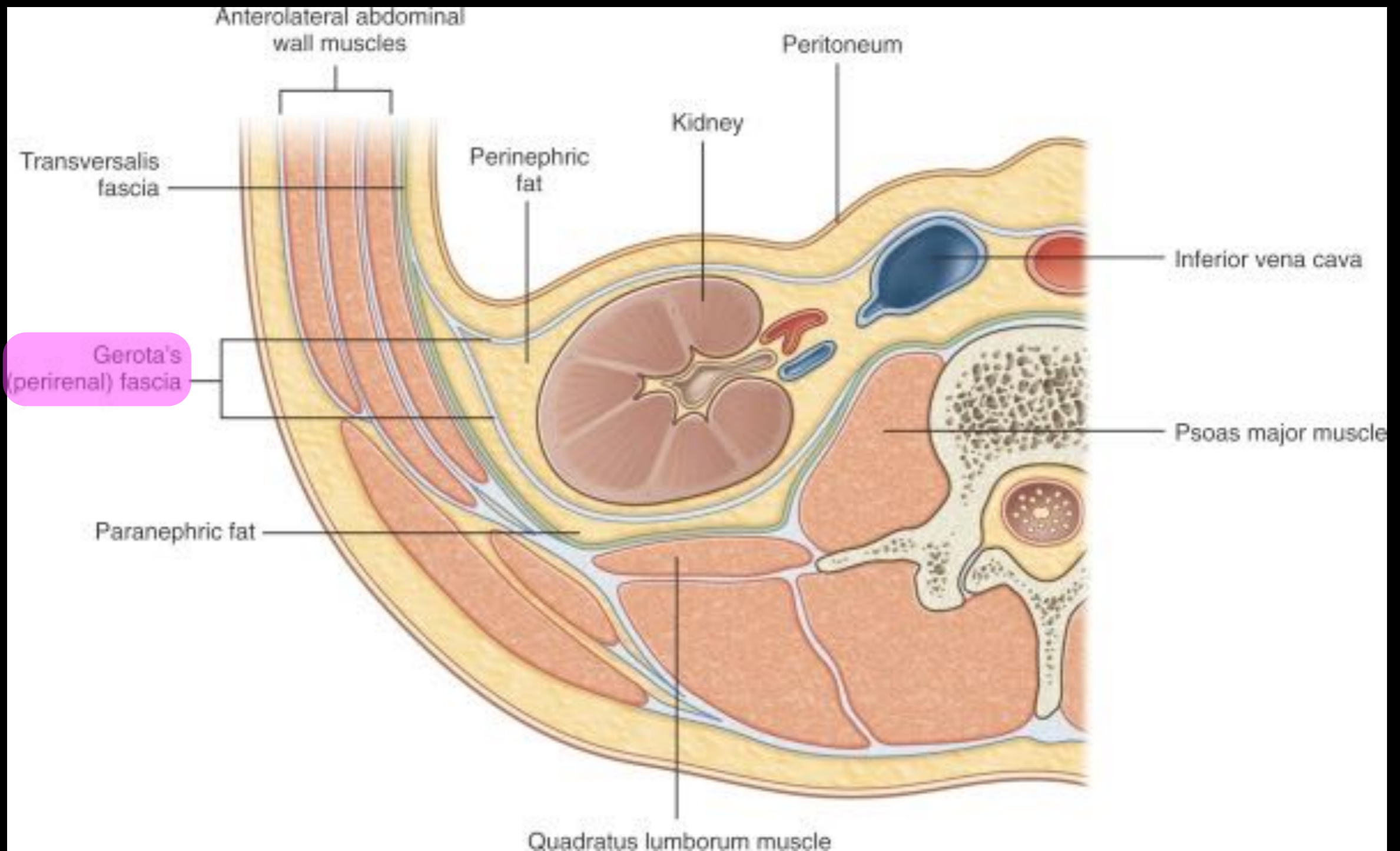
Pathology
Renal cyst rupture



Pathology
Renal cyst rupture



Perinephric free fluid



Perinephric free fluid
Confined by Gerota's fascia



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
-G70/E1/100%
MI1.2 TIs0.4
- 12.0 cm
14 Hz
- ZSI 0
- **Image**

Pathology



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
-G70/E1/100%
MI1.2 TIs0.4
- 12.0 cm
14 Hz
- ZSI 0
- **Image**

Pathology



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
-G70/E1/100%
MI1.2 TIs0.4
- 12.0 cm
14 Hz
- ZSI 0
- **Image**

Pathology
Renal calyx rupture

RIGHT |

Z

Abd/General
_C4-1/CH4MHz
DR60/M3/P2
G70/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
- ZSI 0
- **Text**

Pathology



RIGHT |

Z

Abd/General
_C4-1/CH4MHz
DR60/M3/P2
G70/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
- ZSI 0
- **Text**

Pathology



RIGHT |

Z

Abd/General
_C4-1/CH4MHz
_DR60/M3/P2
_G70/E1/100%
_MI1.3 TIs0.4
_16.0 cm
_11 Hz
_ZSI 0
_Text

Pathology
Renal mass





Abd/Renal
_C4-1/CH4MHz
DR60/M3/P2
- G82/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
△ ZSI 0
Image

Pathology



Abd/Renal
_C4-1/CH4MHz
DR60/M3/P2
- G82/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
△ ZSI 0
Image

Pathology

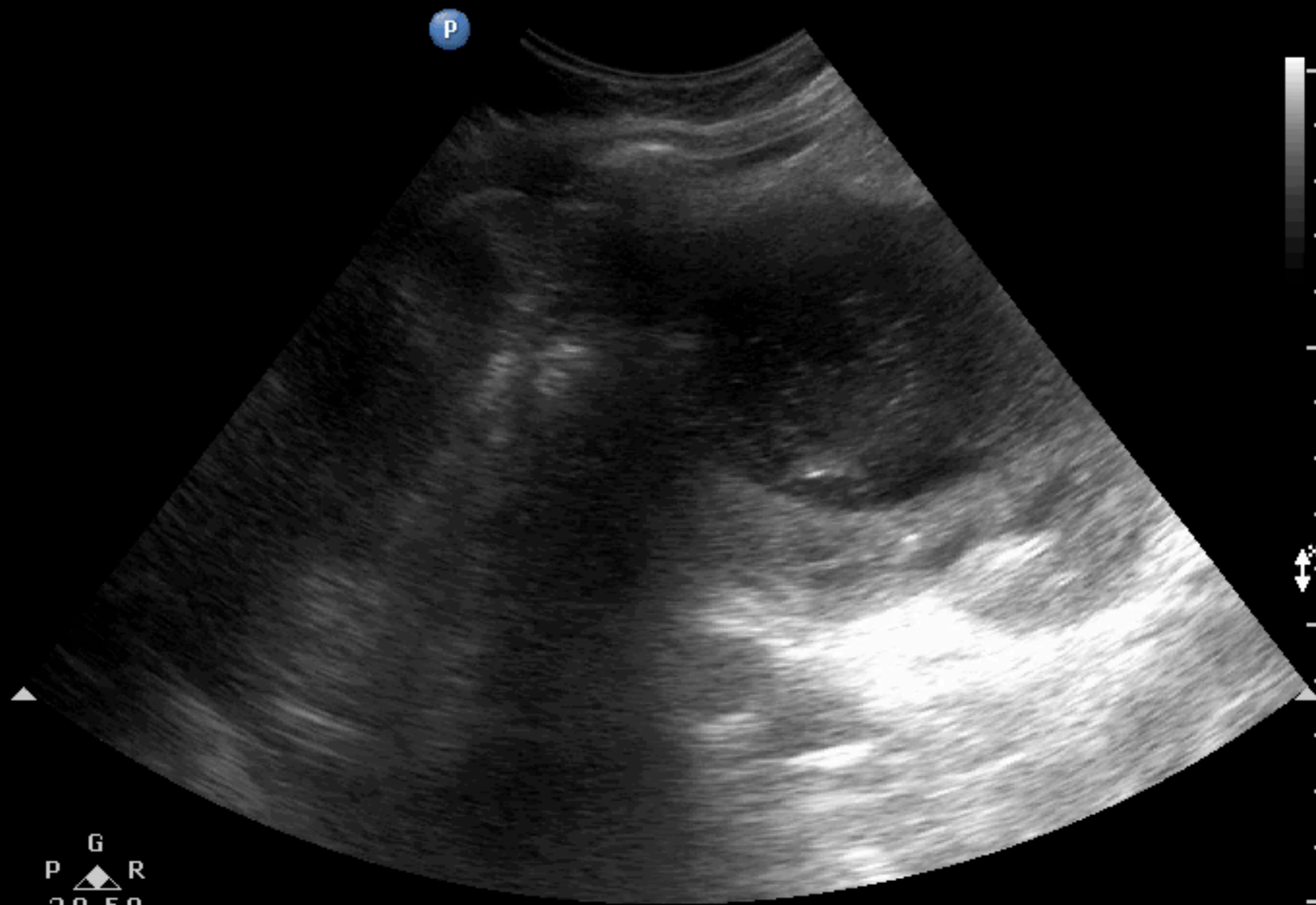


Abd/Renal
_C4-1/CH4MHz
DR60/M3/P2
- G82/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
△ ZSI 0
Image

Pathology
Renal mass

ED FAST
C5-2
32Hz
15cm

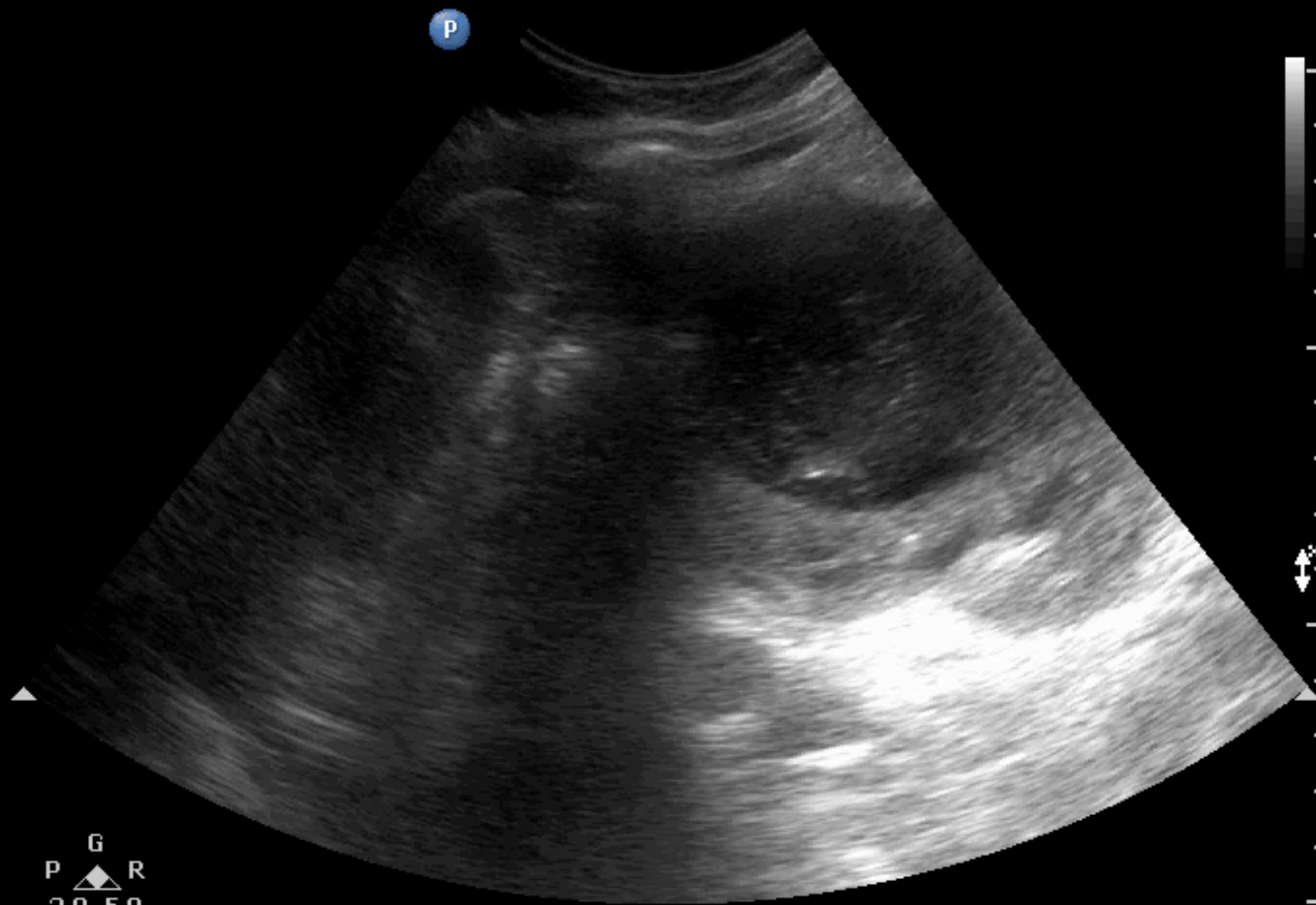
2D
F3
Gn 60
232dB/C5
G/3/2



Pathology

ED FAST
C5-2
32Hz
15cm

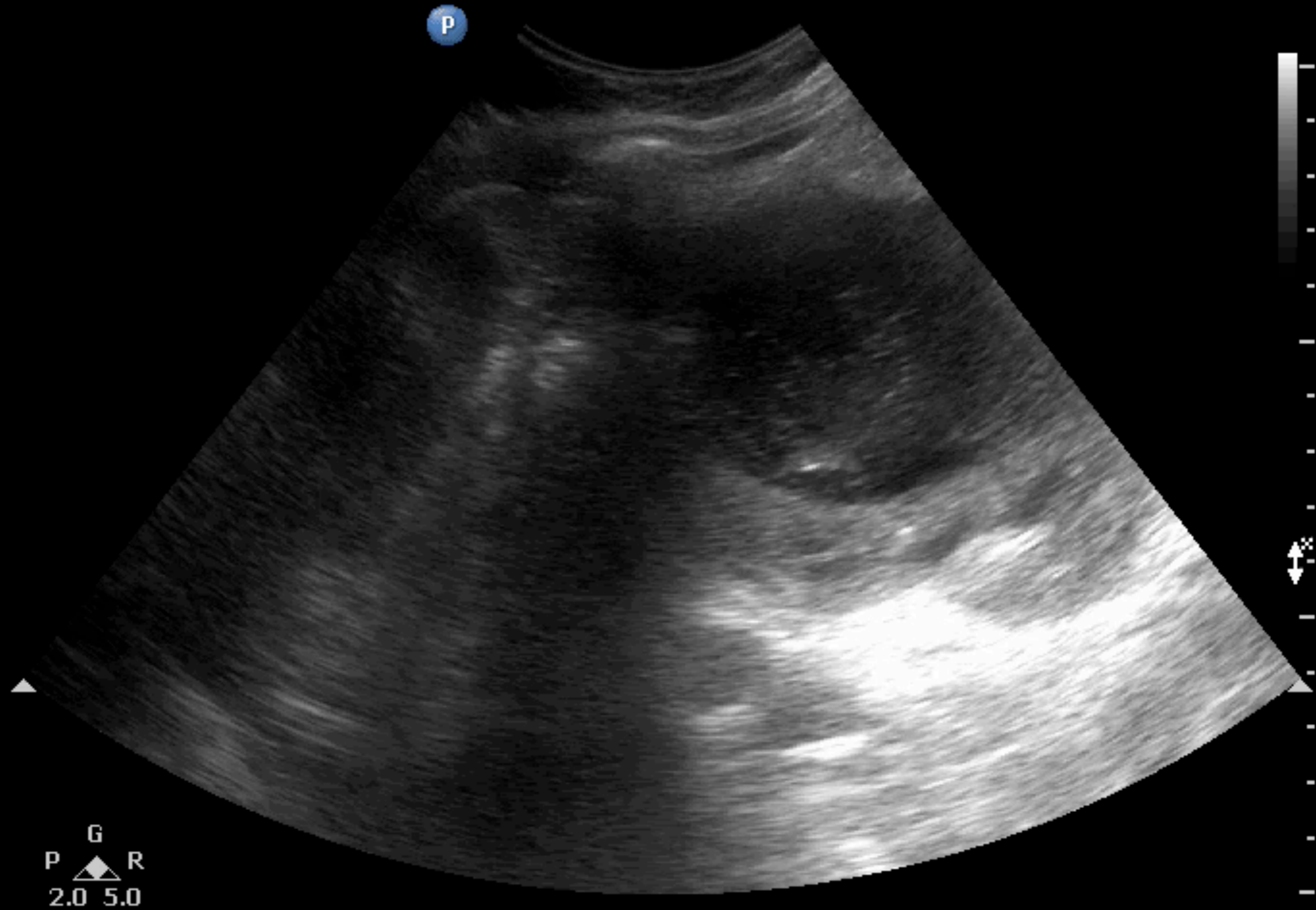
2D
F3
Gn 60
232dB/C5
G/3/2



Pathology

ED FAST
C5-2
32Hz
15cm

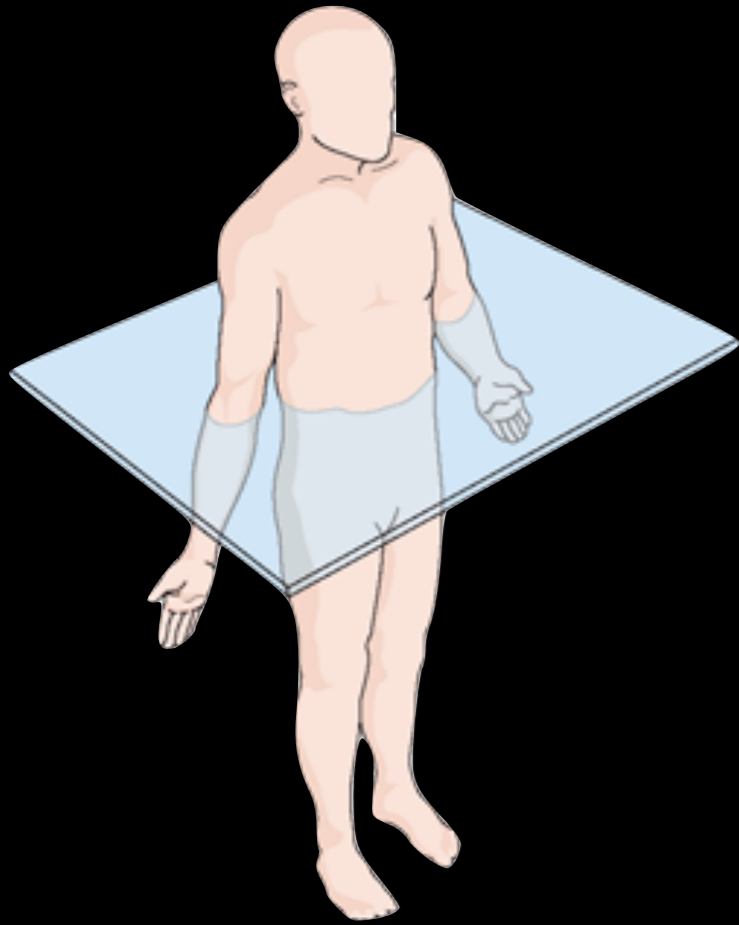
2D
F3
Gn 60
232dB/C5
G/3/2



Pathology

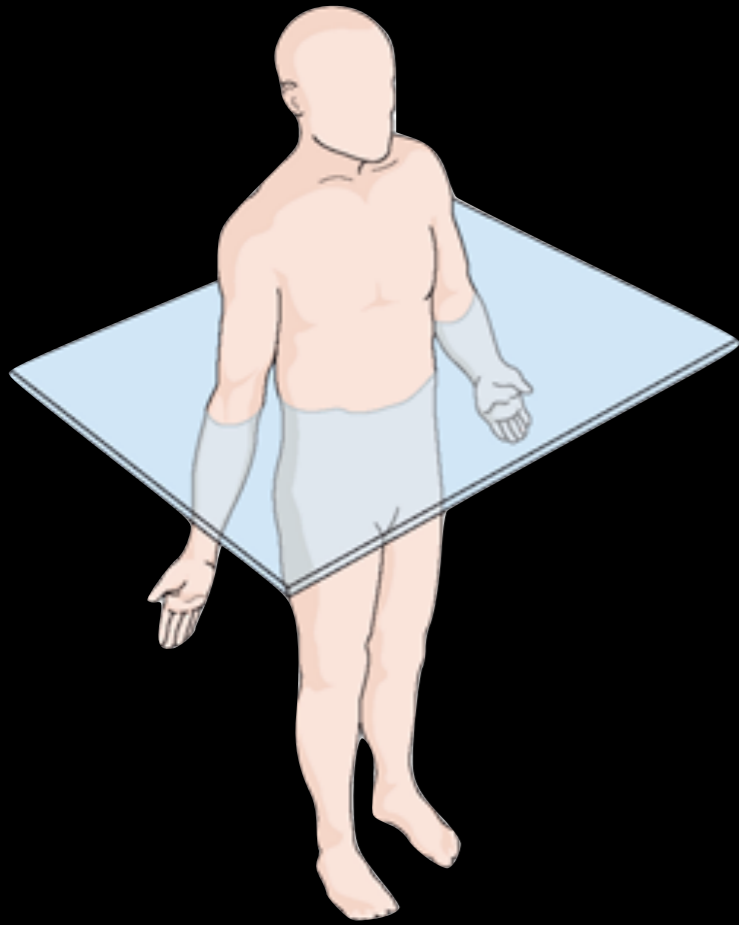
Ruptured angiomyolipoma

Bladder



Transverse plane

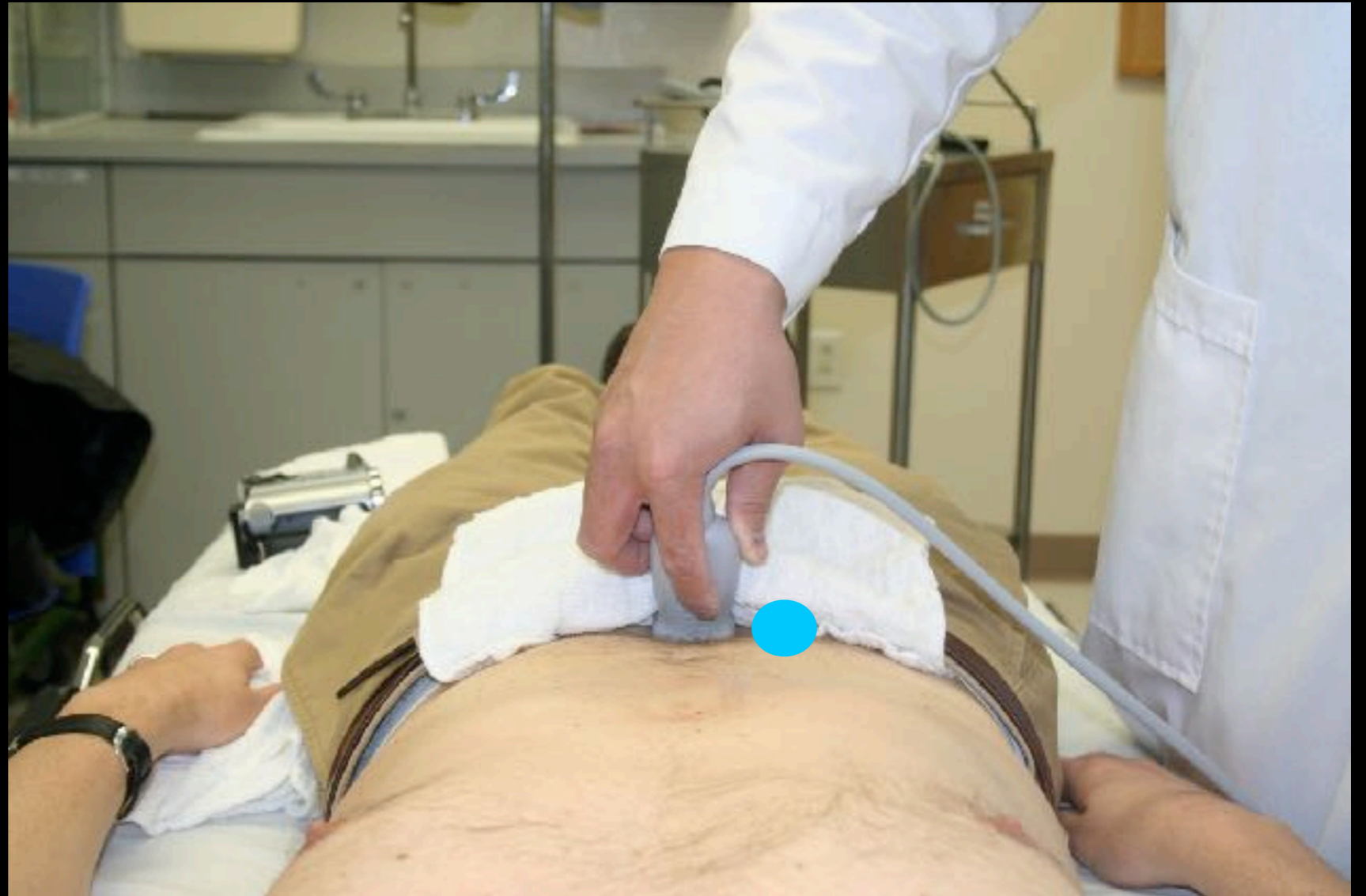
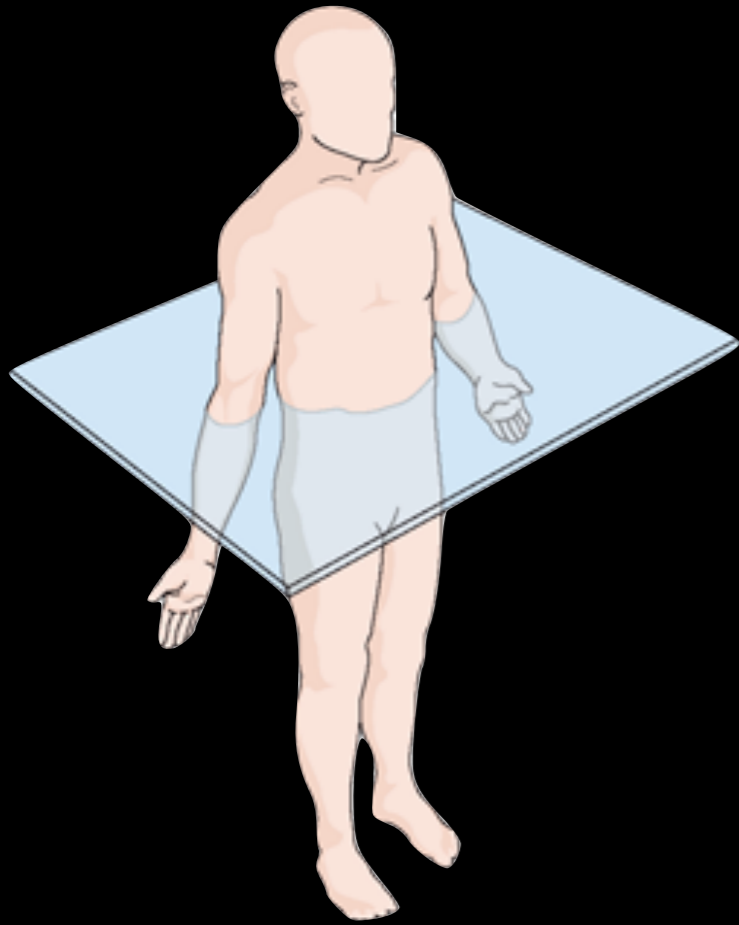
Bladder



Transverse plane

Aim caudal

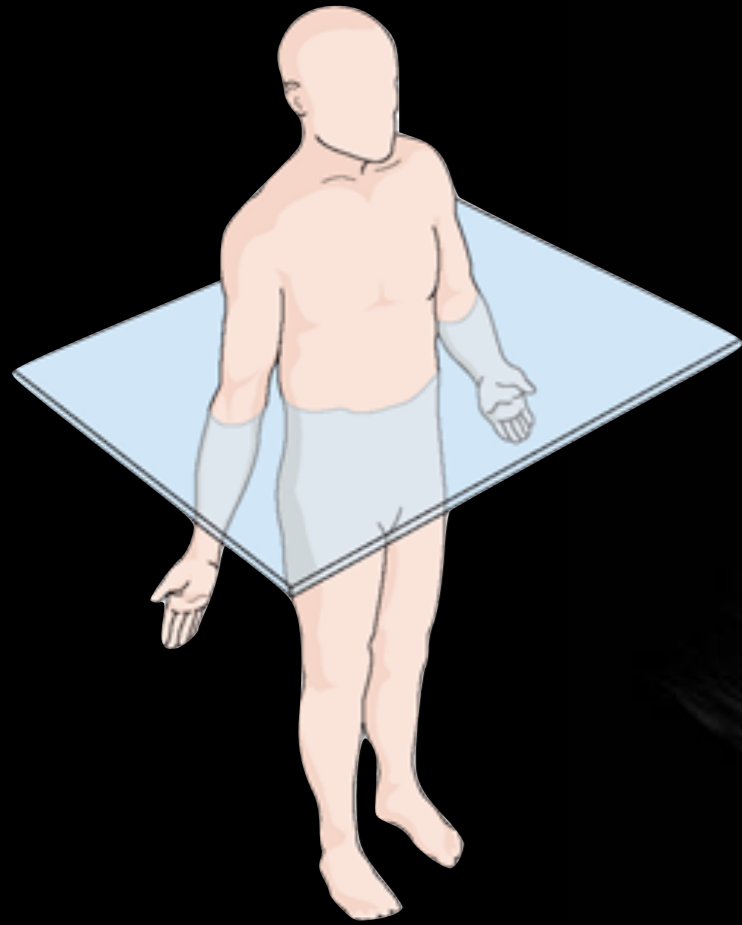
Bladder



Transverse plane

Aim caudal

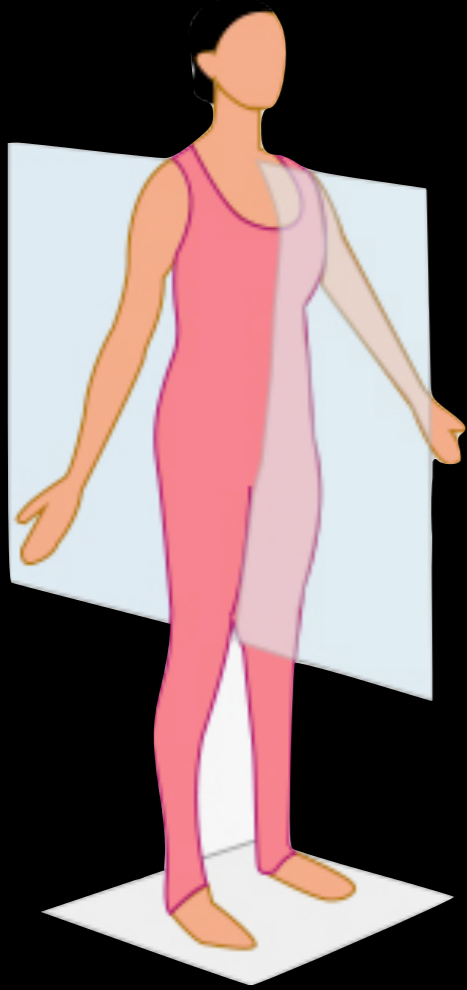
Bladder



Transverse plane

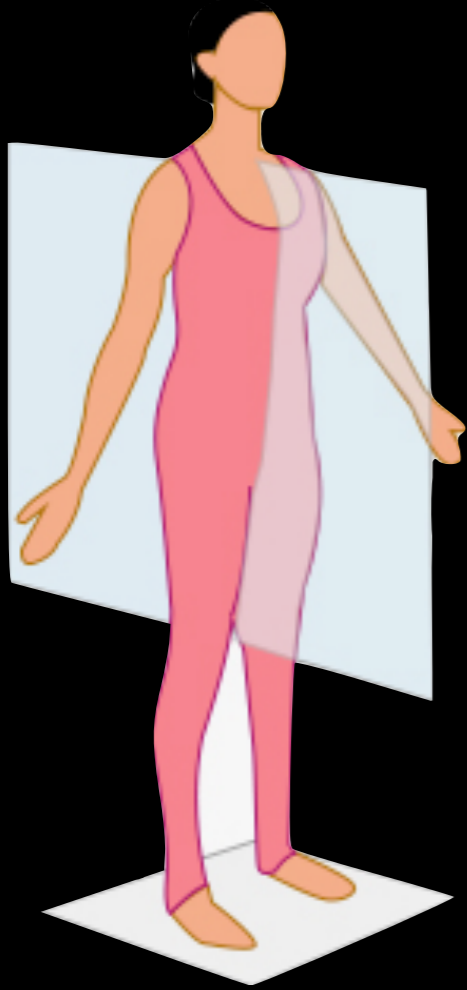
Aim caudal

Bladder



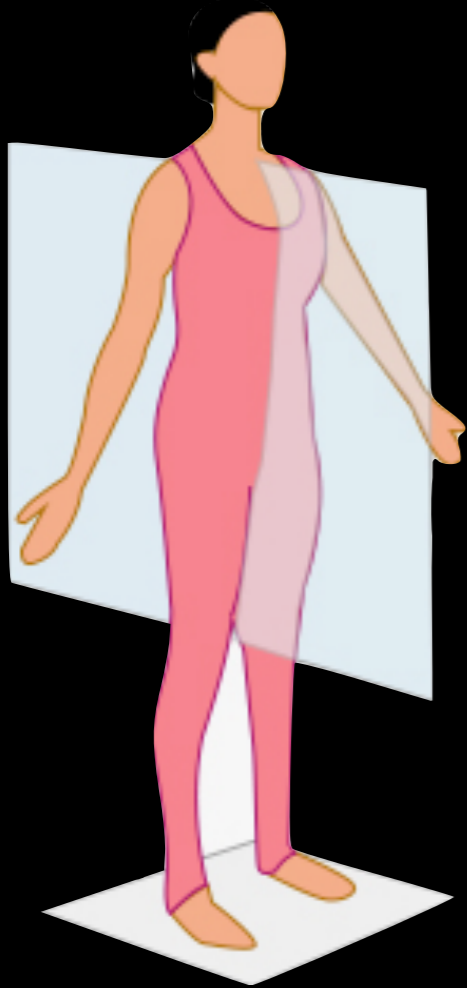
Longitudinal plane

Bladder



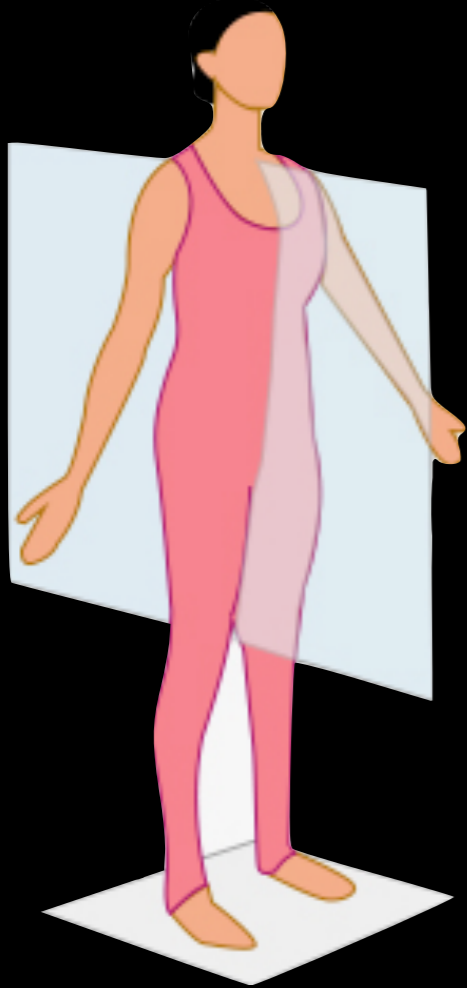
Longitudinal plane
Aim caudal

Bladder



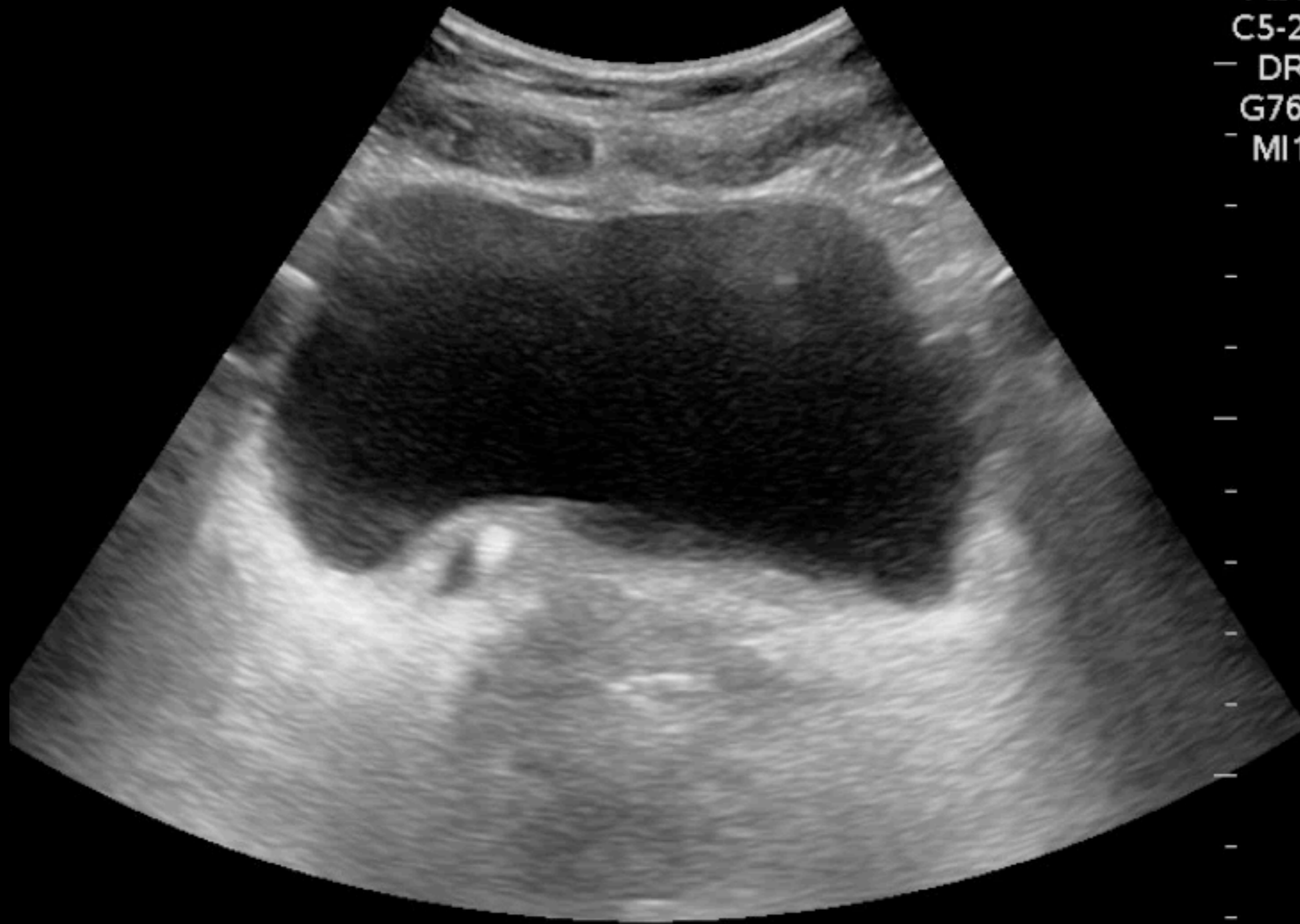
Longitudinal plane
Aim caudal

Bladder



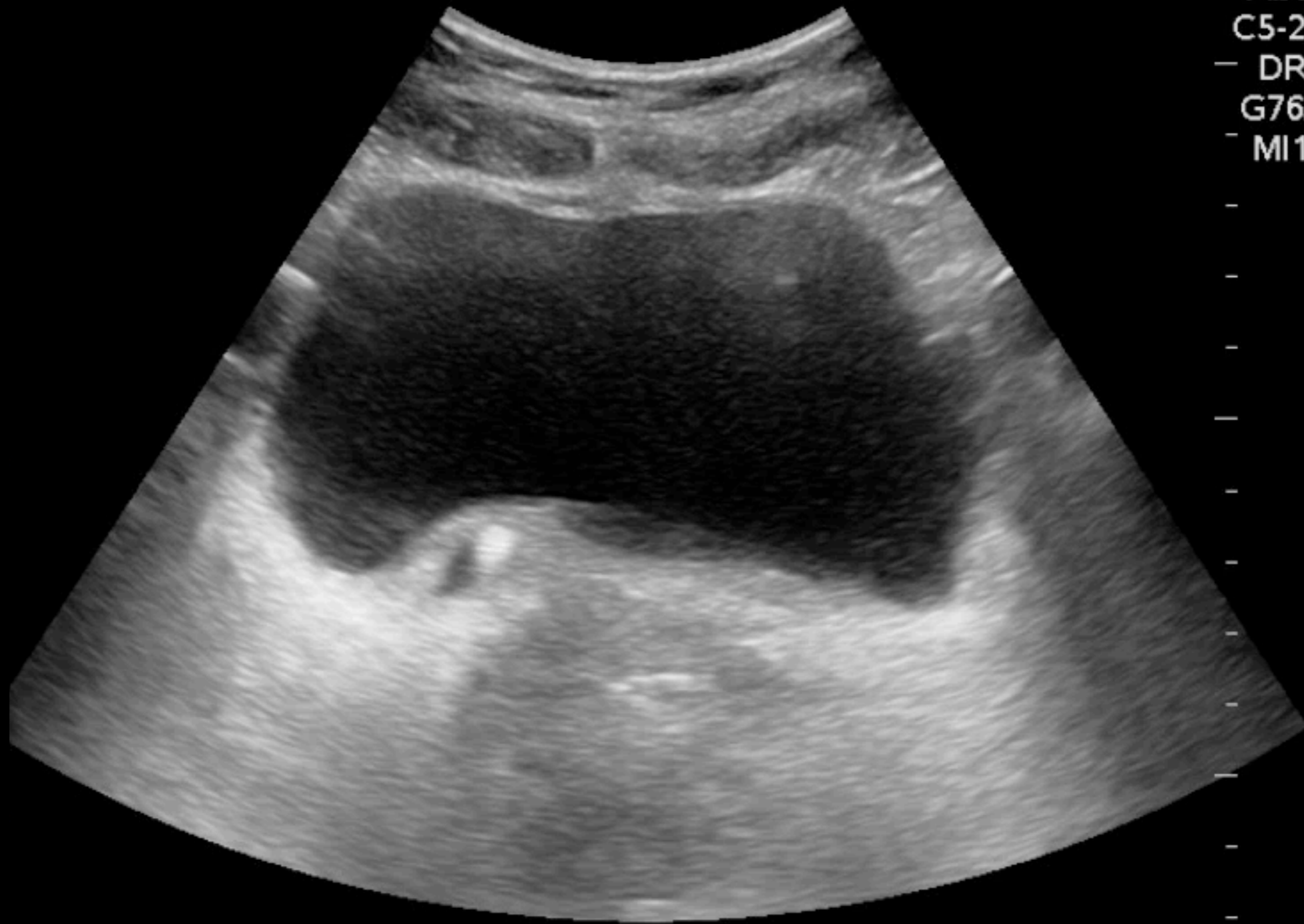
Longitudinal plane
Aim caudal

Z

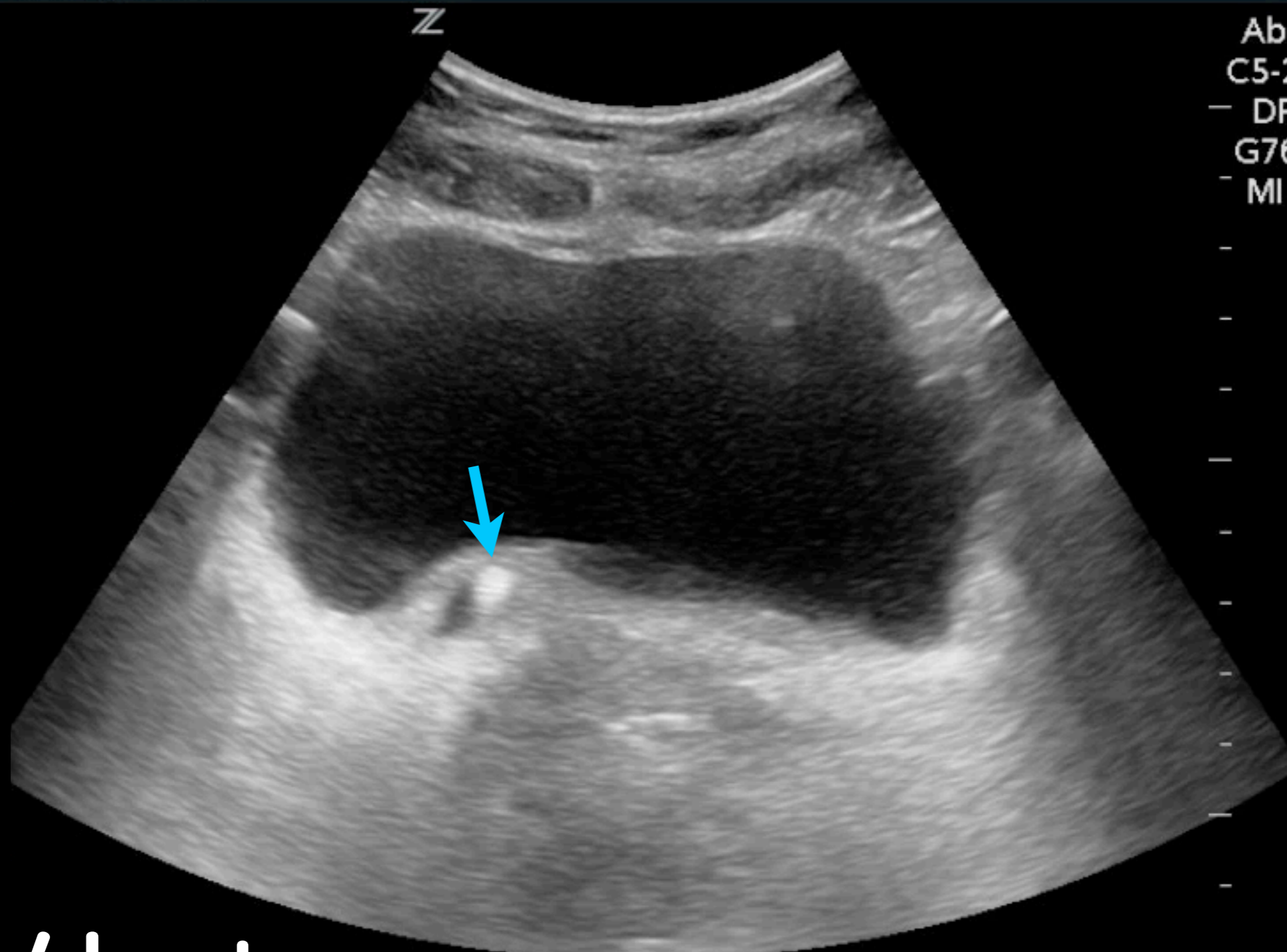


Abd/General
C5-2/CH4MHz
— DR60/M3/P2
G76/E1/100%
— MI1.1 TIs0.1
— 12.0 cm
— 16 Hz
— Δ ZSI 0

Z



Abd/General
C5-2/CH4MHz
— DR60/M3/P2
G76/E1/100%
— MI1.1 TIs0.1
— 12.0 cm
— 16 Hz
— Δ ZSI 0



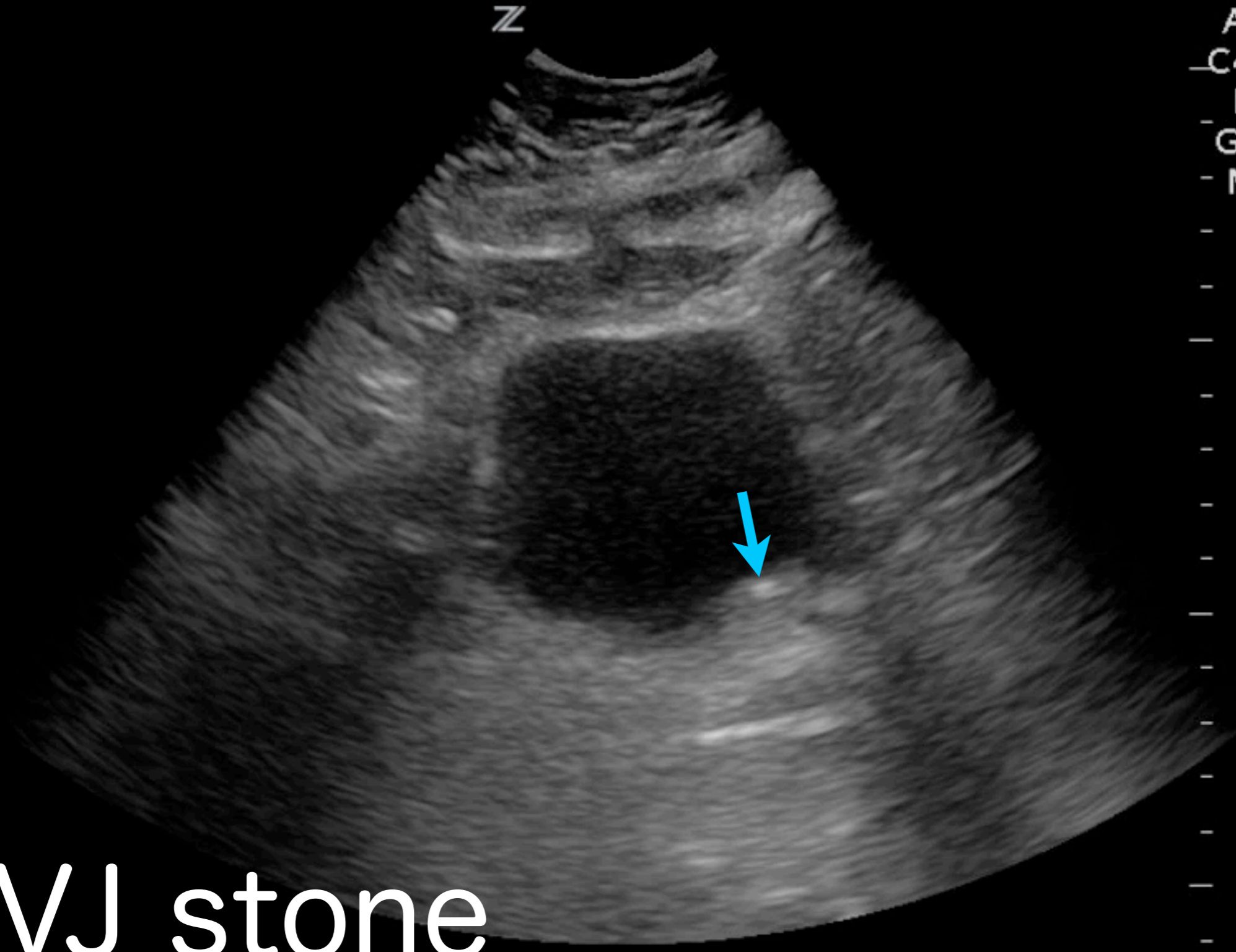
Abd/General
C5-2/CH4MHz
— DR60/M3/P2
G76/E1/100%
— MI1.1 TIs0.1
— 12.0 cm
— 16 Hz
— △ ZSI 0

UVJ stone
With hydronepheter



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
_G56/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
△ ZSI 0
Image


UVJ stone



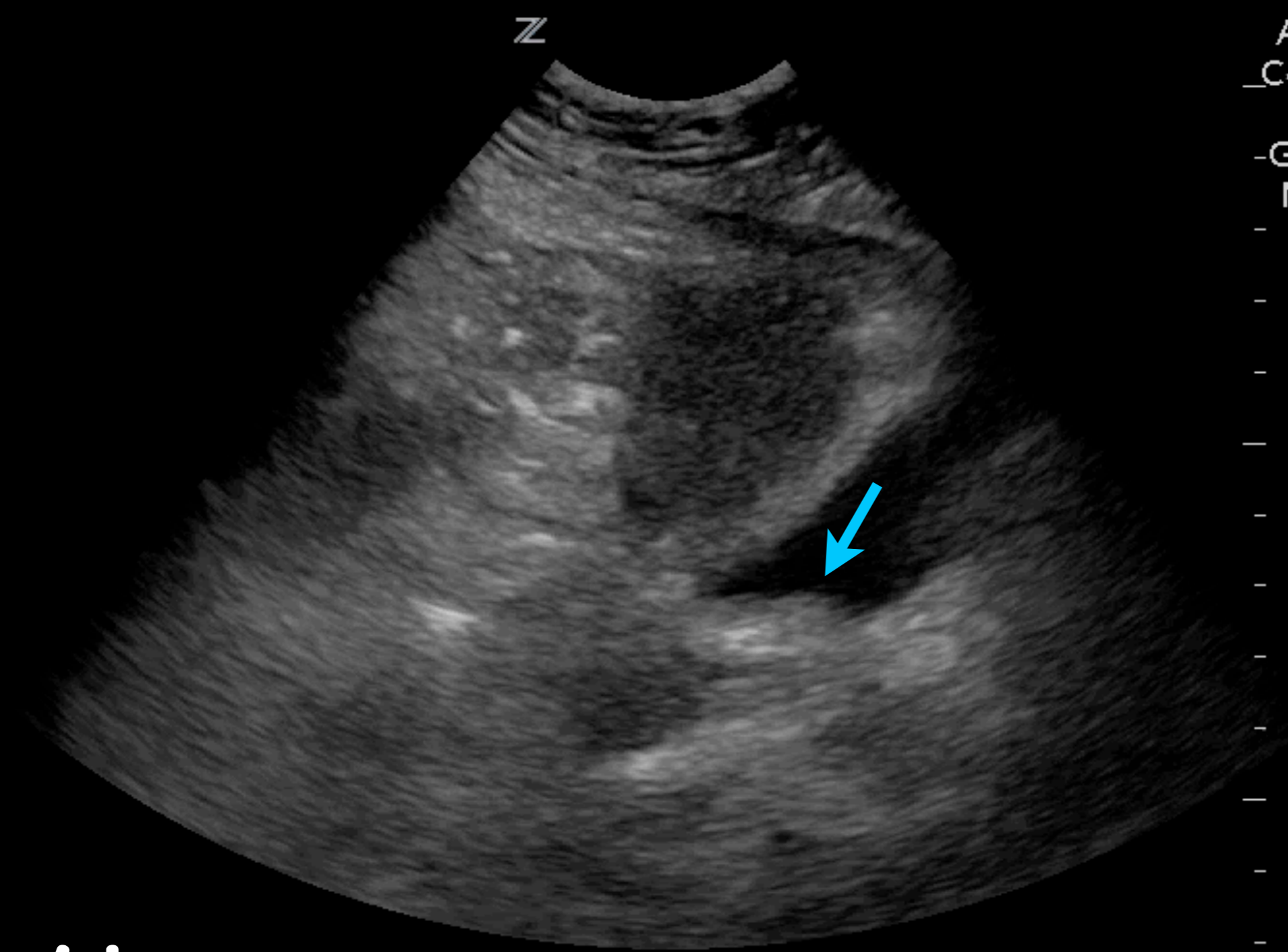
Abd/General
_C4-1/CH4MHz
DR60/M3/P2
_G56/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
△ ZSI 0
Image


UVJ stone
Minimal shadowing



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
-G66/E1/100%
MI1.1 TIs0.4
- 12.0 cm
- 13 Hz
-  ZSI 0
- **Image**

UVJ stone

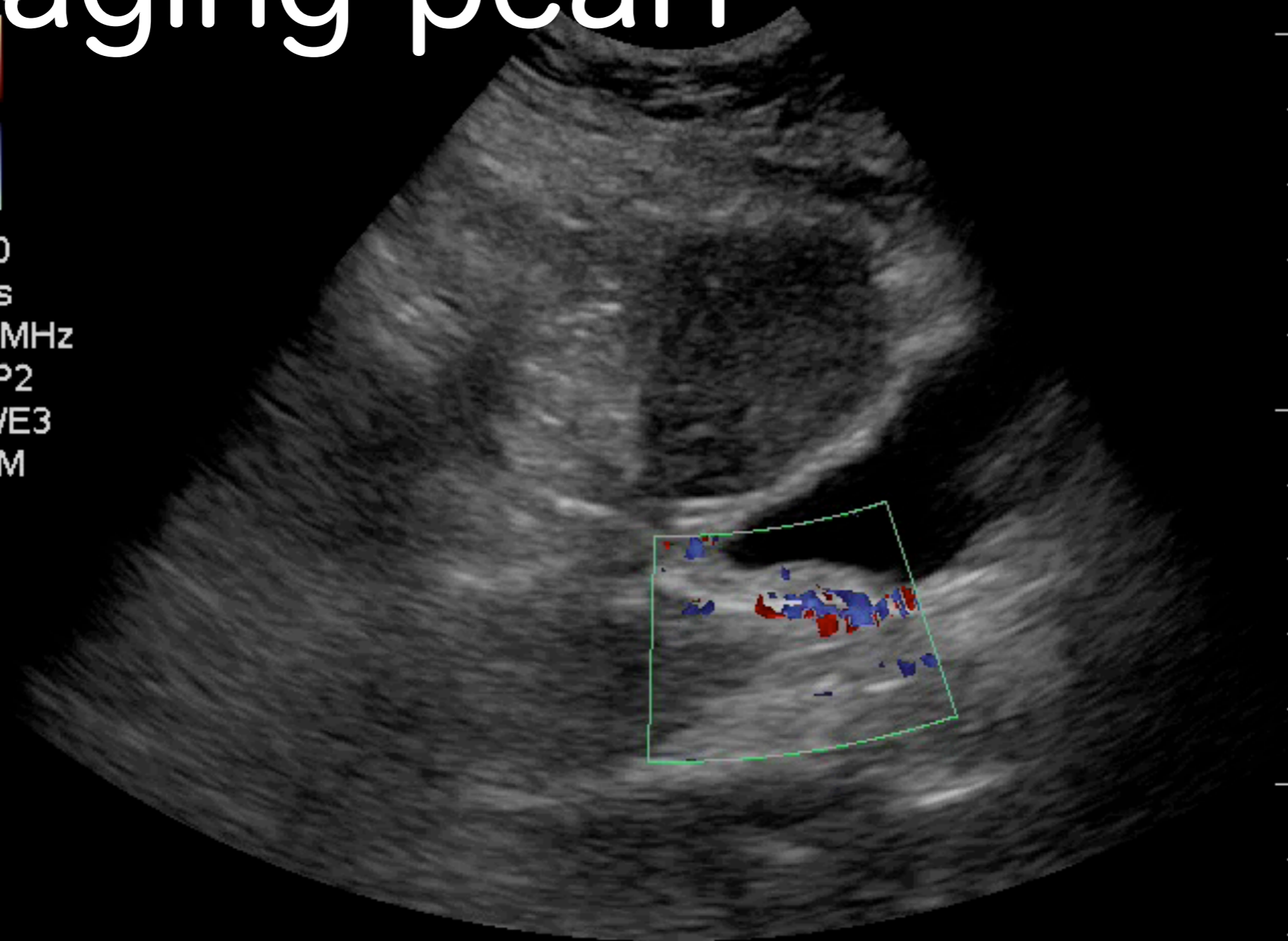


Abd/General
_C4-1/CH4MHz
DR60/M3/P2
-G66/E1/100%
MI1.1 TIs0.4
- 12.0 cm
- 13 Hz
-  ZSI 0
- **Image**

UVJ stone
Longitudinal plane

Imaging pearl

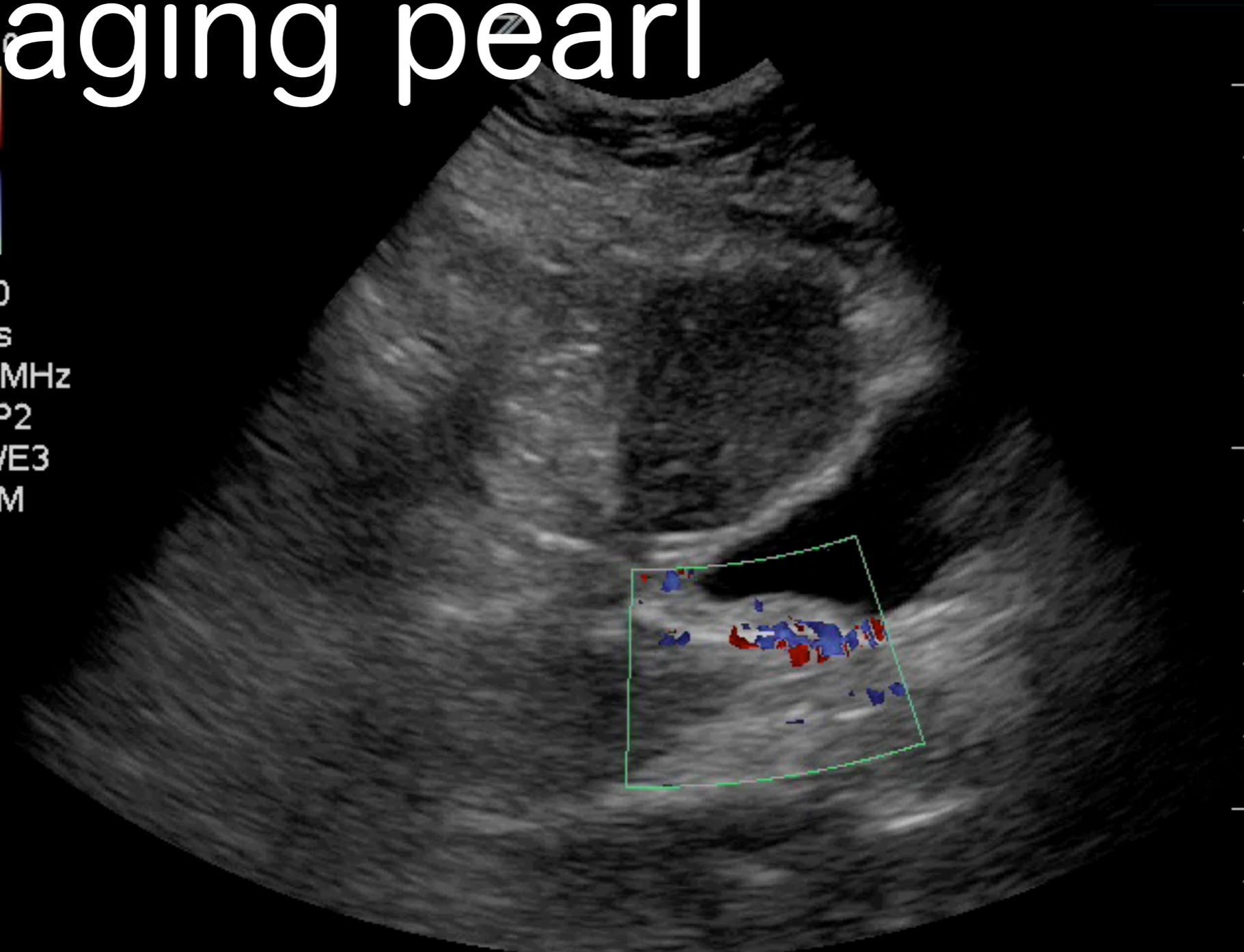
9.0
cm/s
2.25MHz
M3/P2
G78/E3
WF M



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
-G64/E1/100%
MI1.0 TIs0.6
- 12.0 cm
9 Hz
△ ZSI 0
Image

Imaging pearl

9.0
cm/s
2.25MHz
M3/P2
G78/E3
WF M



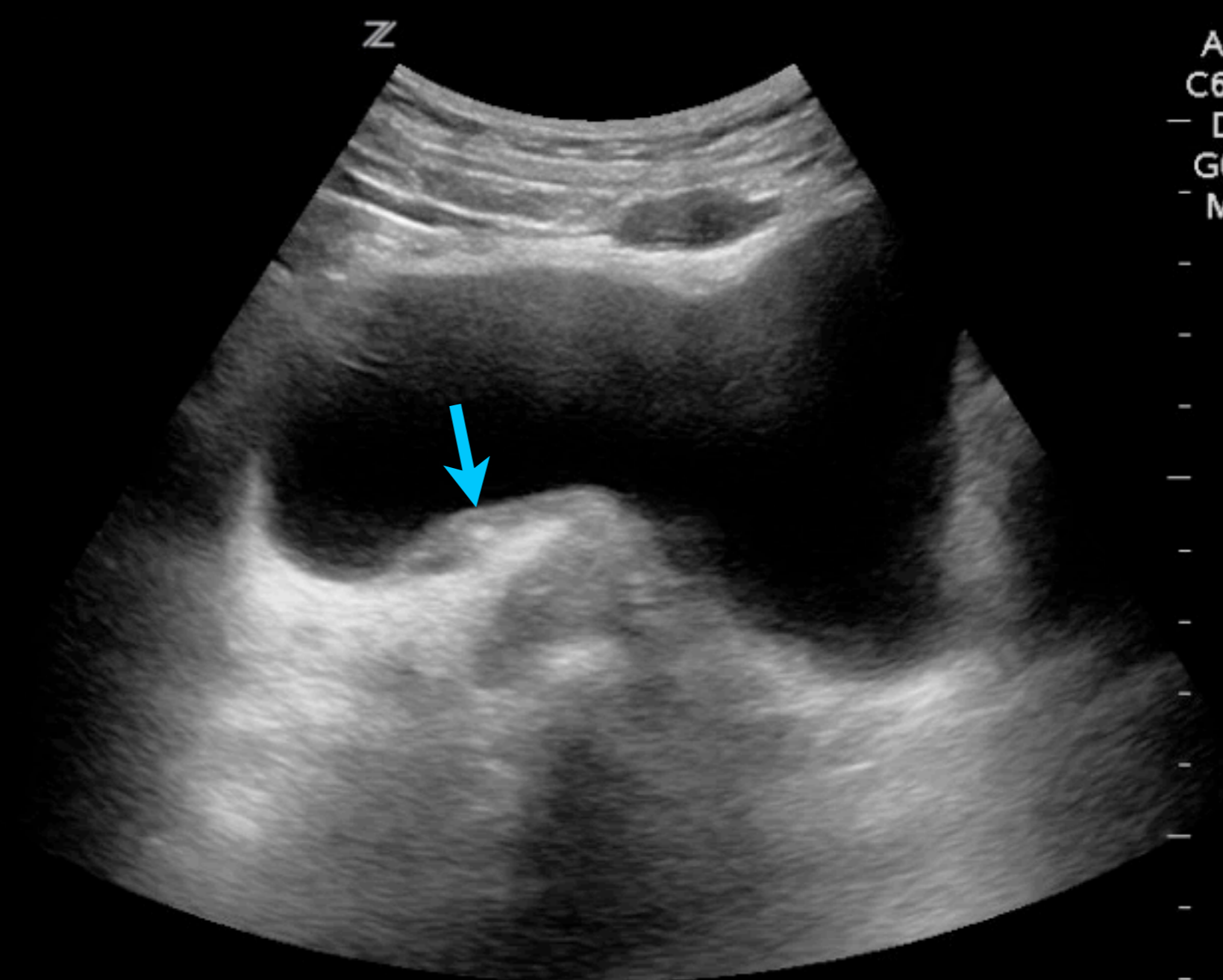
Abd/General
_C4-1/CH4MHz
DR60/M3/P2
-G64/E1/100%
MI1.0 TIs0.6
- 12.0 cm
9 Hz
△ ZSI 0
Image

Twinkle artifact
Utilize color Doppler



Abd/General
C6-2/CH6MHz
— DR50/M2/P2
G62/E1/100%
— MI1.4 TIs0.3
12.0 cm
14 Hz
△ ZSI 0

UVJ stone

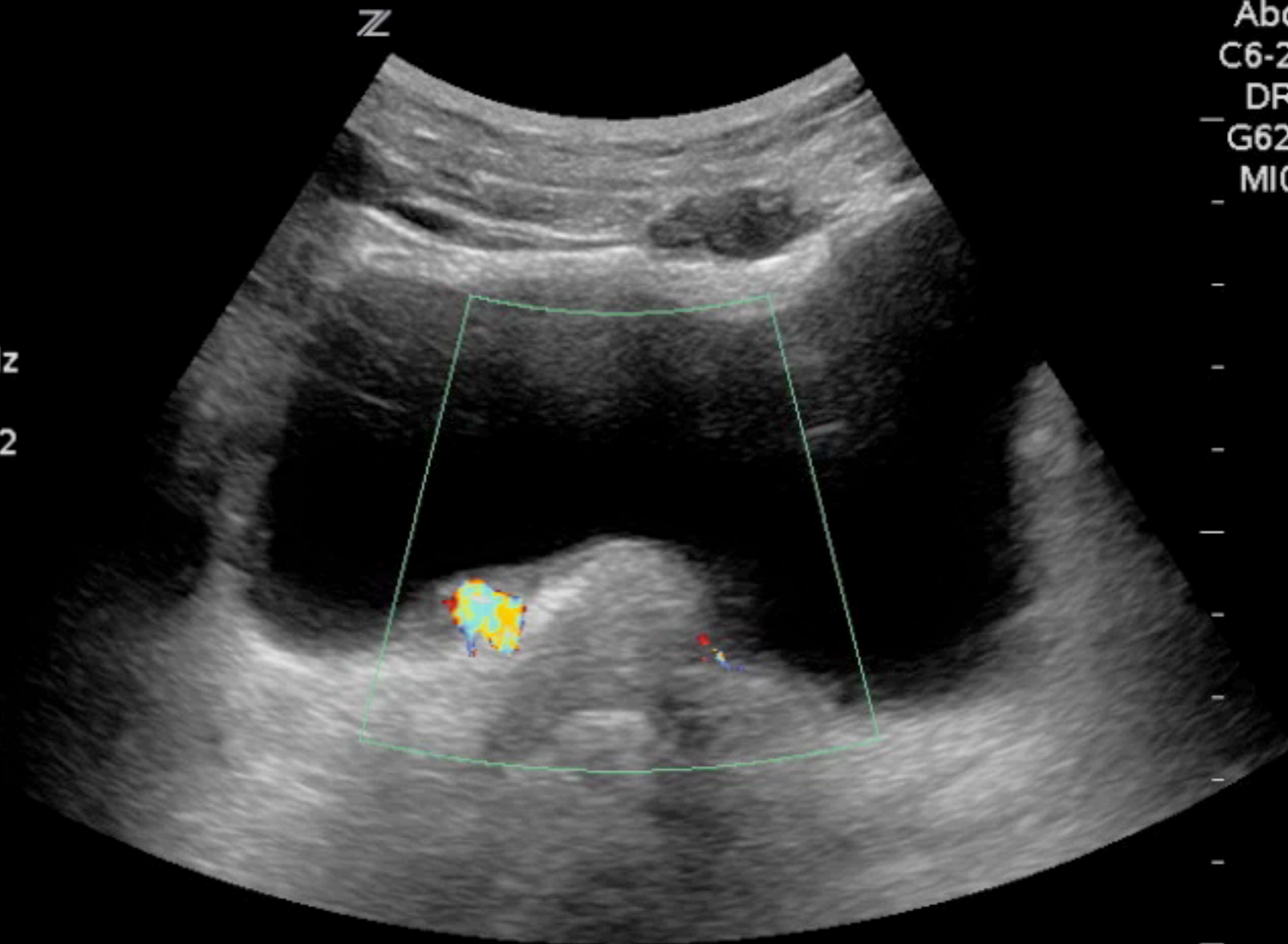


Z

Abd/General
C6-2/CH6MHz
— DR50/M2/P2
G62/E1/100%
— MI1.4 TIs0.3
12.0 cm
14 Hz
△ ZSI 0

UVJ stone

+ 15.0
- 15.0
cm/s
2.9MHz
M3/P2
G66/E2
WF M



Abd/General
C6-2/CH6MHz
DR50/M2/P2
G62/E1/100%
MI0.8 TIs0.8
10.0 cm
9 Hz
ZSI 0

UVJ stone
Twinkle artifact



Abd/General
_C6-2/CH6MHz
DR50/M2/P2
-G60/E1/100%
MI1.4 TIs0.3
14.0 cm
12 Hz
△ ZSI 0

UVJ stone



Abd/General
_C6-2/CH6MHz
DR50/M2/P2
-G60/E1/100%
MI1.4 TIs0.3
14.0 cm
12 Hz
△ ZSI 0

UVJ stone

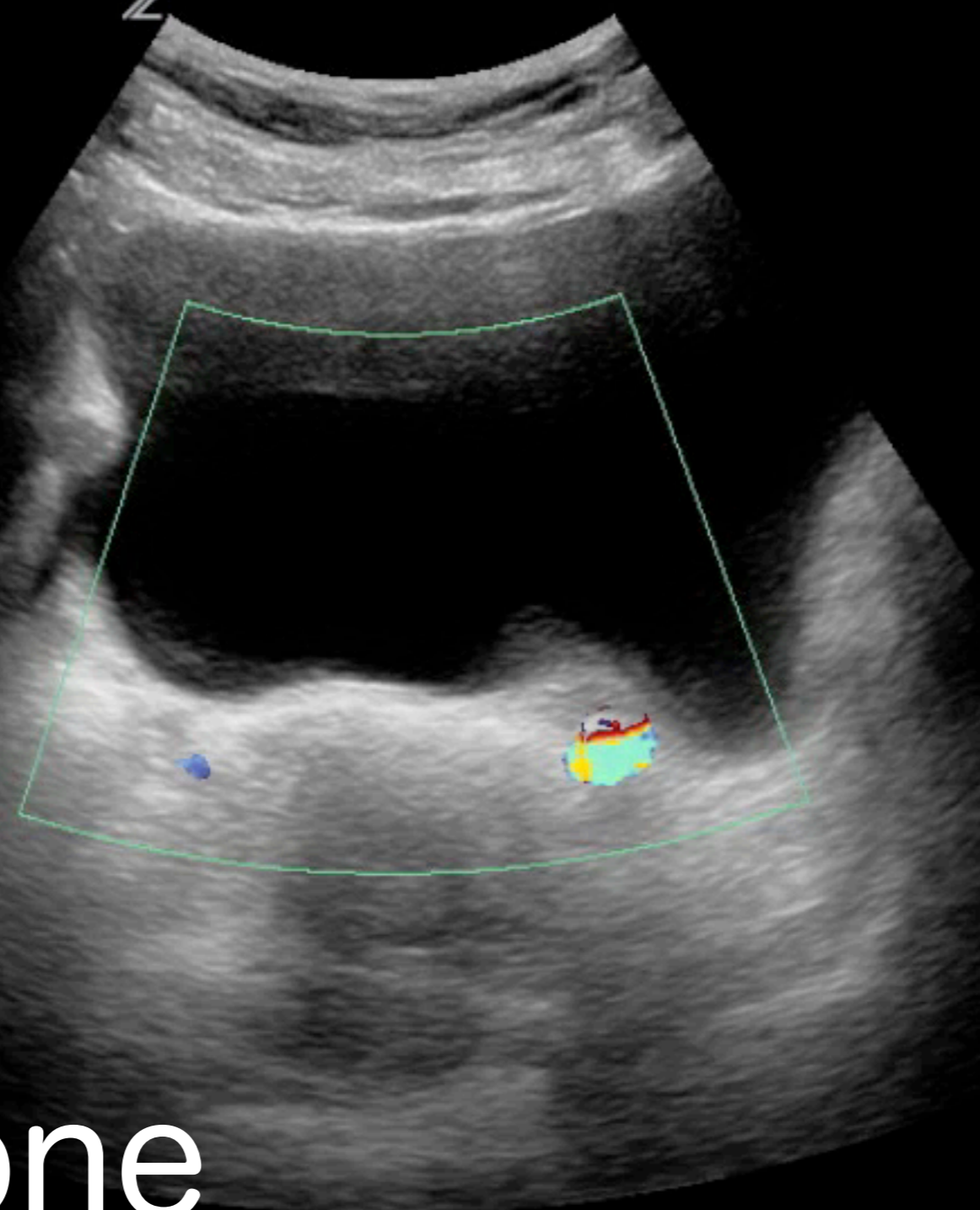


Abd/General
_C6-2/CH6MHz
DR50/M2/P2
-G60/E1/100%
MI1.4 TIs0.3
14.0 cm
12 Hz
△ ZSI 0

UVJ stone
Bladder bulge

Z

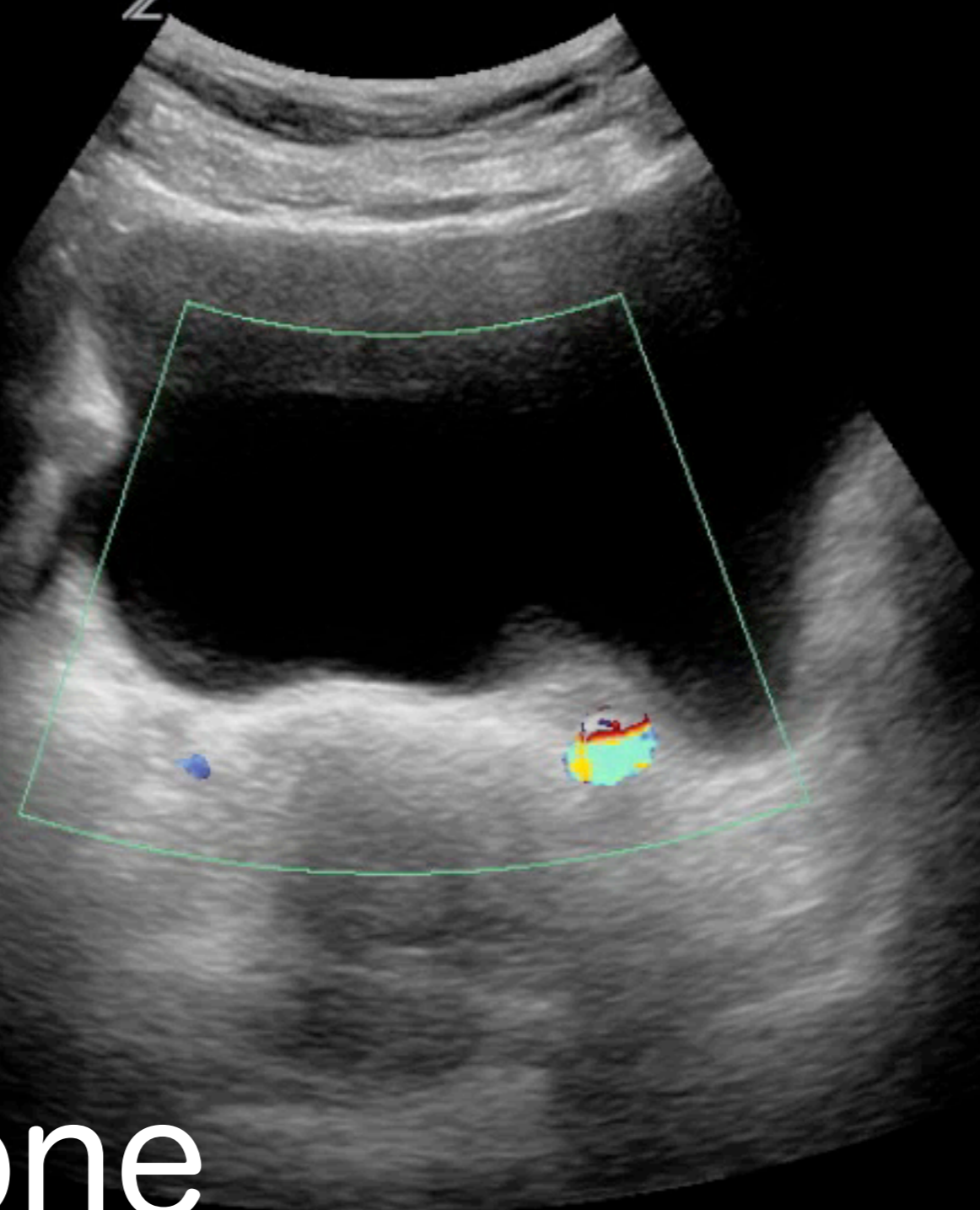
Abd/General
_C6-2/CH6MHz
DR50/M2/P2
-G60/E1/100%
MI0.8 TIs0.7
14.0 cm
9 Hz
△ ZSI 0



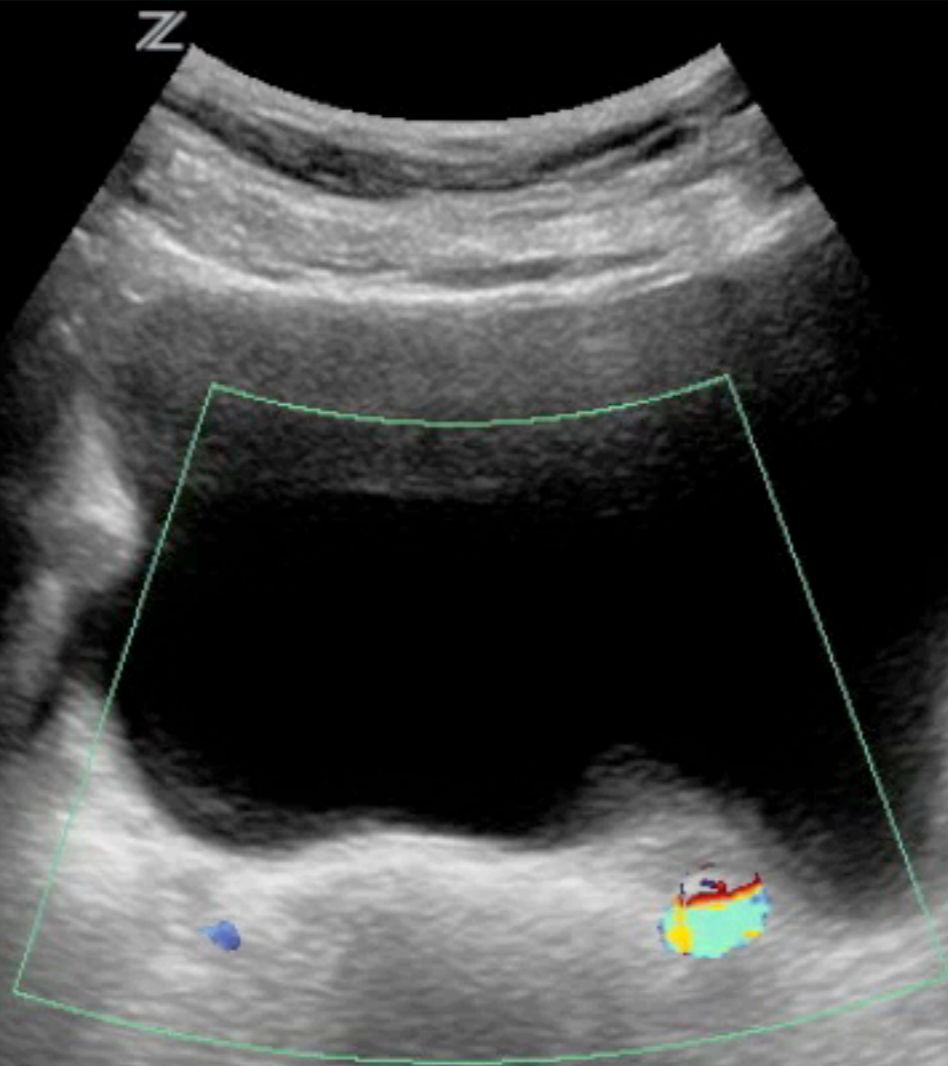
UVJ stone

Z

Abd/General
_C6-2/CH6MHz
DR50/M2/P2
-G60/E1/100%
MI0.8 TIs0.7
14.0 cm
9 Hz
△ ZSI 0



UVJ stone



Abd/General
_C6-2/CH6MHz
DR50/M2/P2
-G60/E1/100%
MI0.8 TIs0.7
14.0 cm
9 Hz
△ ZSI 0

UVJ stone
Twinkle artifact

+ 19.0



- 19.0

cm/s

2.25MHz

M3/P2

G70/E3

WF M

Z

Abd/General
_C4-1/CH4MHz
DR60/M3/P2
-G70/E1/100%
MI0.8 TIs0.5
- 12.0 cm
9 Hz
△ ZSI 0
Image

Ureteral jets

+ 19.0



- 19.0

cm/s

2.25MHz

M3/P2

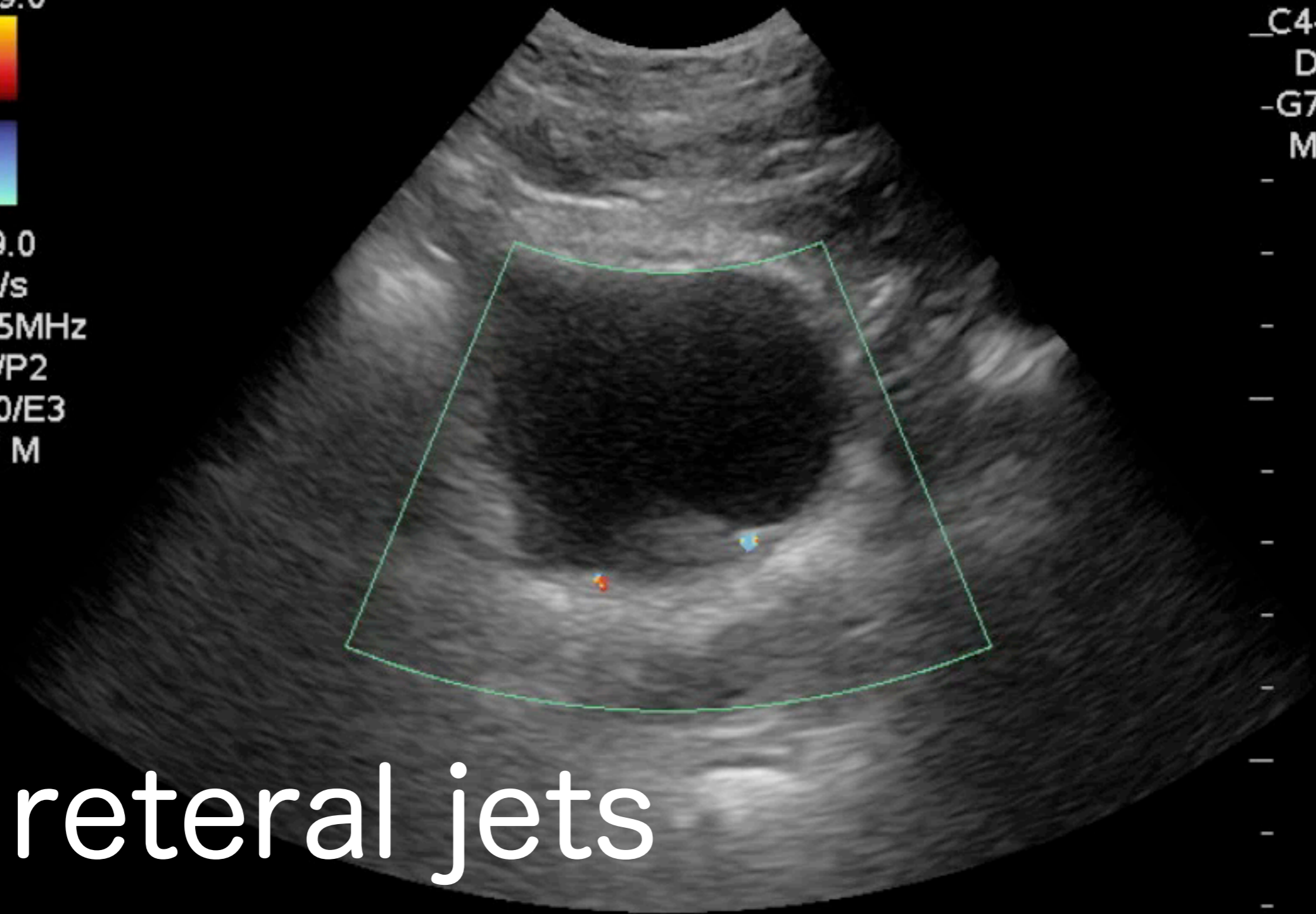
G70/E3

WF M

Z

Abd/General
_C4-1/CH4MHz
DR60/M3/P2
-G70/E1/100%
MI0.8 TIs0.5
- 12.0 cm
9 Hz
△ ZSI 0
Image

Ureteral jets



+ 19.0



- 19.0

cm/s

2.25MHz

M3/P2

G70/E3

WF M

Z

Abd/General

_C4-1/CH4MHz

DR60/M3/P2

-G70/E1/100%

M10.8 T1s0.5

- 12.0 cm

- 9 Hz

-  ZSI 0

- **Image**

Ureteral jets

Rules out complete obstruction



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
G74/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
△ ZSI 0
Image

Pathology



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
G74/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
△ ZSI 0
Image

Pathology



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
G74/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
△ ZSI 0
Image

Pathology
Enlarged prostate



Z

Abd/General
C4-1/CH4MHz
- DR60/M3/P2
- G70/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 14 Hz
- ZSI 0

Pathology



Z

Abd/General
C4-1/CH4MHz
- DR60/M3/P2
- G70/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 14 Hz
- ZSI 0

Pathology



Z

Abd/General
C4-1/CH4MHz
- DR60/M3/P2
- G70/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 14 Hz
- ZSI 0

Pathology
Enlarged prostate

Pathology



Abd/General
-C5-2/CH4MHz
DR60/M3/P2
- G68/E1/100%
- MI0.9 TIs0.1
- 16.0 cm
- 13 Hz
- Δ ZSI 0

13 y/o with hematuria

Pathology



Abd/General
-C5-2/CH4MHz
DR60/M3/P2
- G68/E1/100%
- MI0.9 TIs0.1
- 16.0 cm
- 13 Hz
- Δ ZSI 0

13 y/o with hematuria

Pathology



Abd/General
-C5-2/CH4MHz
DR60/M3/P2
-G68/E1/100%
-MI0.9 TIs0.1
-16.0 cm
-13 Hz
-△ ZSI 0

13 y/o with hematuria
Bladder clot

Pathology



13 y/o with hematuria
Bladder clot


Pathology



13 y/o with hematuria
Bladder clot

Pathology




Abd/General
_C4-1/CH4MHz
DR60/M3/P2
- G62/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
-  ZSI 0
- **Image**

Hematuria

Pathology




Abd/General
_C4-1/CH4MHz
DR60/M3/P2
- G62/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
-  ZSI 0
- **Image**

Hematuria

Pathology



Abd/General
_C4-1/CH4MHz
DR60/M3/P2
- G62/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
-  ZSI 0
- **Image**

Hematuria
Bladder debris

ED FAST
C5-2
32Hz
15cm

2D
F3
Gn 60
232dB/C5
G/3/2



G
P ▲ R
2.0 5.0

Pathology

ED FAST
C5-2
32Hz
15cm

2D
F3
Gn 60
232dB/C5
G/3/2



Pathology

ED FAST
C5-2
32Hz
15cm

2D
F3
Gn 60
232dB/C5
G/3/2



Pathology
Bladder clot

ED FAST
C5-2
32Hz
15cm


2D
F3
Gn 60
232dB/C5
G/3/2



Pitfall


PAE and side lobe artifact



Abd/General
_C4-1/CH4MHz
_DR60/M3/P2
_G60/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
-  ZSI 0
- **Image**


Pathology



Abd/General
_C4-1/CH4MHz
_DR60/M3/P2
_G60/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
-  ZSI 0
- **Image**

Pathology



Abd/General
_C4-1/CH4MHz
_DR60/M3/P2
_G60/E1/100%
- MI1.3 TIs0.4
- 16.0 cm
- 11 Hz
-  ZSI 0
- **Image**

Pathology

Bladder diverticuli



Abd/General
C5-2/CH4MHz
DR60/M3/P2
G72/E1/100%
MI1.1 TIs0.1
10.0 cm
17 Hz
△ ZSI 0

Pathology



Abd/General
C5-2/CH4MHz
DR60/M3/P2
G72/E1/100%
MI1.1 TIs0.1
10.0 cm
17 Hz
△ ZSI 0

Pathology



Abd/General
C5-2/CH4MHz
DR60/M3/P2
G72/E1/100%
MI1.1 TIs0.1
10.0 cm
17 Hz
△ ZSI 0

Pathology

Vesiculoenteric fistula



Abd/General
-C6-2/CH6MHz
-DR50/M2/P2
-G68/E1/100%
-MI1.3 TIs0.3
-16.0 cm
-11 Hz
-△ ZSI 0

Pathology



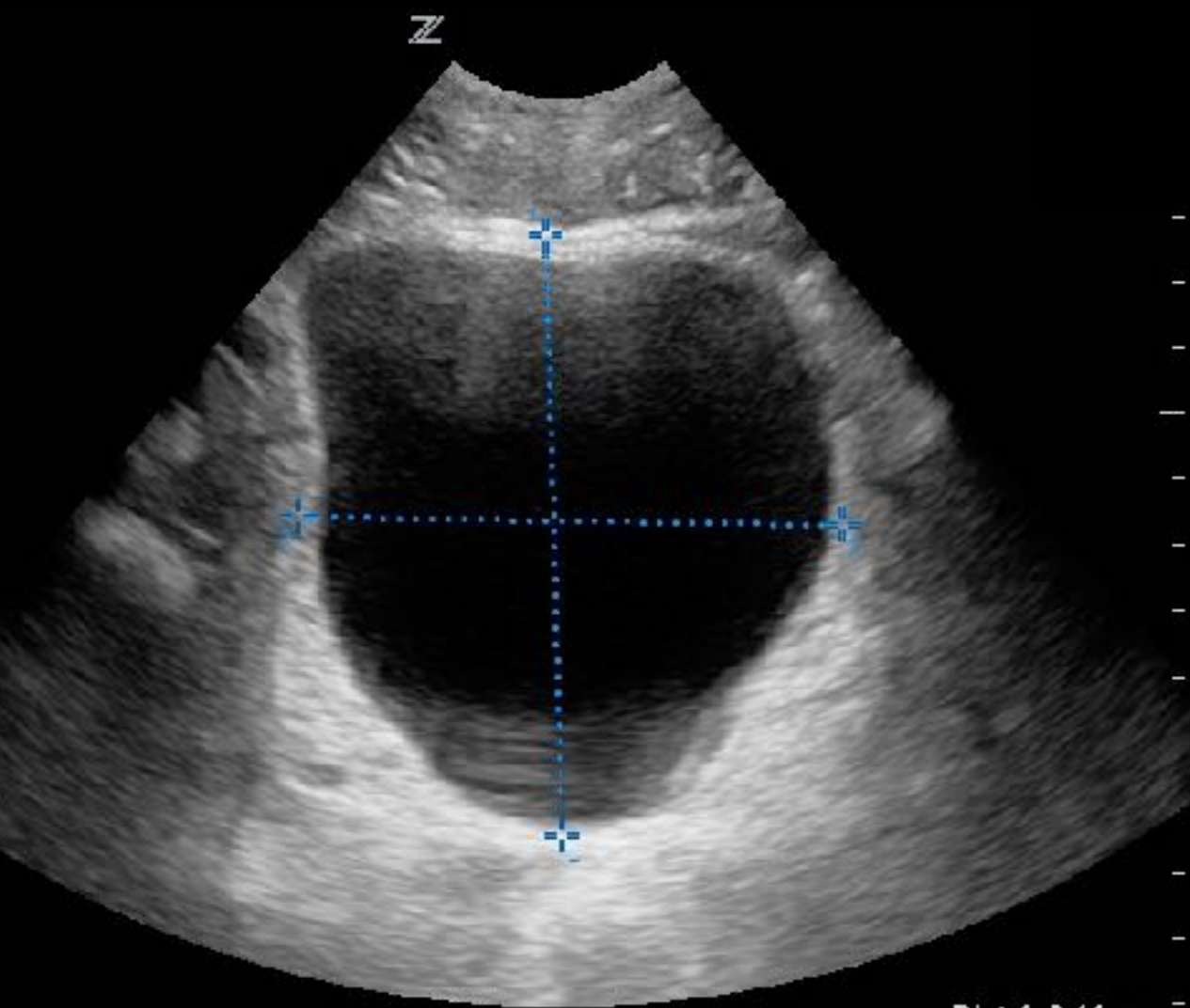
Abd/General
-C6-2/CH6MHz
-DR50/M2/P2
-G68/E1/100%
-MI1.3 TIs0.3
-16.0 cm
-11 Hz
-△ ZSI 0

Pathology

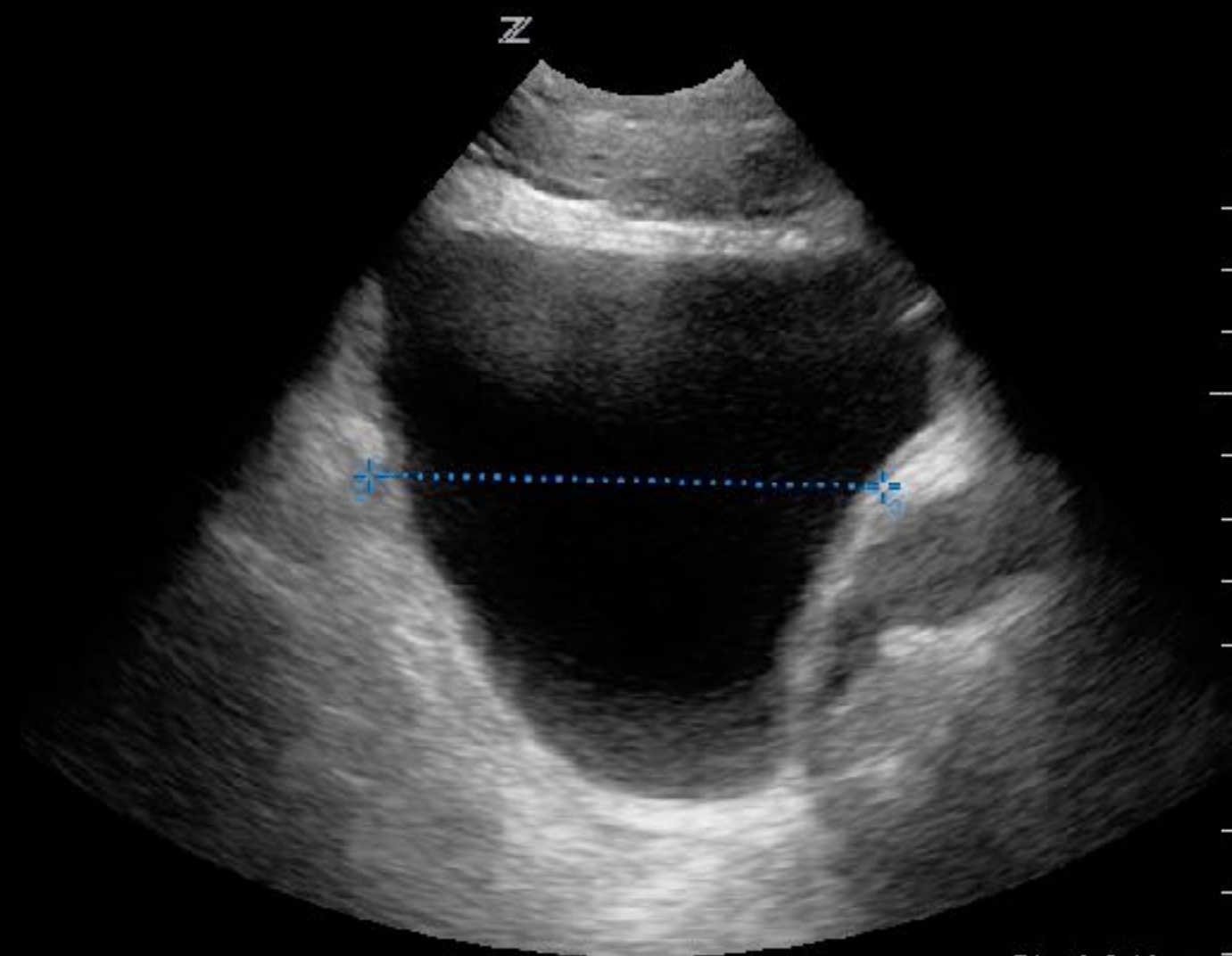


Abd/General
-C6-2/CH6MHz
-DR50/M2/P2
-G68/E1/100%
-MI1.3 TIs0.3
-16.0 cm
-11 Hz
-△ ZSI 0

Pathology
Urinary retention

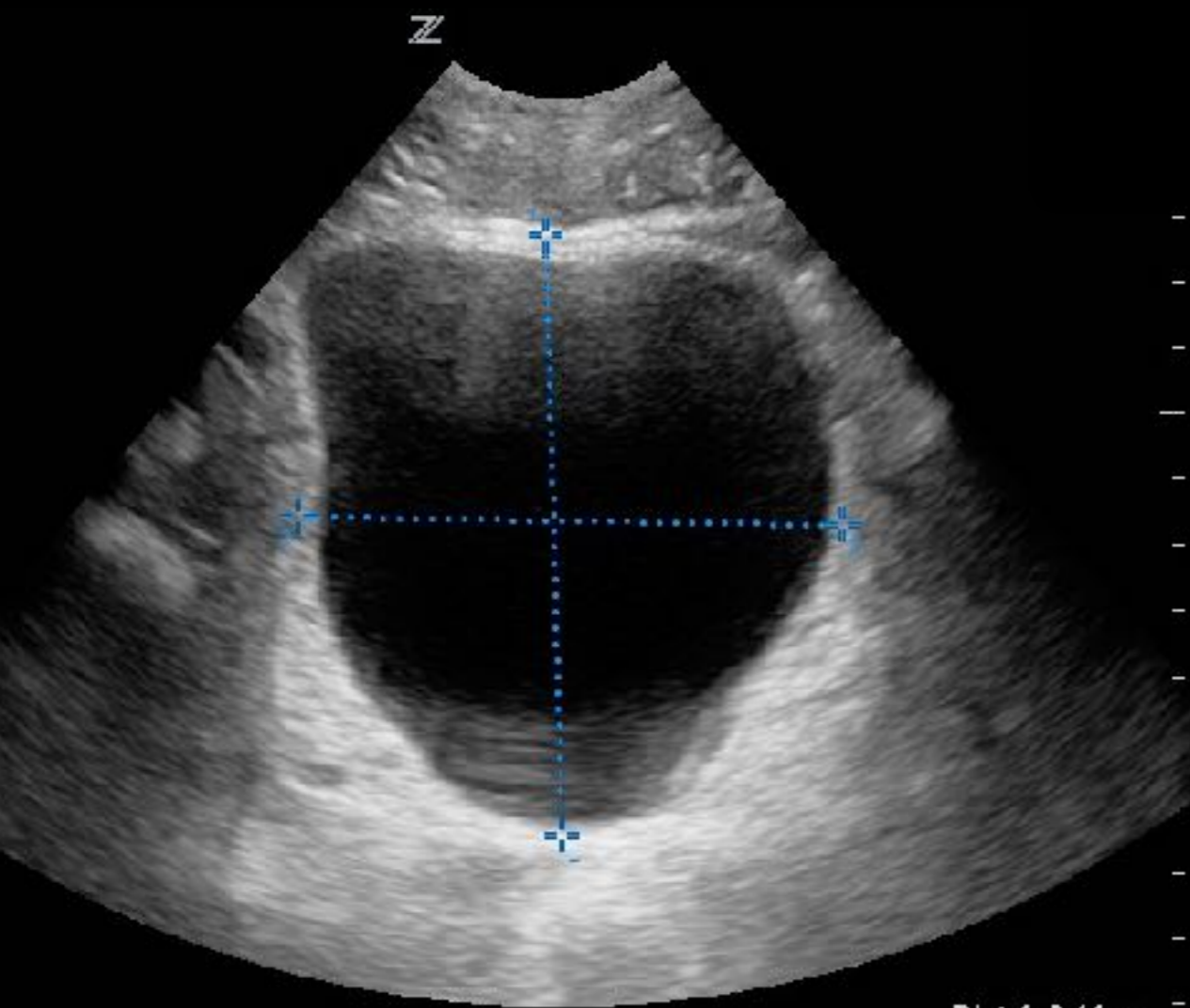


Dist 1: 9.14cm
Dist 2: 8.27cm
Volume 327.31cc

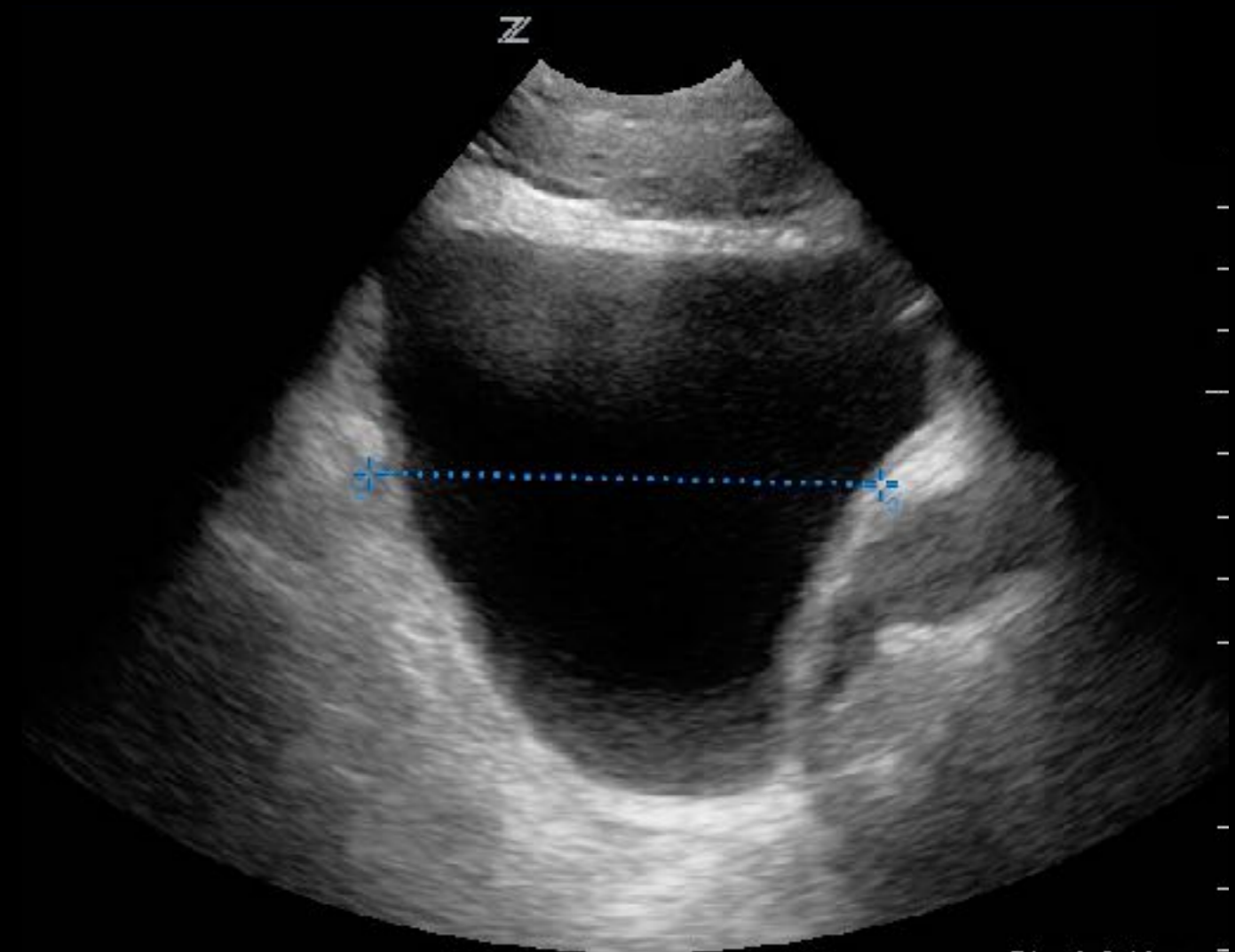


Dist 1: 9.14cm
Dist 2: 8.27cm
Dist 3: 8.25cm
Volume 326.52cc

Bladder volume



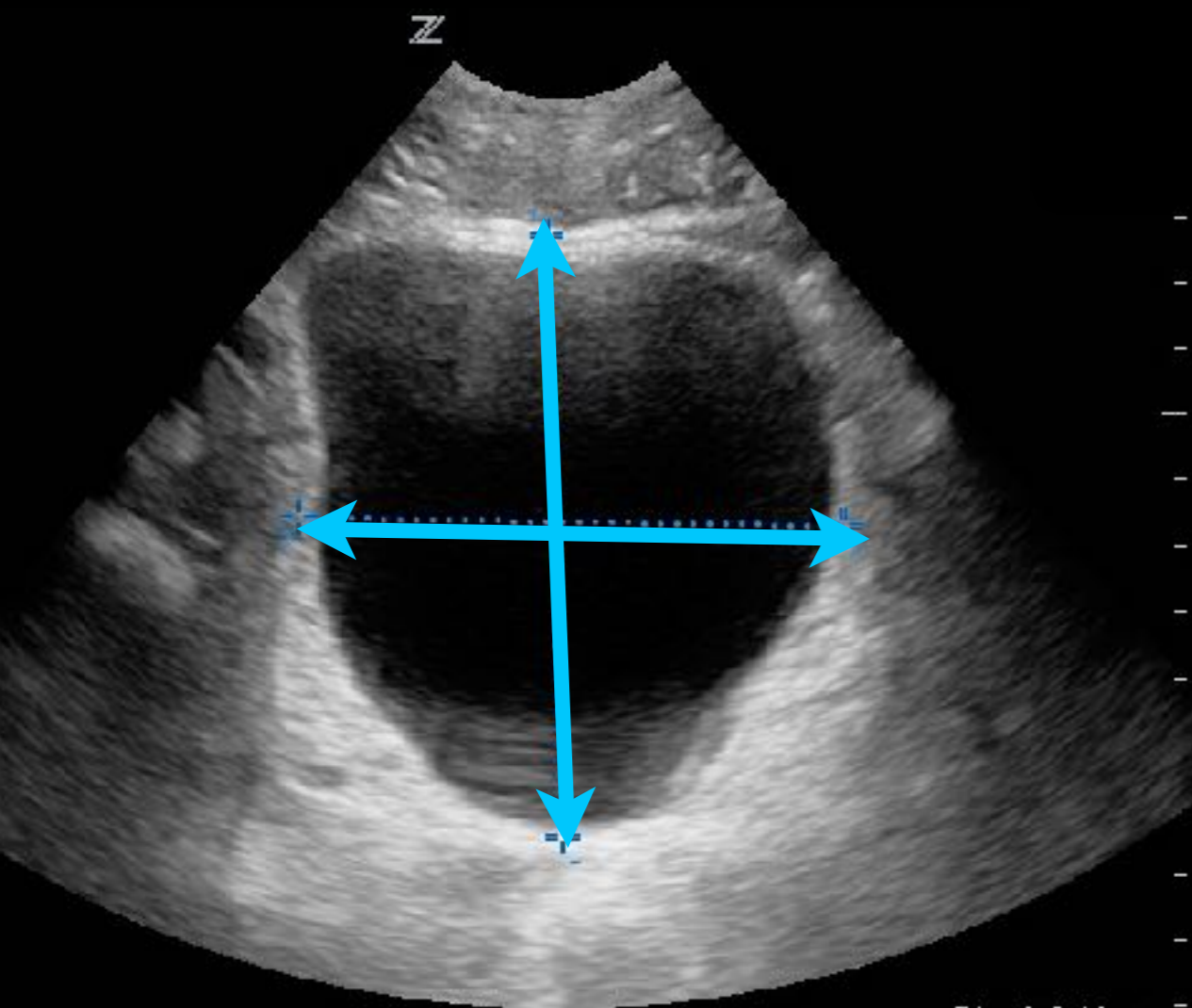
Dist 1: 9.14cm
Dist 2: 8.27cm
Volume 327.31cc



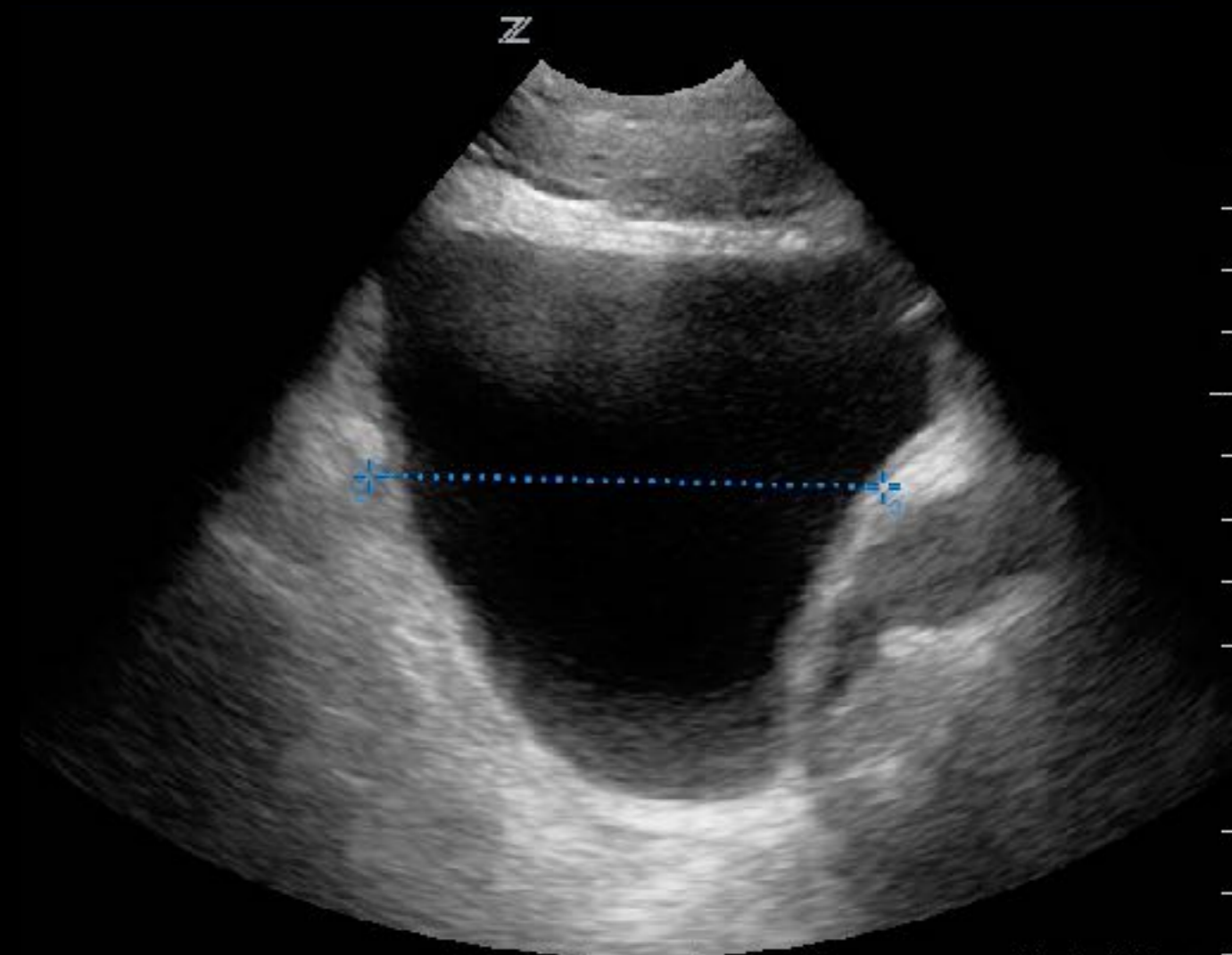
Dist 1: 9.14cm
Dist 2: 8.27cm
Dist 3: 8.25cm
Volume 326.52cc

Bladder volume

$$W \times D \times L \times 0.75$$



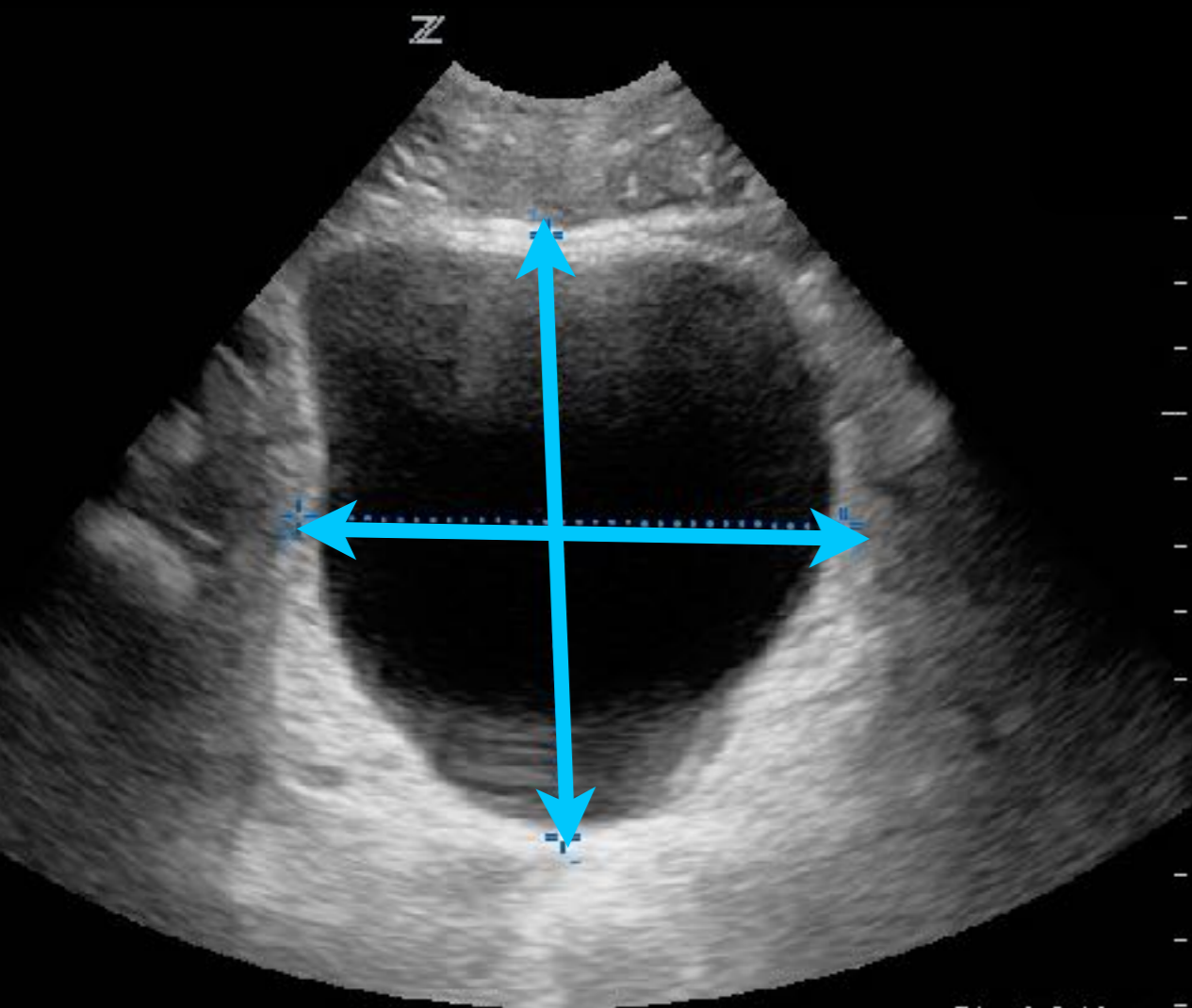
Dist 1: 9.14cm
Dist 2: 8.27cm
Volume 327.31cc



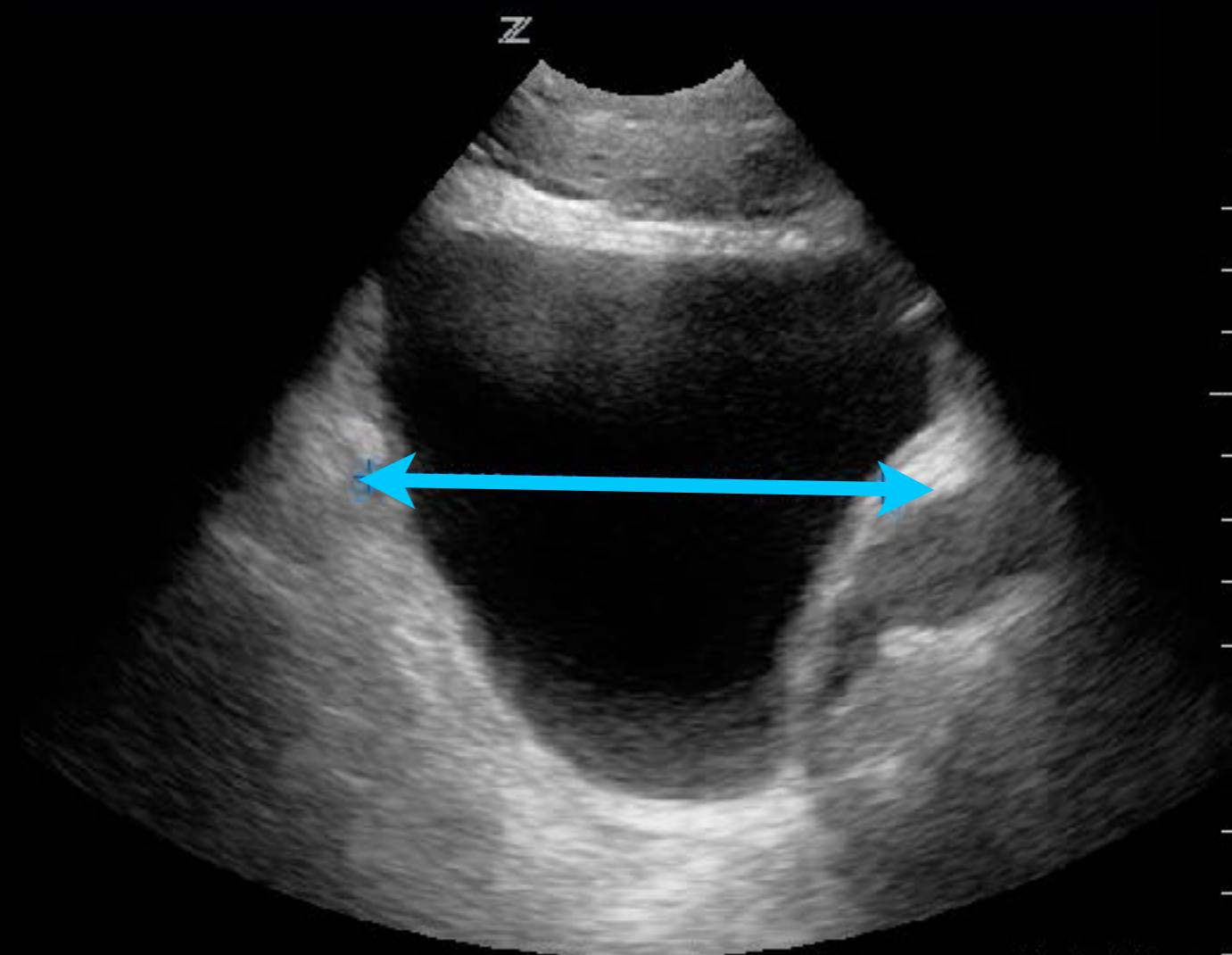
Dist 1: 9.14cm
Dist 2: 8.27cm
Dist 3: 8.25cm
Volume 326.52cc

Bladder volume

$$W \times D \times L \times 0.75$$



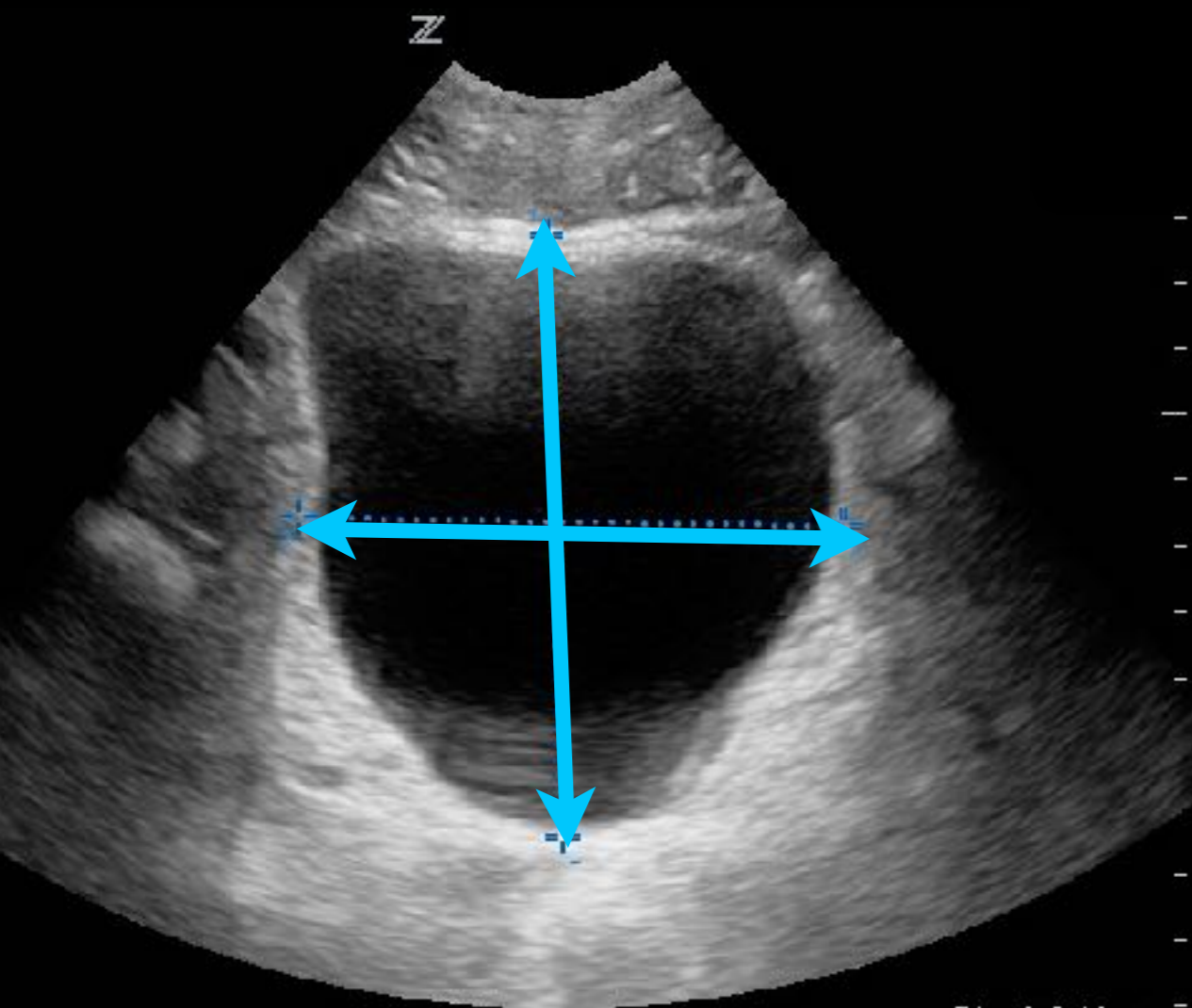
Dist 1: 9.14cm
Dist 2: 8.27cm
Volume 327.31cc



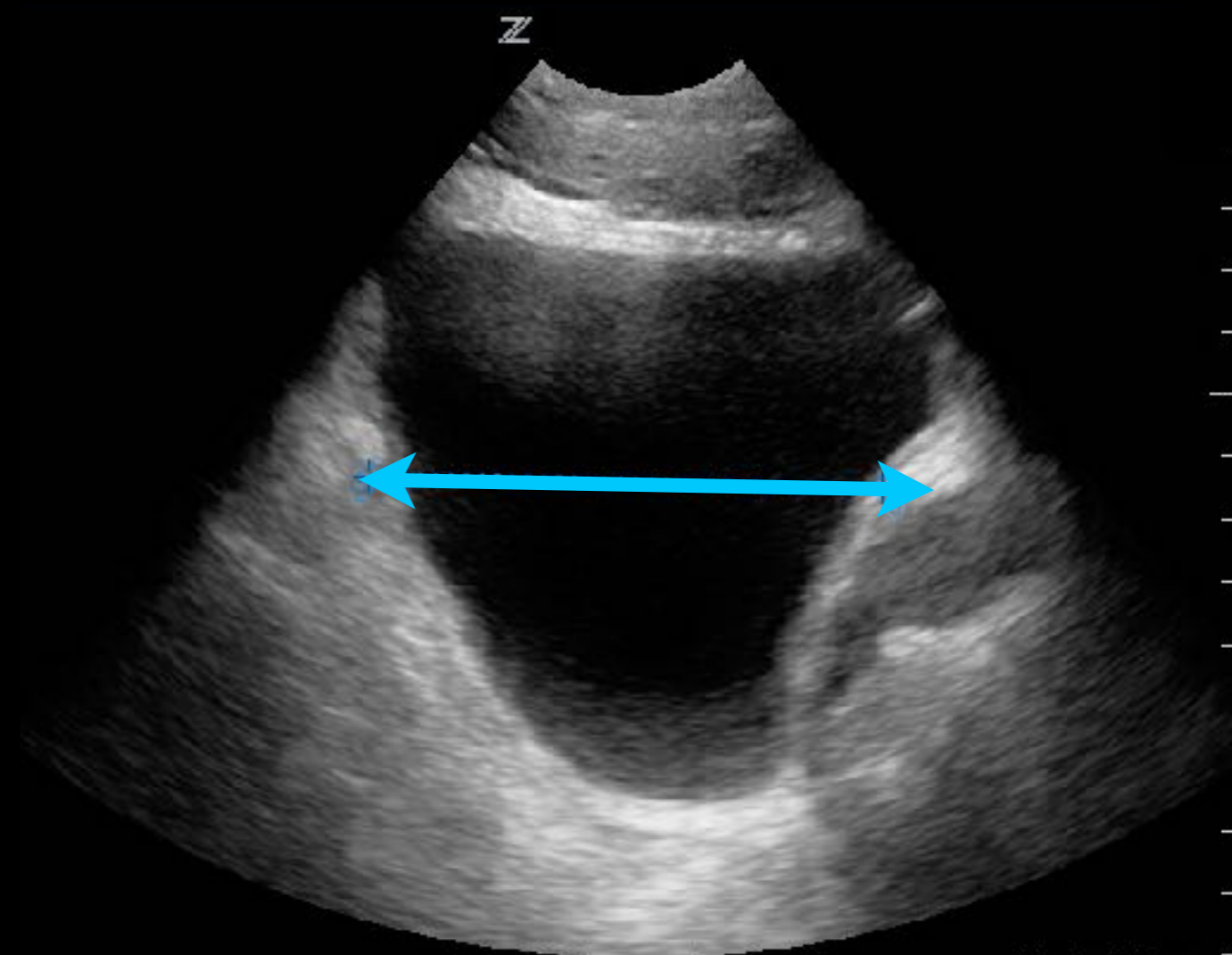
Dist 1: 9.14cm
Dist 2: 8.27cm
Dist 3: 8.25cm
Volume 326.52cc

Bladder volume

$$W \times D \times L \times 0.75$$



Dist 1: 9.14cm
Dist 2: 8.27cm
Volume 327.31cc



Dist 1: 9.14cm
Dist 2: 8.27cm
Dist 3: 8.25cm
Volume 326.52cc

Bladder volume

$$W \times D \times L \times 0.75$$



Urinary retention



Urinary retention



Urinary retention
Bilateral hydronephrosis



Abd/Renal
C6-2/CH4MHz
— DR55/M2/P3
G68/E1/100%
— MI1.3 TIs0.4
12.0 cm
14 Hz
△ ZSI 0
Image

“Foley’s not draining”



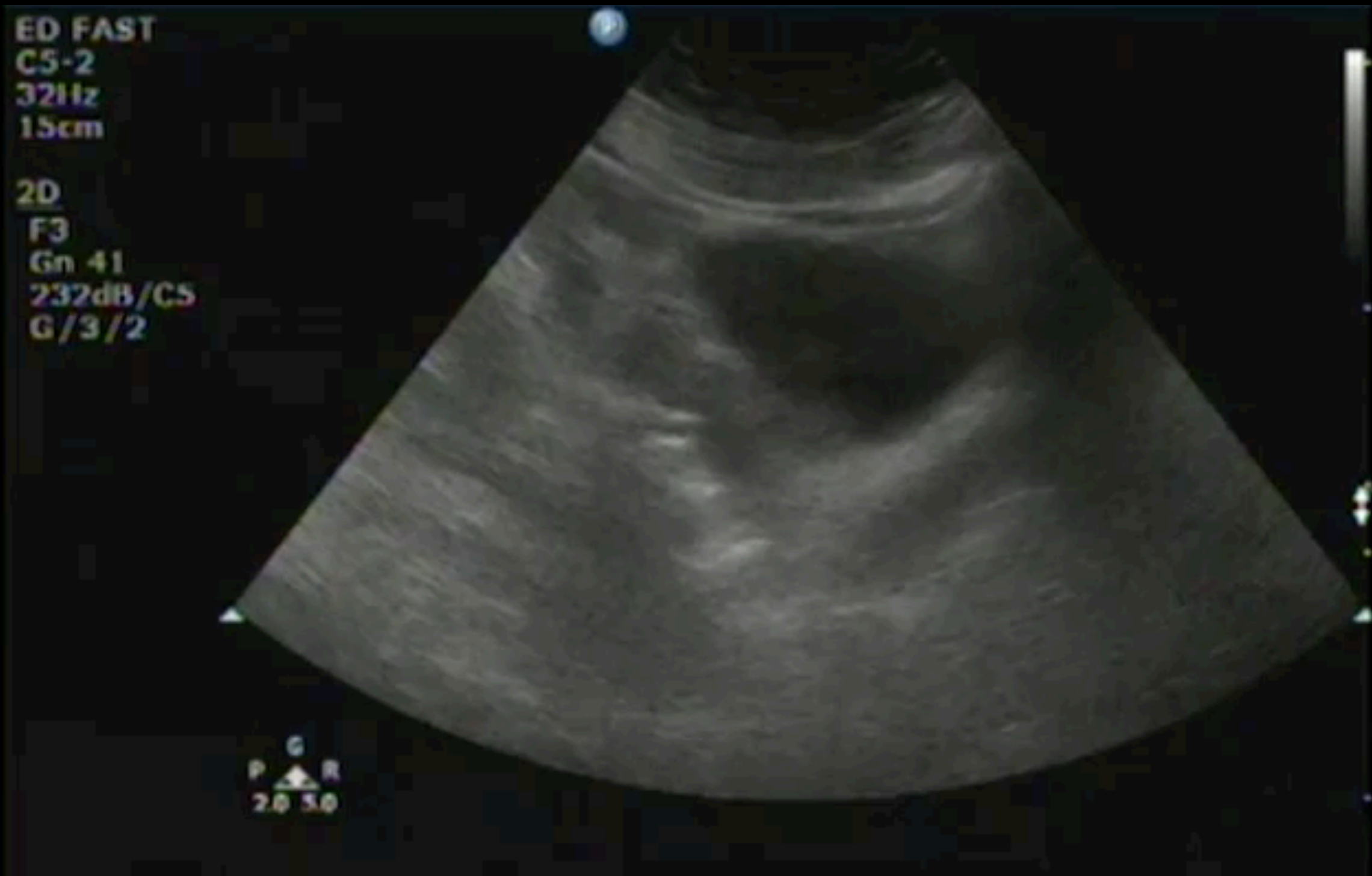
Abd/Renal
C6-2/CH4MHz
— DR55/M2/P3
G68/E1/100%
— MI1.3 TIs0.4
12.0 cm
14 Hz
△ ZSI 0
Image

“Foley’s not draining”

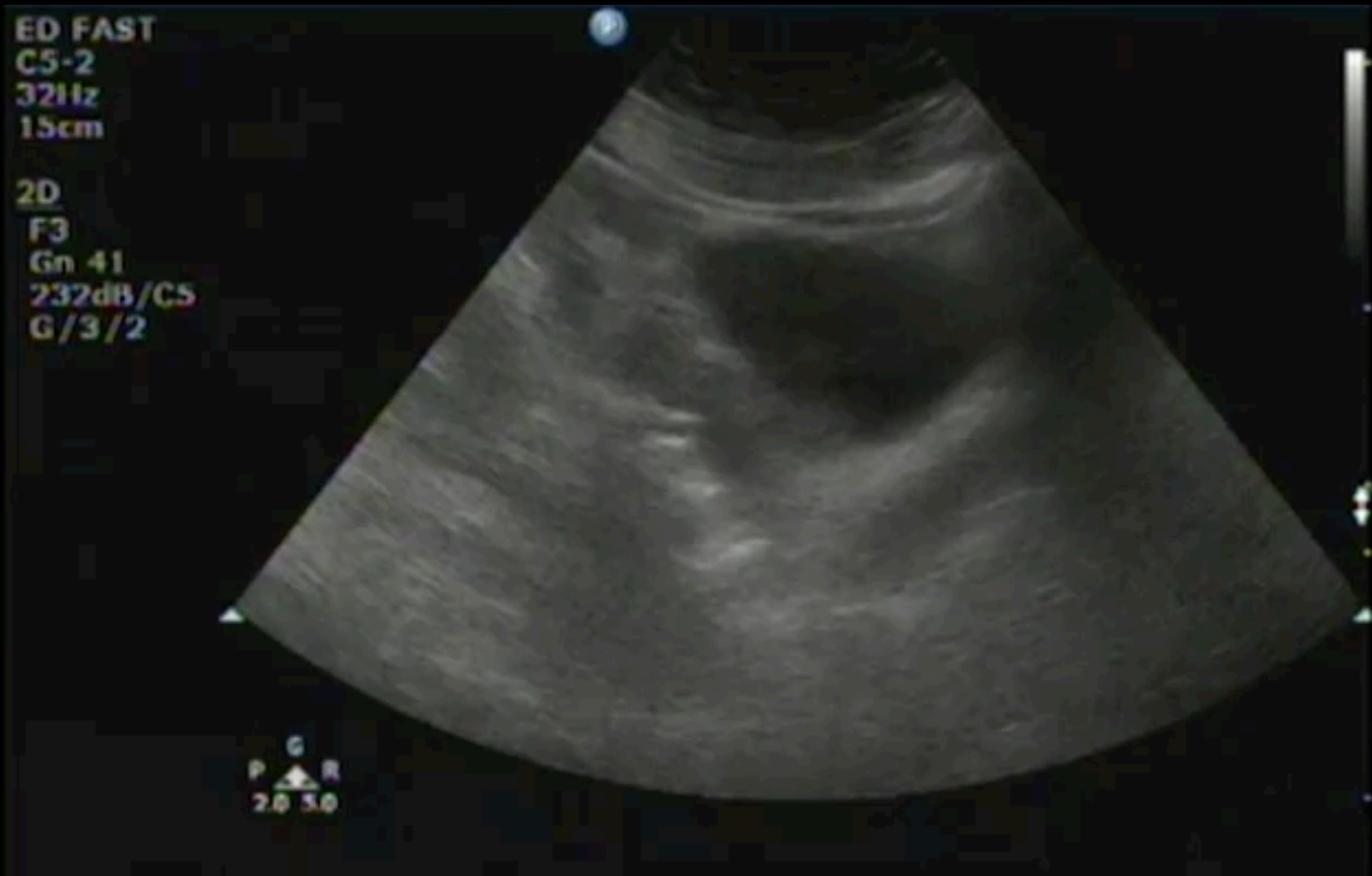


Abd/Renal
C6-2/CH4MHz
— DR55/M2/P3
G68/E1/100%
— MI1.3 TIs0.4
12.0 cm
14 Hz
△ ZSI 0
Image

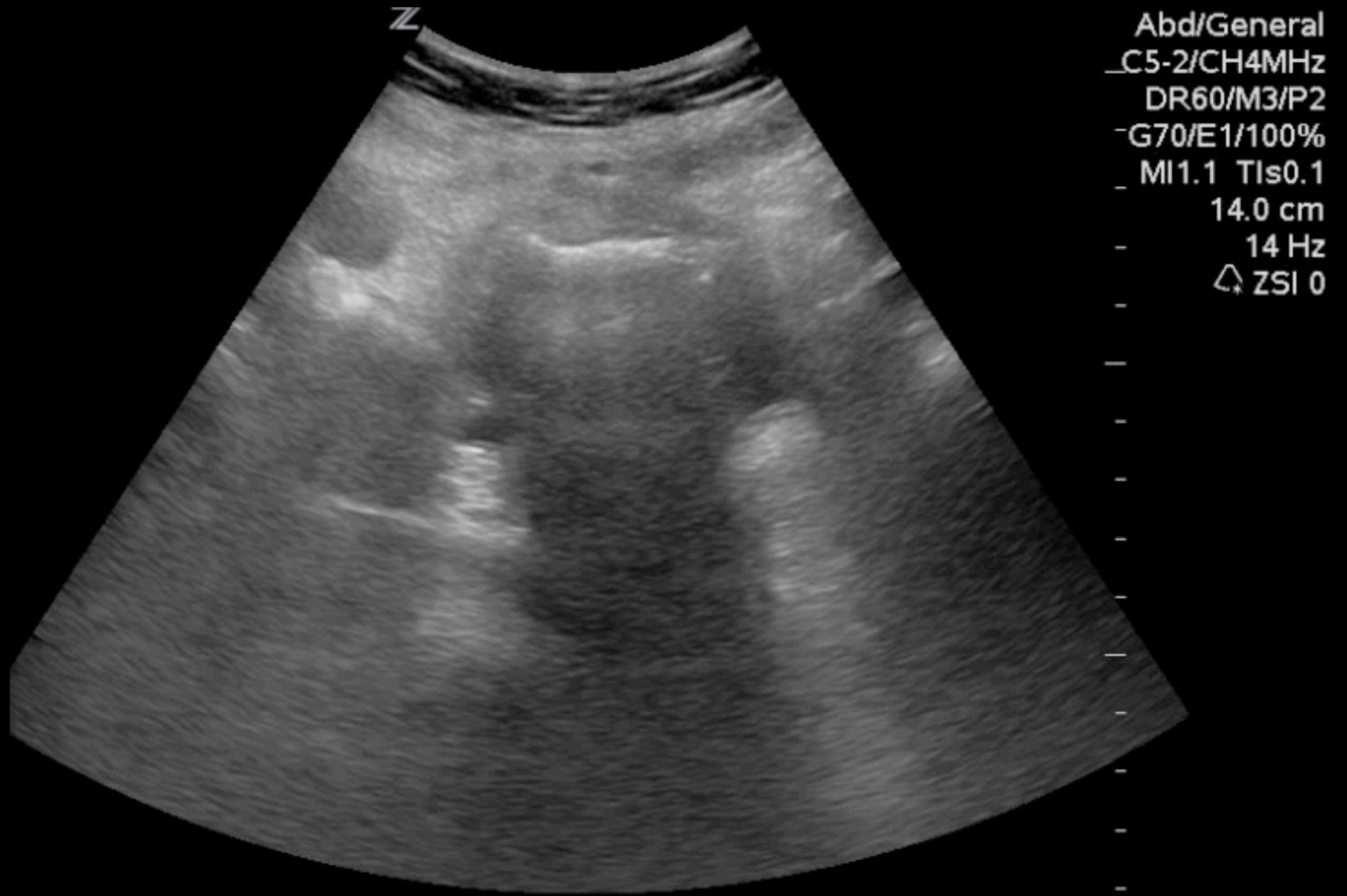
“Foley’s not draining”
Check catheter placement



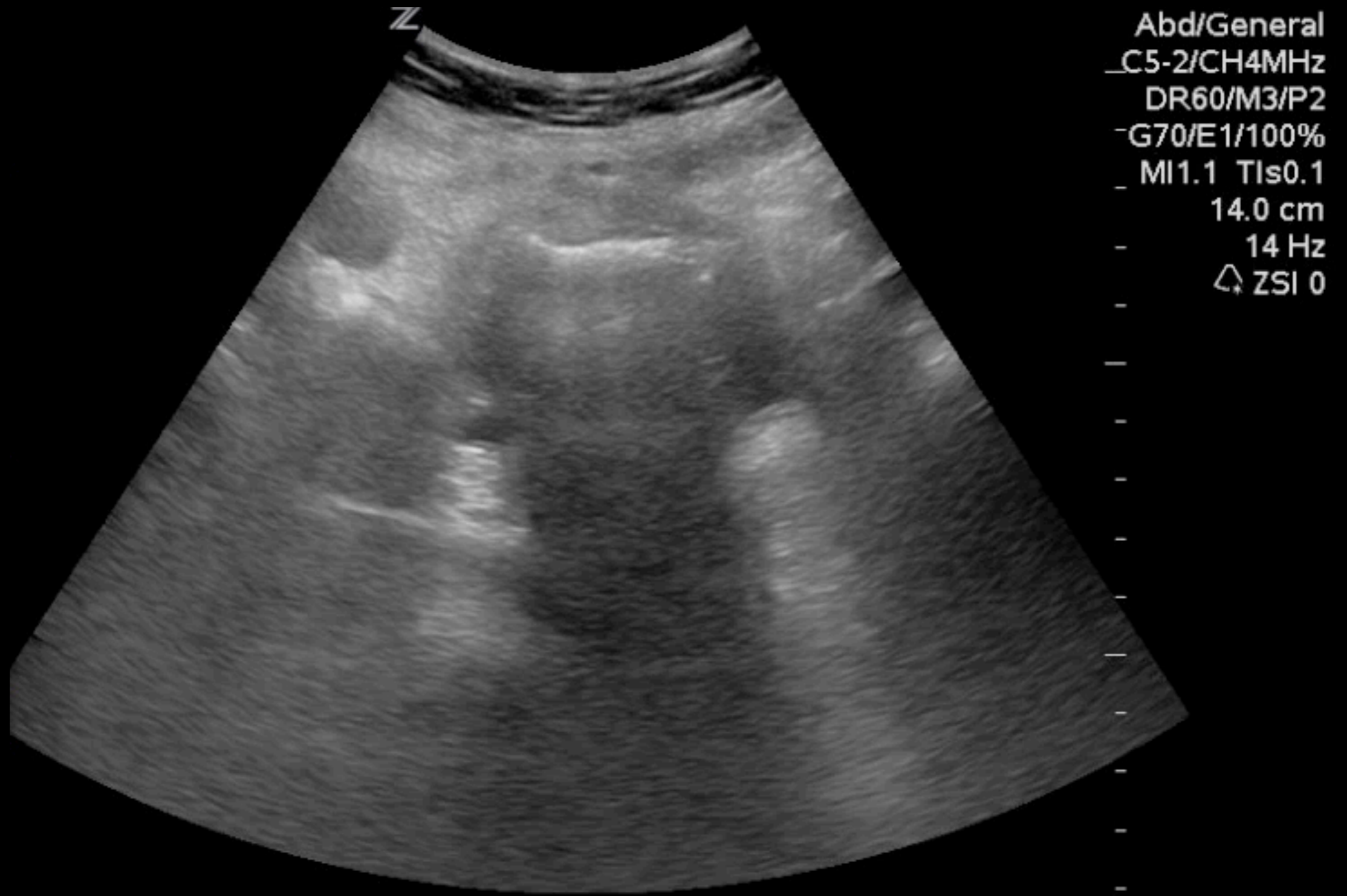
“Foley’s not draining”
Check catheter placement



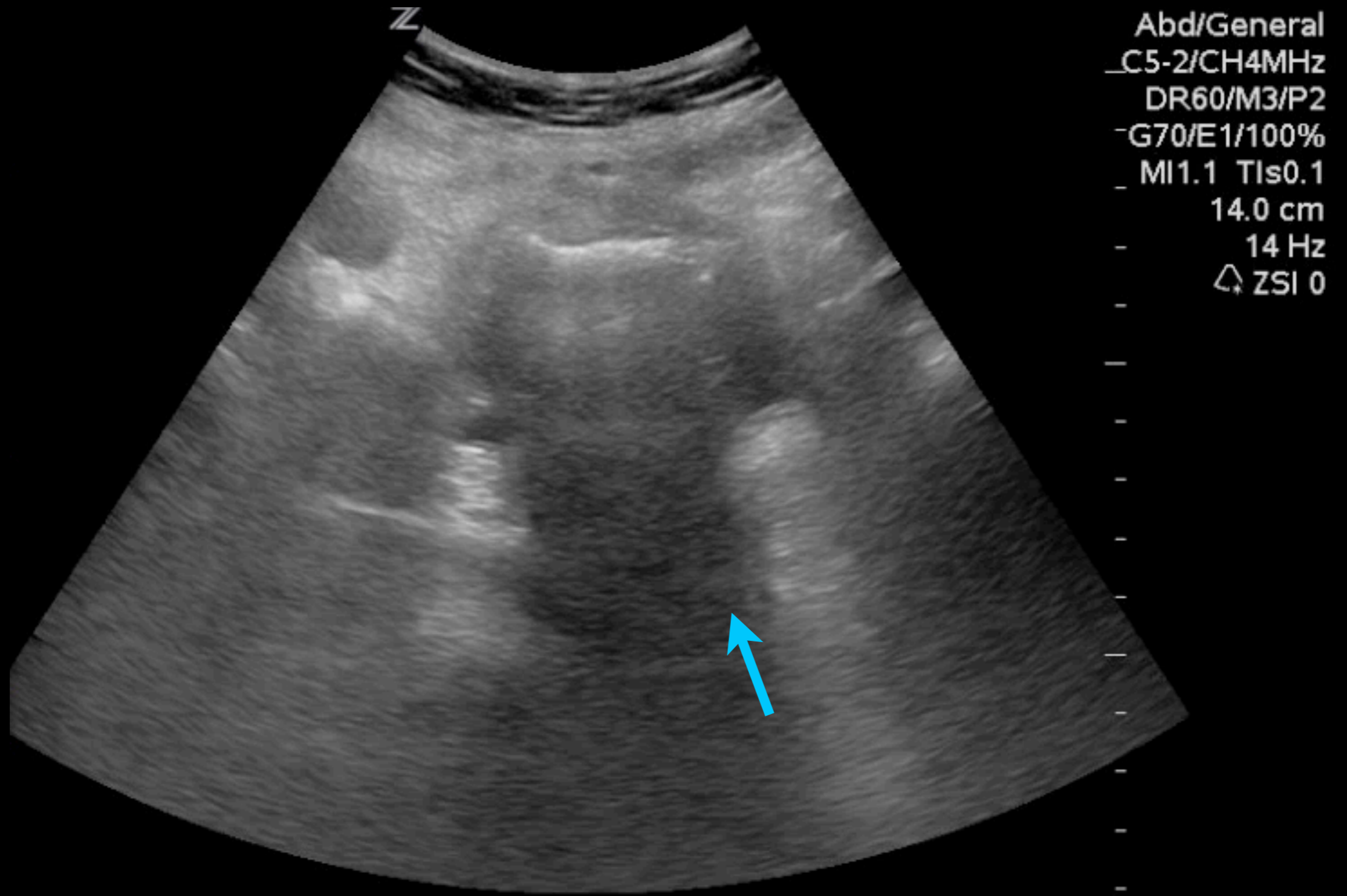
“Foley’s not draining”
Check catheter placement



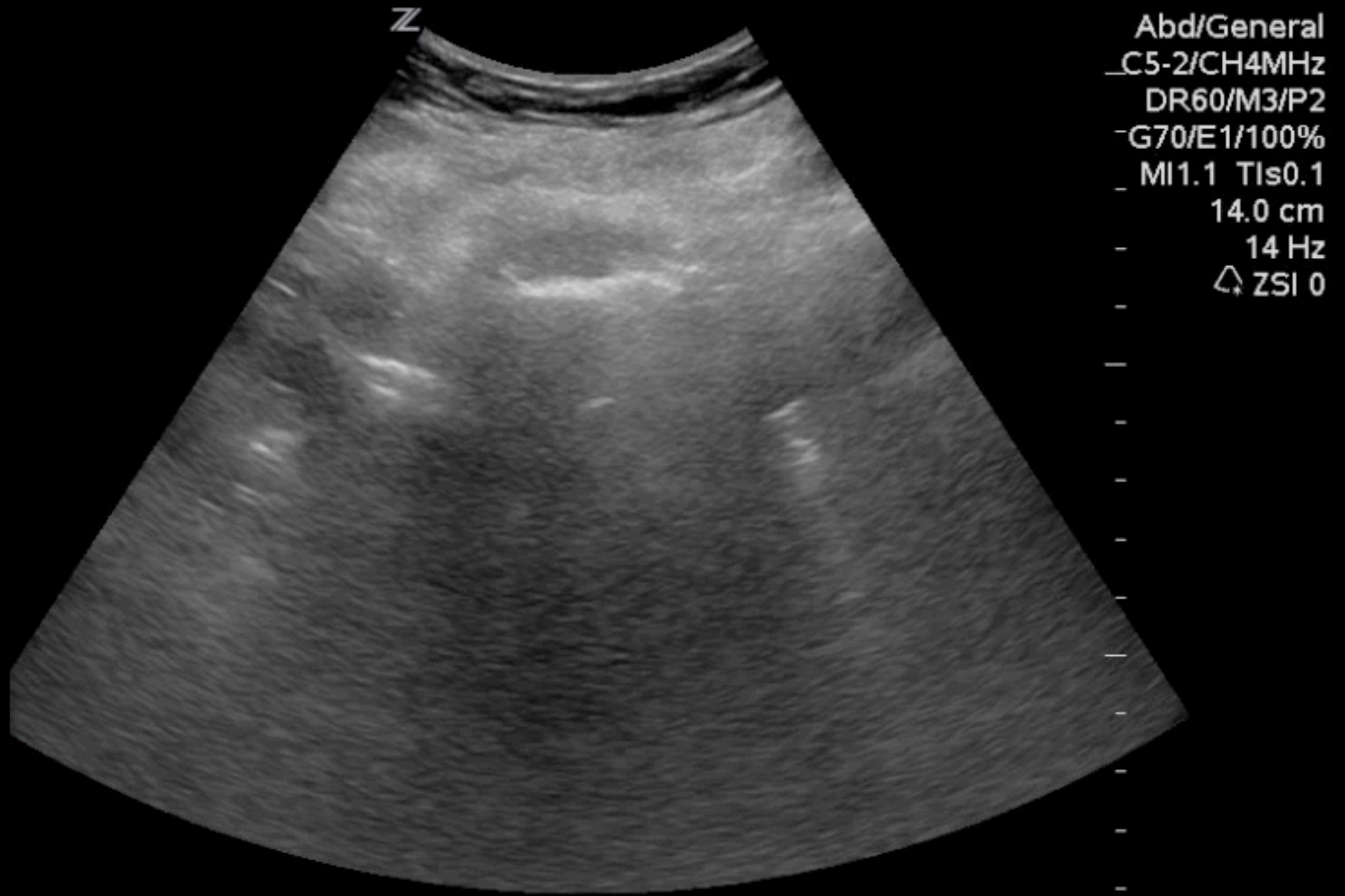
“Foley’s not draining”
Check catheter placement



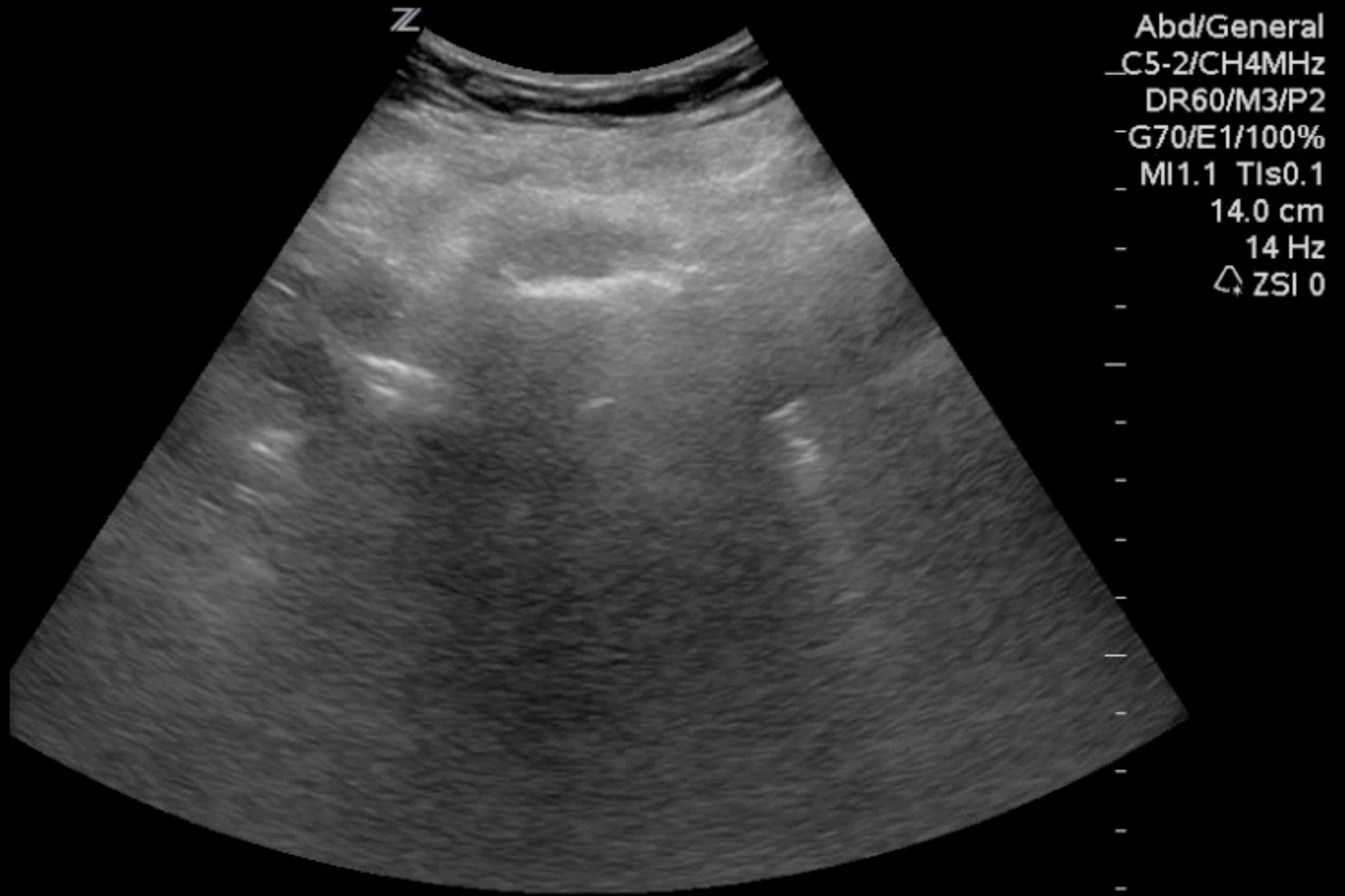
“Foley’s not draining”
Check catheter placement



“Foley’s not draining”
Check catheter placement



“OK it’s draining”
Balloon within bladder



“OK it’s draining”
Balloon within bladder



Abd/Renal
_C6-2/CH4MHz
DR55/M2/P3
-G76/E1/100%
MI1.3 TIs0.4
14.0 cm
12 Hz
△ ZSI 0
Image

“Foley’s not draining”
Check catheter placement



Abd/Renal
_C6-2/CH4MHz
DR55/M2/P3
-G76/E1/100%
MI1.3 TIs0.4
14.0 cm
12 Hz
△ ZSI 0
Image

“Foley’s not draining”
Check catheter placement



Abd/Renal
_C6-2/CH4MHz
DR55/M2/P3
-G68/E1/100%
_MI1.3 TIs0.4
14.0 cm
12 Hz
△ ZSI 0
Image

“Foley’s not draining”
Check catheter placement



“Foley’s not draining”
Check catheter placement



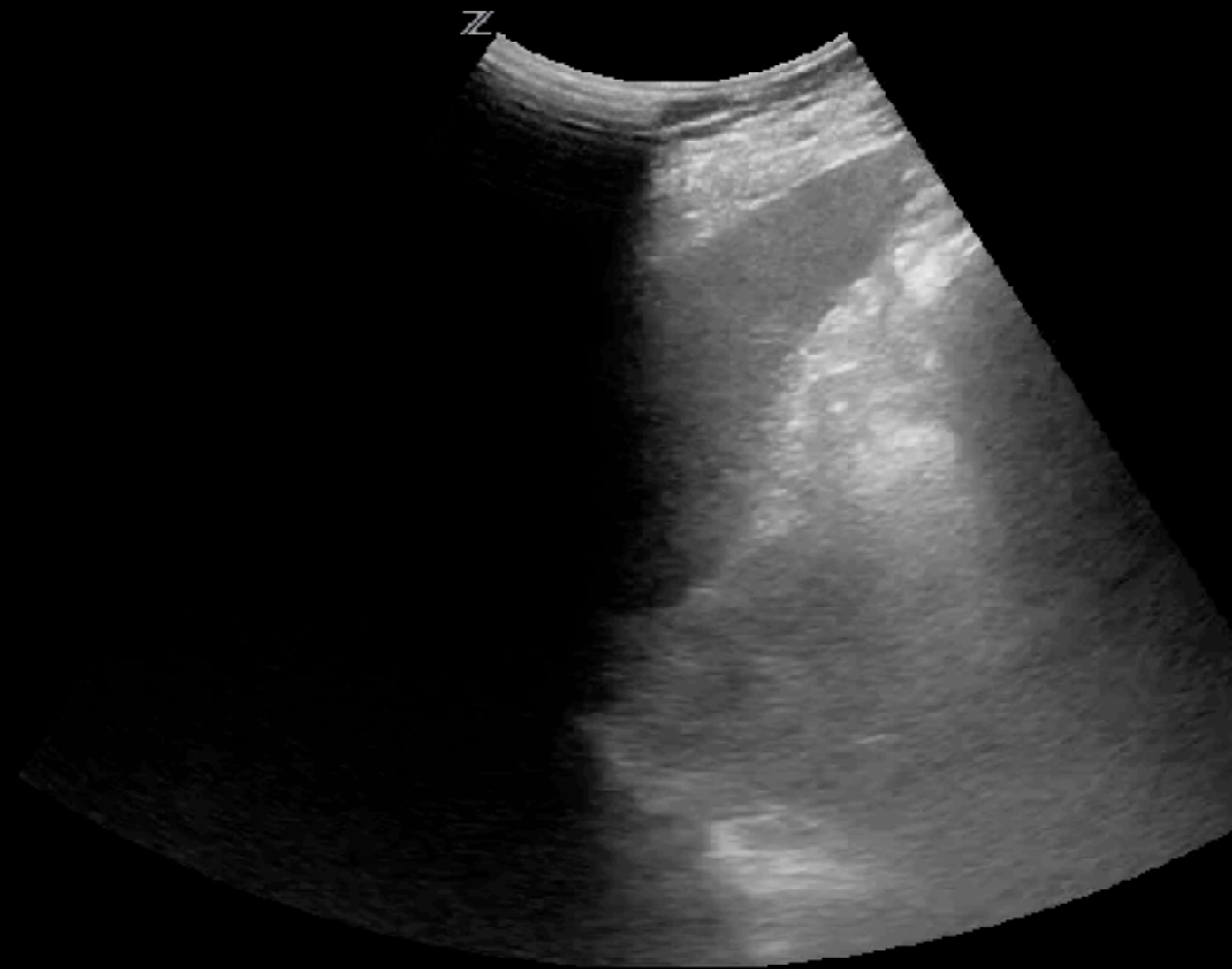
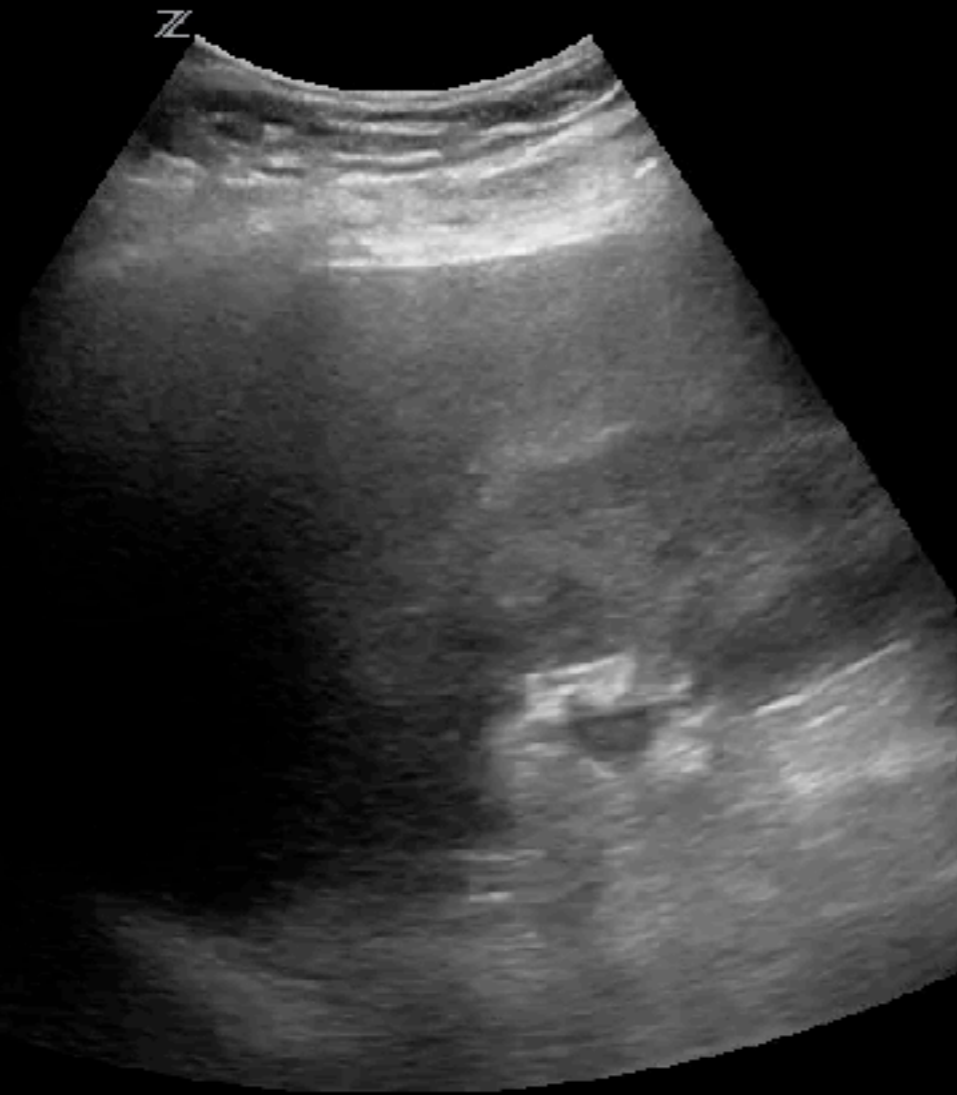
Abd/Renal
_C6-2/CH4MHz
DR55/M2/P3
-G68/E1/100%
MI1.3 TIs0.4
14.0 cm
12 Hz
△ ZSI 0
Image

“Foley’s not draining”
Flush/irrigation

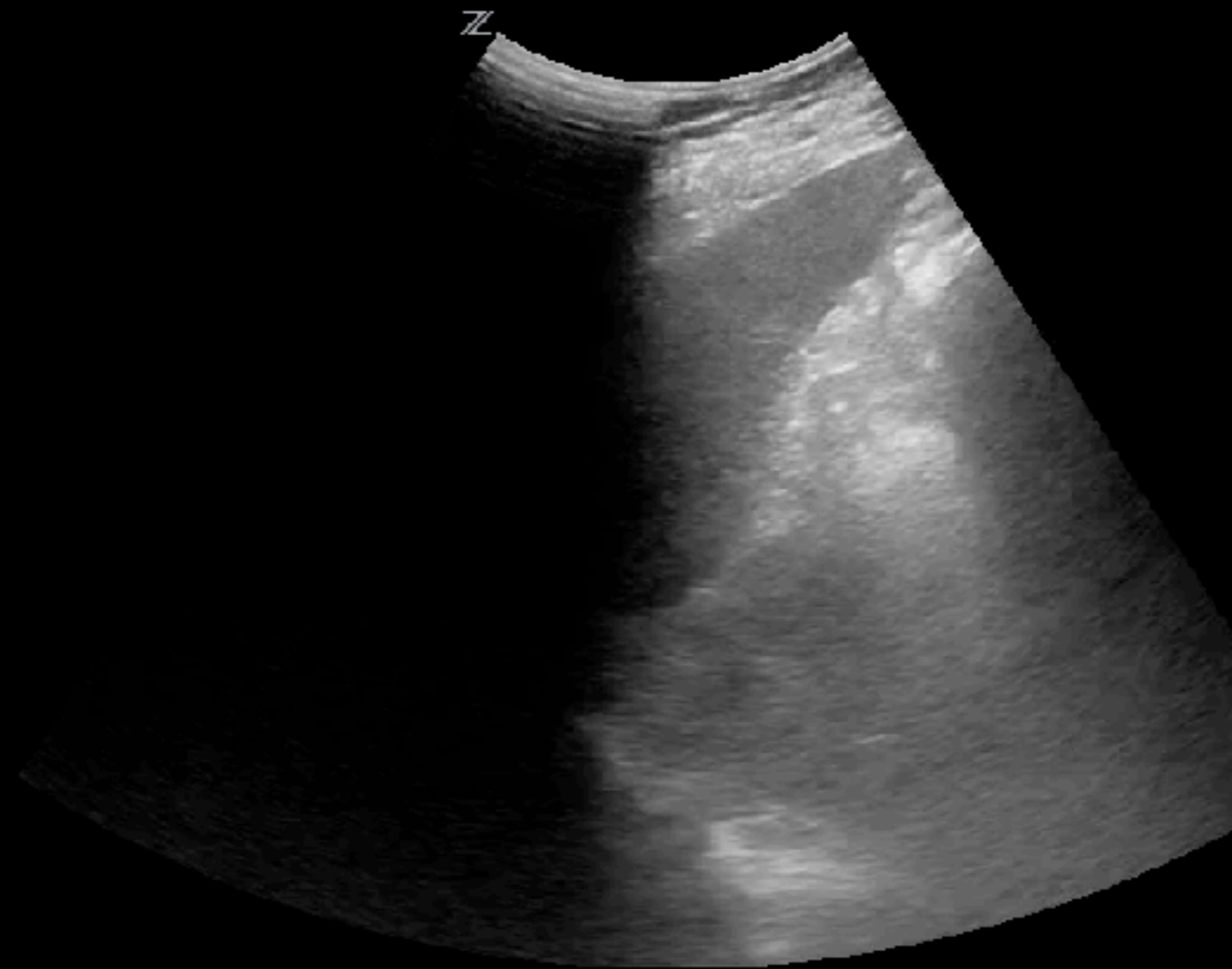
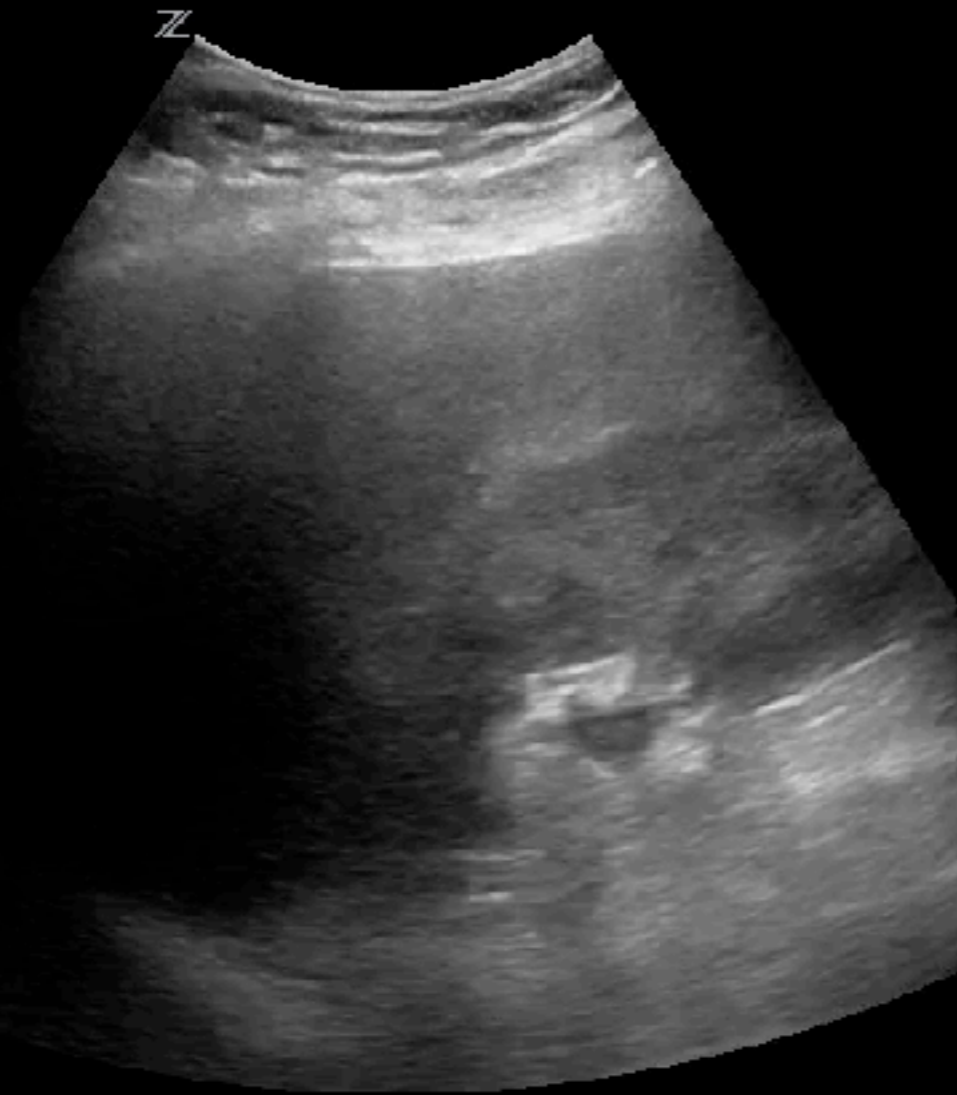


Abd/Renal
_C6-2/CH4MHz
DR55/M2/P3
-G68/E1/100%
MI1.3 TIs0.4
14.0 cm
12 Hz
△ ZSI 0
Image

“Foley’s not draining”
Flush/irrigation



“OK it’s draining”
Hydronephrosis improved



“OK it’s draining”
Hydronephrosis improved

Pitfalls

Pitfalls

False (-) hydronephrosis: dehydration, early obstruction

False (+) hydronephrosis: overdistended bladder, vesicoureteral reflux, pregnant

Other causes of flank pain: AAA

Pitfalls

Summary

Summary

Focused exam: e/o of ureteral stone?

Focused exam: bladder findings?

Part of big picture:
undifferentiated abdominal pain

Summary

FAST

AAA

Renal

GB

FAST

AAA

Renal

GB



AAA

Renal

GB



AAA



GB



AAA





Questions?