

Interactive Quiz Acute Chest Pain

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Past President, British Society of Emergency Radiology
European Society of Emergency Radiology



BSER

British Society of Emergency Radiology

Nordter, Aarhus, May 2023



ESER

European Society of
Emergency Radiology

Pollev.com/edick900



40 yo female, previously well

- Pyrexial
- Chest pain
- Raised Inflammatory Markers
 - C Reactive Protein,
 - Erythrocyte Sedimentation rate
- ? 'Rub' on auscultation



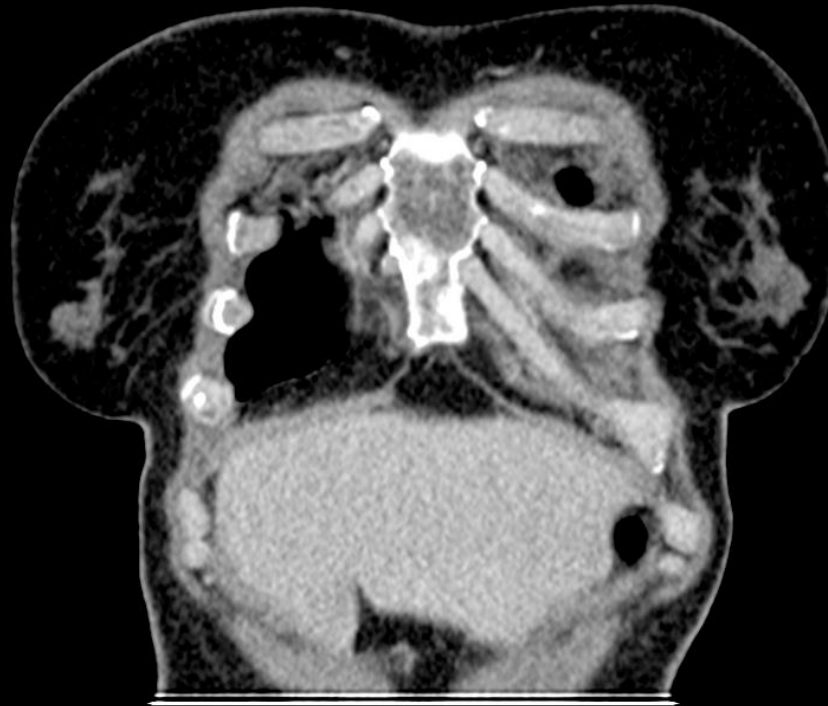
[Pollev.com/edick900](https://pollev.com/edick900)

Thanks to Dr Mary Roddie, Imperial College London





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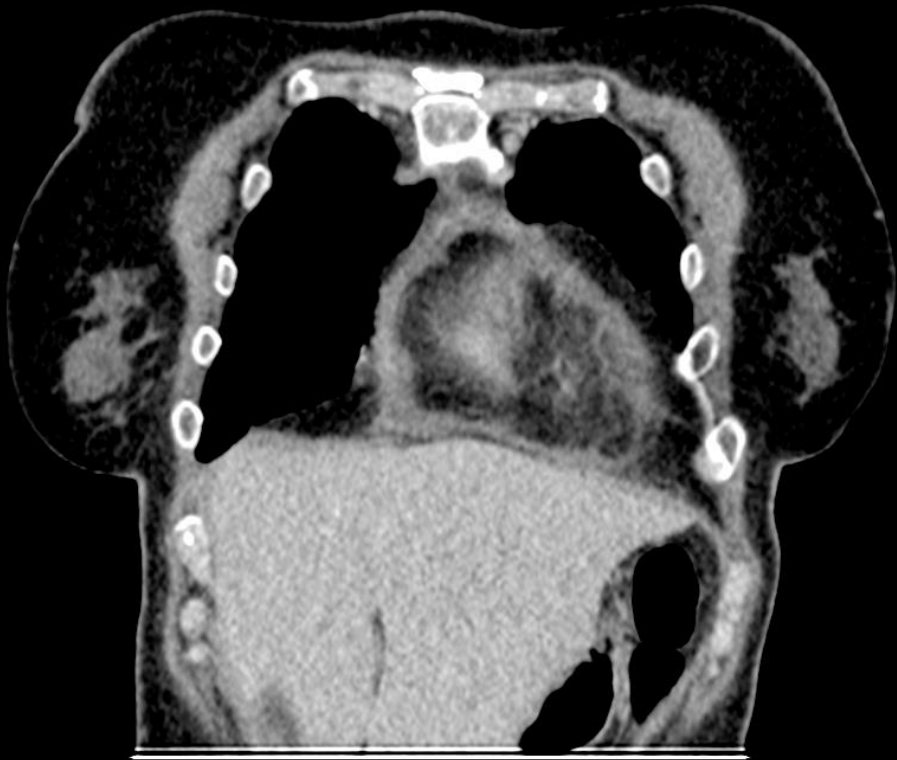
[Pollev.com/edick900](https://pollev.com/edick900)
[Pollev.com/edick900](https://pollev.com/edick900)

LUNG WINDOWS NORMAL



[Pollev.com/edick900](https://pollev.com/edick900)

Thanks to Dr Mary Roddie, Imperial College London



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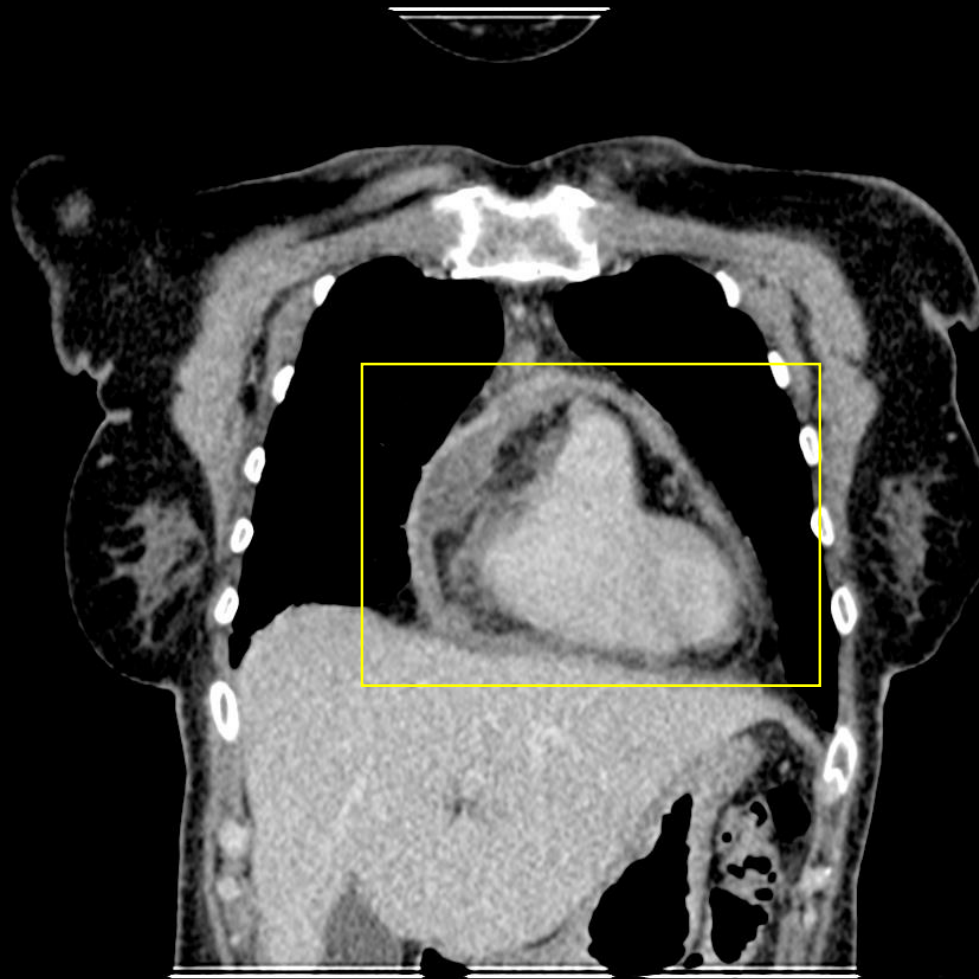
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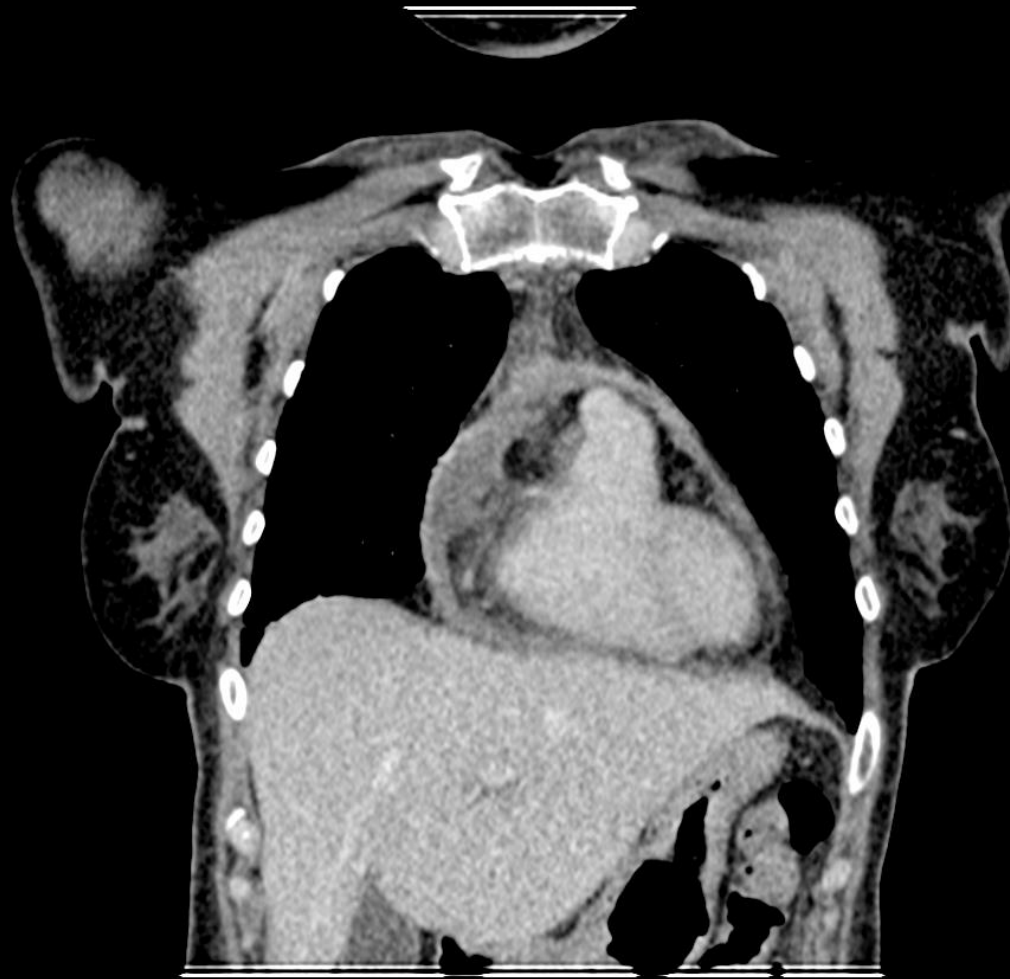
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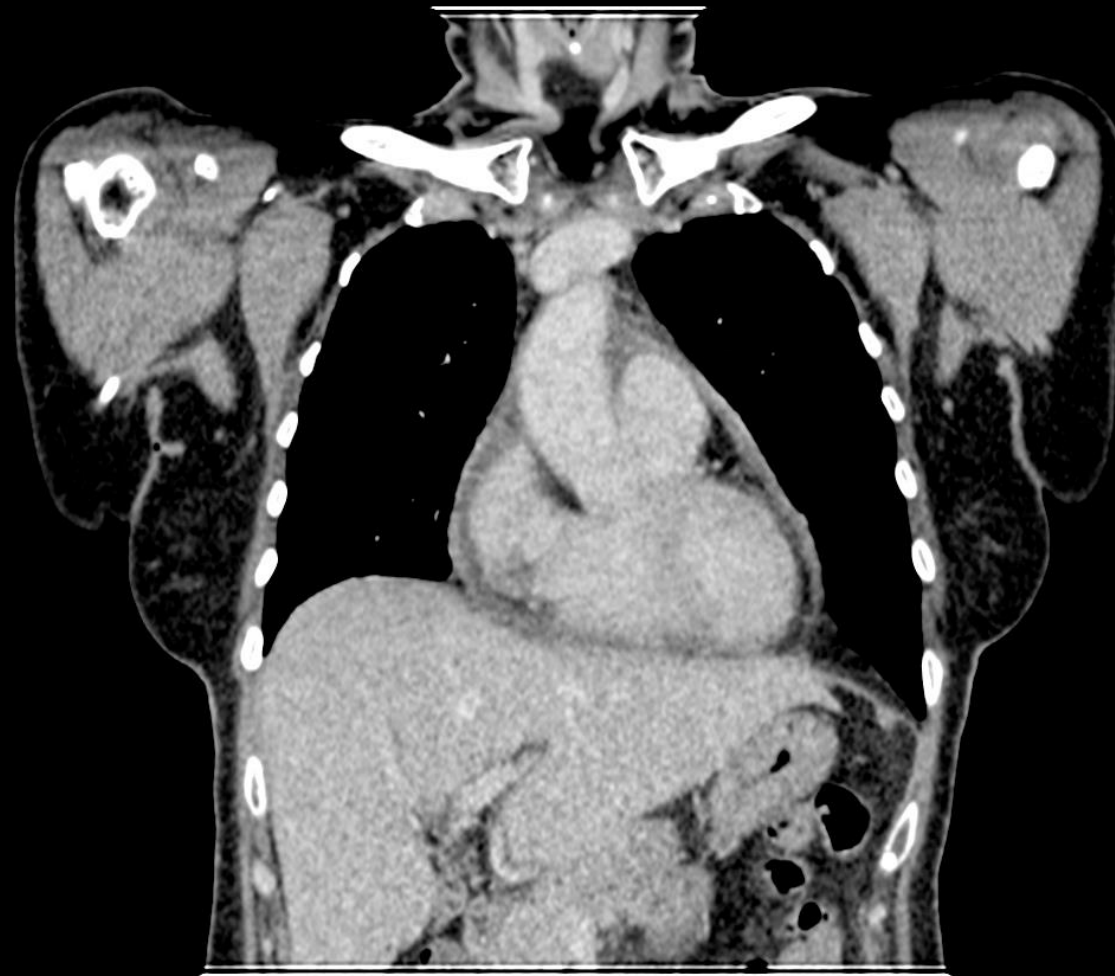
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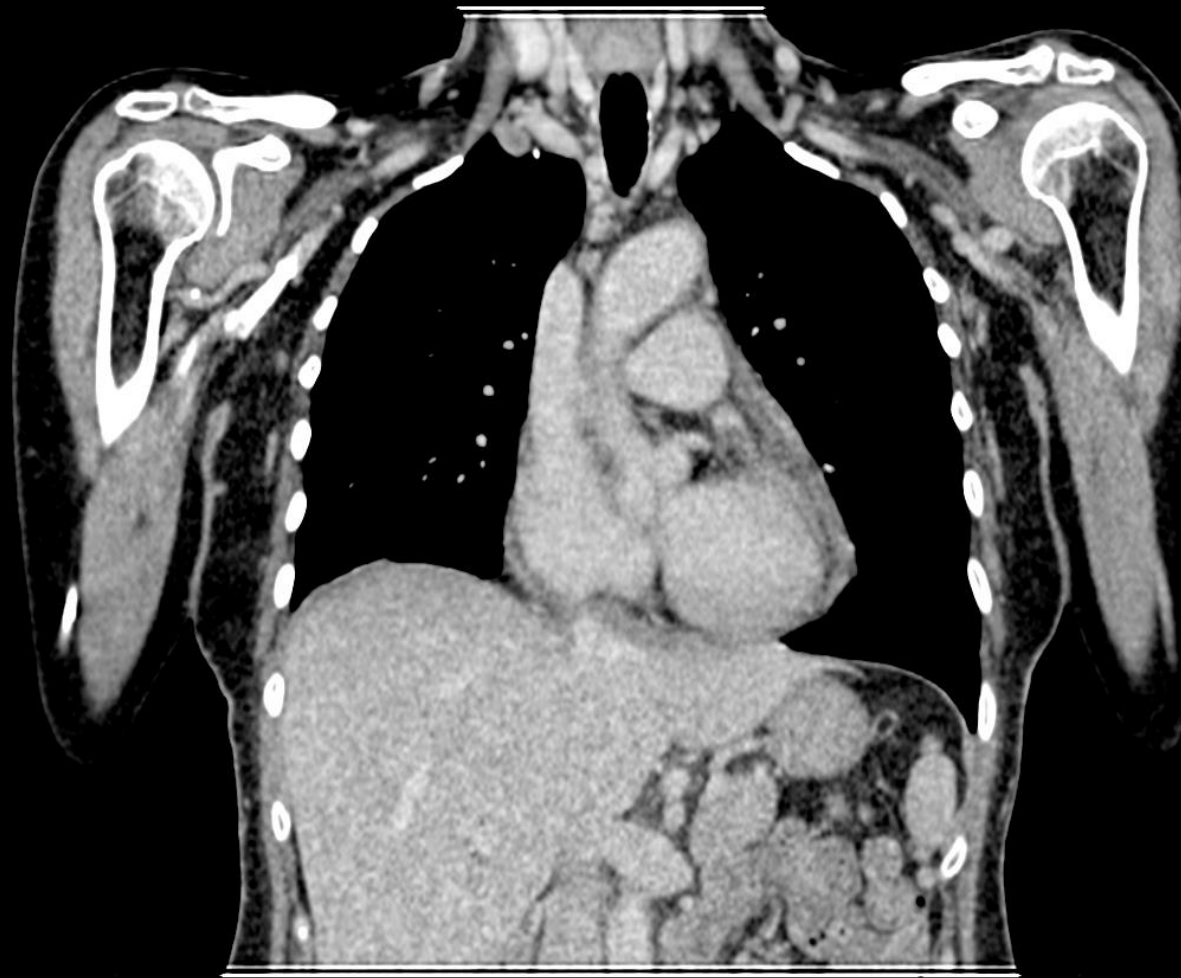
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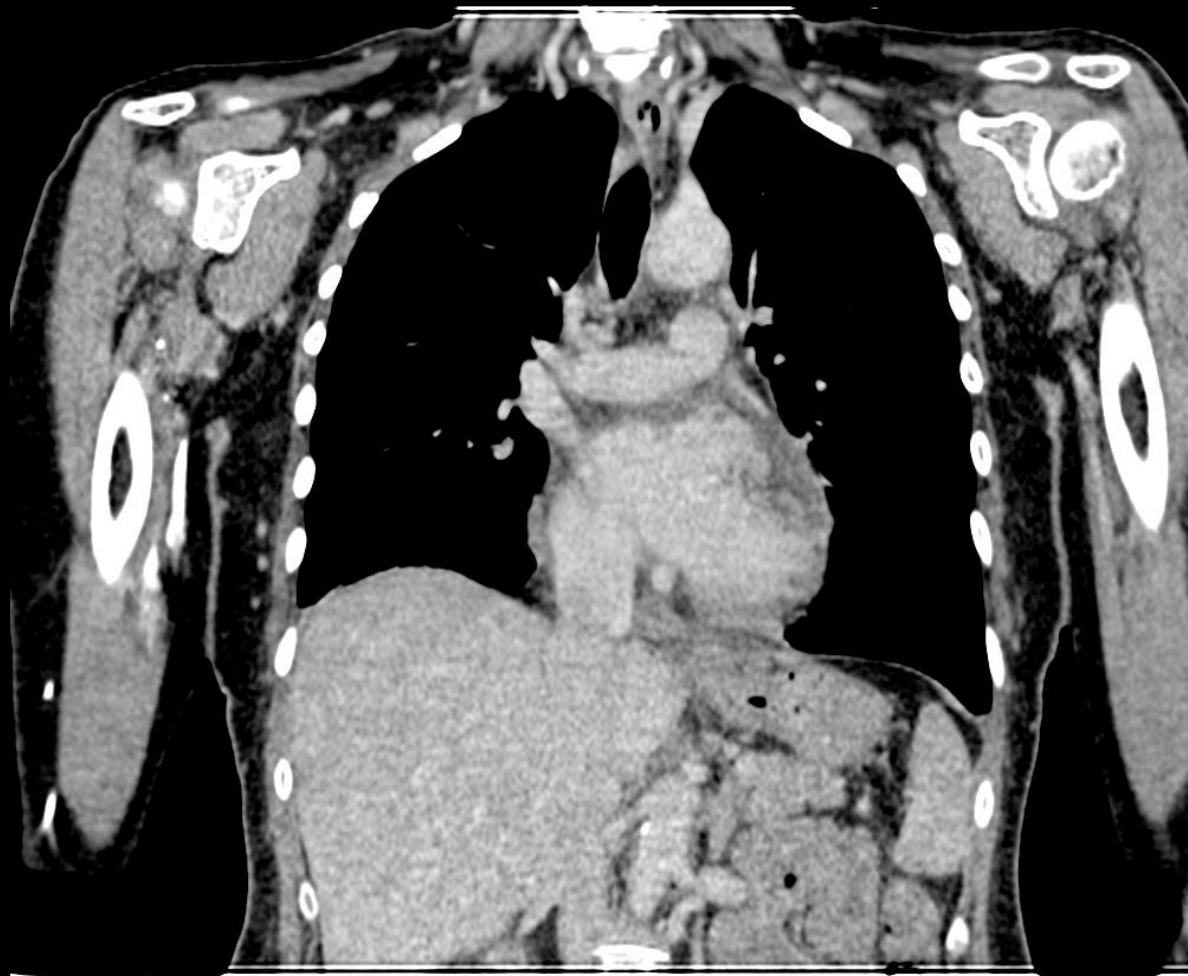
Thanks to Dr Mary Roddie, Imperial College London



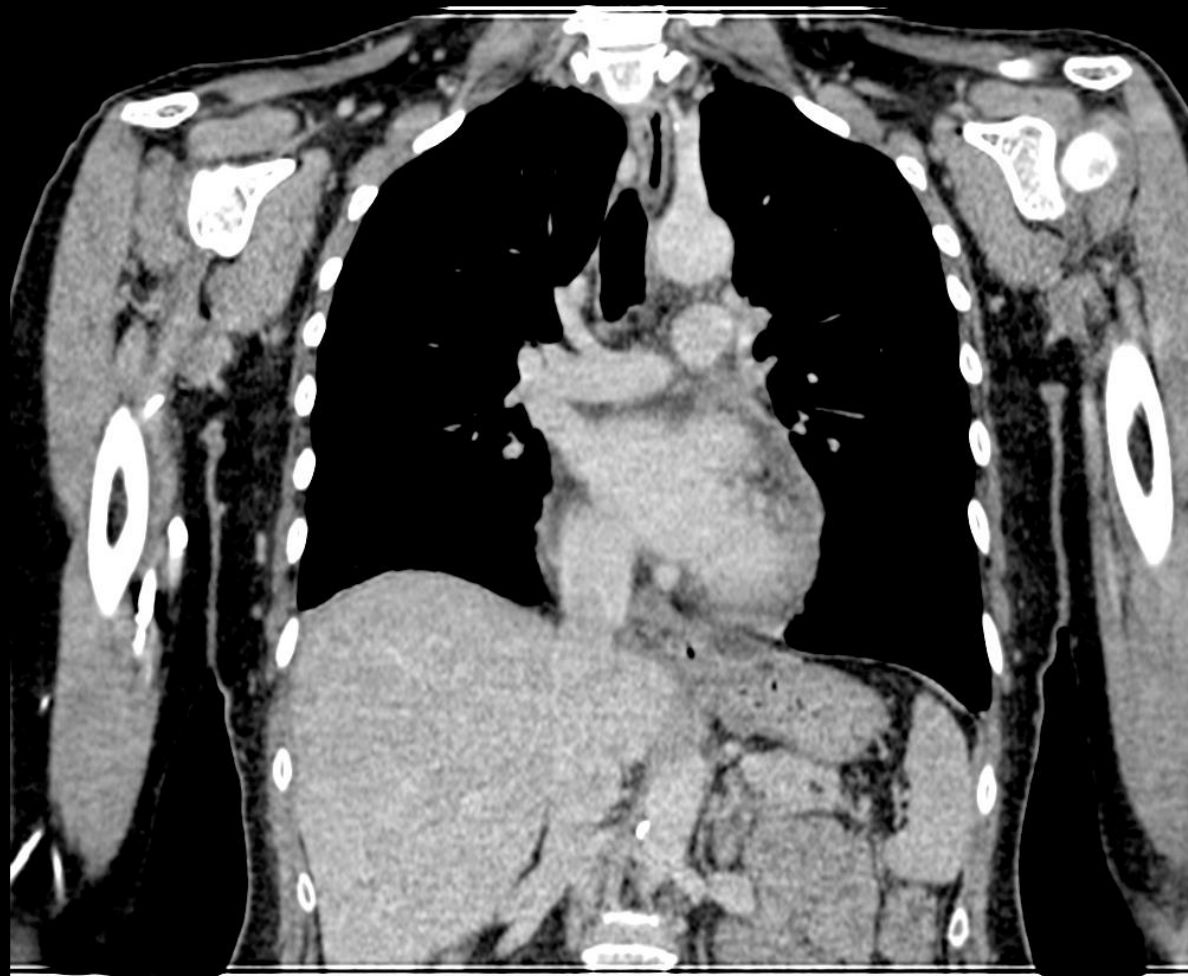
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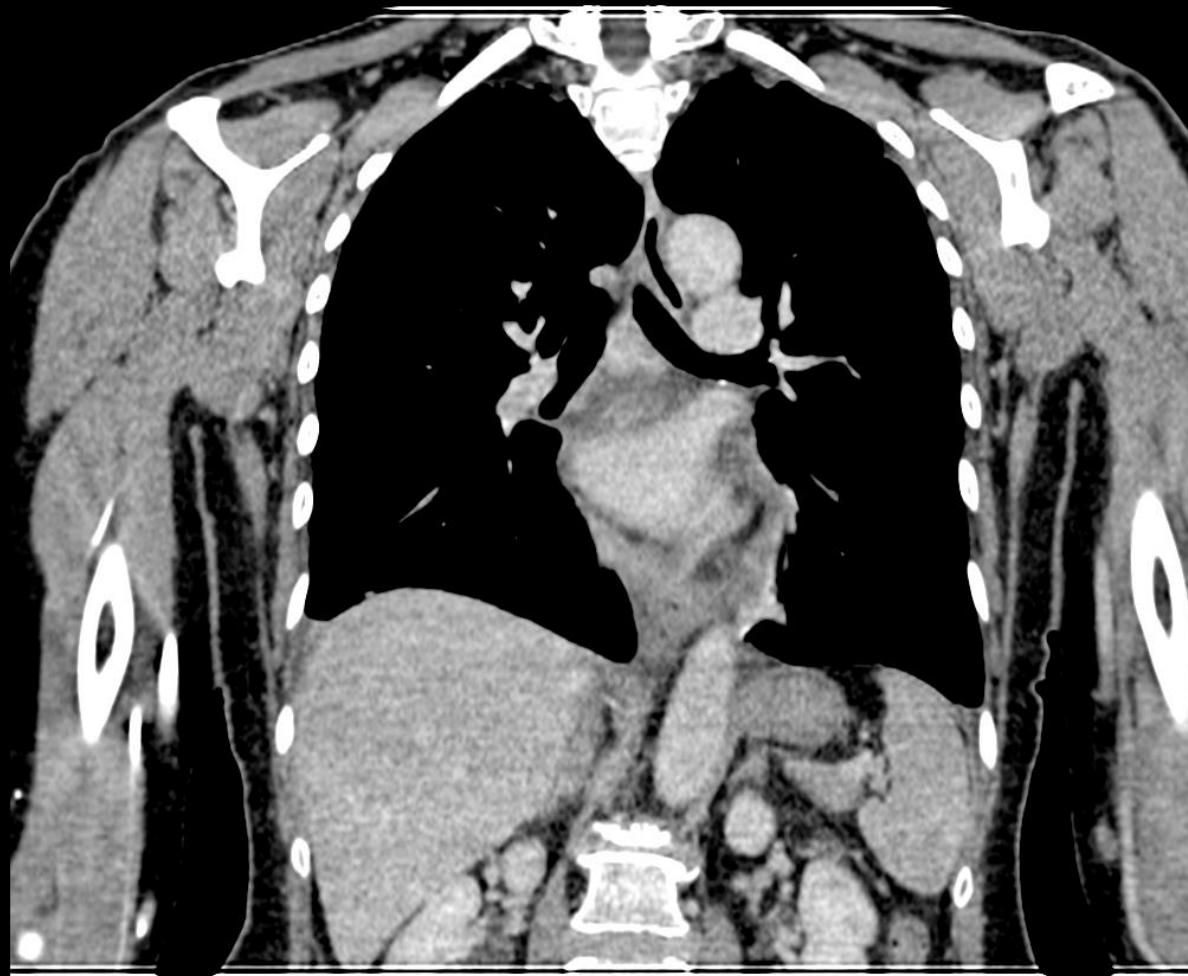
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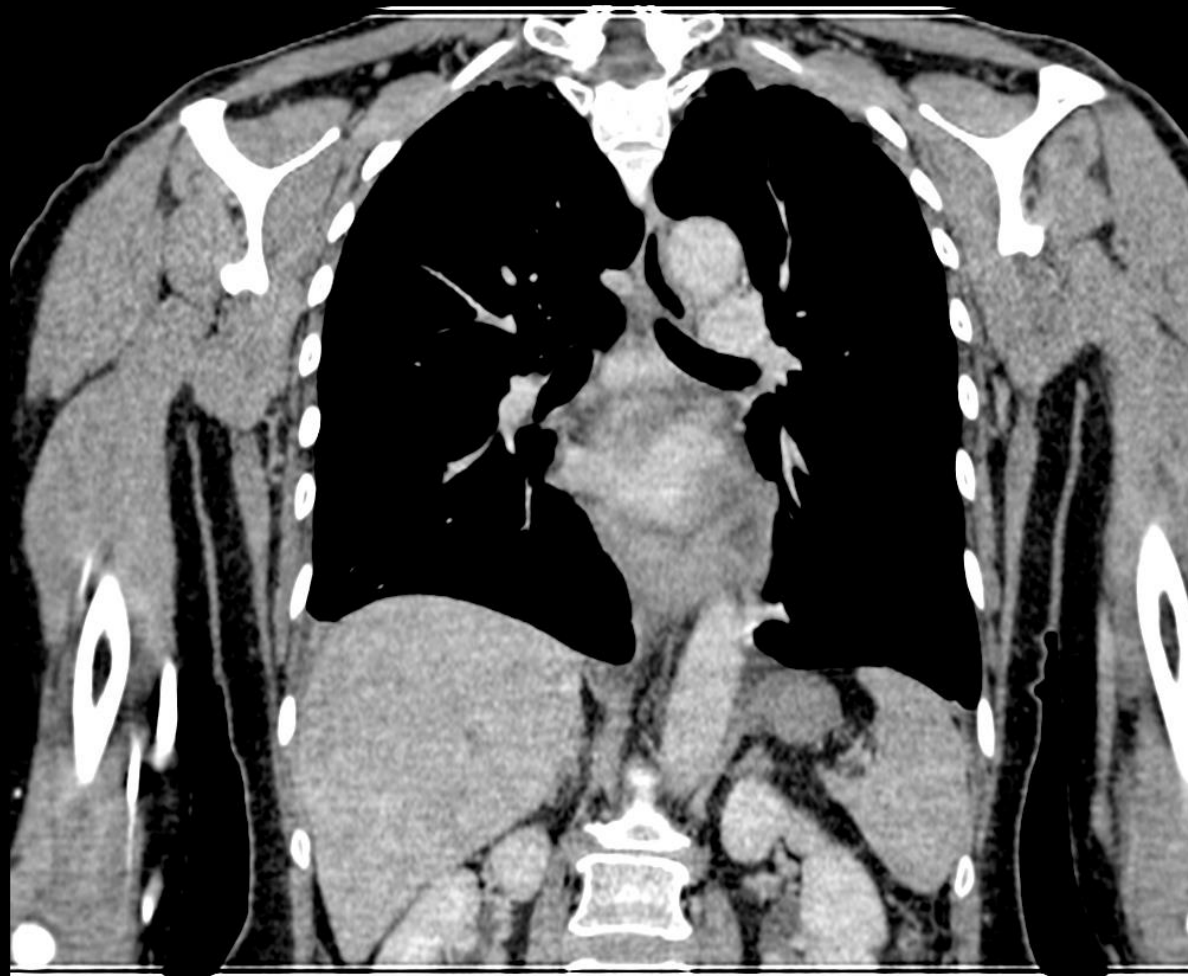
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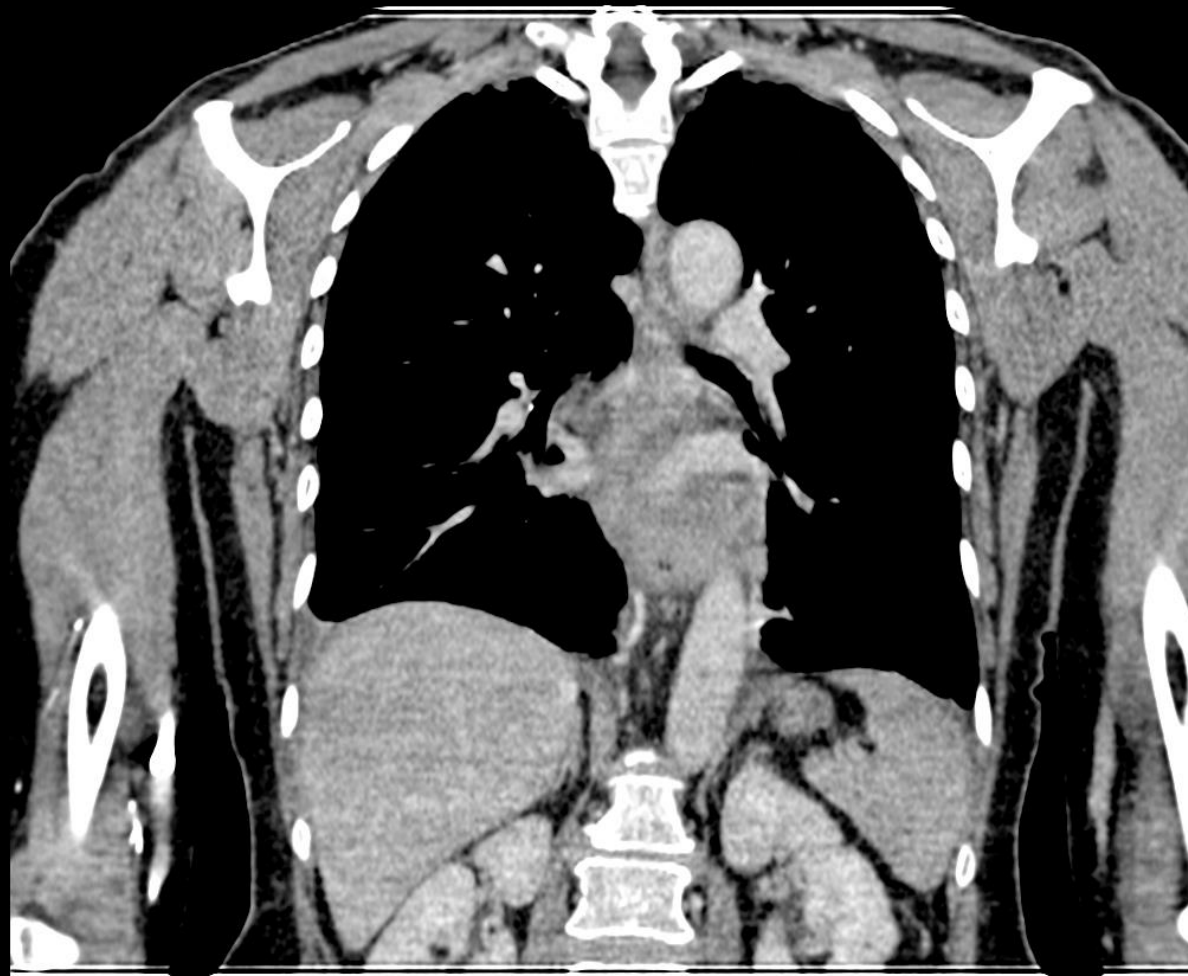
Thanks to Dr Mary Roddie, Imperial College London



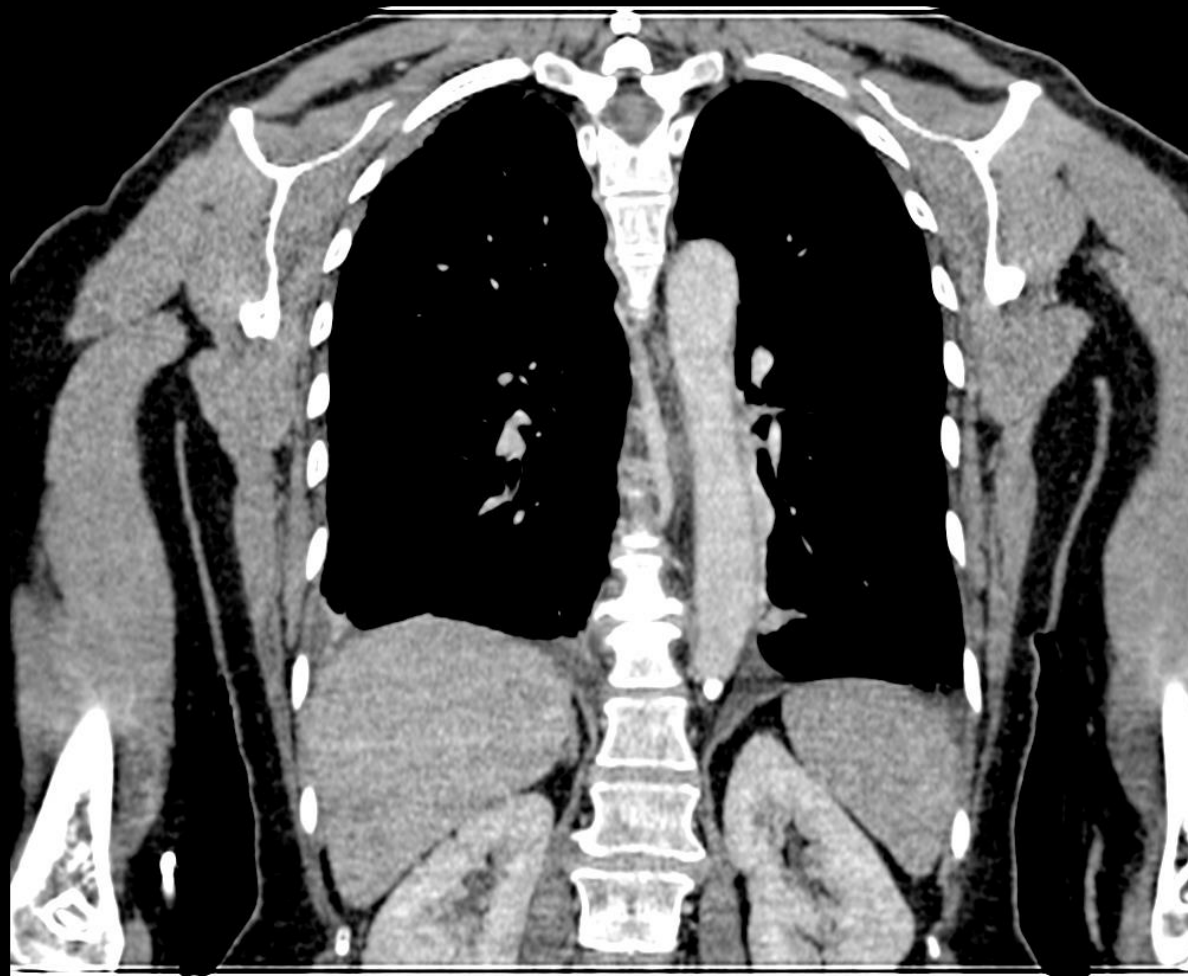
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When poll is active, respond at pollev.com/edick900

Text **EDICK900** to **07480 781235** once to join



What is the diagnosis

Aortic dissection

Pulmonary Embolus

Pericarditis

Right Glenohumeral dislocation

What is the diagnosis

- A: Aortic dissection
- B: Pulmonary Embolus
- C: Pericarditis
- D: Right Glenohumeral dislocation

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Text **EDICK900** to **07480 781235** once to join



What is the diagnosis

Aortic dissection

Pulmonary Embolus

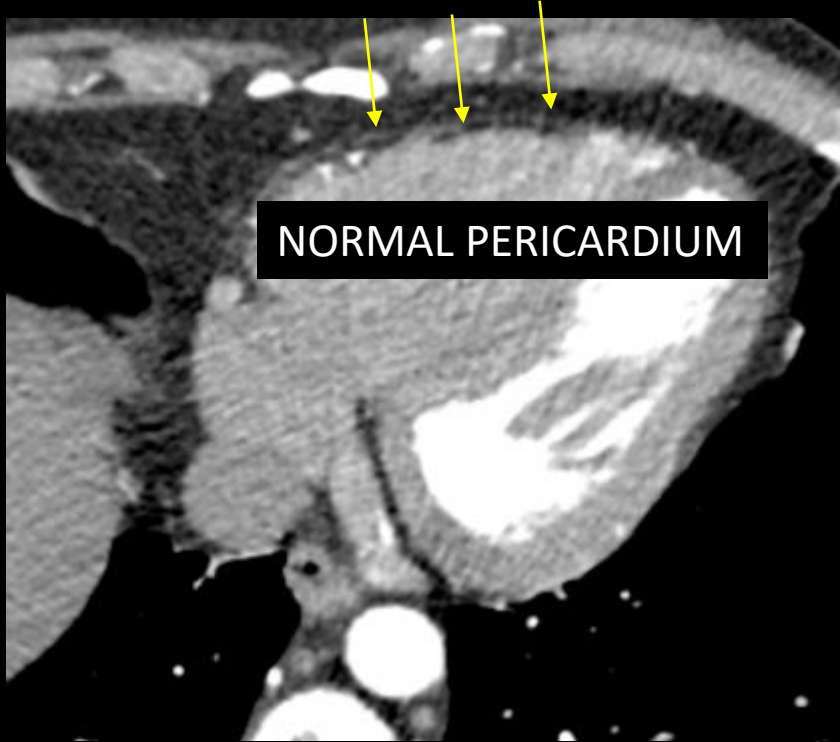
Pericarditis

Right Glenohumeral dislocation

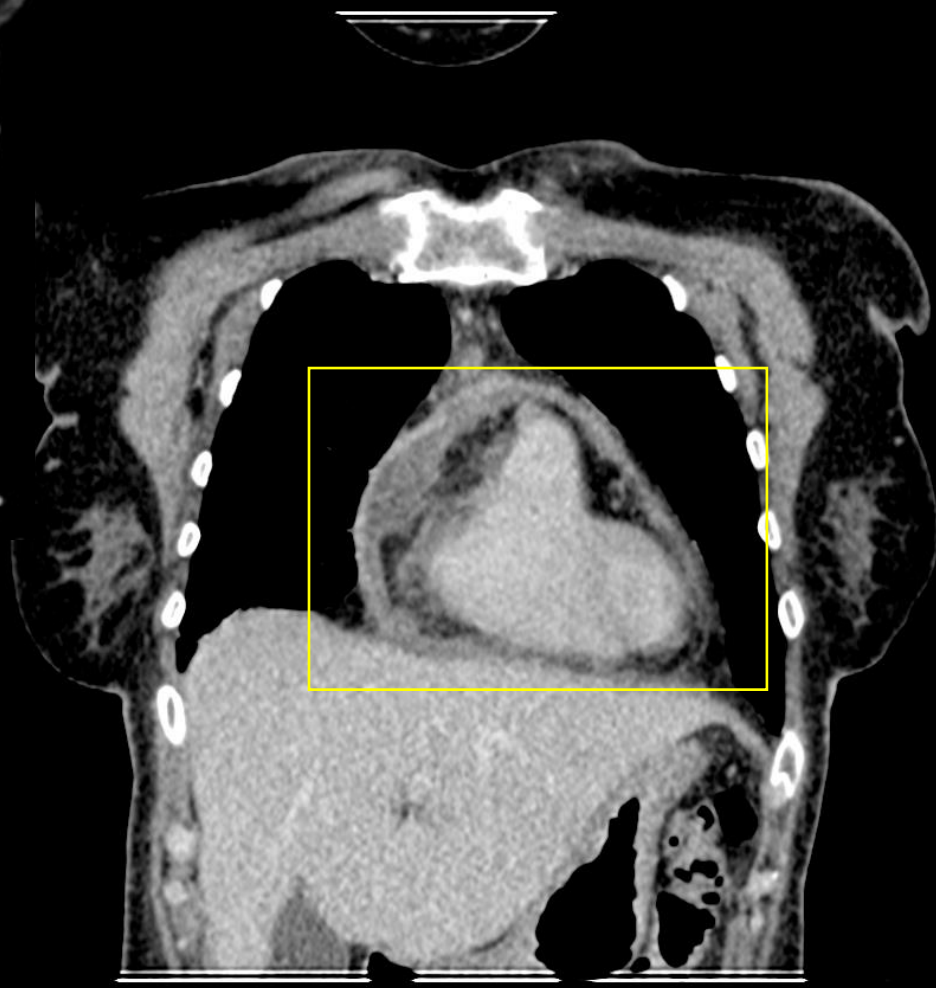
What is the diagnosis

- A: Aortic dissection
- B: Pulmonary Embolus
- C: Pericarditis
- D: Right Glenohumeral dislocation

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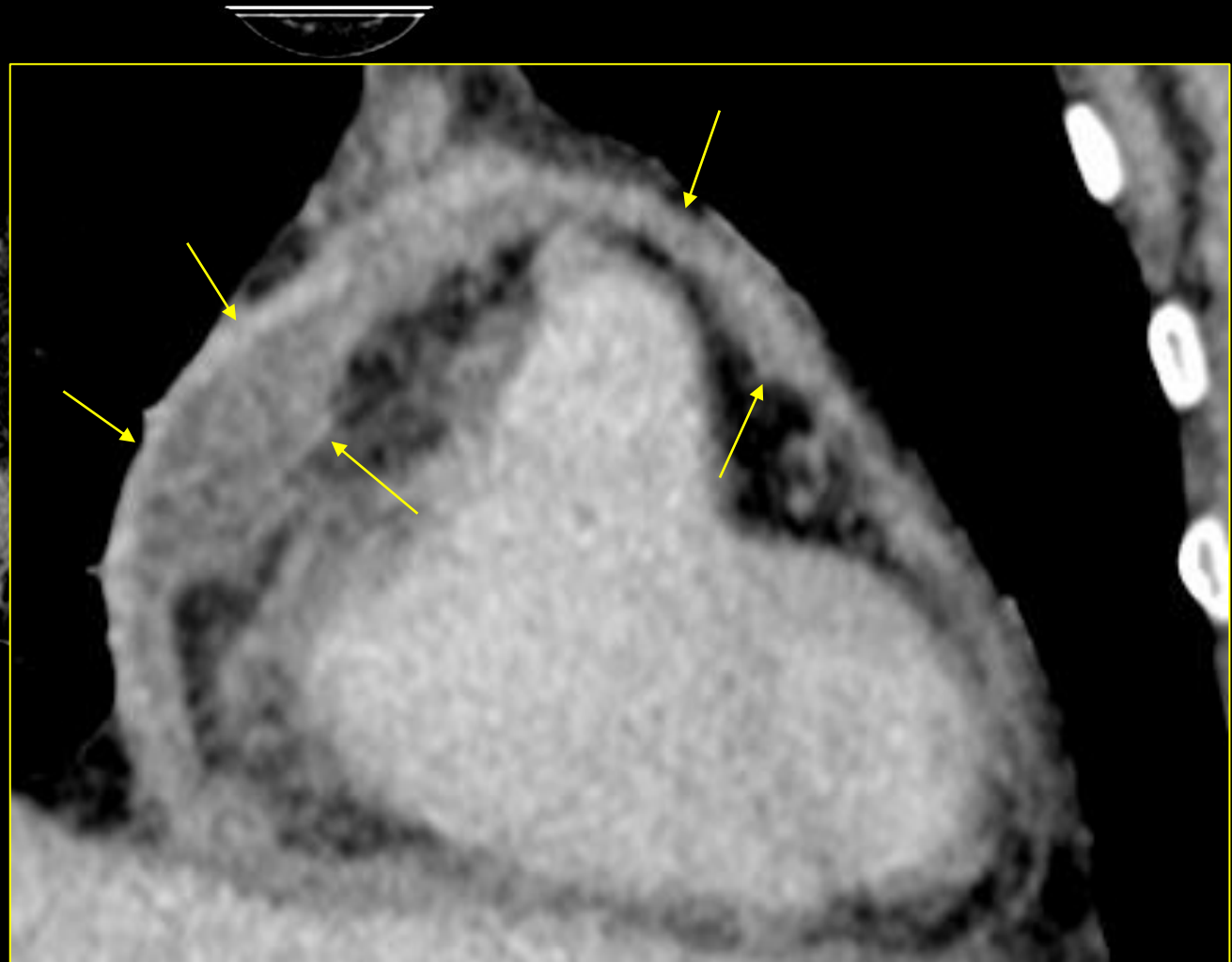


Normal pericardium $\leq 2\text{mm}$
Easiest to see over RV
Normal pericardial fluid 15-50ml



Thanks to Dr Mary Roddie, Imperial College London

2 layers of pericardium
Both thickened
enhancing
Pericardial effusion
stranding



Thanks to Dr Mary Roddie, Imperial College London

Bogaert & Francone Radiology 2013

PERICARDITIS

HX & EX

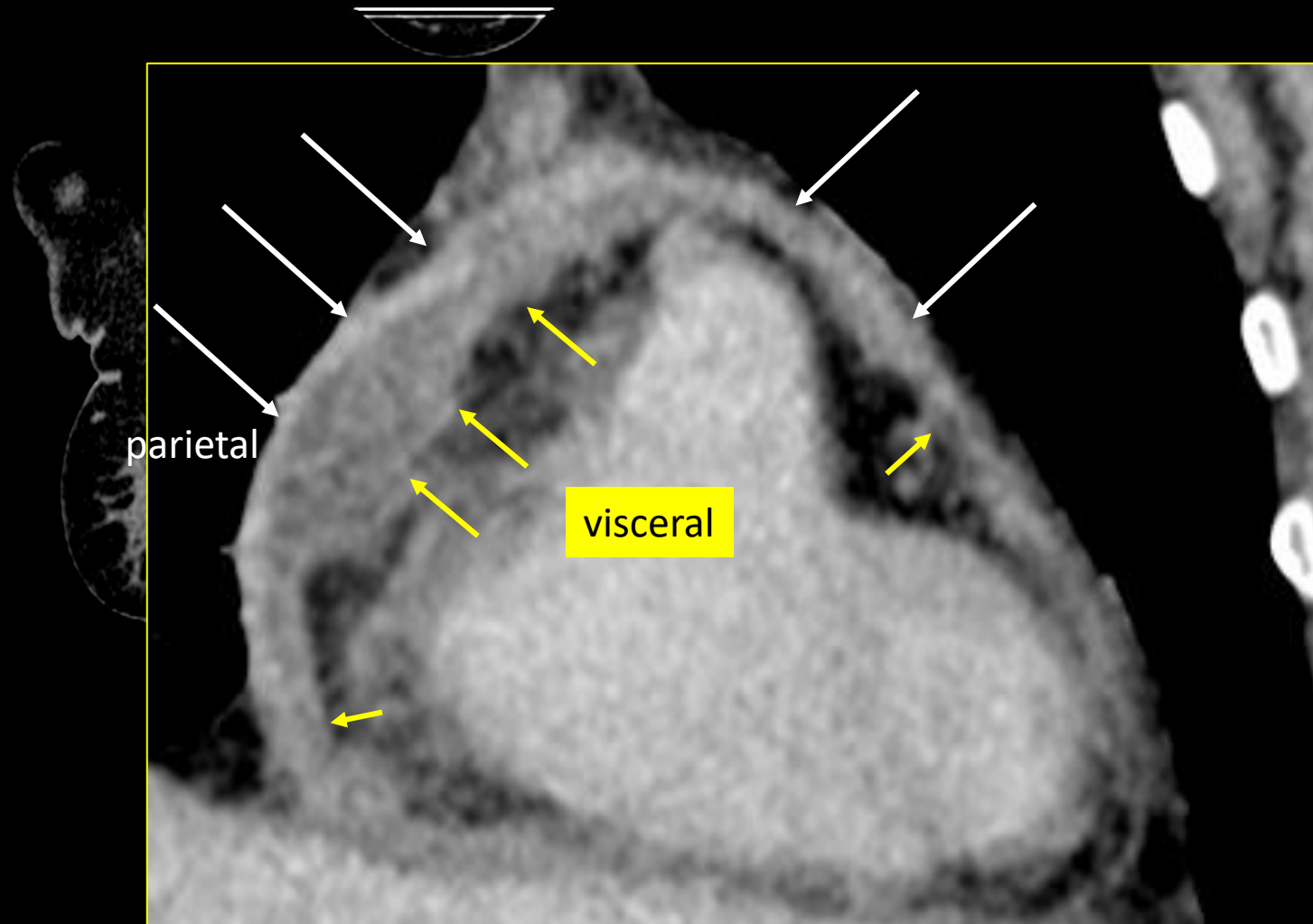
Severe chest pain
Pericardial Rub
Widespread ST elevation

IMAGING:

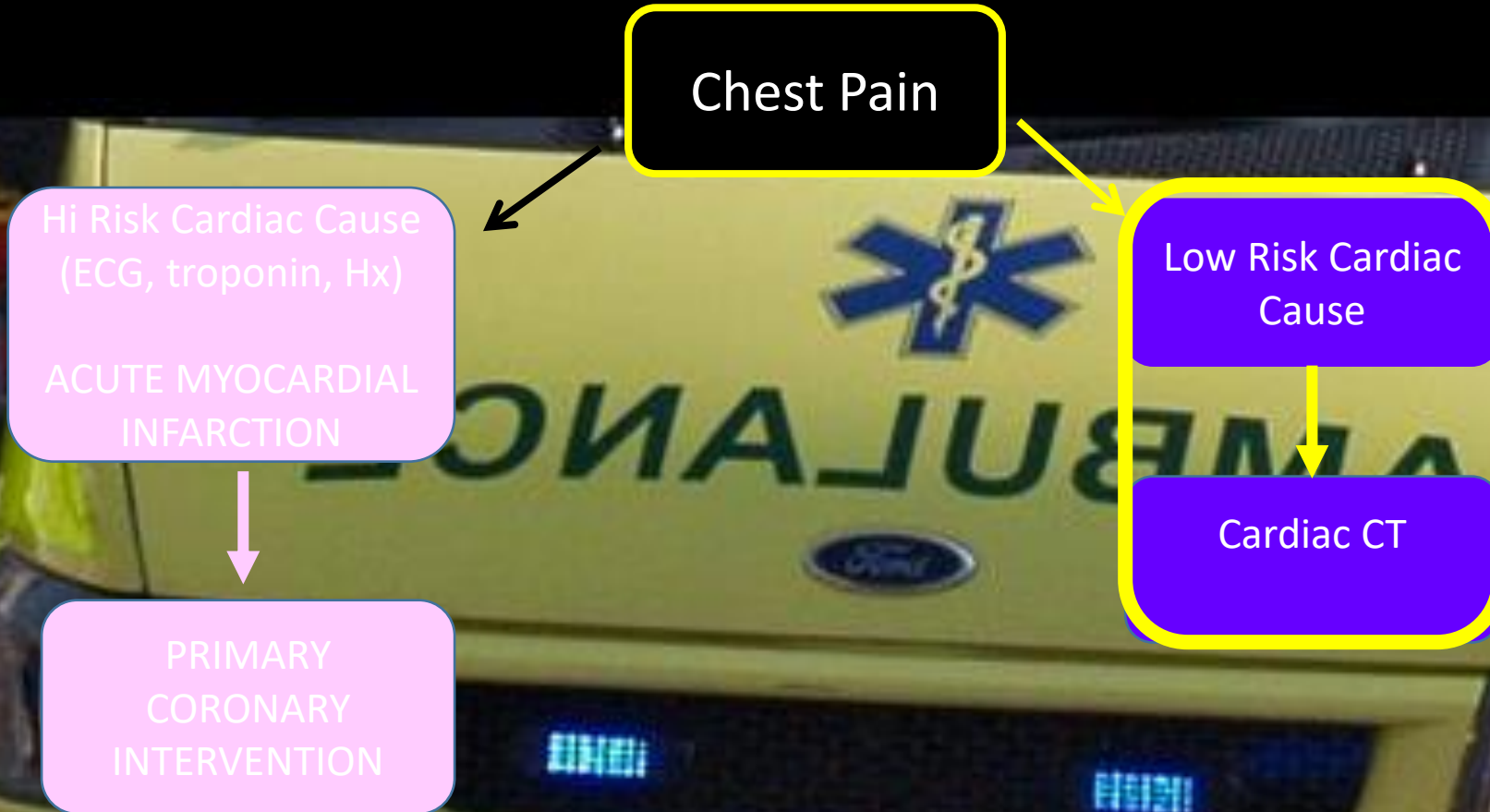
Pericardium >4mm (n =2mm)
Enhancing,
Pericardial effusion
Stranding

Histology:

inflamed pericardial layers
& fibrin adhesions



Middle aged man, Atypical Chest Pain



Banning et al Percutaneous Coronary Intervention in the UK: Heart 2015

Halpern: TRO CT for Acute Chest Pain and possible Acute Coronary Syndrome : How I do it

Frauenfelder et al : TRO CT in the ER:protocols and spectrum of imaging findings, Eur Radiol

Image size: 512 x 512

View size: 698 x 698

WL: 300 WW: 1200

A

Tl

Card Cardiac CTA — Card Cardiac % C

R

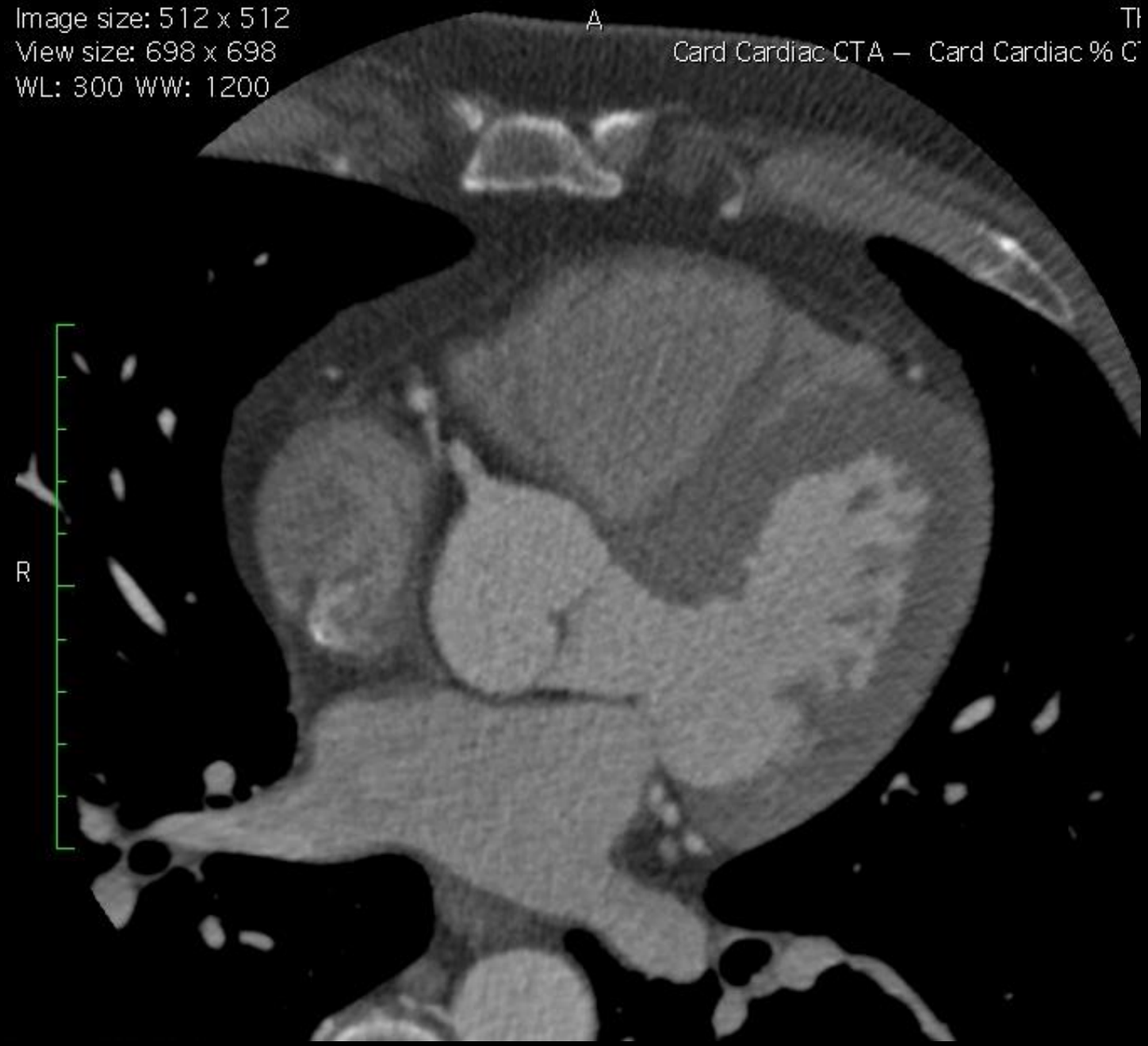


Image size: 512 x 512
View size: 698 x 698
WL: 300 WW: 1200

A Tl
Card Cardiac CTA — Card Cardiac % C

R Main Coronary A

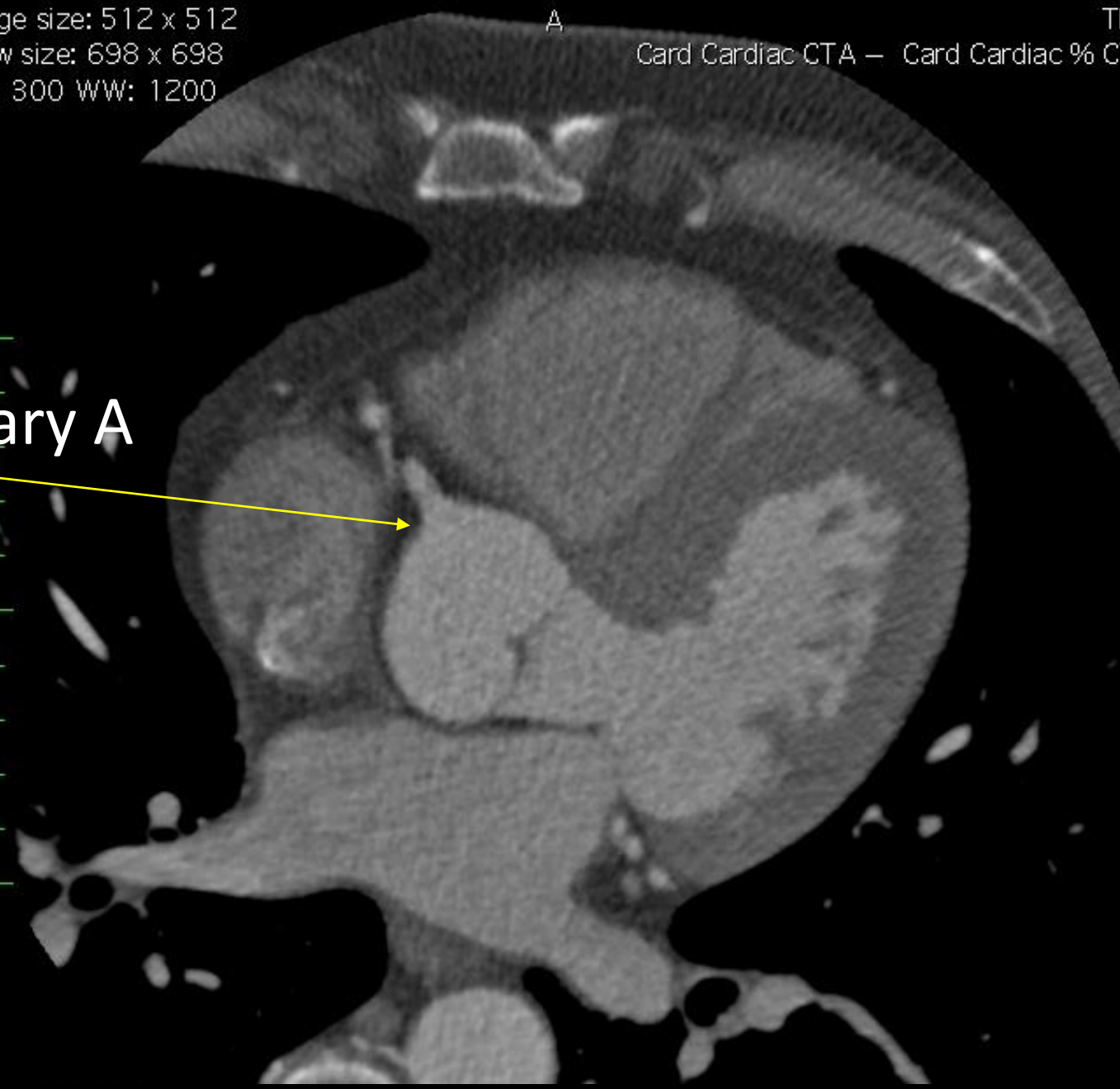
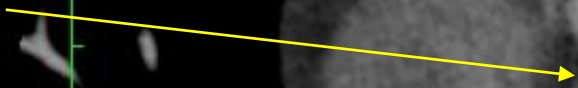


Image size: 512 x 512
View size: 698 x 698
WL: 300 WW: 1200

A

TKM
Card Cardiac CTA — Card Cardiac % CTA
0
0

R

L

Zoom: 136% Angles L-R: 0° S-I: 90°
Im: 326/349 S (L) S (S)

Thanks to Dr Ben Ariff, Imperial College, London

FirstOrderFiducial

12/03/2013 13:46:12

Thickness: 500.00 mm Location: 1596,90 mm P

Made In OsiriX

Image size: 512 x 512
View size: 698 x 698
WL: 300 WW: 1200

A

TKM
Card Cardiac CTA — Card Cardiac % CTA
0
0



Zoom: 136% Angles L-R: 0° S-I: 90°
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Card Cardiac CTA — Card Cardiac % CTA
0
0



Zoom: 136% Angles L-R: 0° S-I: 00°
Im: 219/249 S (L > R)

Thanks to Dr Ben Ariff, Imperial College, London

FirstOrderPreirradiation

Thickness: 500.00 mm Location: 1594.80 mm P

12/03/2013 13:46:12

Made In OsiriX

Image size: 512 x 512
View size: 698 x 698
WL: 300 WW: 1200

A

TKM
Card Cardiac CTA — Card Cardiac % CTA
0
0

R

L

Zoom: 136% Angles L-R: 0° S-I: 00°
Im: 212/249 S (L > R)

Thanks to Dr Ben Ariff, Imperial College, London

Thickness: 500.00 mm Location: 1598.00 mm P

12/03/2013 13:46:12

Made In OsiriX

Image size: 512 x 512
View size: 698 x 698
WL: 300 WW: 1200

A

TKM
Card Cardiac CTA — Card Cardiac % CTA
0
0

R

L

Zoom: 136% Angles L-R: 0° S-I: 90°
Im: 207/249 S: (L - S)

Thanks to Dr Ben Ariff, Imperial College, London

First Order Resection

12/03/2013 13:46:12

Thickness: 500.00 mm Location: 1591.20 mm P

Made In OsiriX

Image size: 512 x 512
View size: 698 x 698
WL: 300 WW: 1200

A

TKM
Card Cardiac CTA — Card Cardiac % CTA
0
0



L Main Coronary A

Zoom: 136% Angles L-R: 0° S-I: 90°
Im: 201/249 S (L) S (S)

Thanks to Dr Ben Ariff, Imperial College, London

First order Reconstruction

12/03/2013 13:46:12

Made In OsiriX

Thickness: 500.00 mm Location: 1589.40 mm P

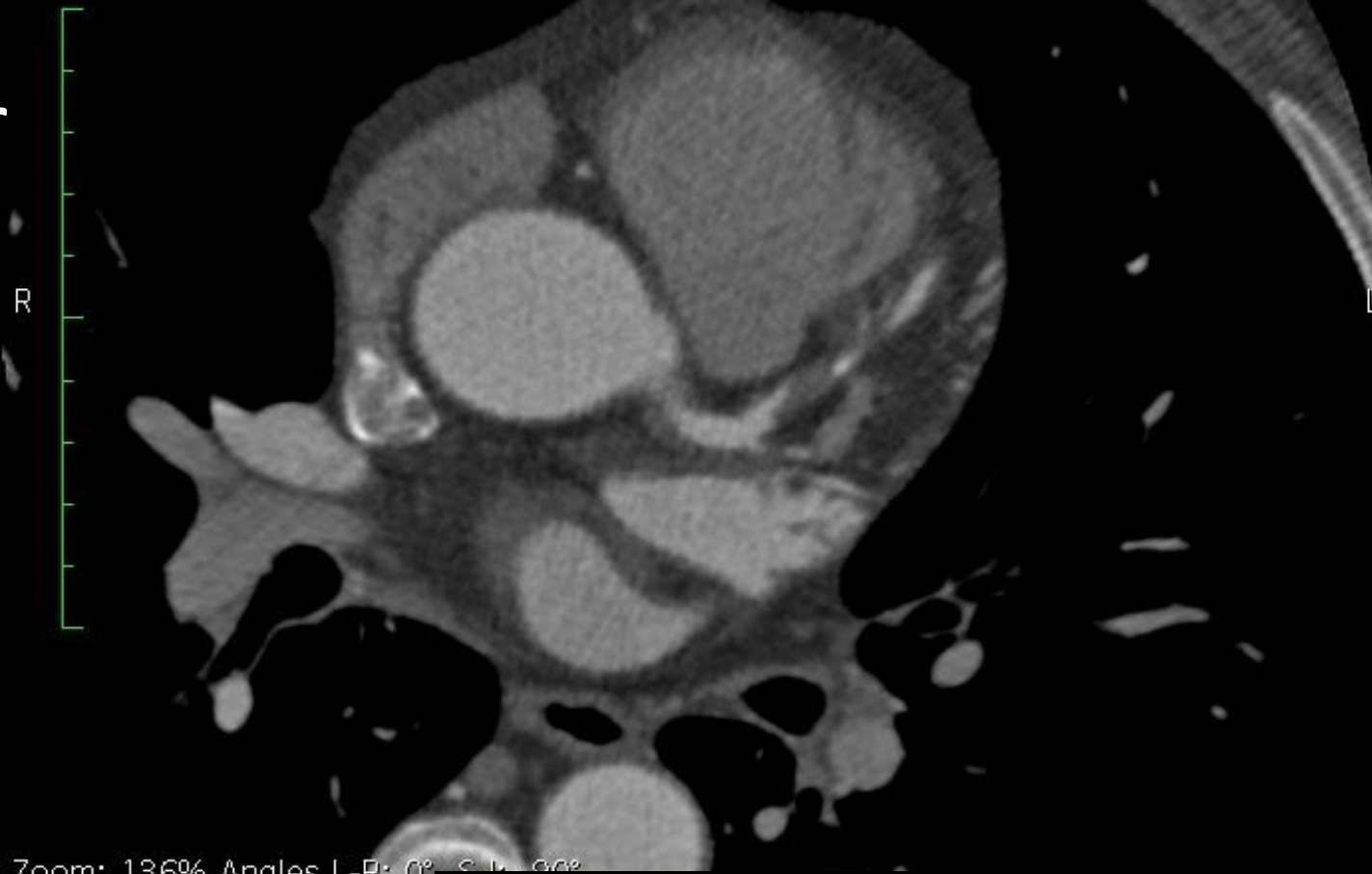
Image size: 512 x 512
View size: 698 x 698
WL: 300 WW: 1200

A

TKM
Card Cardiac CTA — Card Cardiac % CTA
0
0

pollEv.com/edick900

Where is
Left anterior
descending
stenosis?



Zoom: 136% Angles L-R: 0° S: 0°
Im: 201/249 S: (L) S:

Thanks to Dr Ben Ariff, Imperial College, London

Thickness: 500.00 mm Location: 1589.40 mm P

12/03/2013 13:46:12

Made In OsiriX

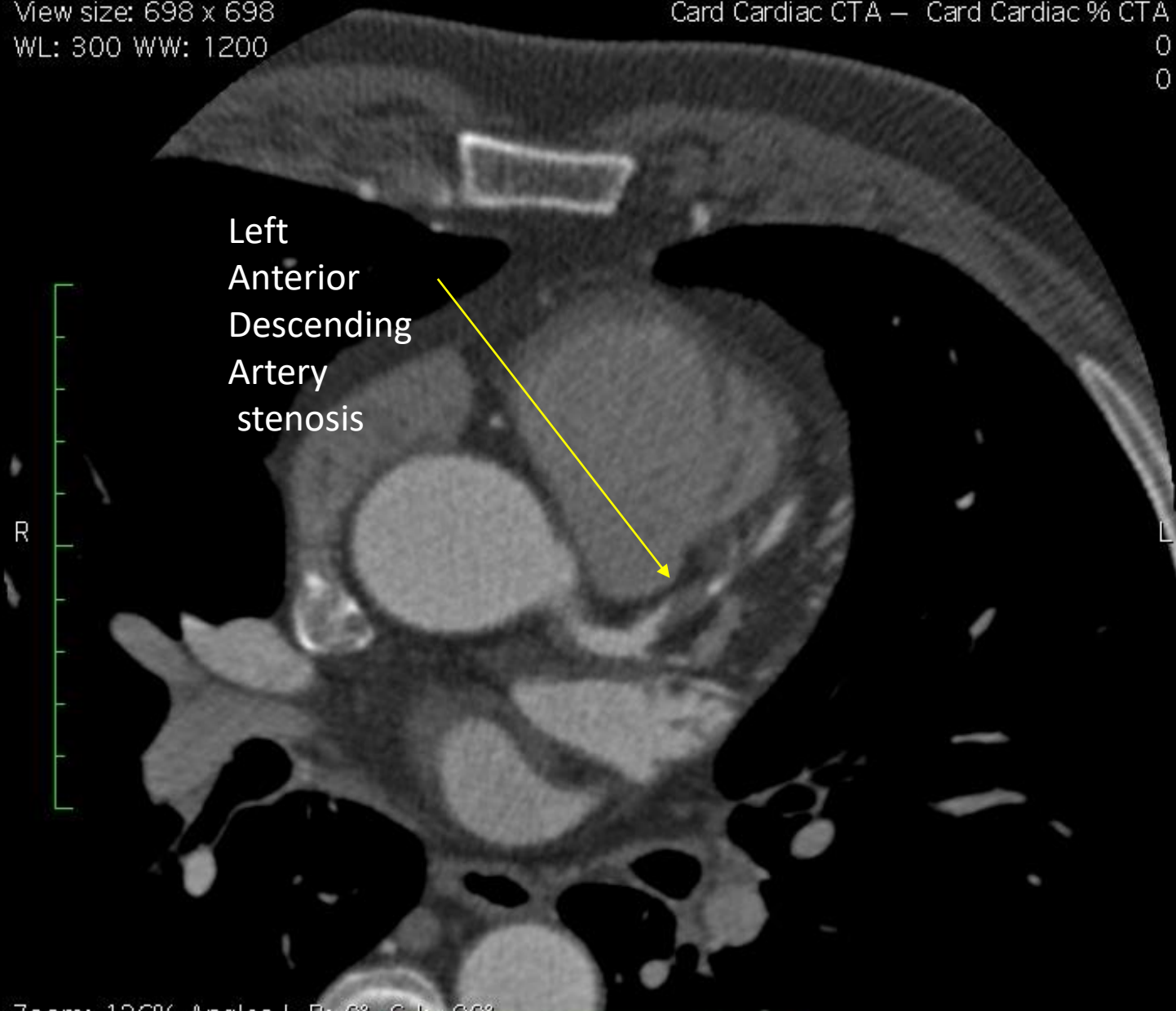
Where is the stenosis of the left anterior descending artery?



Image size: 512 x 512
View size: 698 x 698
WL: 300 WW: 1200

A

Card Cardiac CTA — Card Cardiac % CTA
TKM
0
0



Left
Anterior
Descending
Artery
stenosis

Zoom: 136% Angles L-R: 0° S-I: 90°
Im: 301/349 S (L) S (S)

Thanks to Dr Ben Ariff, Imperial College, London

First order Reconstruction
Thickness: 500.00 mm Location: 1589.40 mm P

12/03/2013 13:46:12
Made In OsiriX

Image size: 512 x 512
View size: 698 x 698
WL: 300 WW: 1200

A

TKM
Card Cardiac CTA — Card Cardiac % CTA
0
n

Severe stenosis or occlusion of Left Anterior Descending Artery



Zoom: 136% Angles L-R: 0° S: 0°
Im: 300/349 S: (L - S)

Thanks to Dr Ben Ariff, Imperial College, London

First order reconstruction

12/03/2013 13:46:12

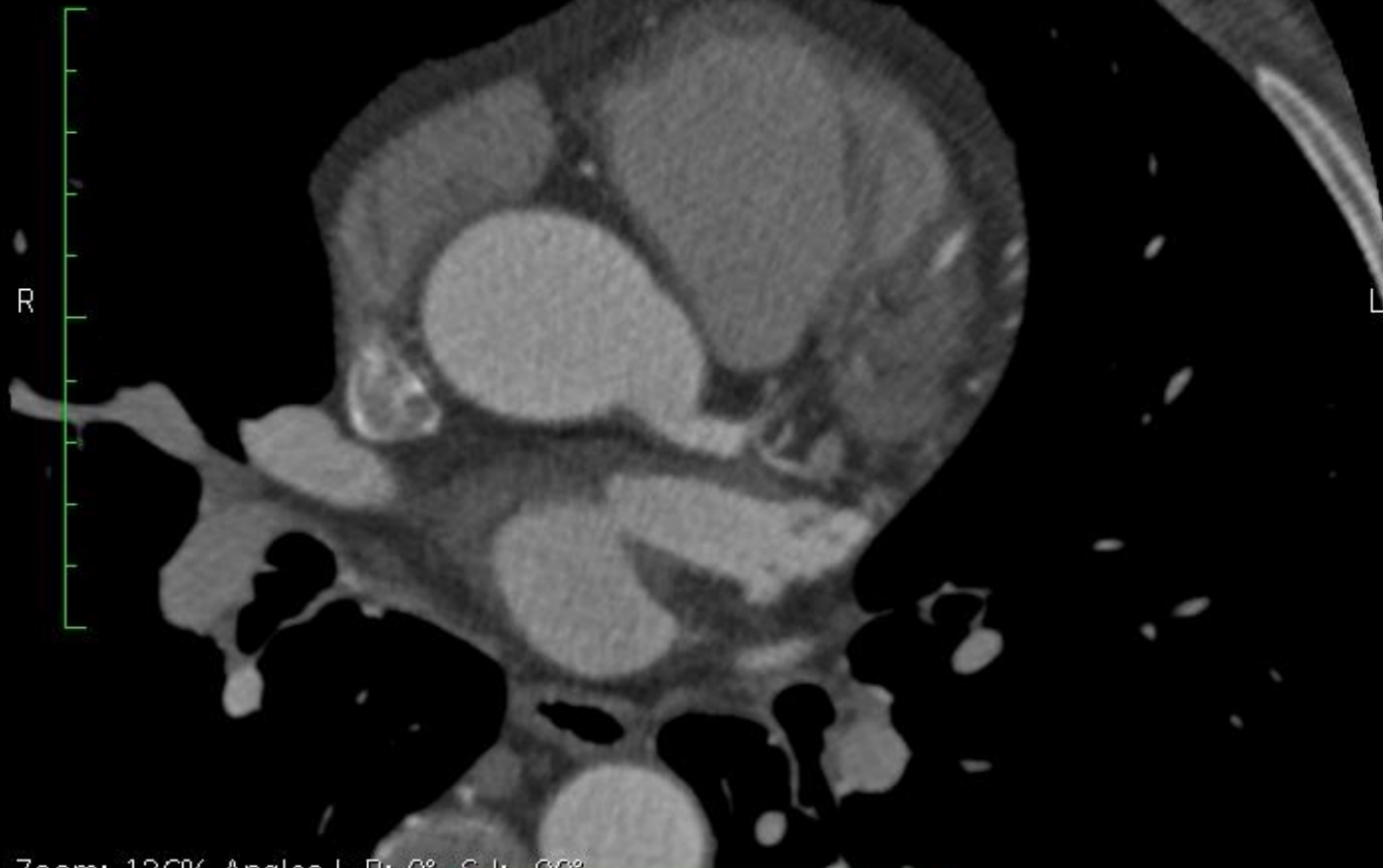
Made In OsiriX

Thickness: 500.00 mm Location: 1569.10 mm P

Image size: 512 x 512
View size: 698 x 698
WL: 300 WW: 1200

A

TKM
Card Cardiac CTA — Card Cardiac % CTA
0
0



Zoom: 136% Angles L-R: 0° S-I: 90°
Im: 294/249 S (L > R)

Thanks to Dr Ben Ariff, Imperial College, London

Thickness: 500.00 mm Location: 1587.80 mm P

12/03/2013 13:46:12
Made In OsiriX

Image size: 512 x 512
View size: 698 x 698
WL: 300 WW: 1200

A

TKM
Card Cardiac CTA — Card Cardiac % CTA
0
0



Zoom: 136% Angles L-R: 0° S-I: 00°
Im: 288/249 S (L - S)

Thanks to Dr Ben Ariff, Imperial College, London

Thickness: 500.00 mm Location: 1585.50 mm P

12/03/2013 13:46:12
Made In OsiriX

Image size: 512 x 512
View size: 698 x 698
WL: 300 WW: 1200

A

TKM
Card Cardiac CTA — Card Cardiac % CTA
0
0



Zoom: 136% Angles L-R: 0° S-I: 90°
Im: 382/349 S: (L - S)

Thanks to Dr Ben Ariff, Imperial College, London

FirstOrderPreirradiation

12/03/2013 13:46:12

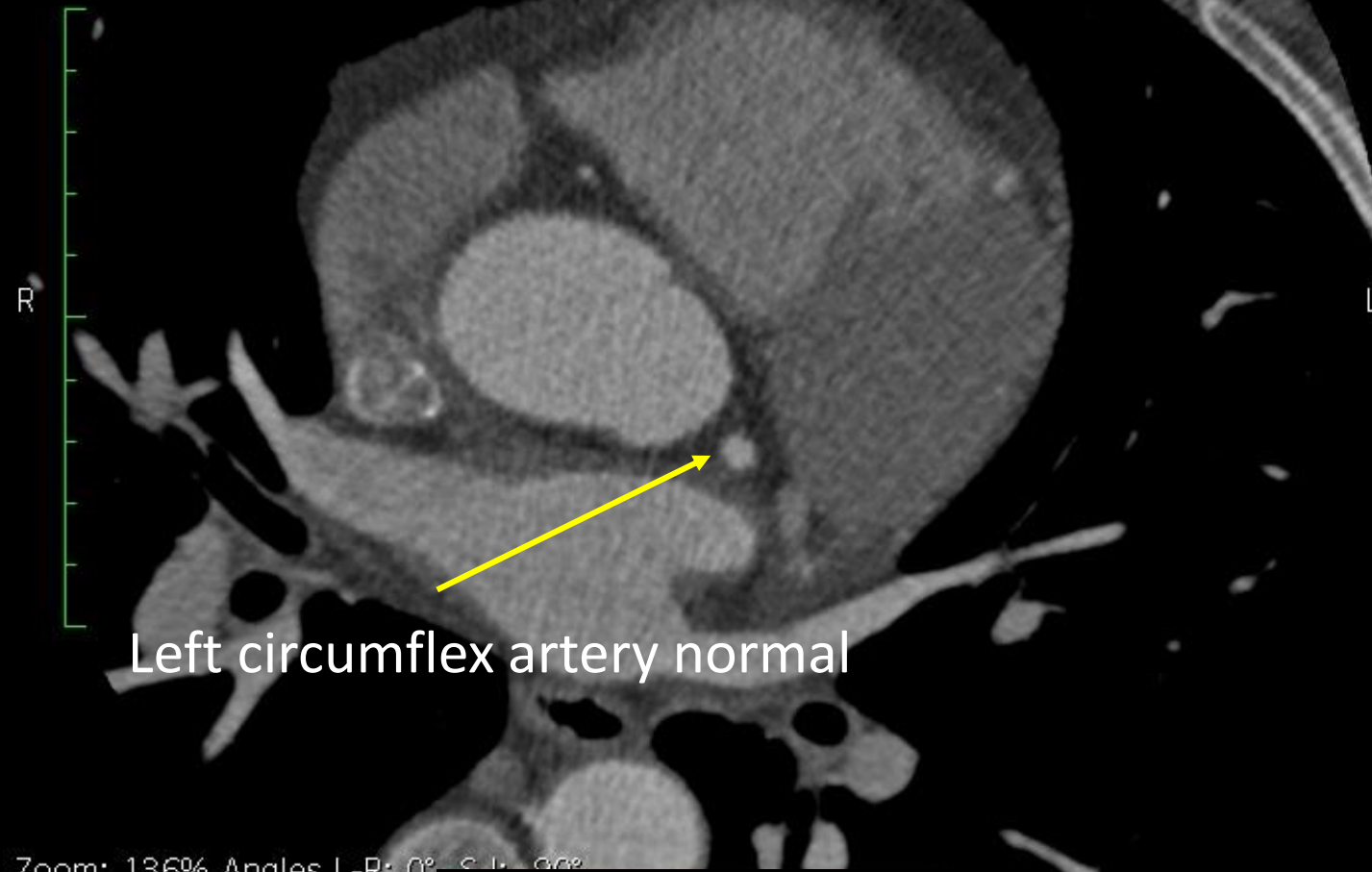
Thickness: 500.00 mm Location: 1588.70 mm P

Made In OsiriX

Image size: 512 x 512
View size: 698 x 698
WL: 300 WW: 1200

A

TKM
Card Cardiac CTA — Card Cardiac % CTA
0
0



Left circumflex artery normal

Zoom: 136% Angles L-R: 0° S-I: 90°
Im: 276/249 S (L to S)

Thanks to Dr Ben Ariff, Imperial College, London

FirstOrderPreirradiation

12/03/2013 13:46:12

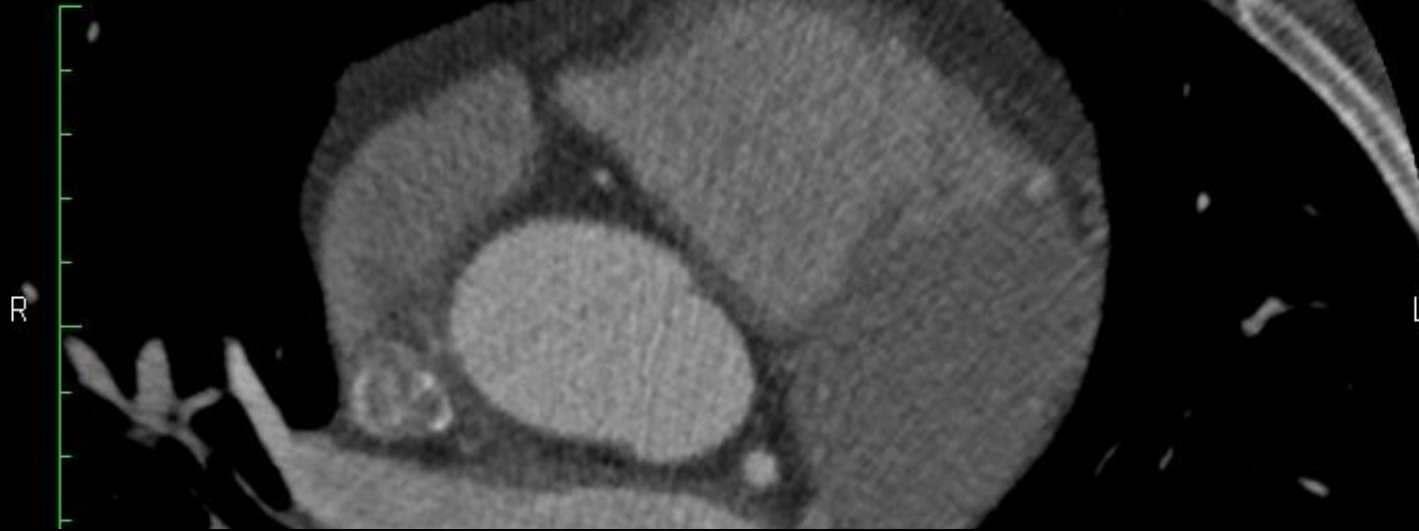
Made In OsiriX

Thickness: 500.00 mm Location: 1581.90 mm P

Image size: 512 x 512
View size: 698 x 698
WL: 300 WW: 1200

A

TKM
Card Cardiac CTA — Card Cardiac % CTA
0
0



**SEVERE STENOSIS OR OCCLUSION LEFT
ANTERIOR DESCENDING ARTERY
NEEDS BYPASS GRAFT OR STENT**

Zoom: 156% Angles L-R: 0
Im: 275/249 S (L - S)

Thanks to Dr Ben Ariff, Imperial College, London

Thickness: 500.00 mm Location: 1581.60 mm P

12/03/2013 13:46:12

Made In OsiriX

Male, 30's,
Chest Pain while exercising, now
settled

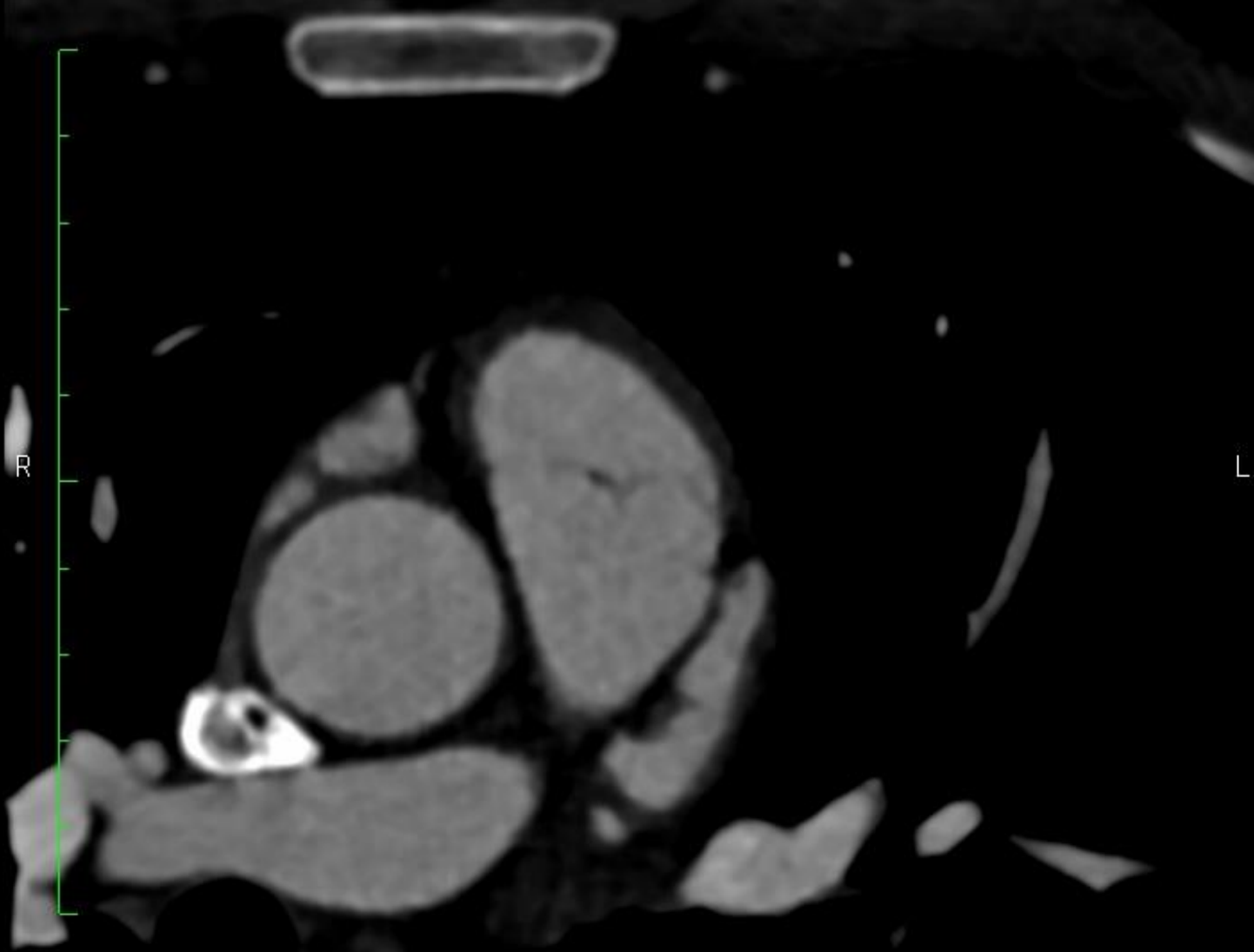


Male, 30's,
Chest Pain while exercising, now
settled

CARDIAC CT



Image size: 512 x 512 A BA
View size: 700 x 700 20Kv_CORONARY_RETRO_SAFIRE - Cardiac 0.75 I26f 2 BestDiast 73 %
WL: 554 WW: 1158 RYJP3838069
5



Zoom: 137% Angles L-R: 0°,
Im: 252/289 S (I -> S)
BigEndianExplicit
Thickness: 750.00 μm Locatic...

Thanks to Dr Ben Ariff, Imperial College London

Image size: 512 x 512

A

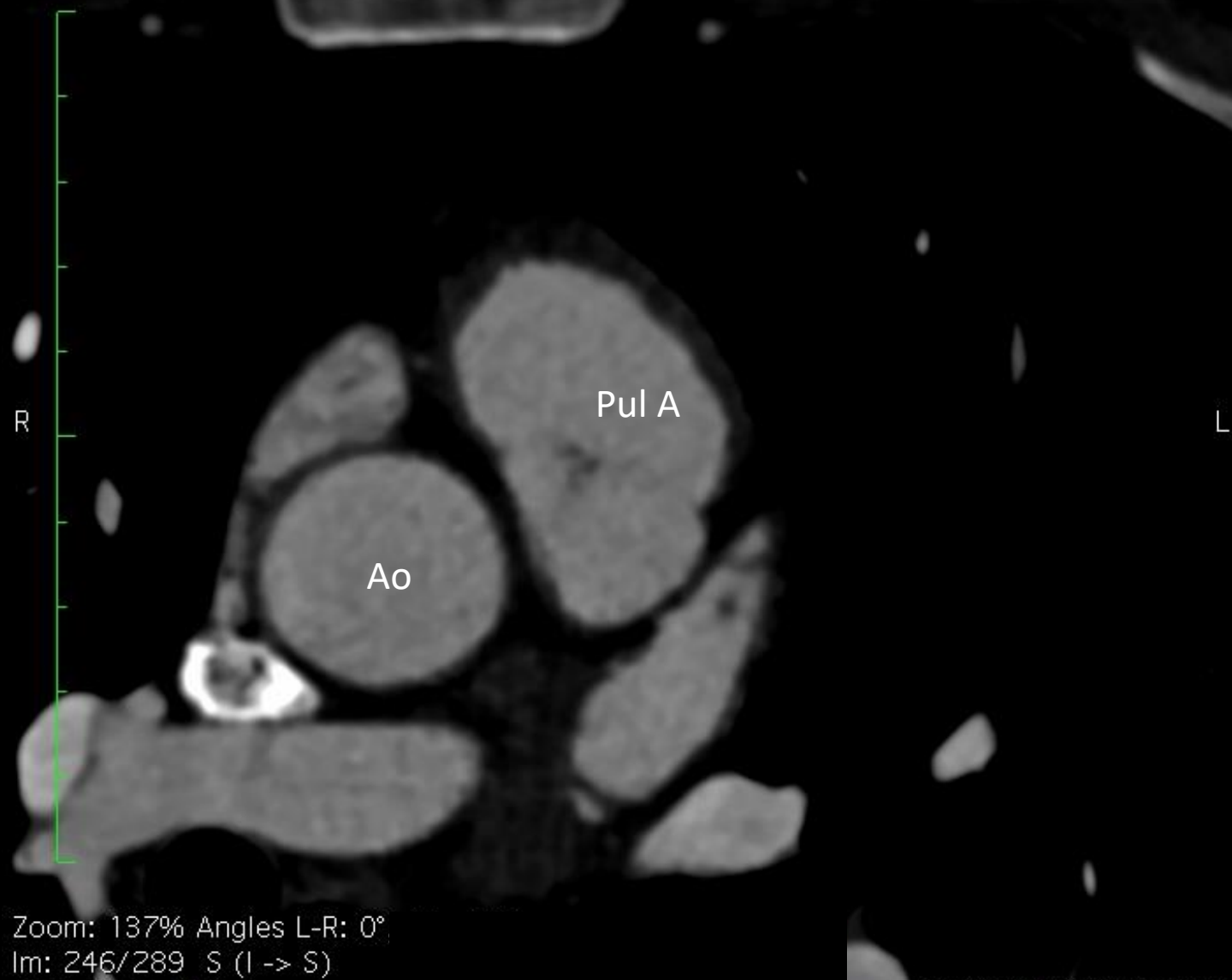
BA

View size: 700 x 700 20Kv_CORONARY_RETRO_SAFIRE — Cardiac 0.75 126f 2 BestDiast 73 %

WL: 554 WW: 1158

RYJP3838069

5



Zoom: 137% Angles L-R: 0°

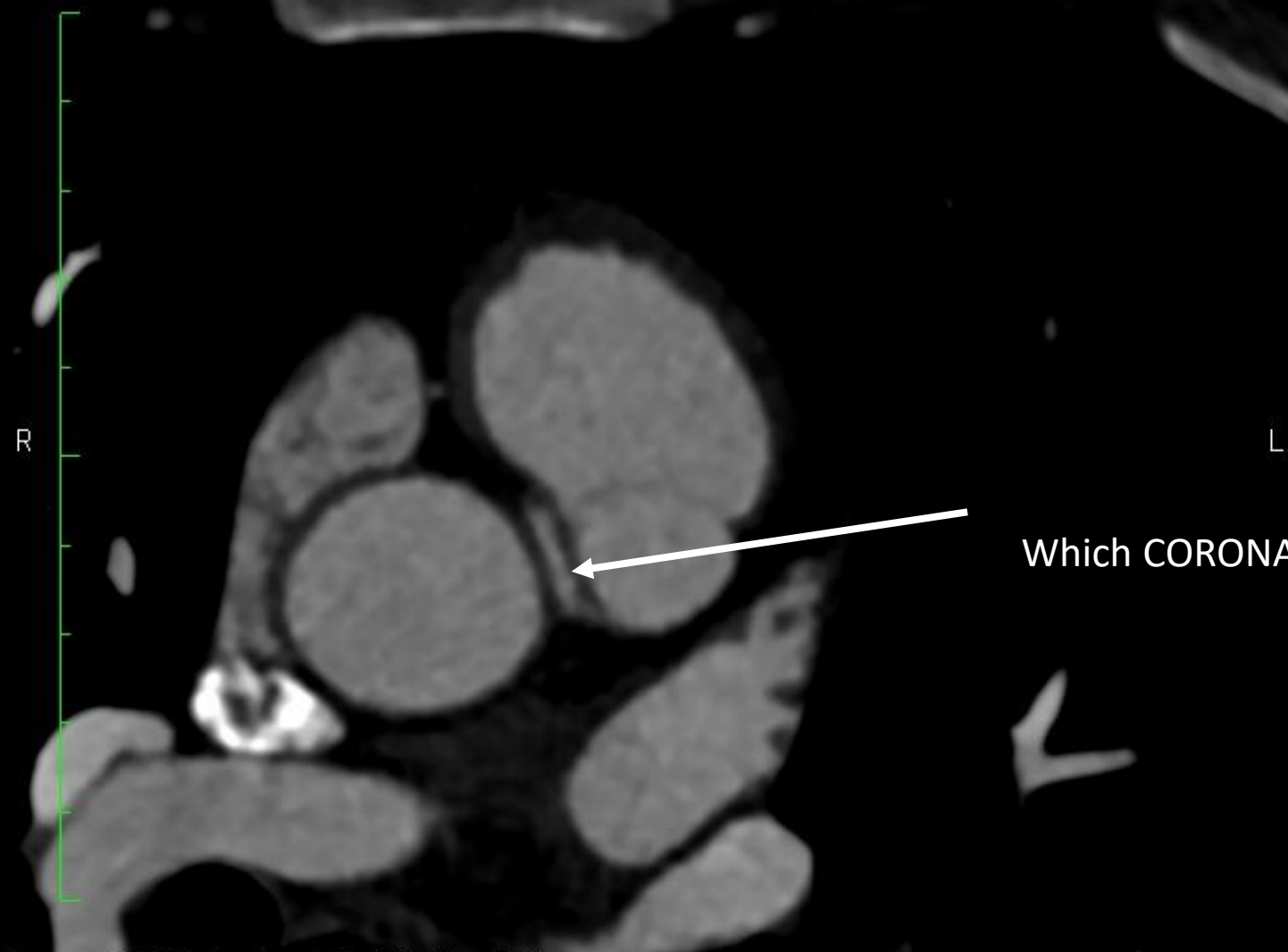
Im: 246/289 S (I -> S)

BigEndianExplicit

Thickness: 750.00 μ m Location: ...

Thanks to Dr Ben Ariff, Imperial College London

Image size: 512 x 512 A BA
View size: 700 x 700 20Kv_CORONARY_RETRO_SAFIRE — Cardiac 0.75 I26f 2 BestDiast 73 %
WL: 554 WW: 1158 RYJP3838069
5



Which CORONARY Artery

Zoom: 137% Angles L-R: 0°,
Im: 240/289 S (I -> S)
BigEndianExplicit
Thickness: 750.00 µm Locatic...

20/12/2013 16:04:21

Thanks to Dr Ben Ariff Imperial College London

Image size: 512 x 512

A

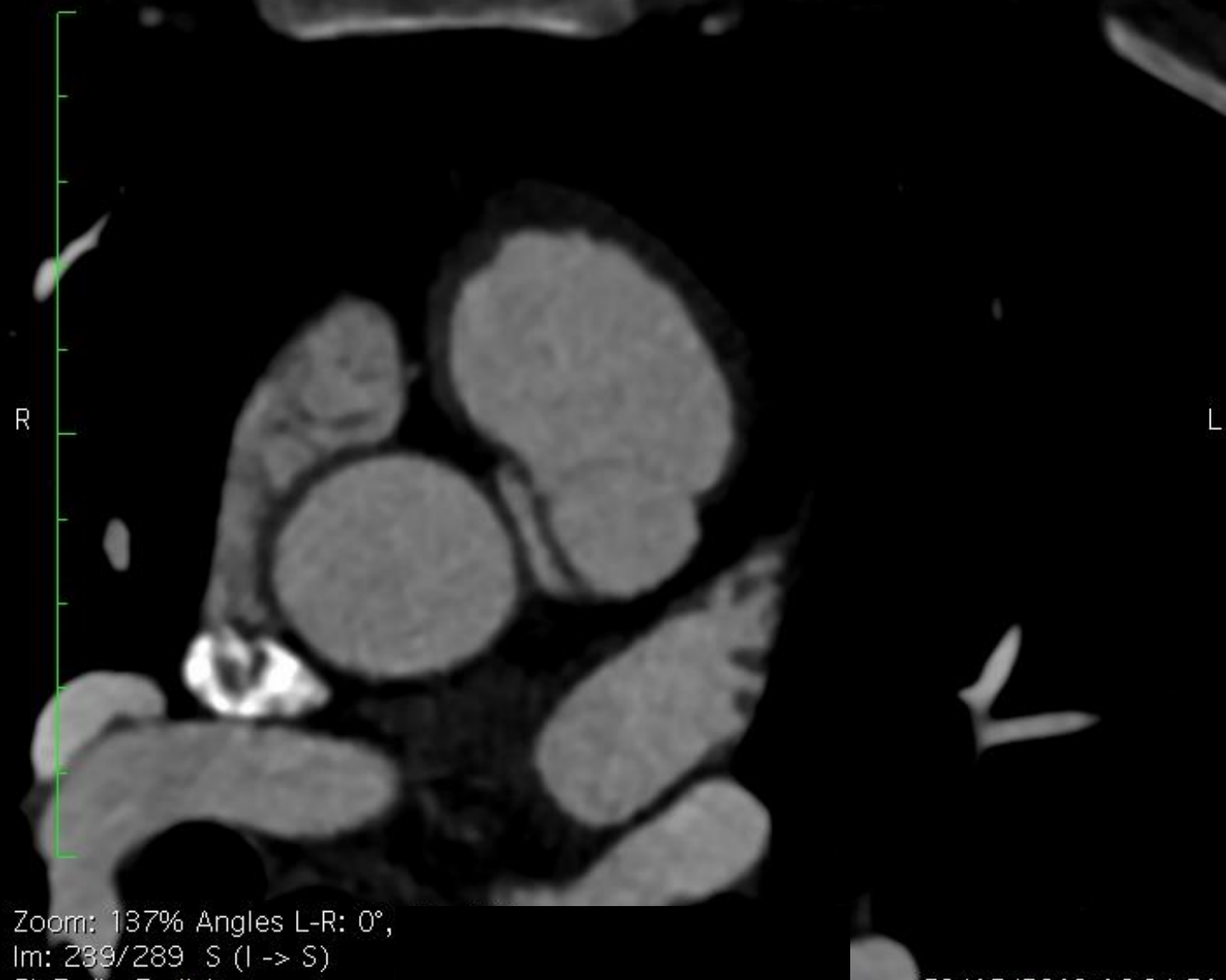
BA

View size: 700 x 700 20Kv_CORONARY_RETRO_SAFIRE - Cardiac 0.75 I26f 2 BestDiast 73 %

WL: 554 WW: 1158

RYJP3838069

5



Zoom: 137% Angles L-R: 0°,

Im: 289/289 S (I -> S)

BigEndianExplicit

Thickness: 750.00 μ m Locatic...

Thanks to Dr Ben Ariff, Imperial College London



Zoom: 137% Angles L-R: 0°,
Im: 233/289 S (I -> S)
BigEndianExplicit
Thickness: 750.00 μm Locatic...

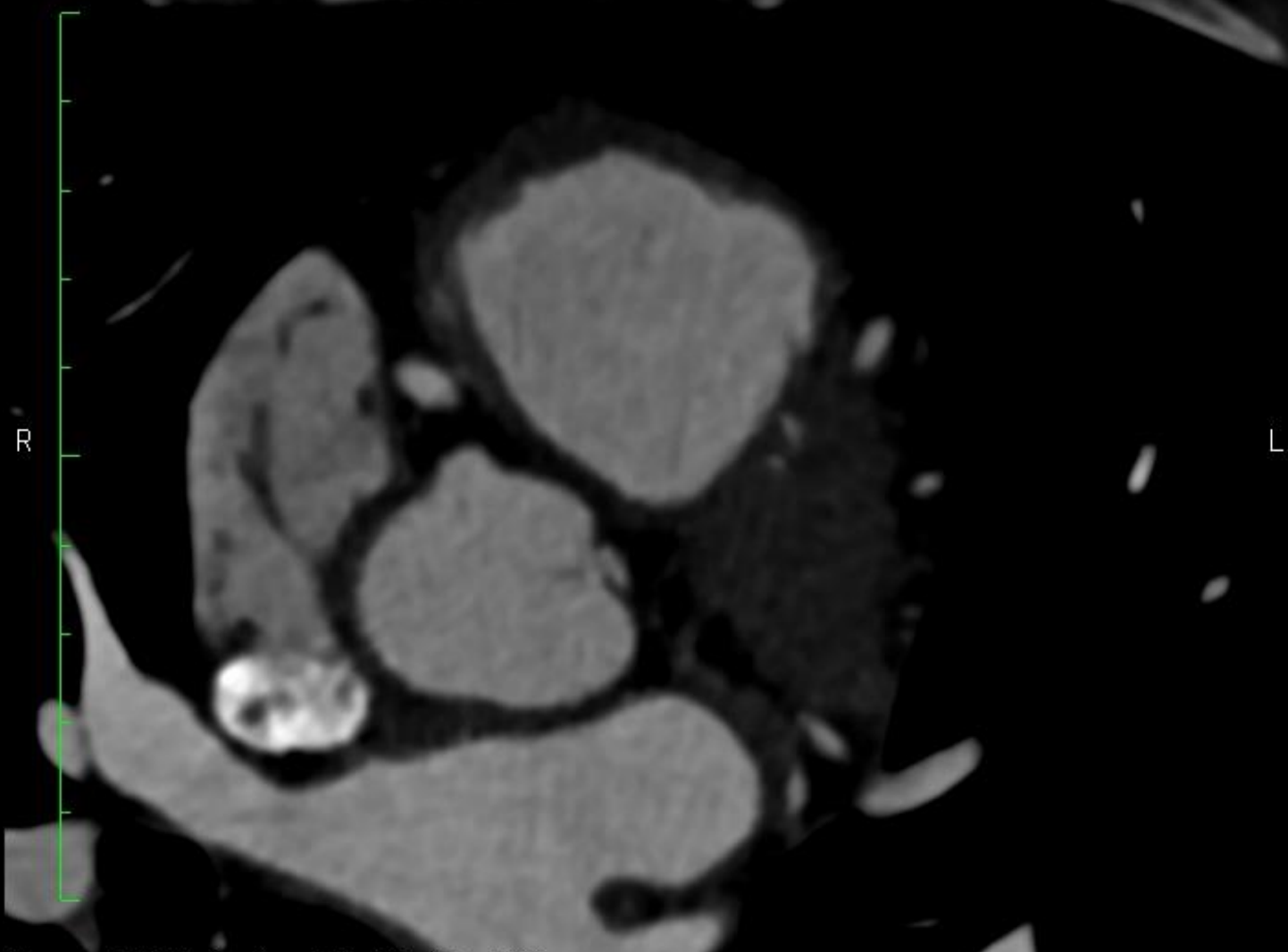
Thanks to Dr Ben Ariff, Imperial College London



Left anterior descending A



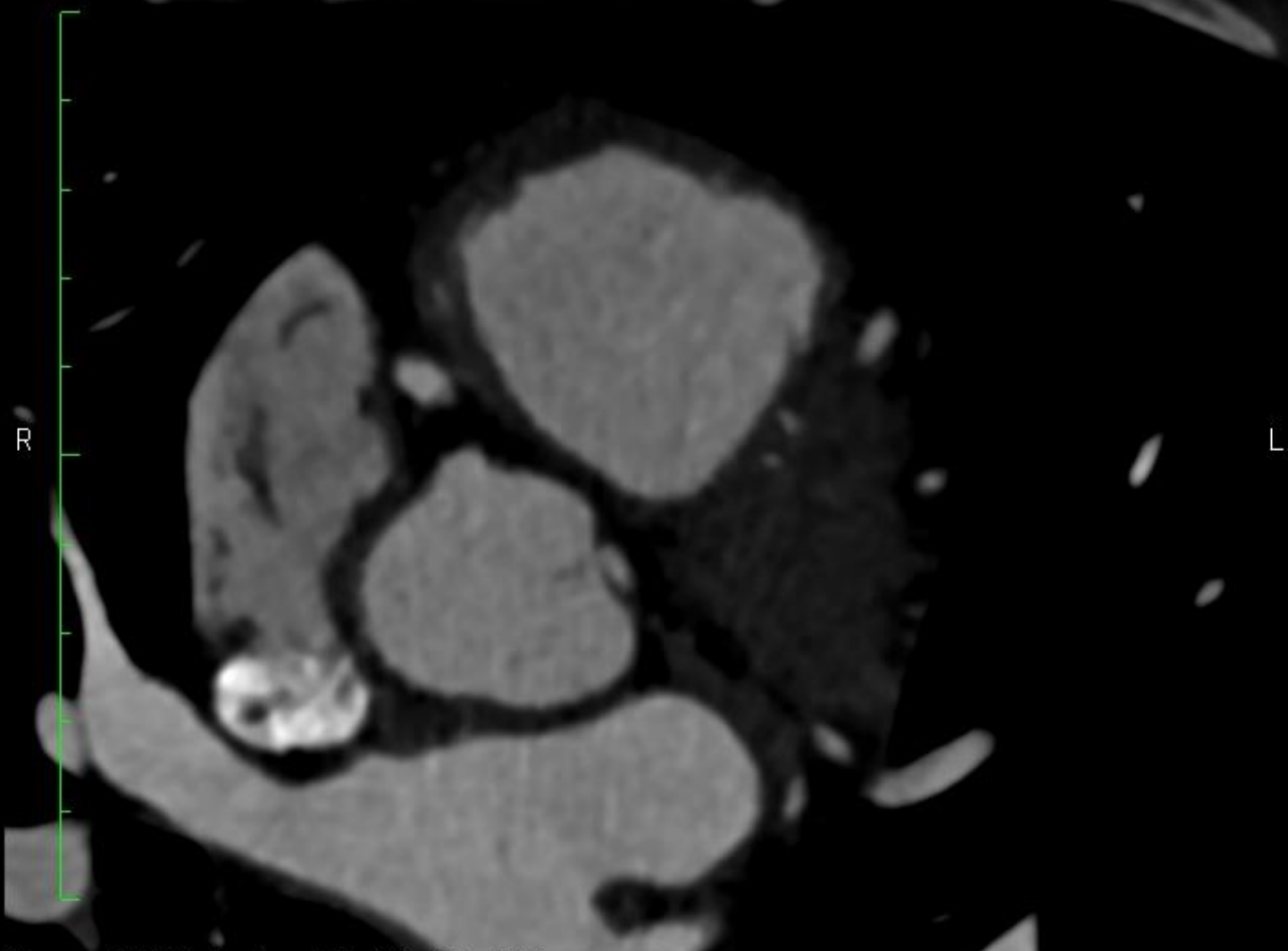
Image size: 512 x 512 A BA
View size: 700 x 700 20Kv_CORONARY_RETRO_SAFIRE – Cardiac 0.75 I26f 2 BestDiast 73 %
WL: 554 WW: 1158 RYJP3838069
5



Zoom: 137% Angles L-R: 0°,
Im: 215/289 S (I -> S)
BigEndianExplicit
Thickness: 750.00 μ m Locatic...

Thanks to Dr Ben Ariff, Imperial College London

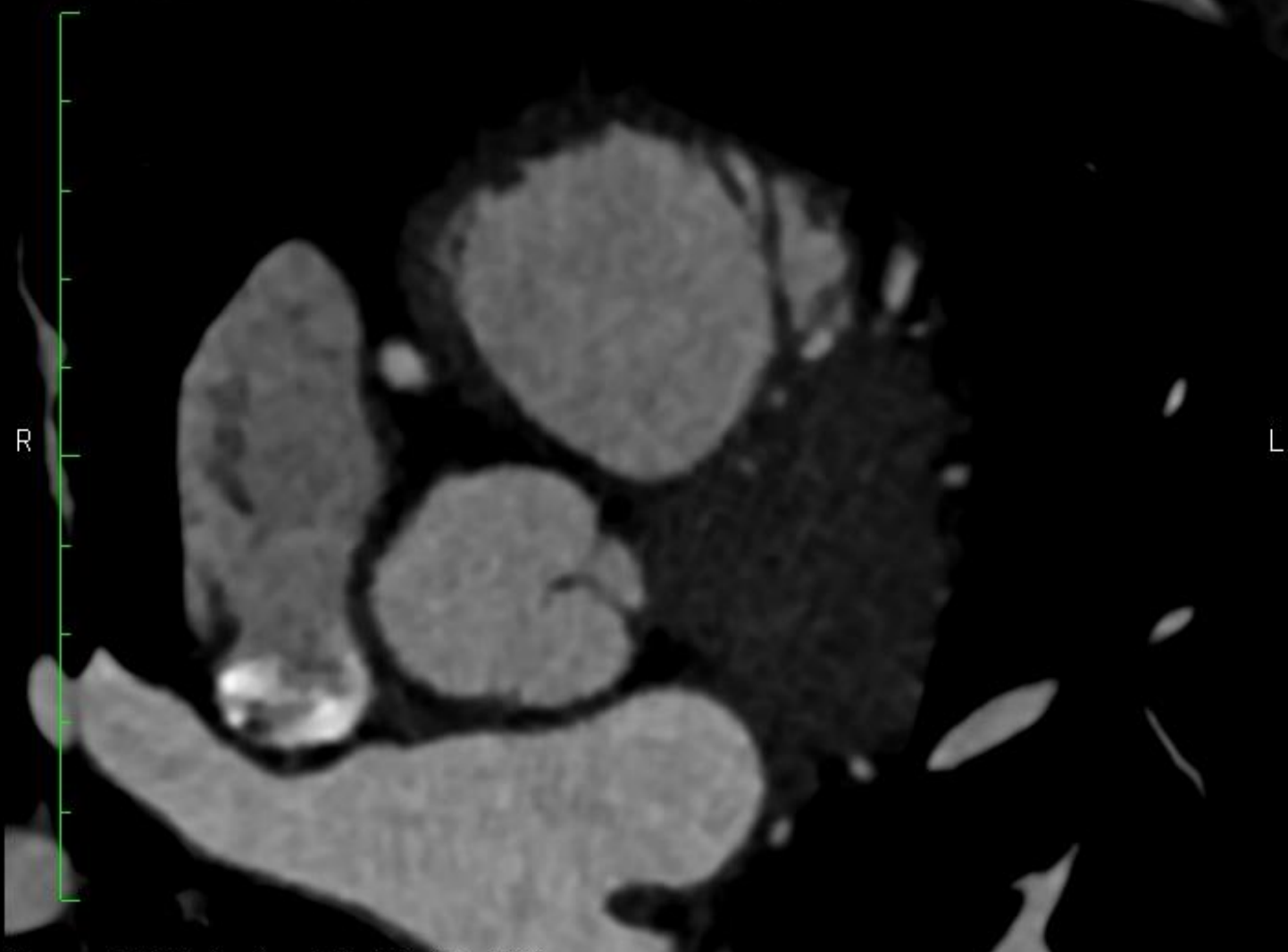
Image size: 512 x 512 A BA
View size: 700 x 700 20Kv_CORONARY_RETRO_SAFIRE – Cardiac 0.75 I26f 2 BestDiast 73 %
WL: 554 WW: 1158 RYJP3838069
5



Zoom: 137% Angles L-R: 0°,
Im: 214/289 S (I -> S)
BigEndianExplicit
Thickness: 750.00 μ m Locatic...

Thanks to Dr Ben Ariff, Imperial College London

Image size: 512 x 512 A BA
View size: 700 x 700 20Kv_CORONARY_RETRO_SAFIRE — Cardiac 0.75 I26f 2 BestDiast 73 %
WL: 554 WW: 1158 RYJP3838069
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Zoom: 137% Angles L-R: 0°,
Im: 208/289 S (I -> S)
BigEndianExplicit
Thickness: 750.00 μm Locatic...

Thanks to Dr Ben Ariff, Imperial College London

Image size: 512 x 512

A

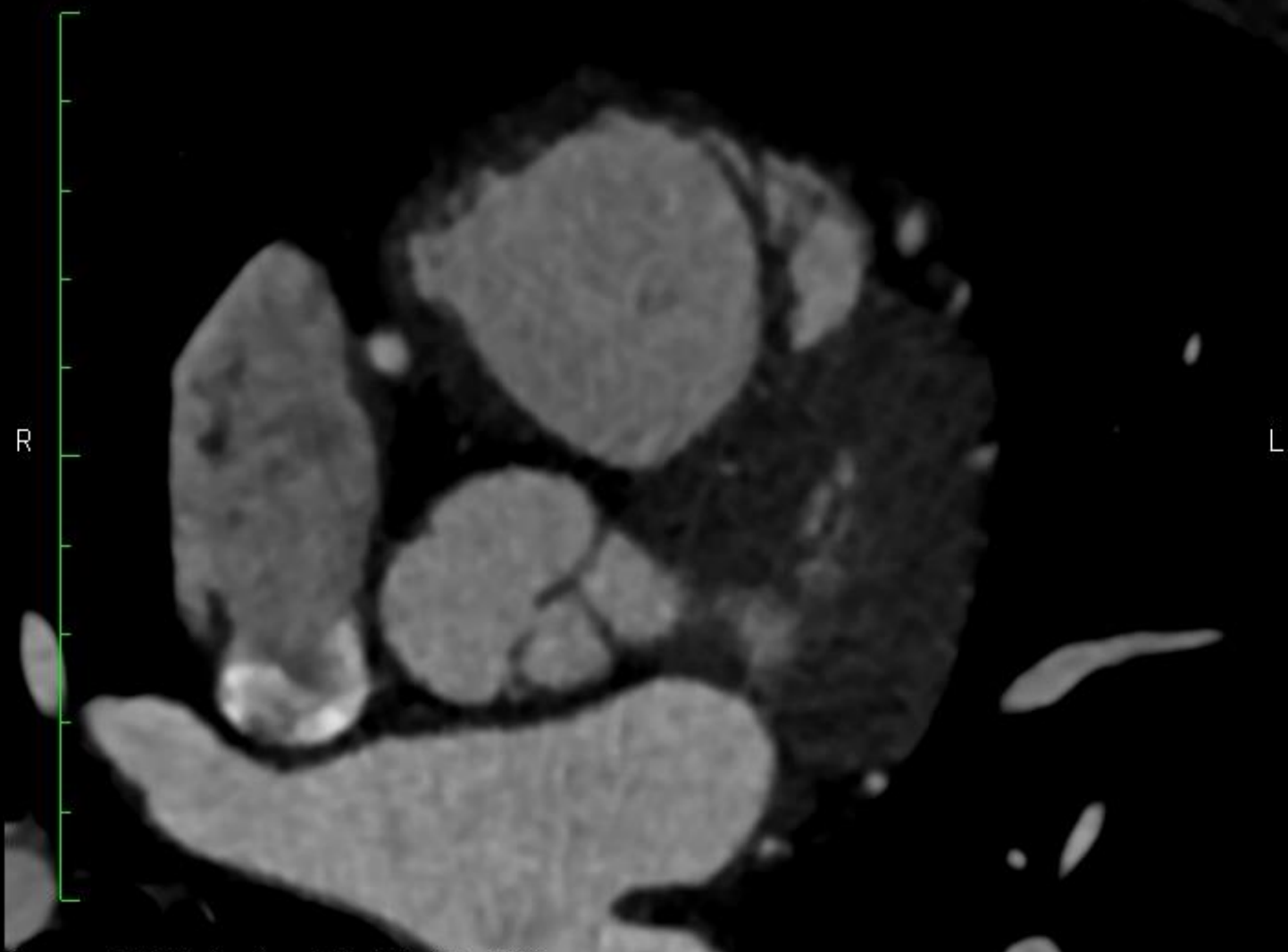
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RYJP3838069

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Zoom: 137% Angles L-R: 0°,

Im: 202/289 S (I -> S)

BigEndianExplicit

Thickness: 750.00 μ m Locatic...

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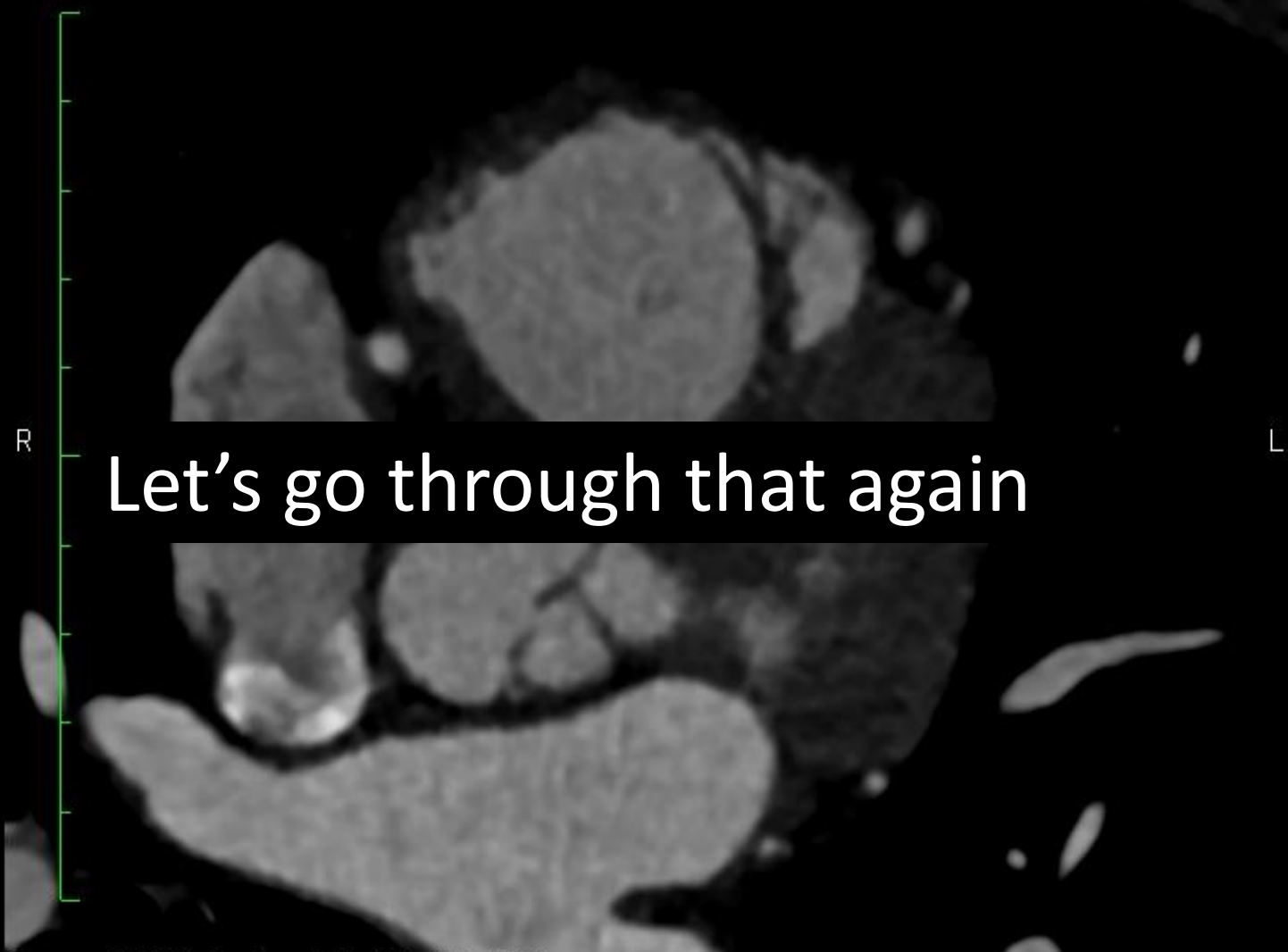
Why do you think the patient gets pain when exercising?

“ Ischemia ”

“ Pulmonary artery and Aorta squeeze the origin of coronary branch with this individual anatomical anomaly ”

“ Coronary artery gets squashed ”

“ Pulmonary artery and aorta dilate ”



Let's go through that again

Single origin all
3 coronary arteries

RCA

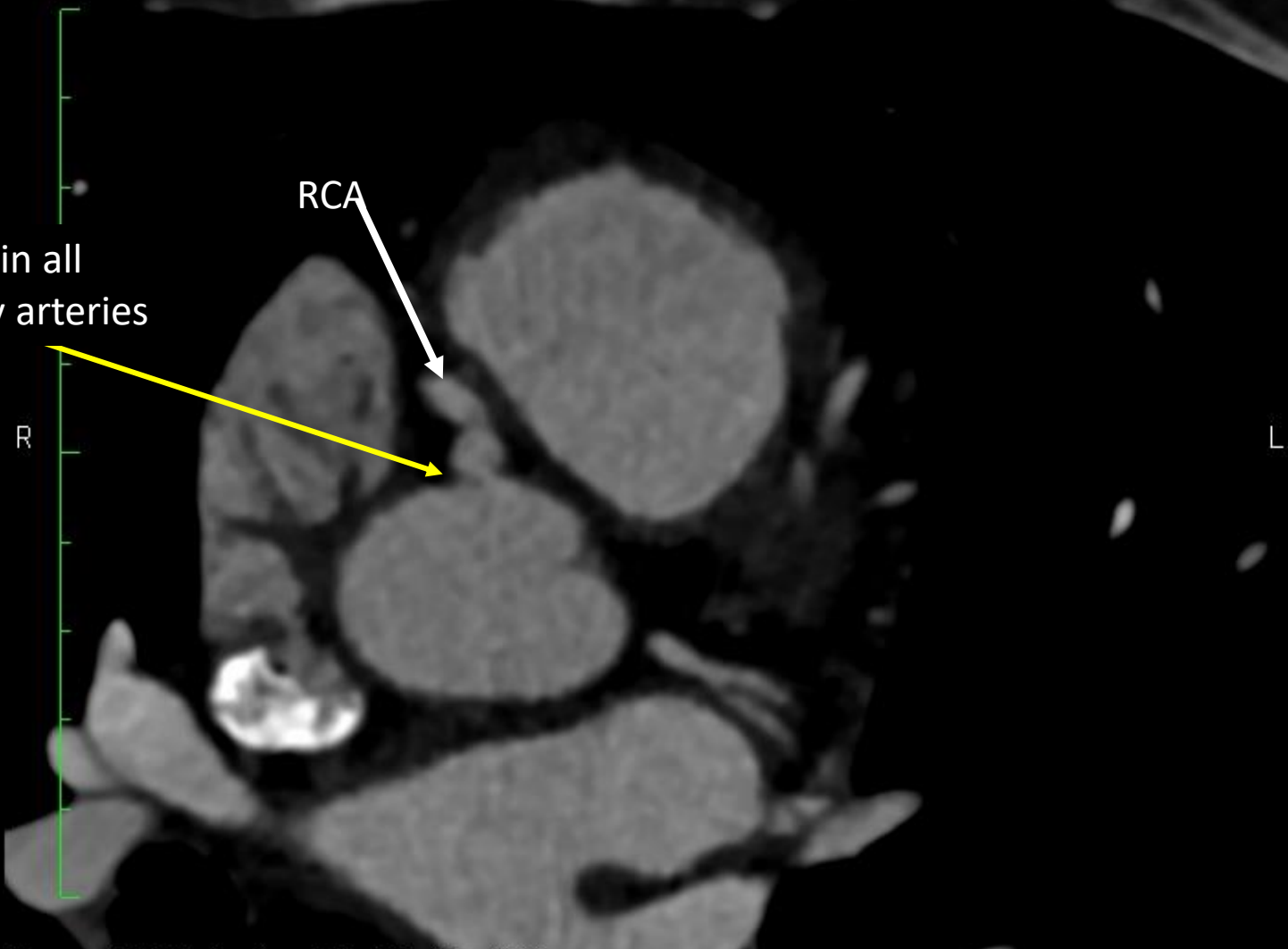


Image size: 512 x 512

A

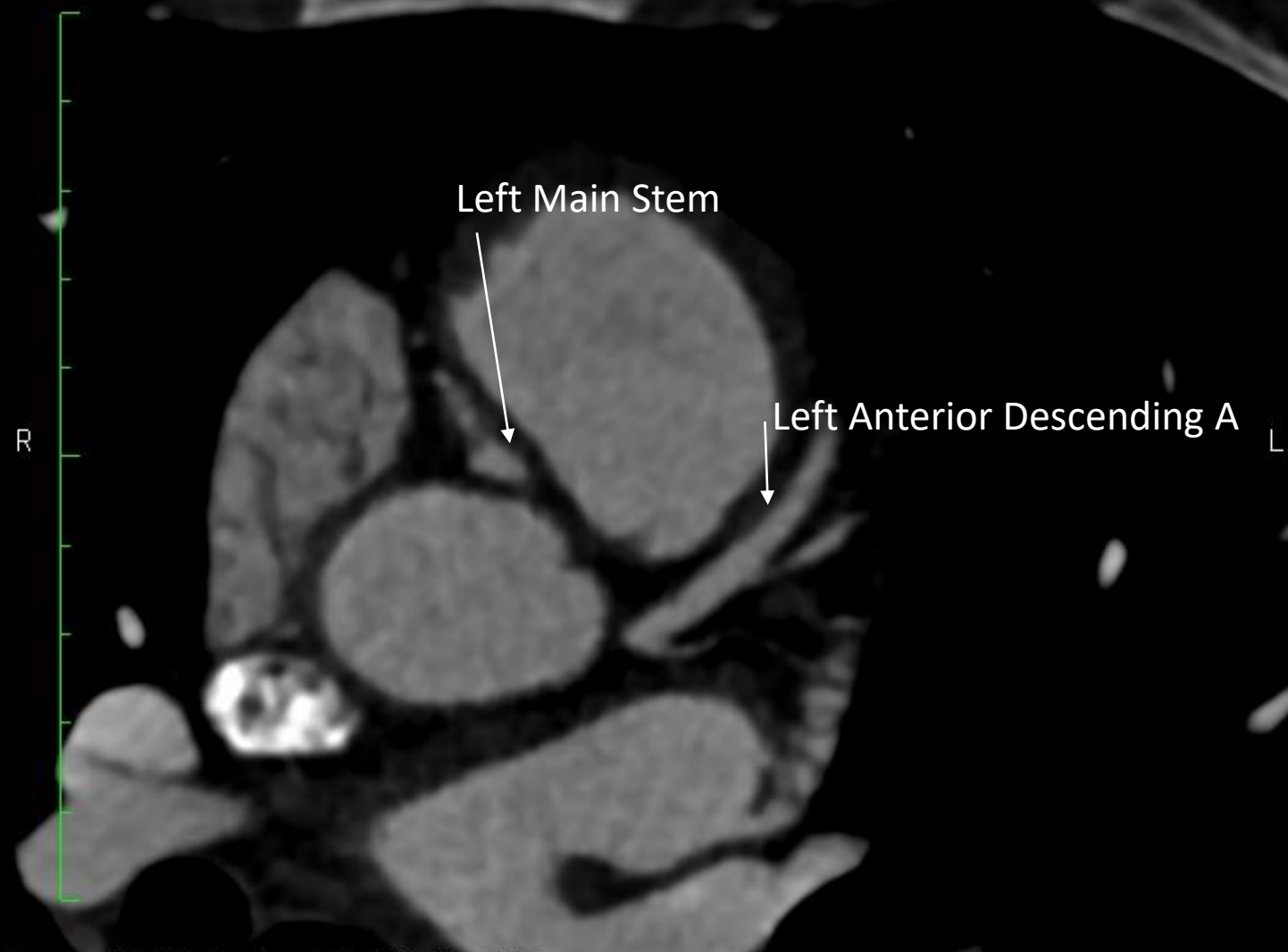
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WL: 554 WW: 1158

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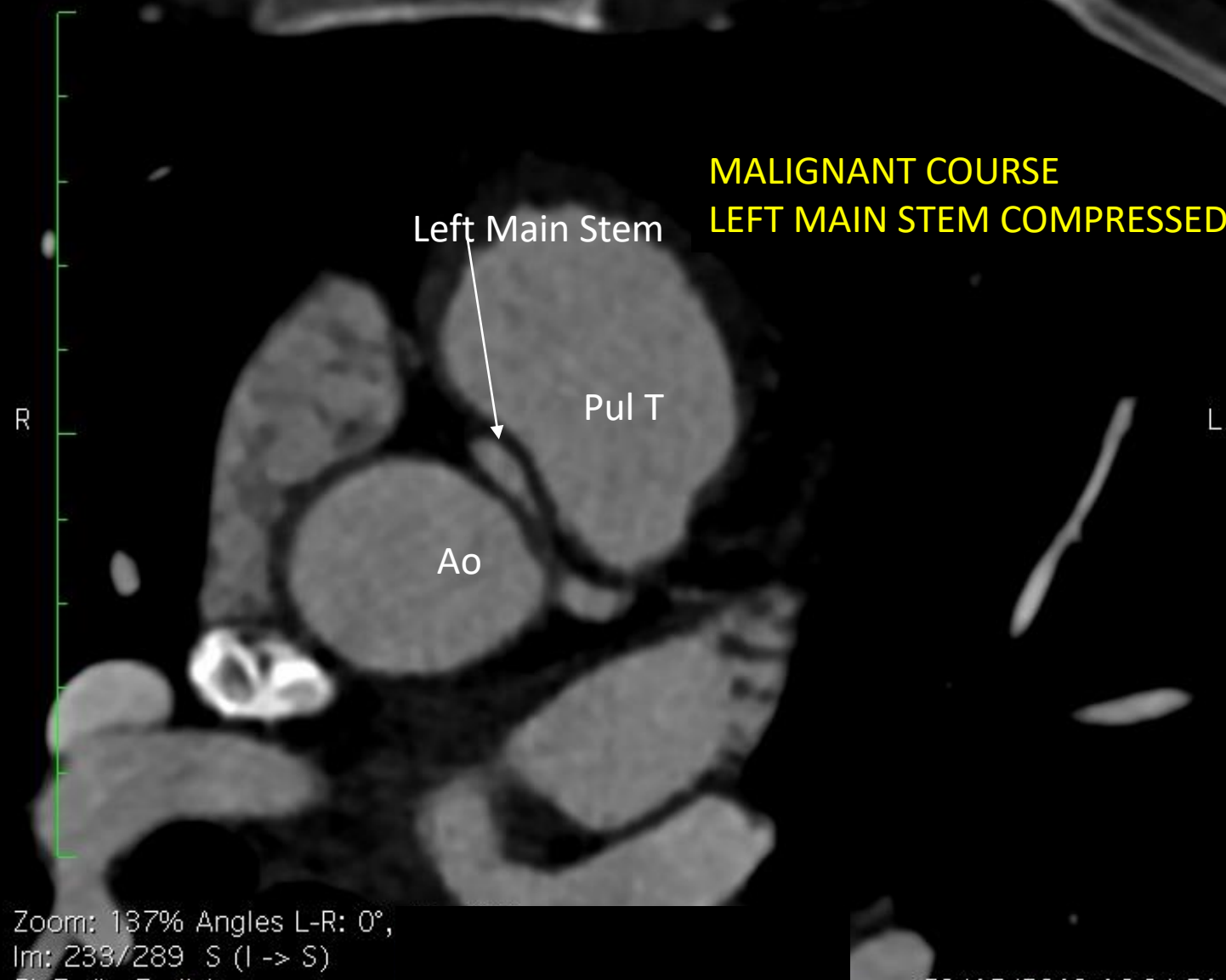
Zoom: 137% Angles L-R: 0°,

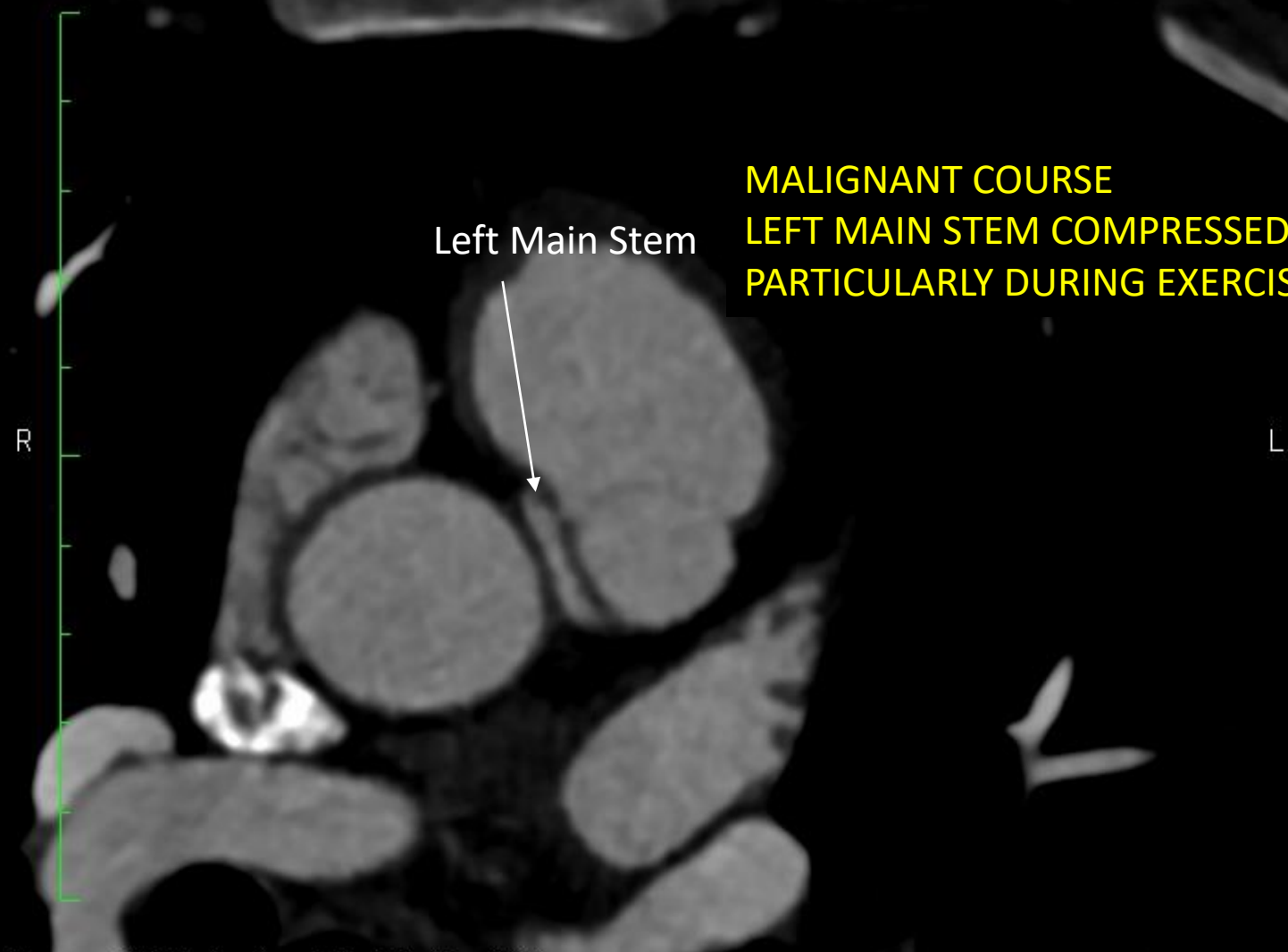
Im: 227/289 S (I -> S)

BigEndianExplicit

Thickness: 750.00 μm Locatic...

Thanks to Dr Ben Ariff, Imperial College London





**MALIGNANT COURSE
LEFT MAIN STEM COMPRESSED BETWEEN PUL/AORTA
PARTICULARLY DURING EXERCISE**

Left Main Stem

R

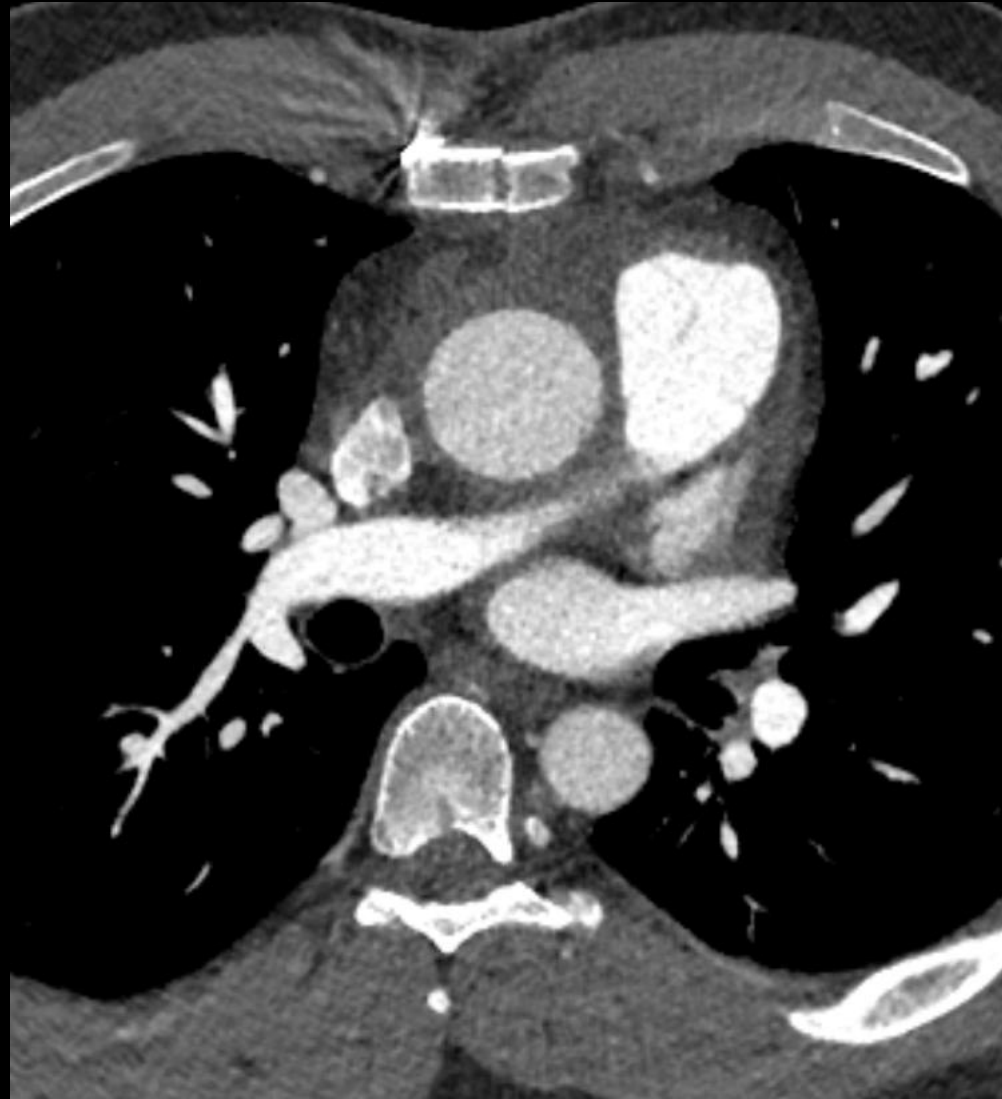
L

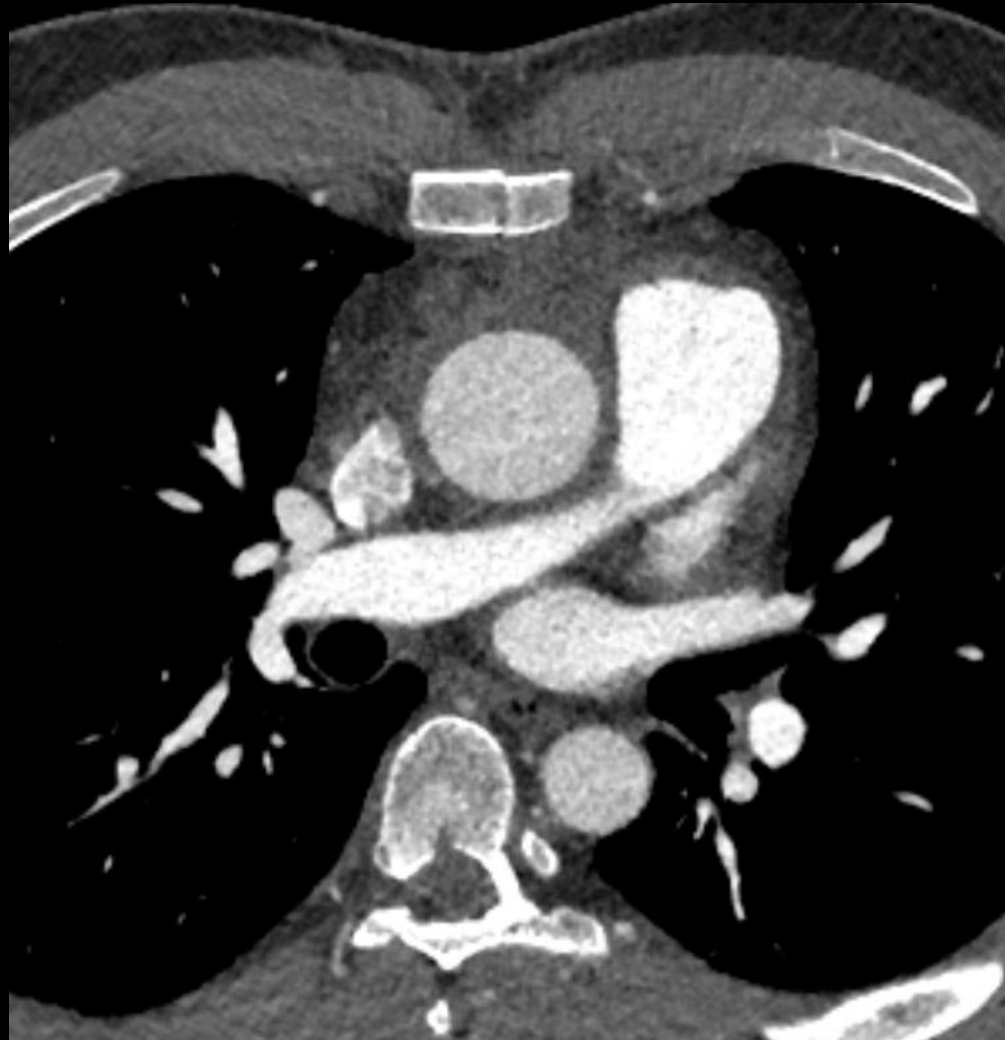
Young Man Acute Chest Pain

?PE for CT PA

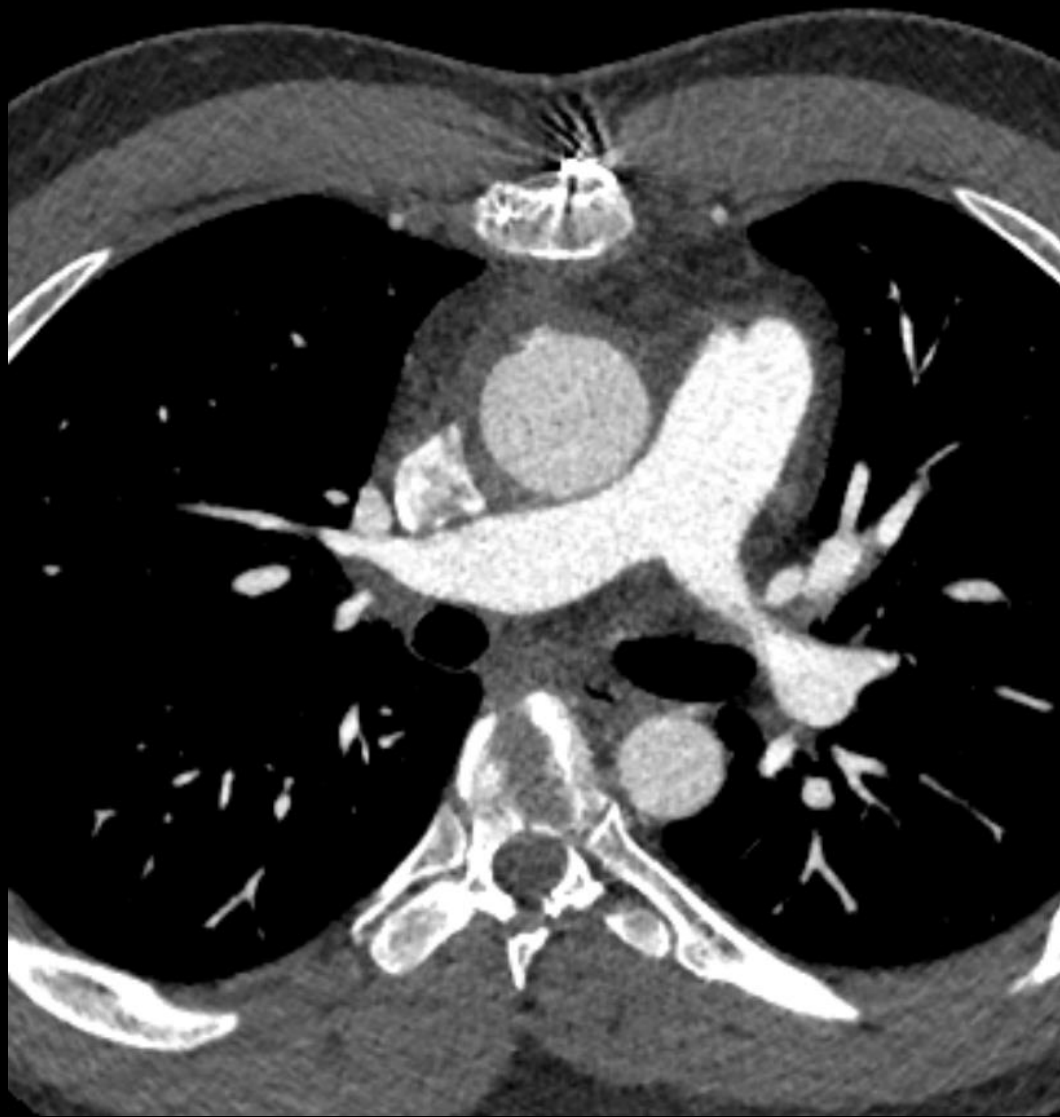


Acute Chest pain - CT PA







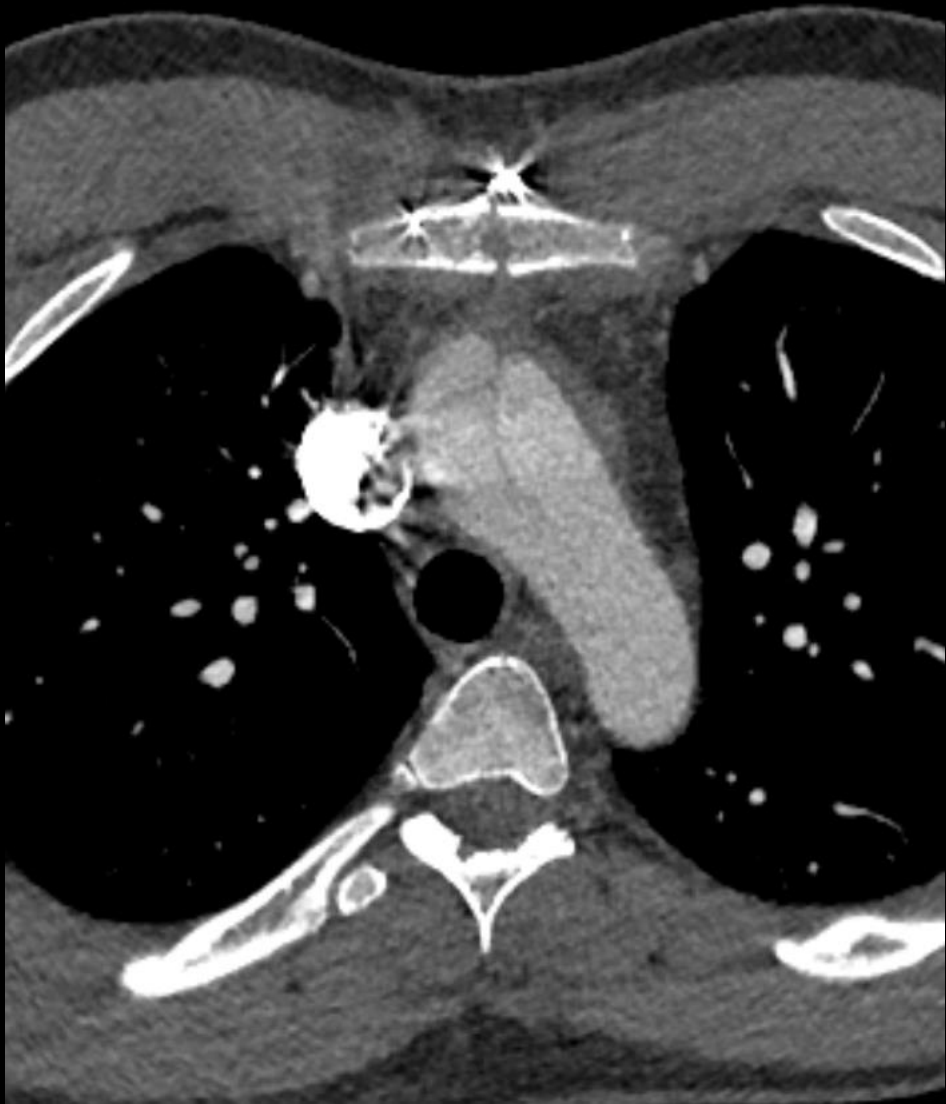


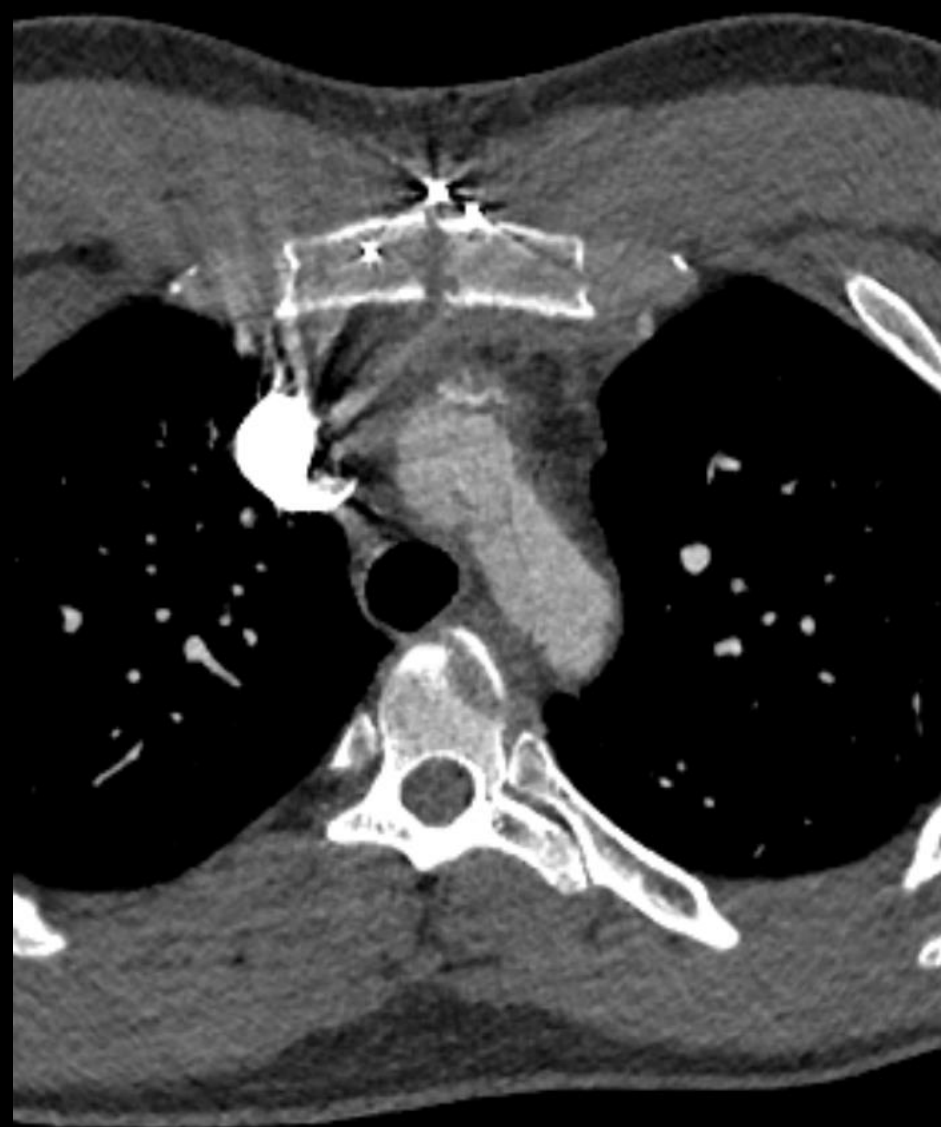








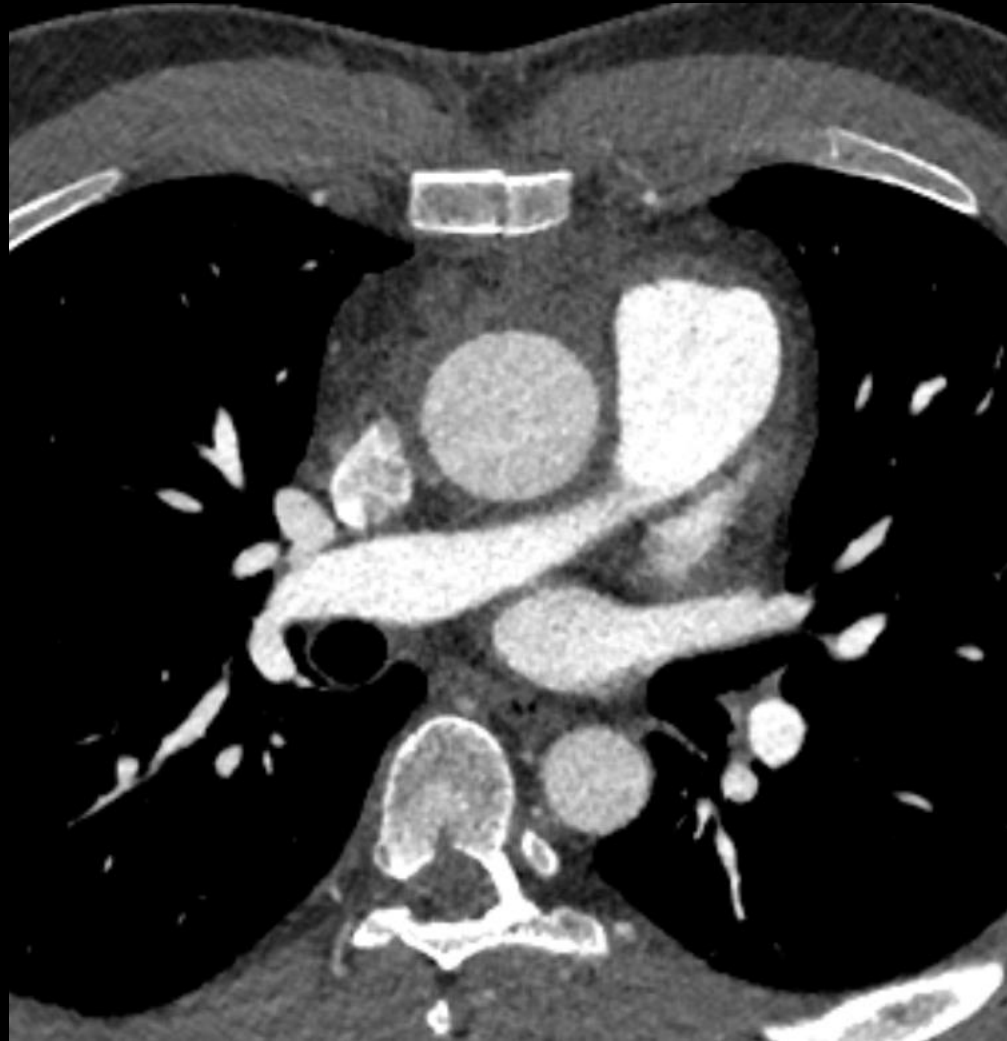




What is the diagnosis

Acute Chest pain - CT PA

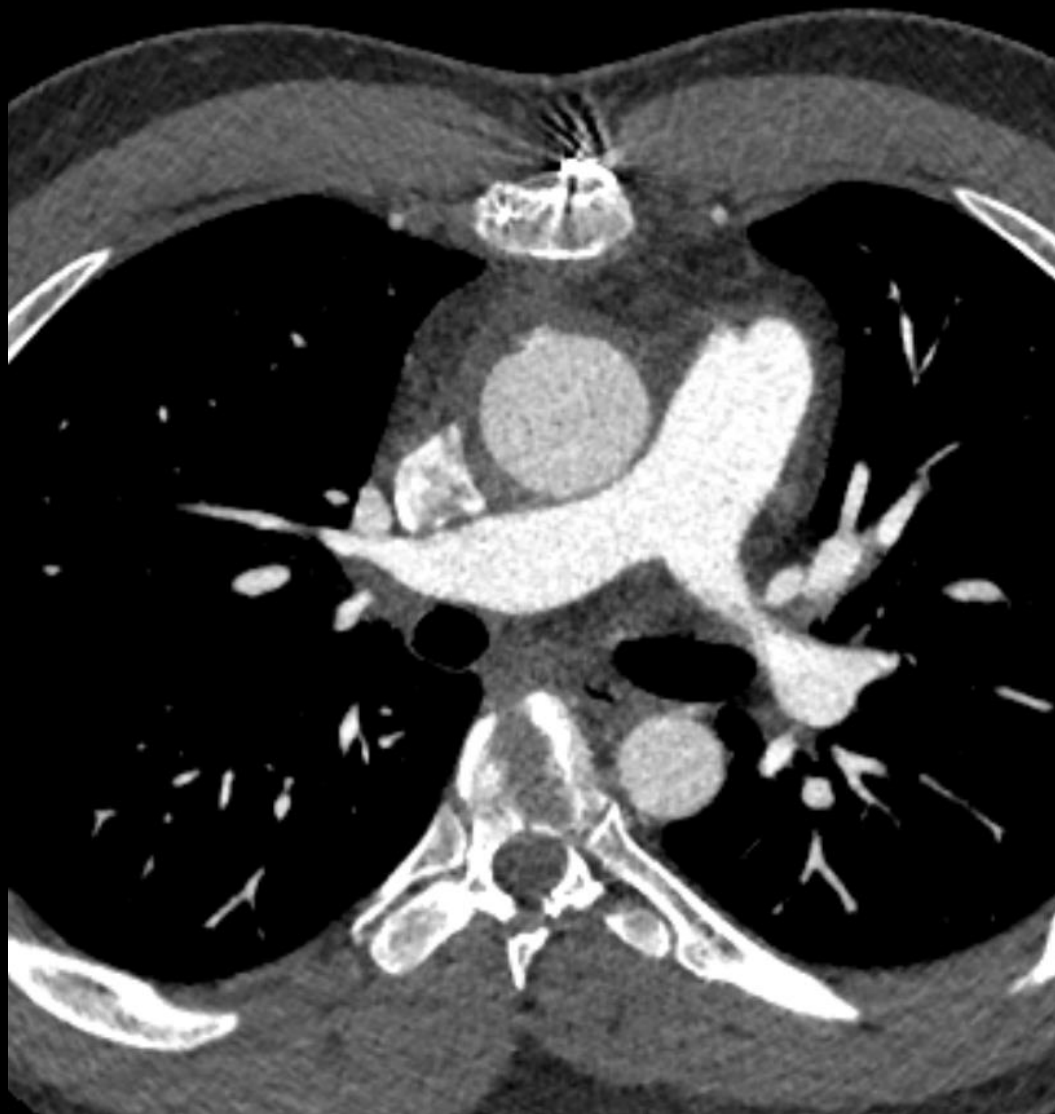




No PE



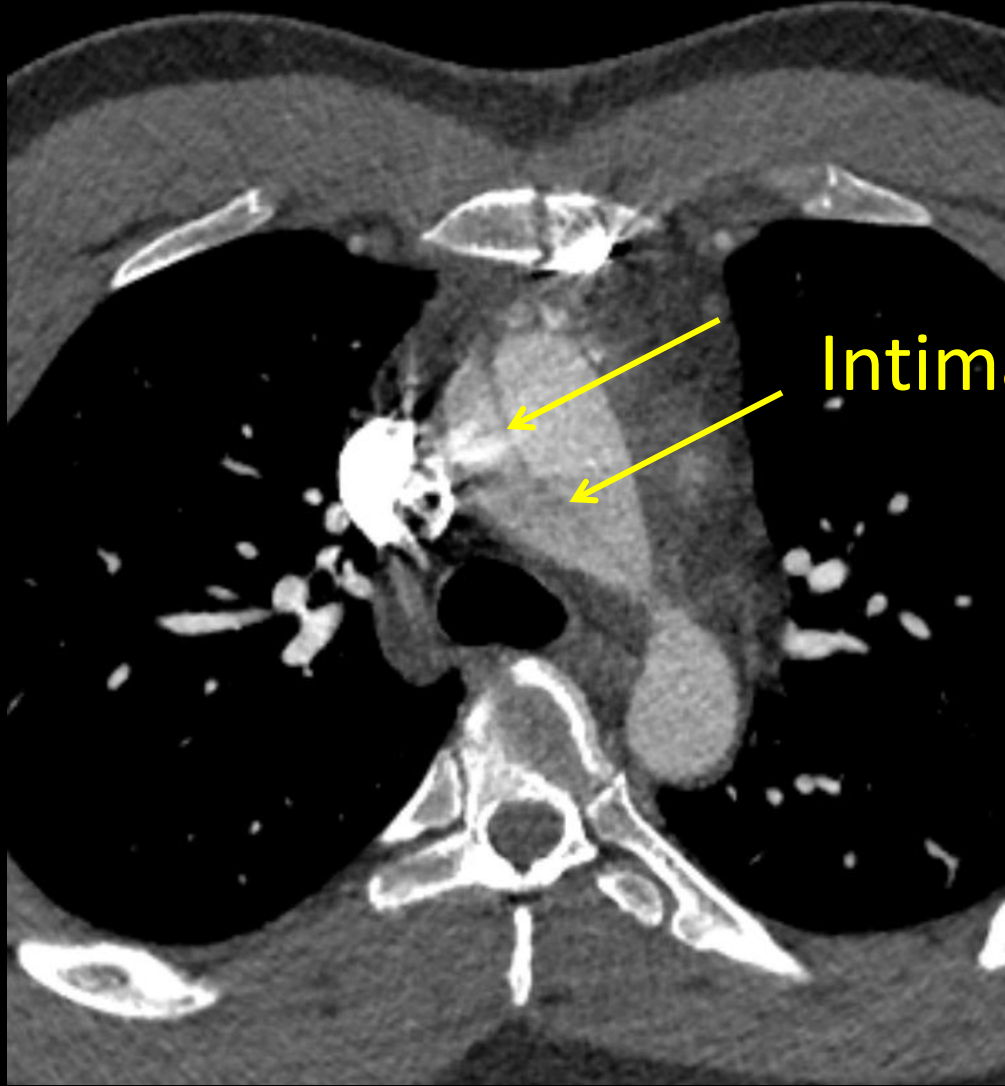
No PE



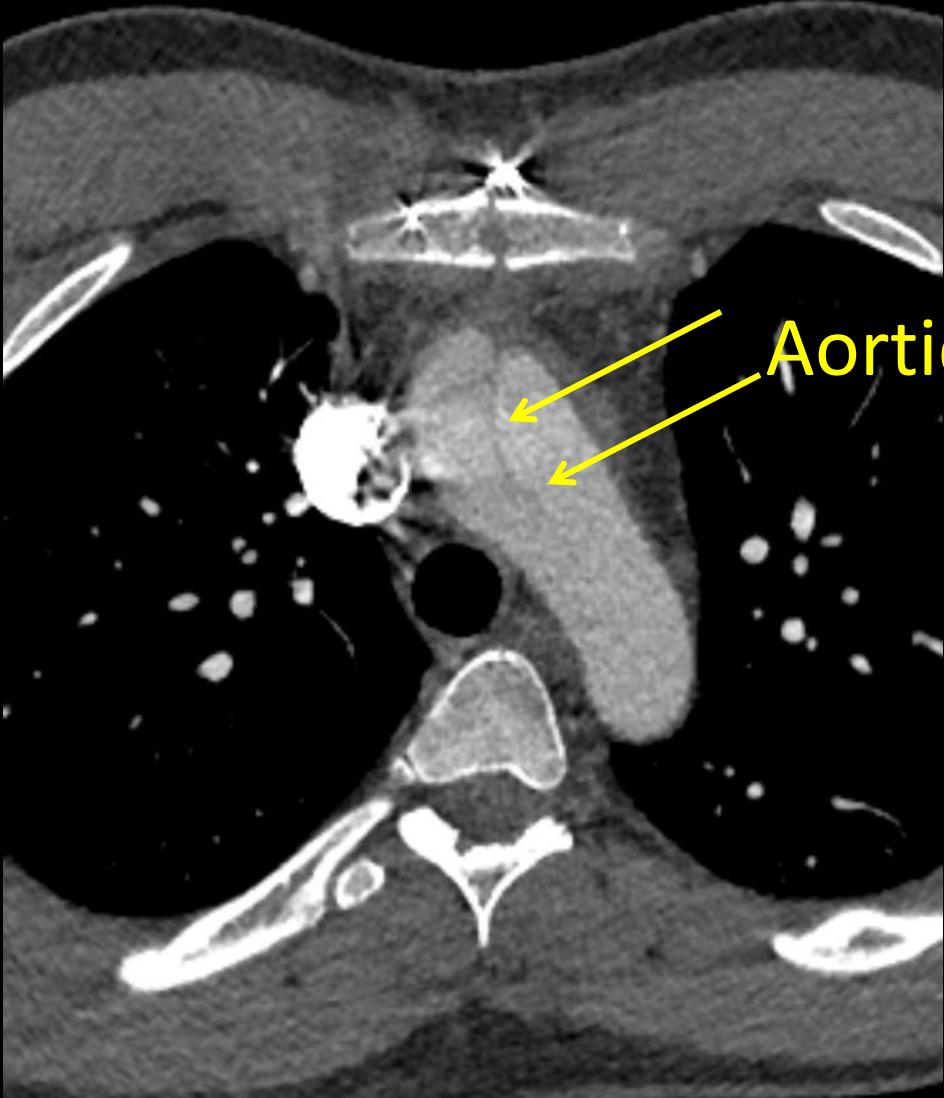




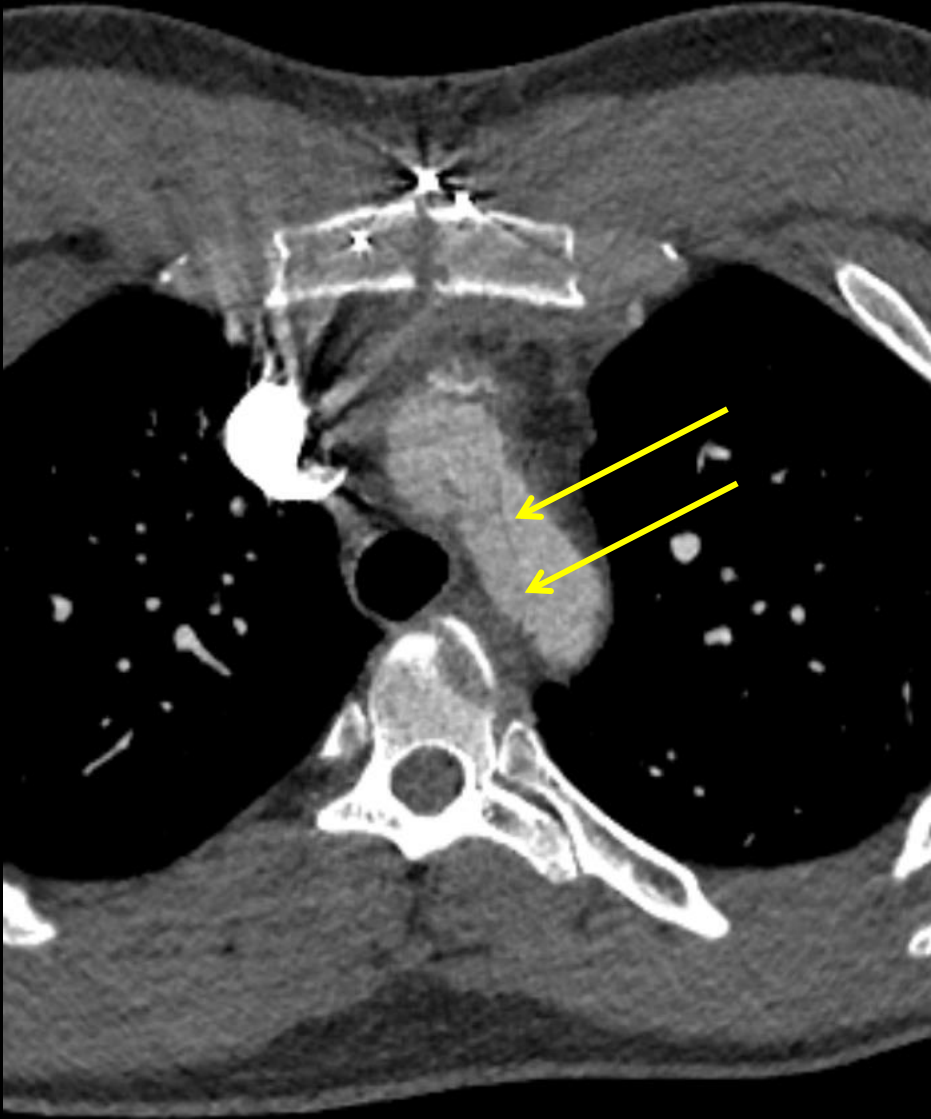




Intimal flap



Aortic Dissection



Elderly man, Severe 'tearing', interscapular chest pain



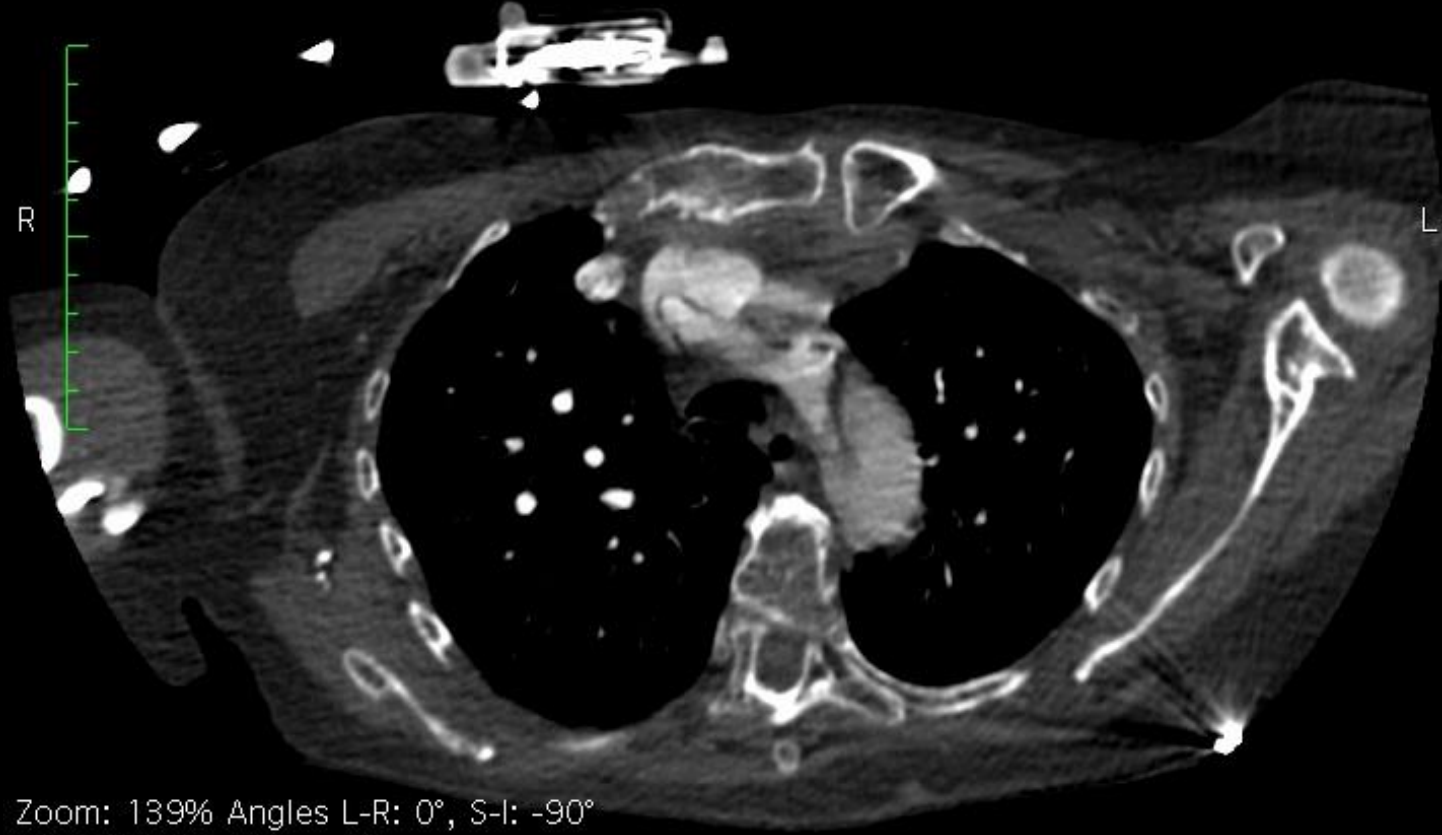
Thanks to Dr John Curtis, Aintree University Hospital, UK

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5

'Tearing' interscapular severe Chest Pain

DOUBLE RULE OUT



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 597/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
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Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5

DOUBLE RULE OUT



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 592/706 S (L → S)

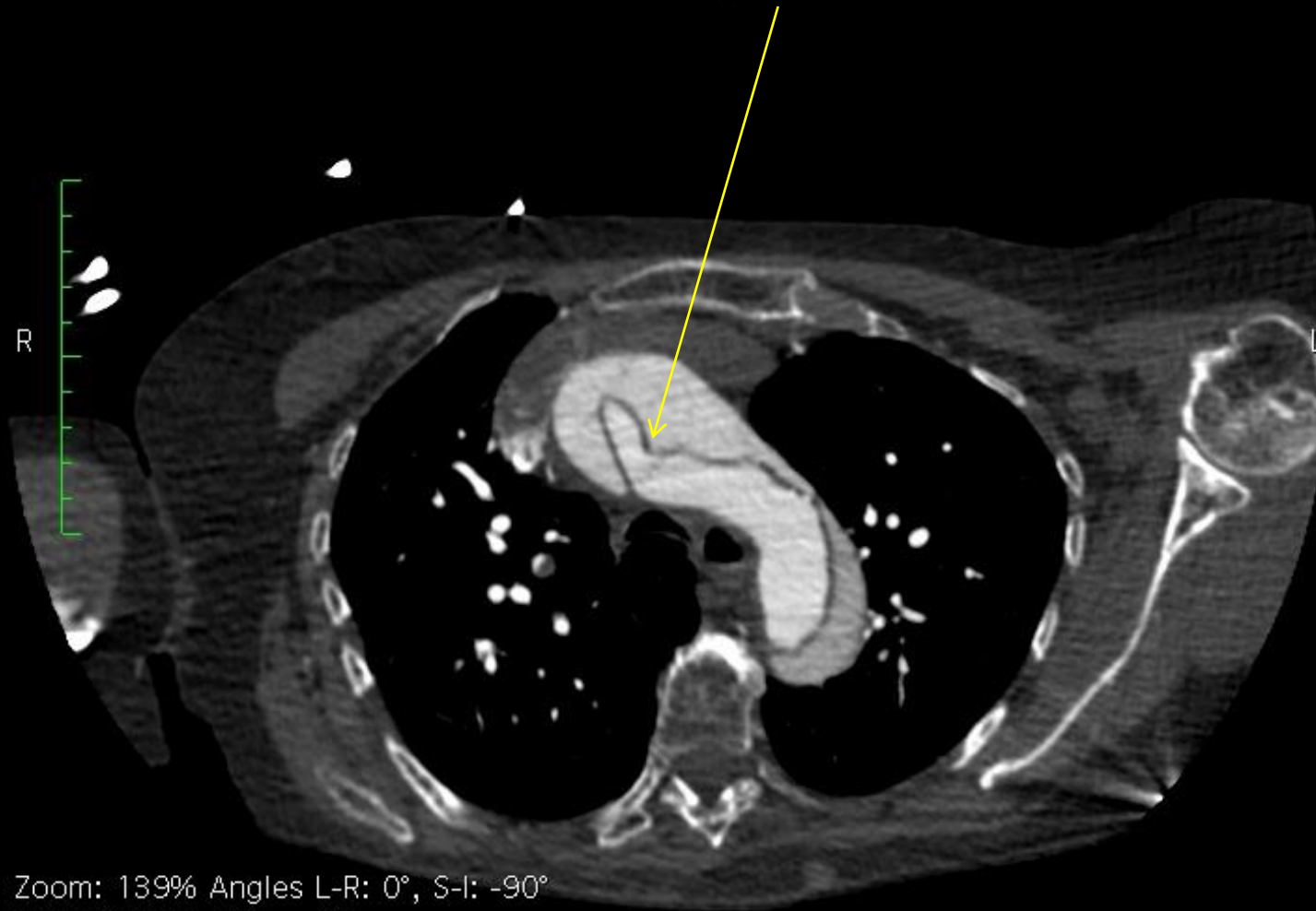
Thanks to Dr John Curtis, Aintree University Hospital, UK

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Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5

ASCENDING AORTA



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 581/706 S (L - S)

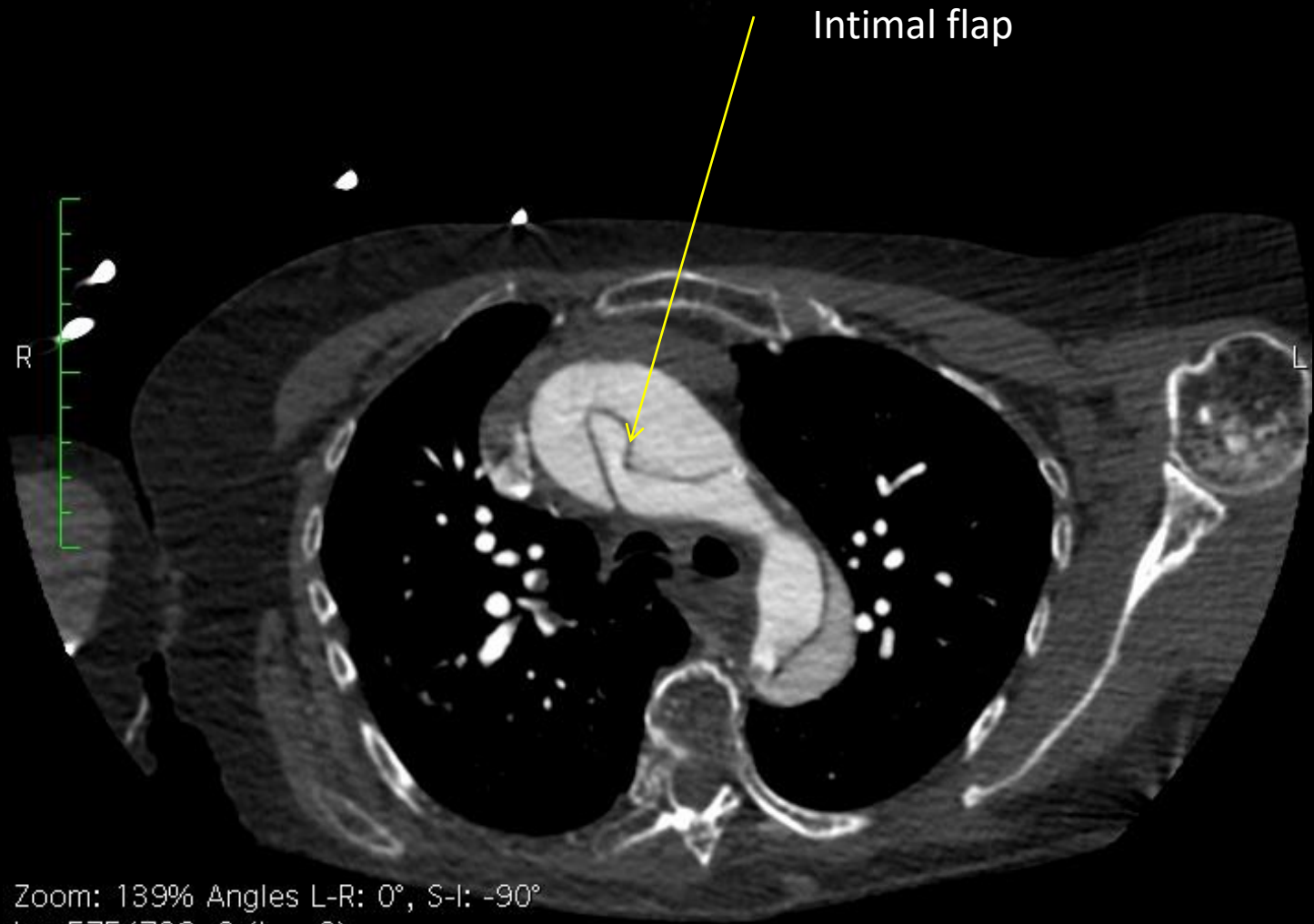
Thanks to Dr John Curtis, Aintree University Hospital, UK

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Thickness: 1.00 mm Location: 1735.50 mm

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



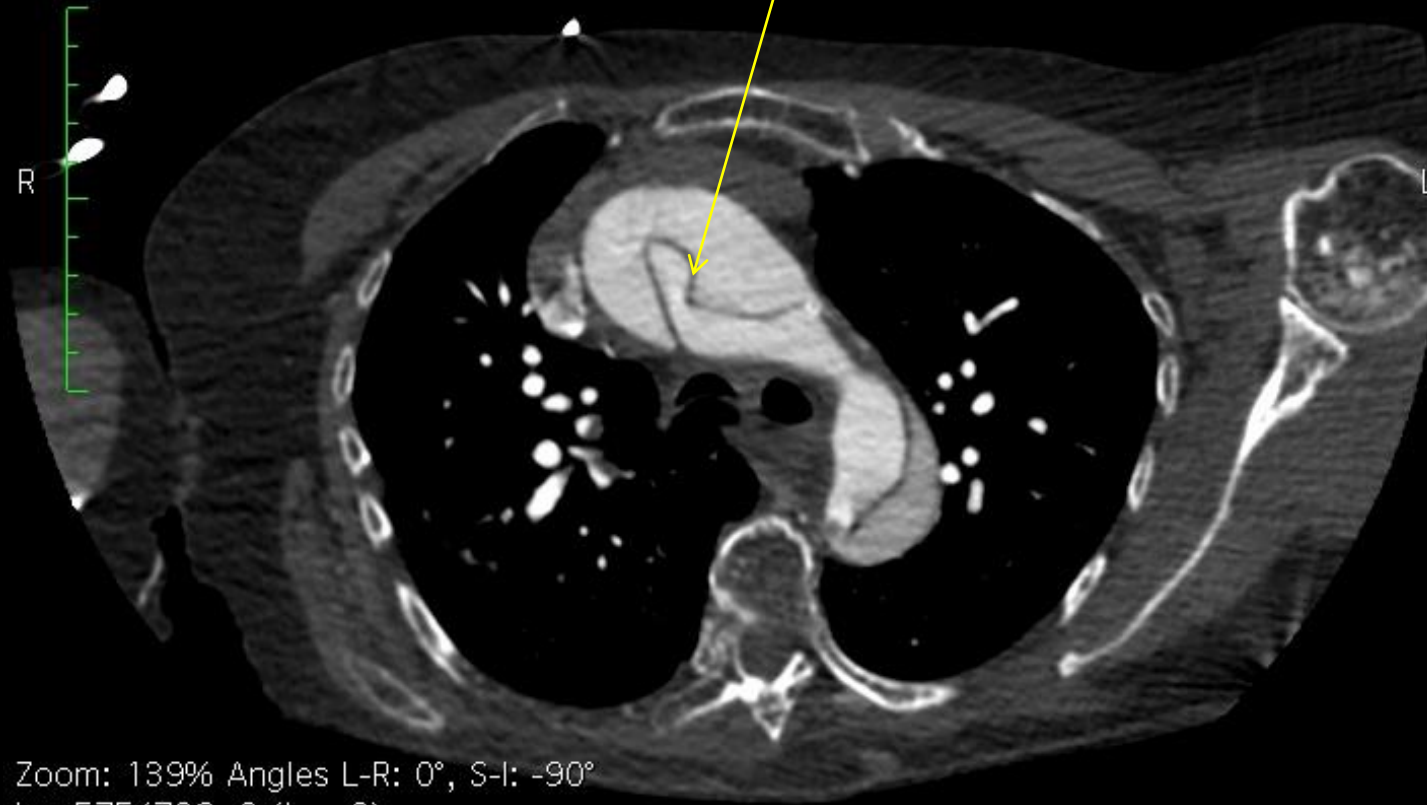
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 575/706 S (L → S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

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AORTIC DISSECTION

Intimal flap



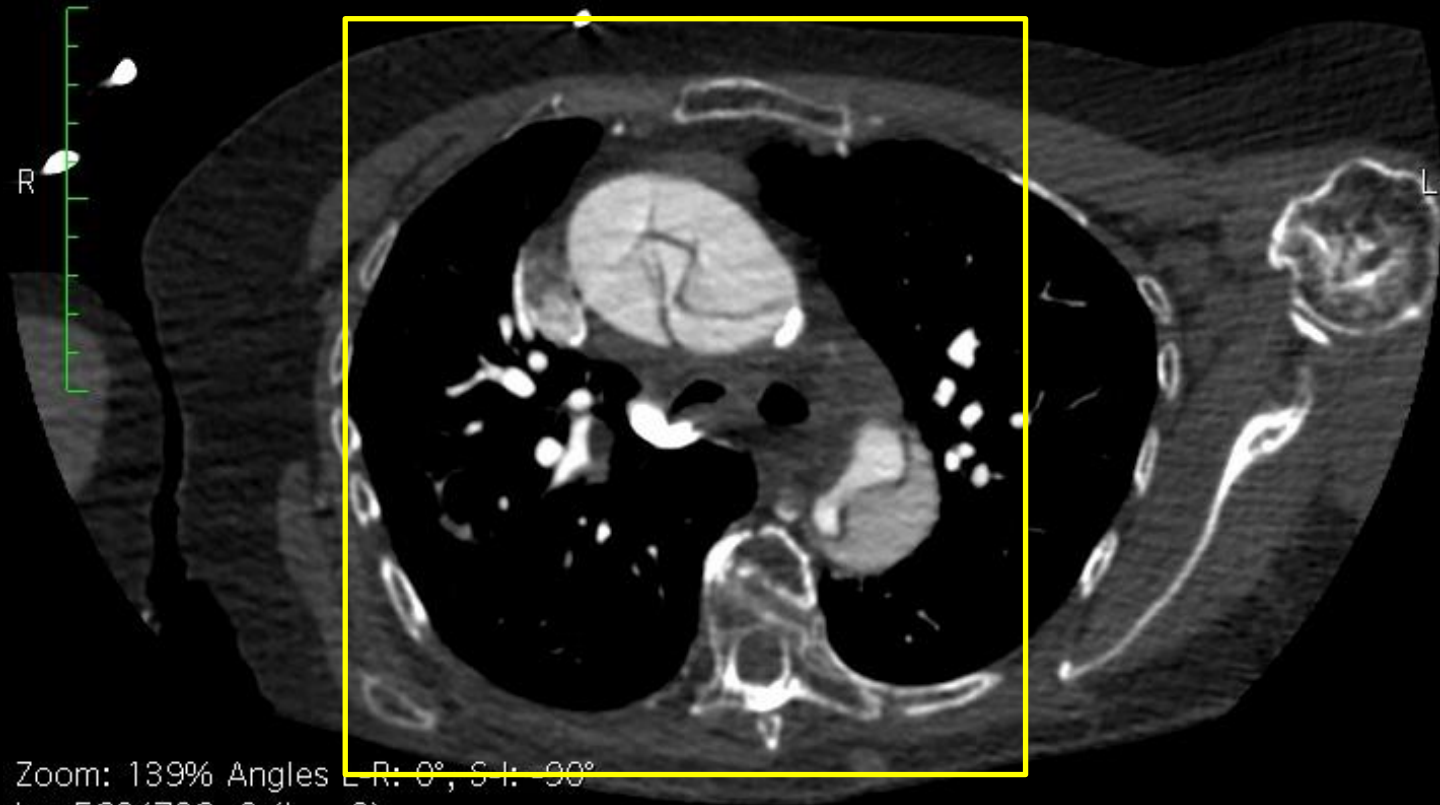
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 575/706 S (L → S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: 90°
Im: 569/706 S (L→S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

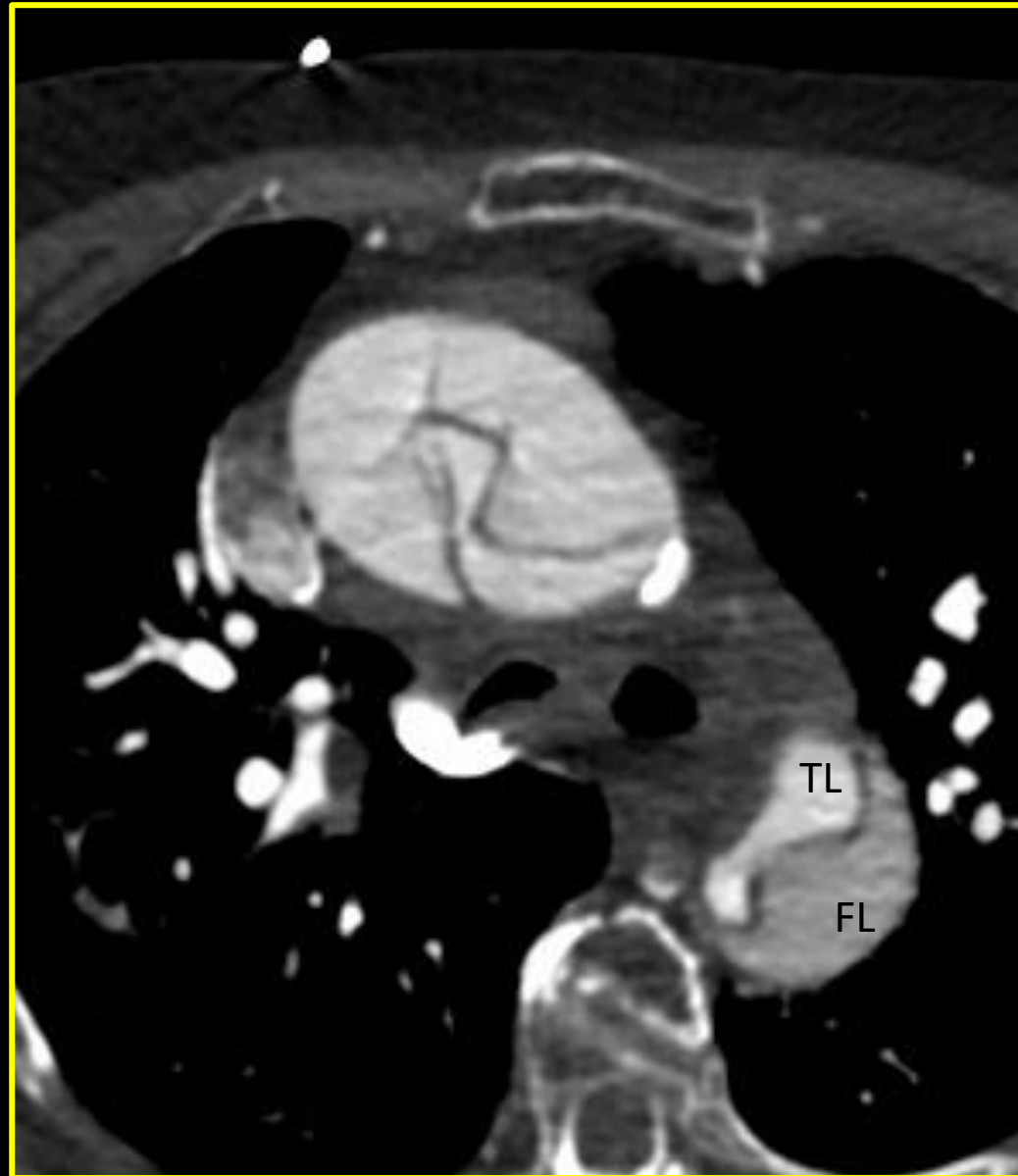
14/04/2016 04:21:40
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Which is the true lumen



True Lumen
Central
More dense

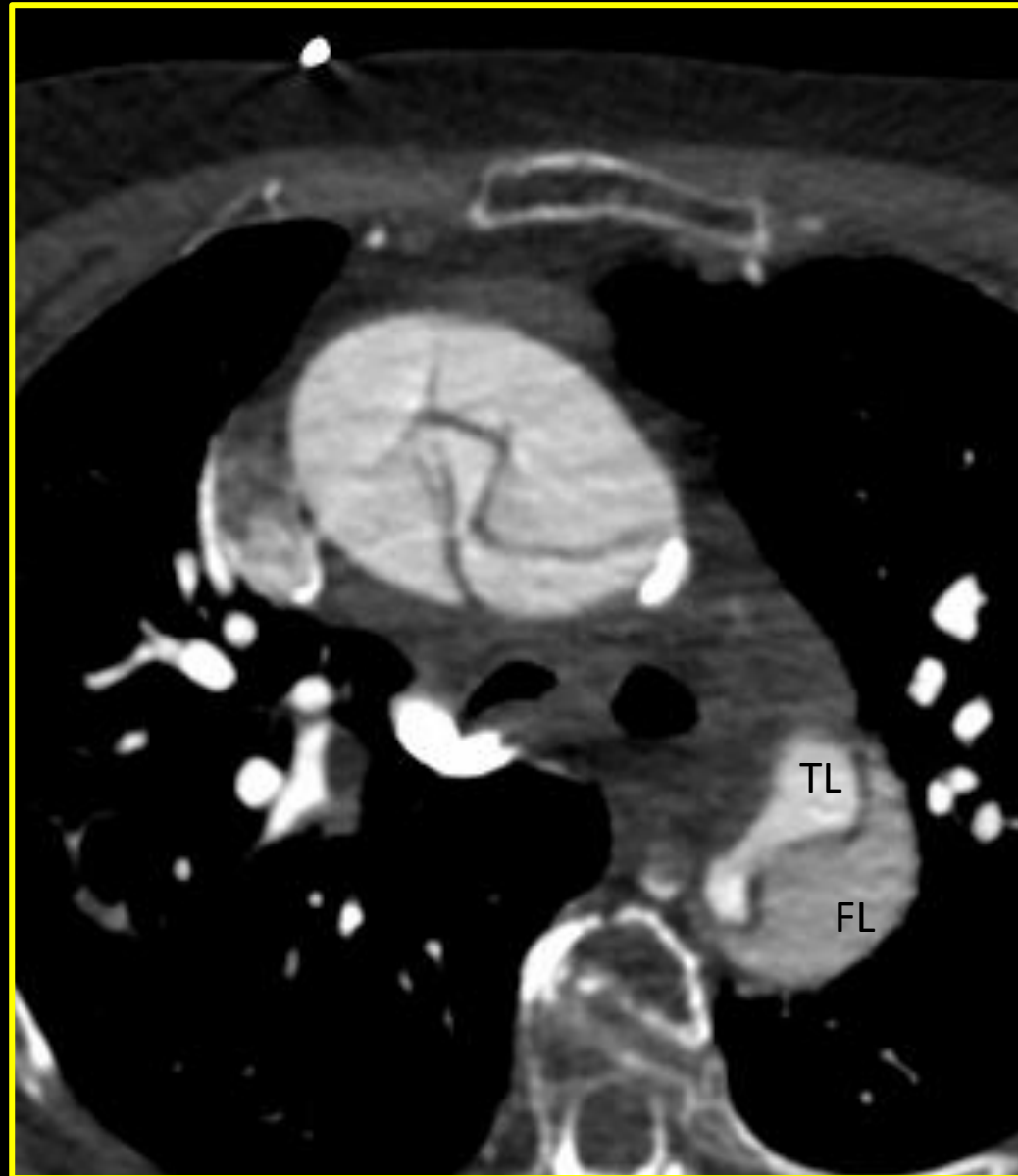
False Lumen
Webs
Less dense
'beak'



Thanks to Dr John Curtis, Aintree University Hospital, UK

True Lumen
Central
More dense

False Lumen
Webs
Less dense
'beak'



Thanks to Dr John Curtis, Aintree University Hospital, UK

True Lumen
Central
More dense

False Lumen
Webs
Less dense
'beak'

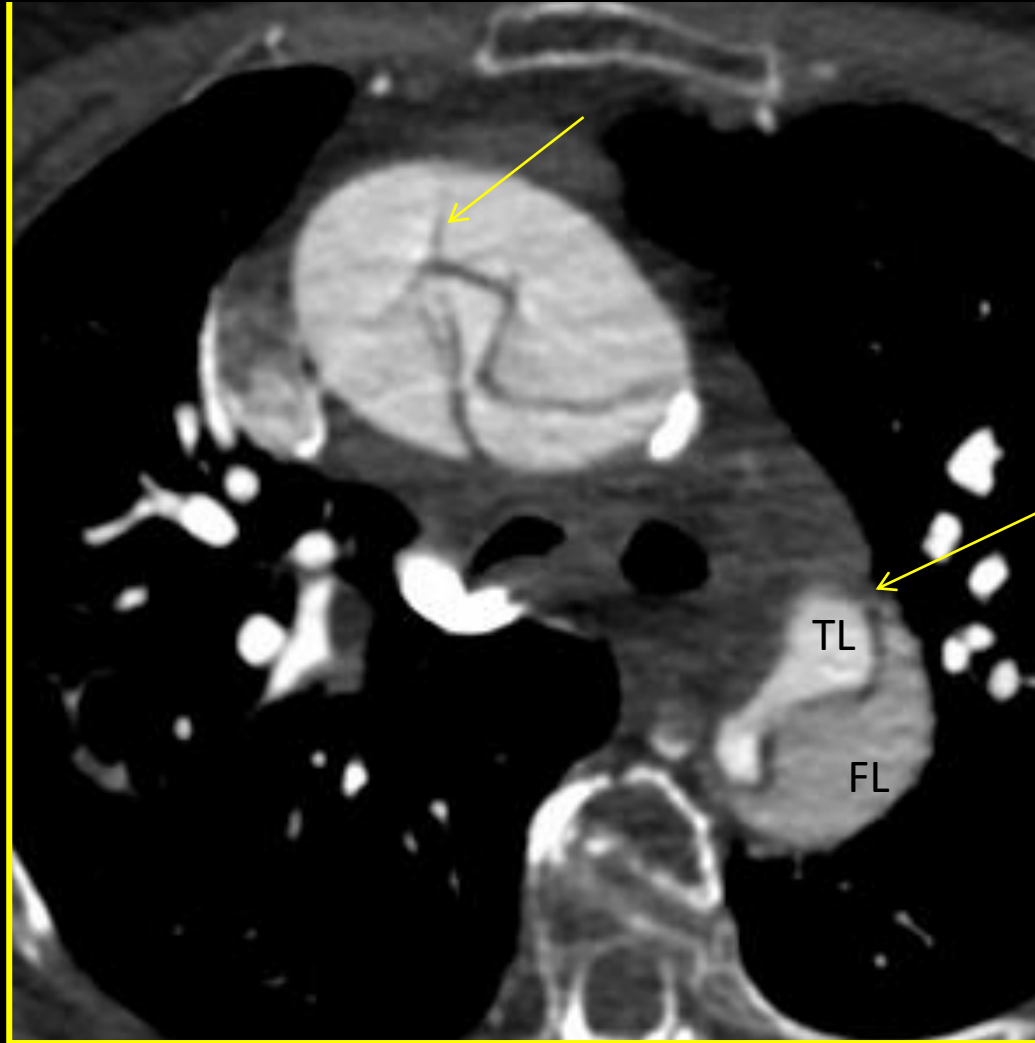


Thanks to Dr John Curtis, Aintree University Hospital, UK

which lumen is generally smaller? False or true lumen?

True Lumen
Central
More dense

False Lumen
Webs
Less dense
'beak'



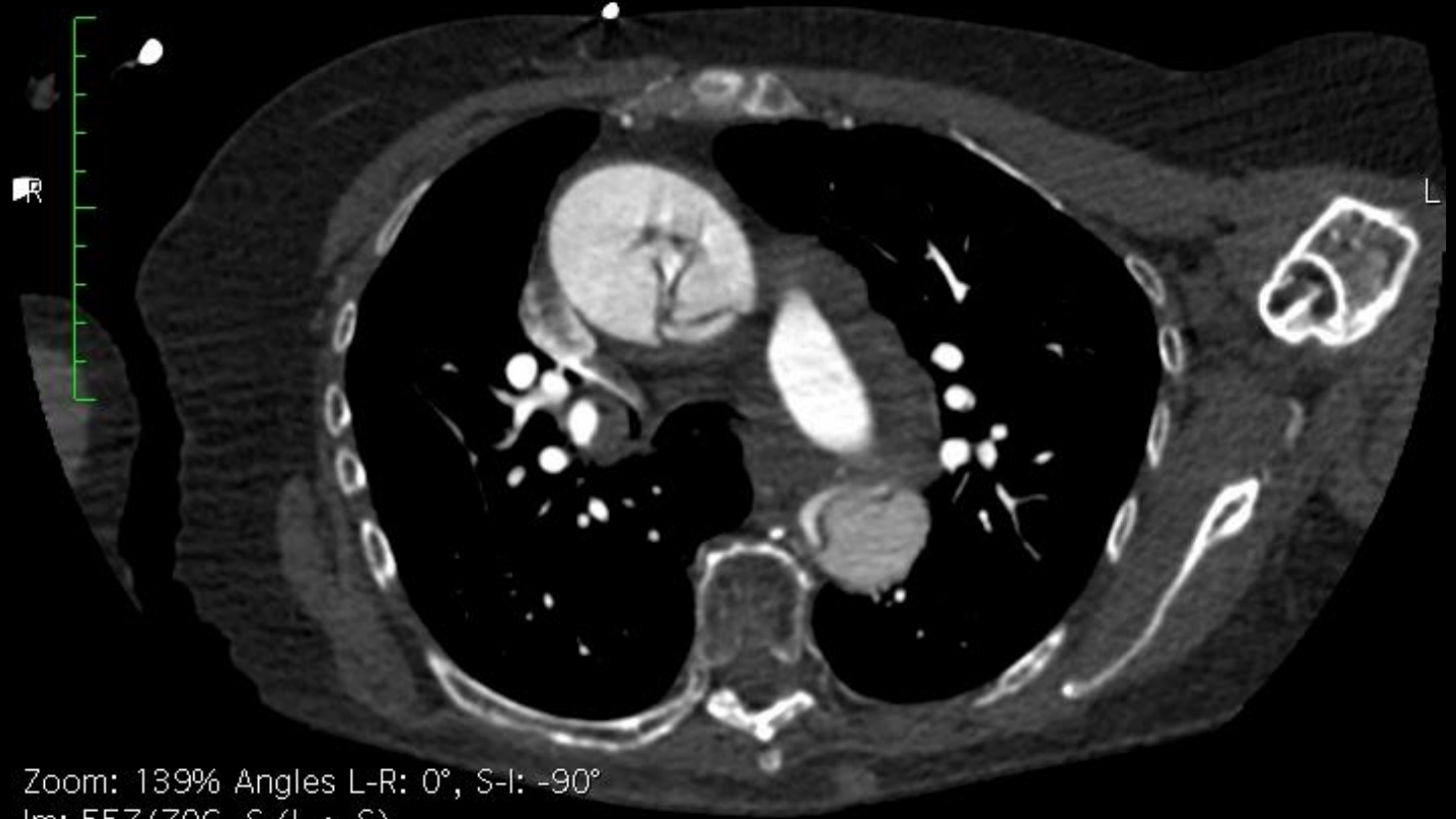
Thanks to Dr John Curtis, Aintree University Hospital, UK

what are the signs of a poor prognosis?

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5

FL near obliterates TL



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 557/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

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Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



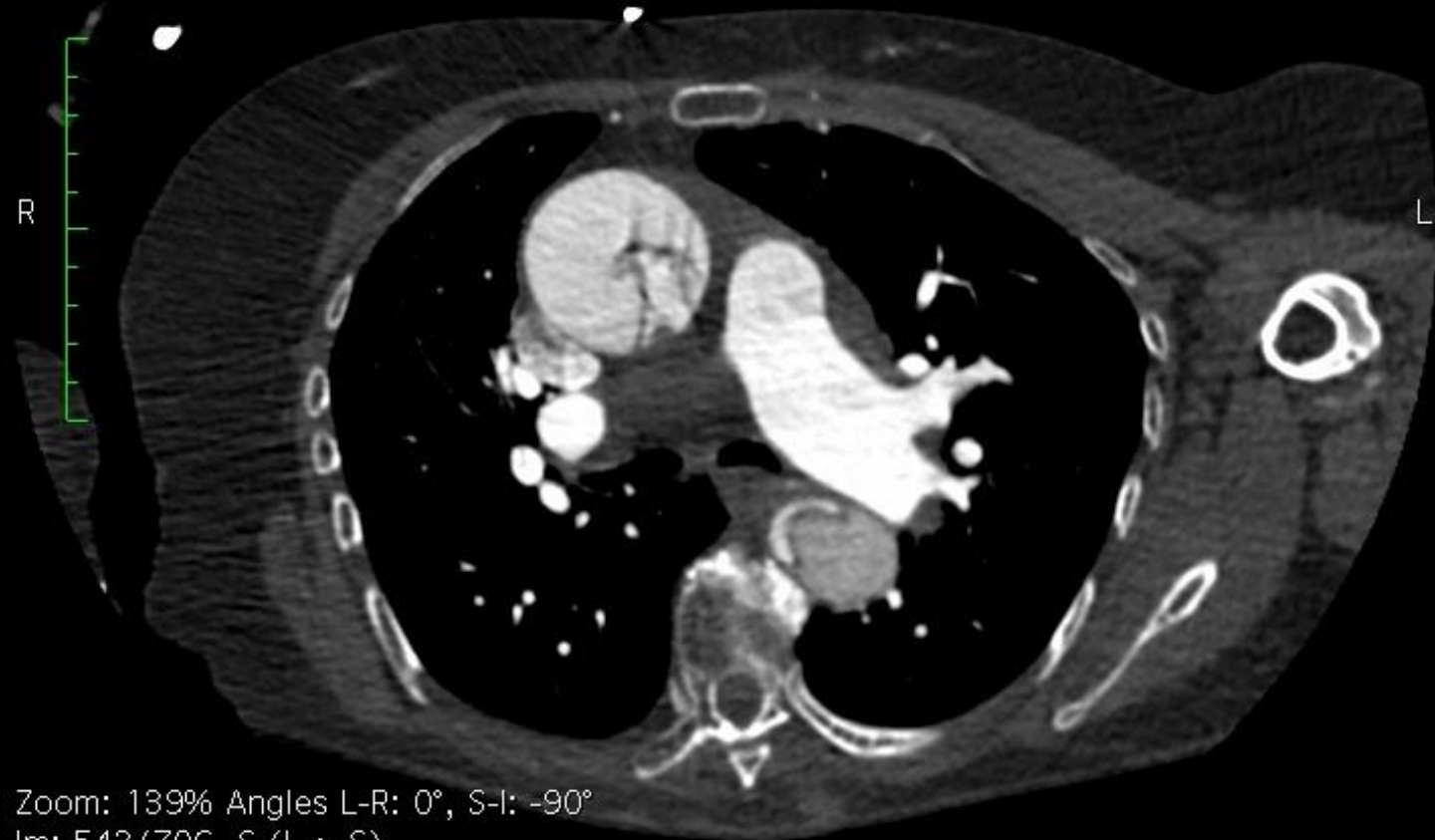
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 553/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 543/706 S (L → S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 538/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

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Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



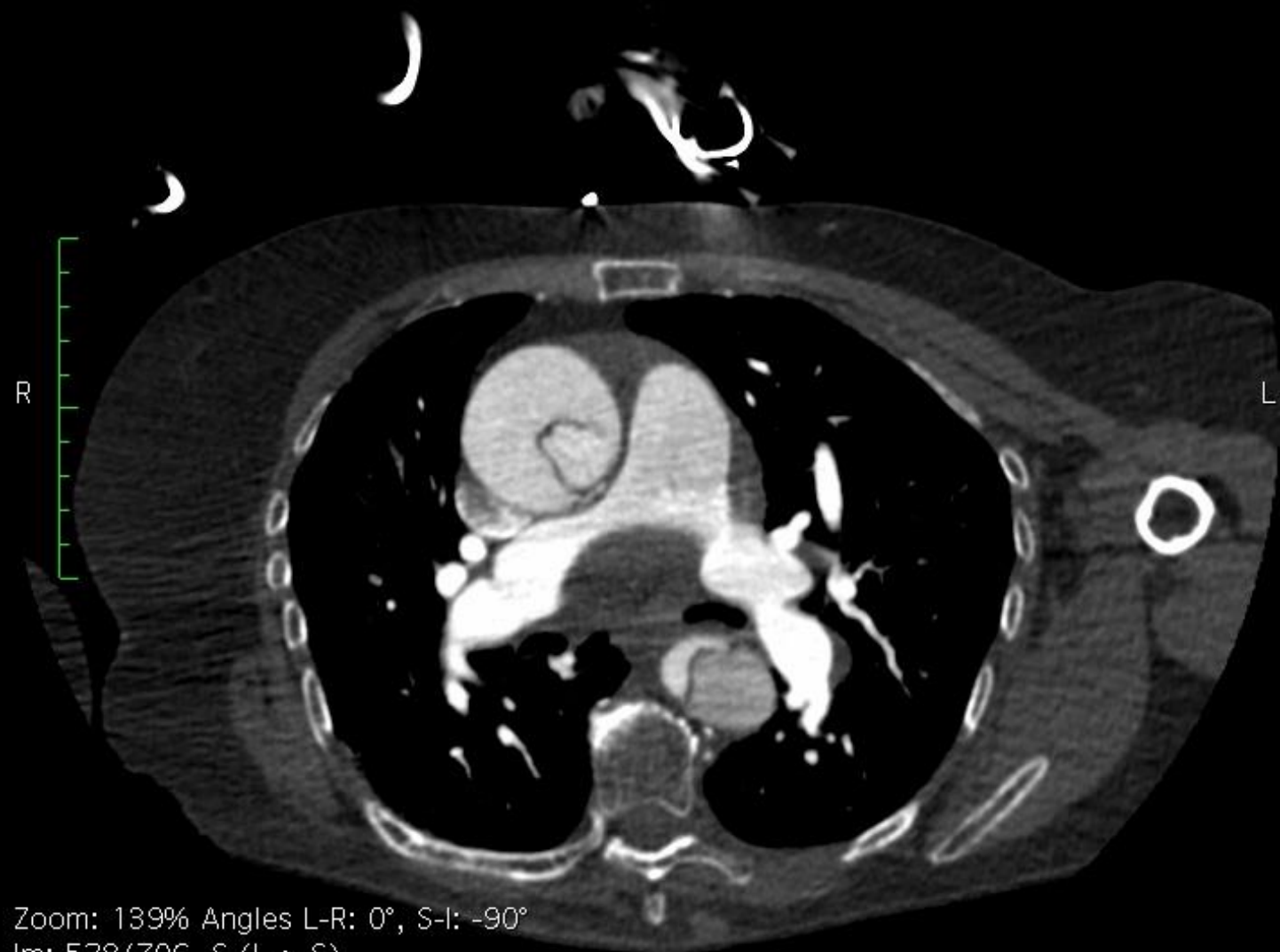
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 532/706 S (L → S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 528/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

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Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



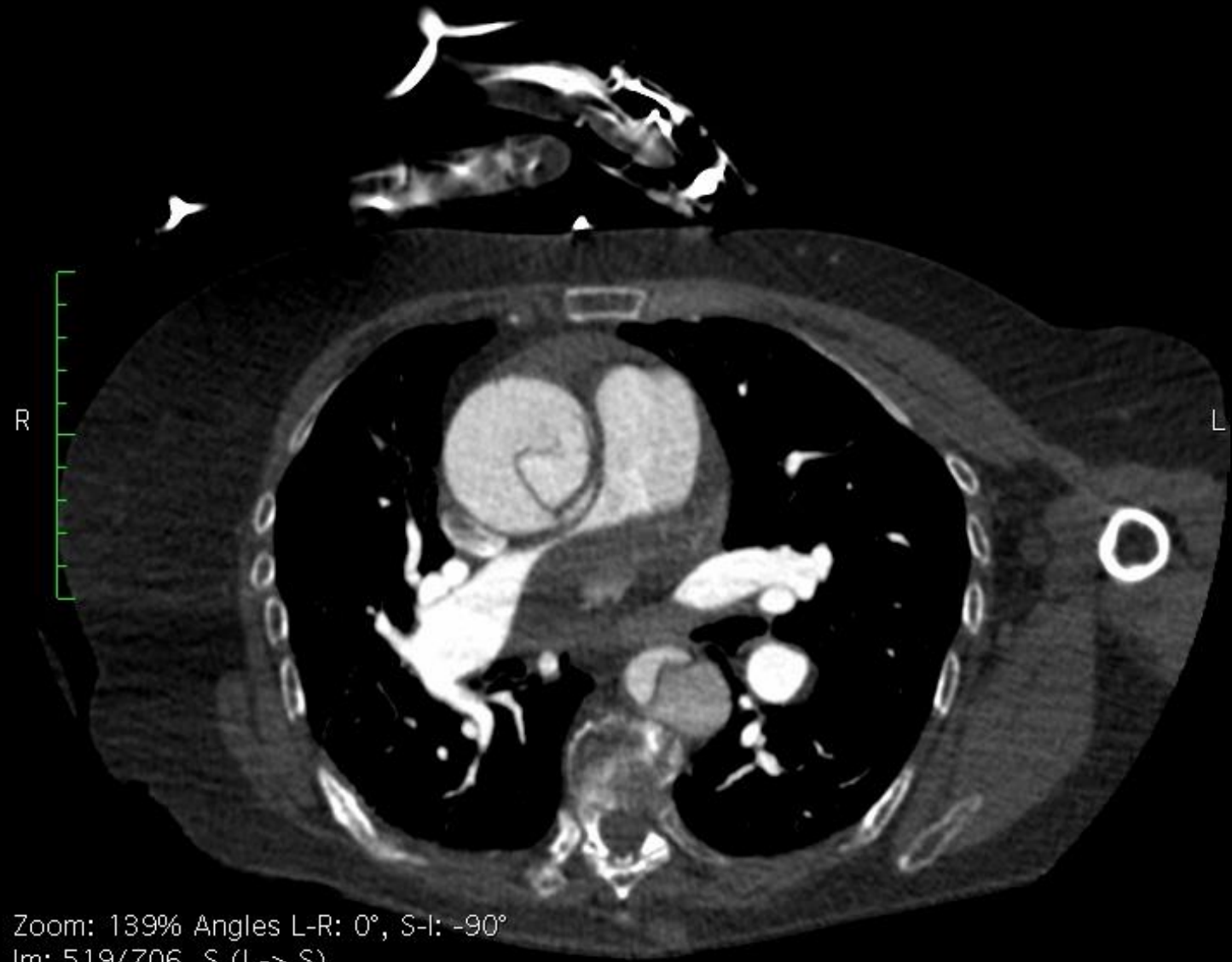
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 523/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



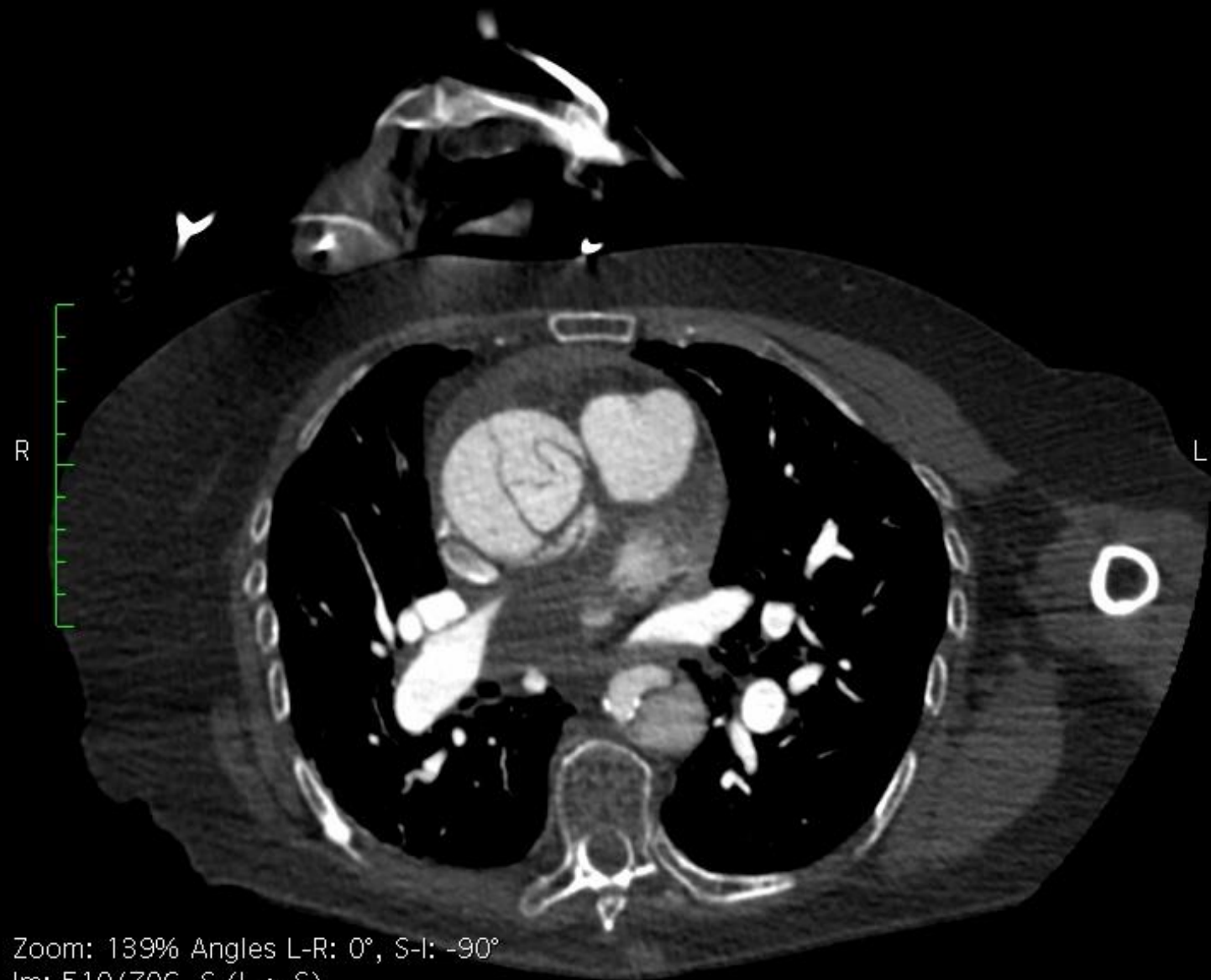
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 519/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

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Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



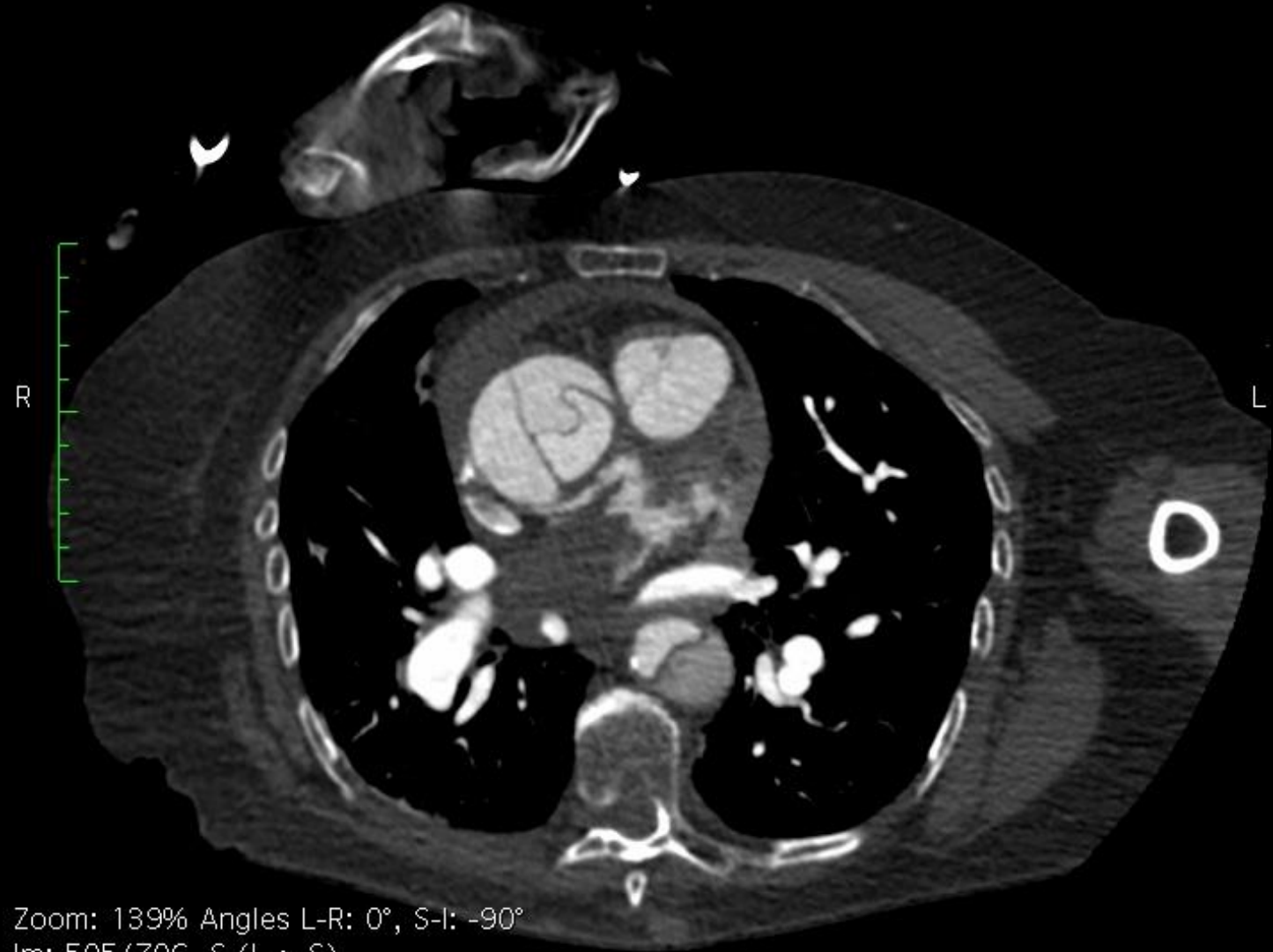
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 510/706 S (L → S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 505/706 S (L -> S)

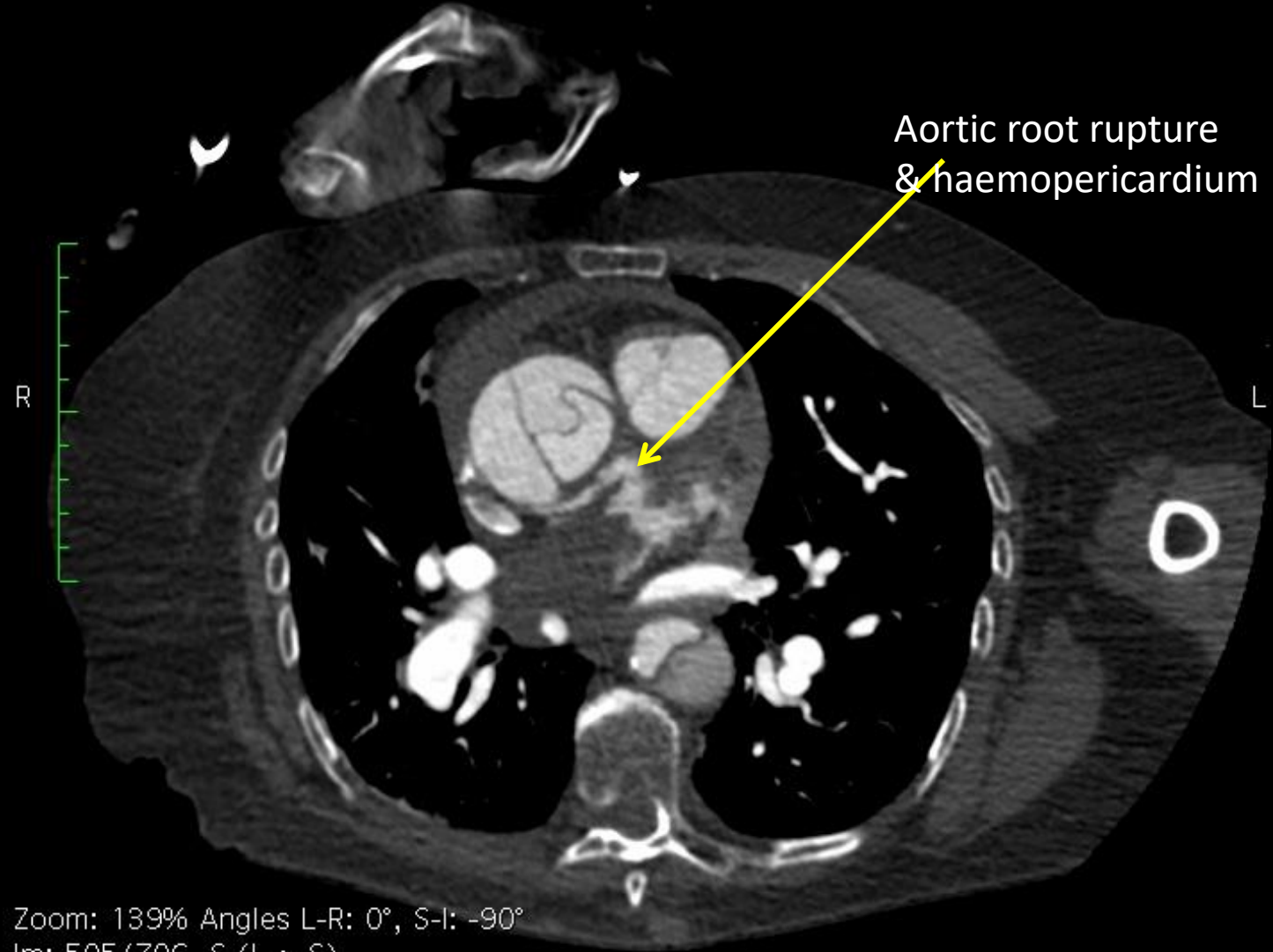
Thanks to Dr John Curtis, Aintree University Hospital, UK

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what are the signs of a poor prognosis?

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



Aortic root rupture
& haemopericardium

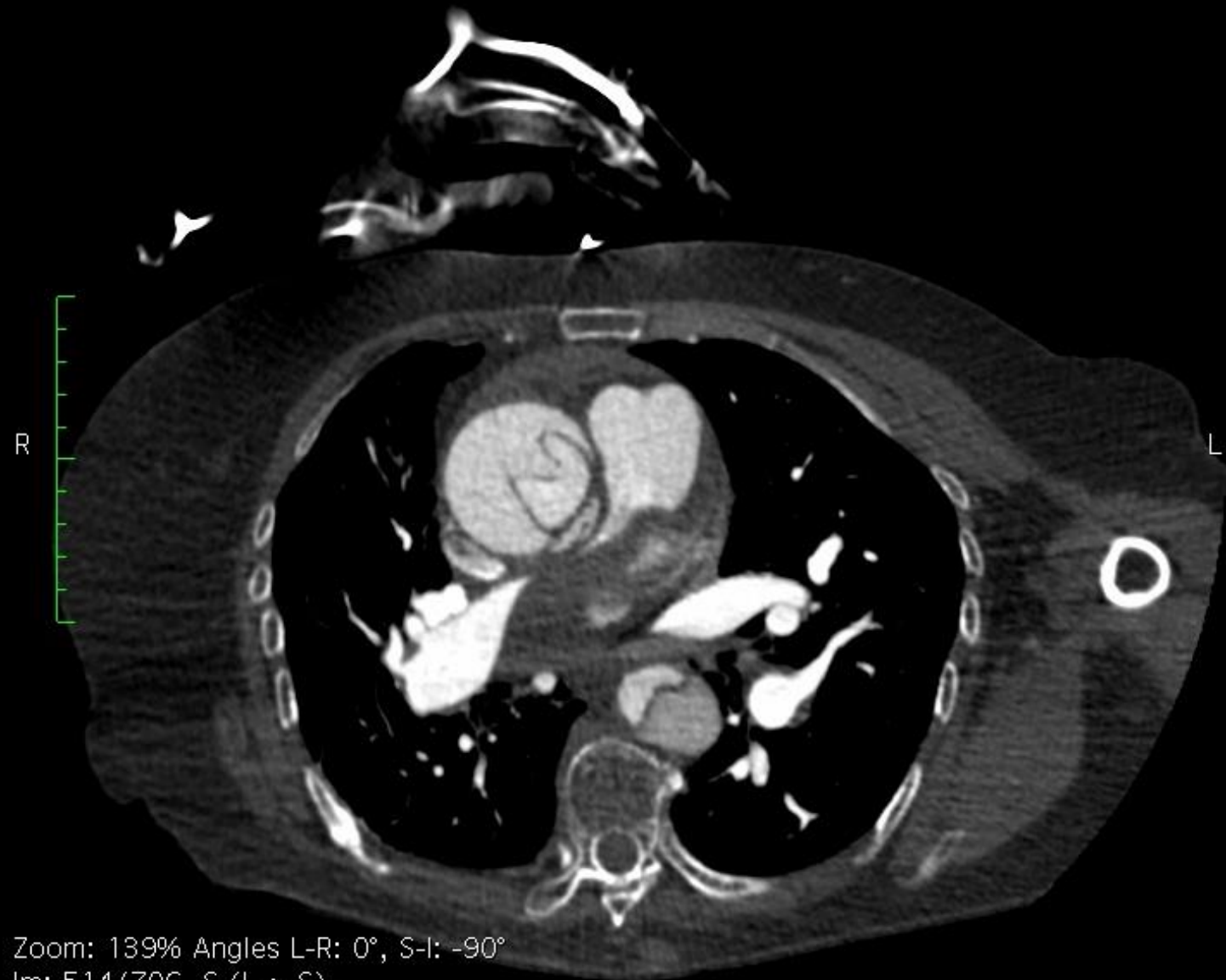
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 505/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



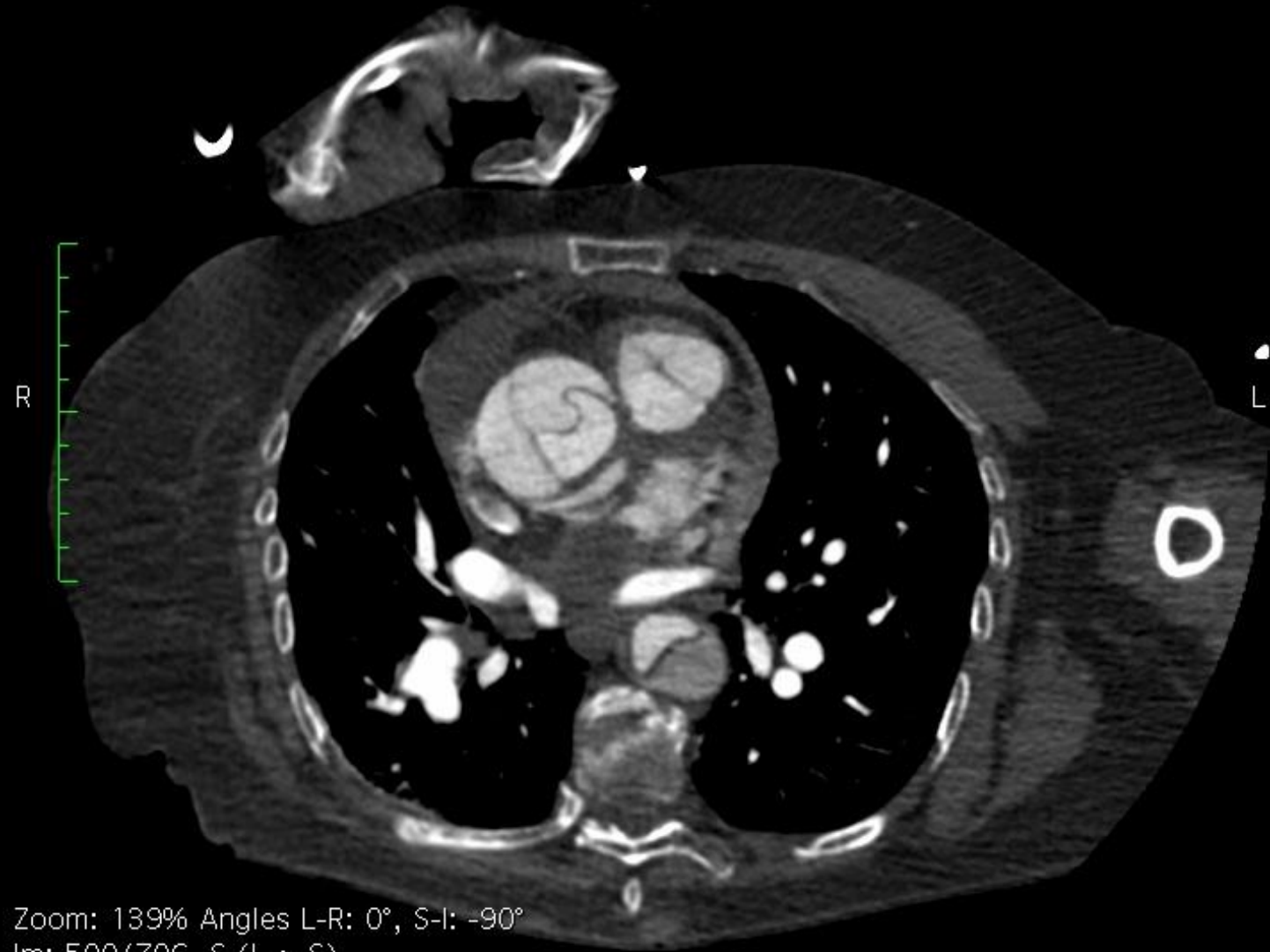
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 514/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



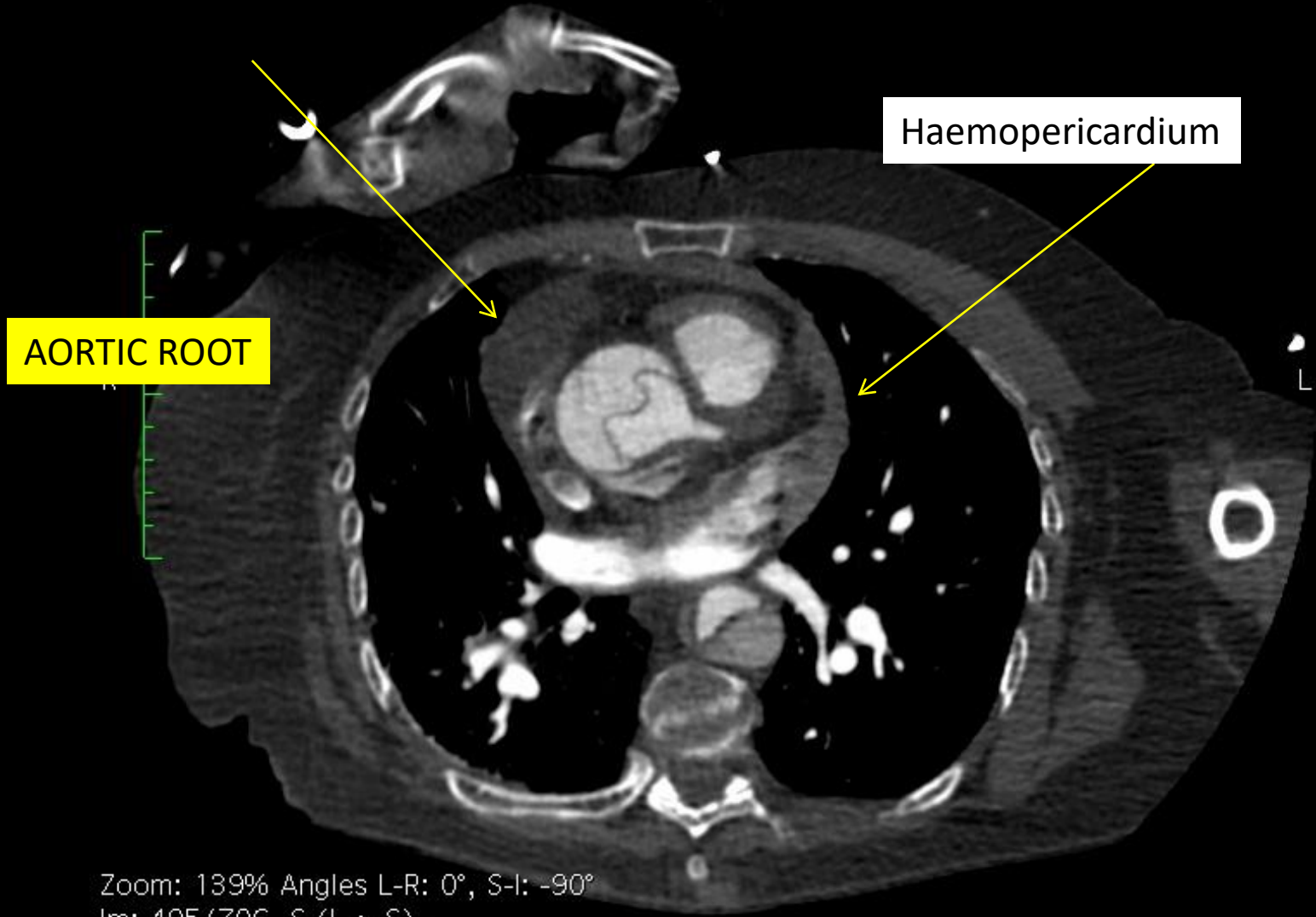
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 500/706 S (L → S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5

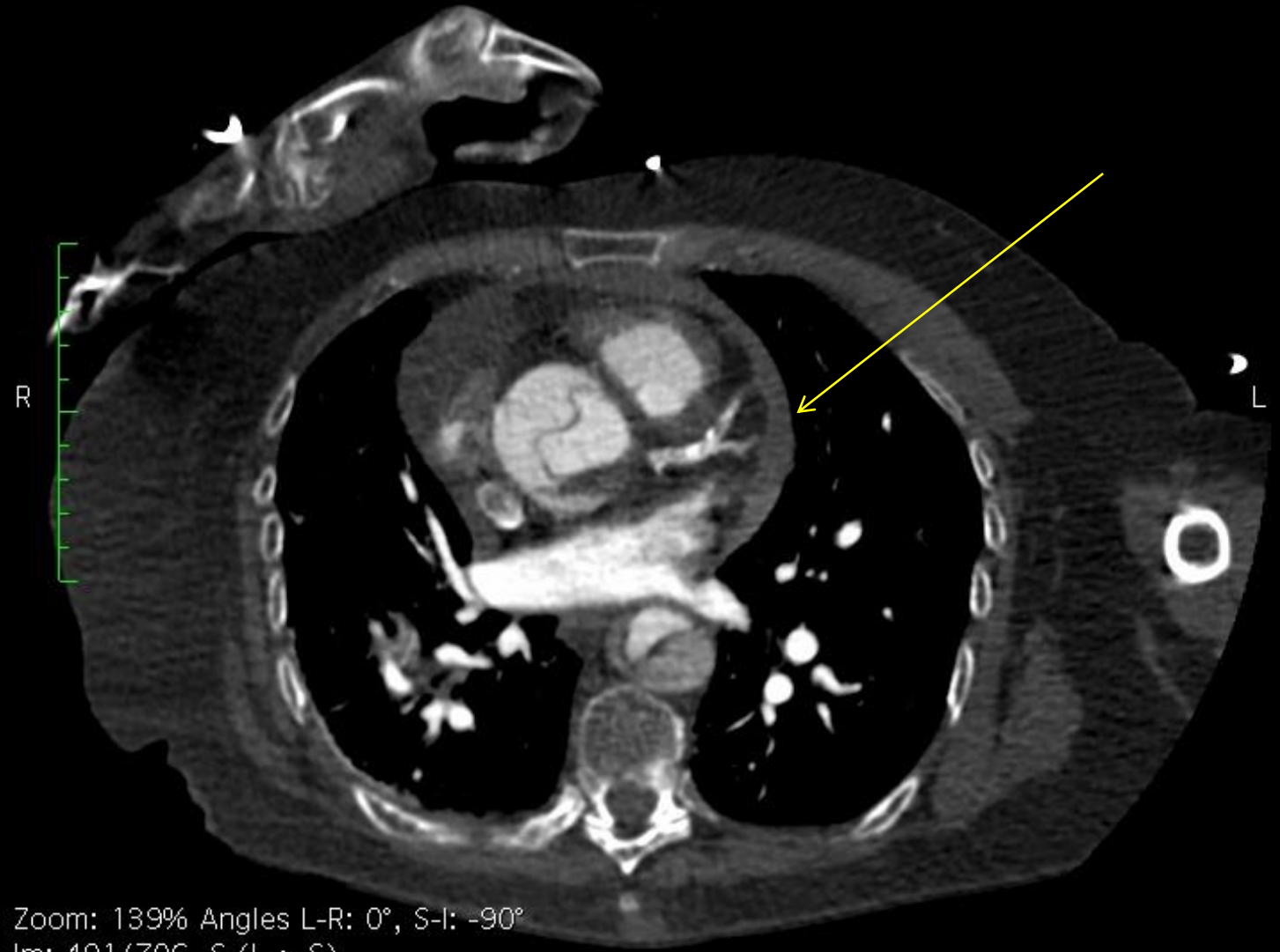


Thanks to Dr John Curtis, Aintree University Hospital, UK

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Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



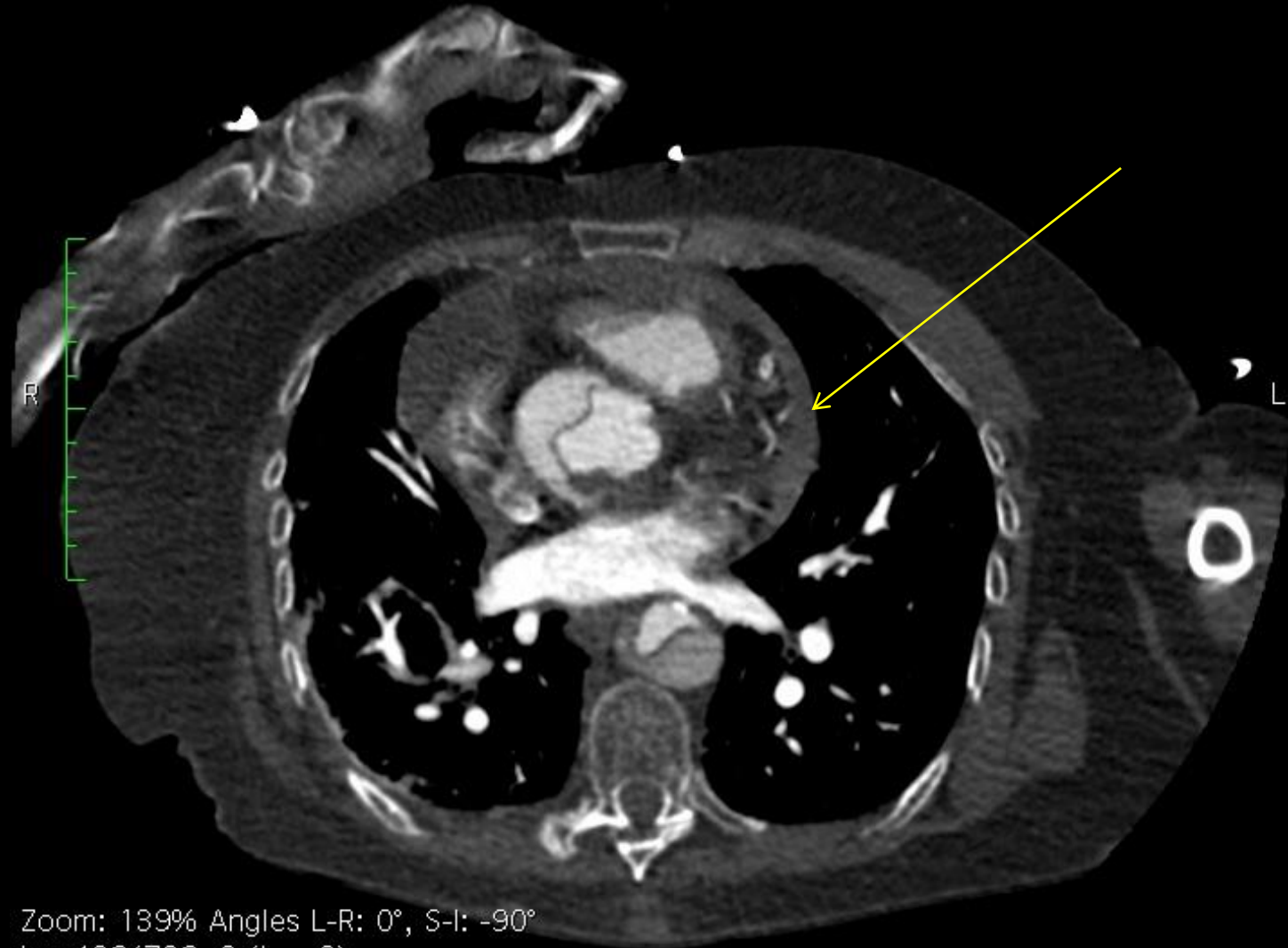
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 491/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



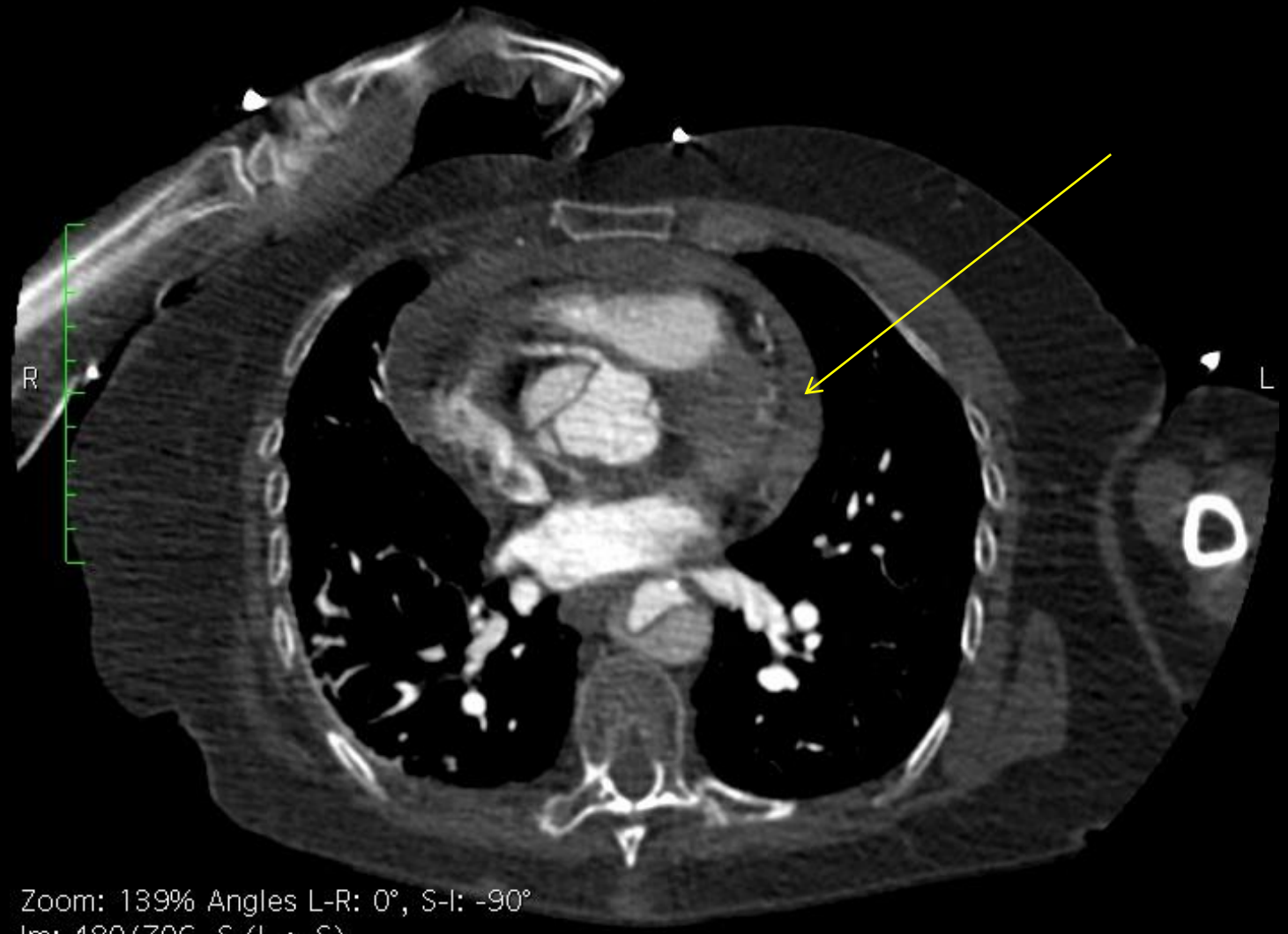
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 486/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

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Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5

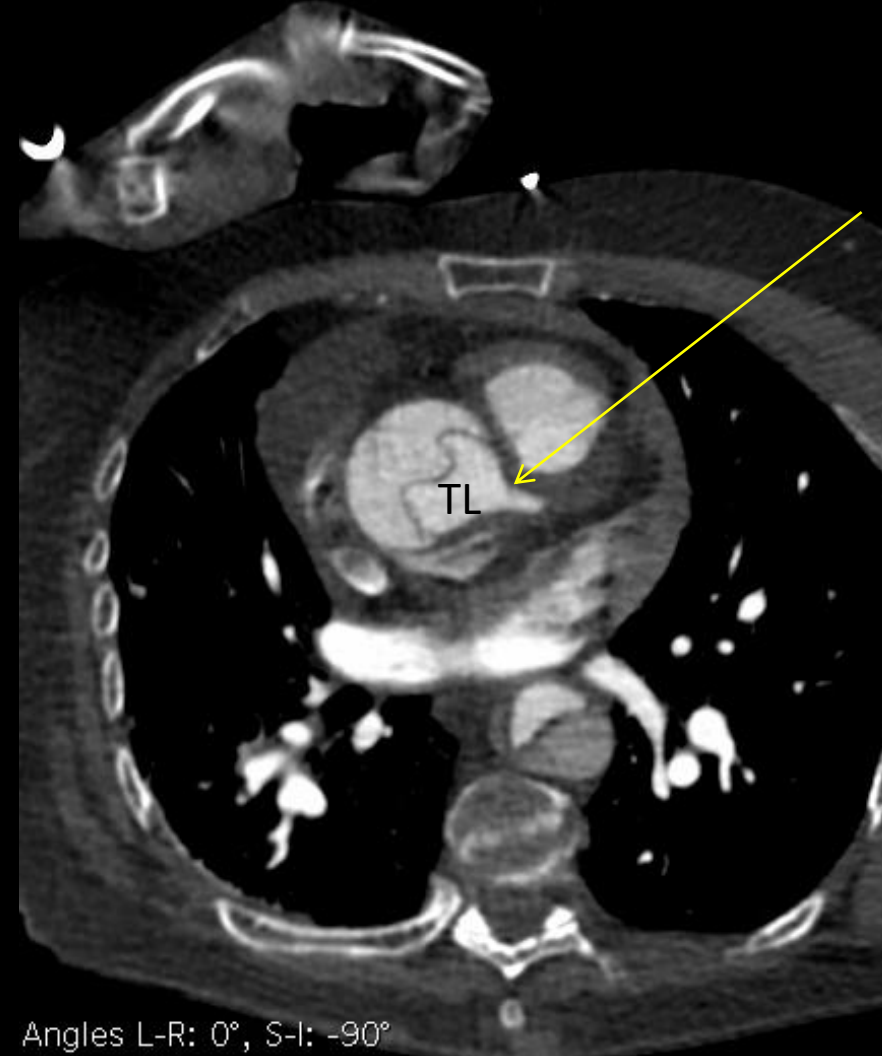
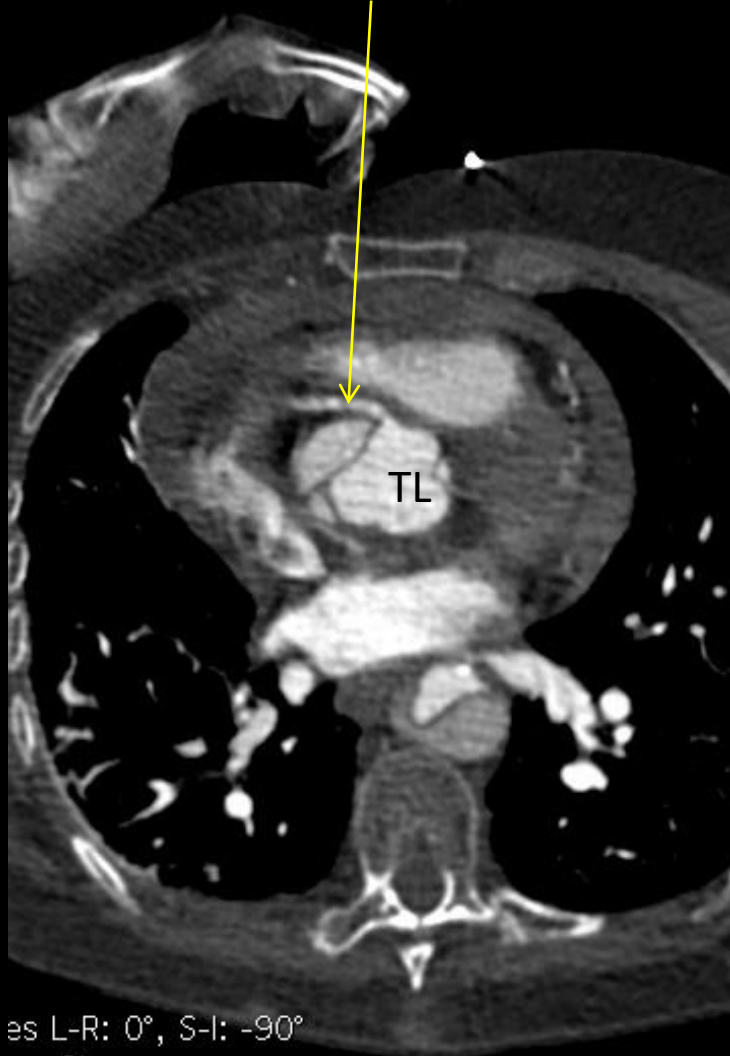


Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 480/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

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Right Coronary A and Left Main Stem off True Lumen



Thanks to Dr John Curtis, Aintree University

0 mm Location: 1724.70 mm P

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 475/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 470/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 466/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 461/706 S (L → S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 456/706 S (L → S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 452/706 S (L → S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 448/706 S (L → S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 444/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 439/706 S (L → S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



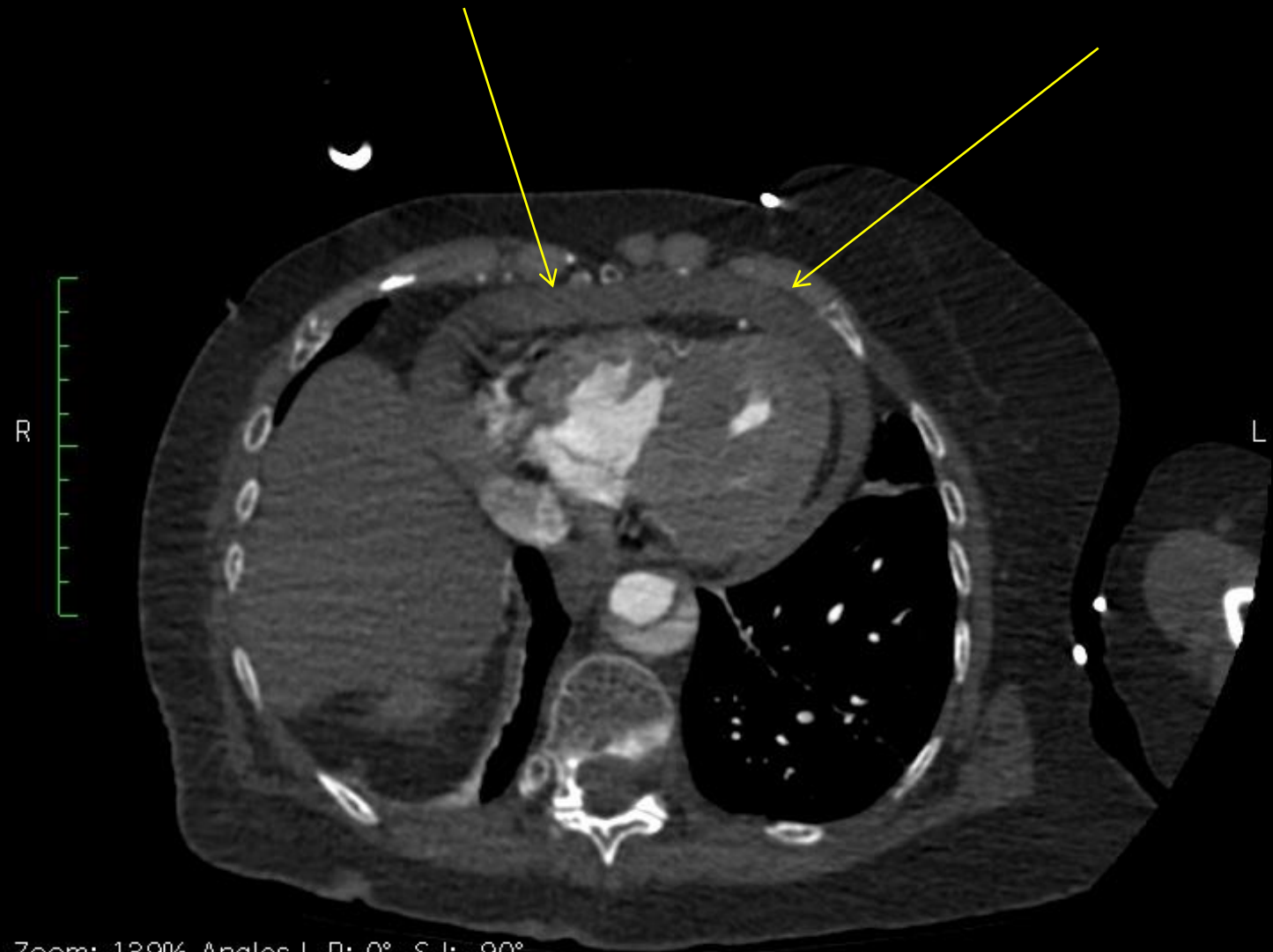
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 434/706 S (L → S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 430/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA - 1.0 CTA Body CTA CE
0
5



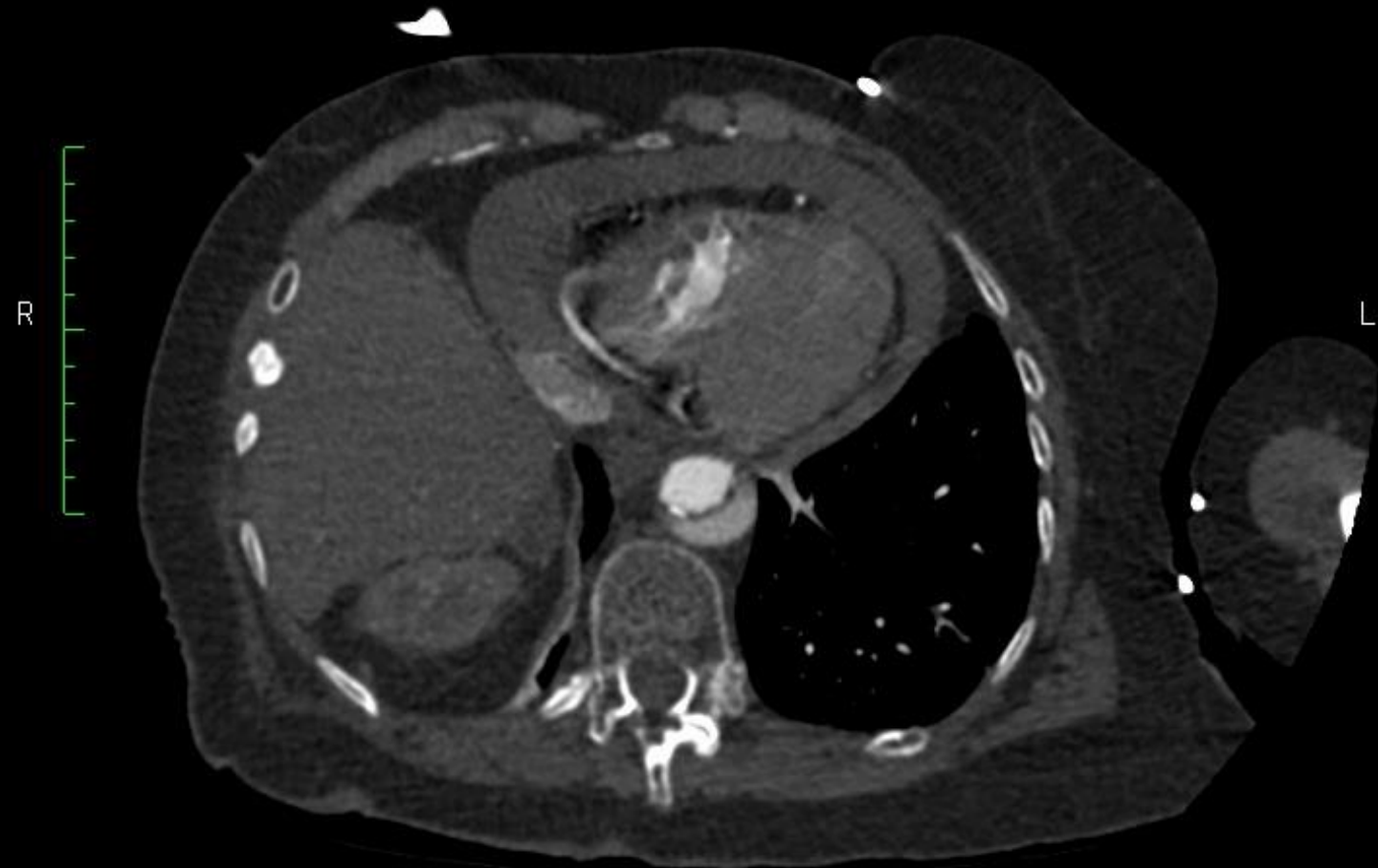
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 425/706 S (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 420/706 (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



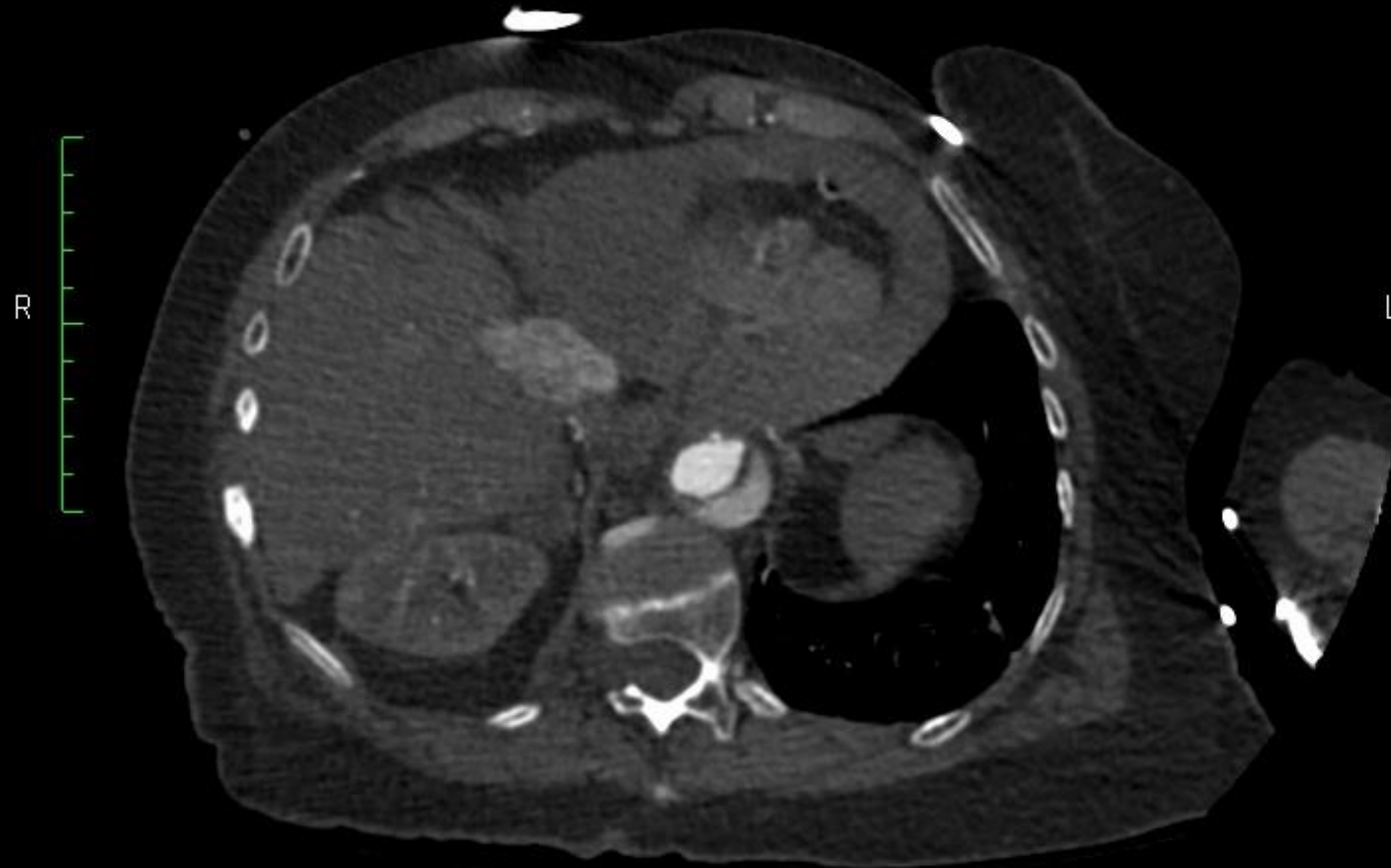
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 413/706 (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



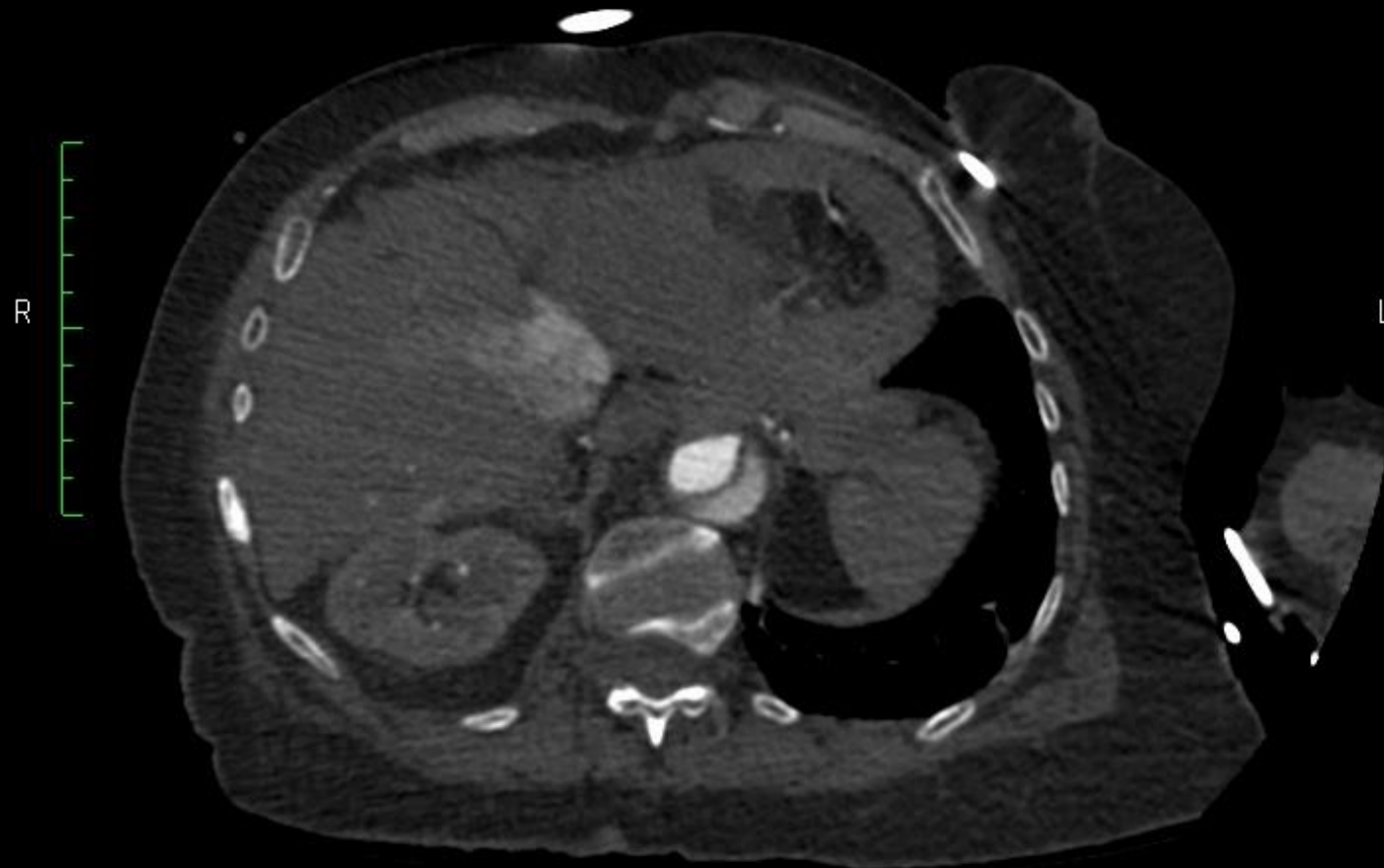
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 408/706 (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



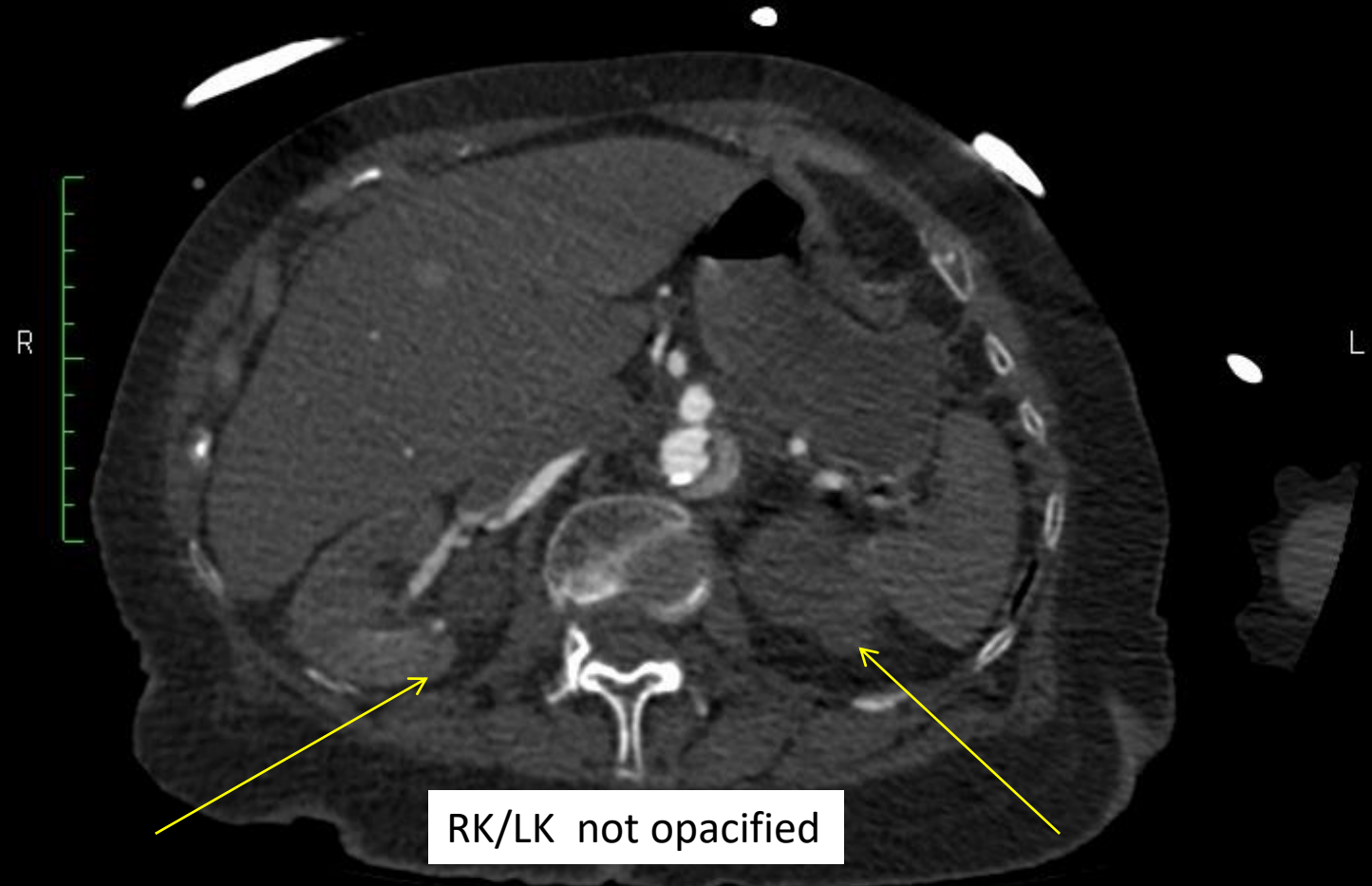
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 403/706 (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
WL: 283 WW: 995

A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



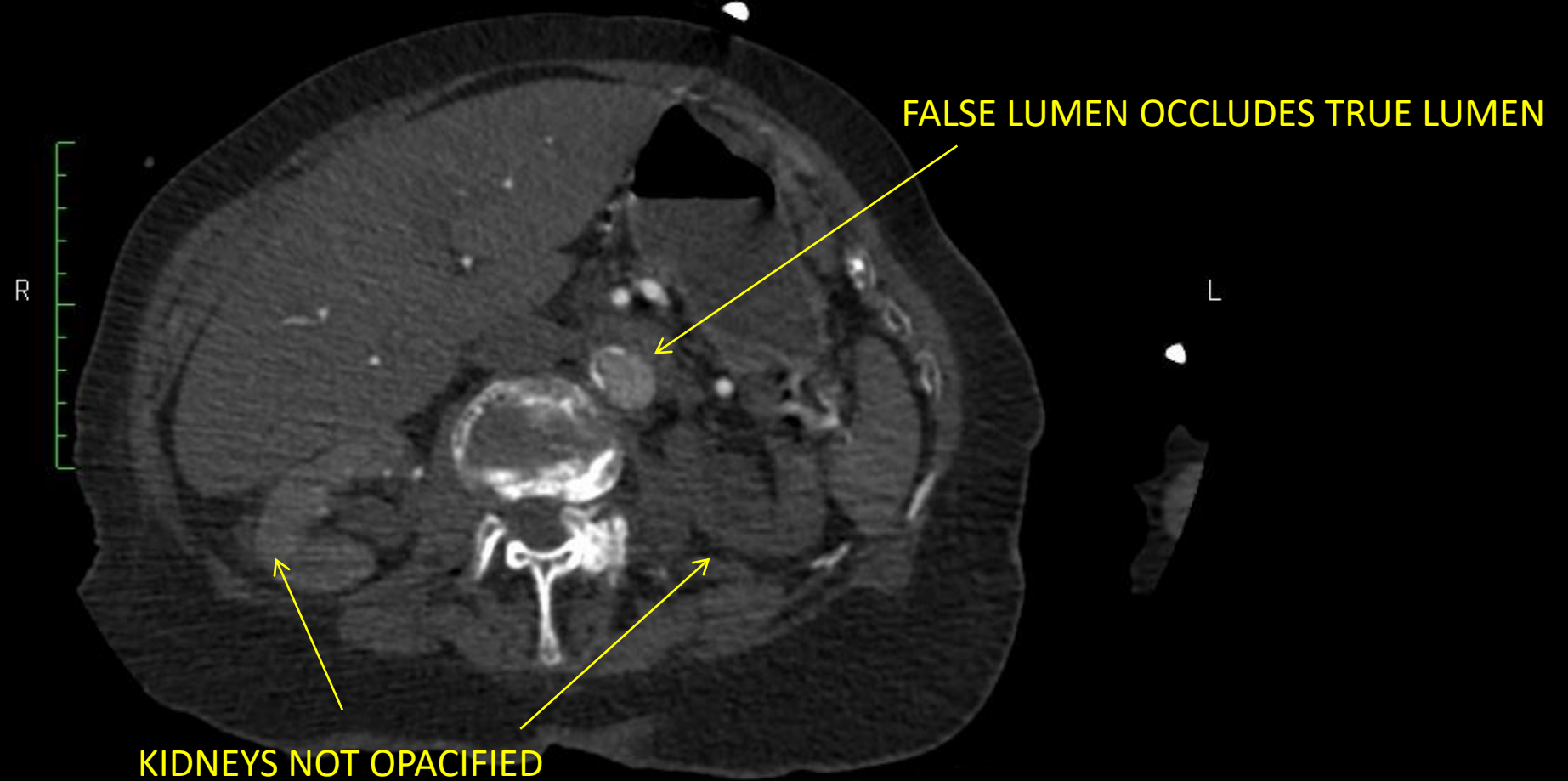
Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 364/706 (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Image size: 512 x 512
View size: 710 x 710
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A T-Aorta CTA — 1.0 CTA Body CTA CE
0
5



Zoom: 139% Angles L-R: 0°, S-I: -90°
Im: 336/706 (L -> S)

Thanks to Dr John Curtis, Aintree University Hospital, UK

14/04/2016 04:21:40
Made In OsiriX

Best description of findings

- A. Type A dissection aorta
- B. Type B dissection aorta
- C. Type A dissection aorta with haemopericardium

Best description of findings

- A. Type A dissection aorta
- B. Type B dissection aorta
- C. Type A dissection aorta with haemopericardium

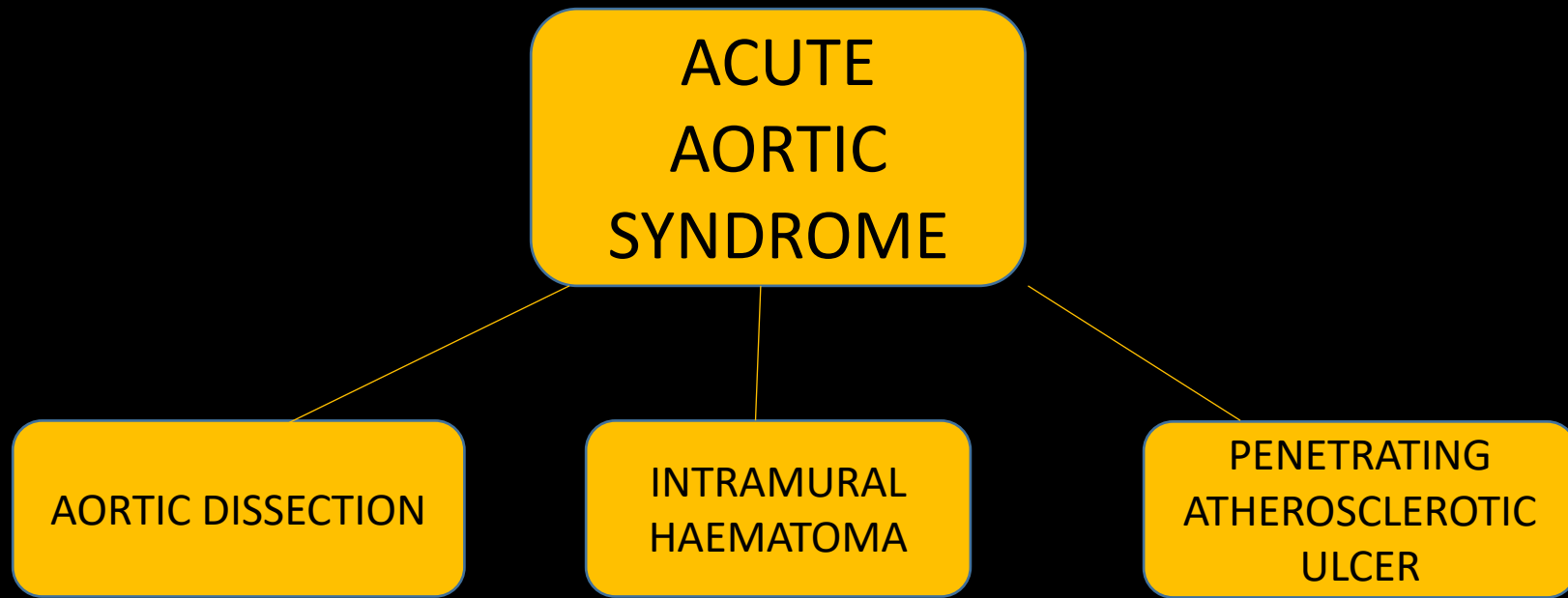
ACUTE
AORTIC
SYNDROME

```
graph TD; A[ACUTE AORTIC SYNDROME] --- B[AORTIC DISSECTION]; A --- C[INTRAMURAL HAEMATOMA]; A --- D[PENETRATING ATHEROSCLEROTIC ULCER];
```

AORTIC DISSECTION

INTRAMURAL
HAEMATOMA

PENETRATING
ATHEROSCLEROTIC
ULCER



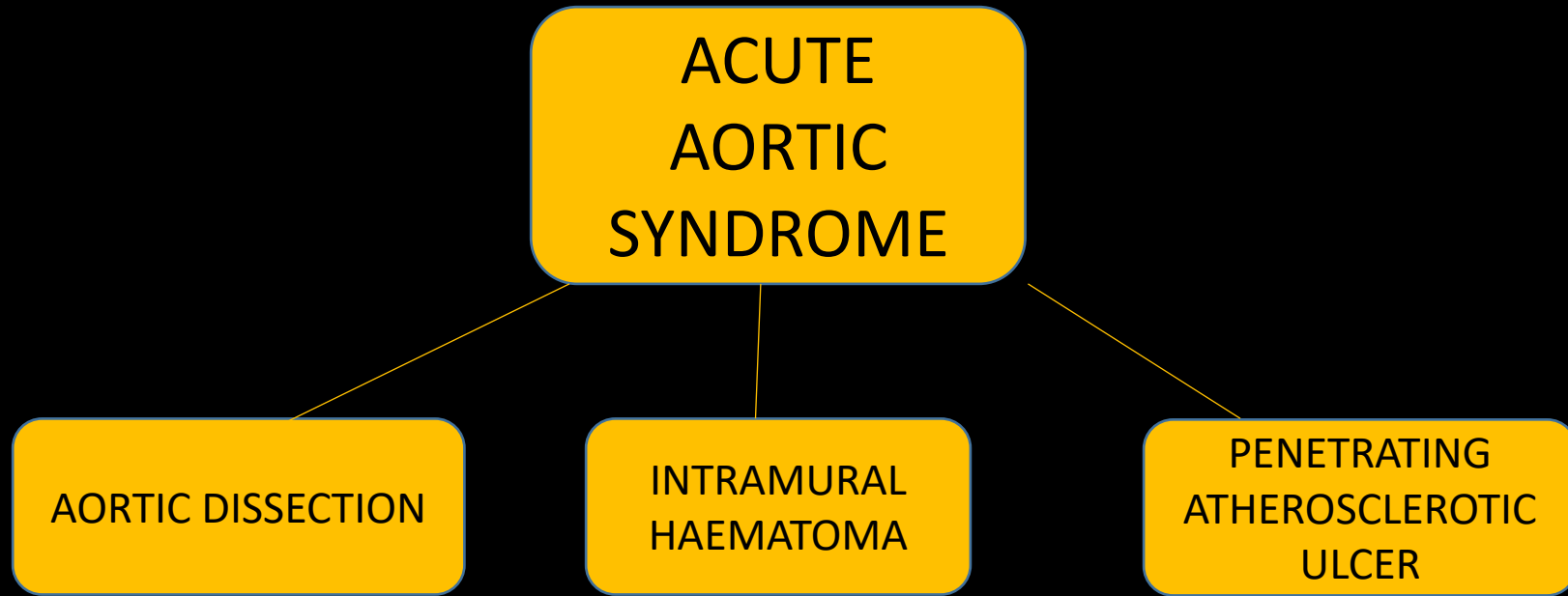
Complications

Tamponade

Acute aortic regurgitation

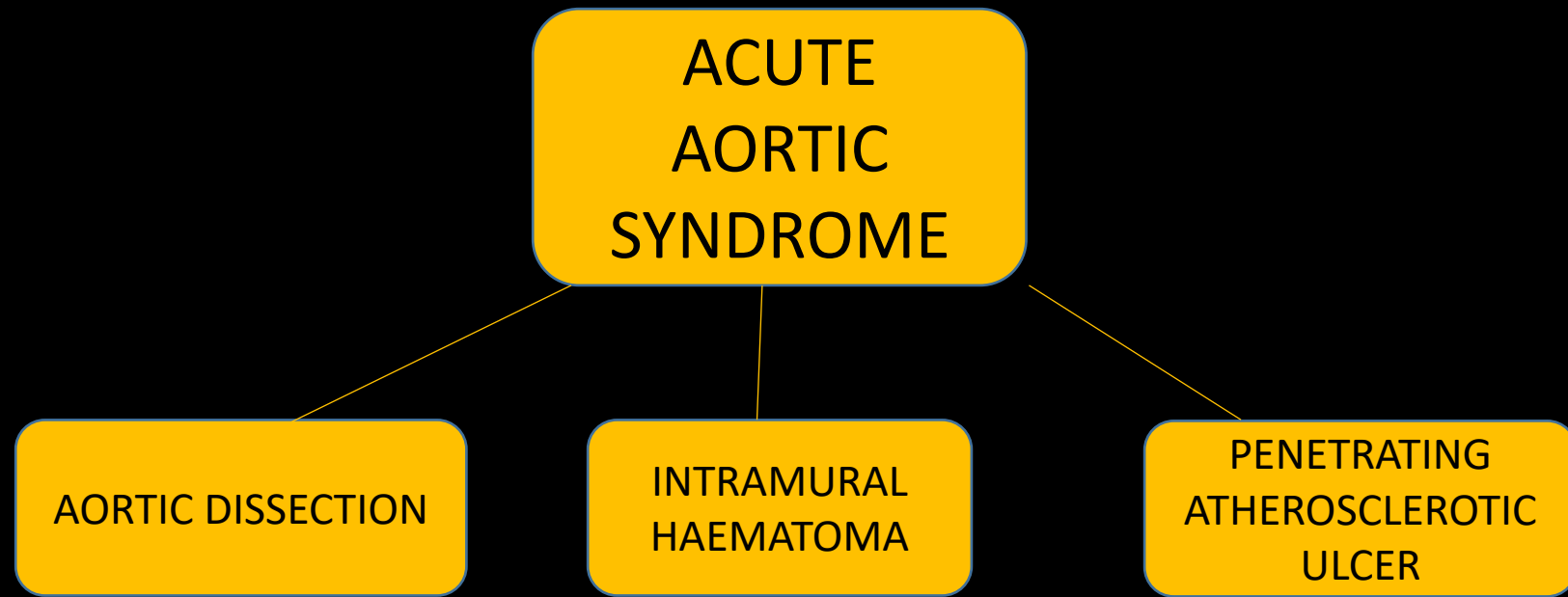
Aortic rupture

Vessel occlusion



Stanford A: ABOVE/ASCENDING AORTA
Endovascular Stent

Stanford B: (BELOW LEFT SUBCLAVIAN A)
Conservative



ALL
disruption of (intima)media

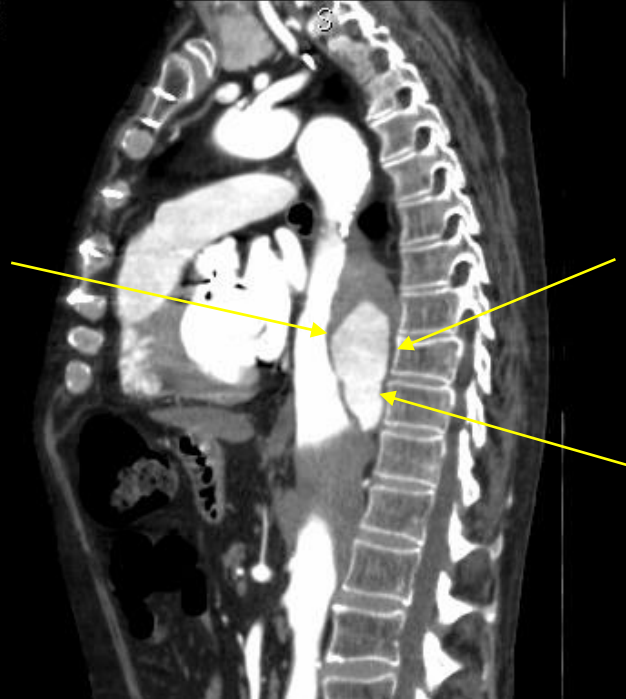
ACUTE AORTIC SYNDROME

AORTIC DISSECTION

INTRAMURAL
HAEMATOMA

PENETRATING
ATHEROSCLEROTIC
ULCER

92
8



ACUTE AORTIC SYNDROME

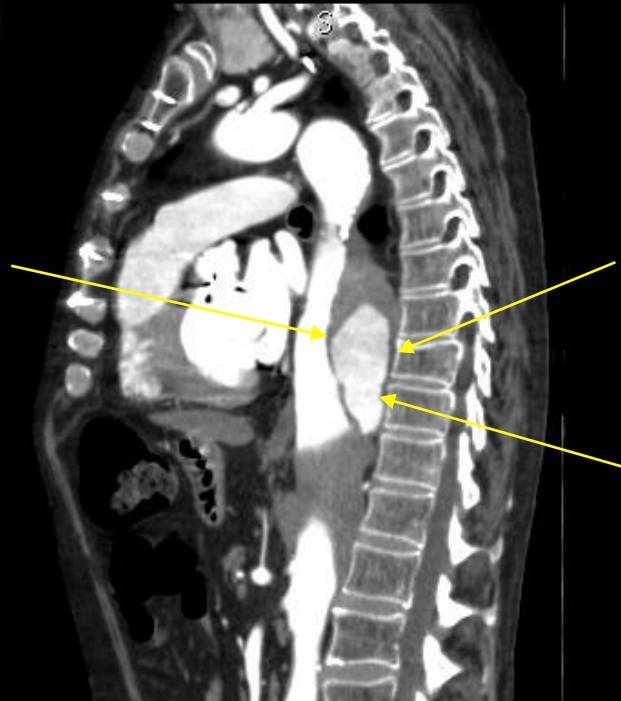
AORTIC DISSECTION

INTRAMURAL
HAEMATOMA

PENETRATING
ATHEROSCLEROTIC
ULCER

Often best seen on non contrast CT
within media
Crescentic
Likely starts with intimal tear which seals
Px variable, Mx uncertain

92
8



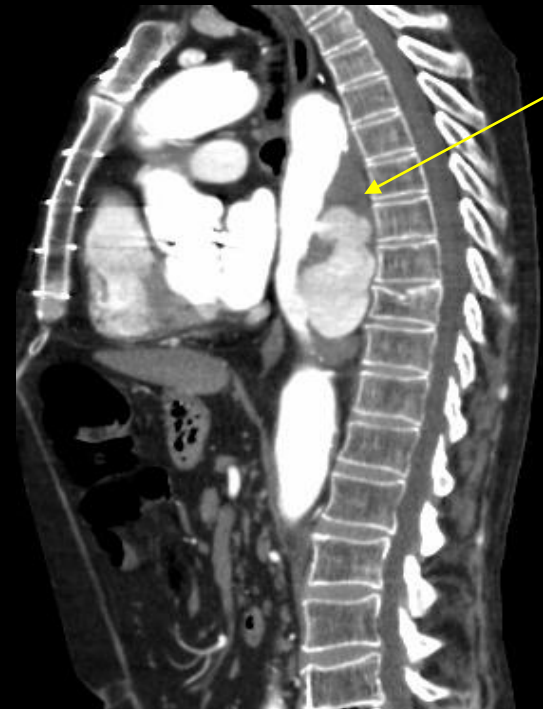
ACUTE AORTIC SYNDROME

AORTIC DISSECTION

INTRAMURAL
HAEMATOMA

PENETRATING
ATHEROSCLEROTIC
ULCER

92
8



ACUTE AORTIC SYNDROME

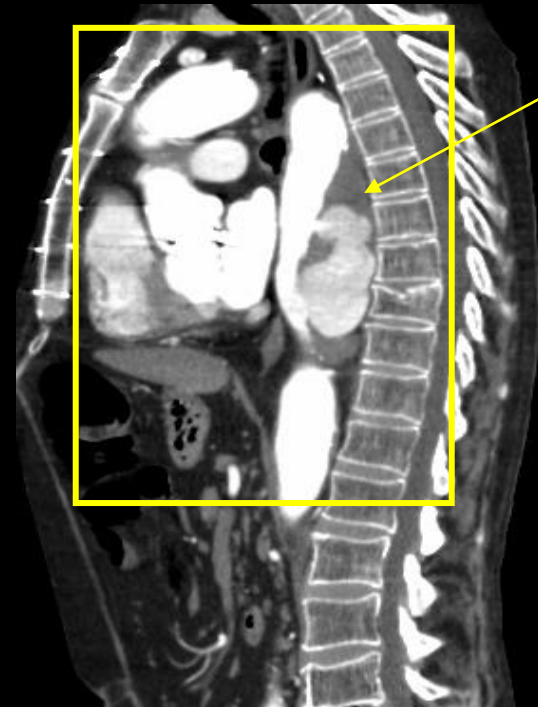
AORTIC DISSECTION

INTRAMURAL
HAEMATOMA

PENETRATING
ATHEROSCLEROTIC
ULCER

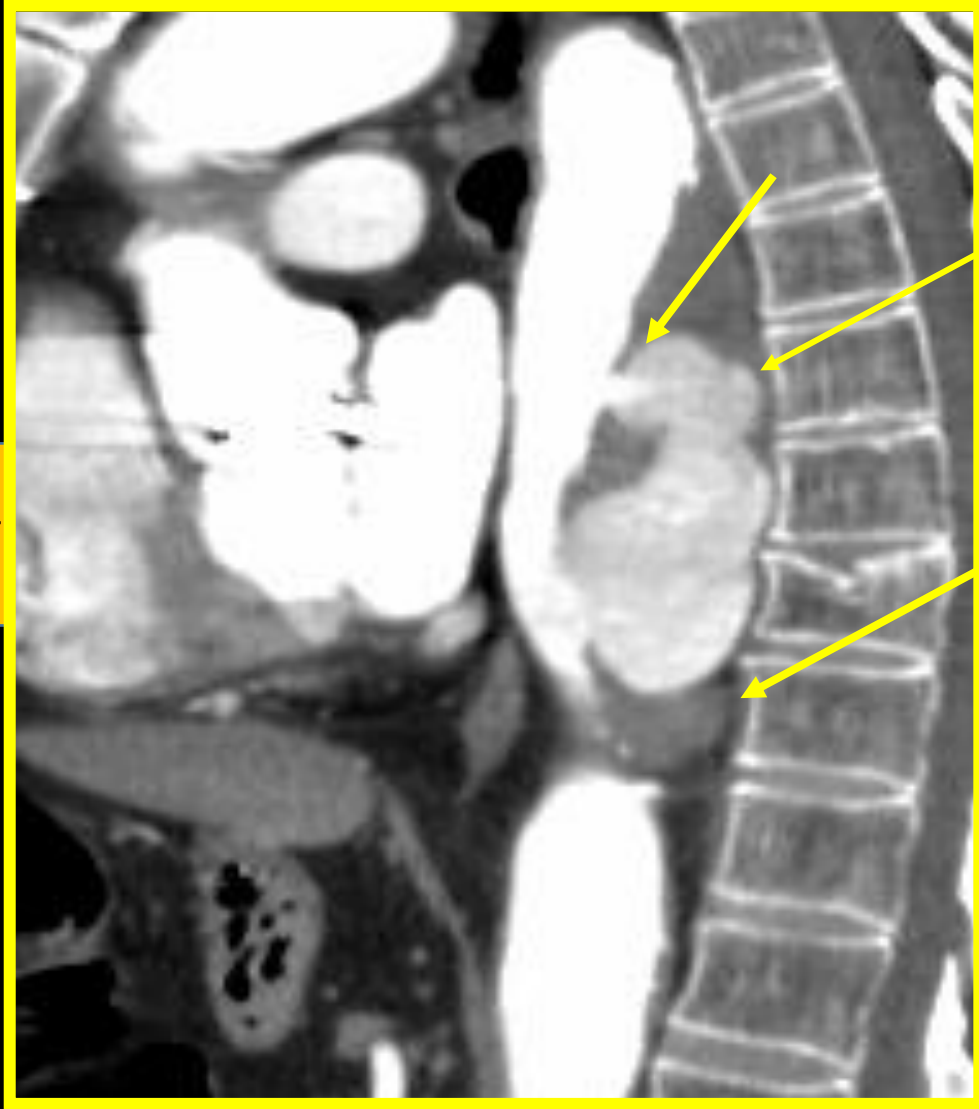
Often multiple atherosclerotic comorbidities

92
8



PAU

AORT



PAU

penetrates media

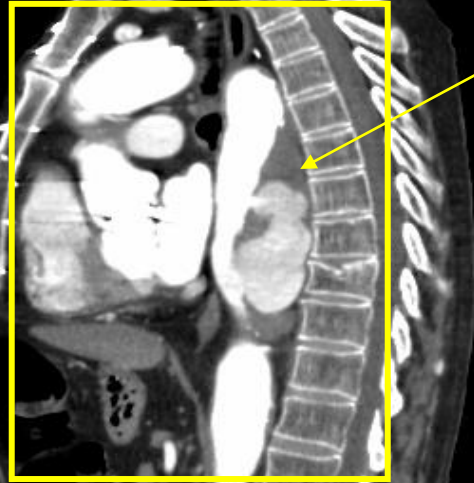
Outpouching

jagged edge

Wall thickening & enhancement

Usually middle to lower 1/3 thoracic aorta

PENETRATING
ATHEROSCLEROTIC
ULCER



POOR PX

Rx: ?Surgery

55 yo Chest Pain and
Short of Breath

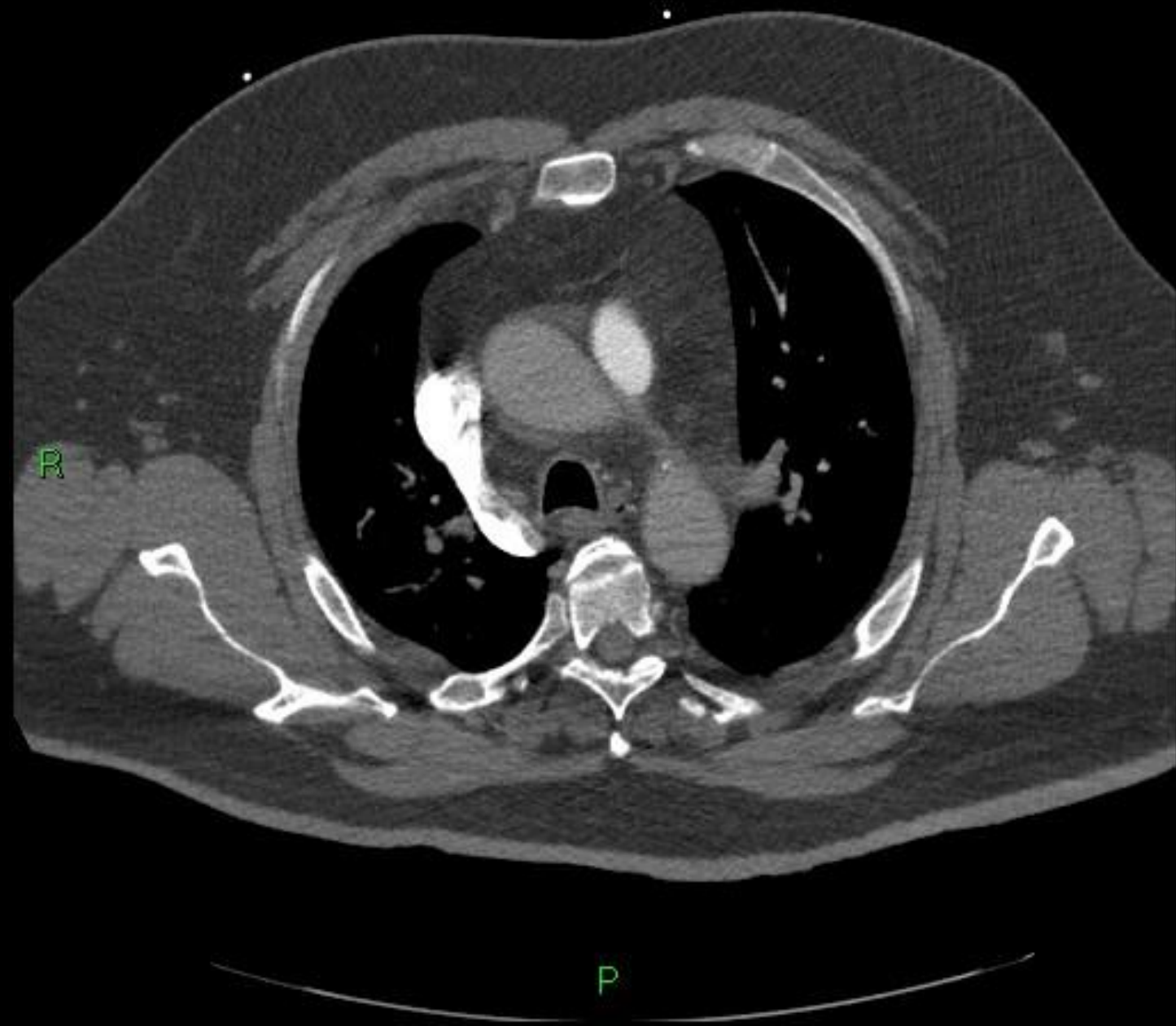
Elevated D dimer
?Pulmonary Embolus



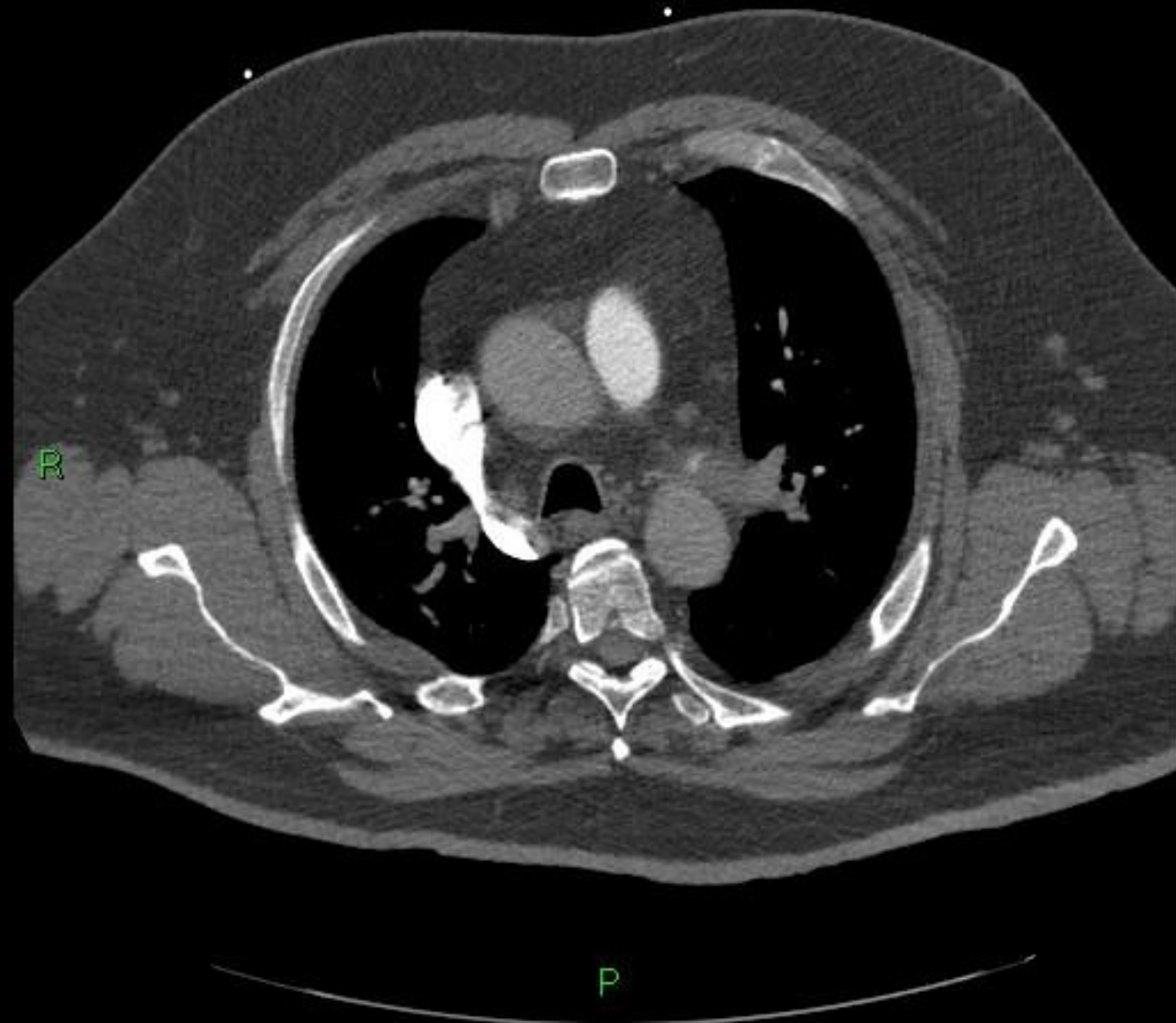
Are there pulmonary emboli?



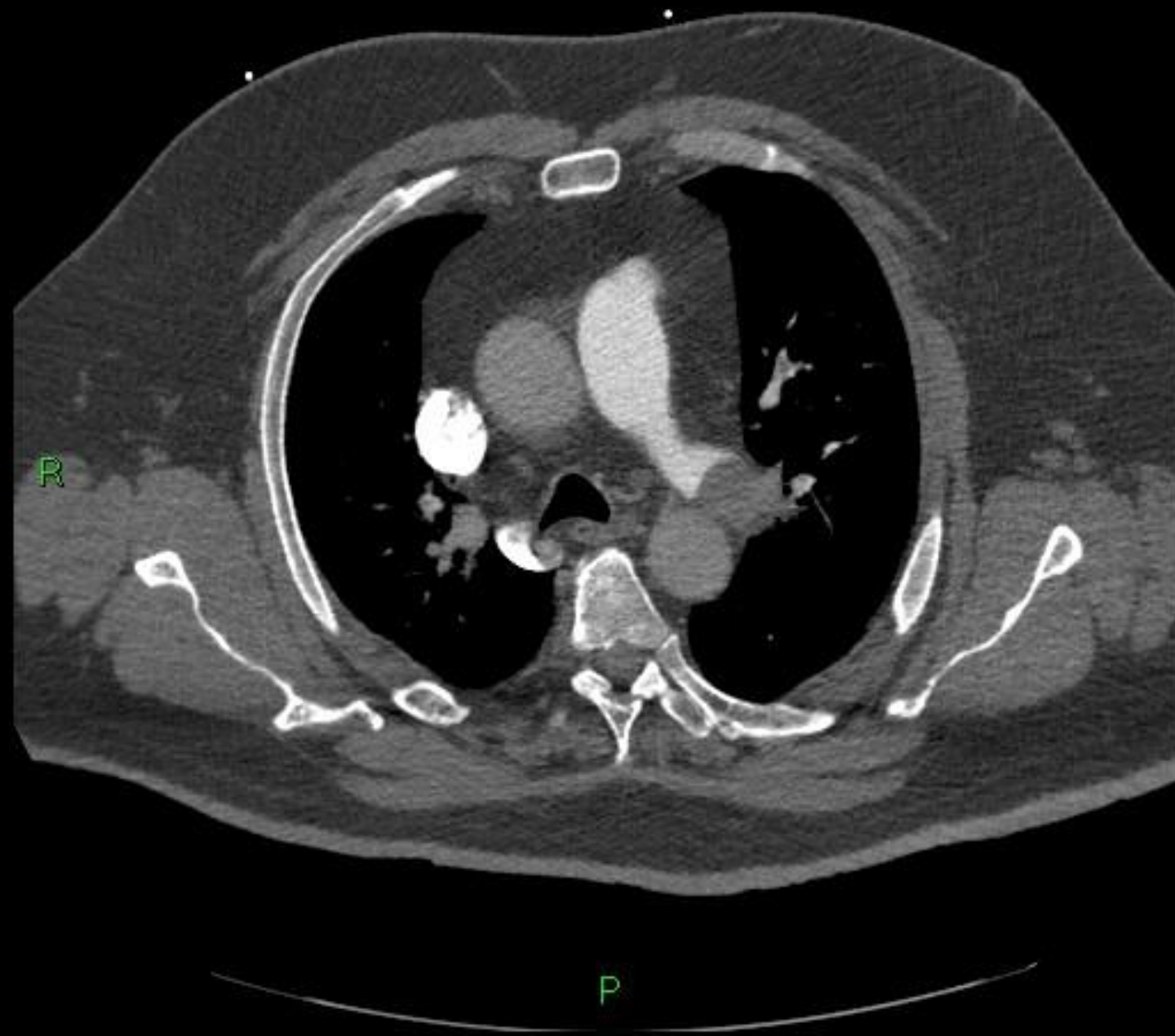
< 501 - 148 Soft Tissue >



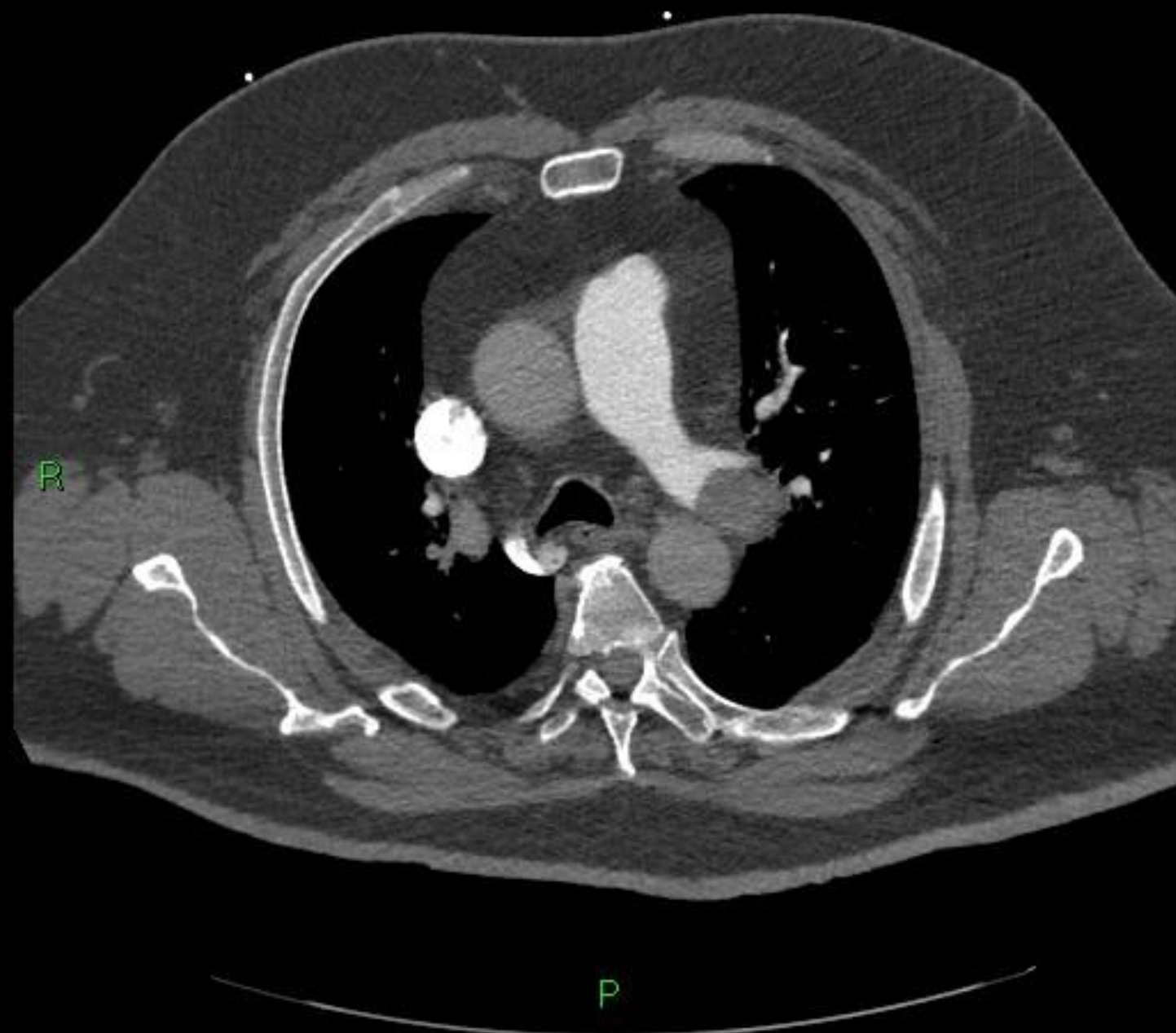
< 501 - 152 Soft Tissue >



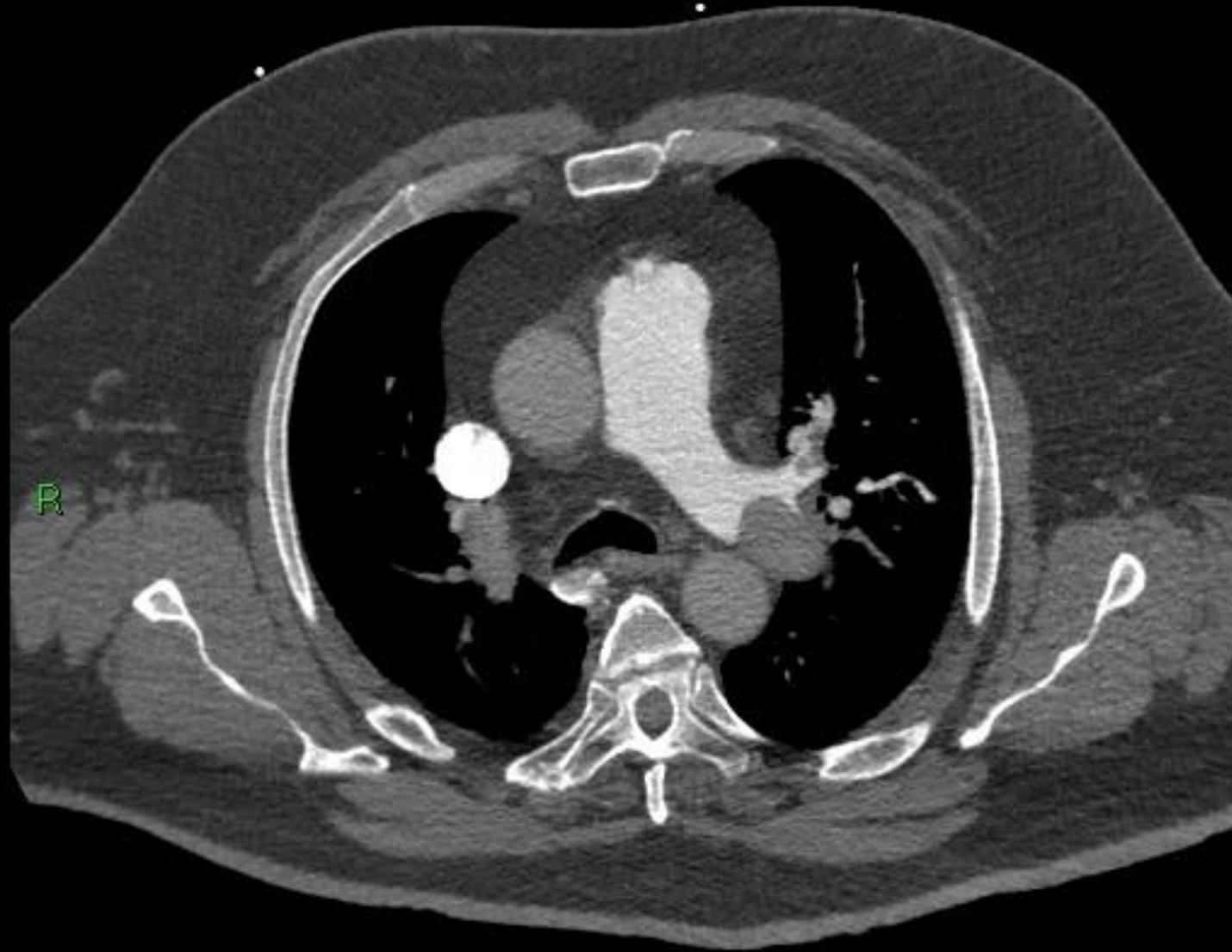
< 501 - 160 Soft Tissue >



< 501 - 164 Soft Tissue >

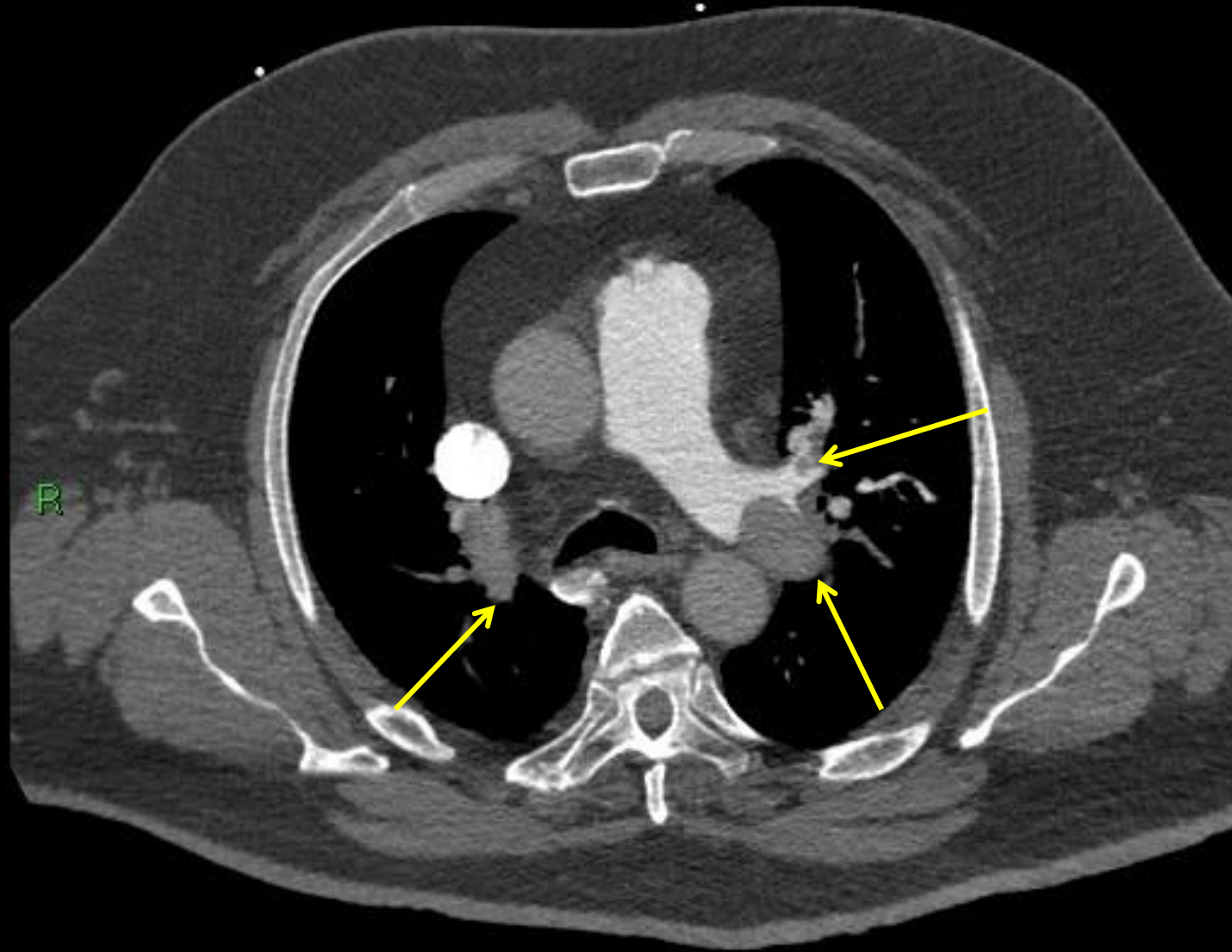


< 501 - 172 Soft Tissue >



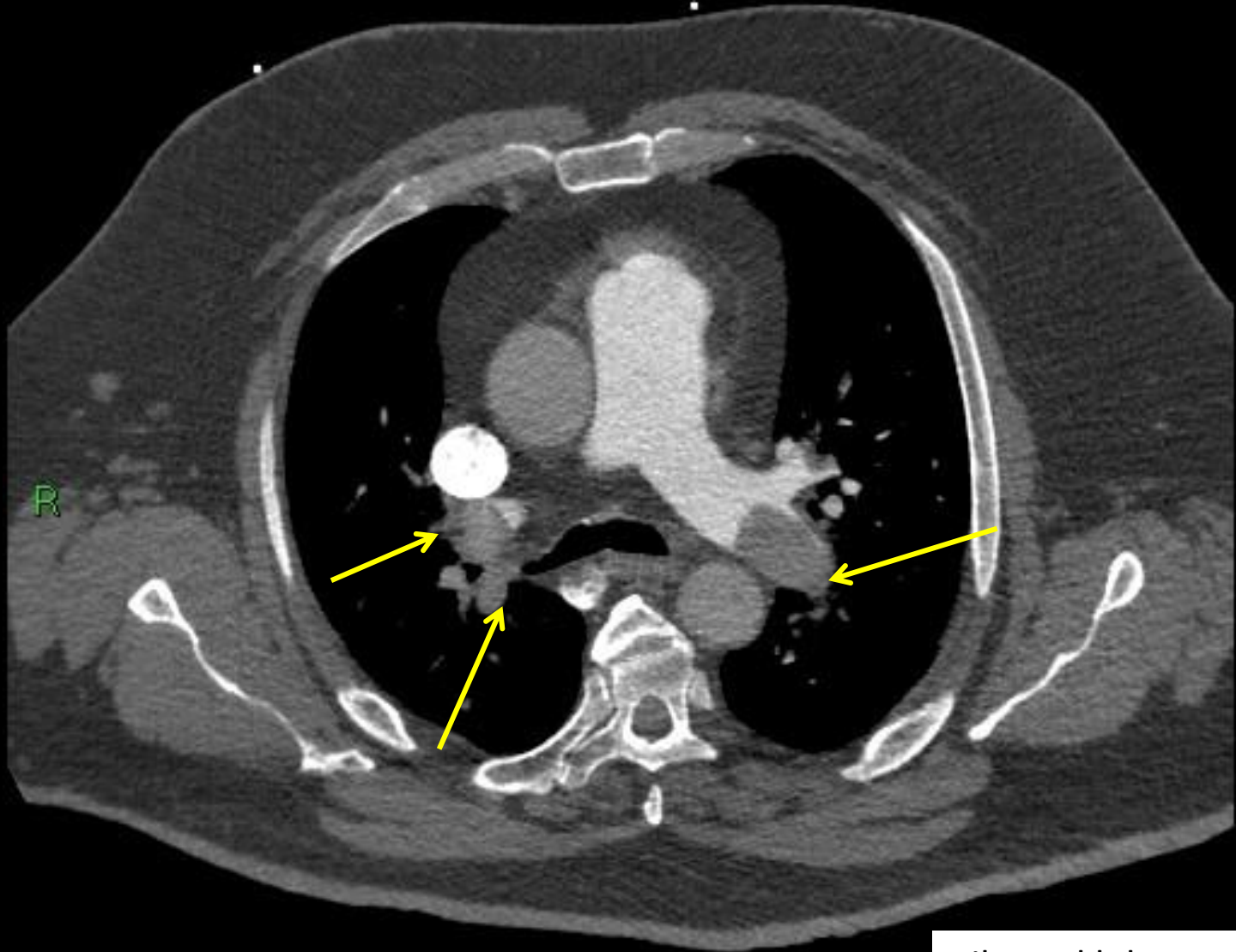
Thanks to Dr Deepa Gopalan, Imperial College London

< 501 - 172 Soft Tissue >



Thanks to Dr Deepa Gopalan, Imperial College London

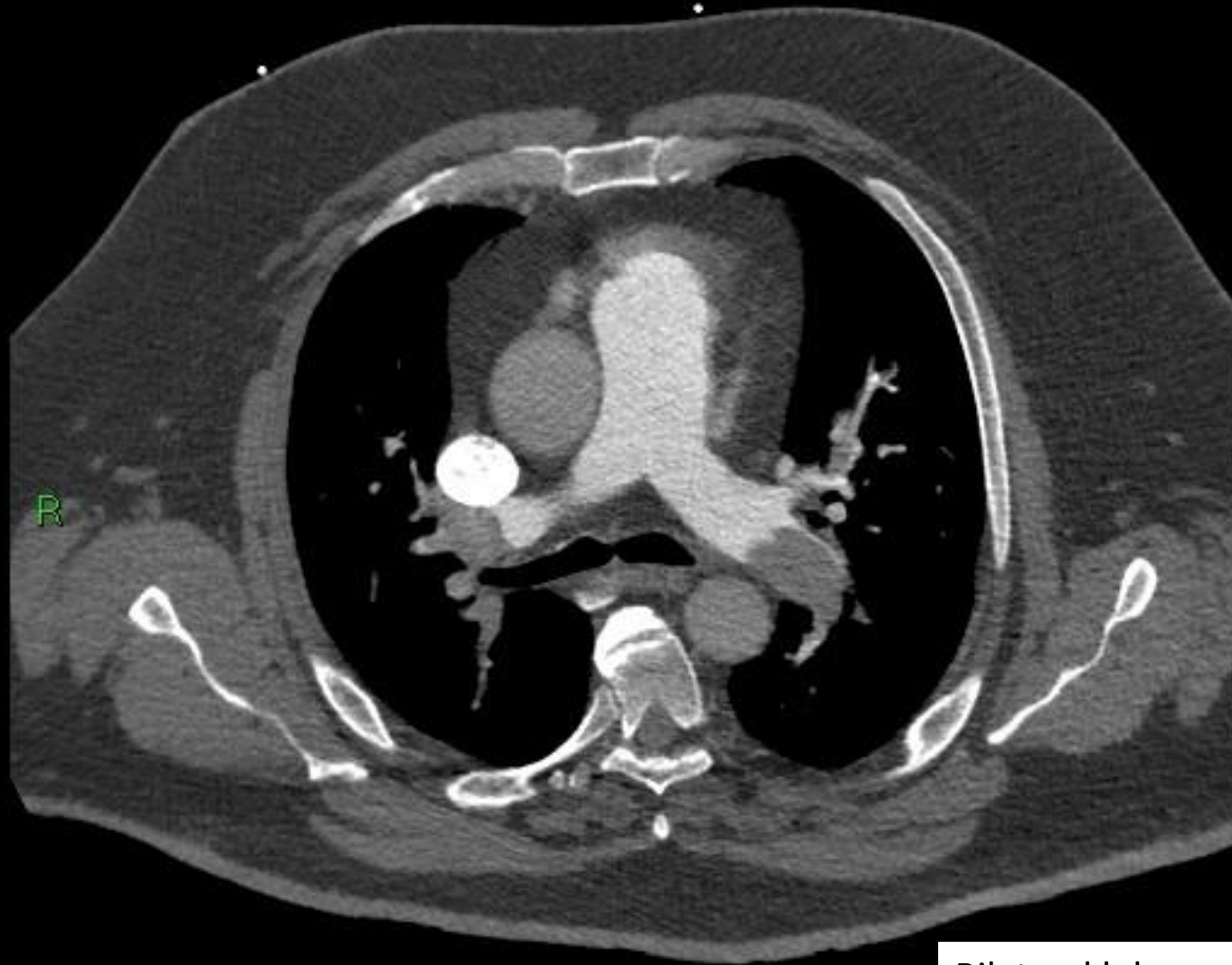
< 501 - 180 Soft Tissue >



Bilateral lobar emboli

P

< 501 - 188 Soft Tissue >



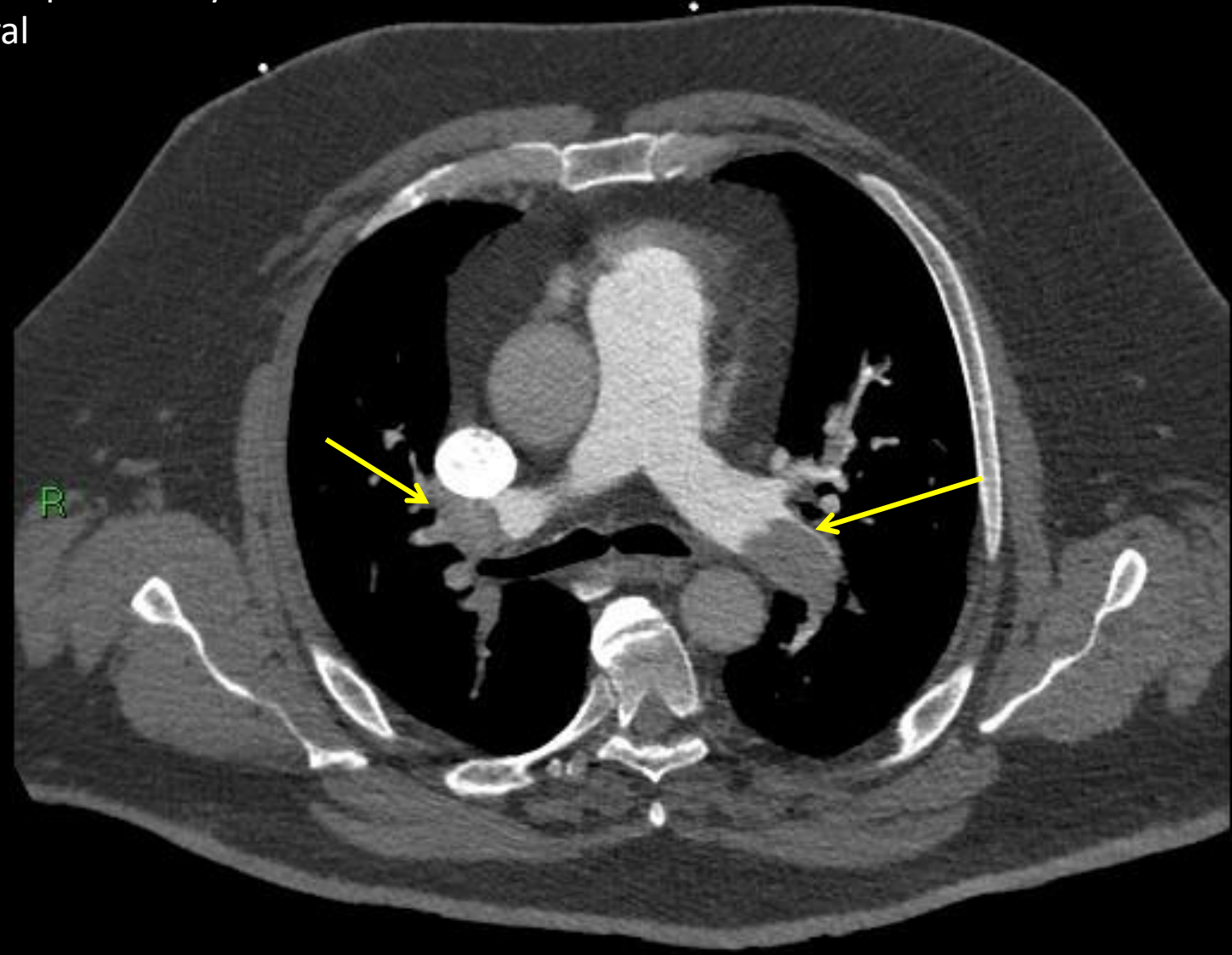
Bilateral lobar emboli

P

< 501 - 188 Soft Tissue >

PEs are likely acute

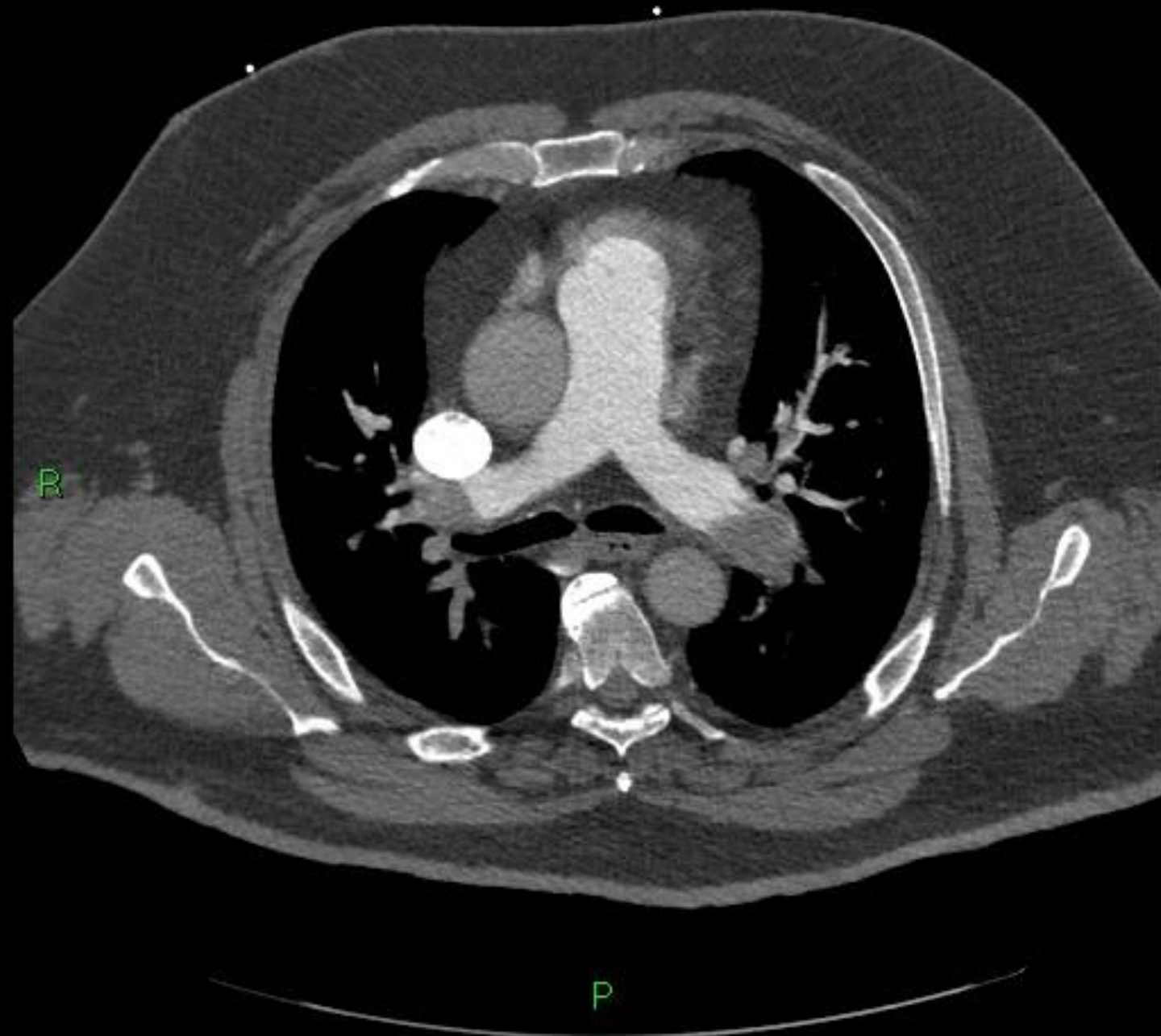
- expand pulmonary arteries
- central



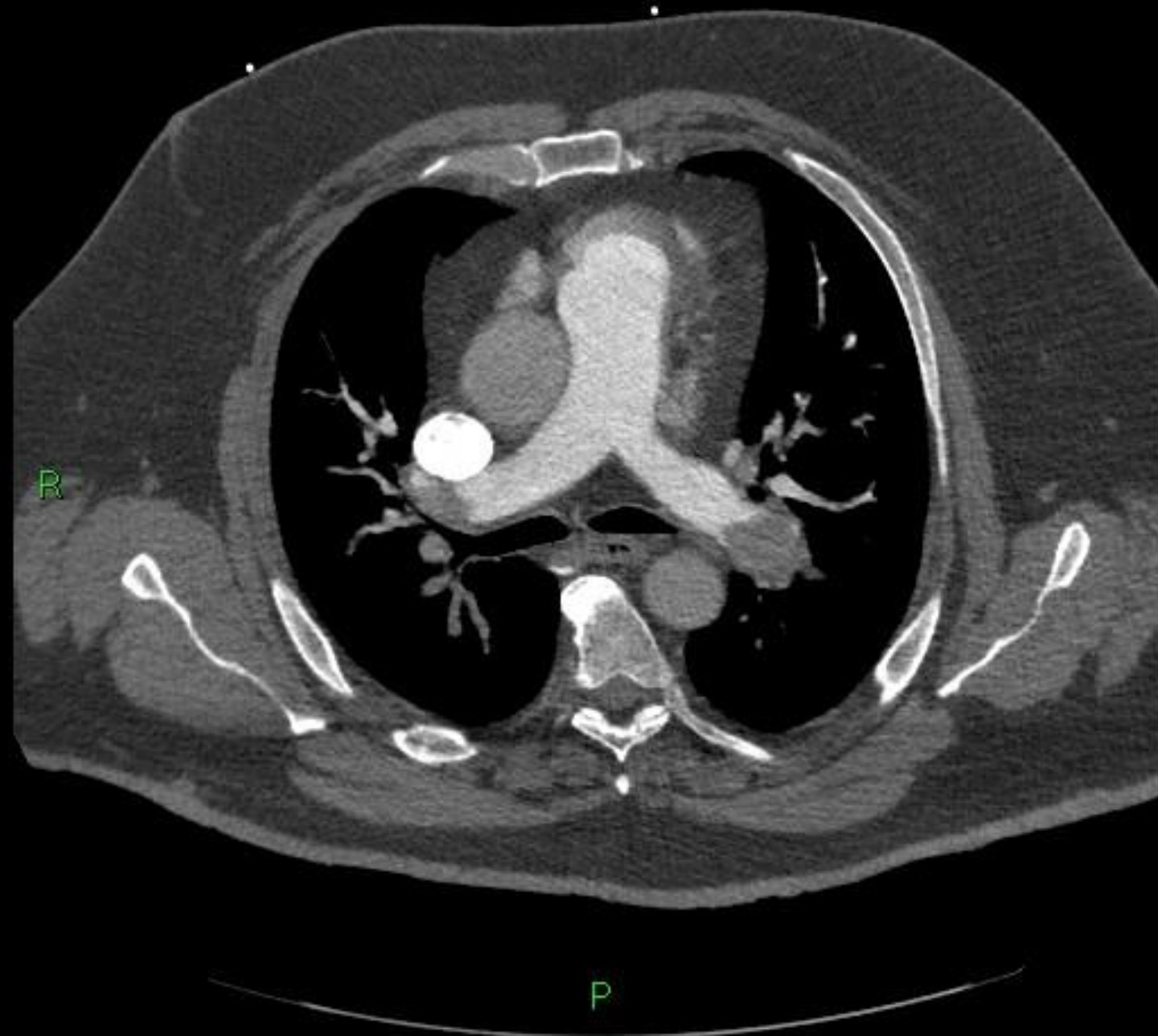
Bilateral lobar emboli

Thanks to Dr Deepa Gopalan, Imperial College London

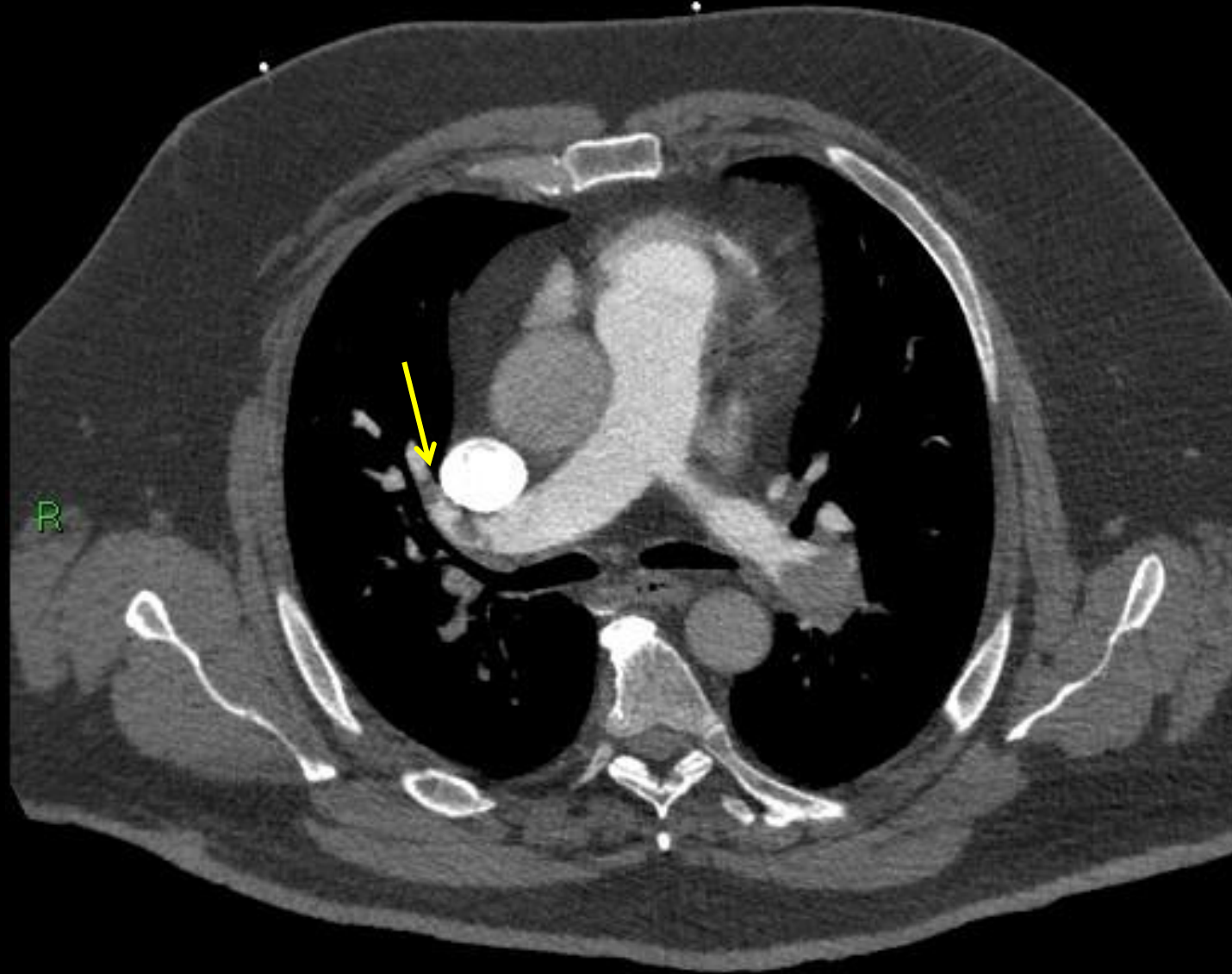
< 501 - 192 Soft Tissue >



< 501 - 196 Soft Tissue >



< 501 - 200 Soft Tissue >

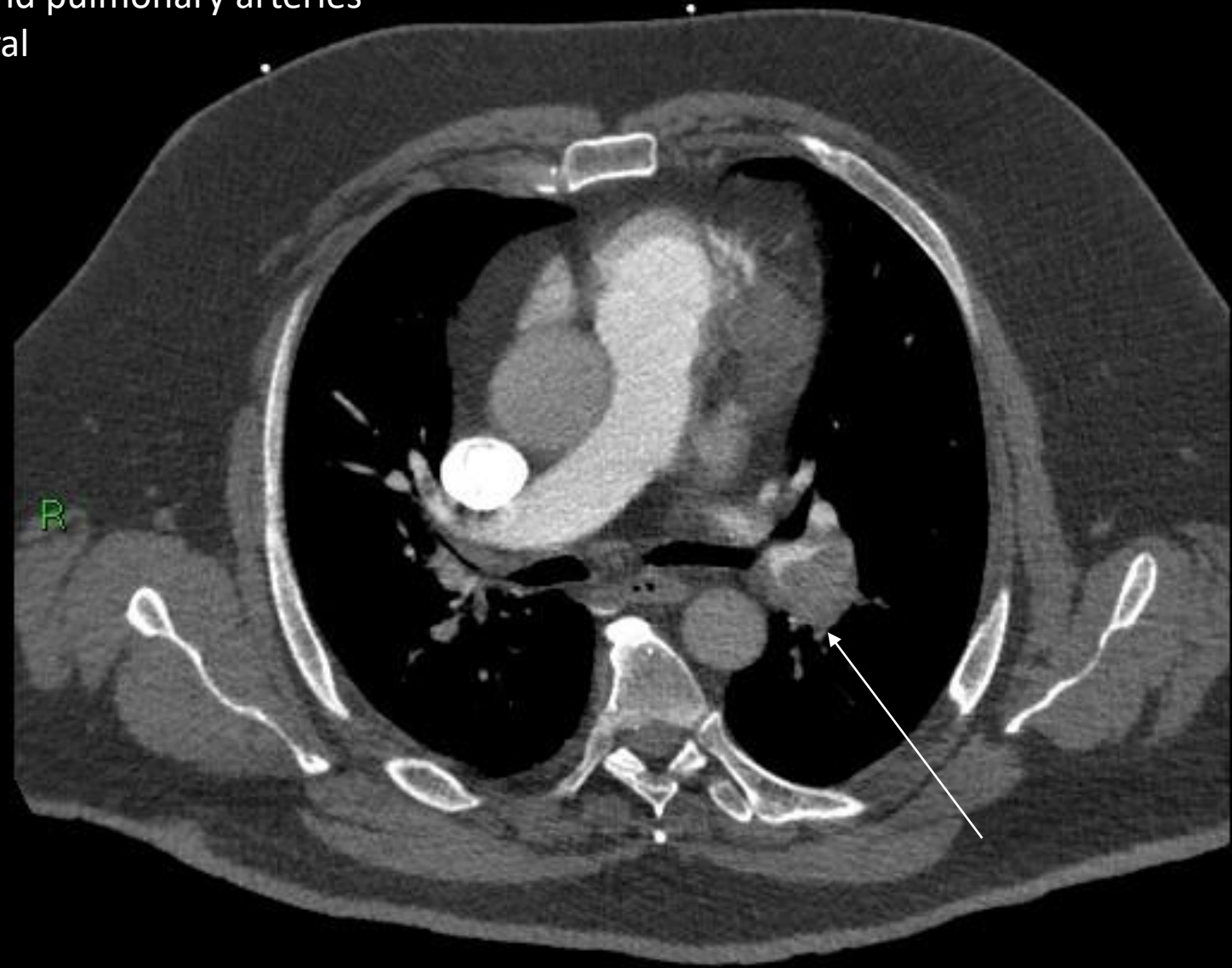


Thanks to Dr Deepa Gopalan, Imperial College London

< 501 - 204 Soft Tissue >

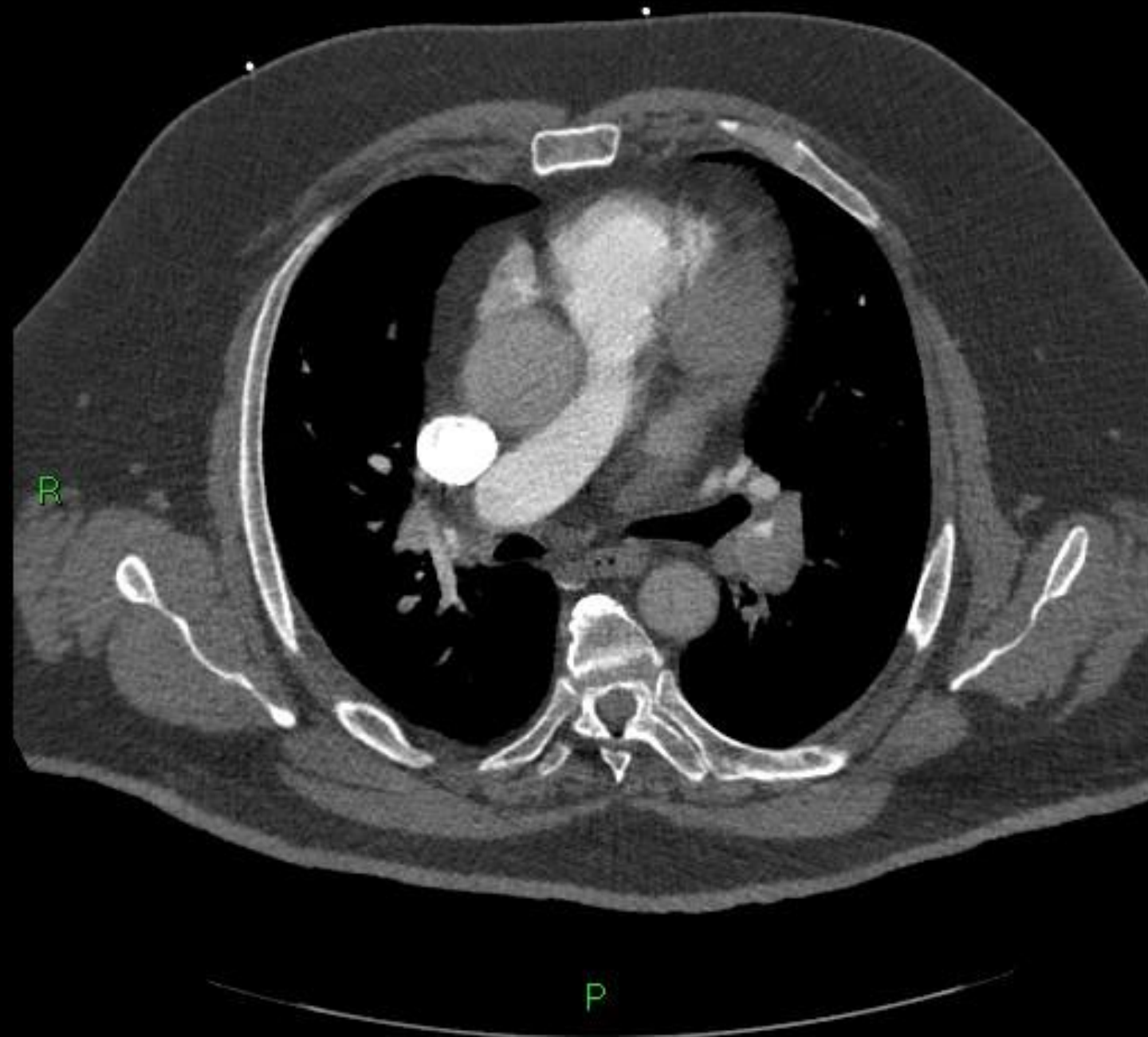
PEs likely acute

- expand pulmonary arteries
- central



Thanks to Dr Deepa Gopalan, Imperial College London

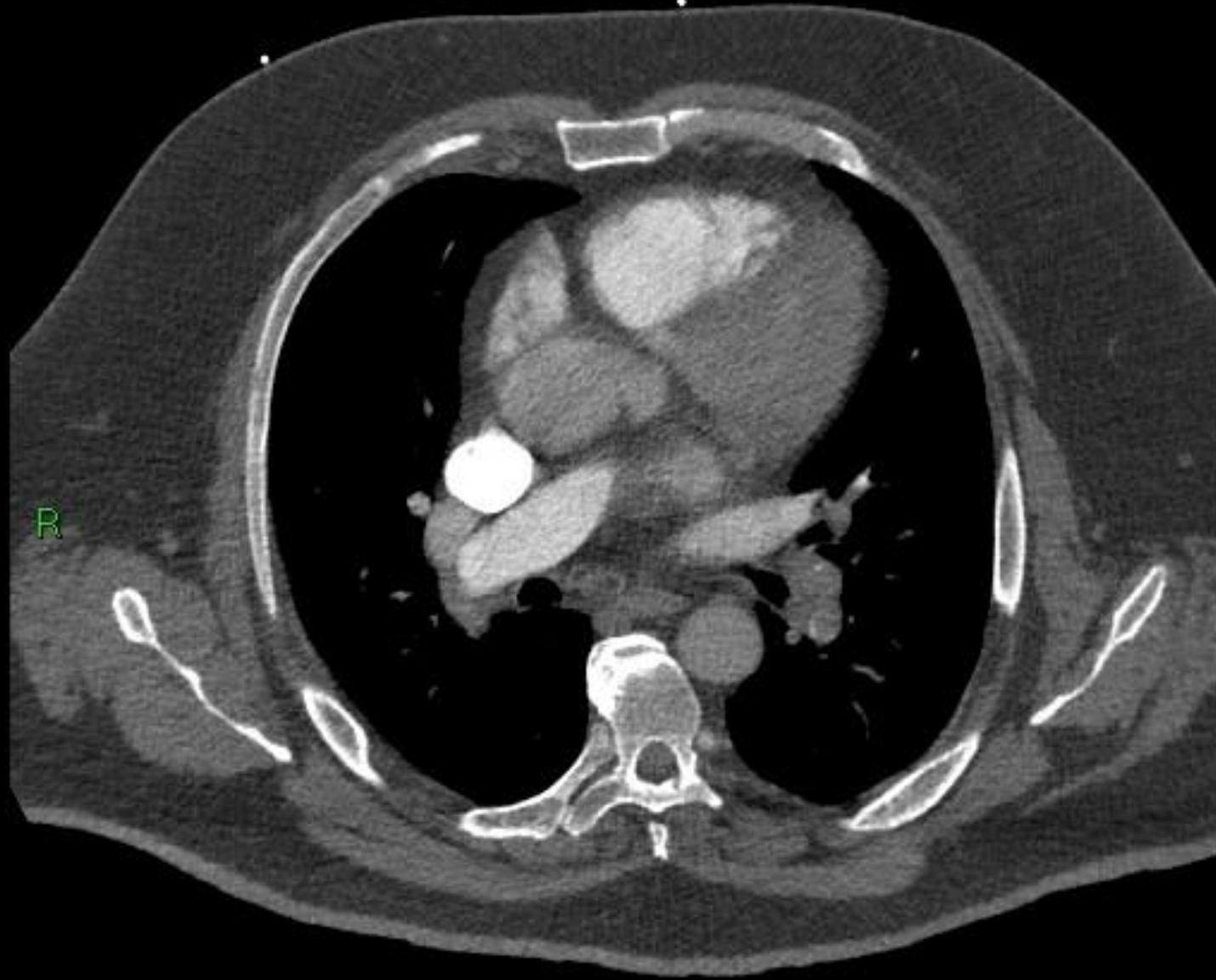
< 501 - 212 Soft Tissue >



< 501 - 220 Soft Tissue >



< 501 - 228 Soft Tissue >

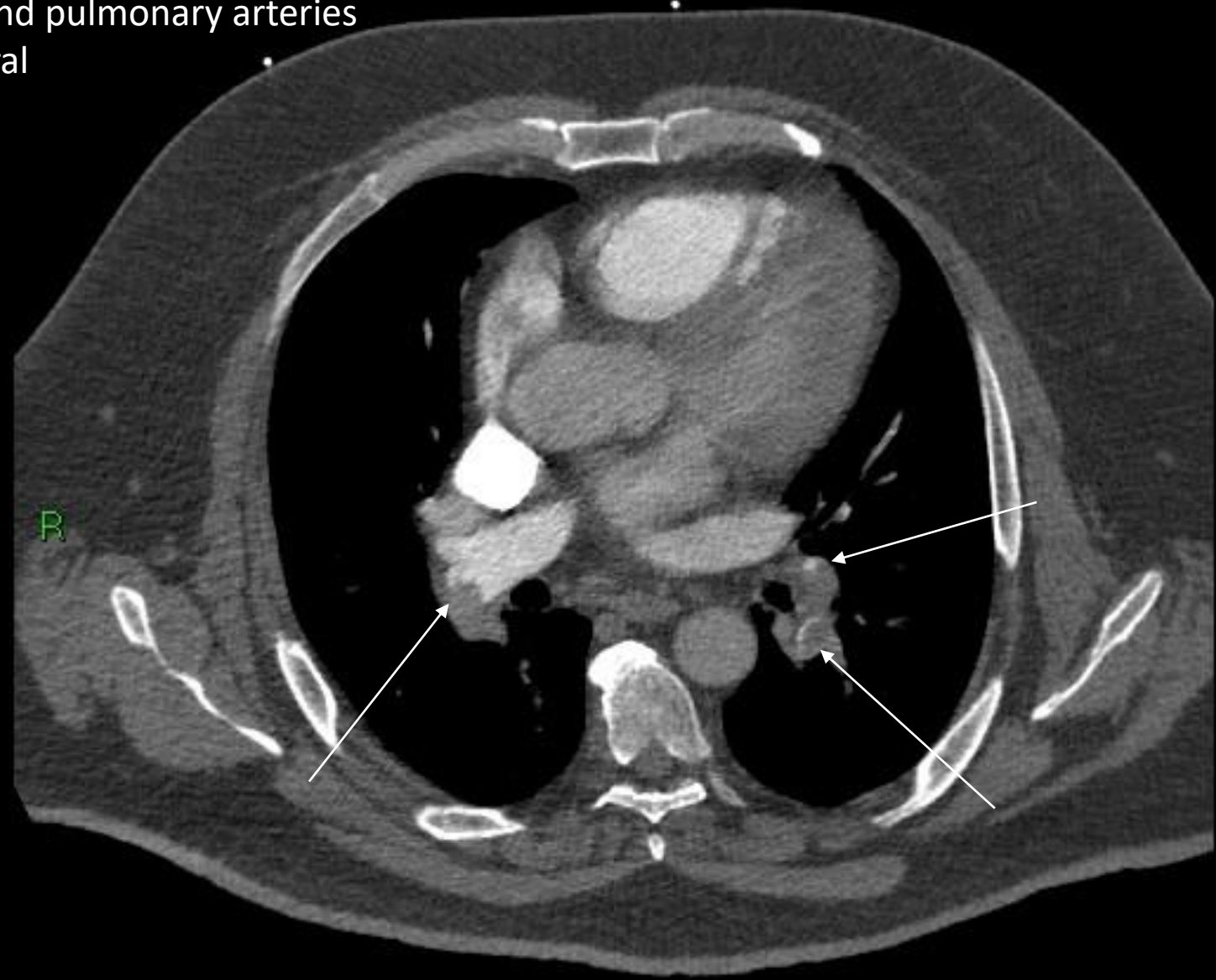


Thanks to Dr Deepa Gopalan, Imperial College London

< 501 - 238 Soft Tissue >

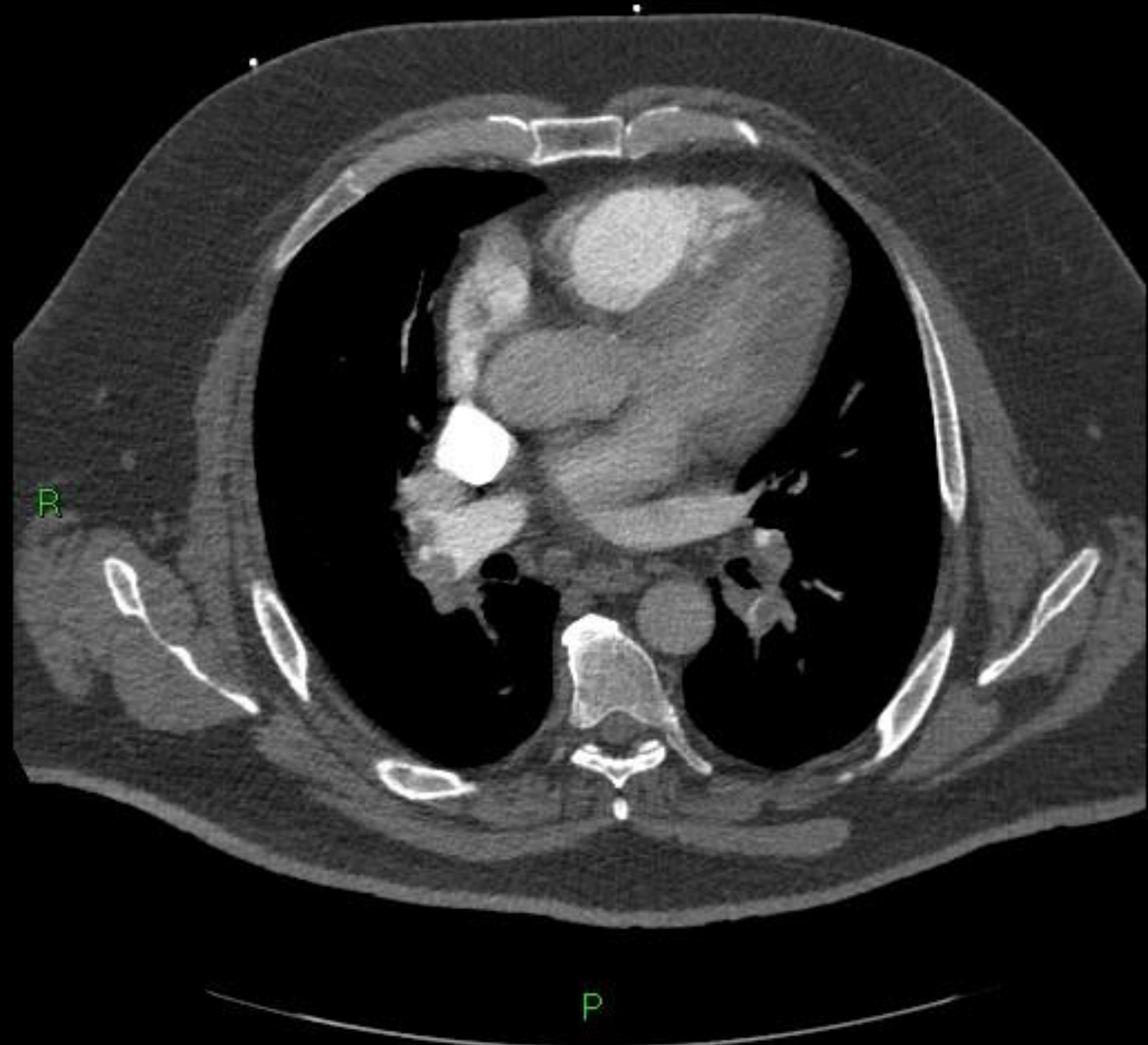
PEs likely acute

- expand pulmonary arteries
- central

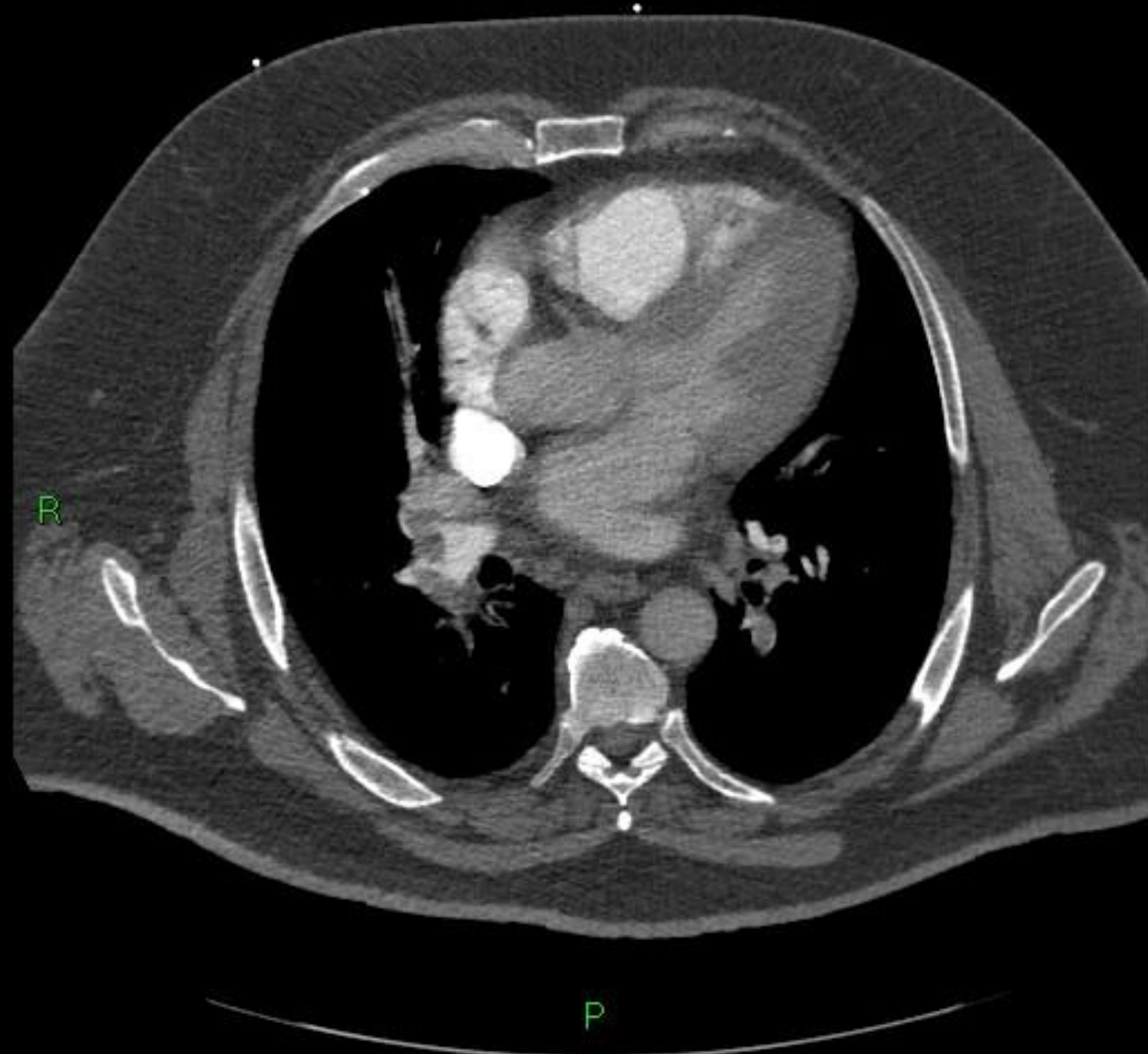


Thanks to Dr Deepa Gopalan, Imperial College London

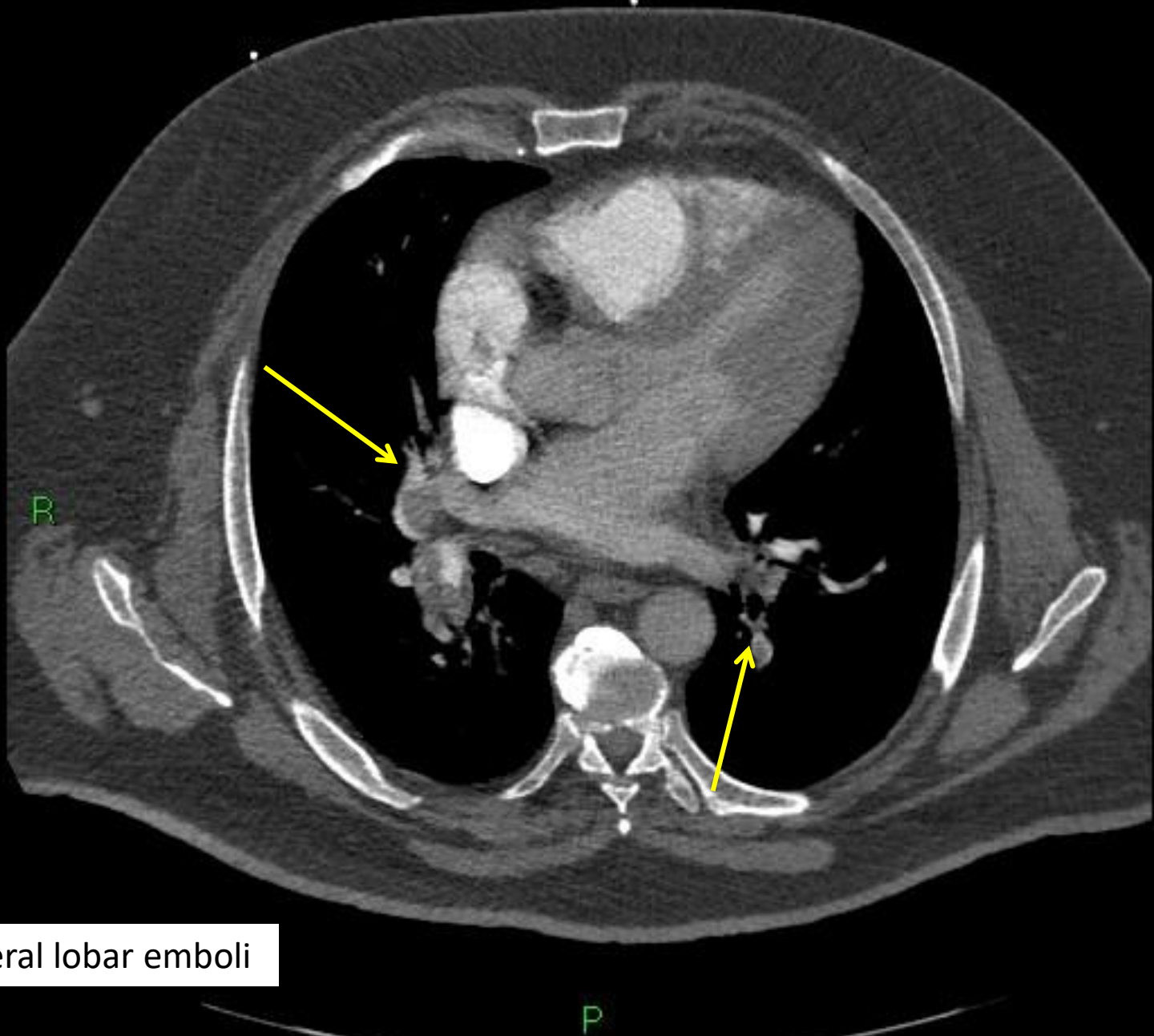
< 501 - 242 Soft Tissue >



< 501 - 252 Soft Tissue >



< 501 - 260 Soft Tissue >

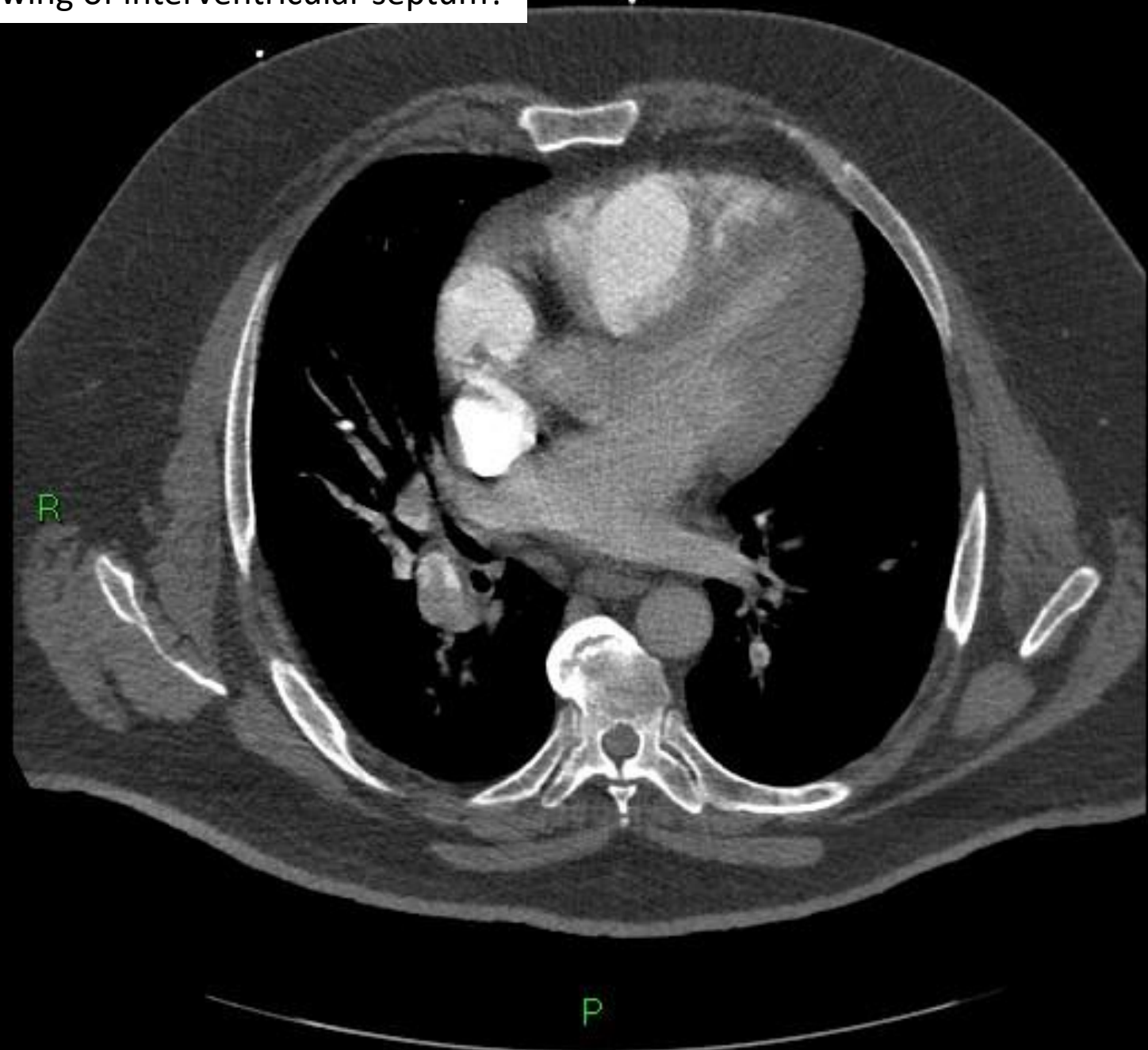


Bilateral lobar emboli

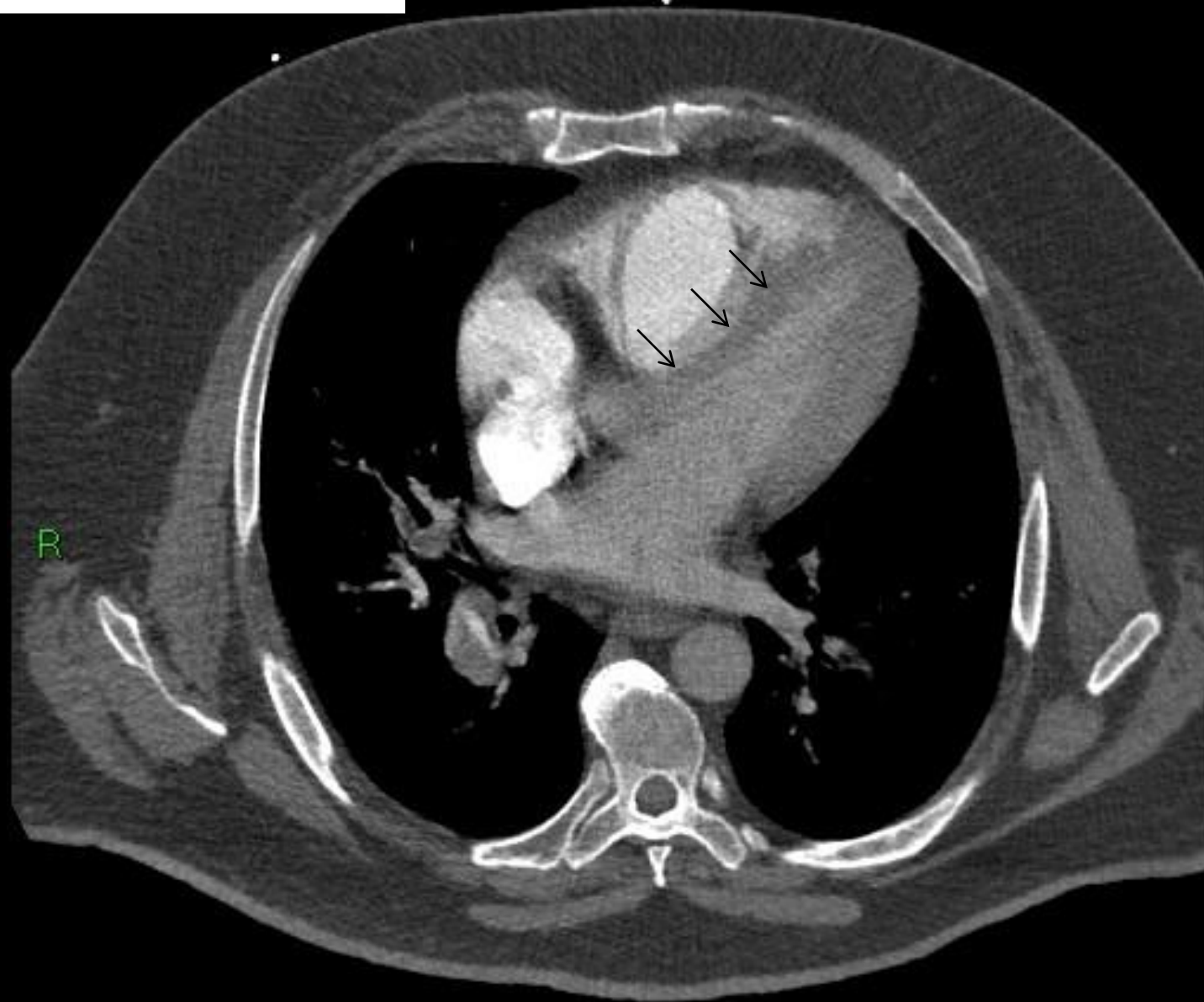
Signs of RV strain? [Left Tissue >](#)



Signs of RV strain:
Bowling of interventricular septum?



FLATTENING OF SEPTUM



Thanks to Dr Deepa Gopalan, Imperial College London

< 501 - 284 Soft Tissue >



R

P

Signs of RV strain: [Left Tissue >](#)



< 501 - 296 Soft Tissue >

RV/LV Ratio?



Thanks to Dr Deepa Gopalan, Imperial College London

< 501 - 304 Soft Tissue >

RV/LV Ratio?

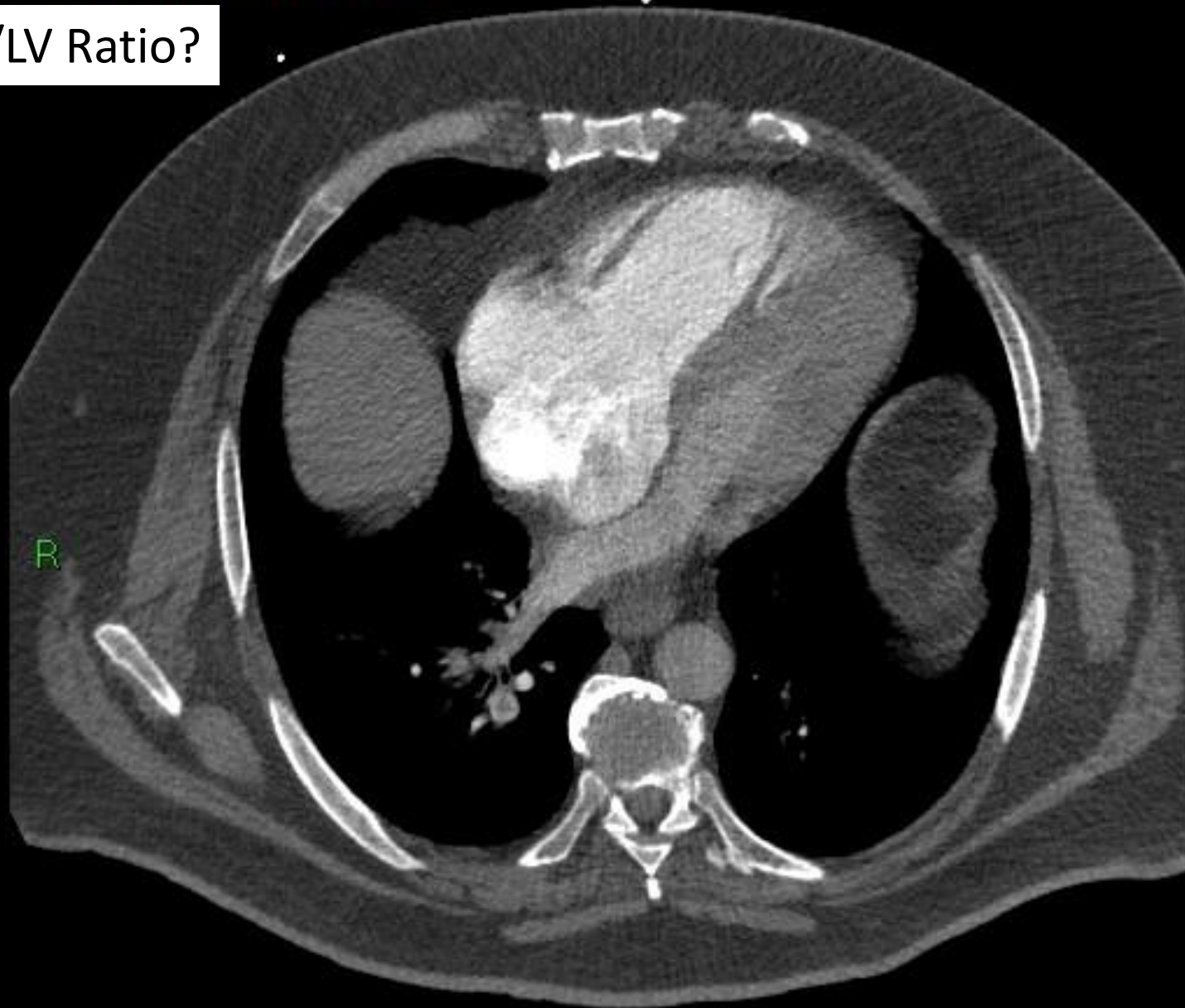


R

P

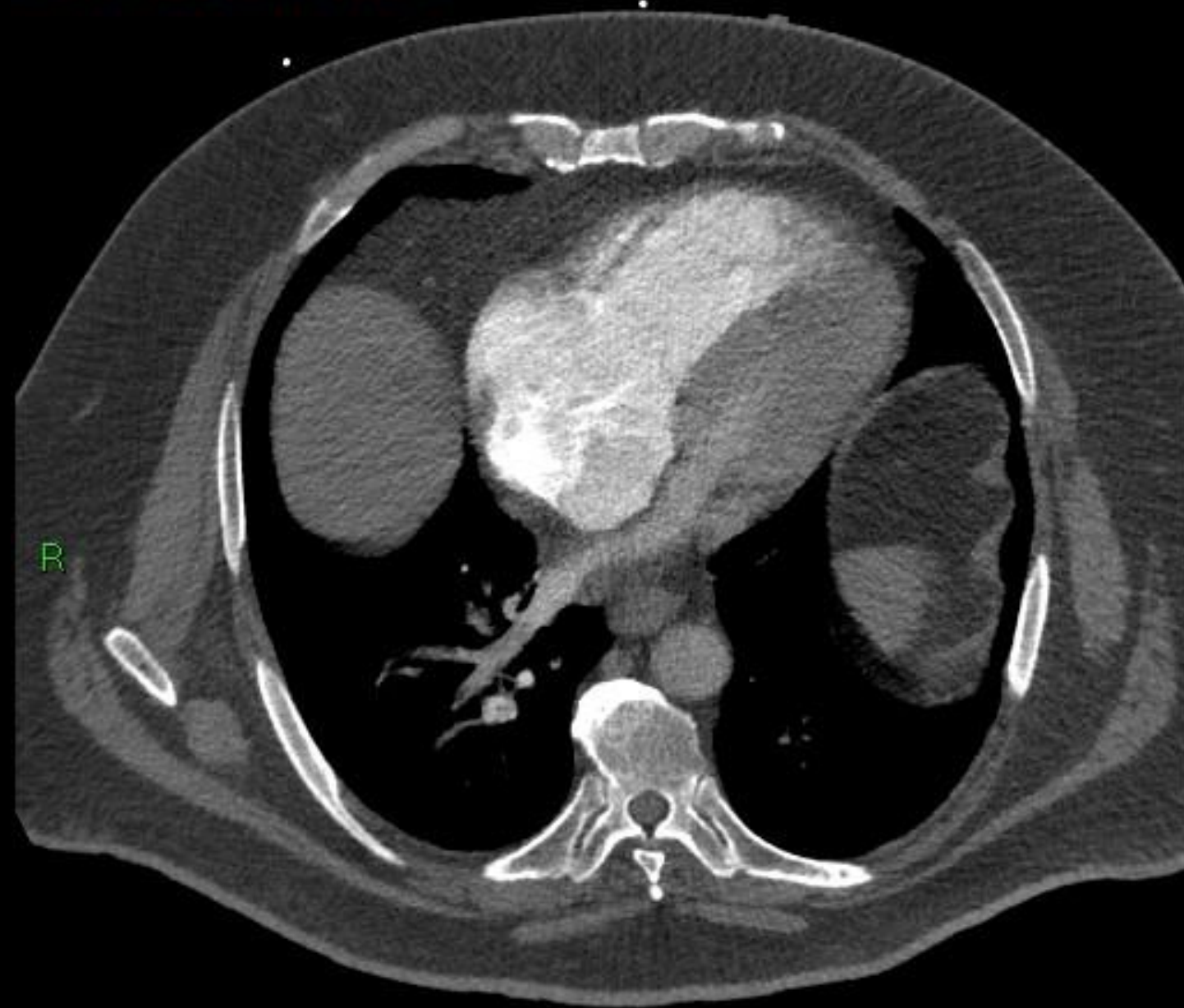
< 501 - 312 Soft Tissue >

RV/LV Ratio?



Thanks to Dr Deepa Gopalan, Imperial College London

< 501 - 320 Soft Tissue >

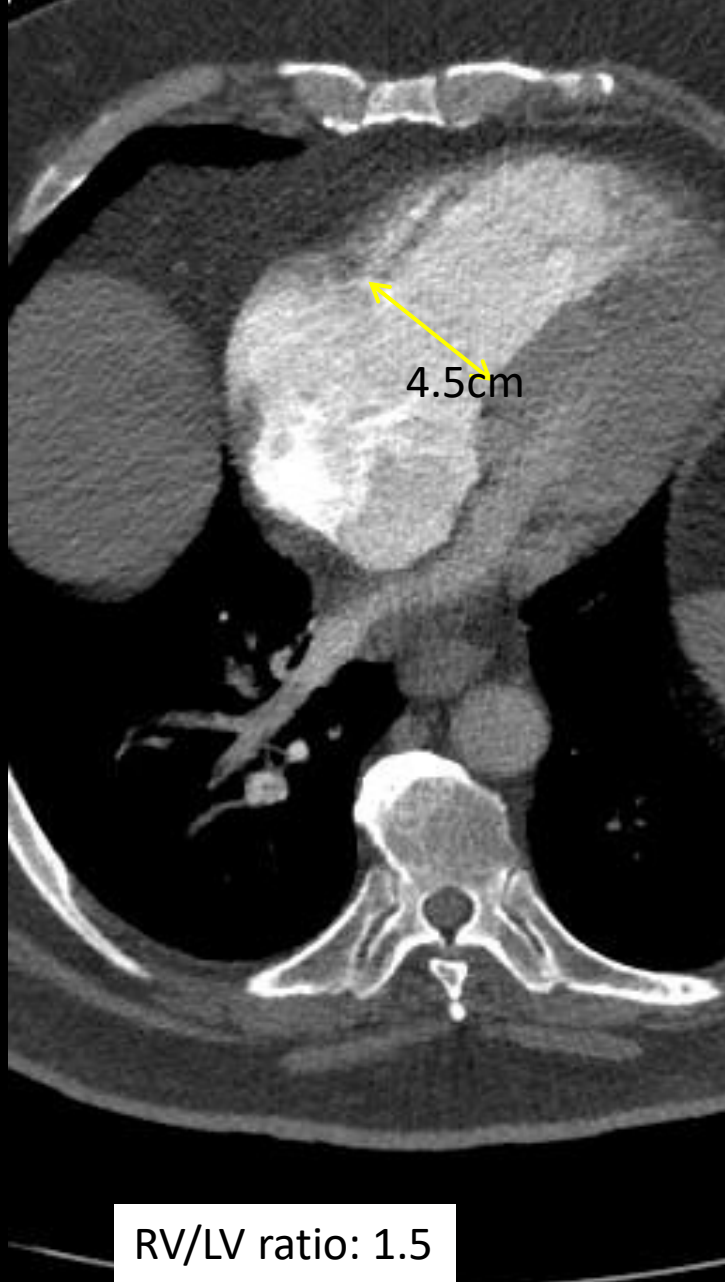


R

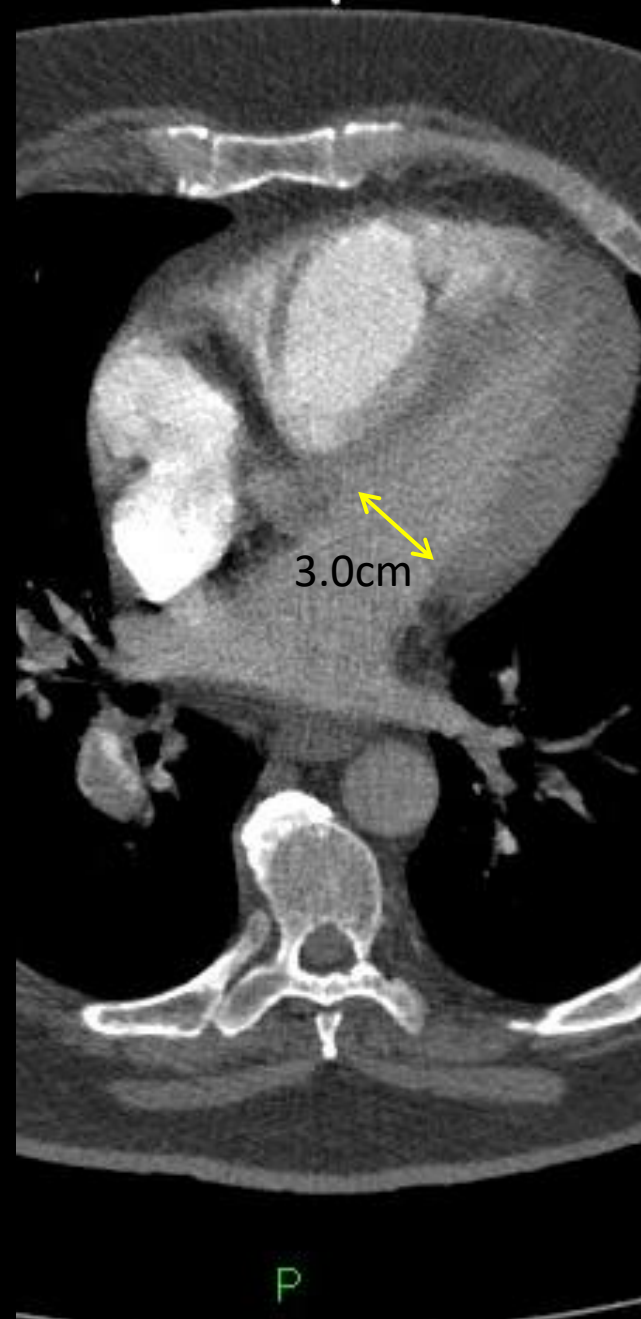
P

Tissue >

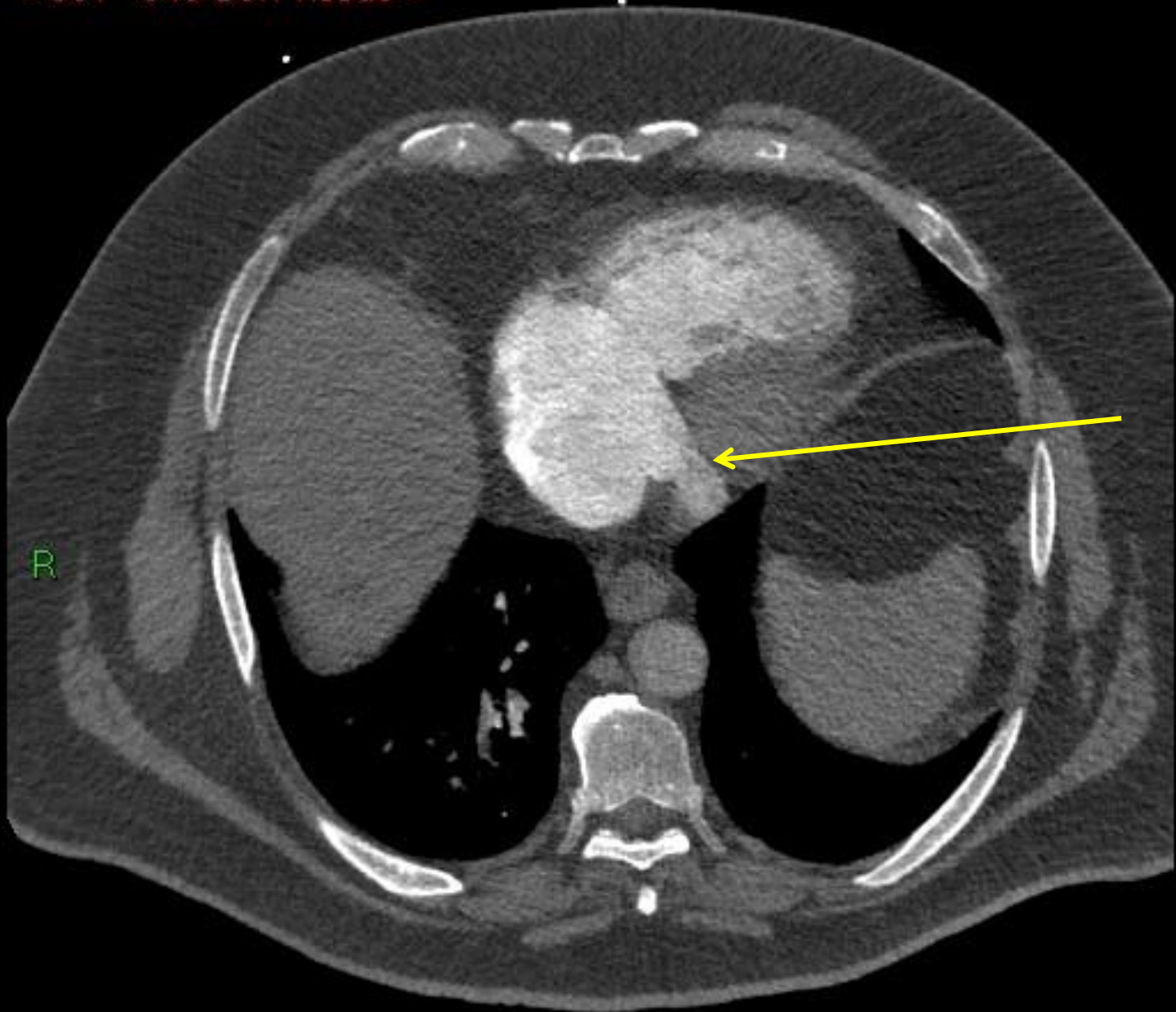
QUANTATIVE MEASURE OF RV STRAIN



P >



< 501 - 348 Soft Tissue >

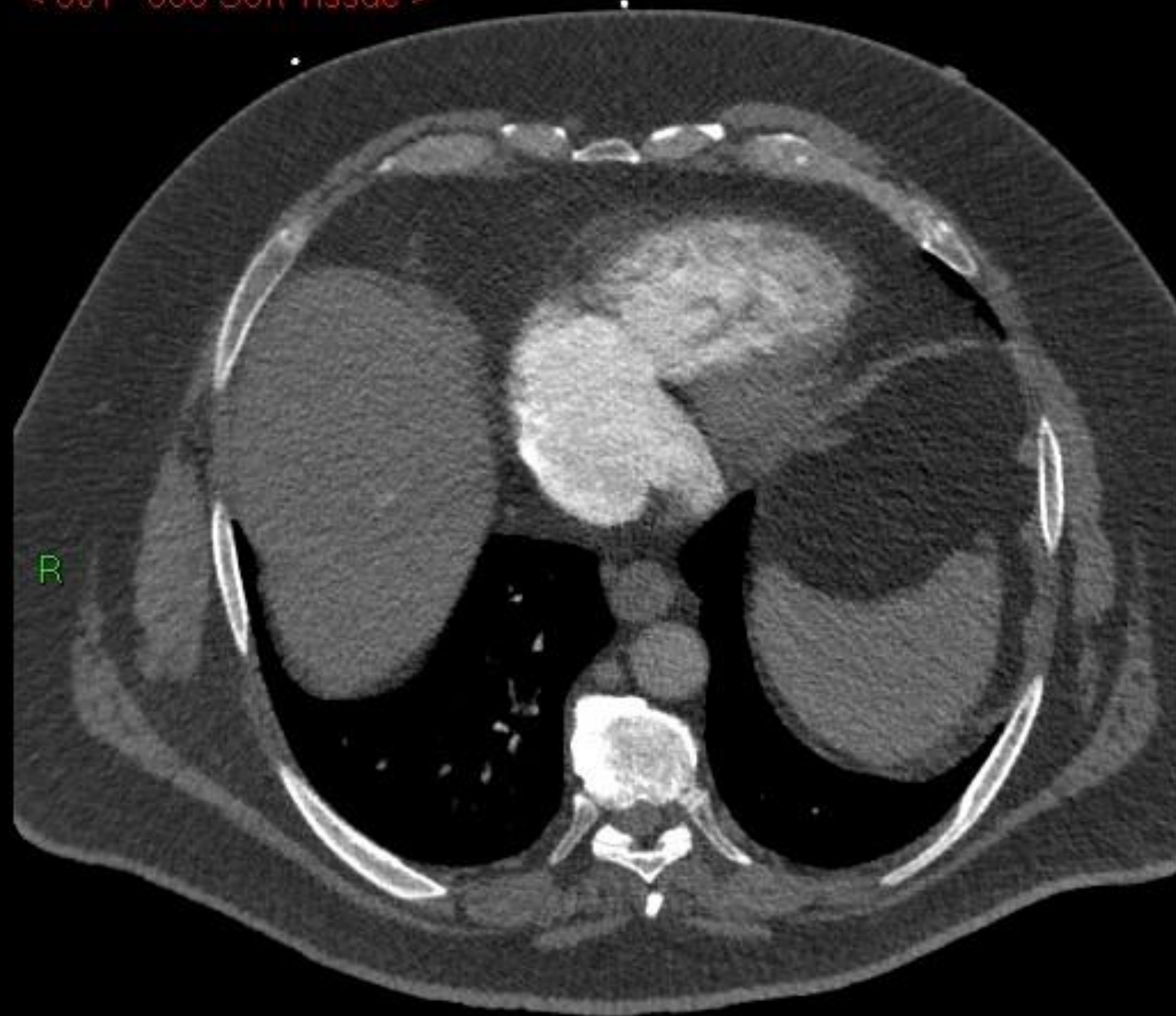


Distended coronary sinus

R

P

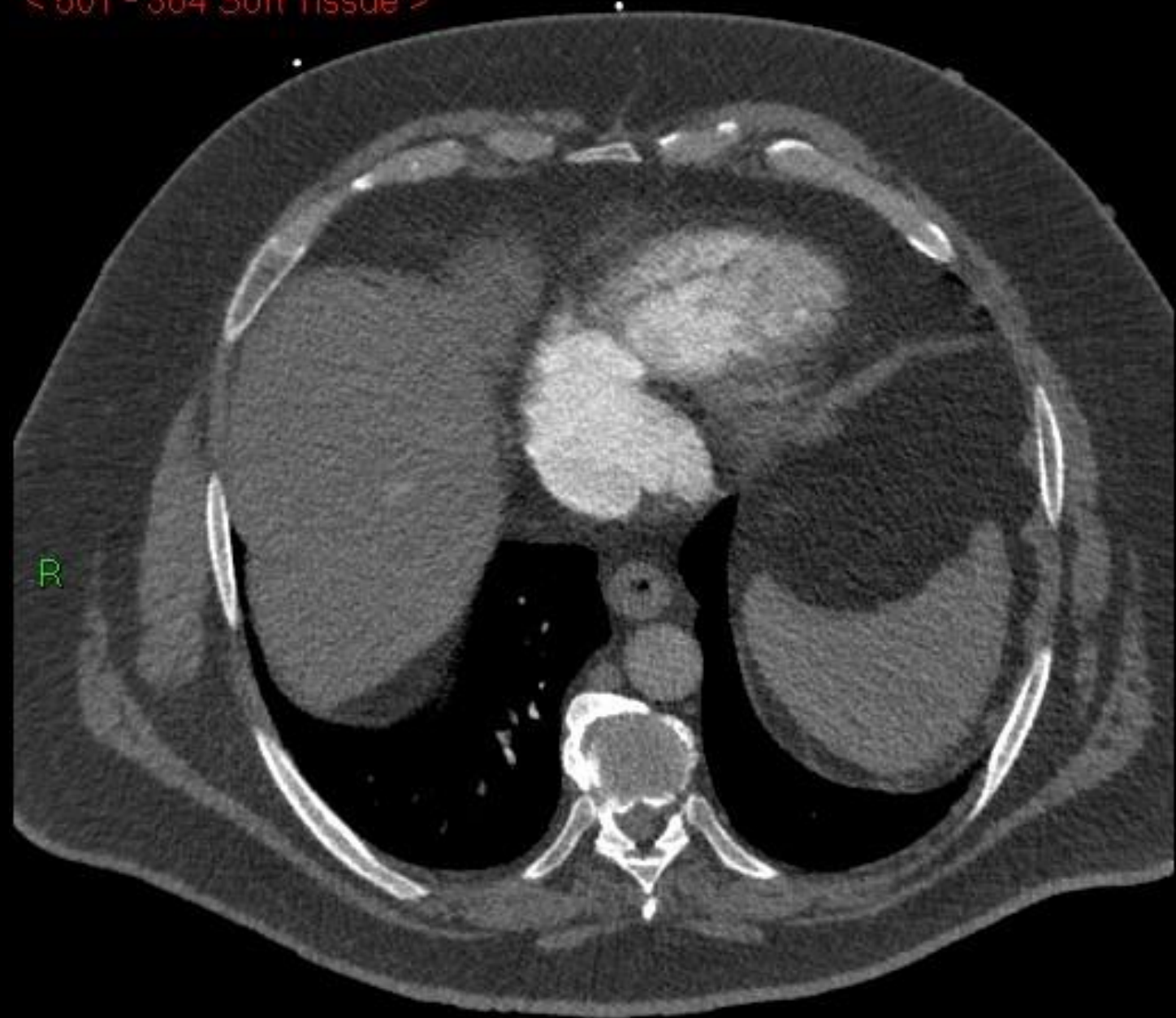
< 501 - 356 Soft Tissue >



R

P

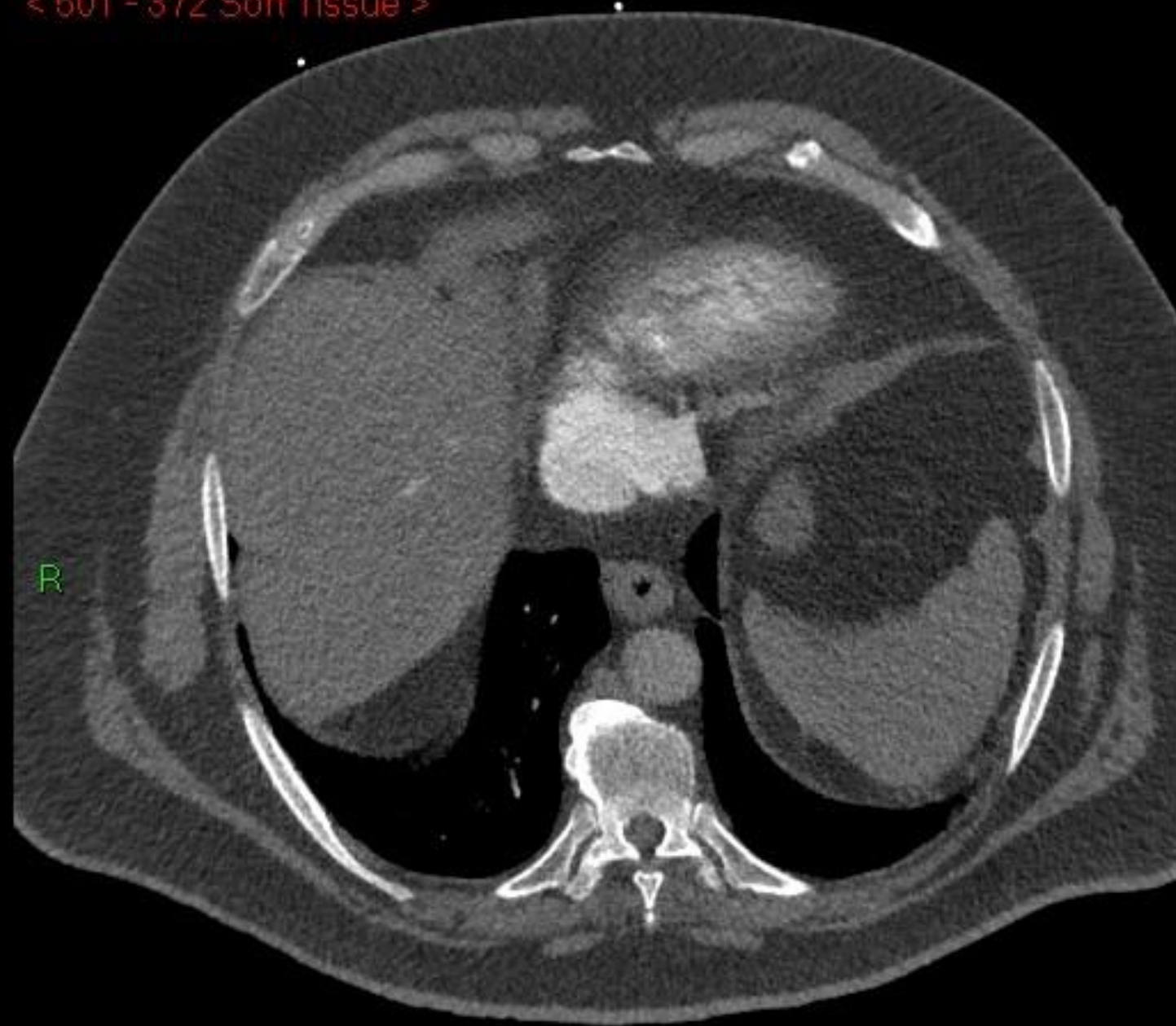
< 501 - 364 Soft Tissue >



R

P

< 501 - 372 Soft Tissue >



R

P

< 501 - 391 Soft Tissue >



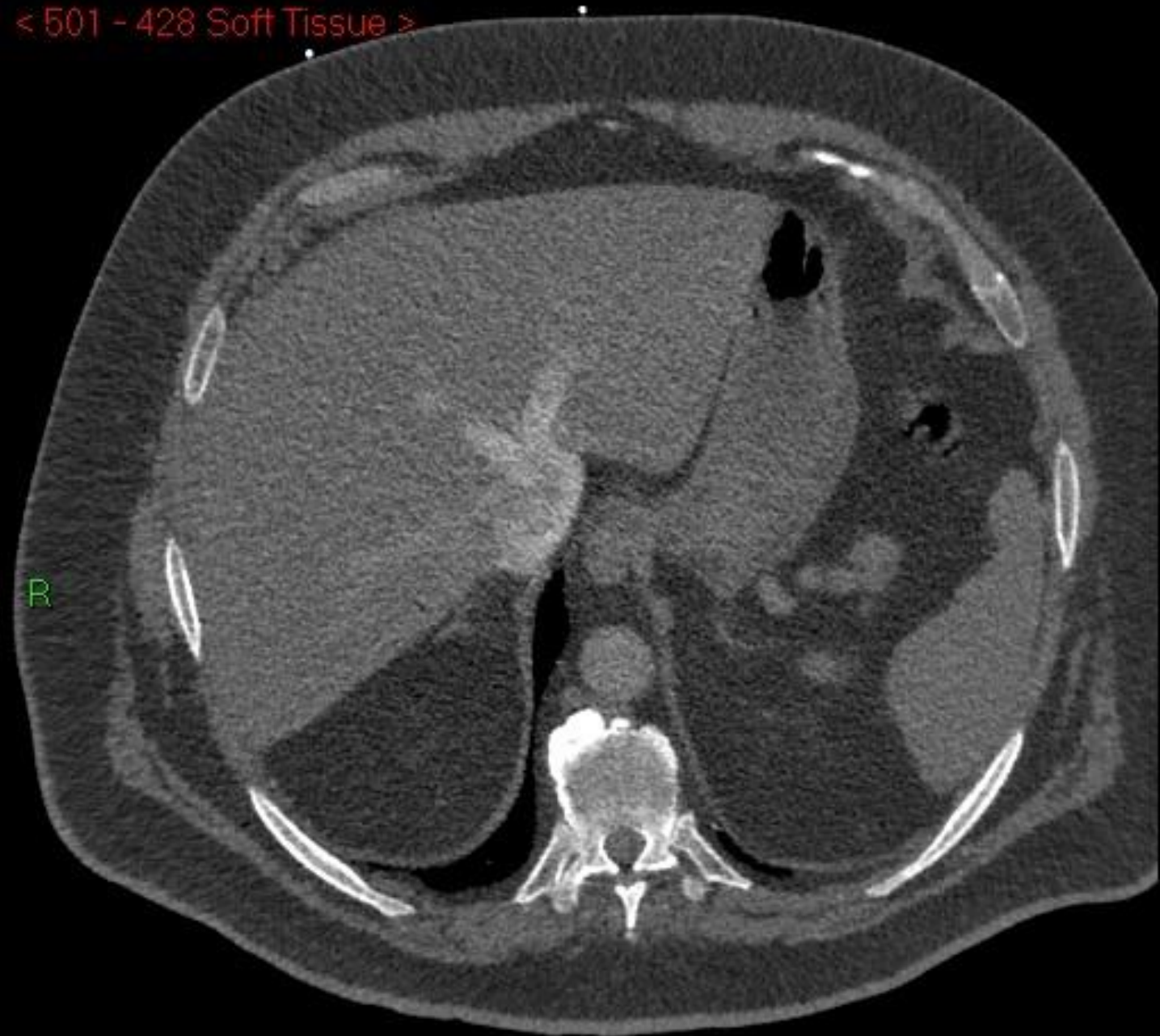
< 501 - 409 Soft Tissue >



R

P

< 501 - 428 Soft Tissue >

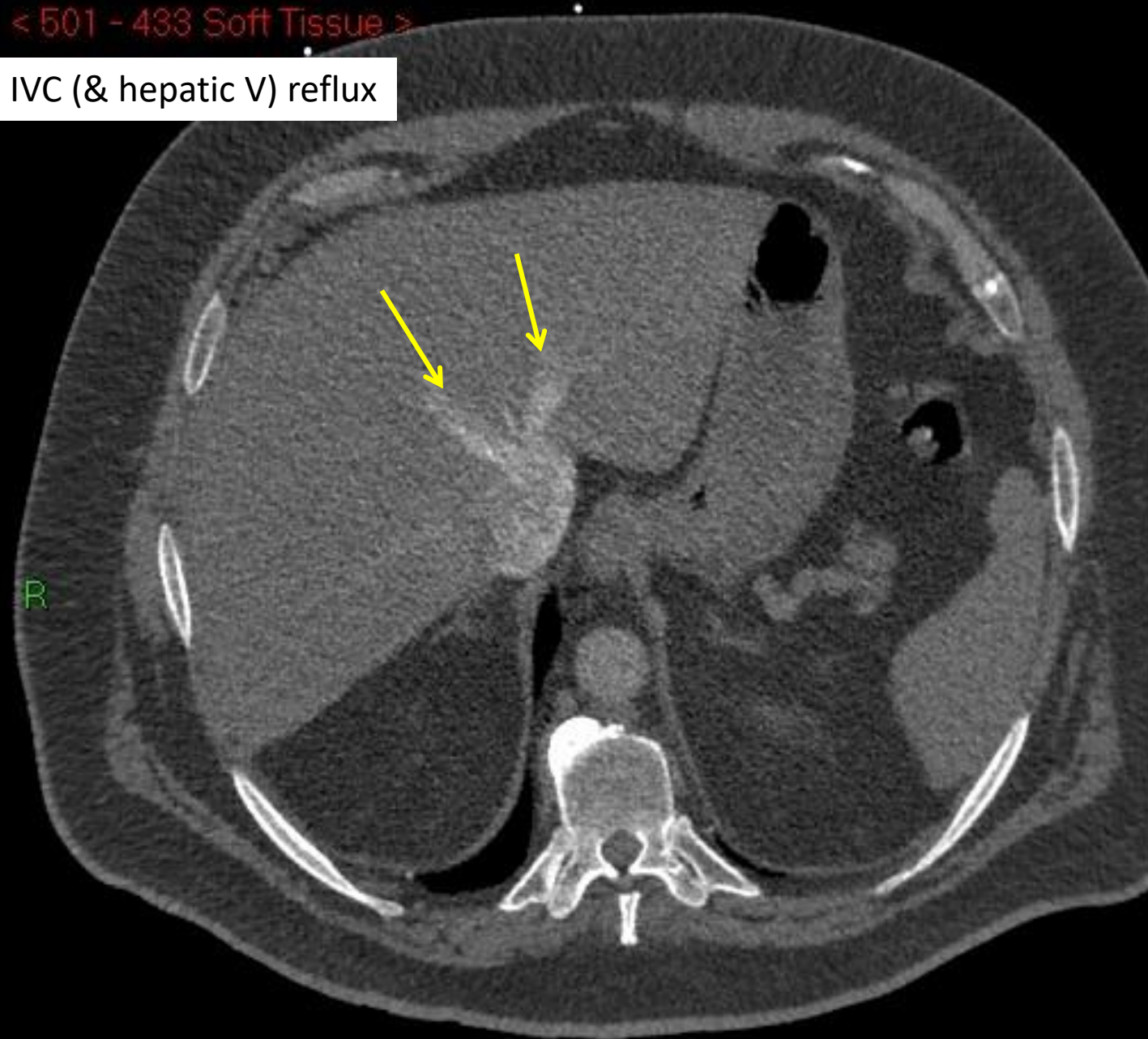


R

P

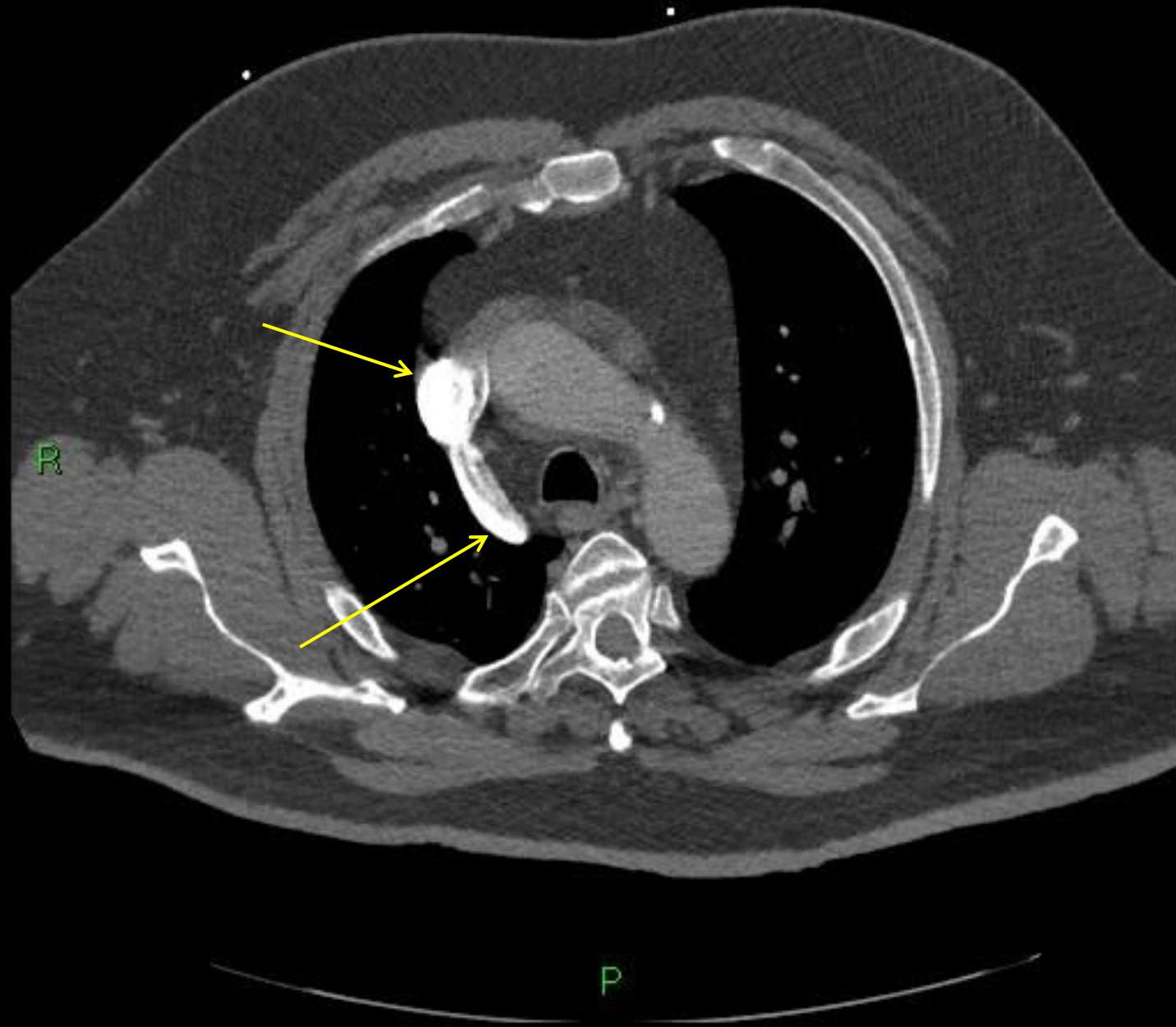
< 501 - 433 Soft Tissue >

IVC (& hepatic V) reflux

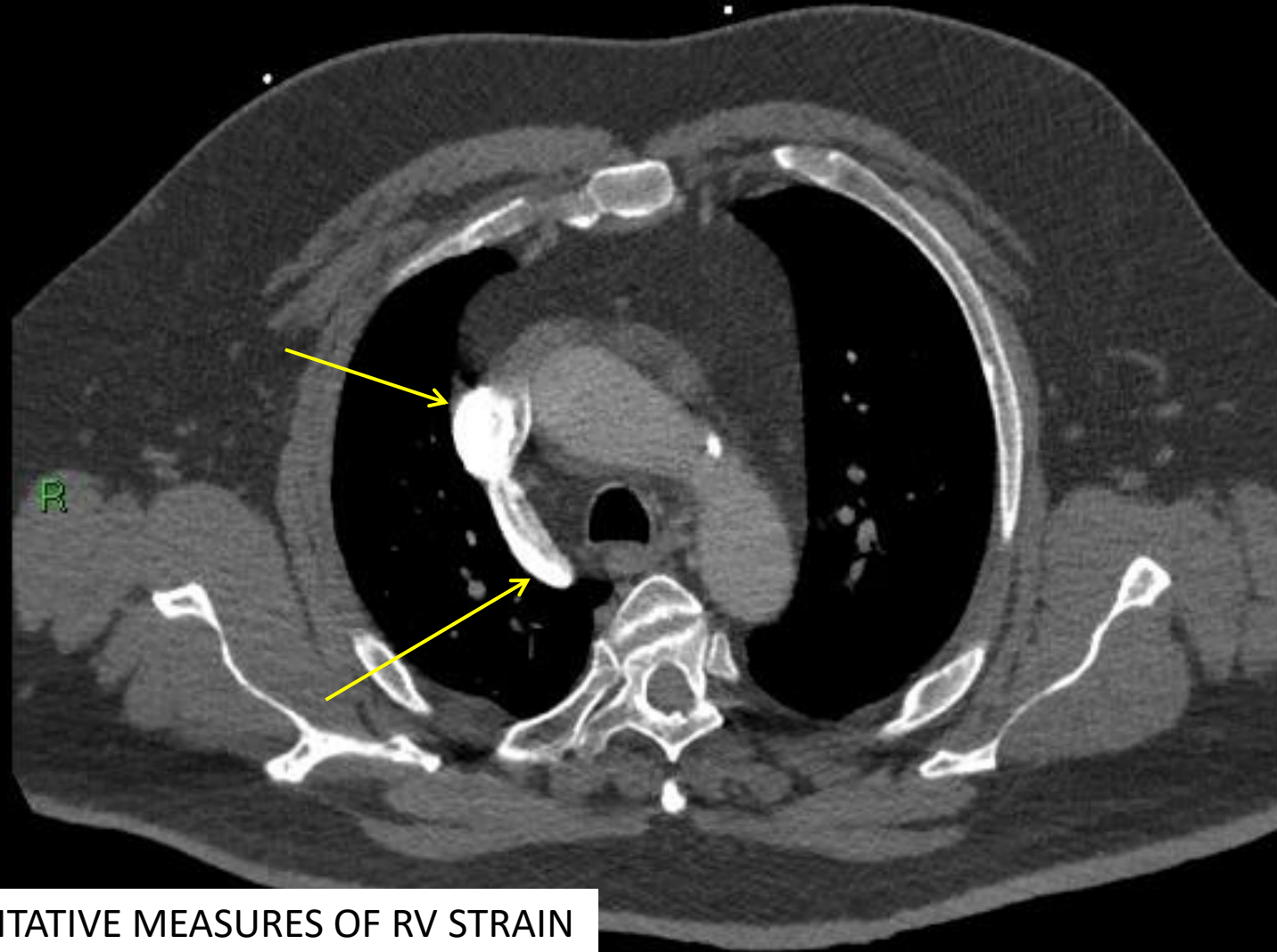


Thanks to Dr Deepa Gopalan, Imperial College London

SVC and Azygous dilation >



SVC and Azygous dilation >

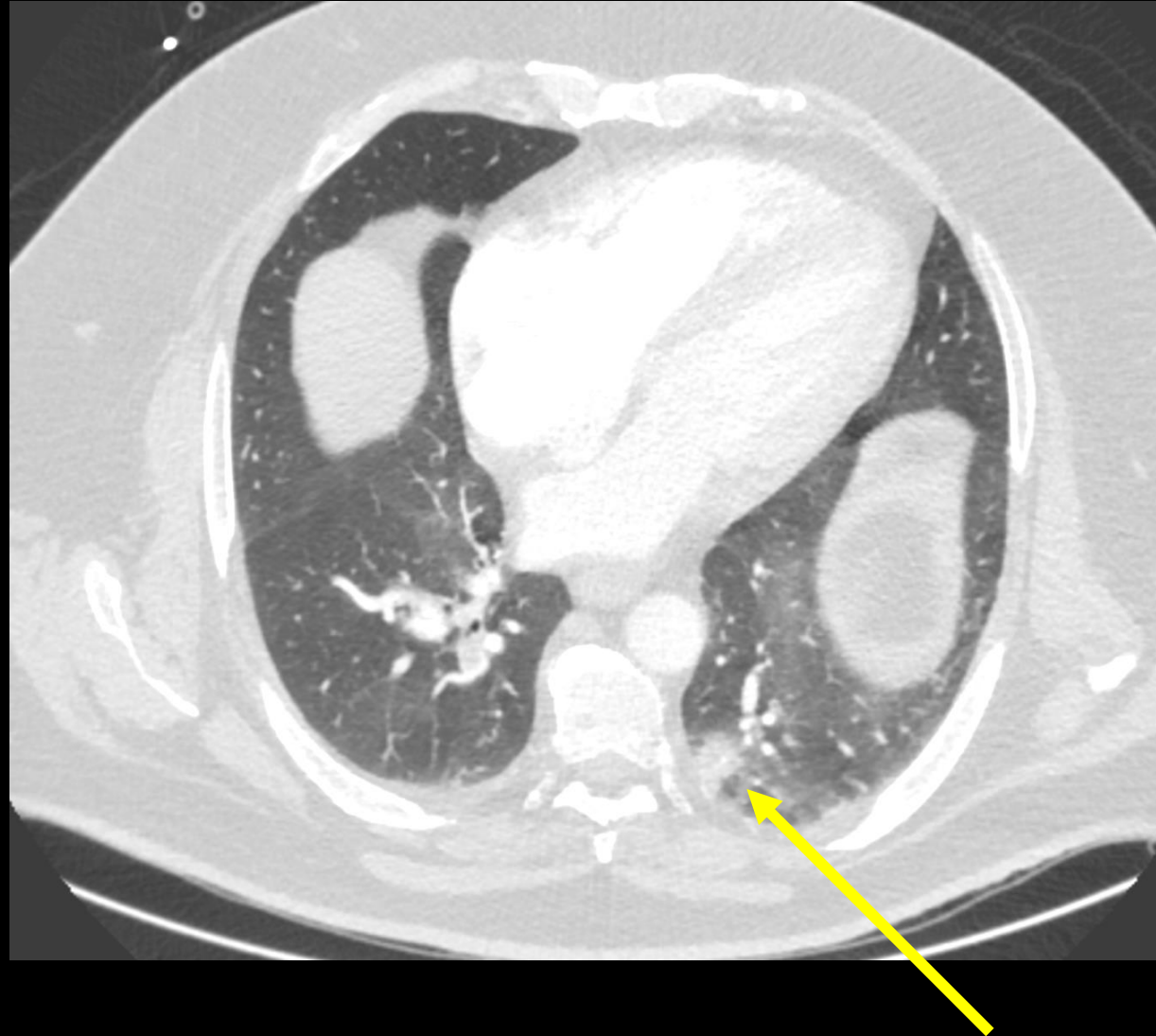


QUALITATIVE MEASURES OF RV STRAIN

- 1 Venous dilation
- 2 Septal bowing/flattening

P

Secondary lung infarction



Which is the MOST important factor in predicting increased mortality in PE

- A. Increased Right Ventricle:Left Ventricle Ratio > 1.0
- B. SVC dilation
- C. Clot burden
- D. Hepatic venous dilation

CLOT BURDEN: How much of the pulmonary arterial tree is filled with embolus
Qanadli et al: New CT index to quantify arterial obstruction in PE. AJR 2001

Which is the MOST important factor in predicting increased mortality in PE

- A. Increased Right Ventricle: Left Ventricle Ratio > 1.0
- B. SVC dilation
- C. Clot burden
- D. Hepatic venous dilation

Metafratzi et al Acute PE: correlation of CTPA Obstruction Index with Blood Gas values AJR 2006

Ghuysen et al CTPA and Px significance in pts with acute PE Thorax 2005

Furlan et al Radiology 2012

CTPA What to put in your report

- Site of Pulmonary Embolus
 - Trunk
 - Main Pulmonary Artery
 - Lobar
 - Segmental
 - Sub-segmental
- Massive/Extensive/Isolated
- Completely/Partially obstructed artery
- Acute versus Chronic (central/distended pulmonary a) = THROMBOLYSIS

CTPA What to put in your report

- RV/LV ratio >1.0 or >1.5
 - Septal position
 - SVC dilation ($>20\text{mm}$)
 - Azygous dilation ($>10\text{mm}$)
 - IVC contrast reflux
- Signs of acute right heart failure
- Features of longstanding heart failure eg thick RV wall ($>6\text{mm}$)
 - Features of CCF, COPD
 - Clot burden

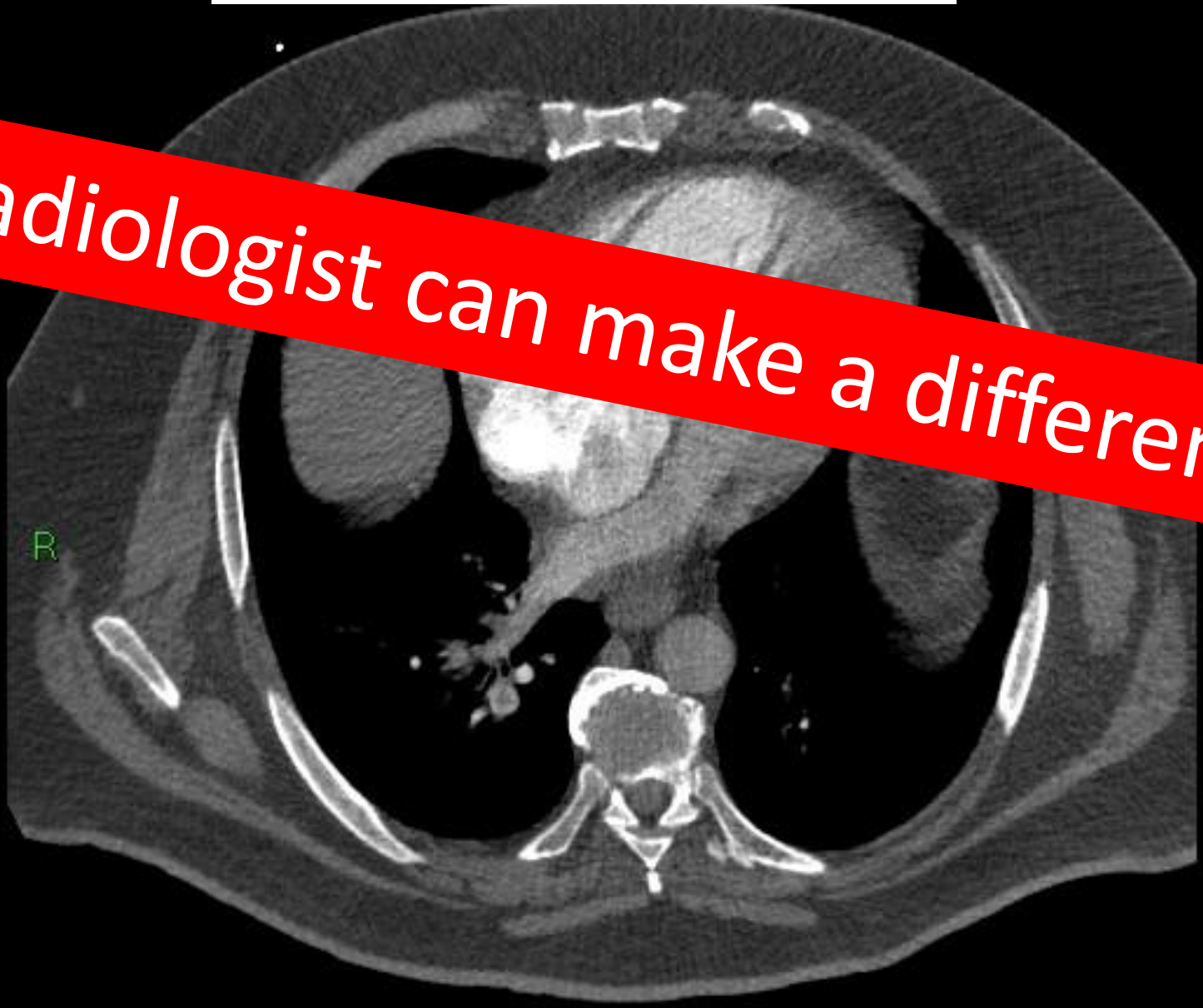
CTPA What to put in your report

- RV/LV ratio >1.0 or >1.5
 - Septal position
 - SVC dilation ($>20\text{mm}$)
 - Azygous dilation ($>10\text{mm}$)
 - IVC contrast reflux
- Signs of acute right heart failure
- Features of longstanding heart failure eg thick RV wall ($>6\text{mm}$)
 - Features of CCF, COPD
 - Clot burden AFFECTS RV/LV RATIO (but doesn't influence mortality)

< 501 - 312

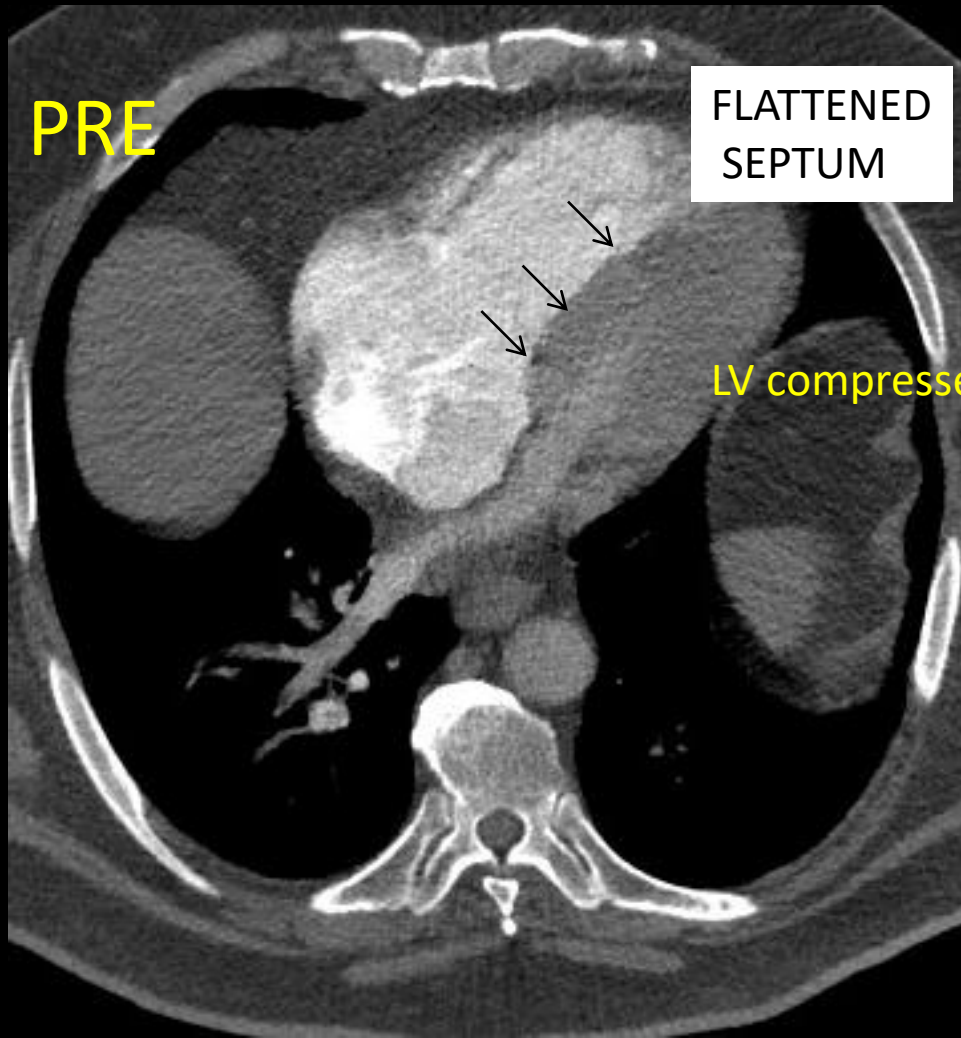
BILATERAL PULMONARY EMBOLI

Radiologist can make a difference

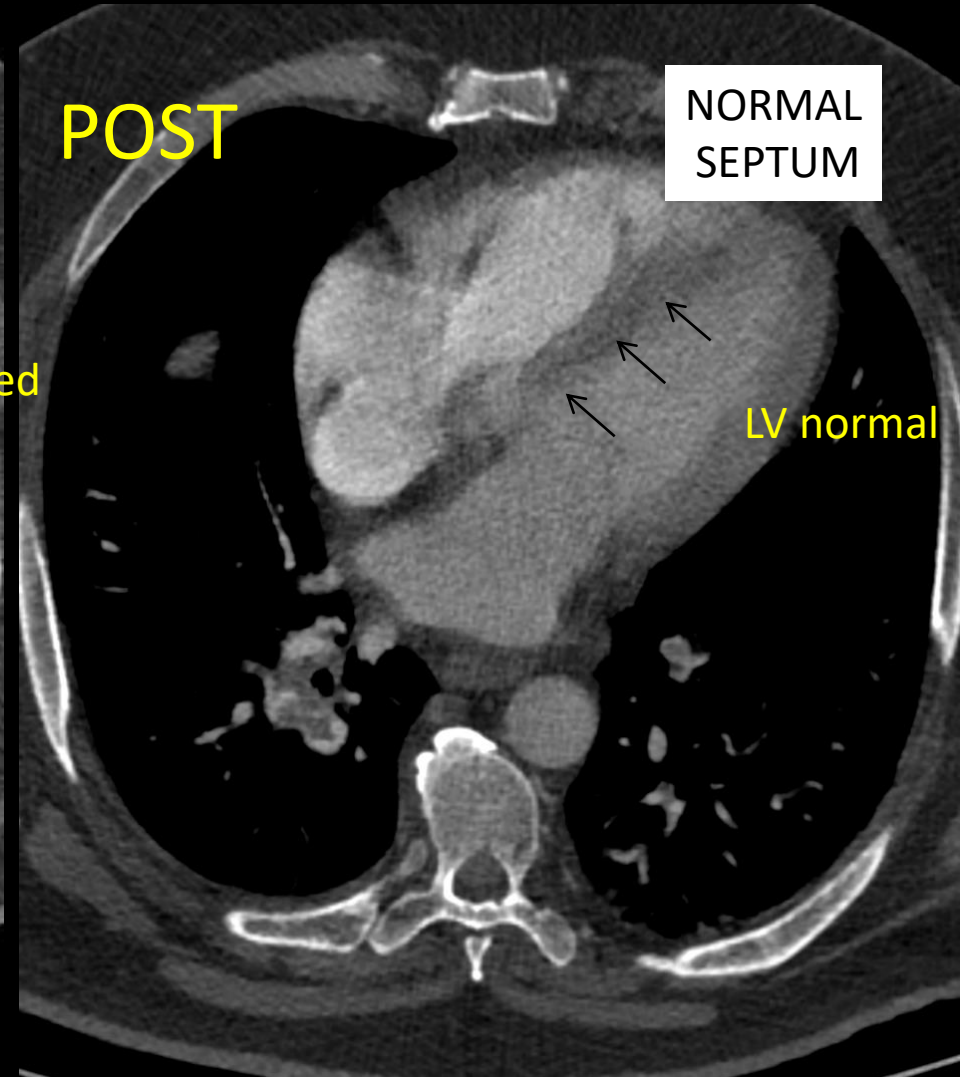


Thanks to Dr Deepa Gopalan, Imperial College London

Post Thrombolysis- RV strain reversed



On admission
RV/LV RATIO 1.5



1 day later - Post catheter thrombolysis of PE
RV/LV Ratio 1.0

FRIDAY NIGHT IN THE EMERGENCY DEPARTMENT

History is important

CT is a good all round investigation

DOUBLE RULE OUT – covers a lot of ground

Anatomical checklist

Alert clinicians early where you can affect outcome





Thanks to

Dr Deepa Gopalan

Dr Ben Ariff

Dr Chris Schelvan

Dr Sue Copley

Dr Mary Roddie

Declan O'Regan

Dr John Curtis

Dr Ali Alsafi

Dr Elika Kashef



BSER

British Society of Emergency Radiology



ESER

European Society of
Emergency Radiology