Multi-Detector Computed Tomography and Trans thoracic Echocardiography for predicting Left Atrial Appendage Occluder Device Size

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Disclosure

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Background

- AF may cause thromboembolic strokes
- The LAA is the thrombi source in more than 90% of strokes
- Anticoagulation significantly reduces the risk for stroke
- However it is often not tolerable, & used by approximately 50-60% of patients eligible for this treatment

Background

- Several devices have been developed to occlude the LAA
- Inaccurate LAA orifice sizing may lead to repeated device insertion attempts or failure
- A mean of 1 ± 1.6 devices per patients (range 1-4) is reported in the literature, until optimal LAA closure was obtained

Purpose

- The purpose of this study was to compare the routine pre-procedural transthoracic echocardiography (TTE) with multi-detector CT (MDCT) for LAA device sizing

Subjects & Methods

- All subjects underwent TTE and ECG gated MDCT scans prior to LAA closure device insertion
- MDCT scans
  - 265-slice scanner with
  - Retrospective ECG gating
  - Systolic phase (30-40% of the R-R interval) was used for calculations (when LAA is the largest)

Subjects & Methods

- TTE & MDCT measurements included:
  - LAA orifice maximal diameter (mm)
  - LAA orifice minimal diameter (mm)
  - LAA depth (mm)
- These values were compared with final device size (mm)

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Subjects & Methods

- TTE follow up at six weeks was performed in order to document the absence or presence of regurgitation (adjacent to the occluder device)

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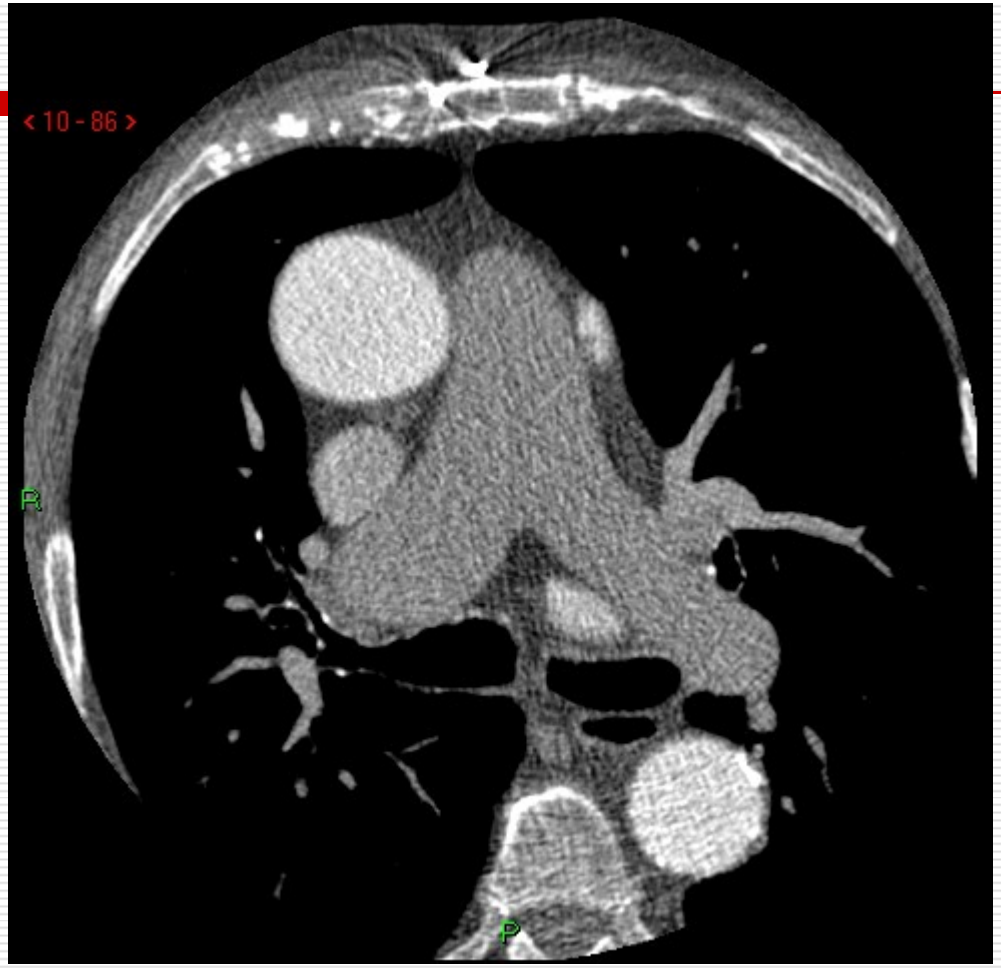
Results

- This study cohort included 22 chronic AF patients
  - 13 F; 9 M
  - Average age 76 y
- Two procedures failed (2/22)
- The total number of devices used was 24 in 20 patients
- 1.2 devices per patient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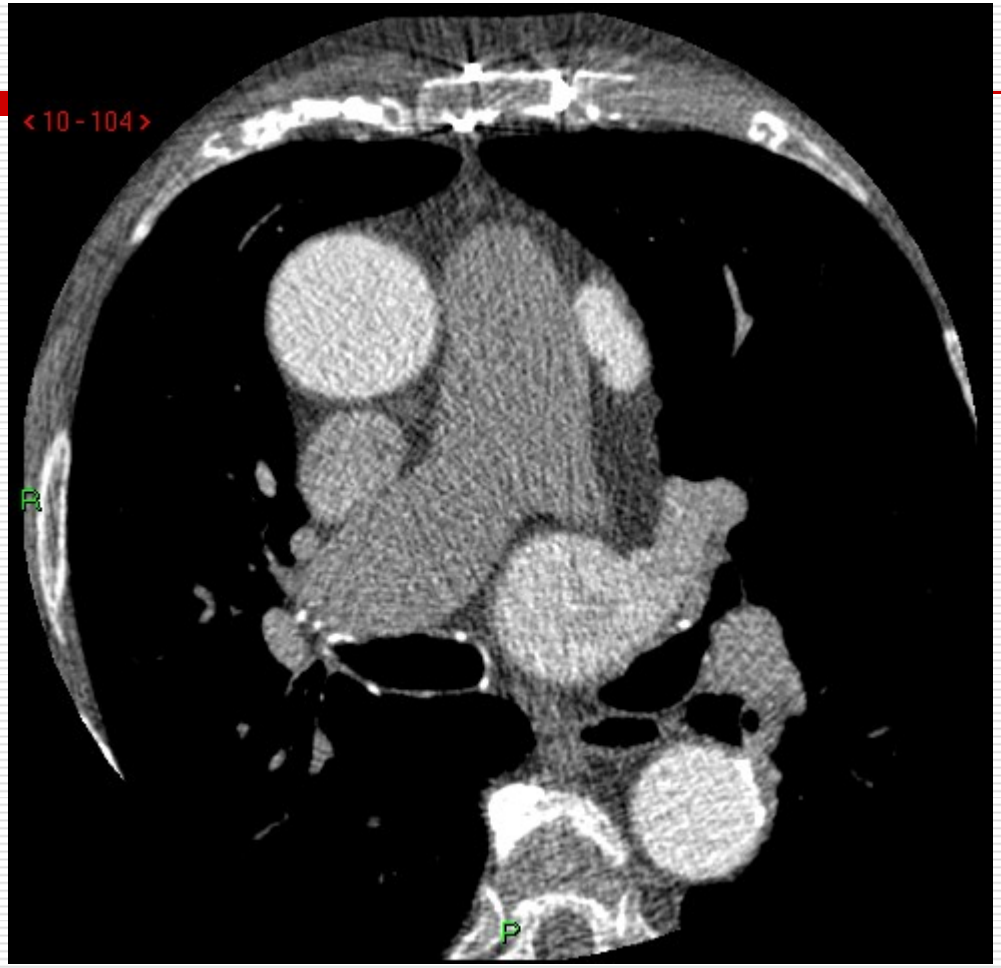
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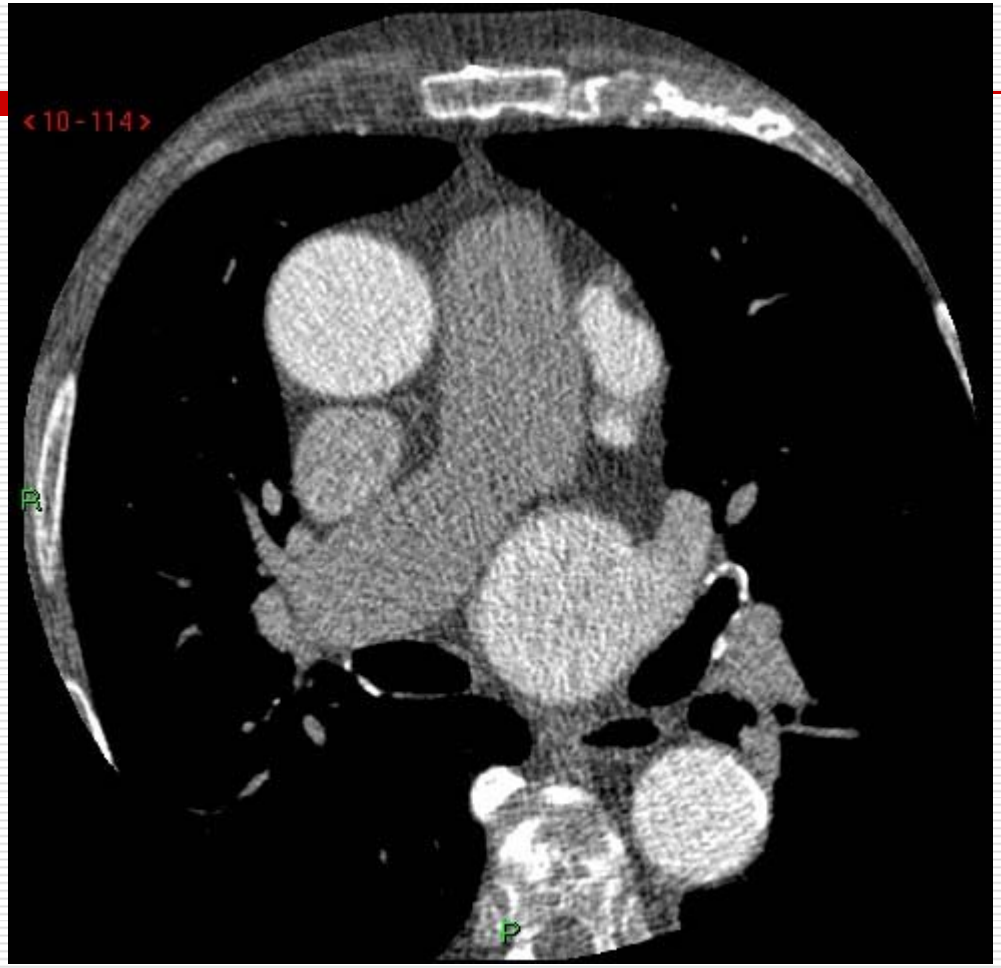
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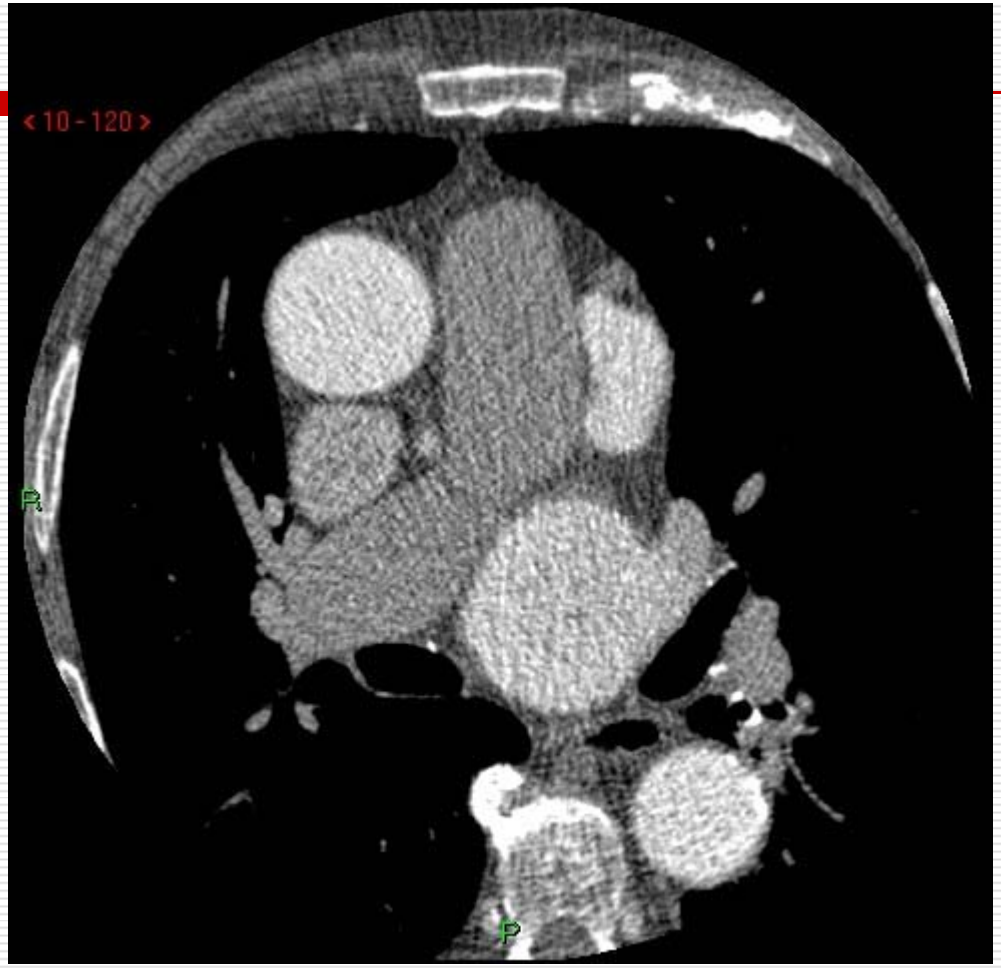
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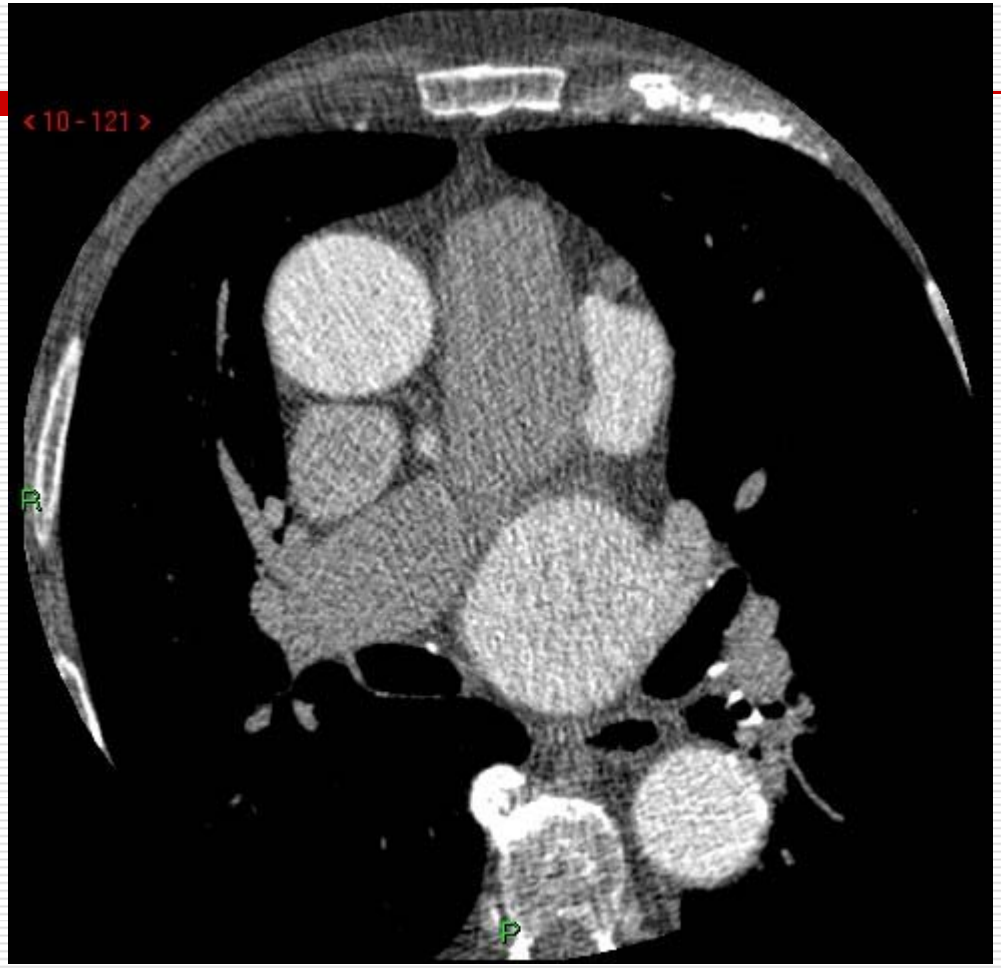
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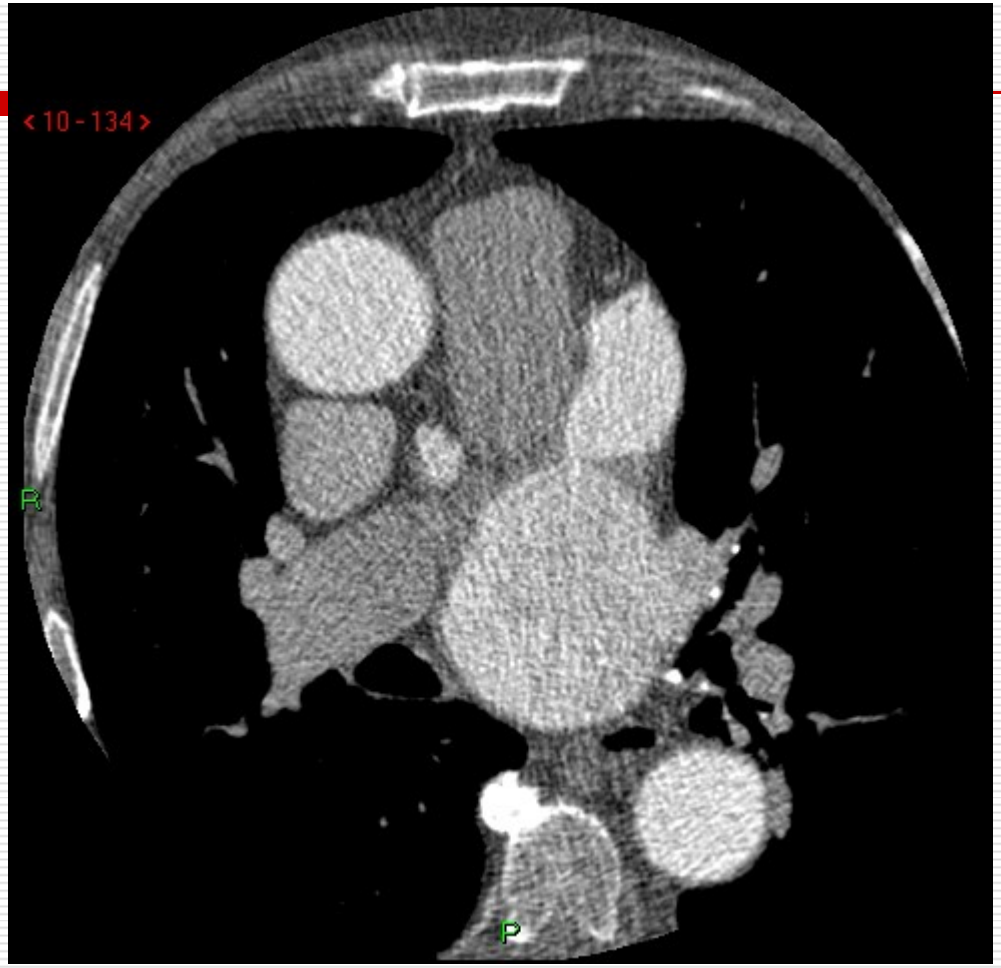
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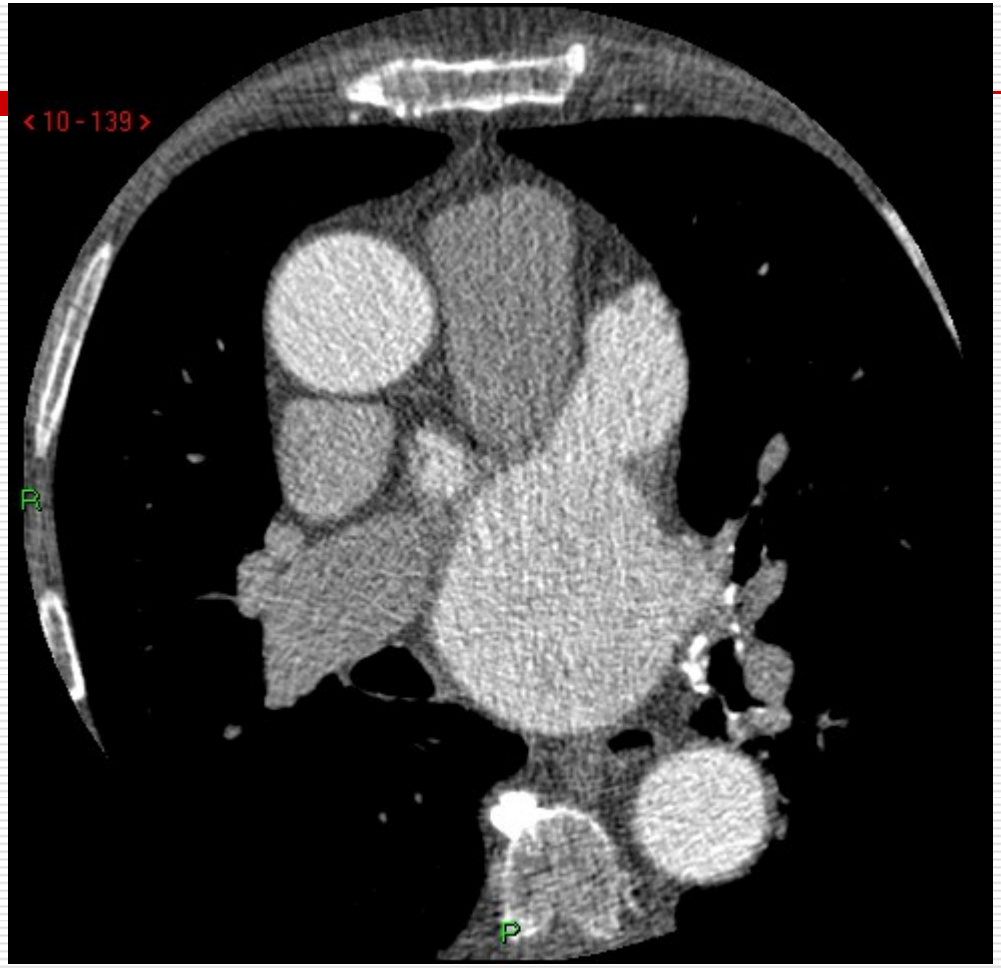
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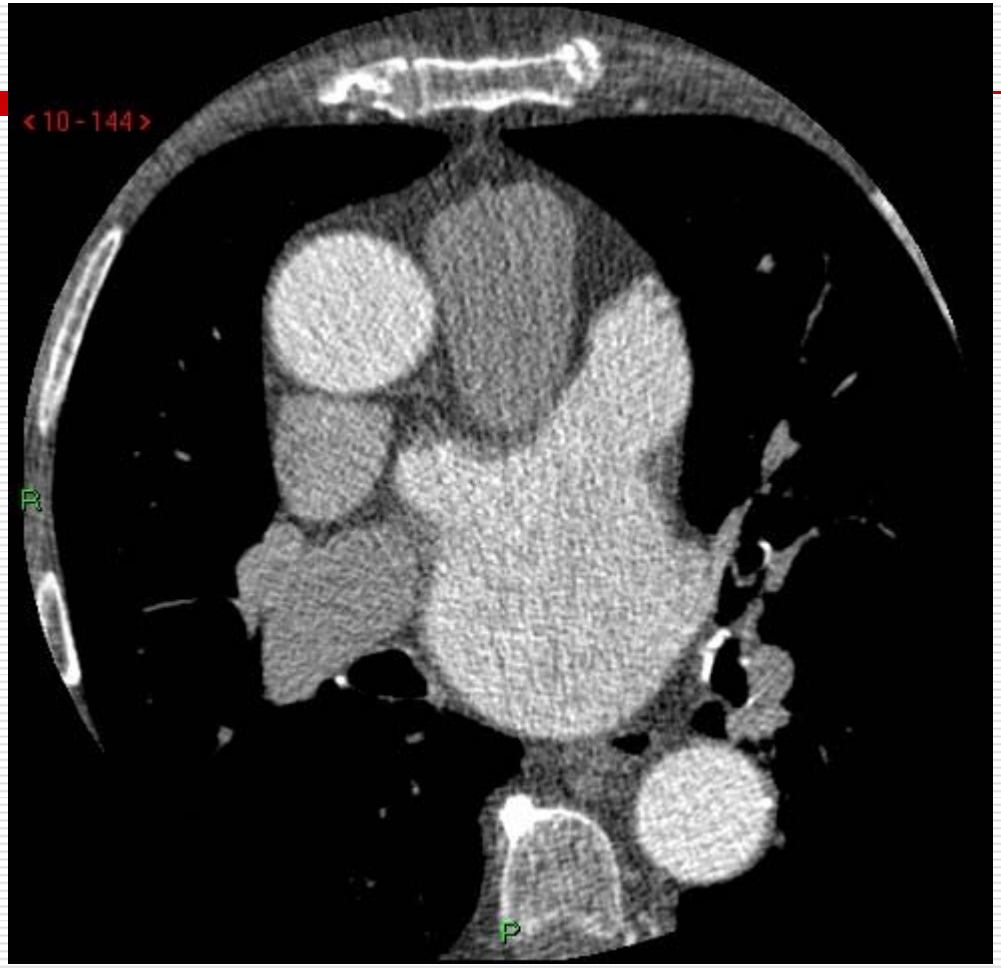
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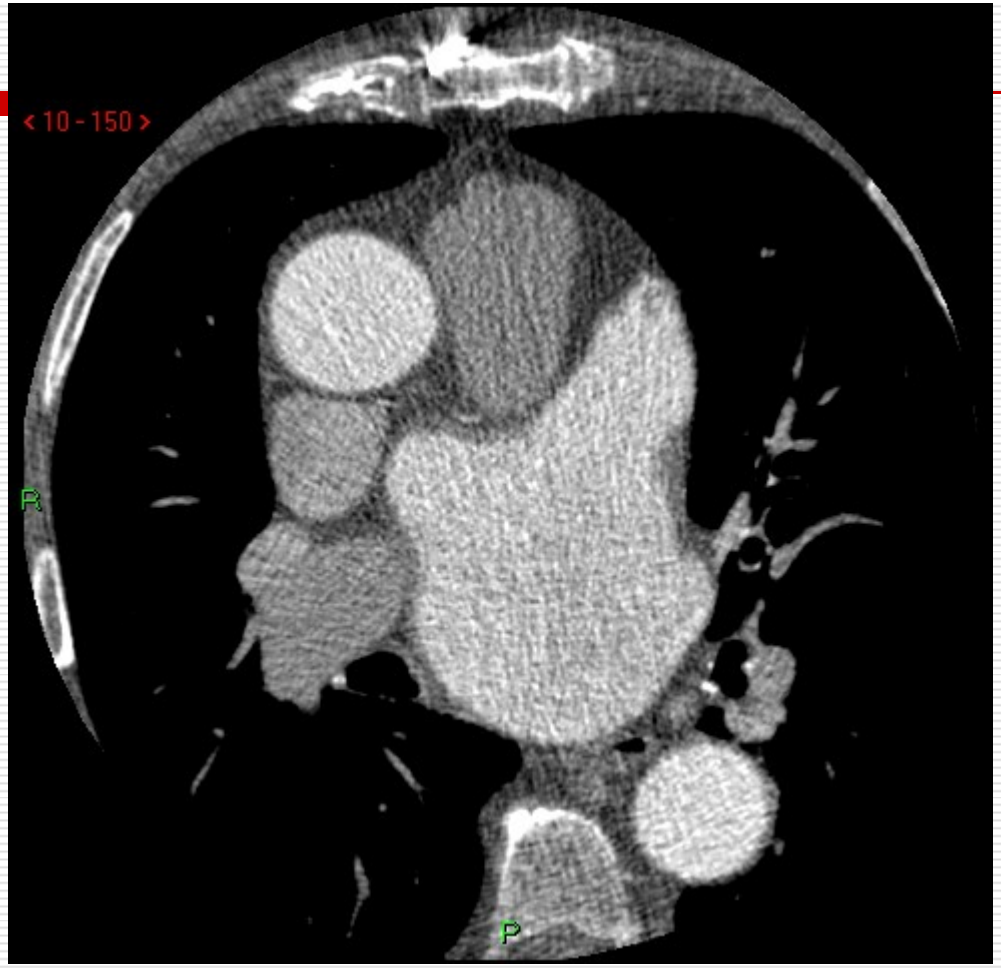
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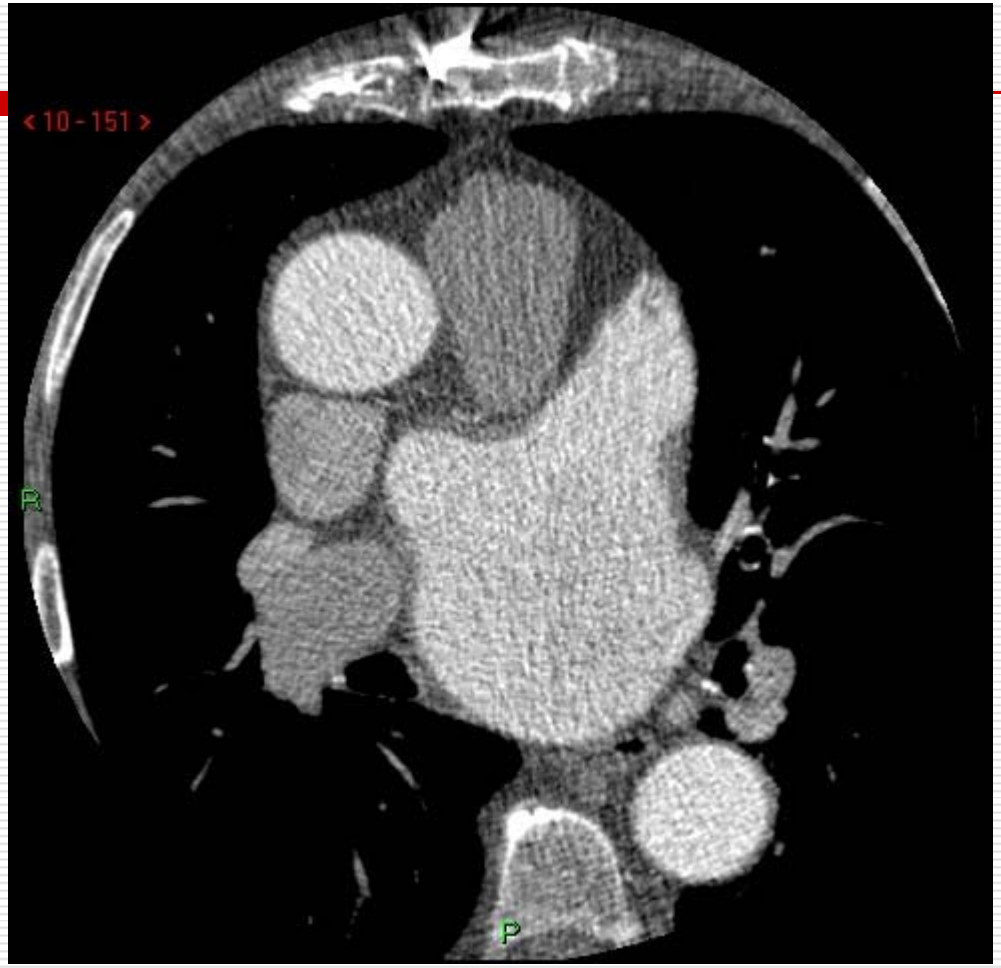
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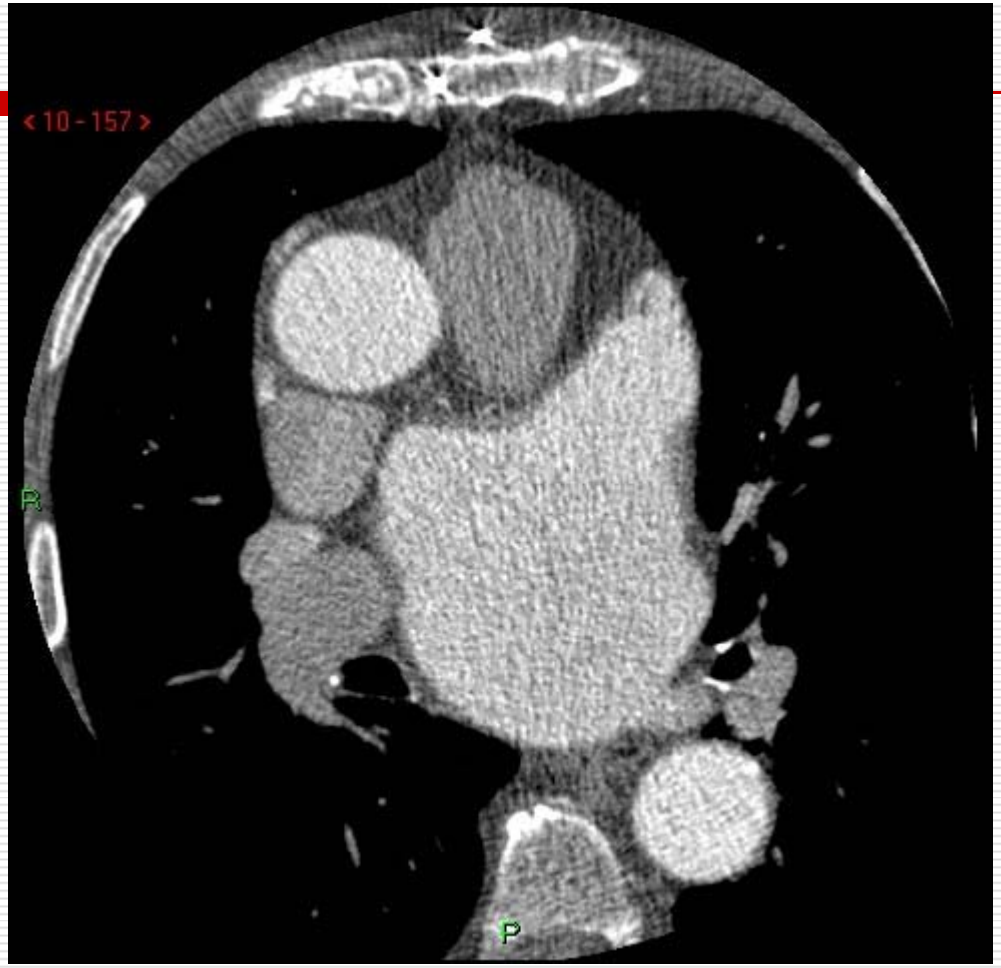
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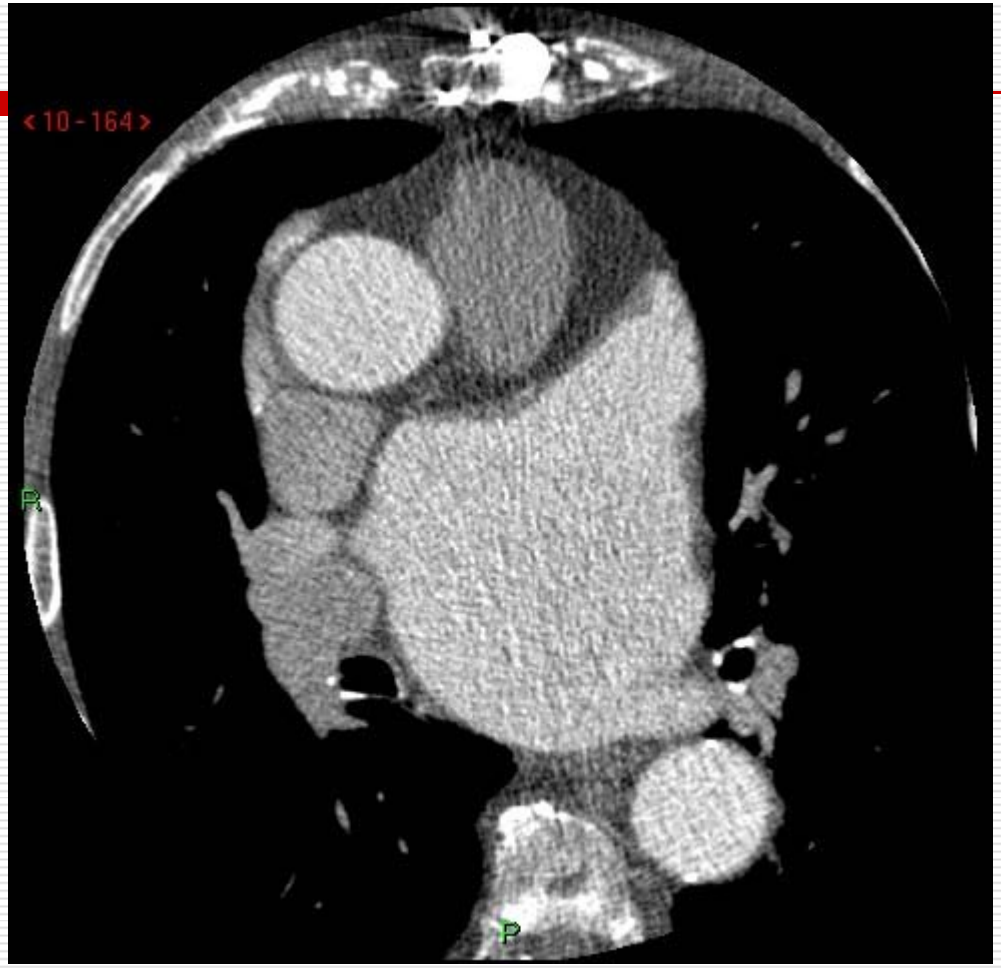
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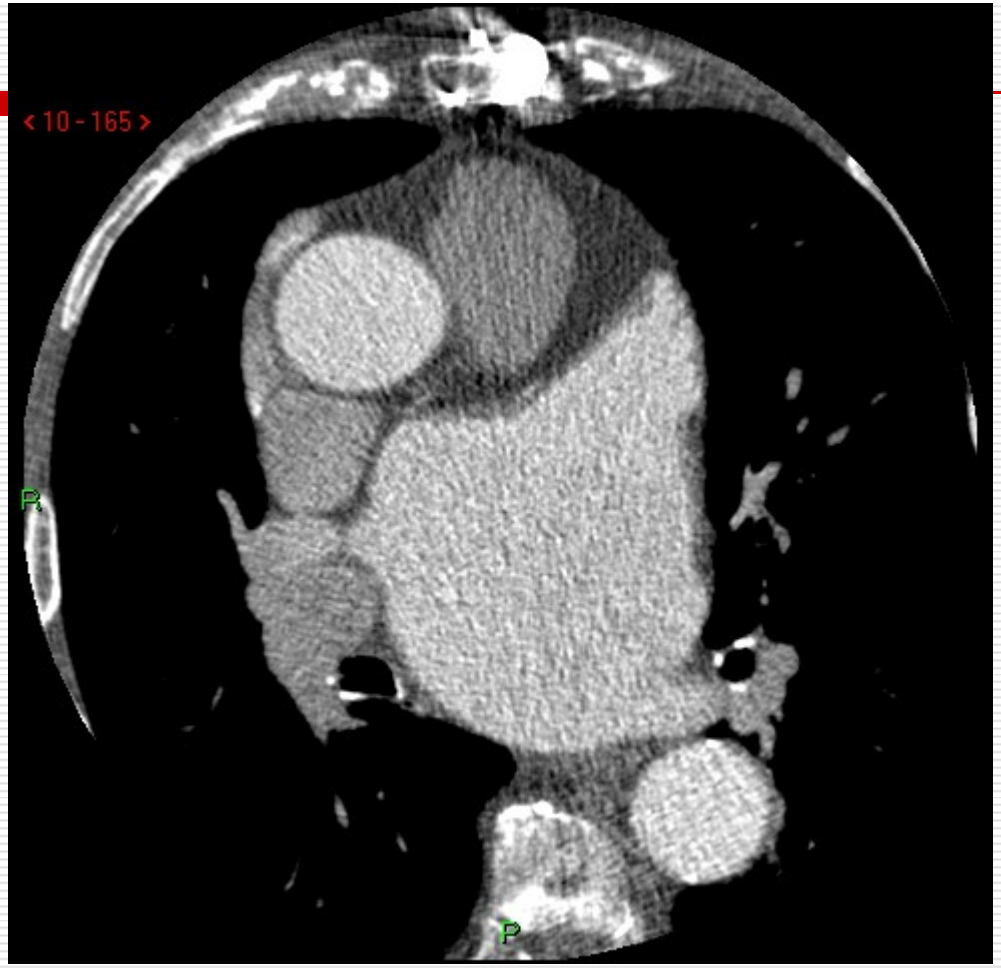
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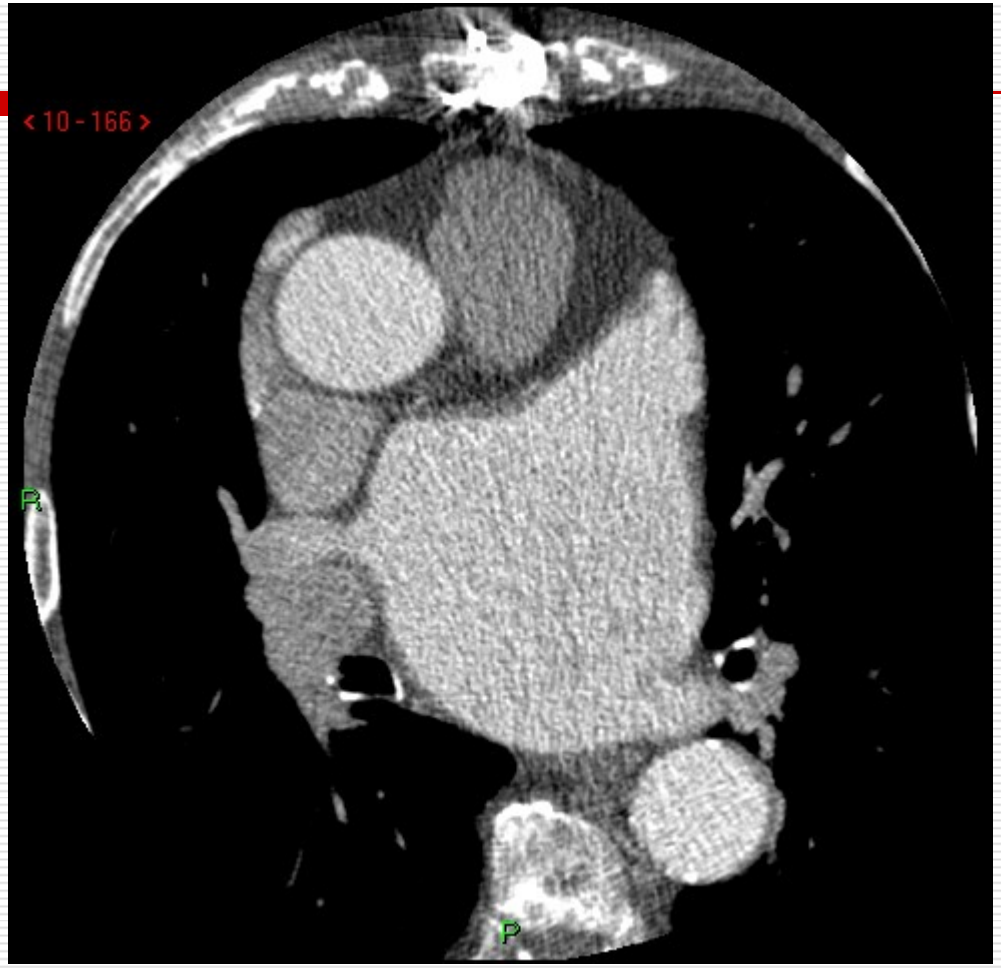
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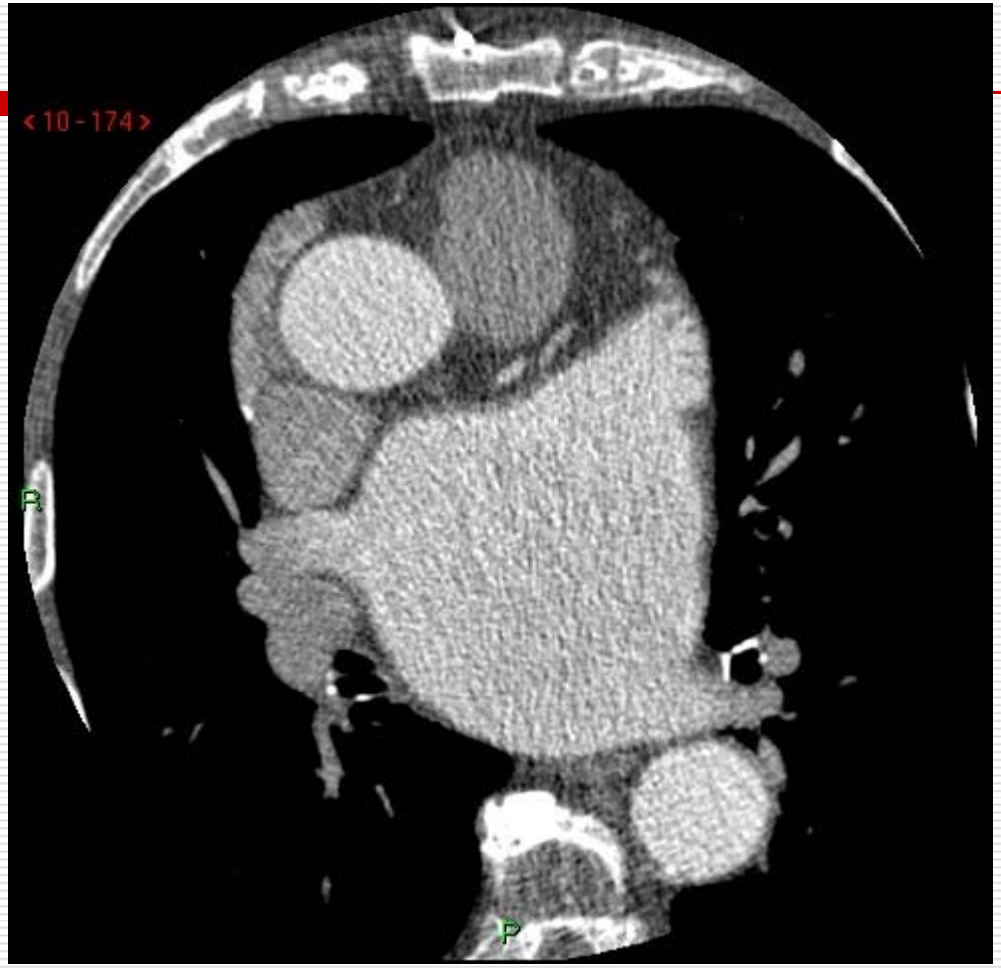
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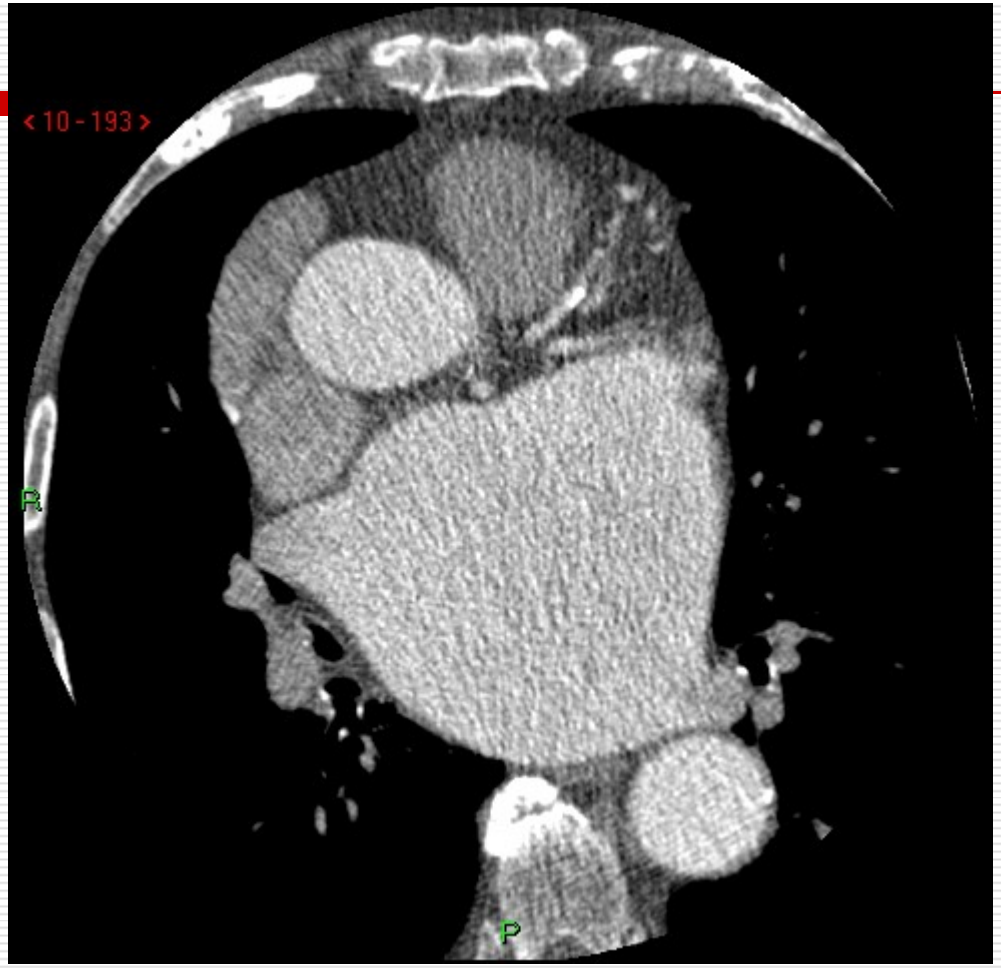
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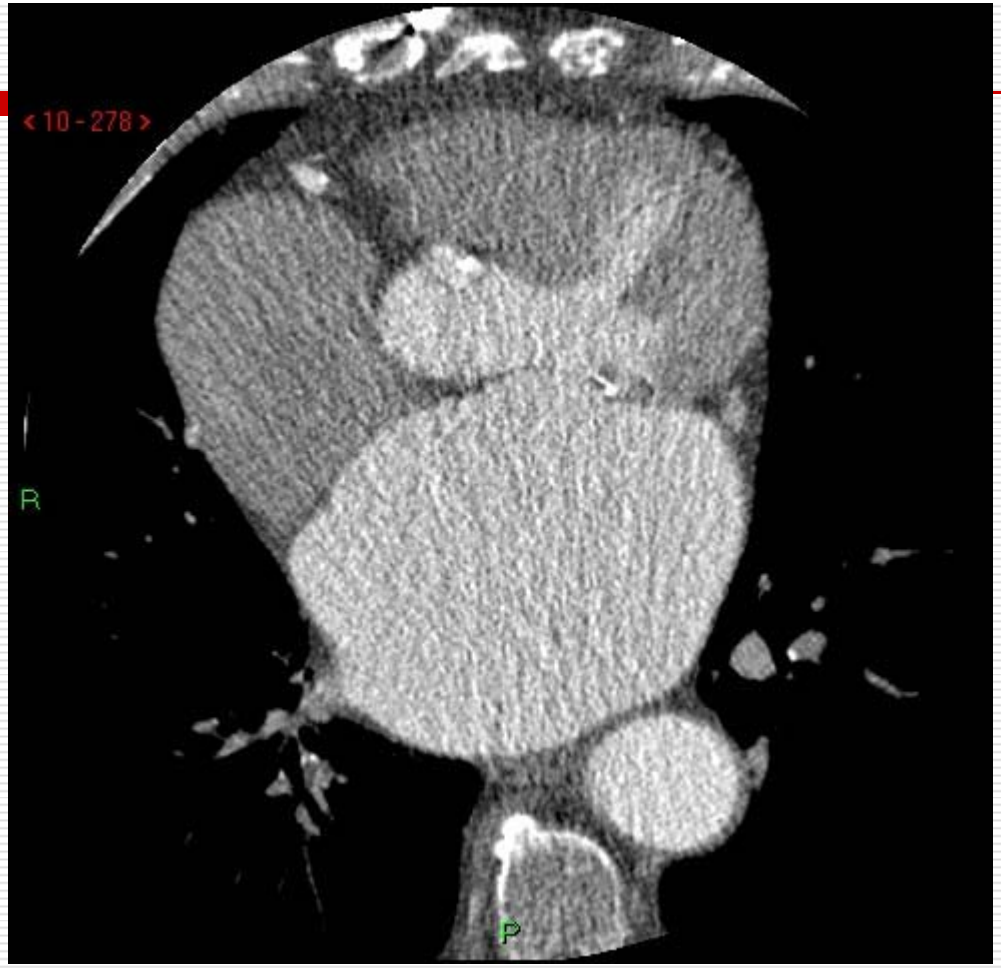
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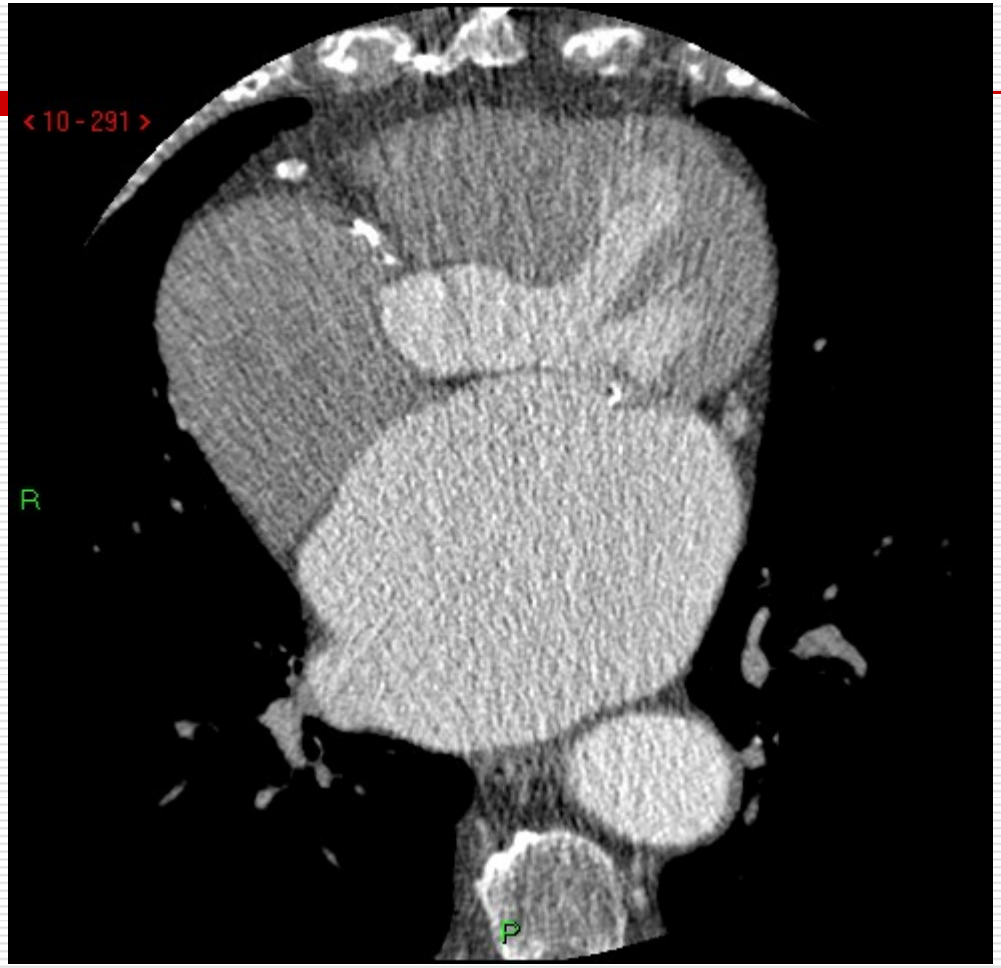
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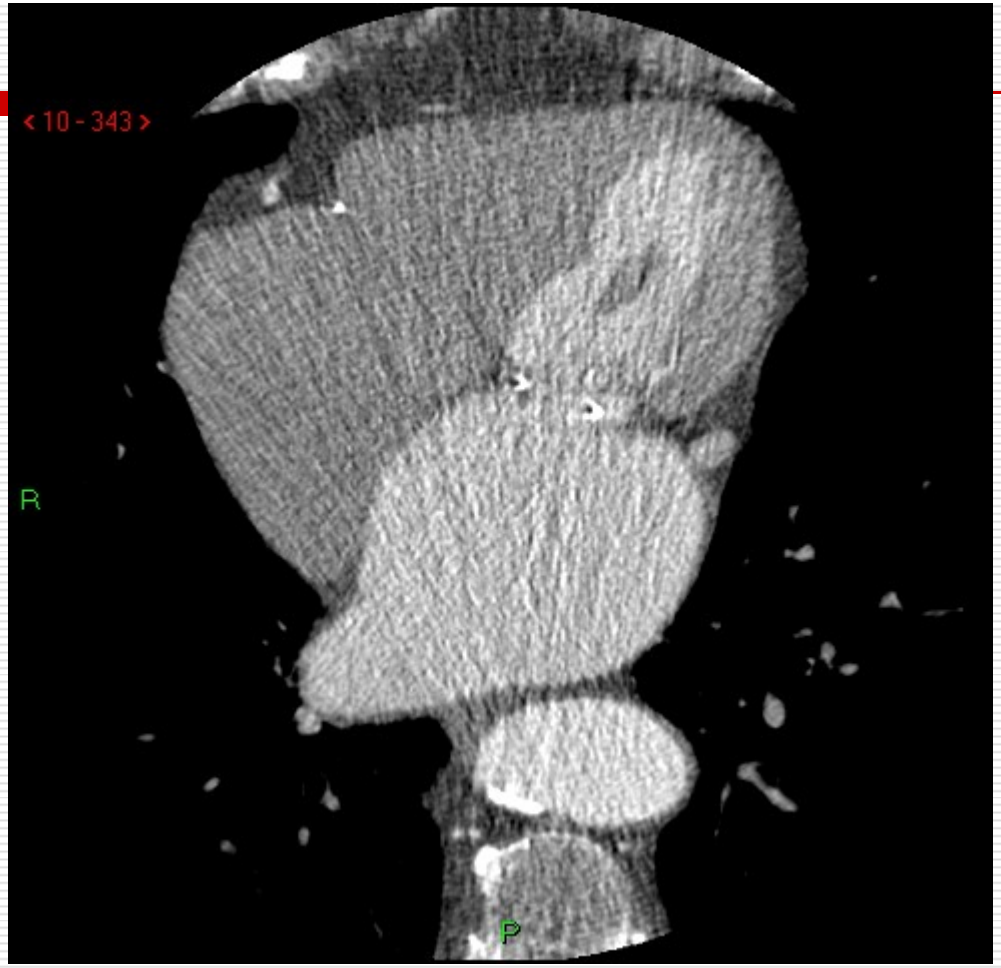
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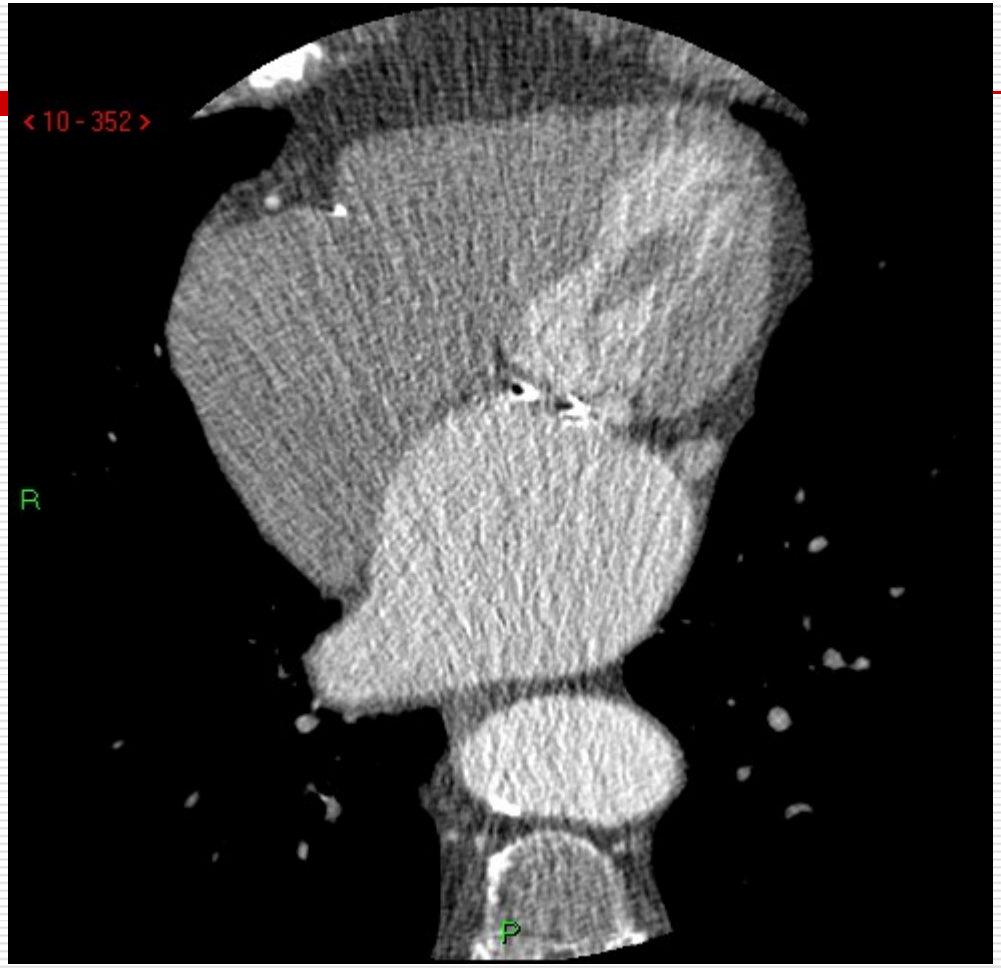
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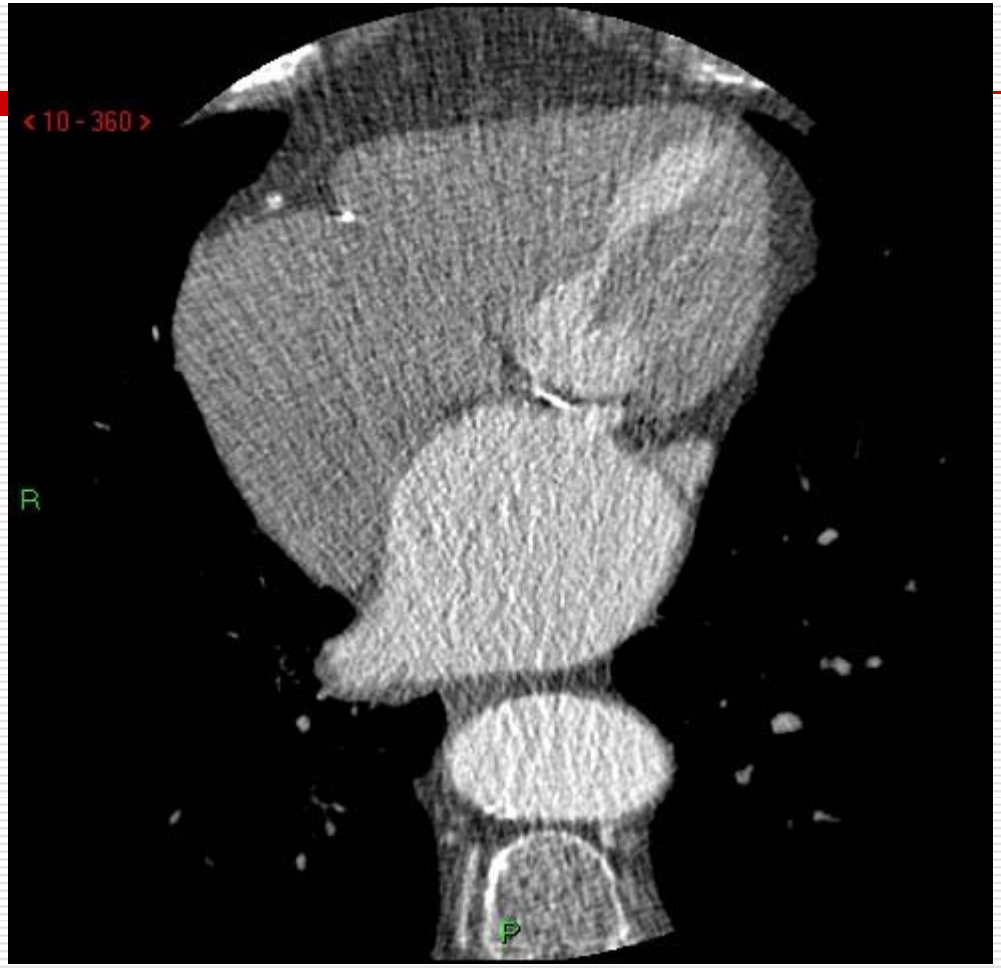
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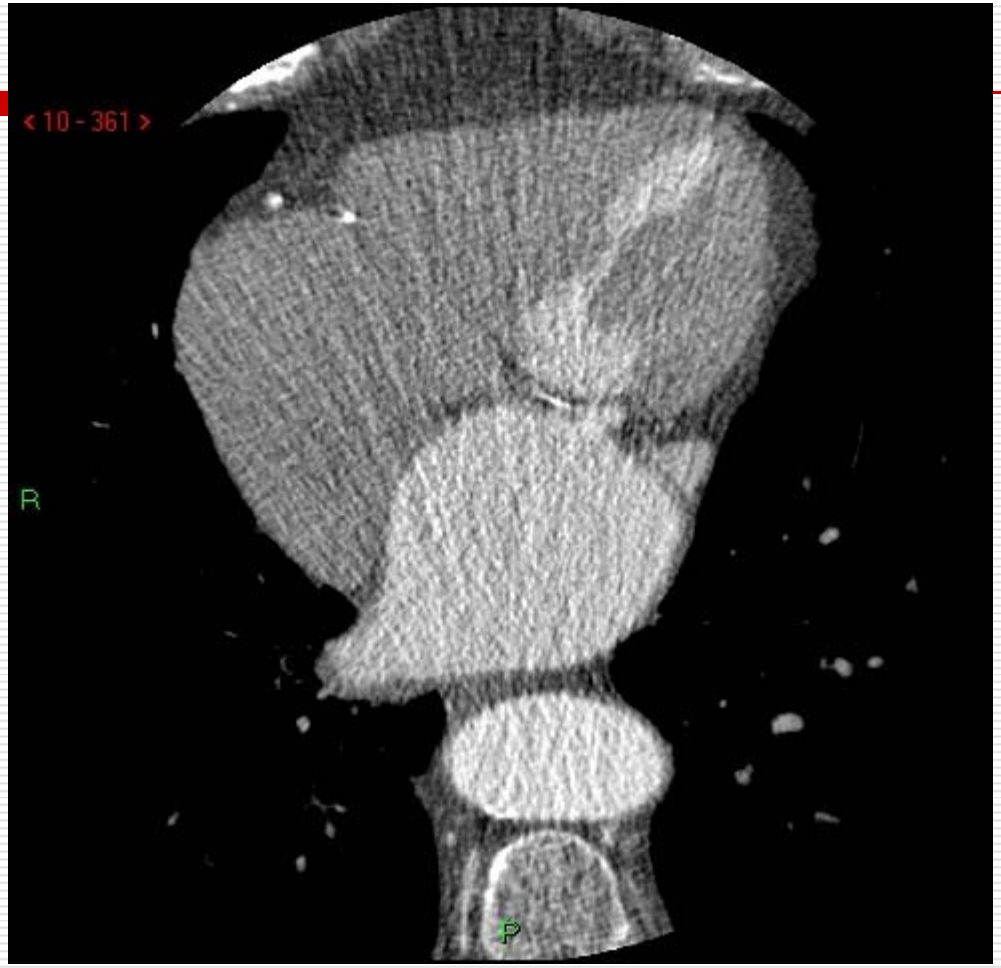
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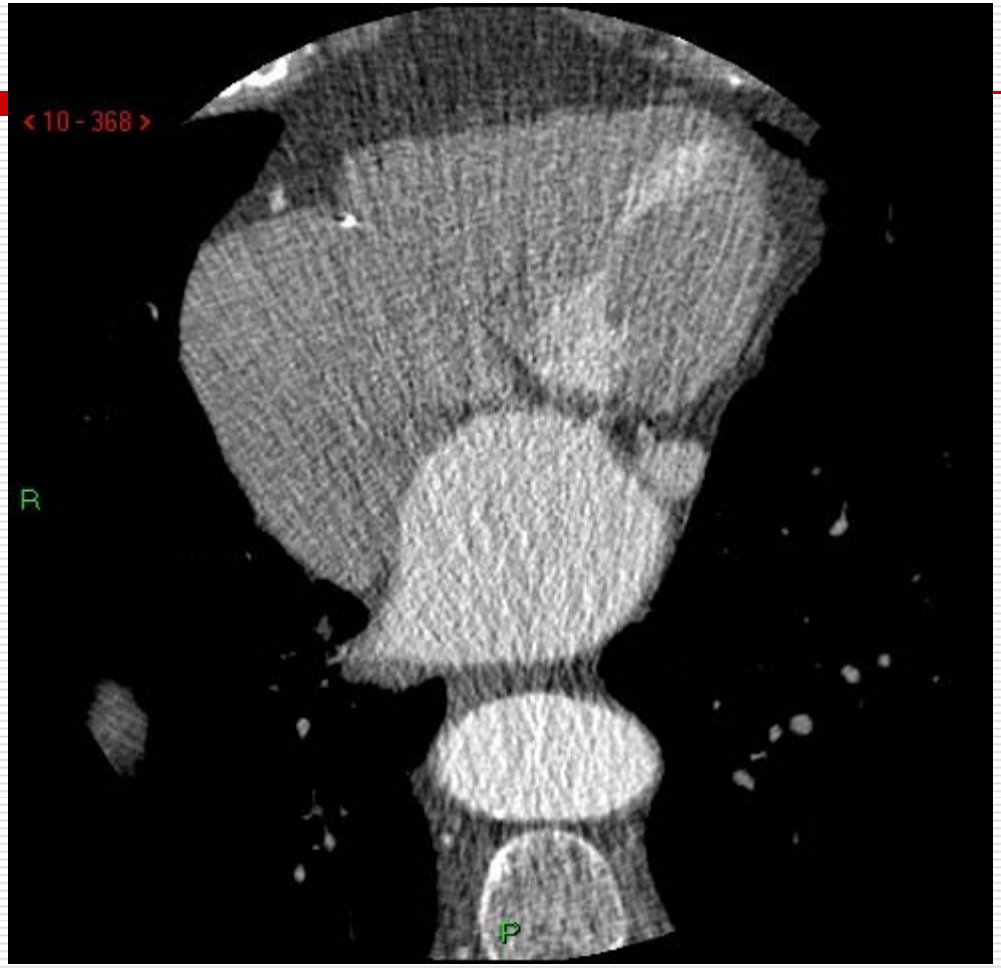
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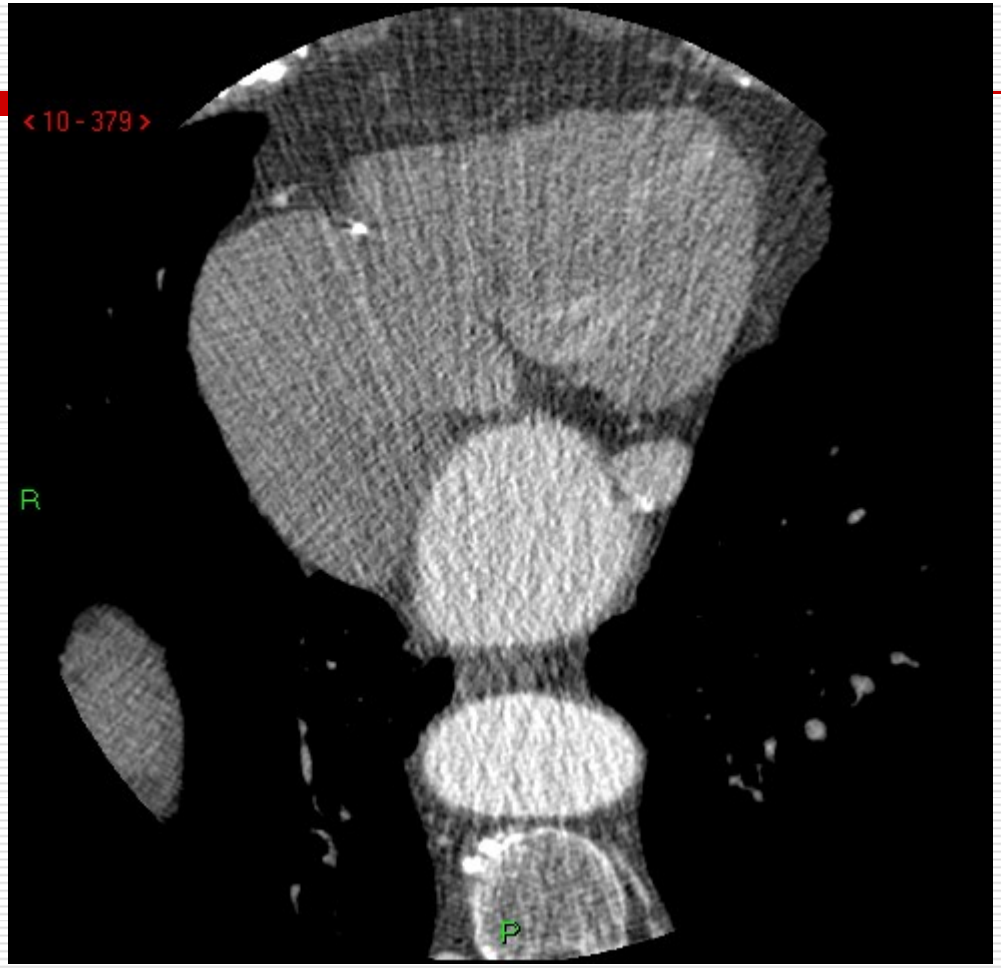
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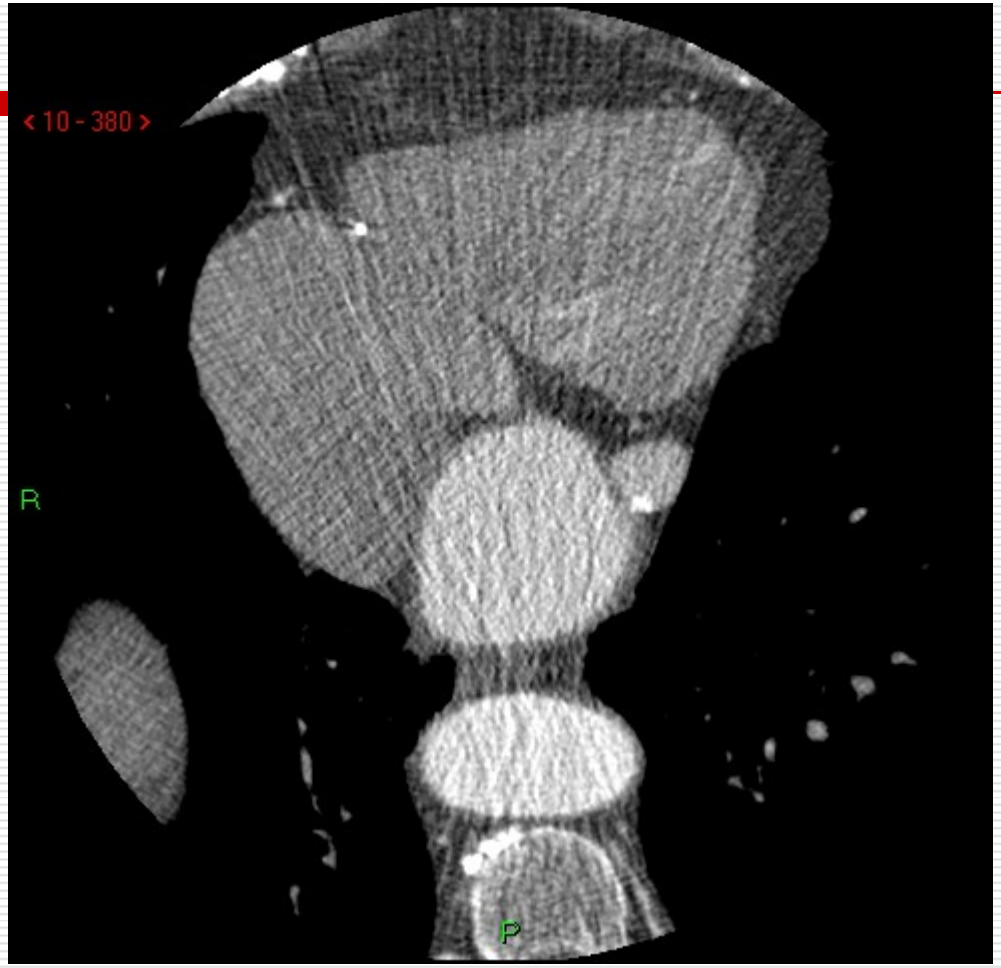
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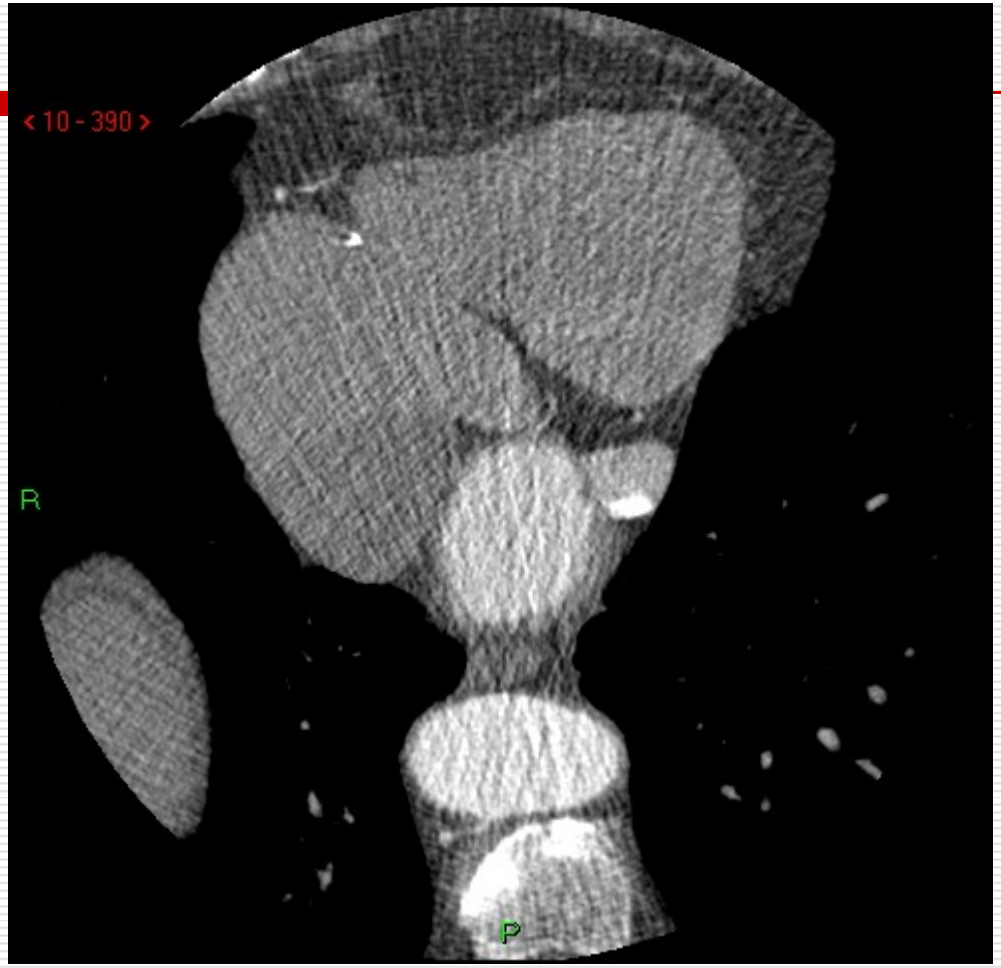
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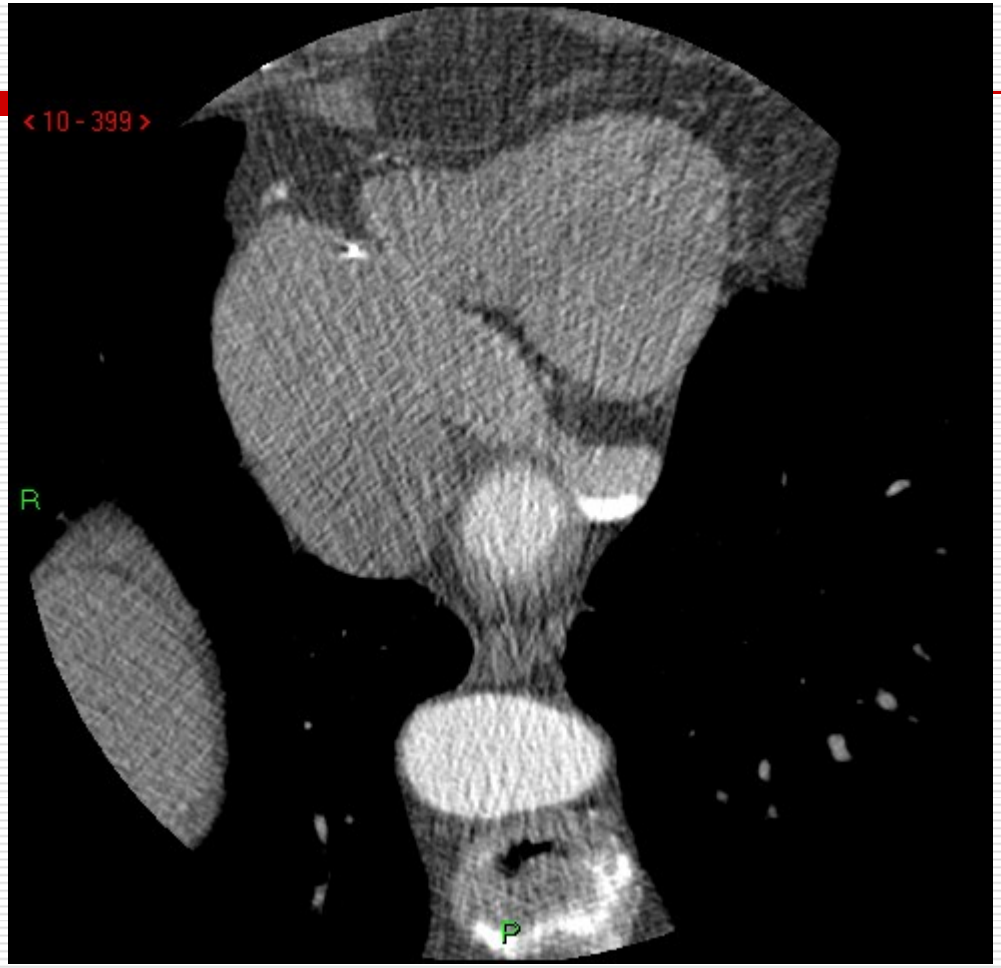
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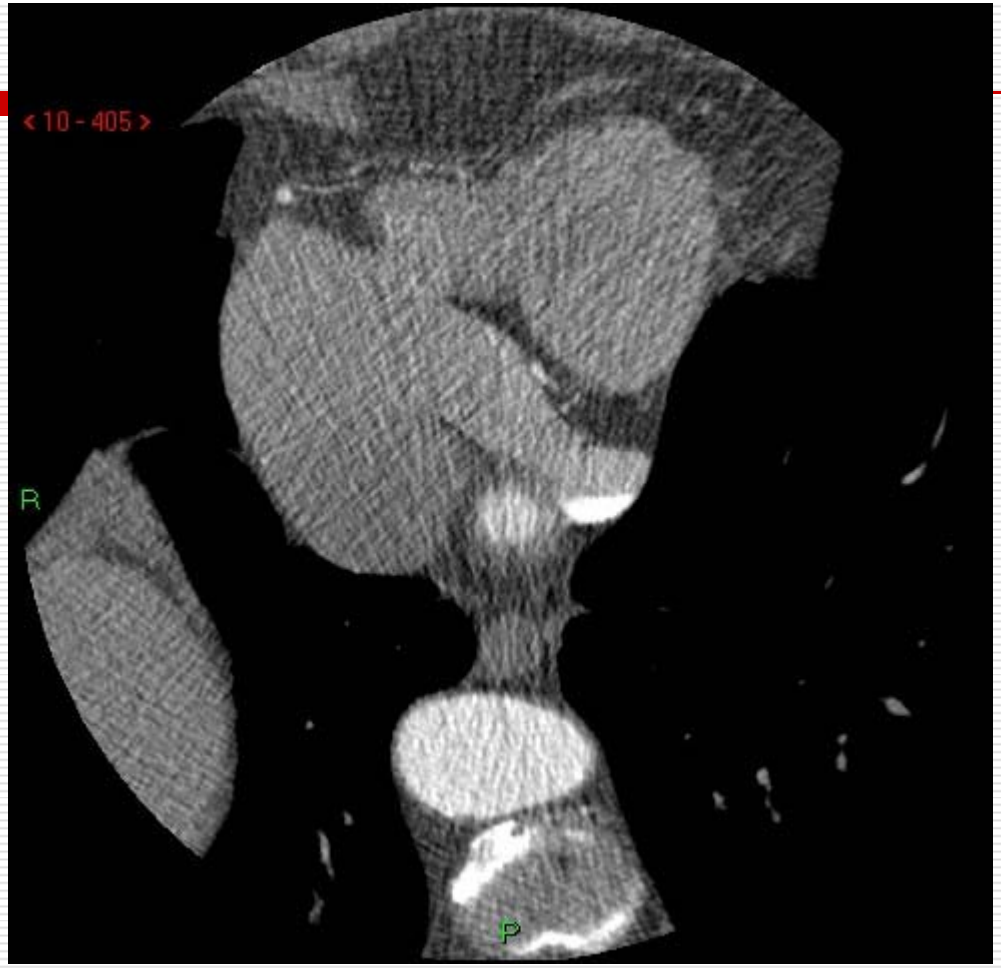
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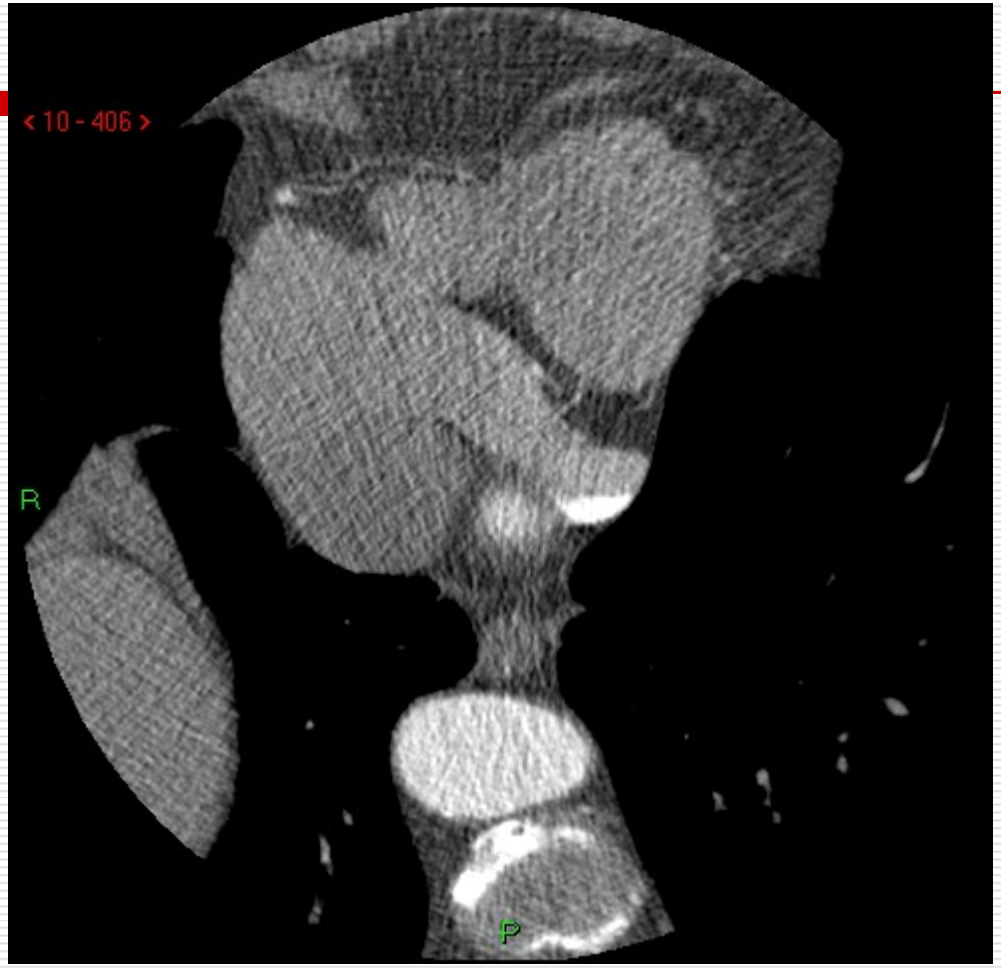
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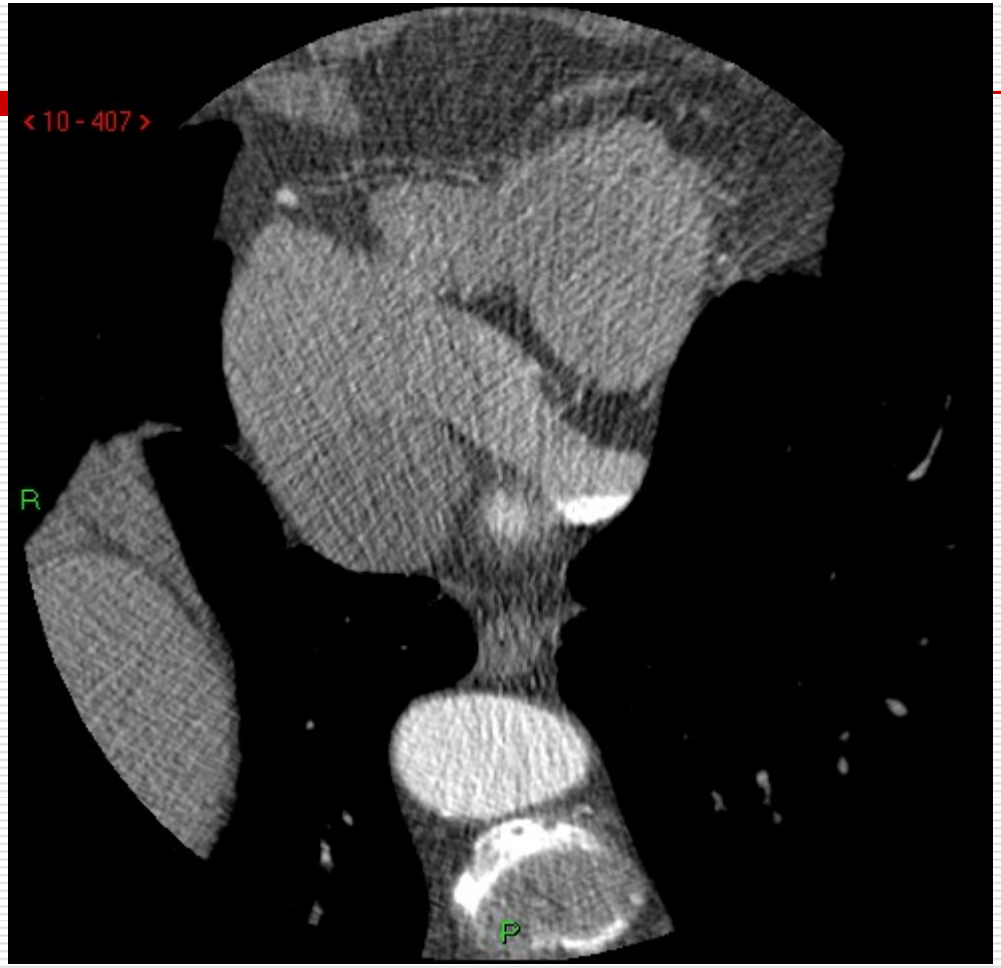
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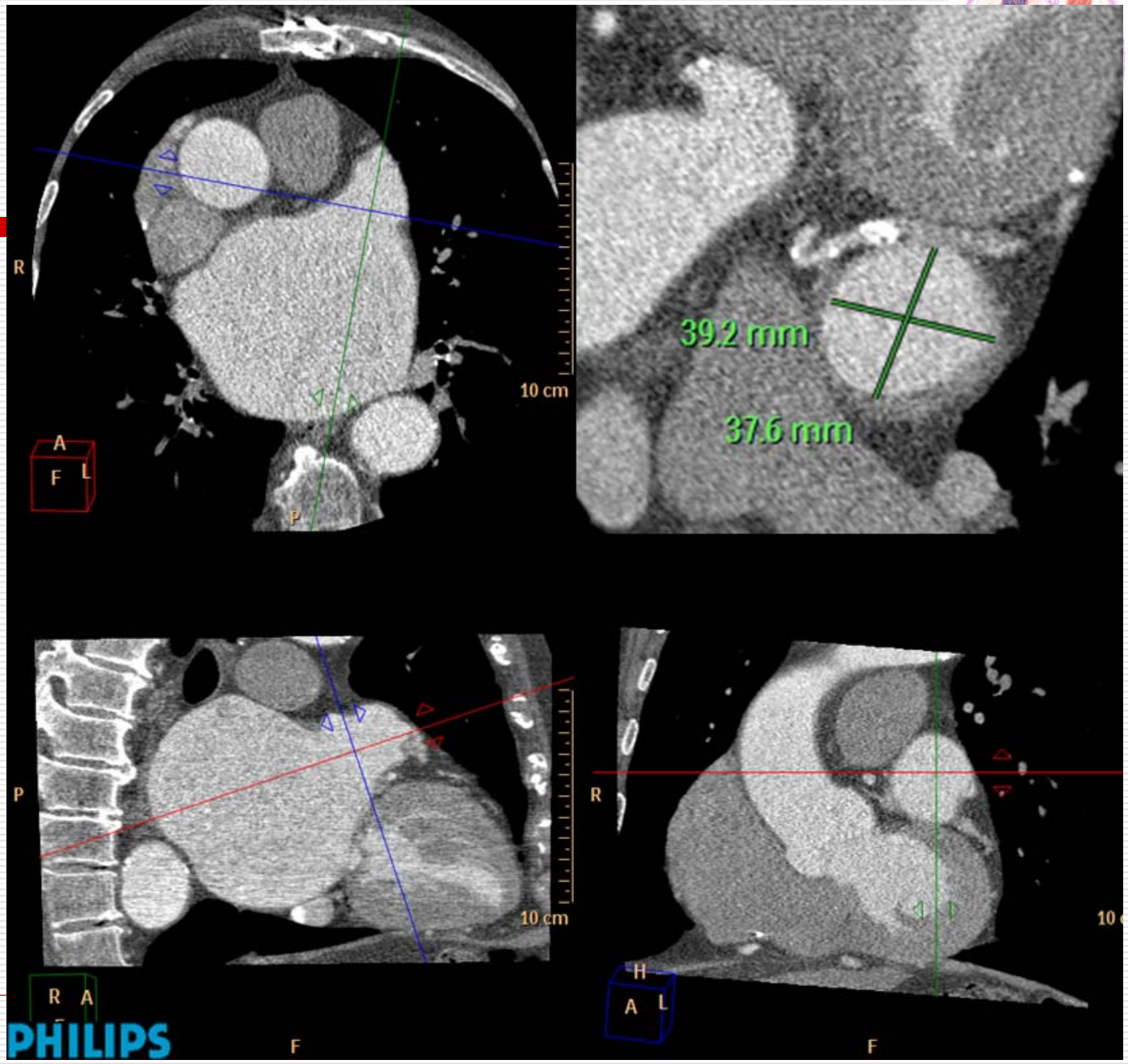

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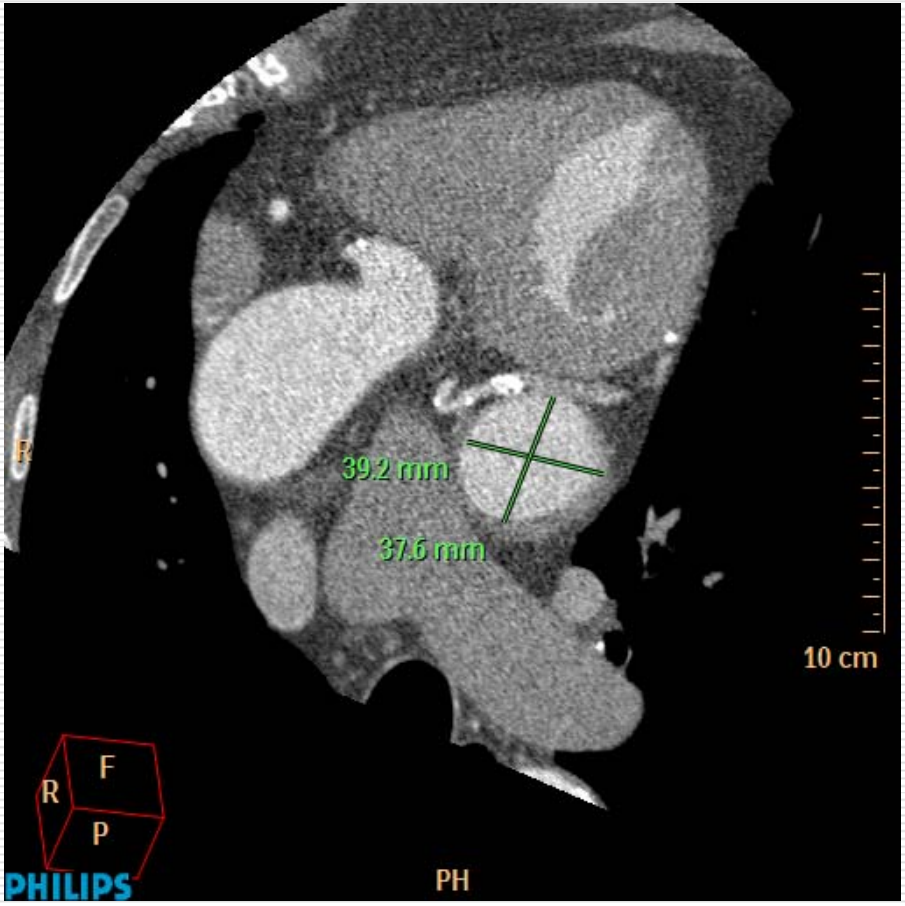


LAA diameters

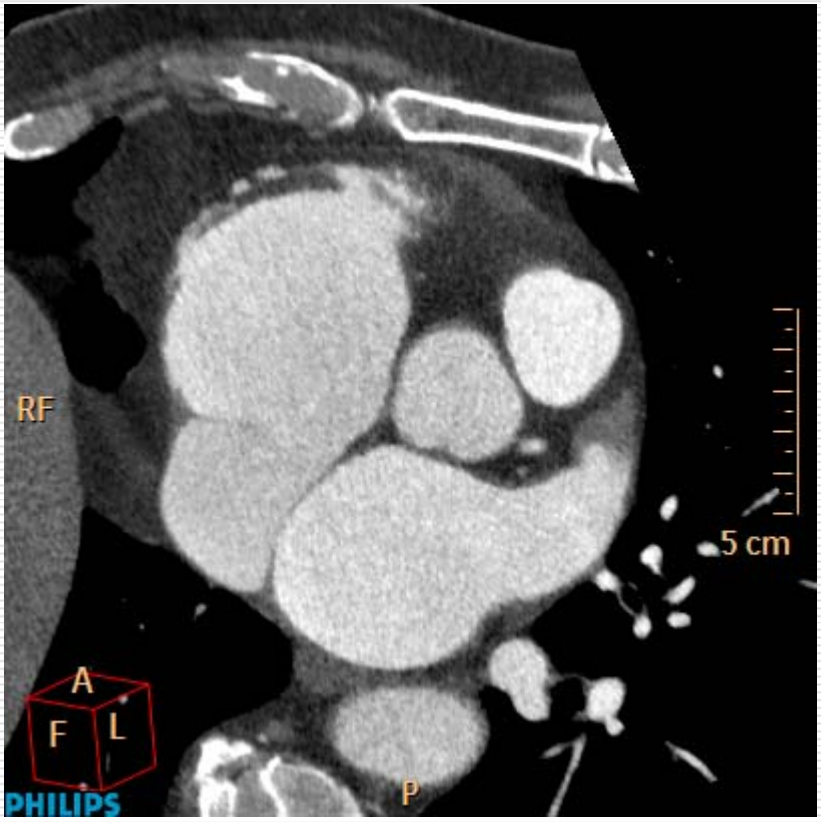
LAA depth

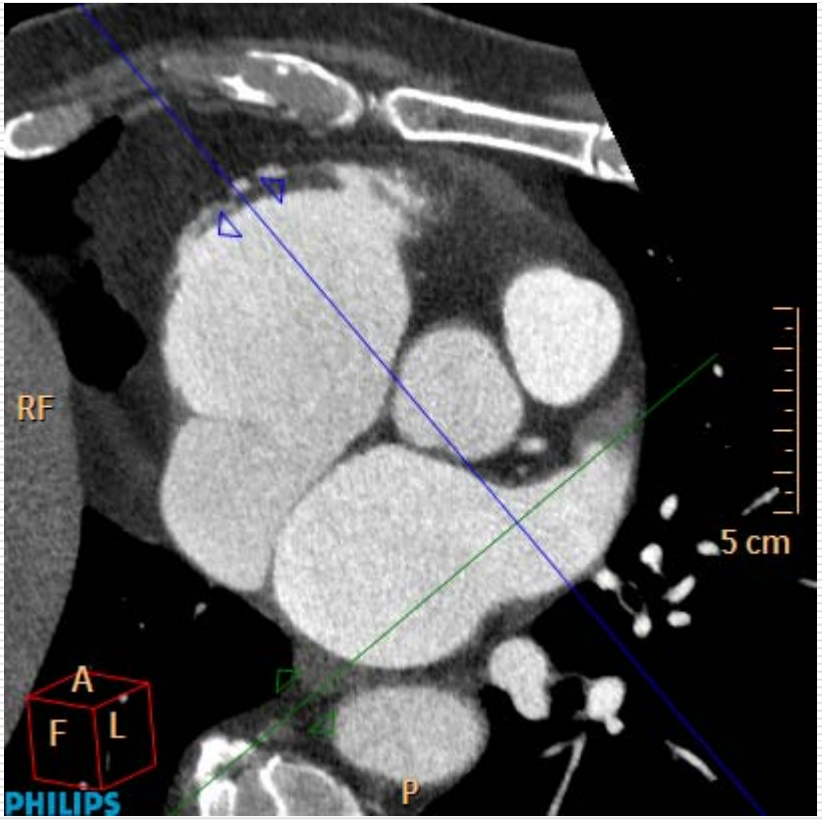
Pt 1

- 78 y, chronic AF pt
- MDCT diameters: 39X38 mm
- TTE diameters: 31X29 mm

- Procedure failed (with device size of 33 mm)

Pt 2





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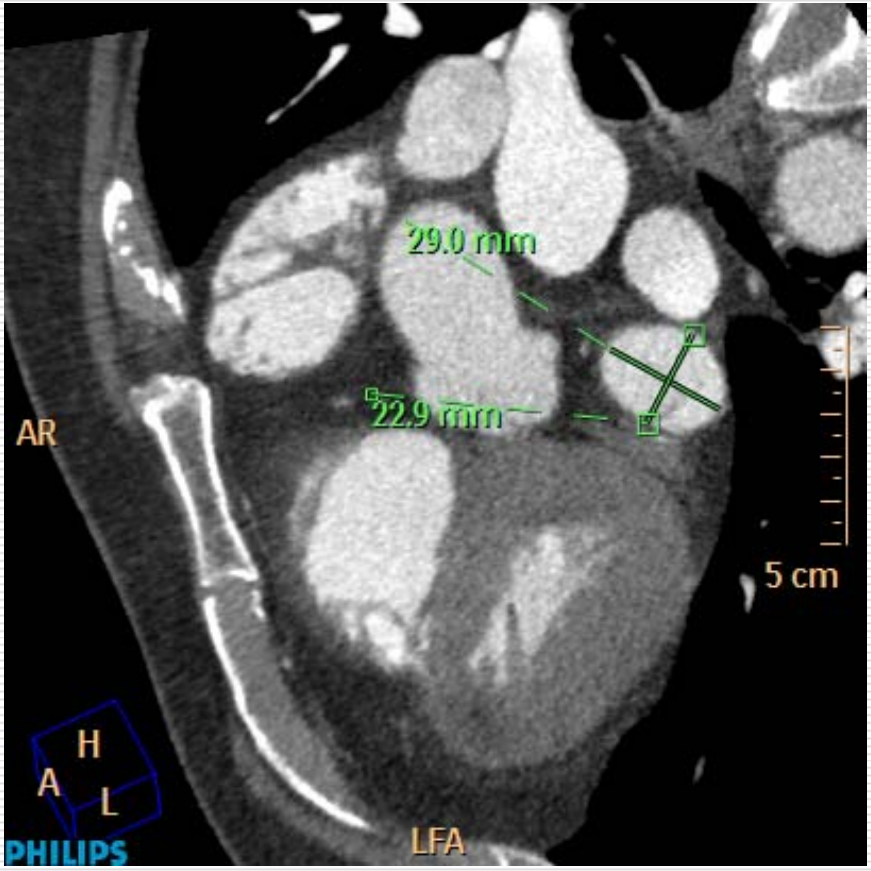

Pt 2

- 79 y, chronic AF pt
- MDCT diameters: 29X22 mm
- TTE diameters: 27X20 mm

- Device size: 30 mm

Results

- Mean maximal diameters:
  - TTE : 25 mm
  - MDCT: 27 mm

  } **Good concordance rho = 0.66**

- Mean minimal diameters:
  - TTE : 18 mm
  - MDCT: 22 mm

  } Poor concordance rho = 0.39

- Mean depth:
  - TTE : 22 mm
  - MDCT: 27 mm

  } Poor concordance rho = 0.3

Results

- Good correlation was found between the maximal diameter and device size

- TTE maximal diameter in relation to device size (p=0.08)
- MDCT maximal diameter in relation to device size (0=0.06)

Results

- LAA maximal diameter on MDCT > 30 mm (N=5)
  - Procedure failure N=2 (maximal diameter >35 mm on MDCT & TTE)
  - Regurgitation N=2 (1 underestimated by TTE)

Results

- Incomplete occlusion with regurgitation
  - 4/20 pts
  - 3/4 TTE underestimated LAA diameters as compared with MDCT
- Two devices per procedure
  - 4/20 cases,
  - 3/4 of them TTE underestimated LAA orifice diameters as compared with MDCT

Conclusions

- Maximal LAA diameters measured on MDCT and TTE demonstrated good correlation

- Good correlation was found between the maximal diameter on MDCT and TTE in relation to device size

Conclusions

- In cases with incomplete LAA occlusion or utilization of more than 1 device, TTE underestimated LAA diameters as compared with MDCT

Conclusions

- MDCT could be an important adjunct modality for device sizing & device model selection
  - Potentially avoiding incomplete LAA occlusion or the utilization of more than one device per procedure
- These results are preliminary and warrant further studies