# Tips and Tricks of biopsy

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*Medanta-The Medicity*

# Indications

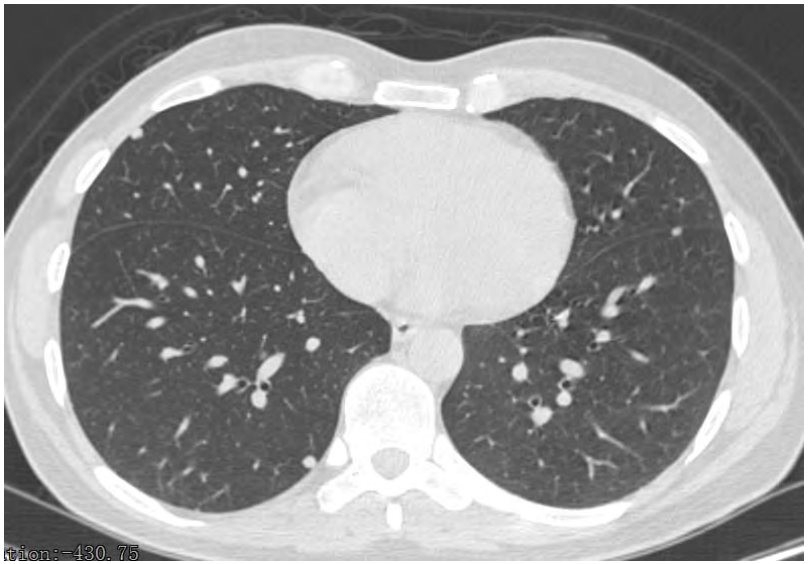
- Diagnosis of primary tumor
- Confirmation of suspected metastases
- Determination of cancer stage
- Diagnosis of benign processes (cyst, infection and inflammation)


Veer

# Biopsy vs FNAC

- Retrospective review of 171 (128x 20-G FNTB and 43x FNAC) ultrasound-guided biopsies
- **Liver** 109, **Pancreas** 19, **Lymph node** 10, **Omentum** 5, **Right iliac fossa mass** 6, **Adrenal** 6 and **others** 16
- A definitive diagnosis was made in 122/128 biopsies **(95.3%)** and 32/43 biopsies **(74.4%)** for FNTB and FNAC
- A greater insufficient sampling rate occurs with FNAC **(25.6%)** than with FNTB **(4.7%)**
- For abdominal biopsy, 20-G FNTB needles have a much higher yield than FNAC with no increase in complications

O'Connell AM, Keeling F et al; Fine-needle trucut biopsy versus fine-needle aspiration cytology with ultrasound guidance in the abdomen; J Med Imaging RadiatOncol. 2008 Jun;52(3):231-6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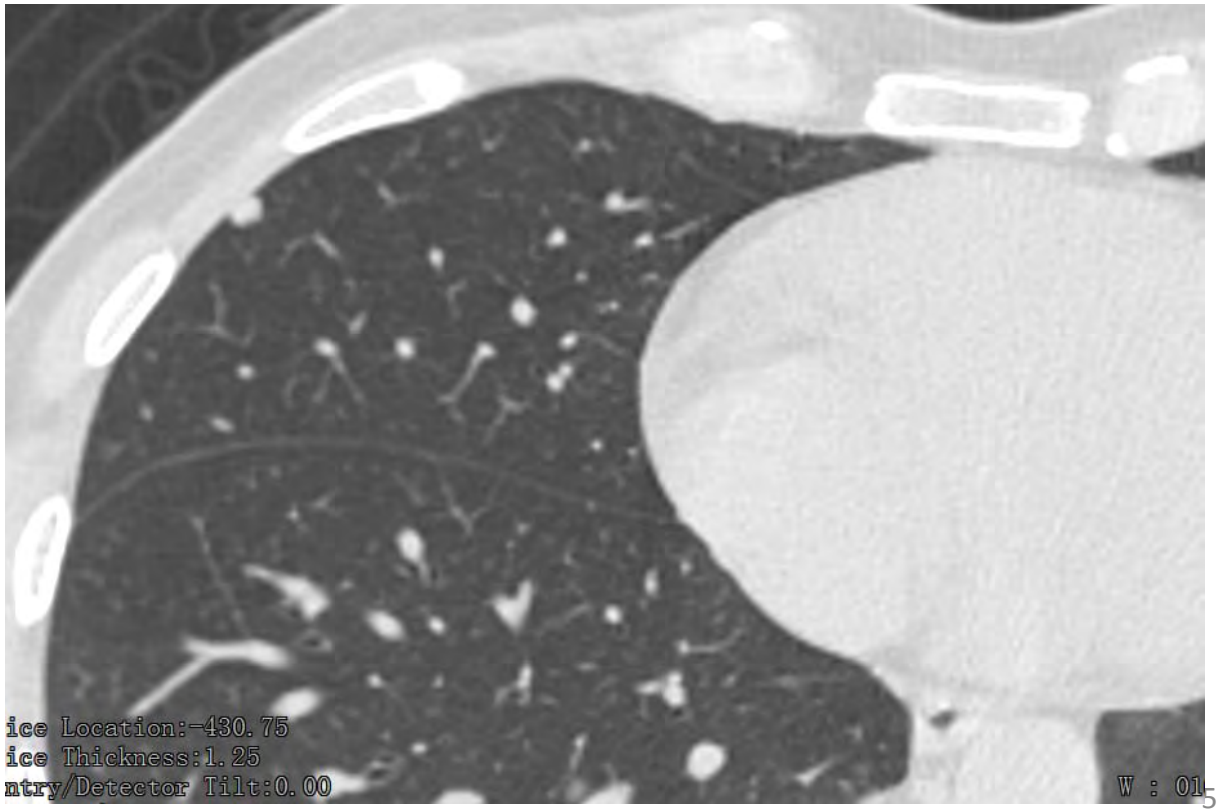
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# Need & Feasibility

- Patient evaluation and planning
  - Patient record, history and imaging studies
  - Lab investigations
  - Medications chart
  - Comorbidities




# Addendum of Newer Anticoagulants to the SIR Consensus Guideline

Indravadan J. Patel, MD, Jon C. Davidson, MD, Boris Nikolic, MD, MBA, Gloria M. Salazar, MD, Marc S. Schwartzberg, MD, T. Gregory Walker, MD, Wael E. Saad, MD, for the Standards of Practice Committee, with Cardiovascular and Interventional Radiological Society of Europe (CIRSE) Endorsement

J Vasc Interv Radiol 2013; 24:641–645

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**Table 1.** Periprocedural Coagulation Parameter Surveillance and Medical Management of Patients Undergoing Percutaneous Image-Guided Procedures

| Category | 1 | 2 | 3 |
|---|---|---|---|
| **Procedure** | Nontunneled venous catheter | Angiography (arterial intervention with access size up to 7-F) | TIPS |
| | Dialysis access interventions | Venous interventions | Renal biopsy |
| | Central line removal | Chemoembolization/radioembolization | Radiofrequency ablation |
| | IVC filter placement | Uterine fibroid embolization | Nephrostomy tube placement |
| | Venography | Transjugular liver biopsy | Biliary interventions (new tract) |
| | Catheter exchange (biliary, nephrostomy, abscess drainage catheter) | Tunneled venous catheter | |
| | Thoracentesis | Subcutaneous port device placement | |
| | Paracentesis | Abscess drainage | |
| | Thyroid biopsy | Biopsy (excluding superficial and renal) | |
| | Joint aspiration/injection | Percutaneous cholecystostomy | |
| | Superficial aspiration, drainage, and/or biopsy (excluding intrathoracic or intraabdominal sites) | Enteric tube placement, initial | |
| | | Spinal procedures (vertebroplasty, kyphoplasty, lumbar puncture, epidural injection, facet block) | |
| **Tests** | INR: recommended | INR: recommended | INR: recommended |
| | aPTT: recommended | aPTT: recommended | aPTT: recommended |
| | Platelet count: not routinely recommended | Platelet count: recommended | Platelet count: recommended |
| | Hematocrit: not routinely recommended | Hematocrit: not routinely recommended | Hematocrit: not routinely recommended |
| **Thresholds** | INR: correct to ≤ 2.0 | INR: correct to ≤ 1.5 | INR: correct to ≤ 1.5 |
| | Platelets: ≤ 50,000/μL recommend transfusion | Platelets: ≤ 50,000/μL recommend transfusion | Platelets: ≤ 50,000/μL recommend transfusion |
| | aPTT: no consensus | aPTT: no consensus (trend toward correcting for values ≥ 1.5× control, 73% consensus) | aPTT: correct so that value is ≤ 1.5× control |

**Table 2.** Current Medications and Management Recommendations (4–11)

| Medications | Category I Procedure (Low Bleeding Risk) | Category II Procedure (Moderate Risk of Bleeding) | Category III Procedure (Significant Bleeding Risk/ Bleeding Difficult to Detect) |
|---|---|---|---|
| **Warfarin (Coumadin)** | Withhold 3–5d<br>• INR ≤ 2.0 | Withhold 5d<br>• INR ≤ 1.5 | Withhold 5d<br>• INR ≤ 1.5 |
| **Aspirin*** | Do not withhold | Do not withhold | Withhold 5 d before procedure |
| **Heparin (unfractionated)** | No consensus<br>• Check aPTT | No consensus<br>• aPTT—trend toward correcting for values ≥ 1.5× control, 73% consensus | Withhold 2–4 h before procedure<br>• aPTT ≤ 1.5x control |
| **LMWH (therapeutic dose)** | Withhold 1 dose or 12 h before procedure | Withhold 1 dose or 12 h before procedure | Withhold 2 doses or 24 h before procedure |
| **Fondaparinux** | Do not withhold | Withhold<br>• 2–3 d (CrCl ≥ 50 mL/min)<br>• 3–5 d (CrCl ≤ 50 mL/min) | Withhold<br>• 2–3 d (CrCl ≥ 50 mL/min)<br>• 3–5 d (CrCl ≤ 50 mL/min) |
| | **Thienopyridines*** | | |
| **Clopidogrel (Plavix)*** | Withhold for 0–5 d before procedure | Withhold for 5 d before procedure | Withhold for 5 d before procedure |
| **Prasugrel (Effient)*** | | | |
| **Ticlopidine(Ticlid)*** | Withhold for 0–5 d before procedure | Withhold for 7 d before procedure | Withhold for 7 d before procedure |
| | **NSAIDs** | | |
| **Short-acting (half-life 2–6 h)**<br>• **Ibuprofen**<br>• **Diclofenac**<br>• **Ketoprofen**<br>• **Indomethacin** | Do not withhold | Do not withhold | Withold 24 h before procedure |
| **Intermediate-acting (half-life 7–15 h)**<br>• **Naproxen**<br>• **Sulindac**<br>• **Diflunisal**<br>• **Celecoxib** | Do not withhold | Do not withhold | Withhold 2–3 d before procedure |
| **Long-acting (half-life > 20 h)**<br>• **Meloxicam**<br>• **Nabumetone**<br>• **Piroxicam** | Do not withhold | Do not withhold | Withhold 10 d before procedure |

# Patient Consultation

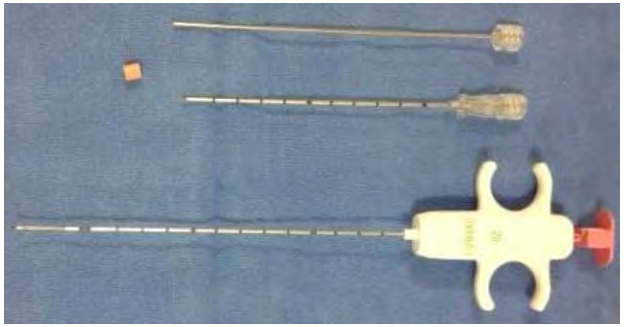
- Patient Counseling

- Pre-procedure advise / preparation

I/V access

# Materials & Equipments

- Anesthesia
  - 2% xylocaine
- Needle selection
  - Size
    - 20-26G for FNA
    - 11-20G for (bone to soft tissue)
  - Type
    - Semi automated / automated
    - Coaxial

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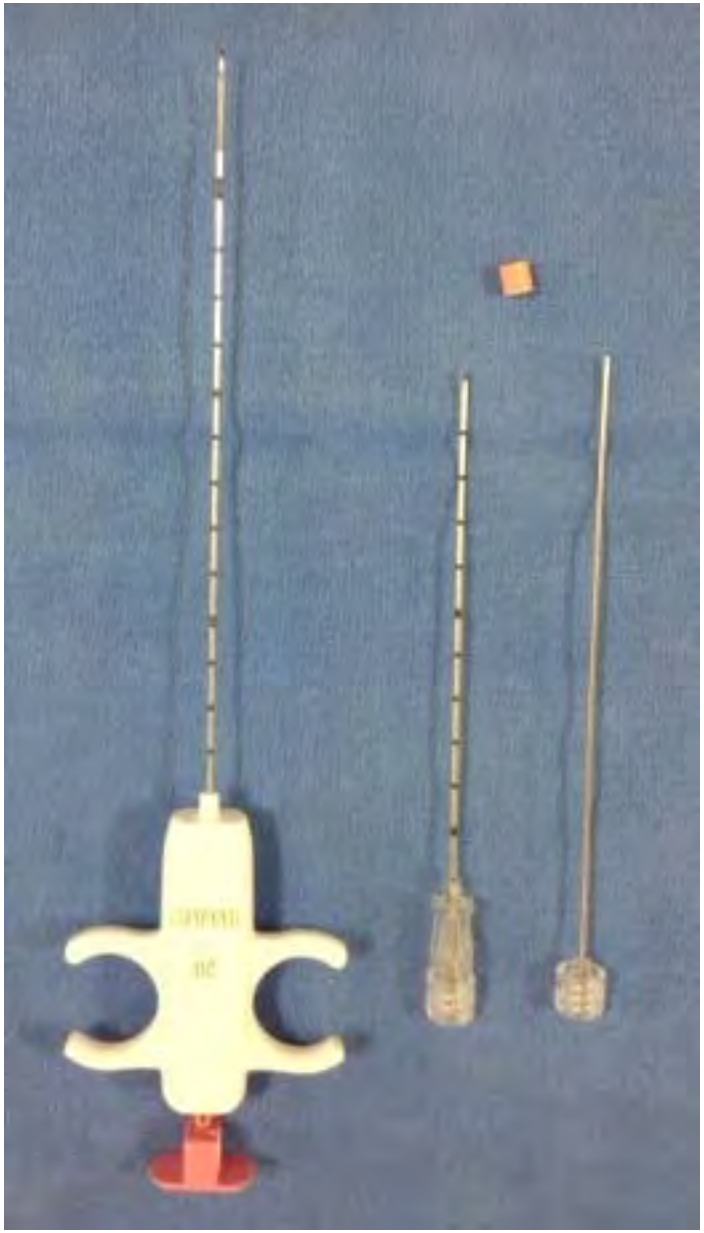
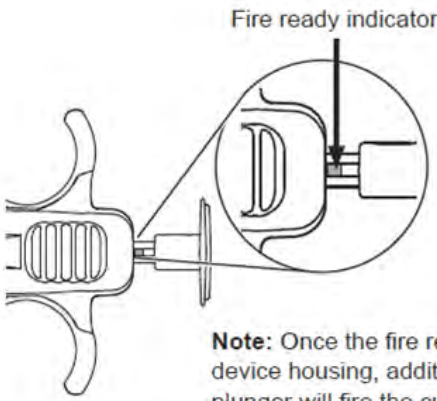



**Figure 4: Front of Device**




**Note:** Once the fire ready indicator meets the device housing, additional pressure on the plunger will fire the cutting cannula.

# Security


**Penetration Depth Indicator**

- Displays and confirms primed penetration depth

**Visual Fire Ready Indicator**

- Confirms sample notch is fully advanced

**Coaxial Blunt Tip Stylet**

- Replaces sharp trocar tip to help reduce the risk of damage to vasculature or other organs

| BARD® MISSION® Disposable Core Biopsy Instrument Kit | | | | |
|---|---|---|---|---|
| Catalogue Number | BARD® MISSION® Disposable Core Biopsy Instrument | | BARD® TRUGUIDE® Disposable Coaxial Biopsy Needle | |
| | Gauge Size and Needle Length | Penetration Depths | Gauge Size and Needle Length | Usable Needle Length |
| 1810MSK | 18g x 10cm | 10mm and 20mm | 17g x 7.8cm | 5.1cm |
| 1816MSK | 18g x 16cm | 10mm and 20mm | 17g x 13.8cm | 11.1cm |
| 1820MSK | 18g x 20cm | 10mm and 20mm | 17g x 17.8cm | 15.1cm |
| 2010MSK | 20g x 10cm | 10mm and 20mm | 19g x 7.8cm | 5.1cm |
| 2016MSK | 20g x 16cm | 10mm and 20mm | 19g x 13.8cm | 11.1cm |
| 2020MSK | 20g x 20cm | 10mm and 20mm | 19g x 17.8cm | 15.1cm |

Kidney & Omentum - 16 G

# Biopsy technique
## *general principle*

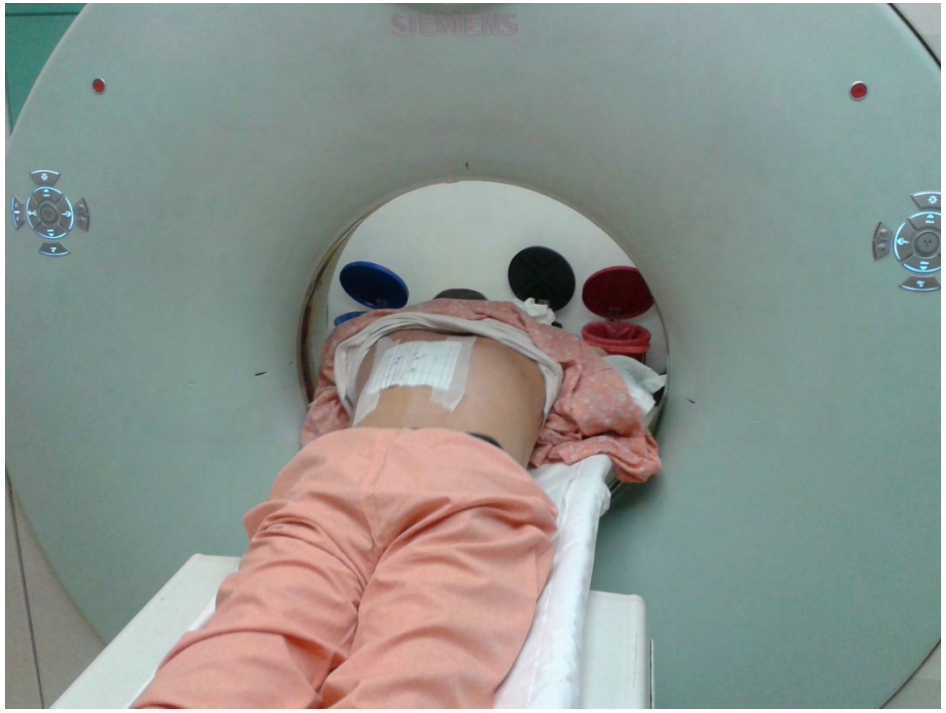
- Shortest path possible
- Breath hold during needle placement
- Structures to avoid
  - Lung
  - Pleura
  - GB
  - Small & Large bowel
  - Pancreas
  - Obstructed biliary duct
  - Bladder

# Image guidance technique

- USG Guidance
  - Perform USG & Localize lesion
  - USG BEAM SOULD BE PARALLEL TO NEEDLE SHAFT
    - BOBBING / JIGGLING

# Image guidance technique

- CT GUIDANCE
  - Use contrast if required
  - Localizing marker grid on skin
  - Appropriate angulation as per CT measurements
  - CT fluoroscopy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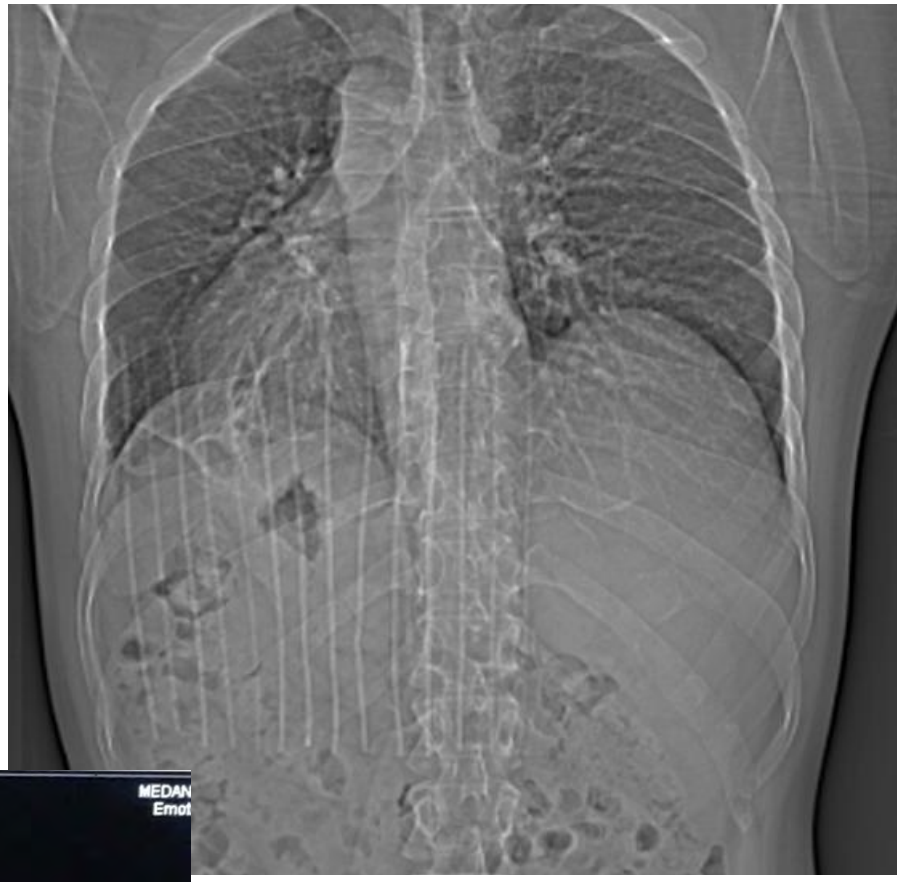

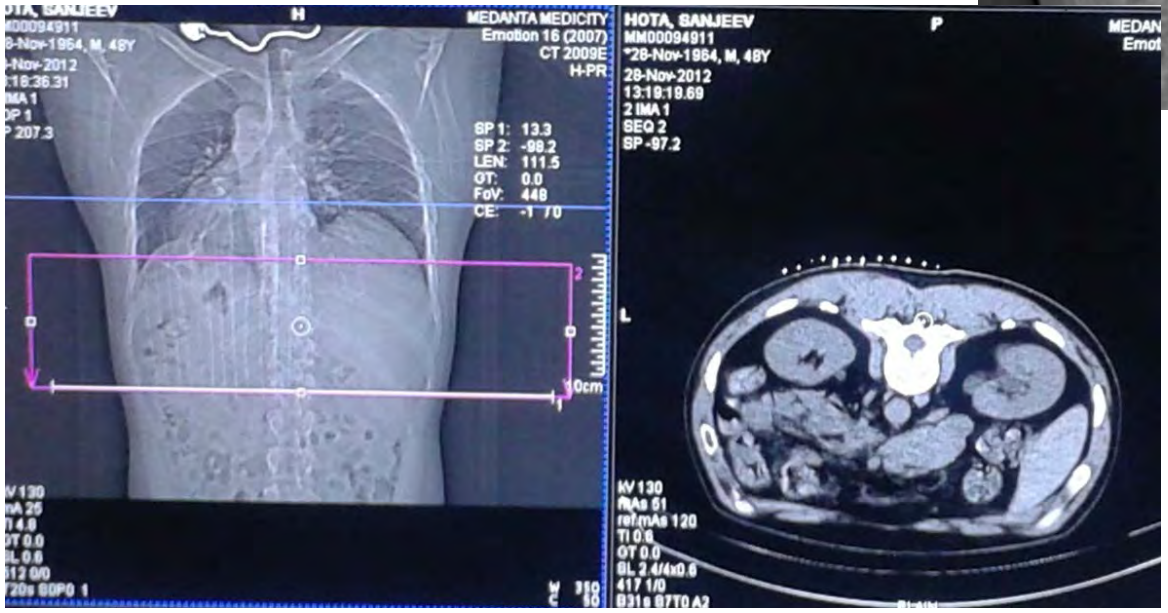
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SP 2: -98.2
LEN: 111.5
QT: 0.0
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SEQ 2
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kV 130
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ref mAs 120
QT 0.0

# Organ specific approaches

- Liver
  - Use adequate cuff of normal liver parenchyma
- Retroperitoneum
  - Posterior and anterior approaches

- Presacral / Pelvic
  - Transgluteal
  - Transvaginal
  - Transrectal

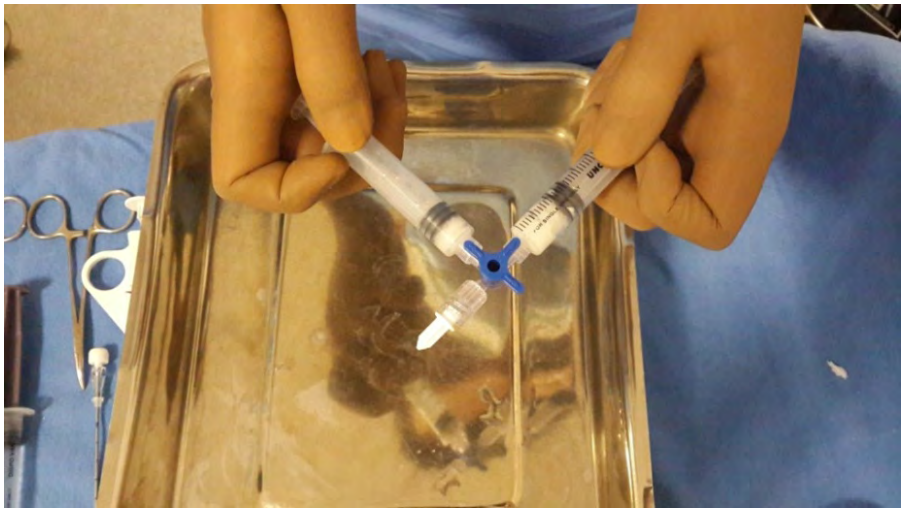
Late rejection: Known case of Hepatitis C underwent transplant for decompensated liver disease

Presented at 18 mth post LDLT

| | S. Bilirubin | SGOT | SGPT | Alk PO4 | GGT | HCV-RNA |
|---|---|---|---|---|---|---|
| Value | 1.8 | 150 | 190 | 90 | 74 | $6.2X10^5$ |

# Liver Biopsy

Percutaneous Plug Biopsy

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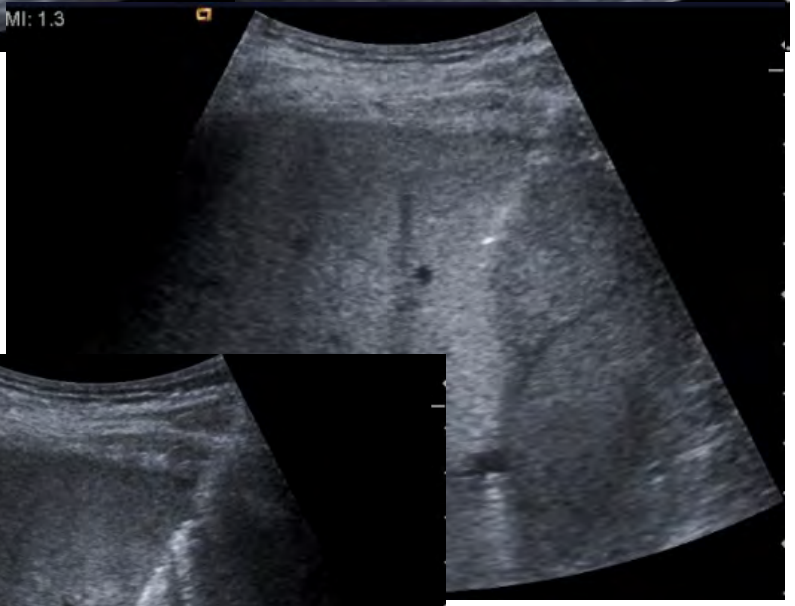
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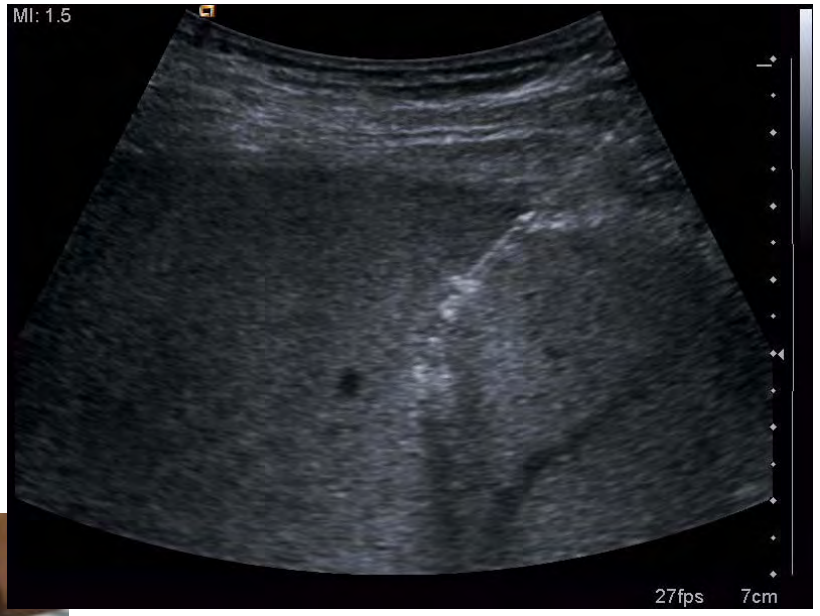
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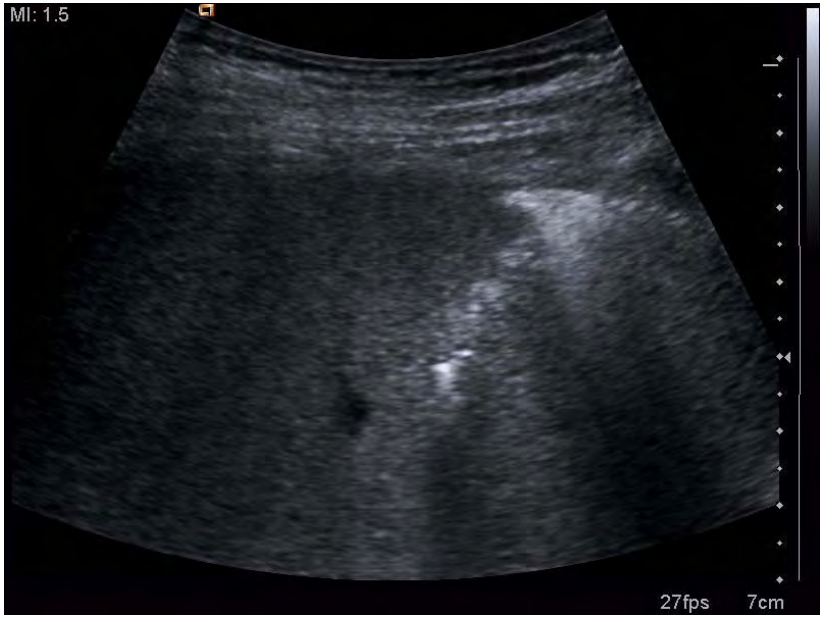
MI: 1.5
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# Liver Biopsy

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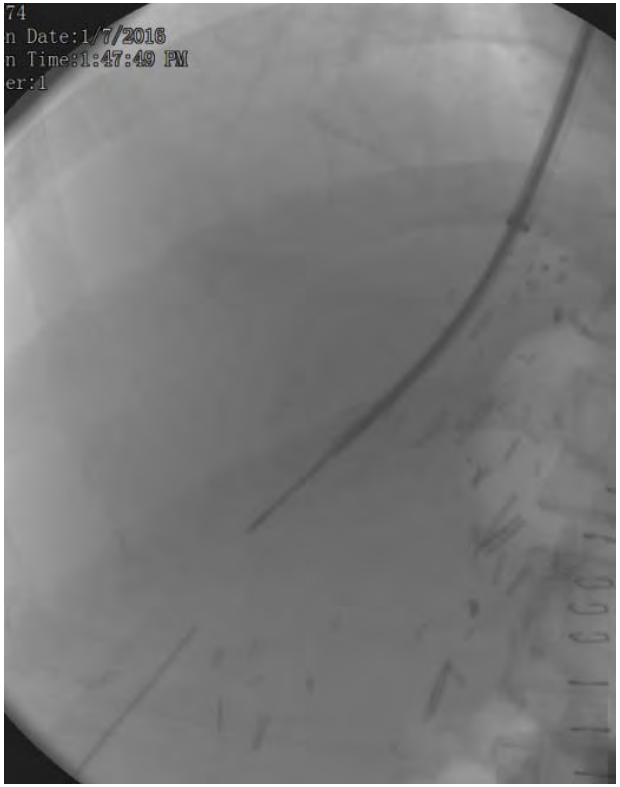
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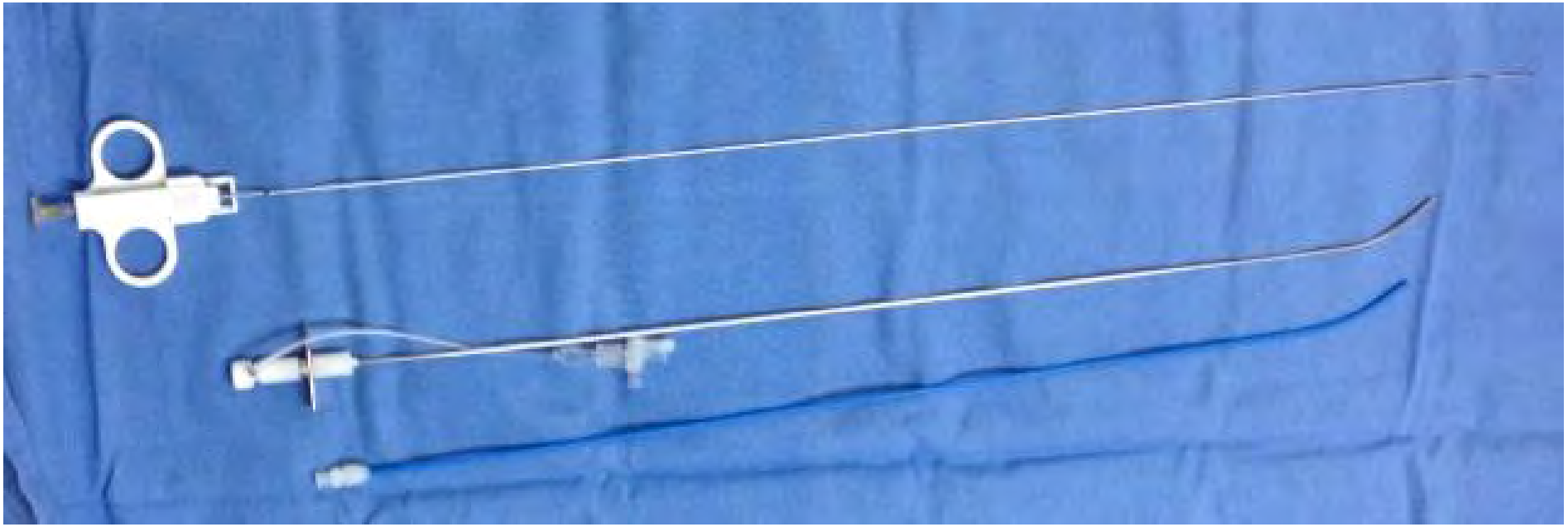
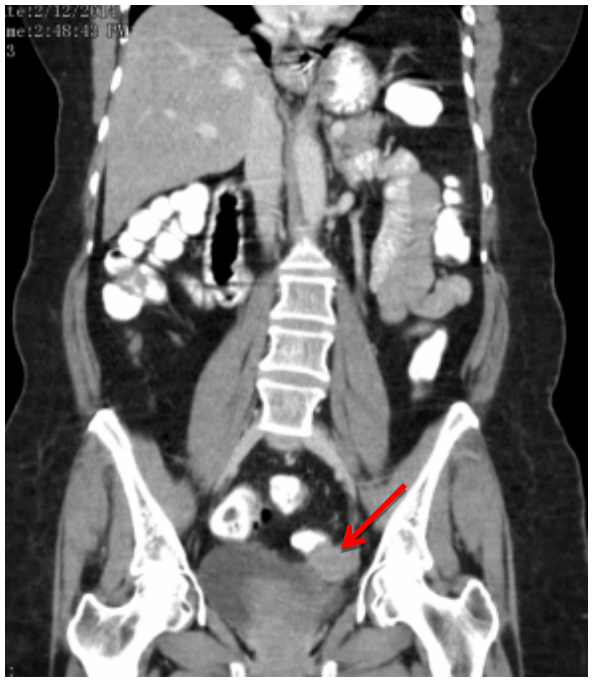
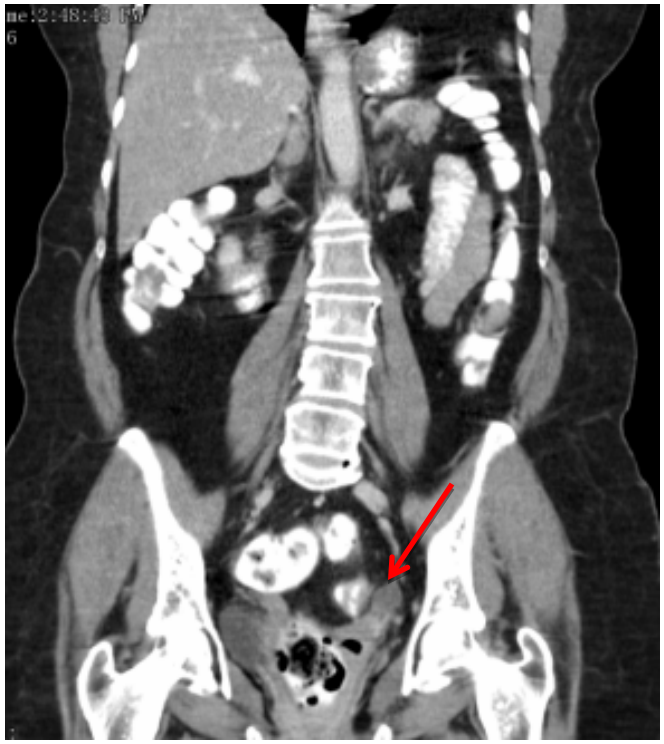
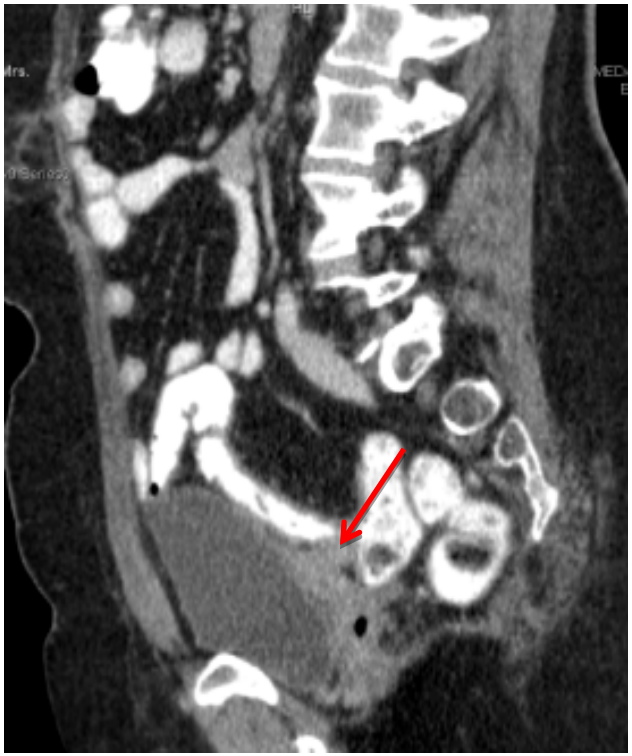
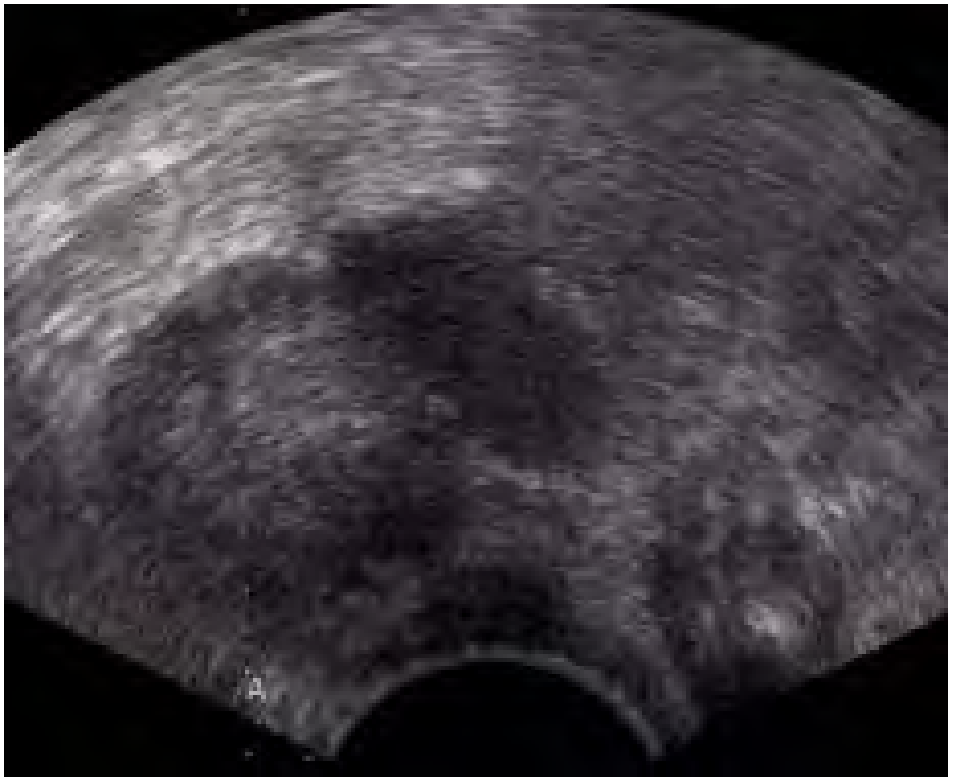


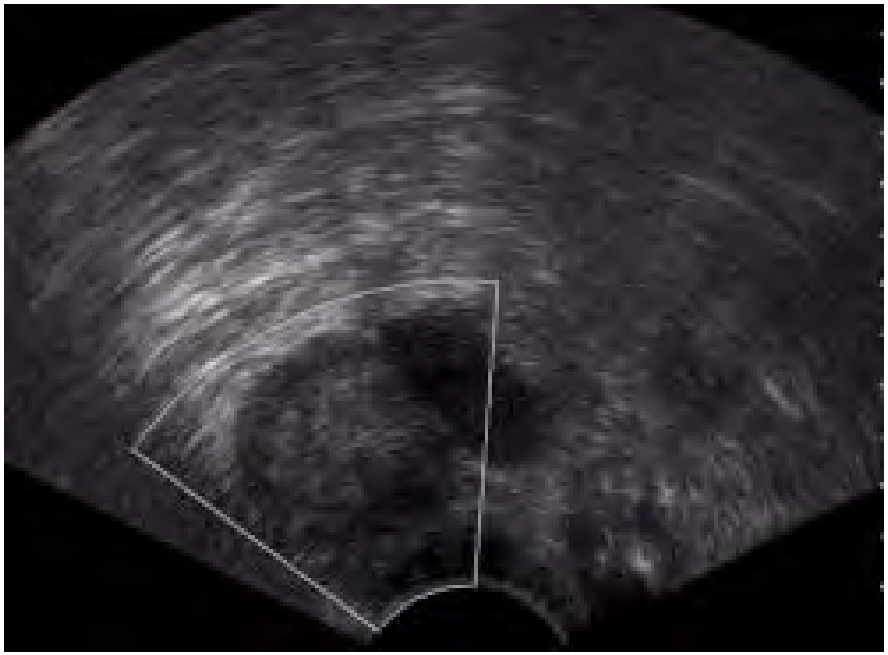
# Pelvic mass-TVS sampling

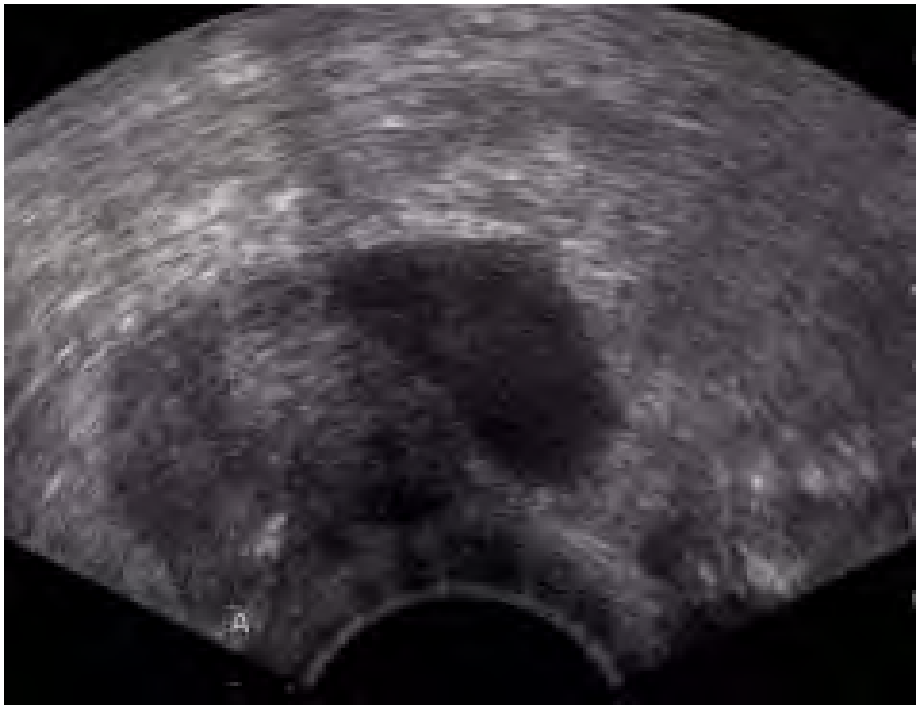


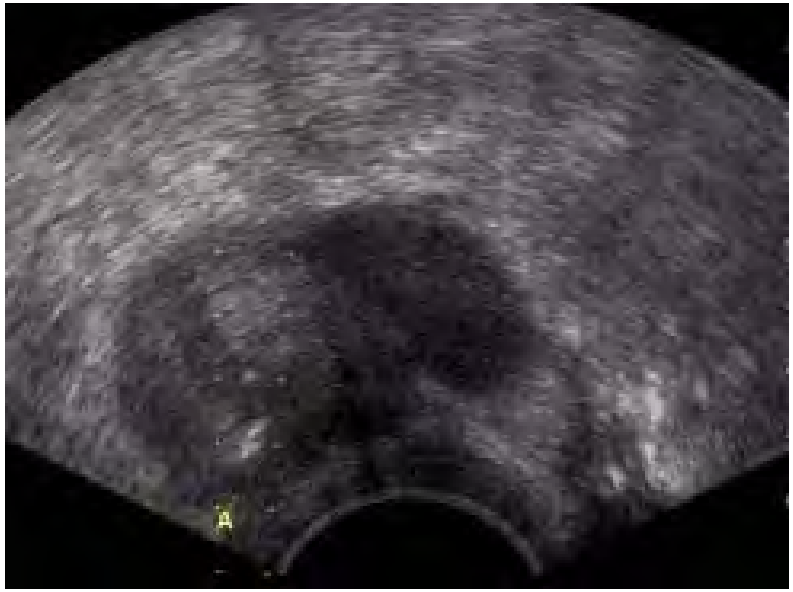


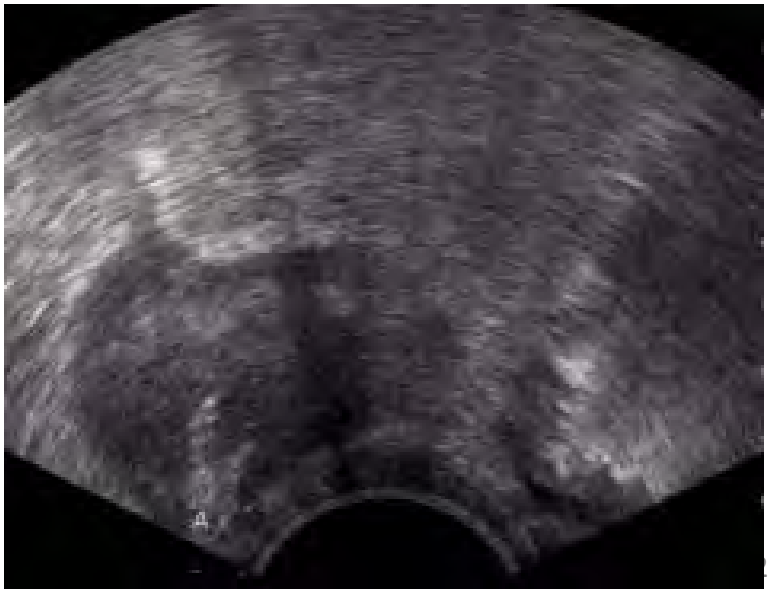




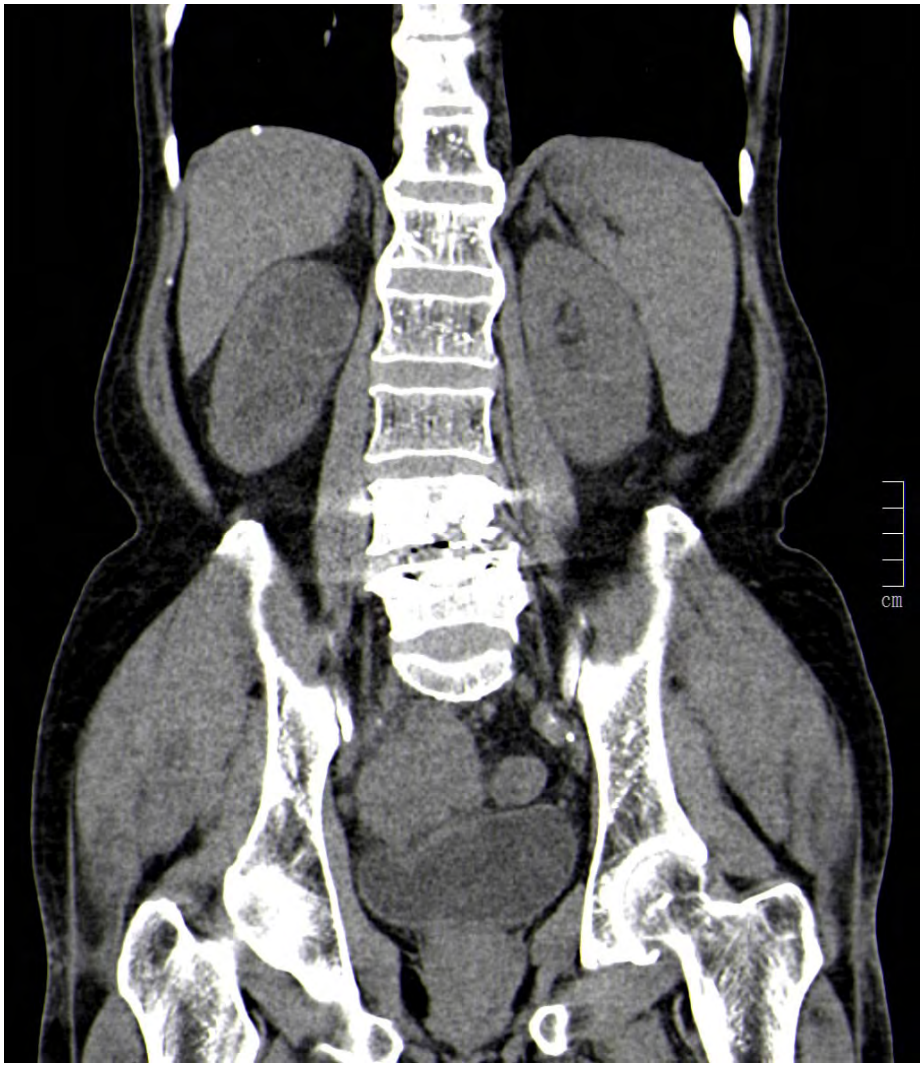


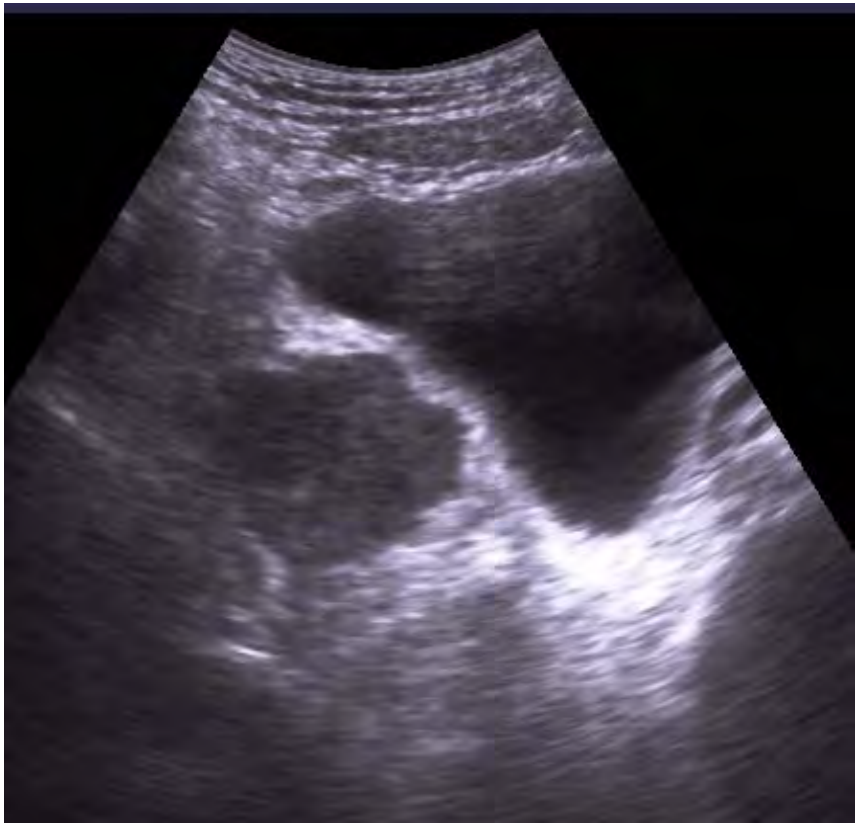


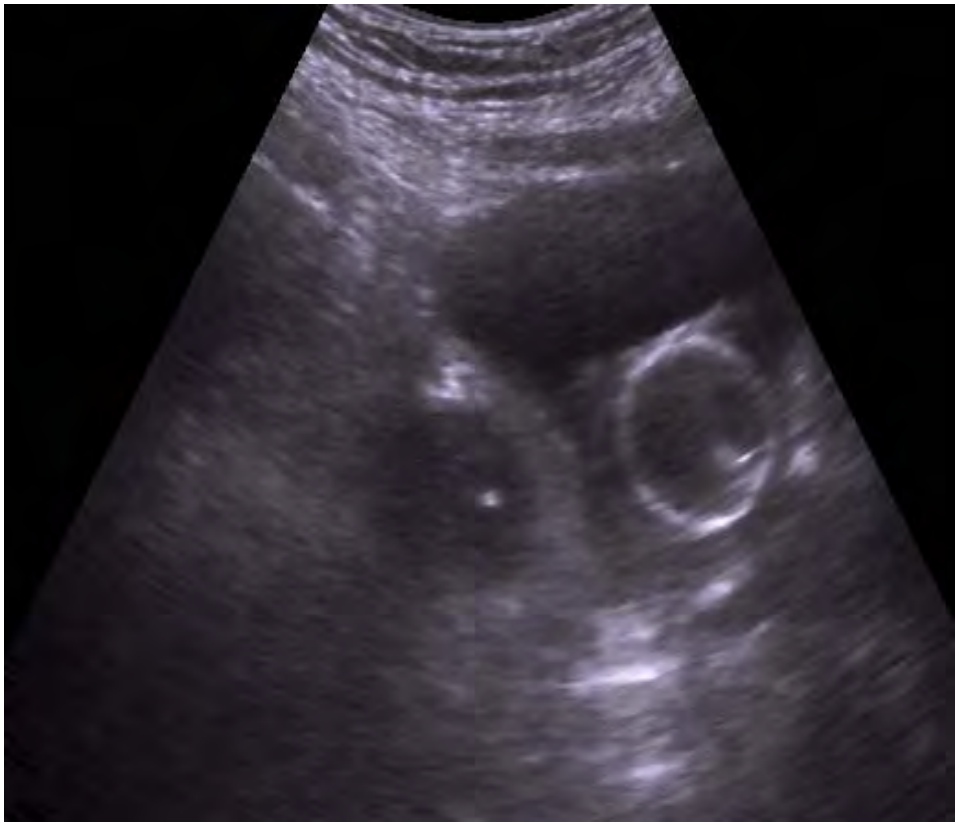


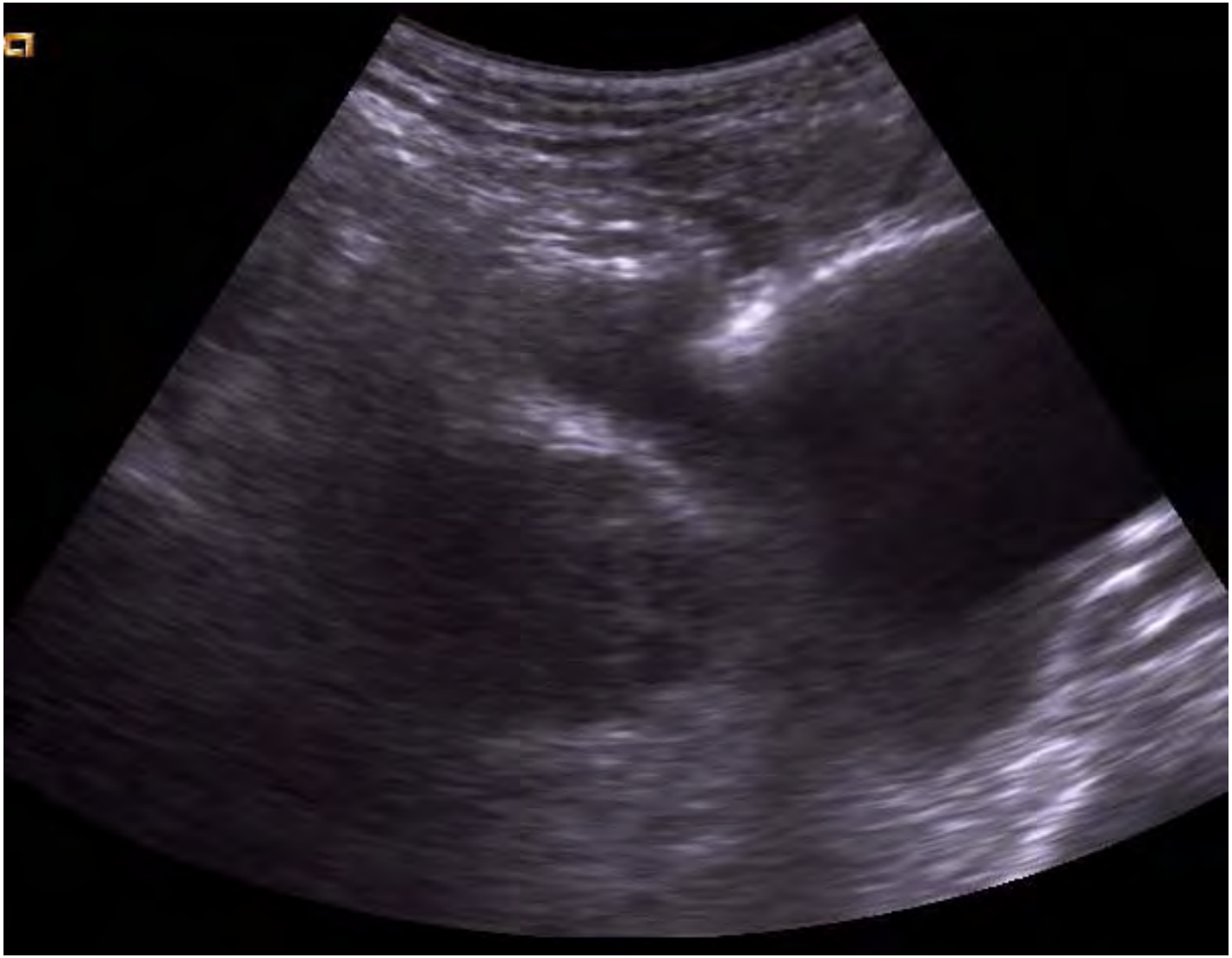


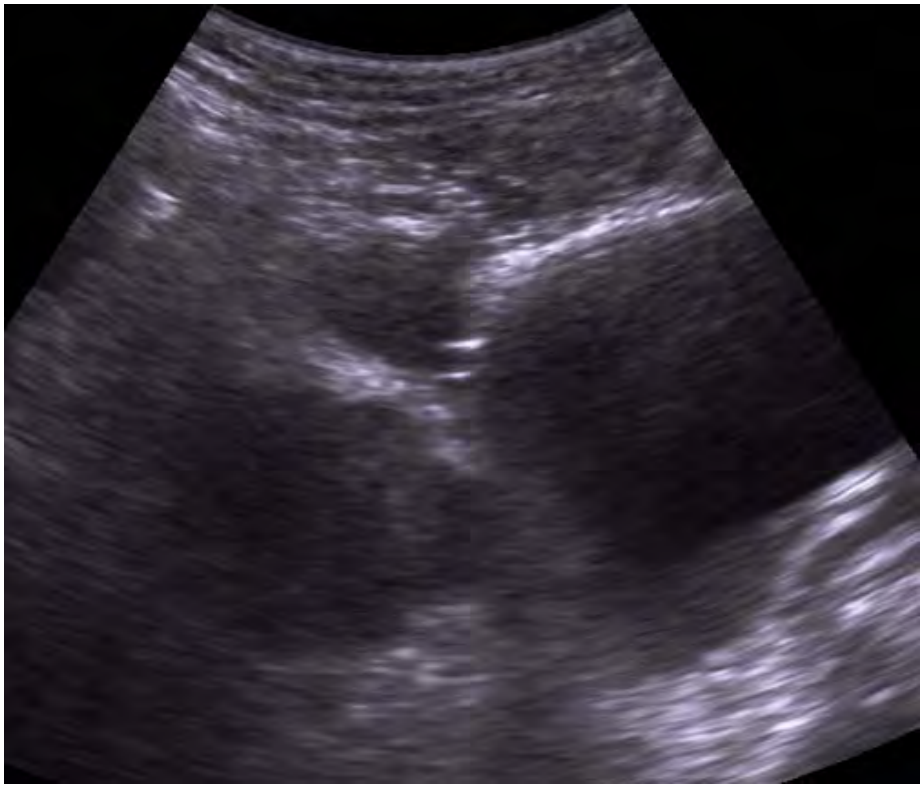
# Pelvic mass

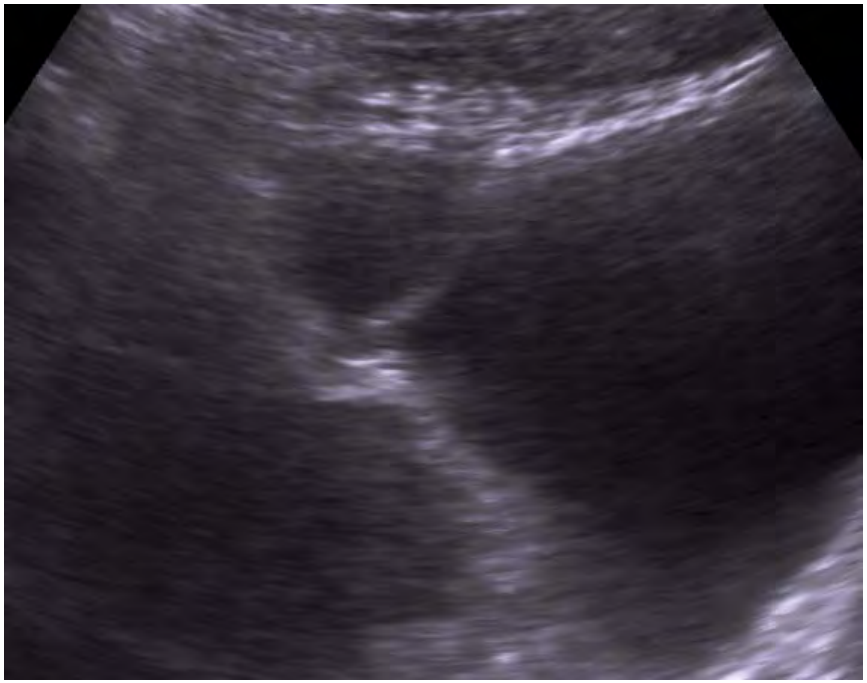












# Sample collection

- FNA
  - Dry and Wet fixed smears
- Biopsy
  - Formalin
  - Saline

# Post procedure management

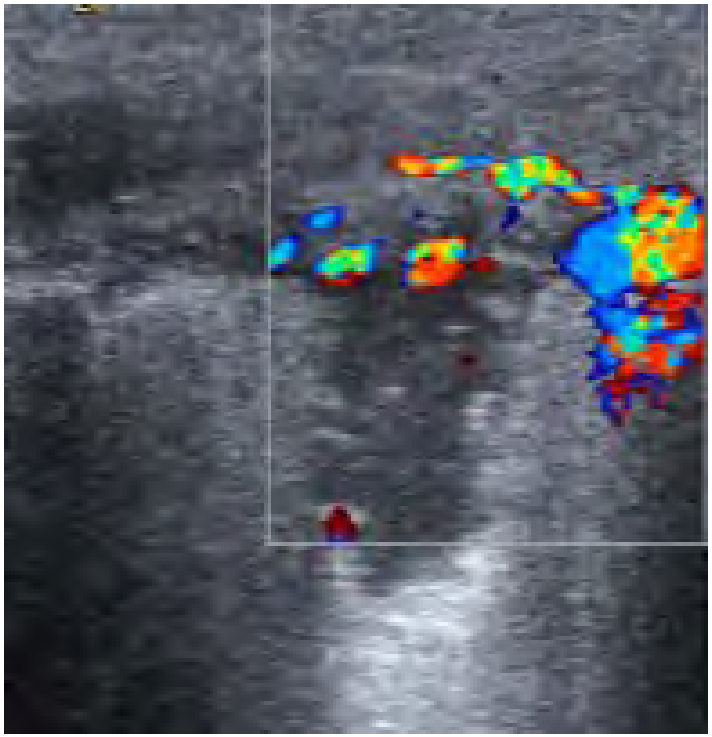
- Post procedure notes and orders to be written on the records
- Monitor vitals
- Bed rest for 1-4 hrs
- Clear liquid diet as the first oral feed
- Any further investigation (e.g CXR) if required
- Patient discharge only after 2-4hrs
- Instructions regarding follow up for potential late complications

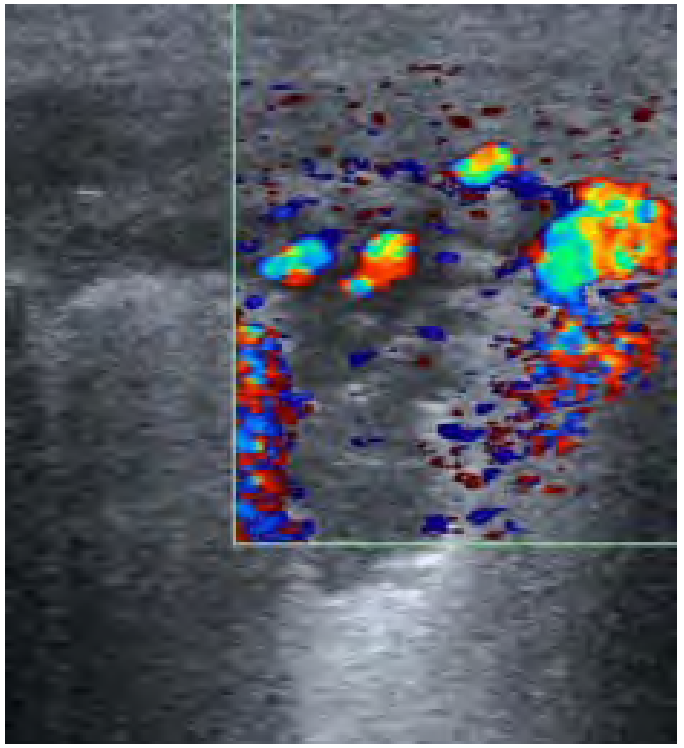
# Complications

- Overall estimate <2%
  - Hemorrhage
  - Infection
  - Organ injury
  - Pneumothorax
  - Pancreatitis
- Mortality rate 0.006% - 0.031%

Smith et al, Radiology 178:253-258, 1991

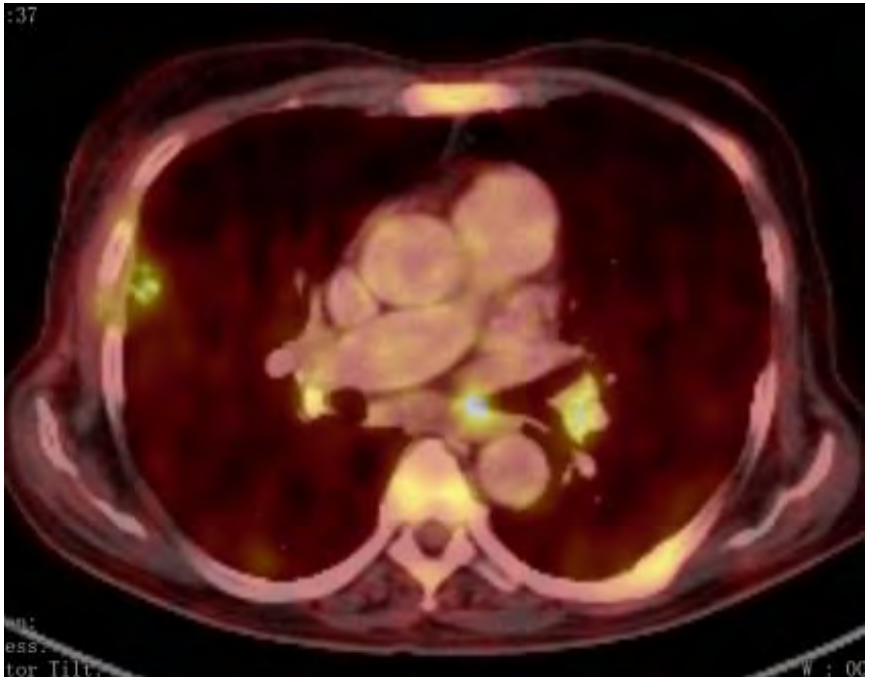
# *The protected lesion*

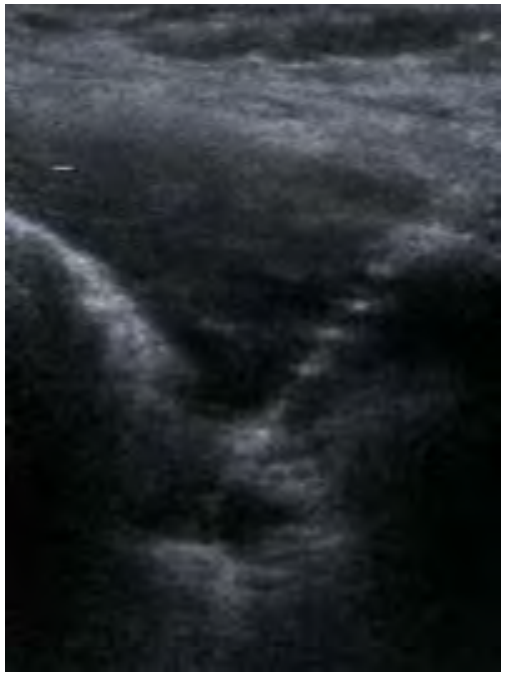


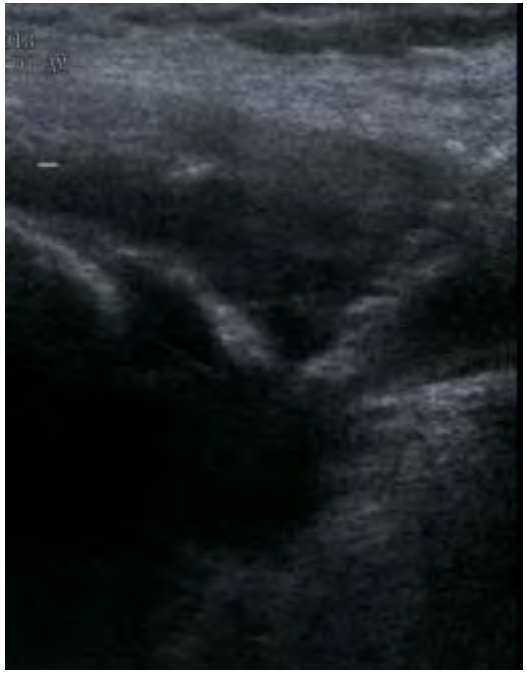


*Pleural based lesion*

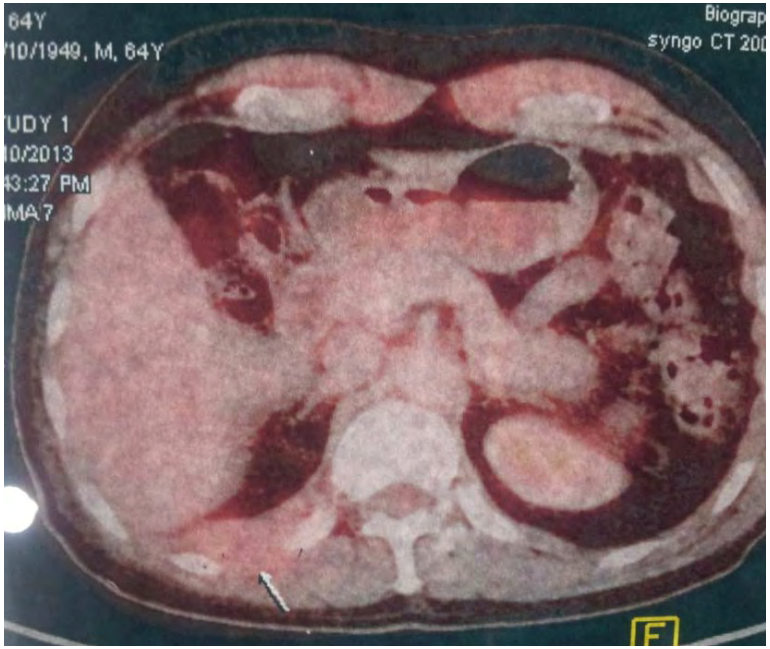
# *The hidden lesion*

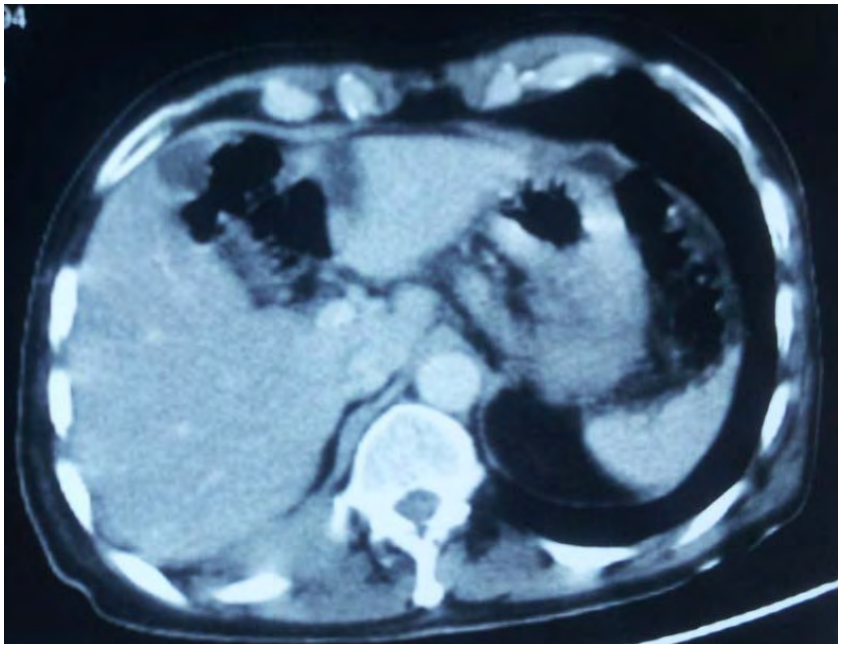


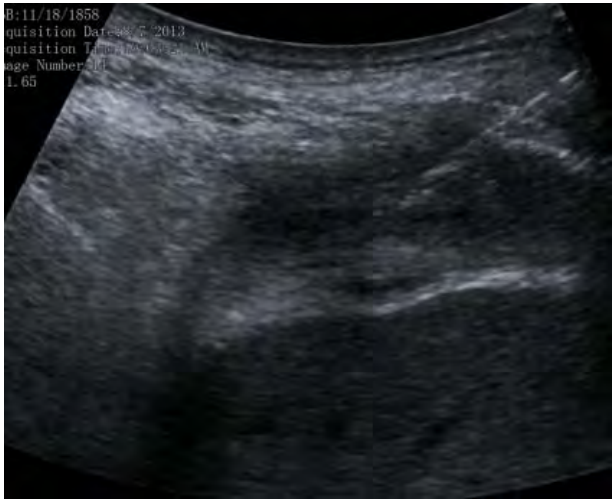




# *The hard lesion*

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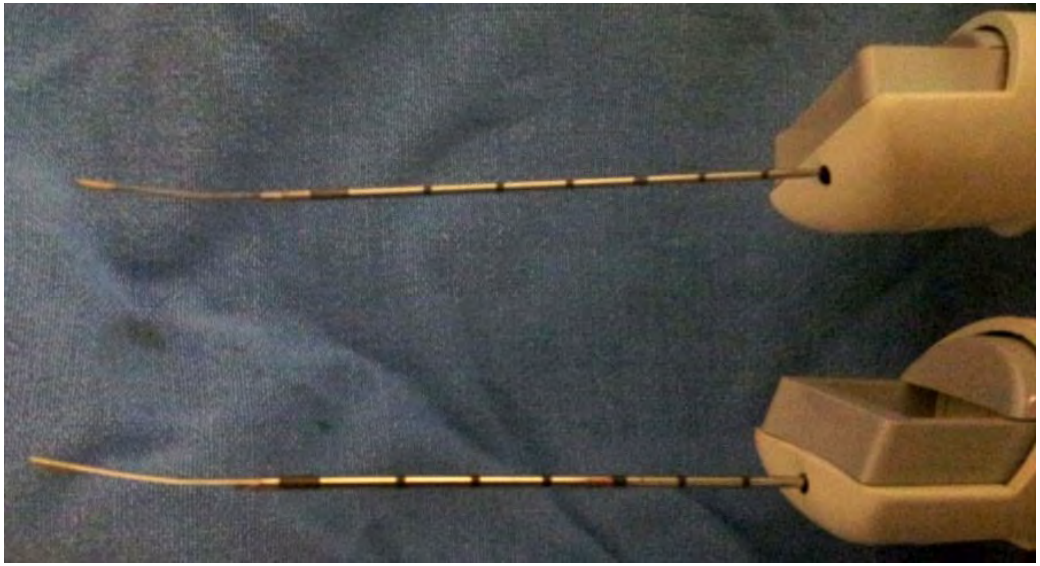
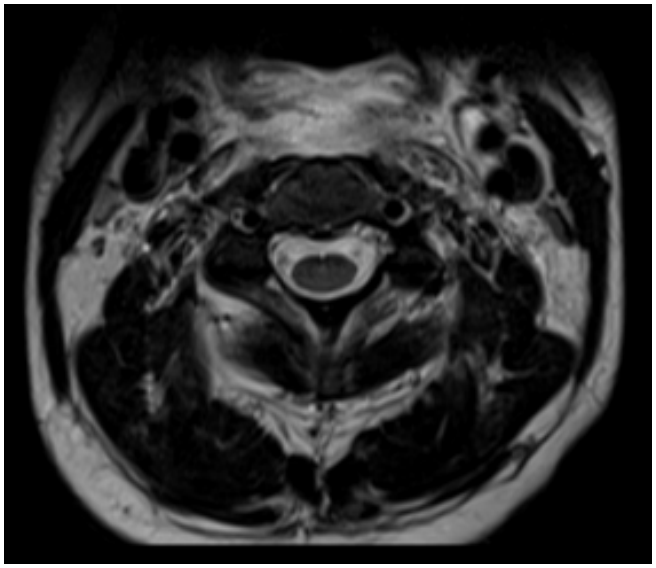
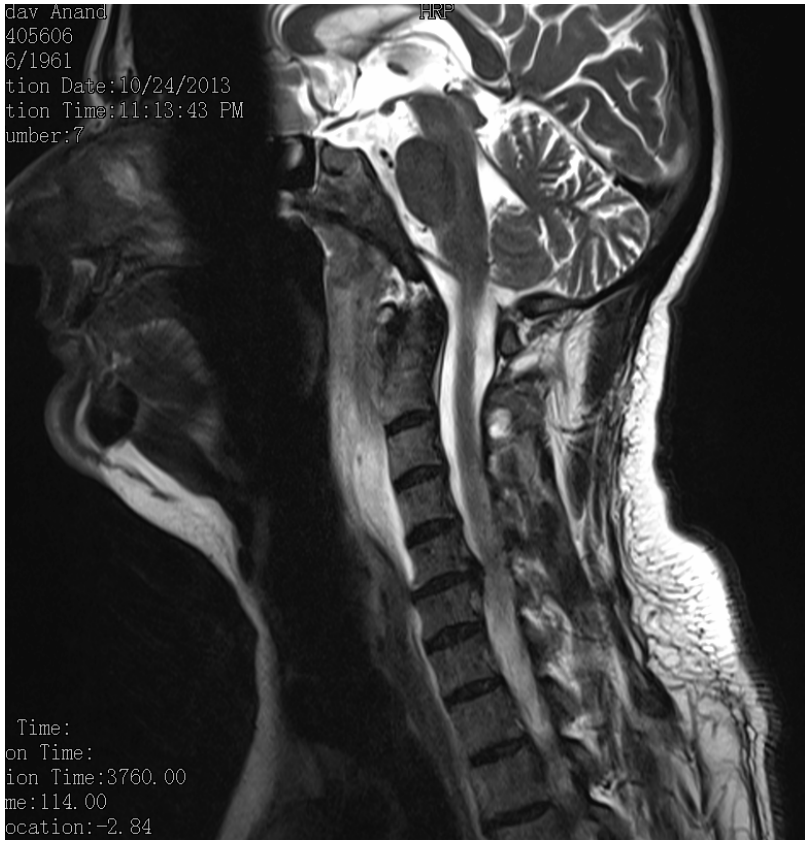



COOK

# *Retropharyngeal soft tissue*

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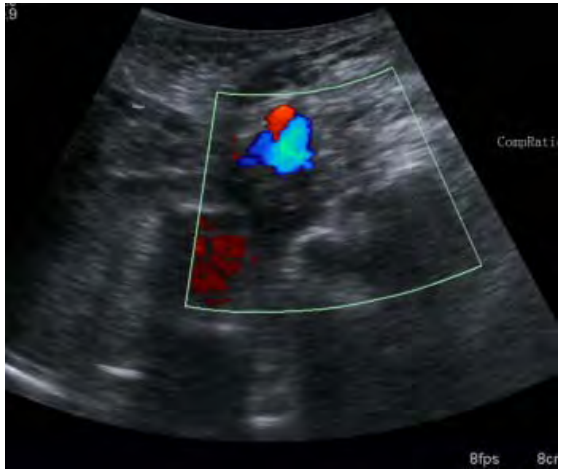
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27fps

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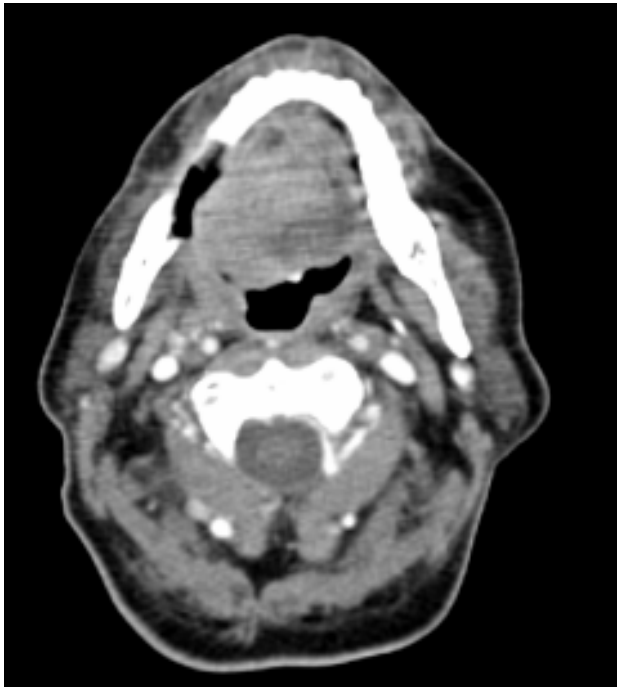
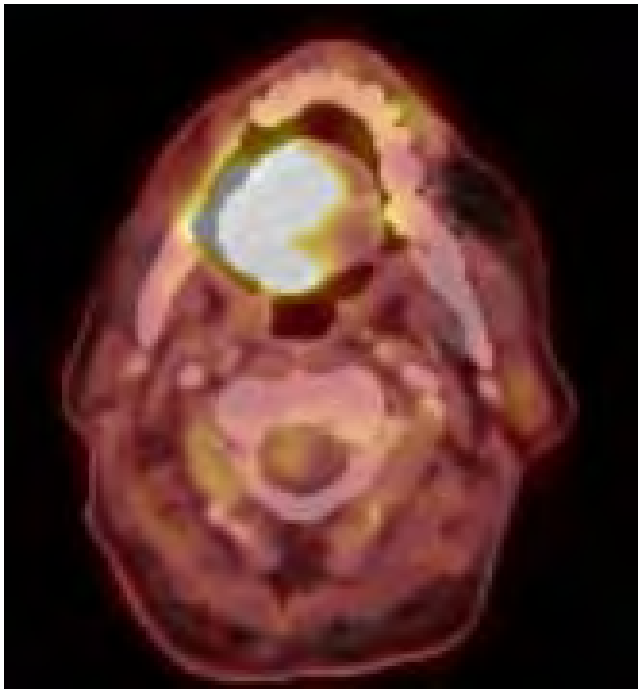
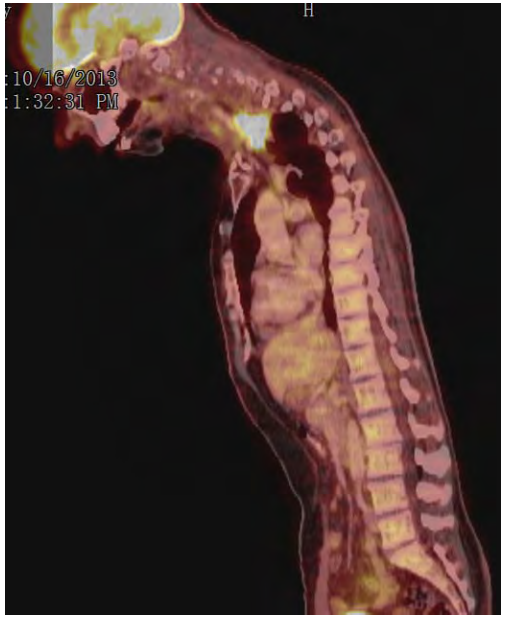
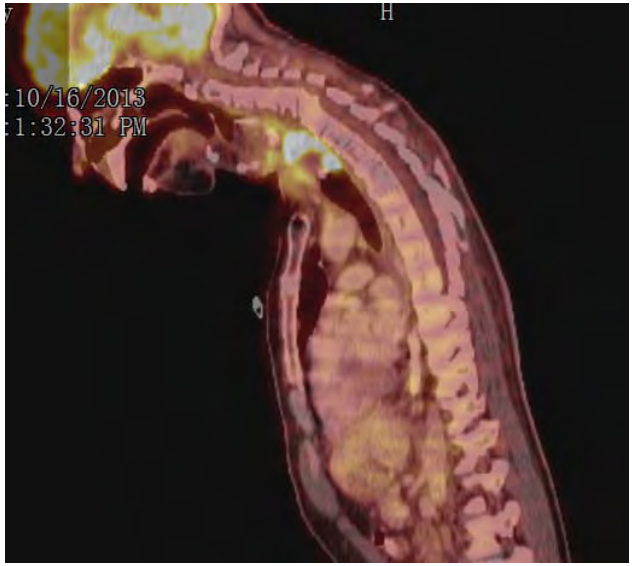


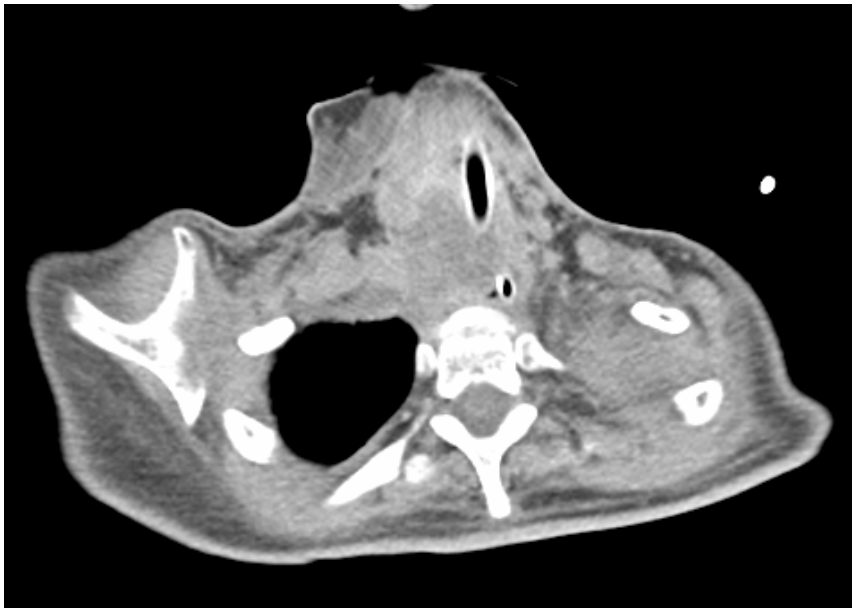


# *Retrothyroid mass*


*K/C/O Ca Floor of mouth*

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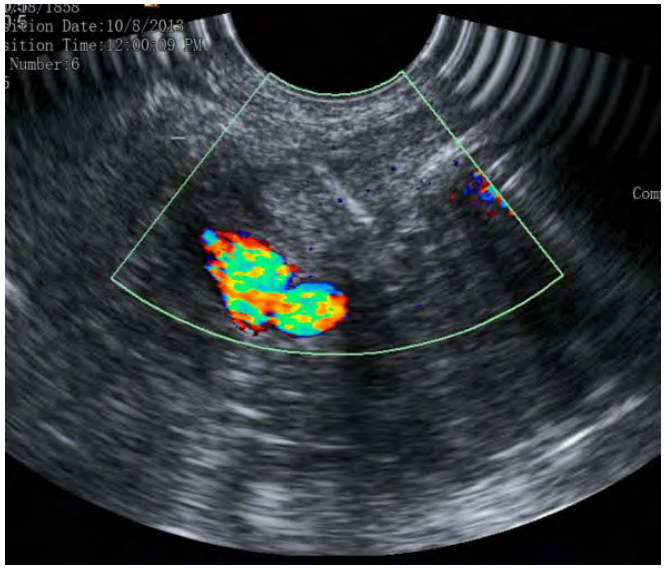
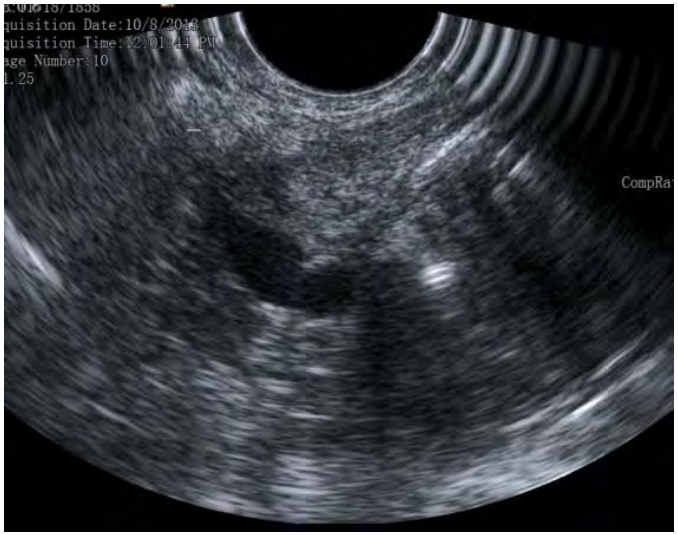
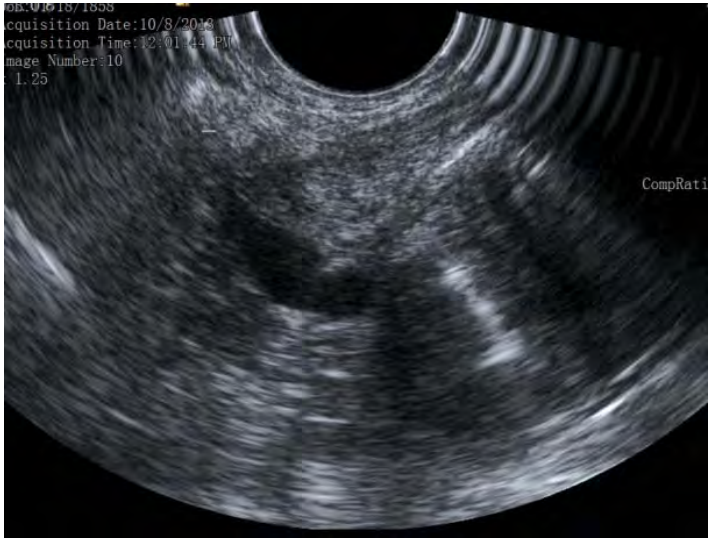
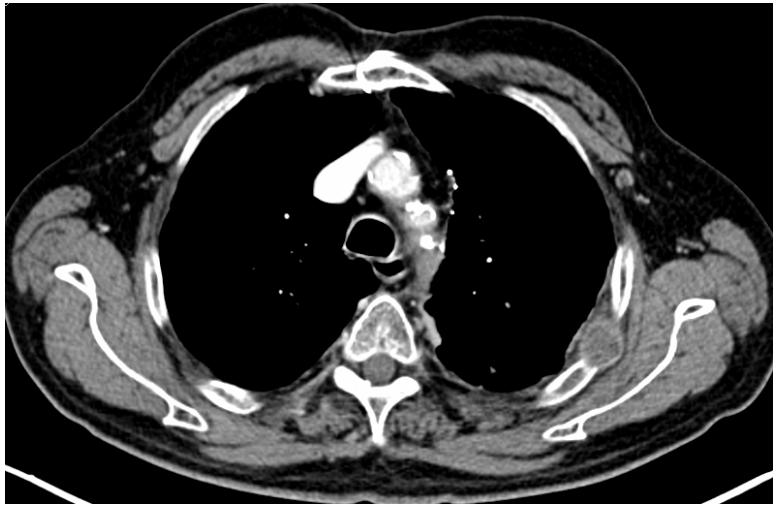
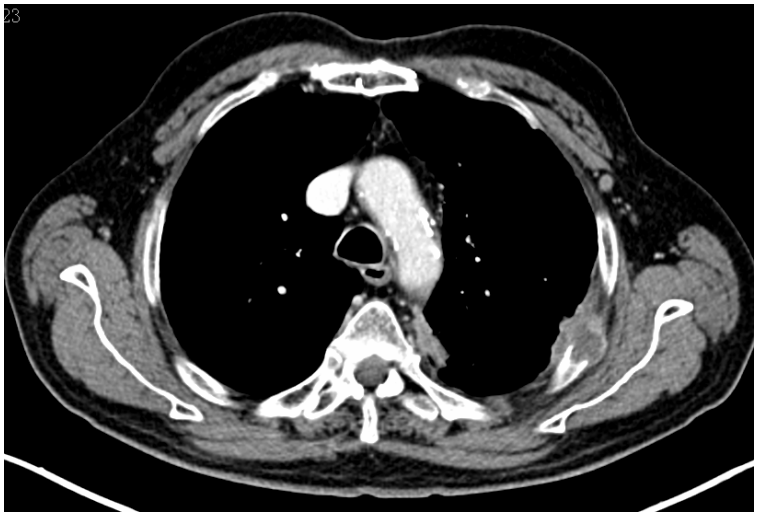


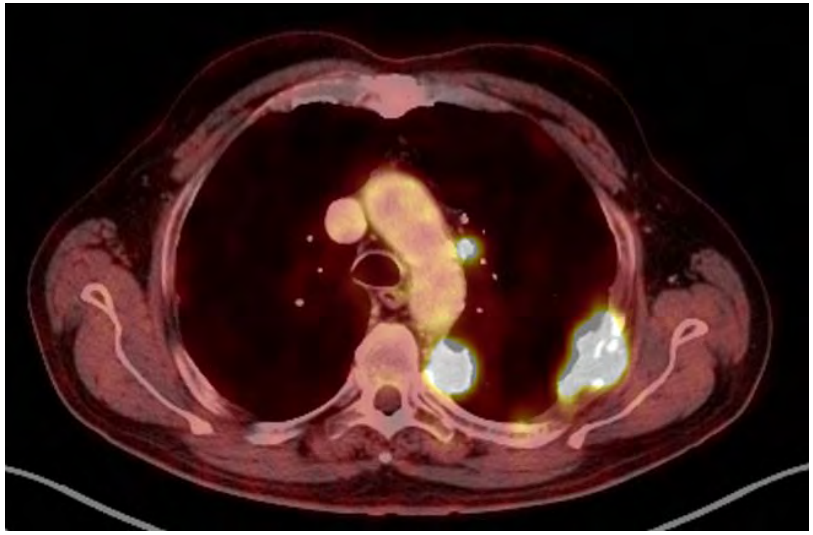




# *Maneouver*





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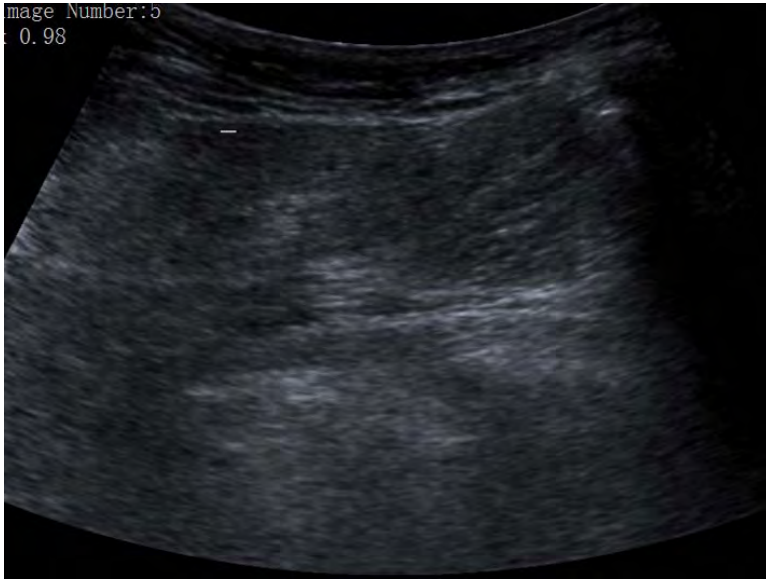
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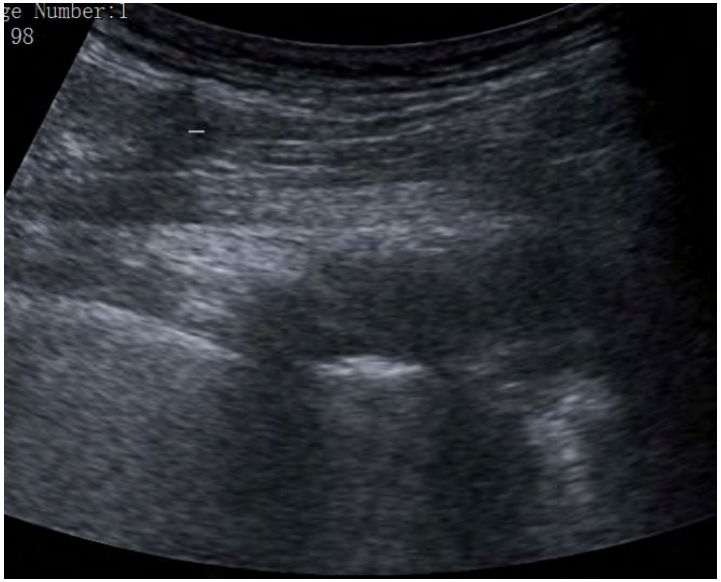
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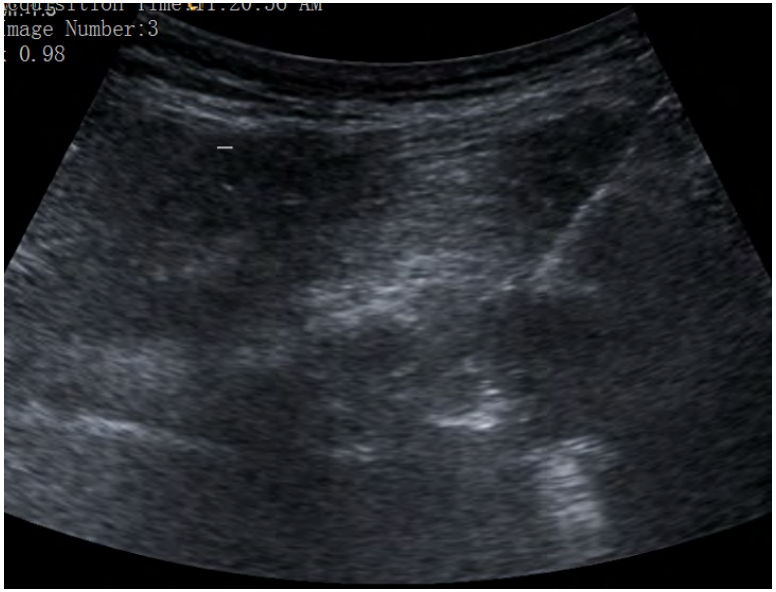
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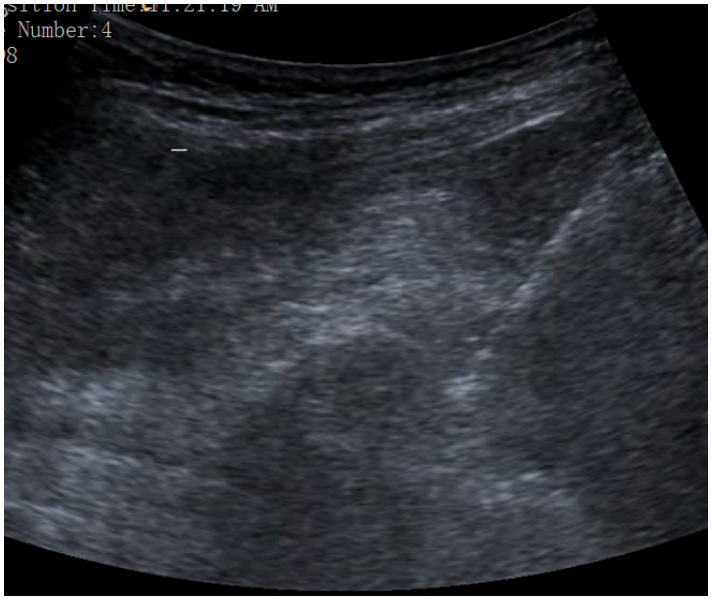
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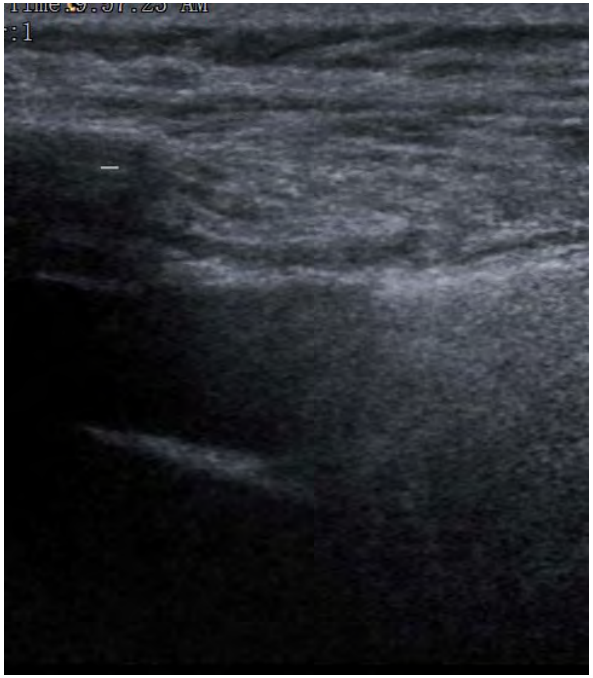
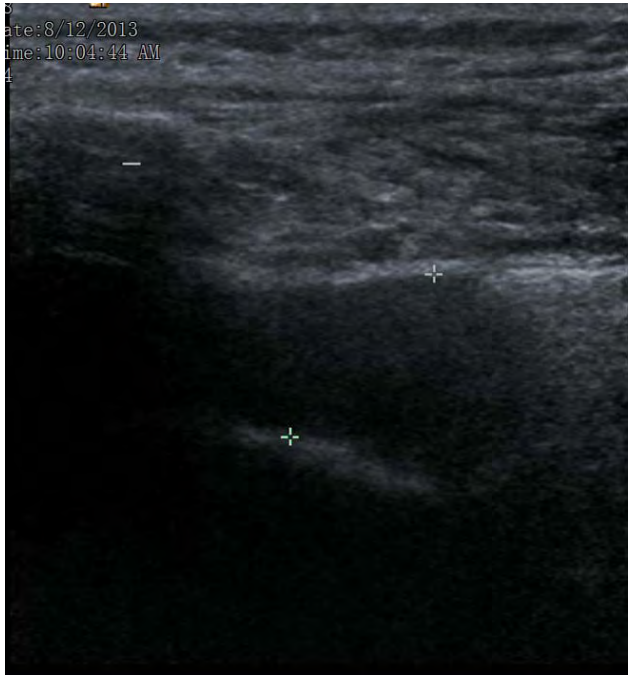
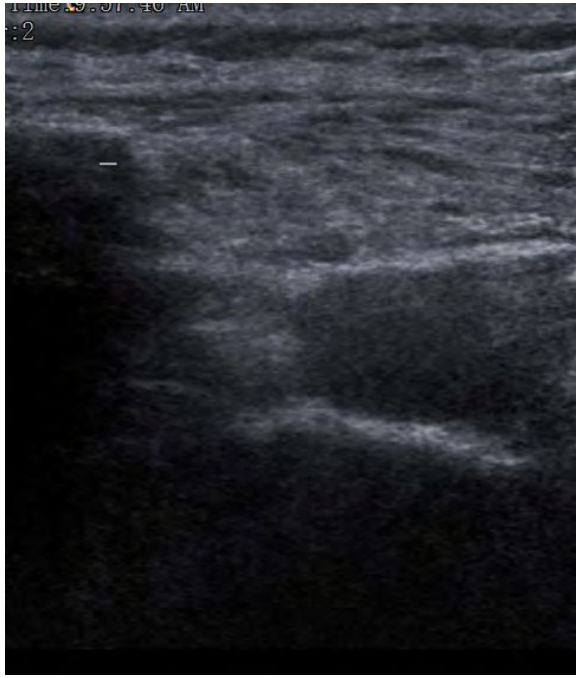
# *Paracardiac node*

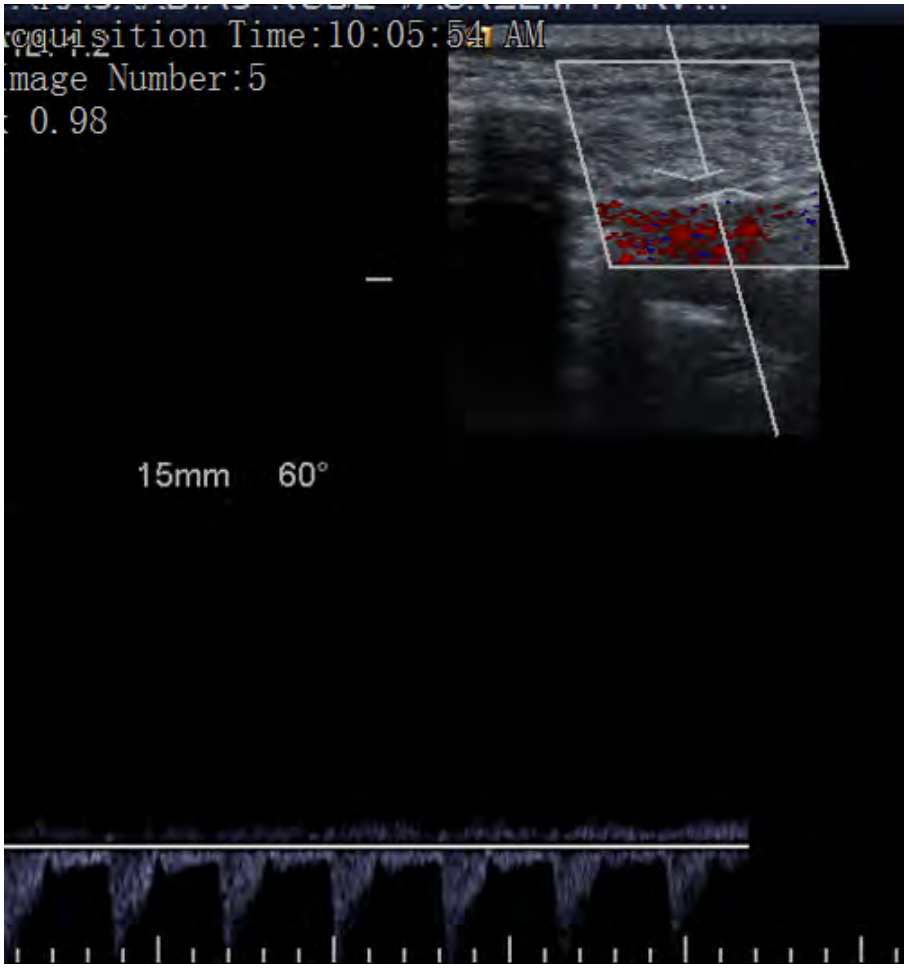
*Spot the difference*

# *Spot the difference…….contd*



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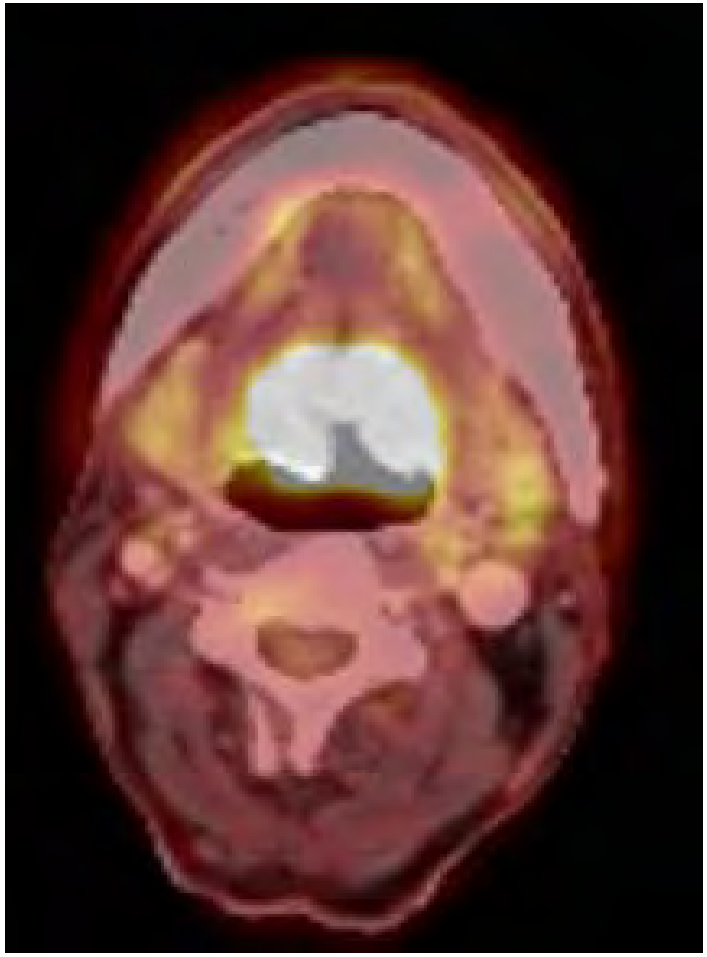
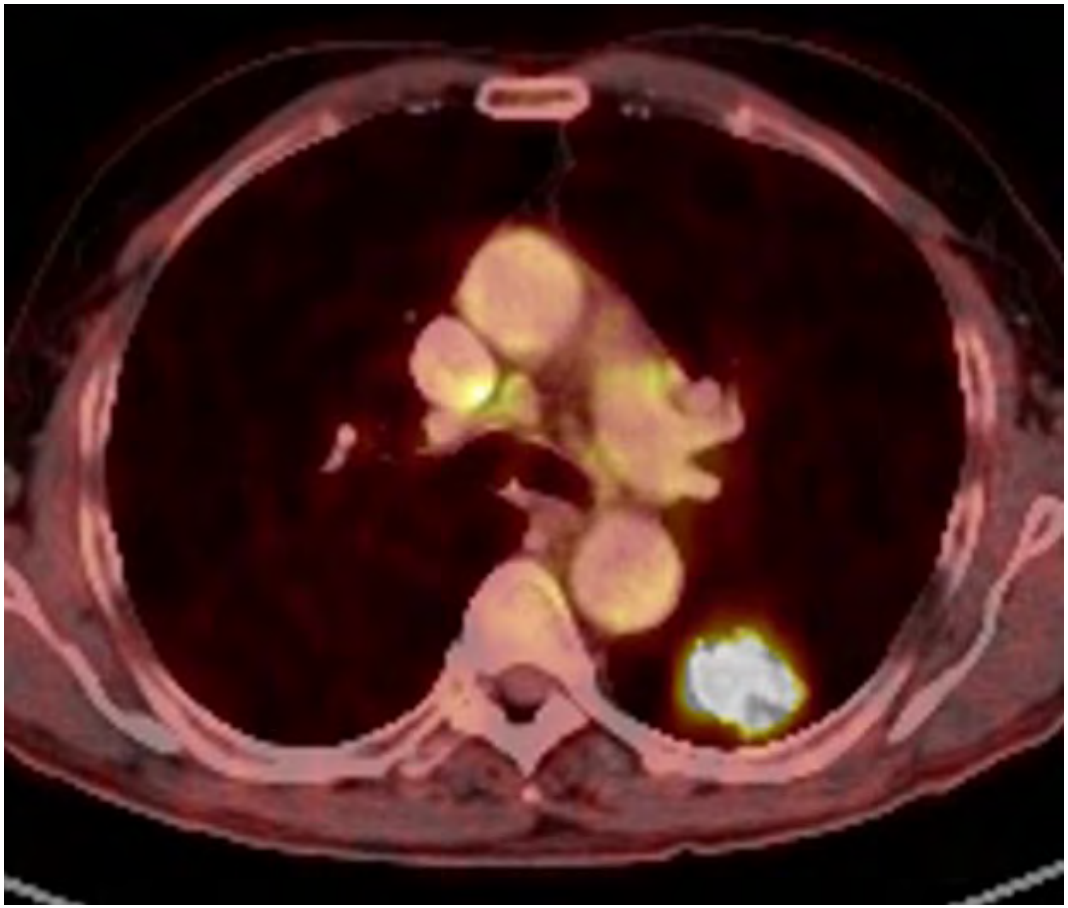
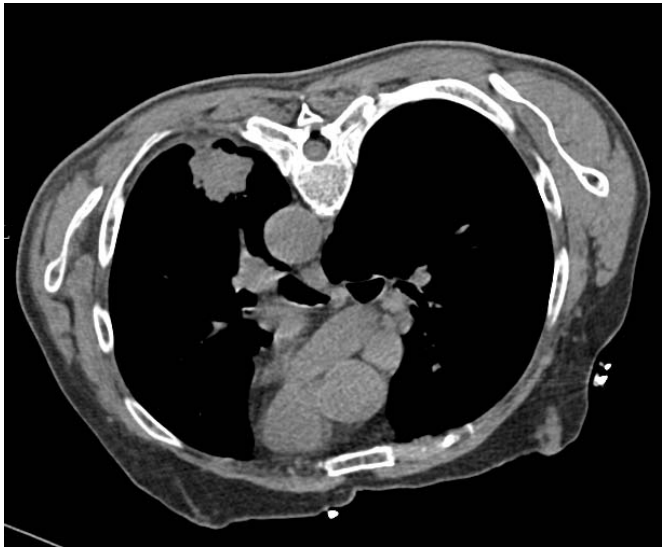
# *Ca base of tongue*

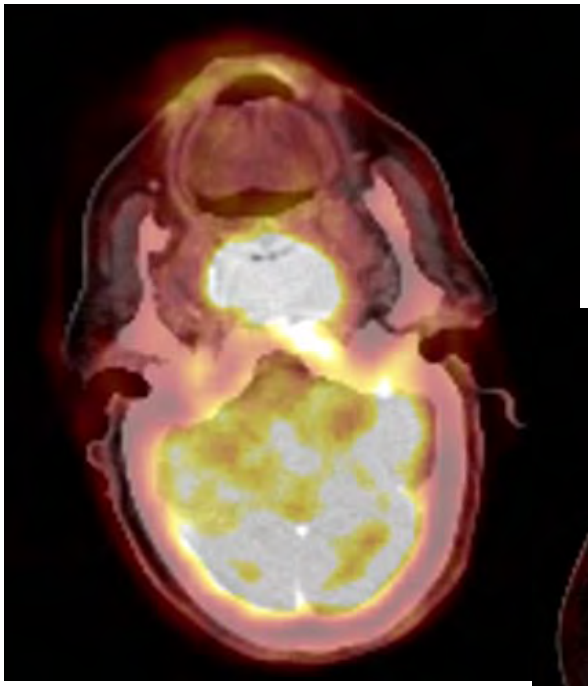


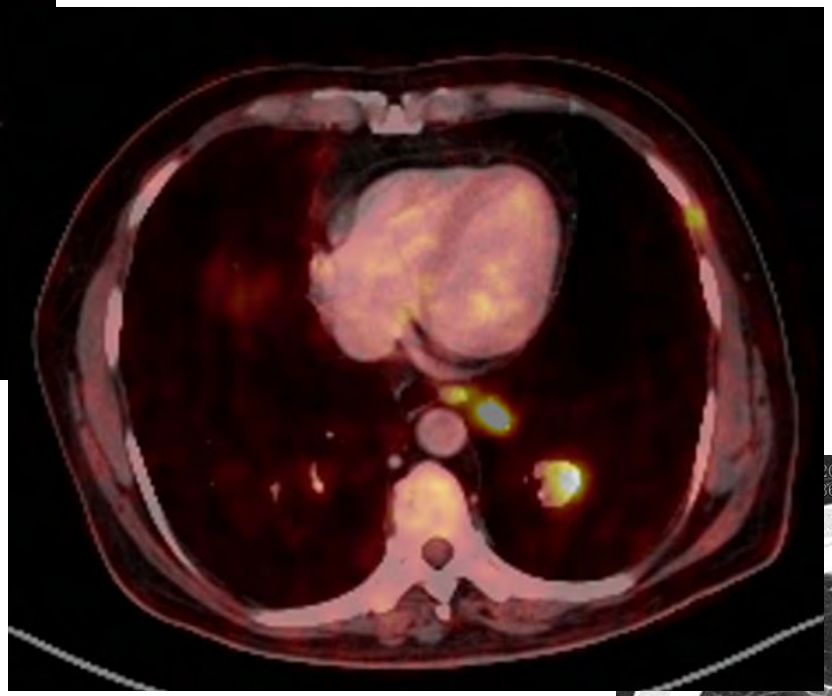


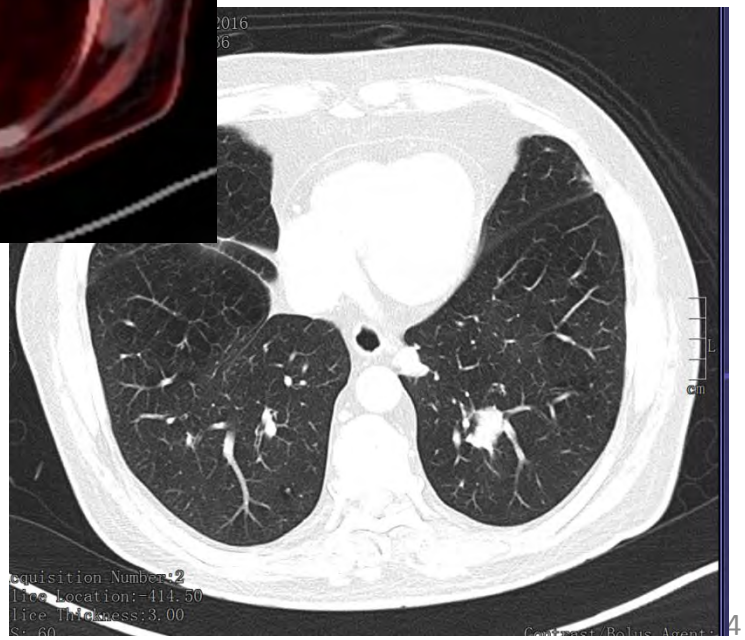


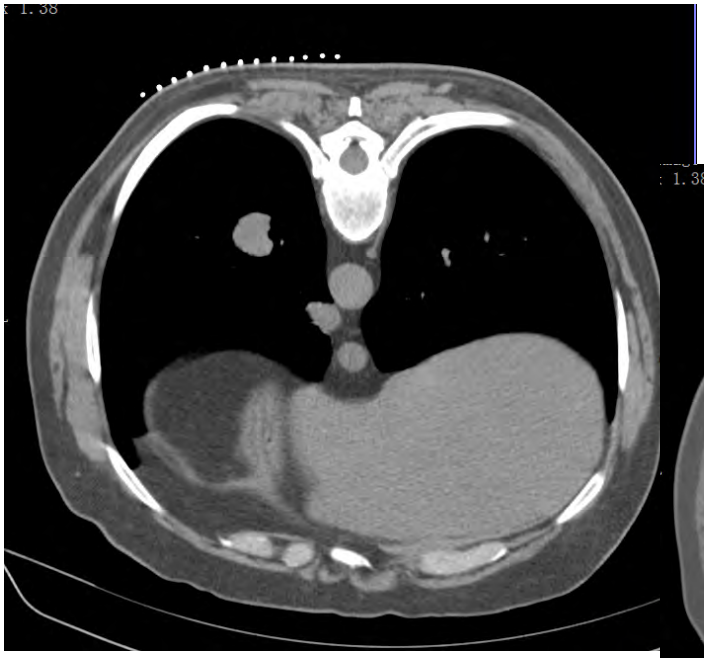


# Ca Nasopahrynx





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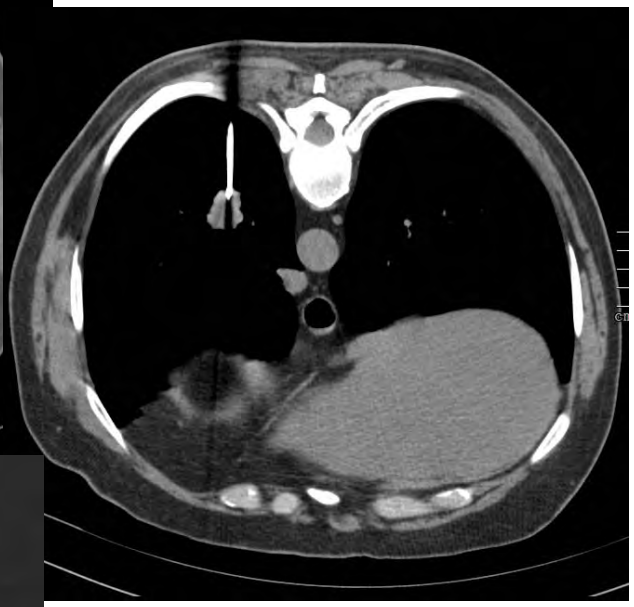
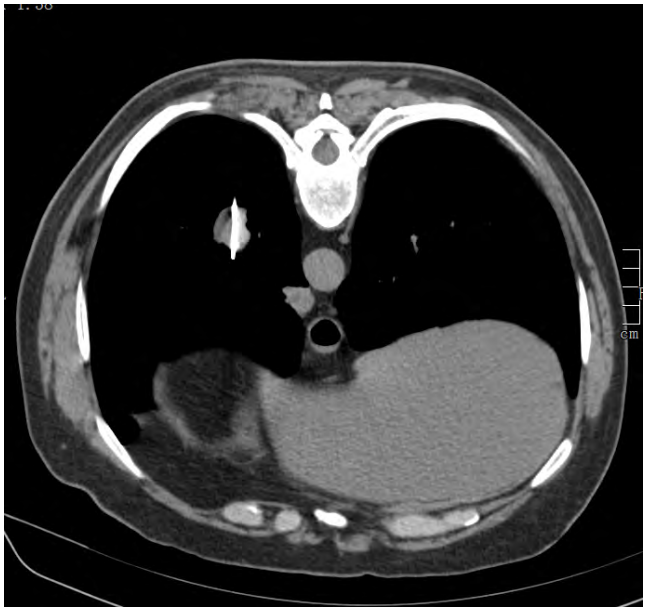
1.38



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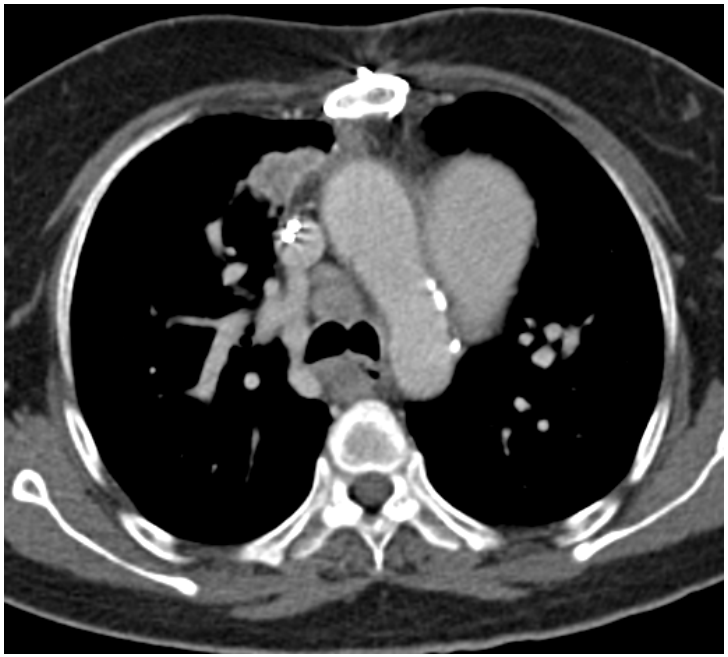
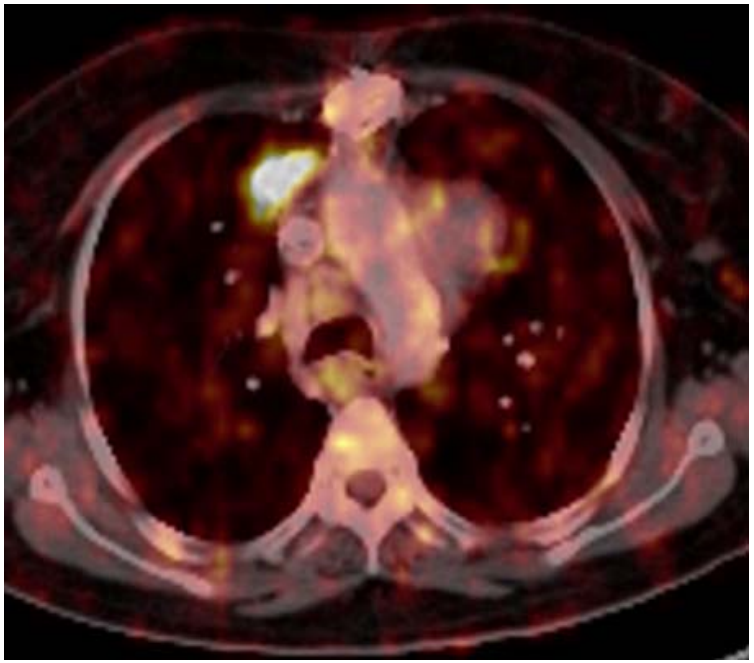
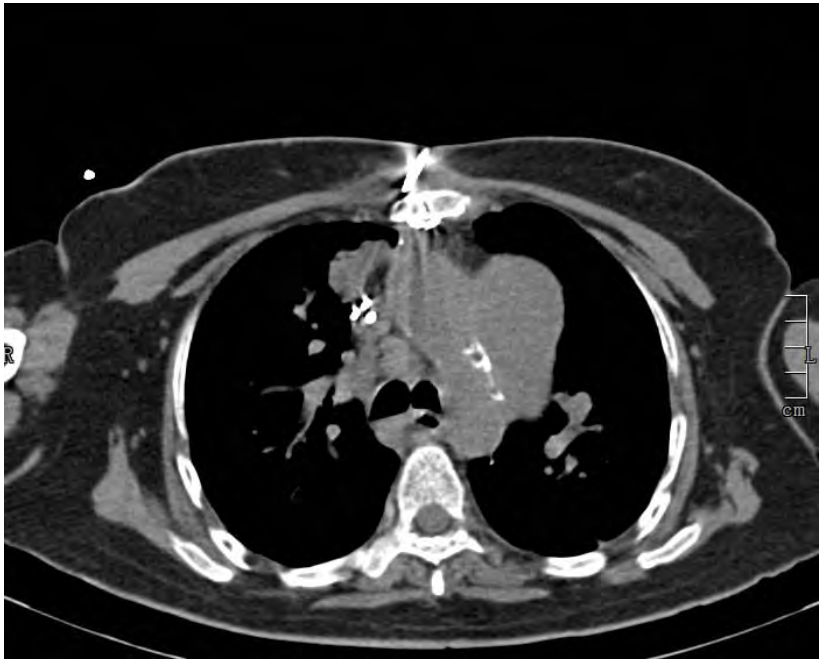
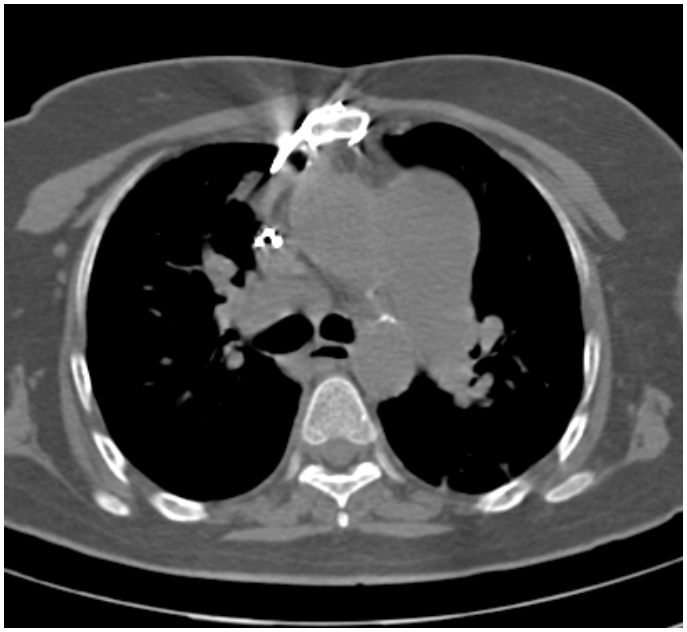


Ca Cervix





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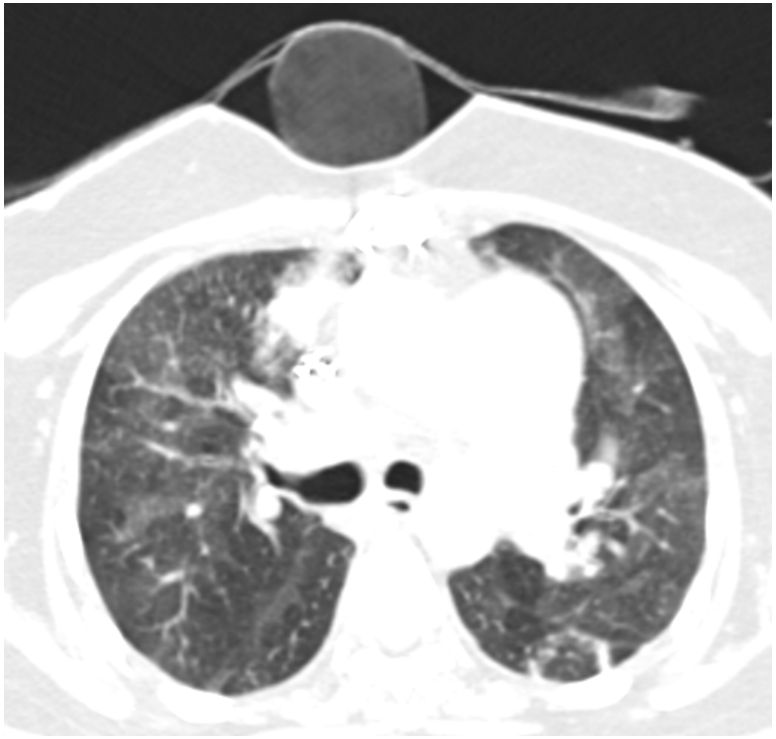
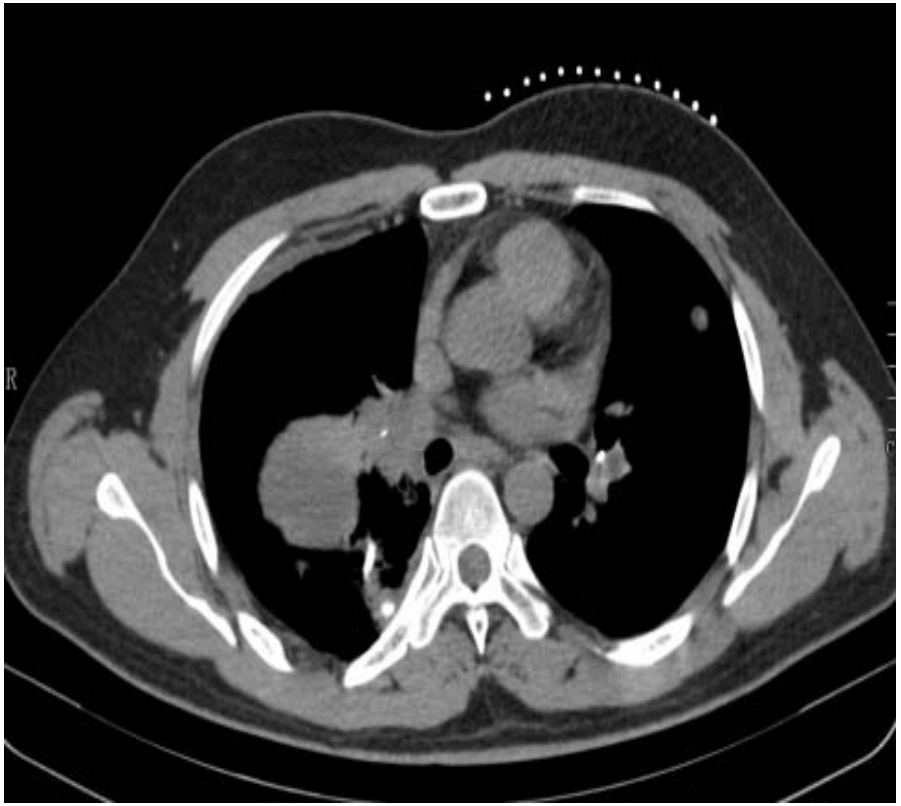
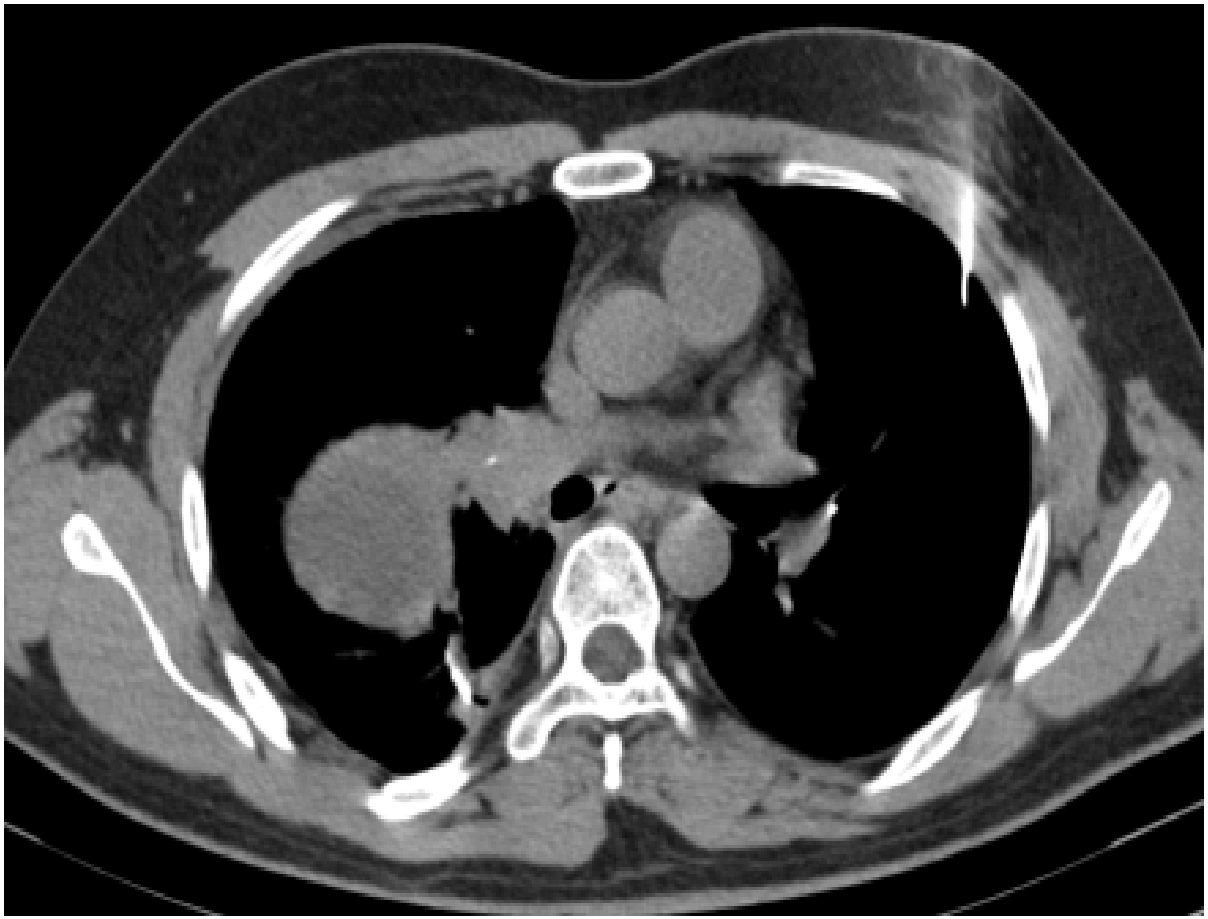
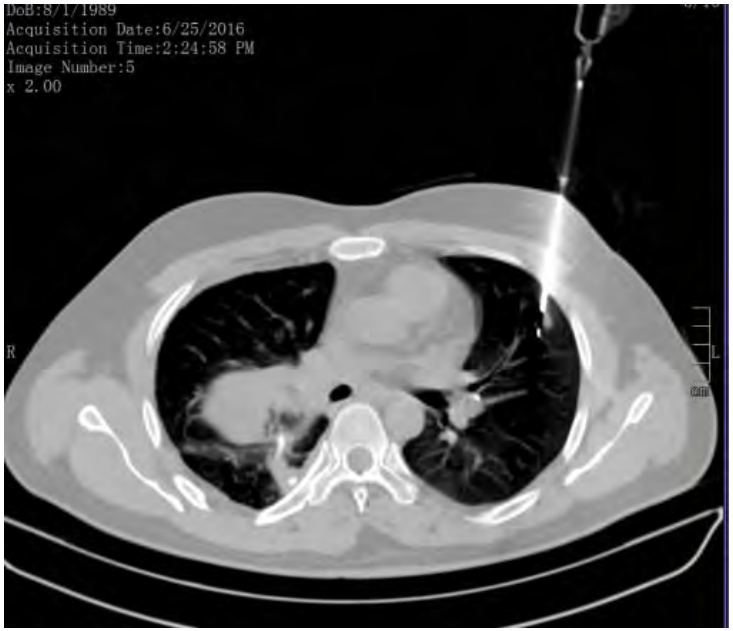




Follow up case of invasive mucinous adenocarcinoma of right lower lobe – post lobectomy status

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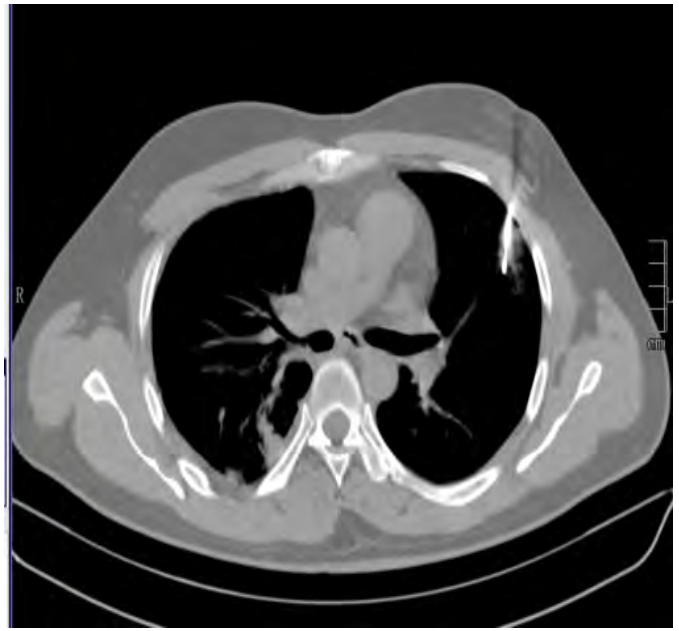
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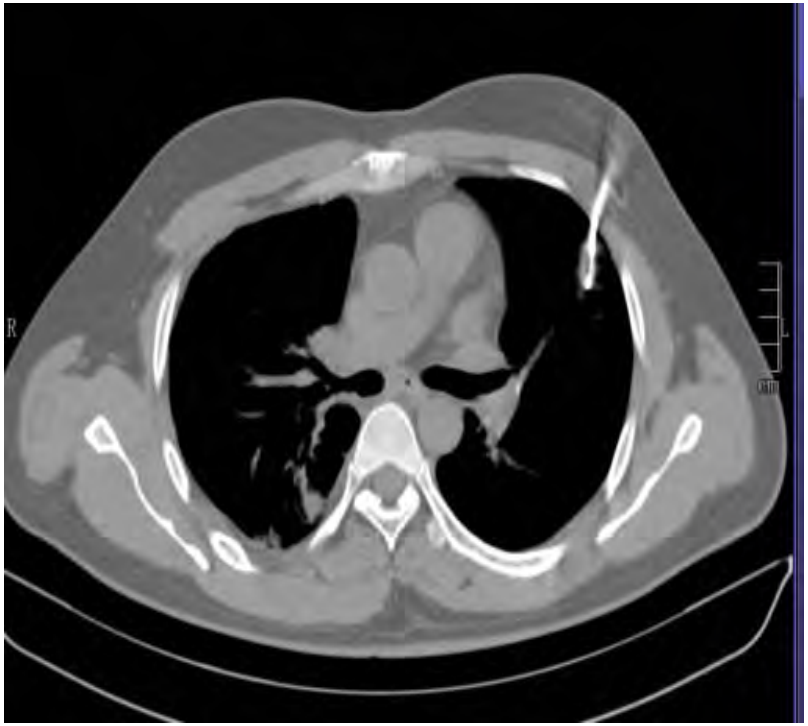
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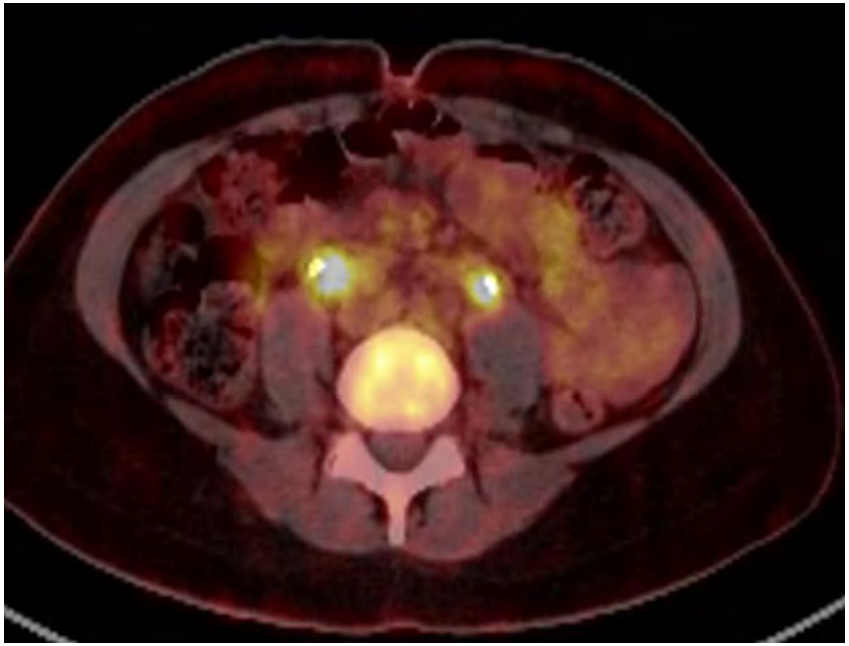
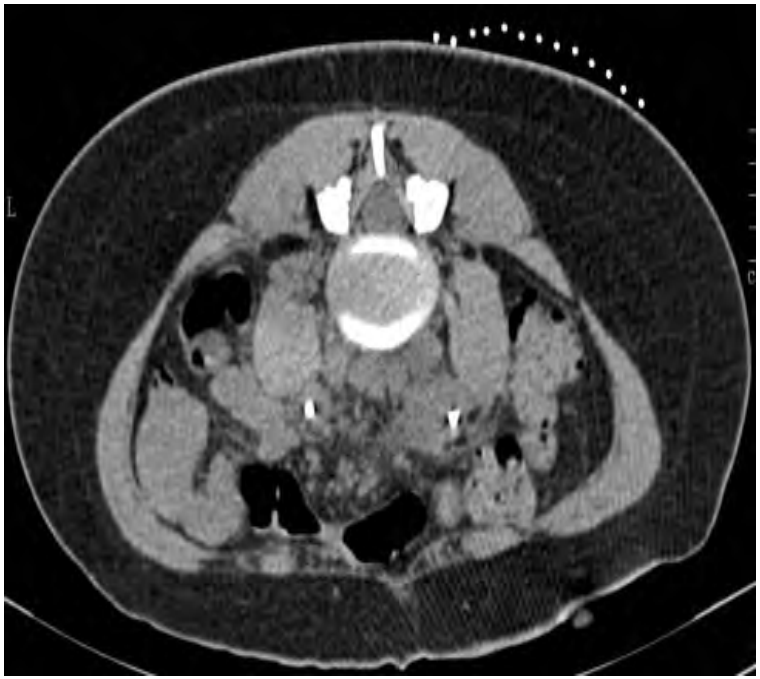
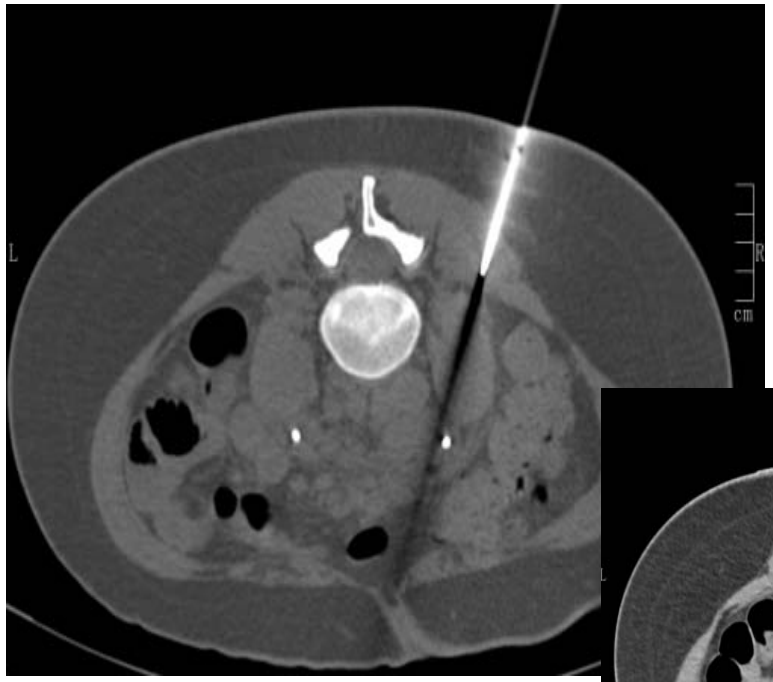
R

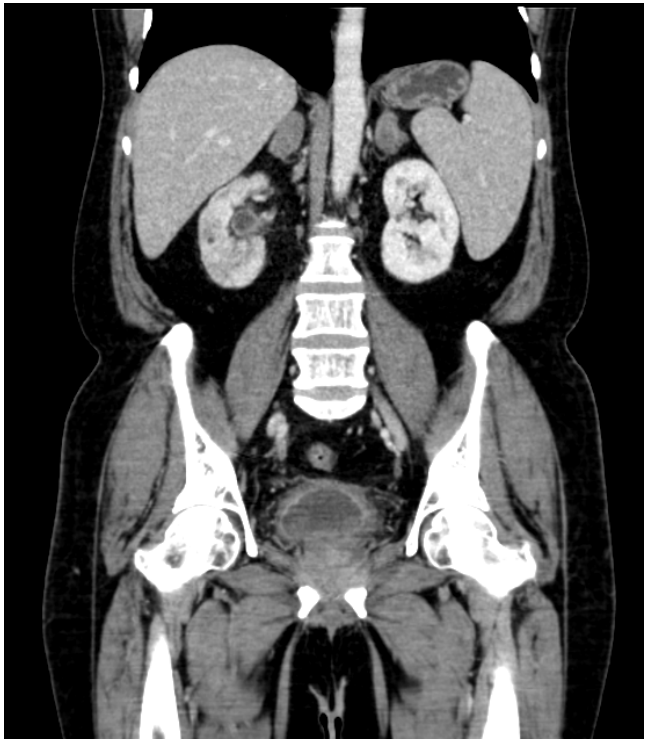
Presented with bilateral hydronephrosis

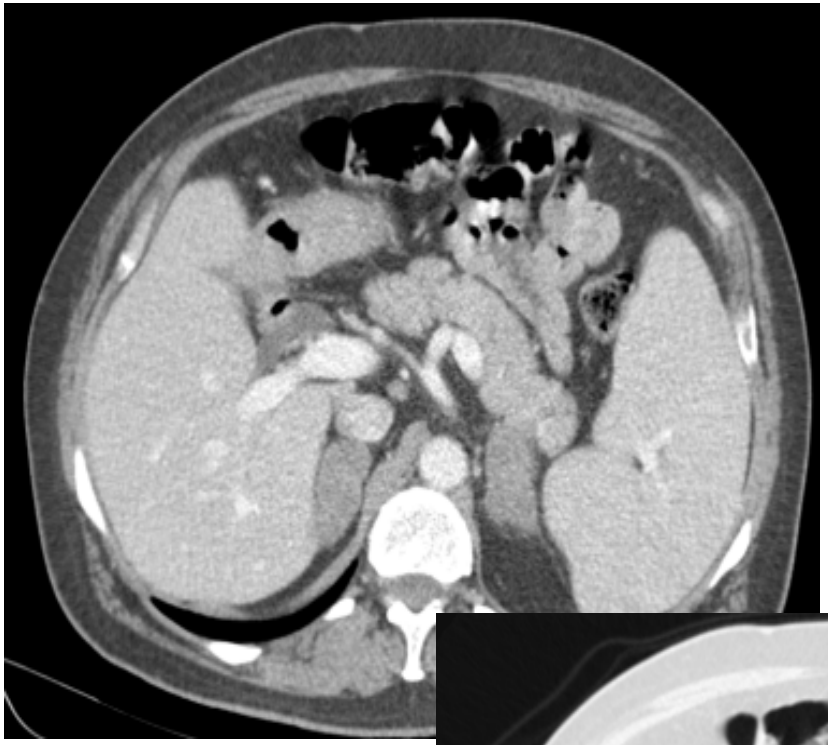



B Cell Lymphoma

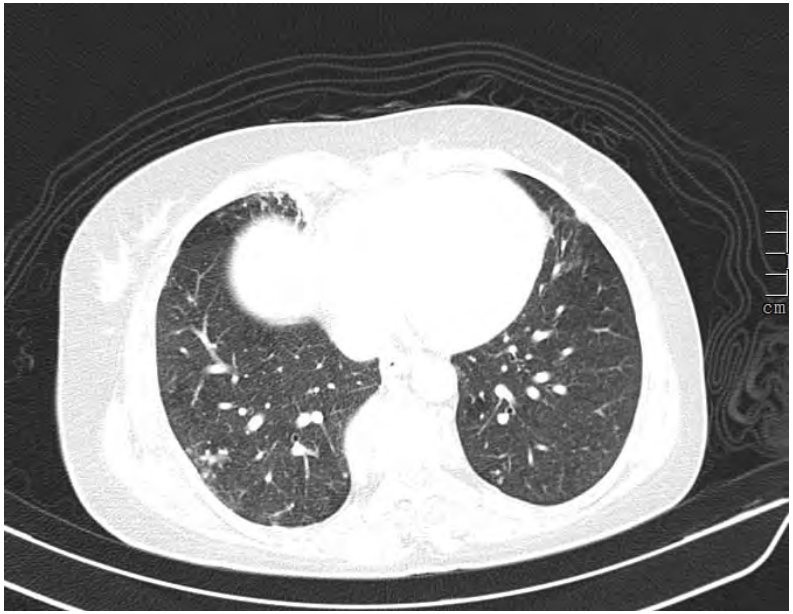
Adreno-cortical insufficiency

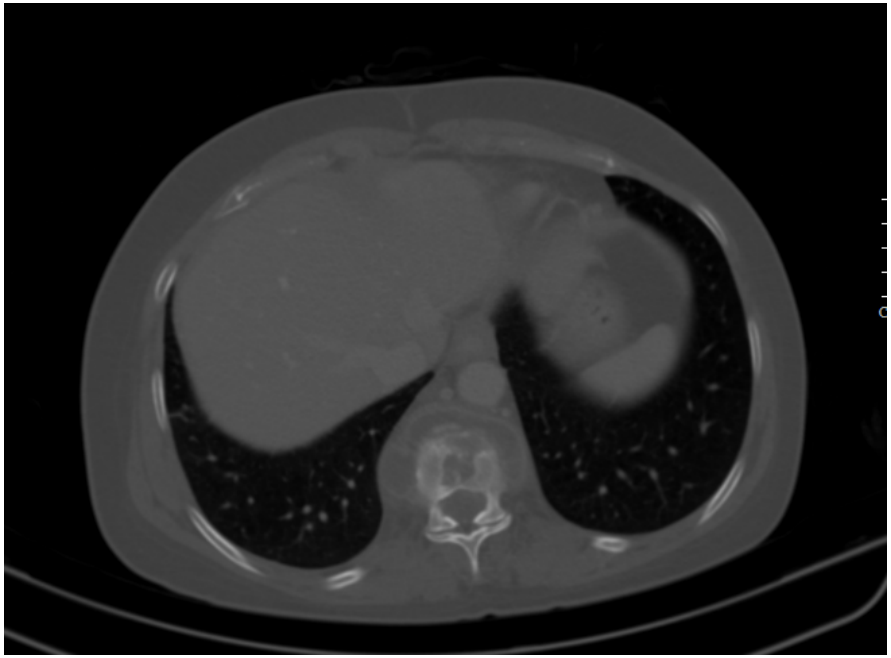


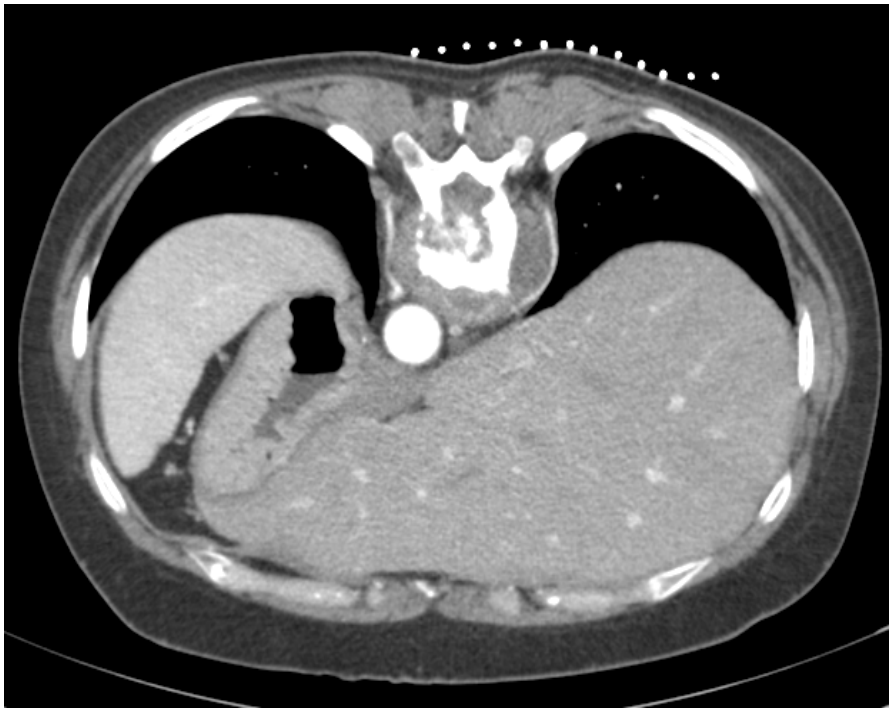


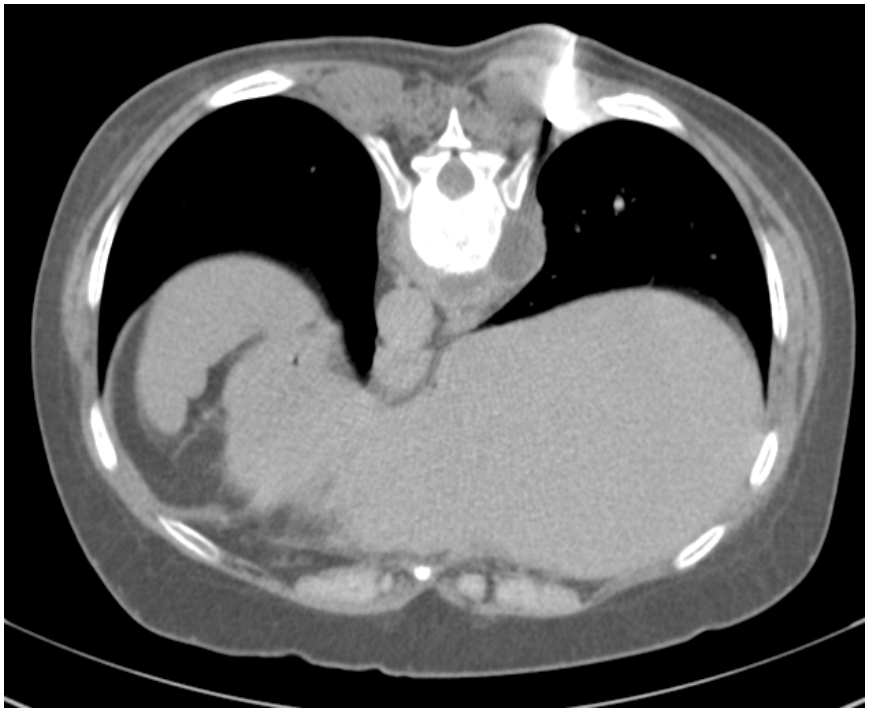

cm

Centri-lobular nodules, para-vertebral soft tissue at D10-D11 level







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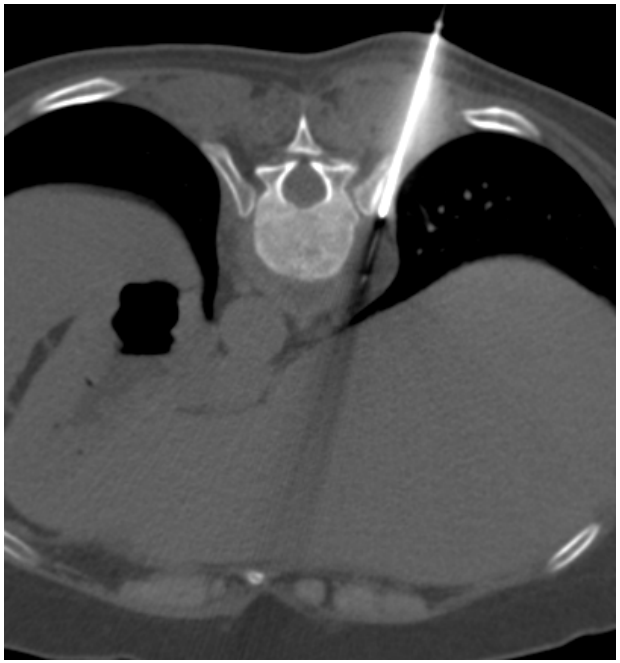
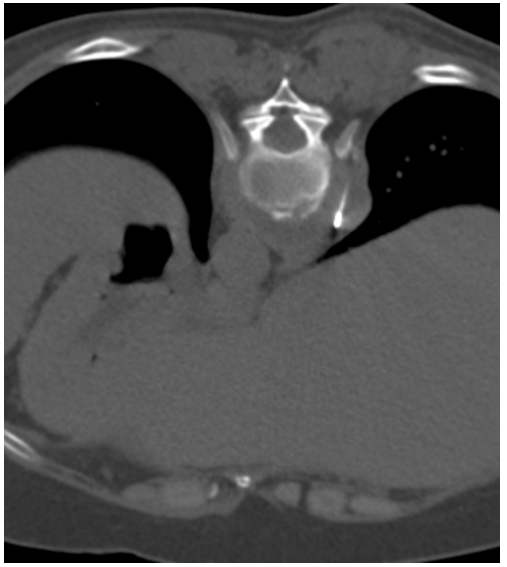
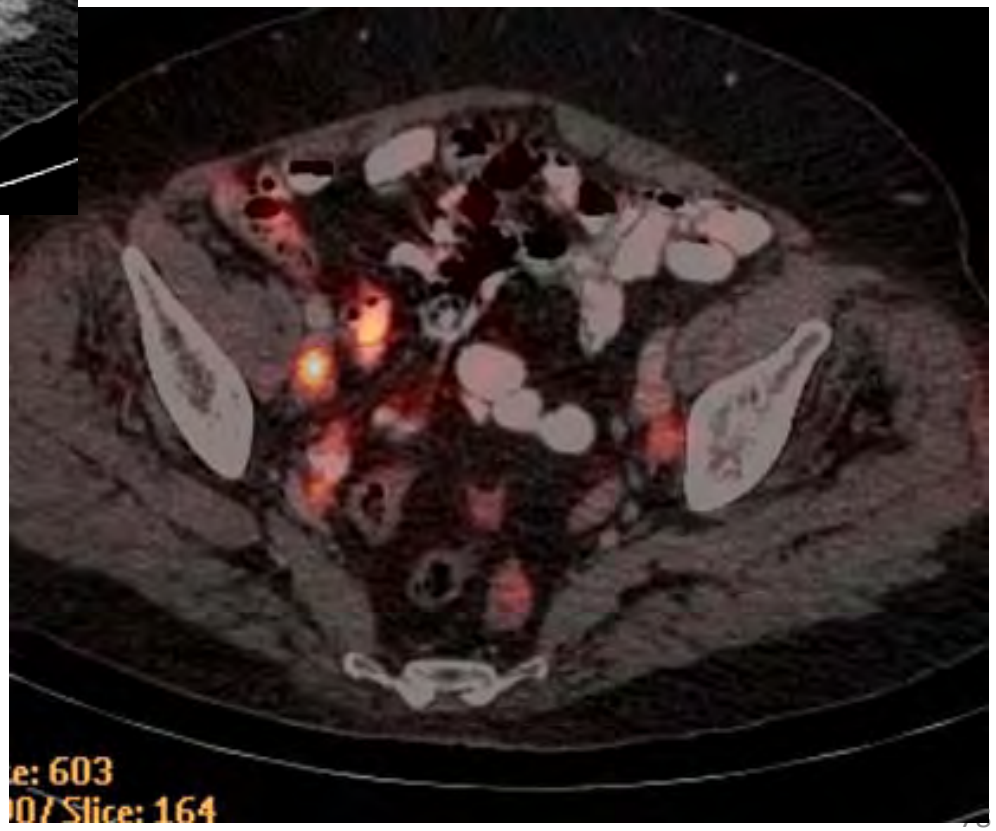


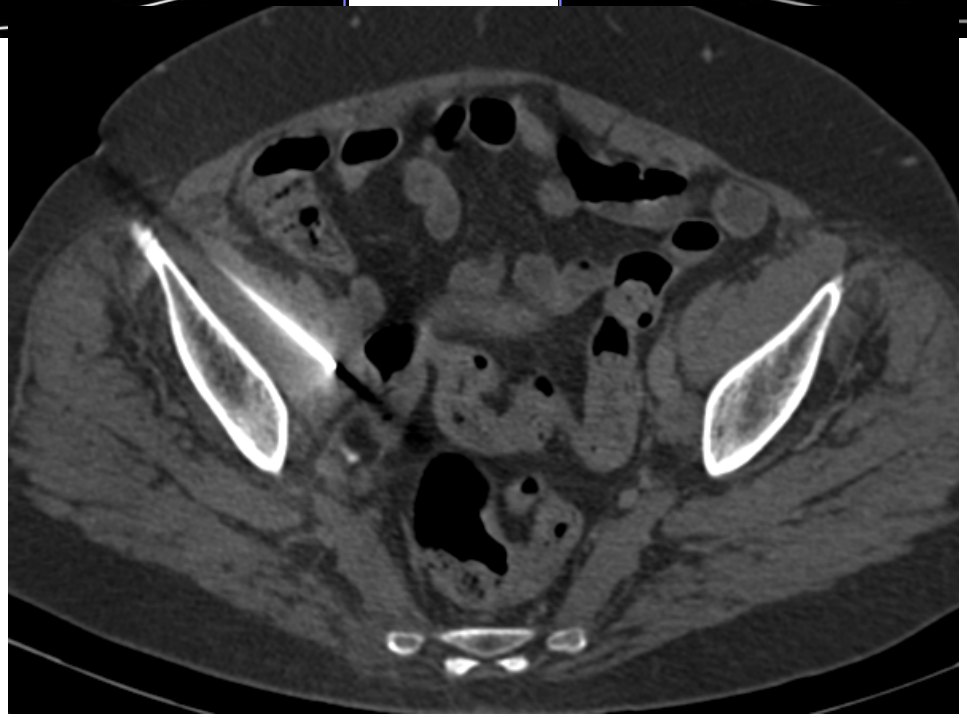


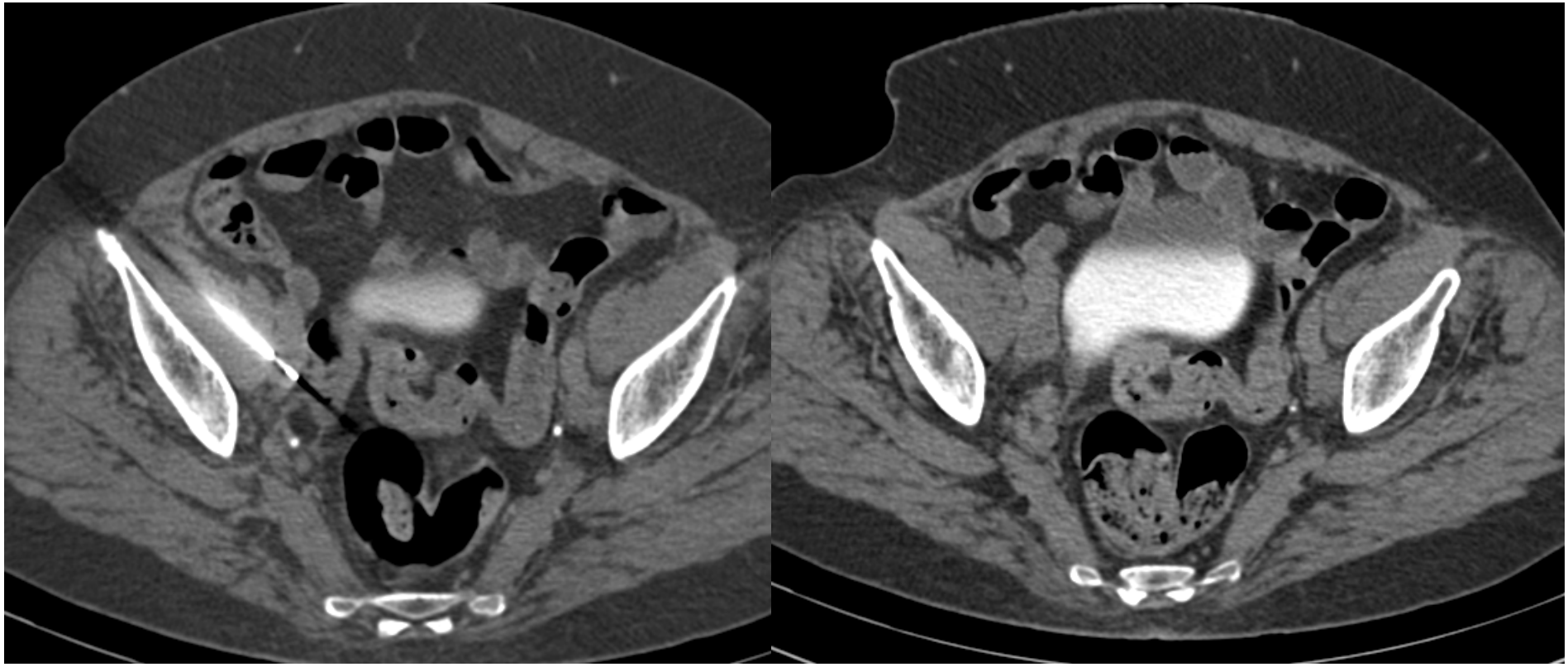


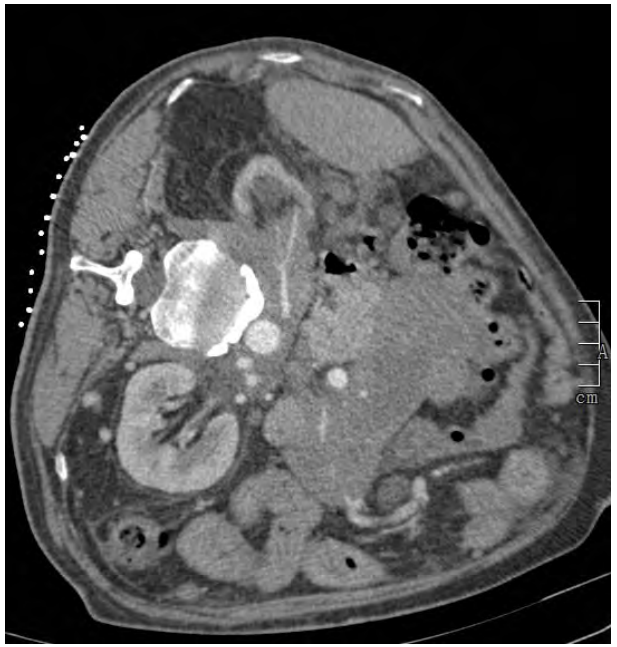
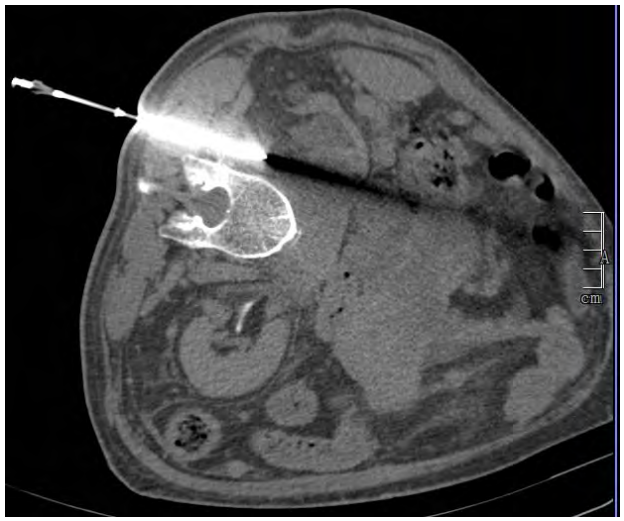

Post menopausal bleeding
Post TAH & BSO
Endometroid adenocarcinom


R
cm

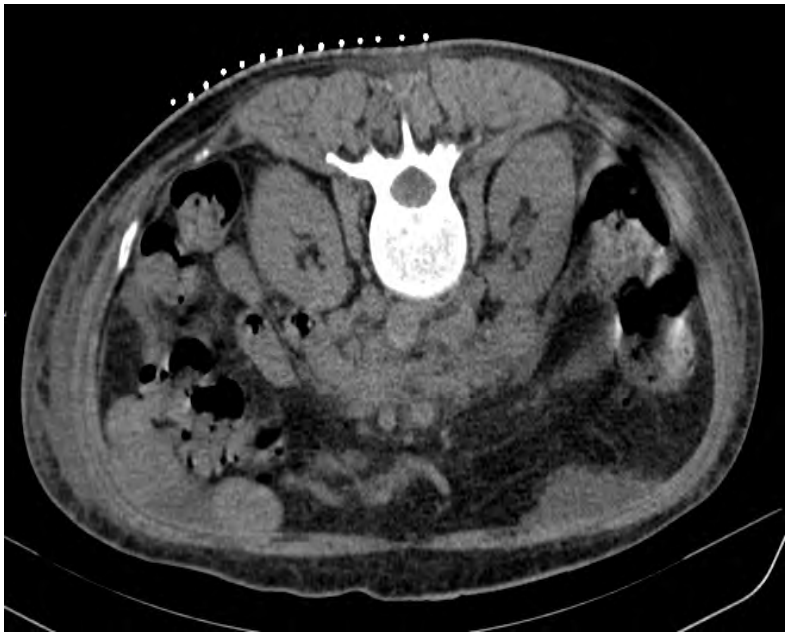

R
cm

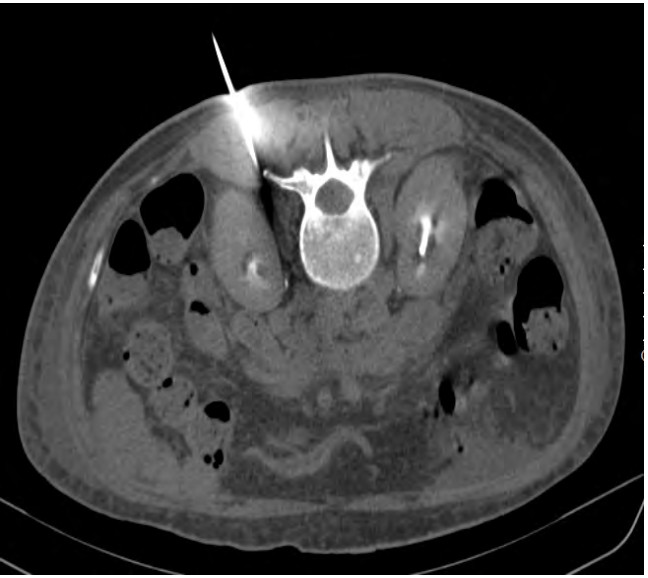


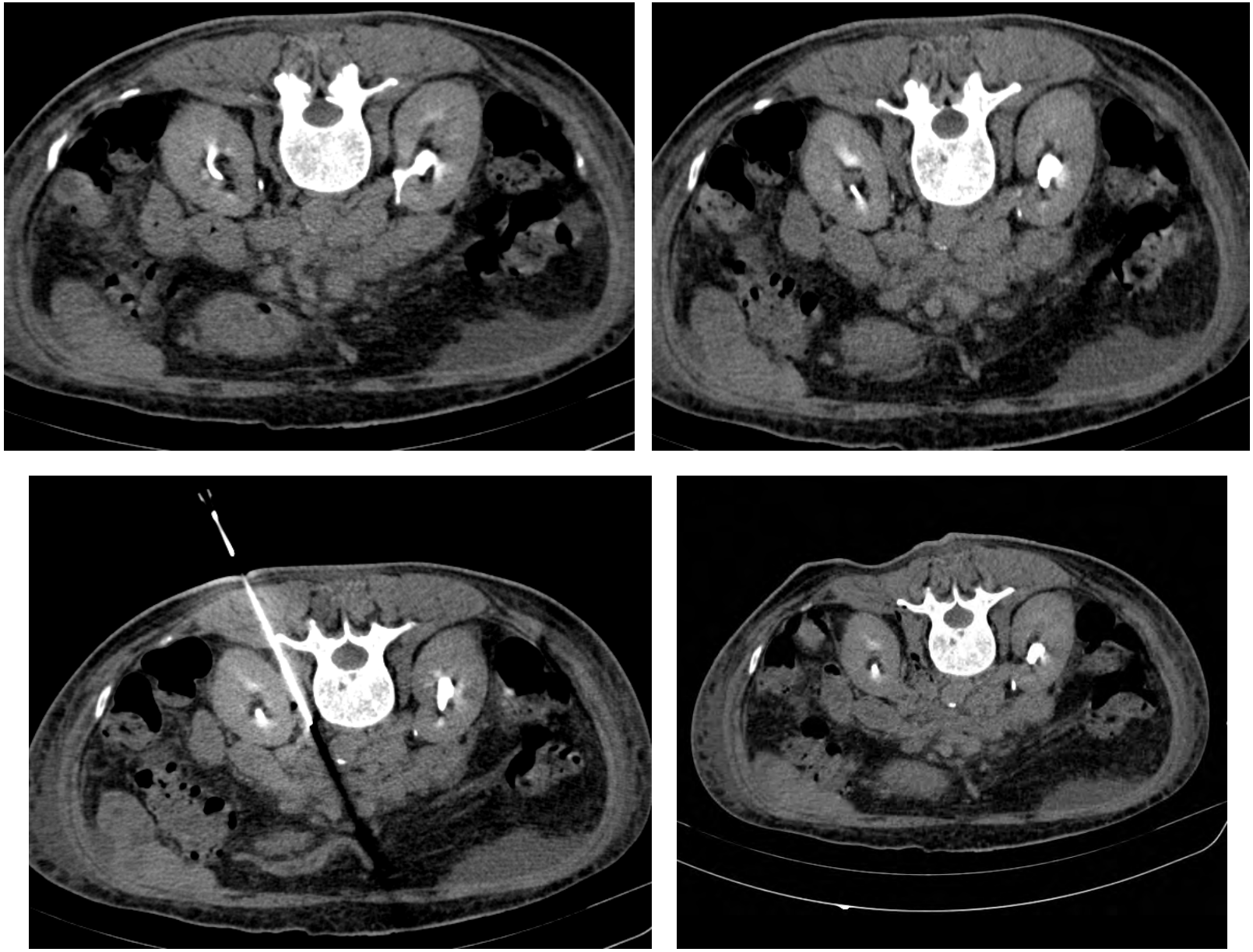


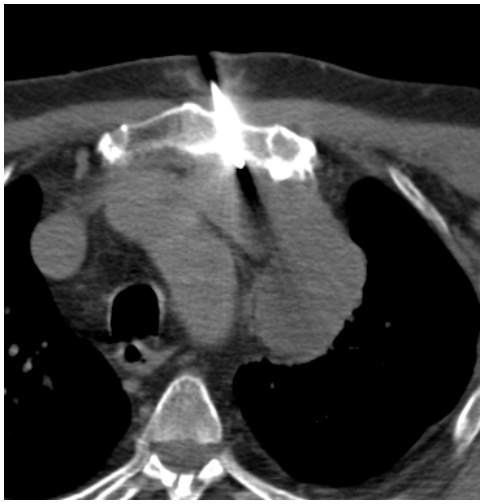
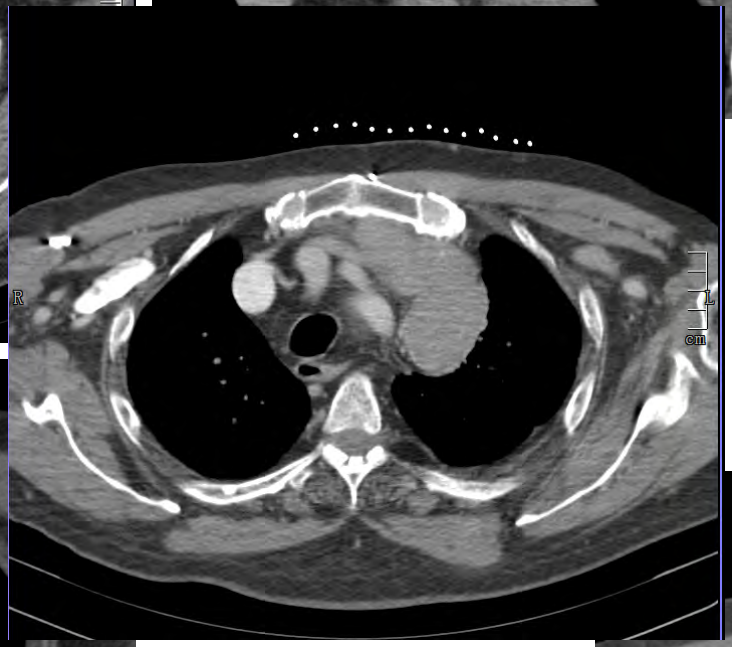
Non specific pain abdomen
CECT – large mass in para-caval and mesenteric region
Biopsy – fibromatosis



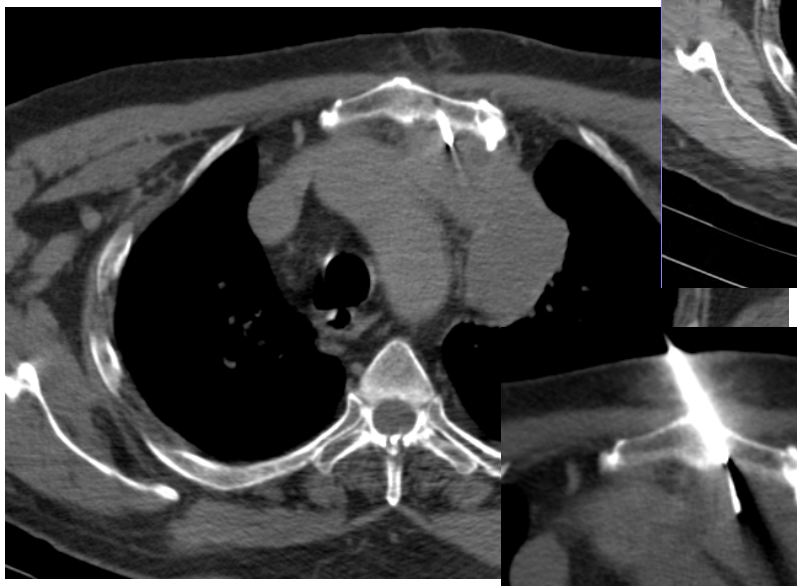
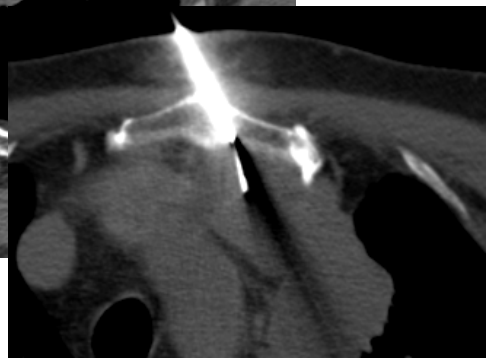




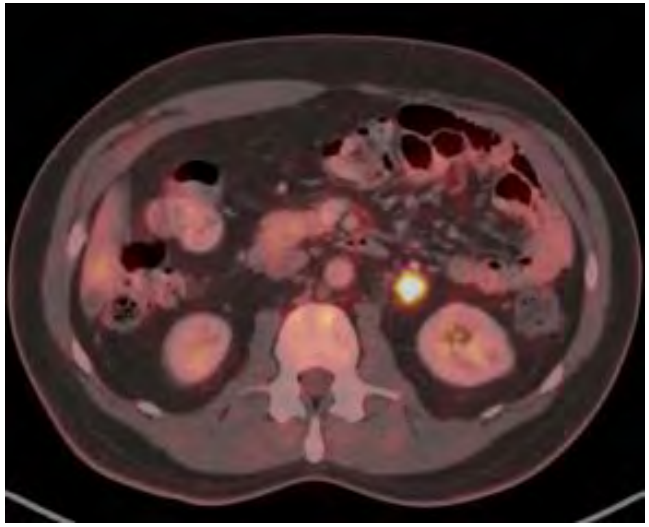


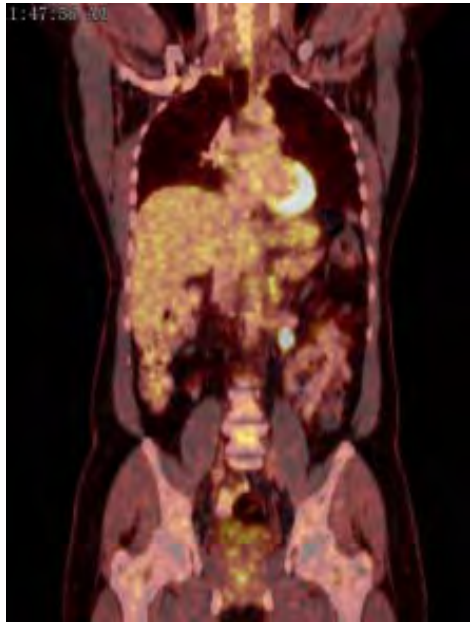



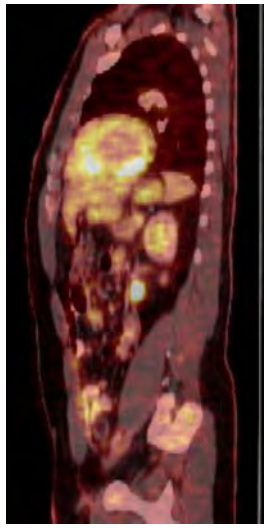
Case of myasthenia
Post thymectomy -6 yr

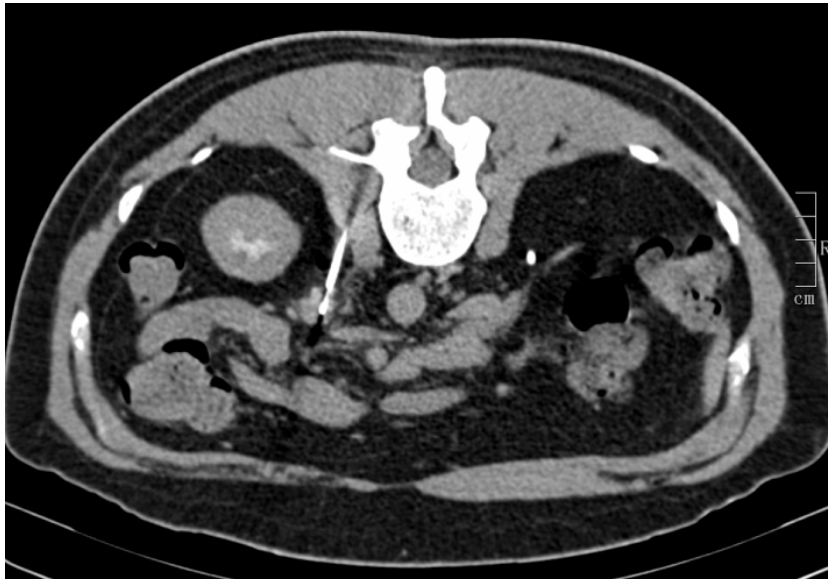




# What else to look for…….



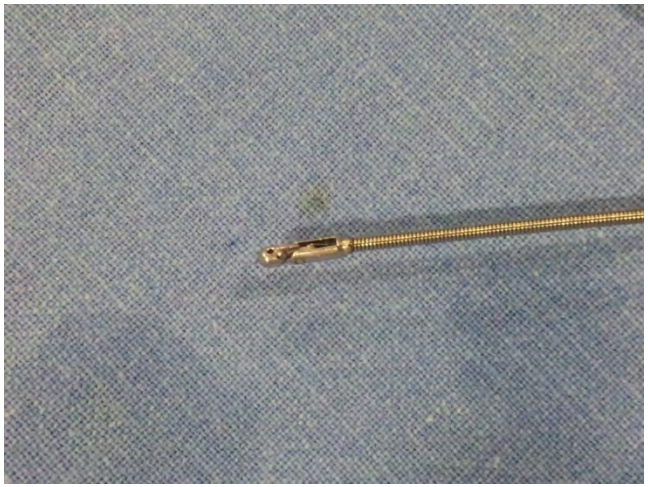


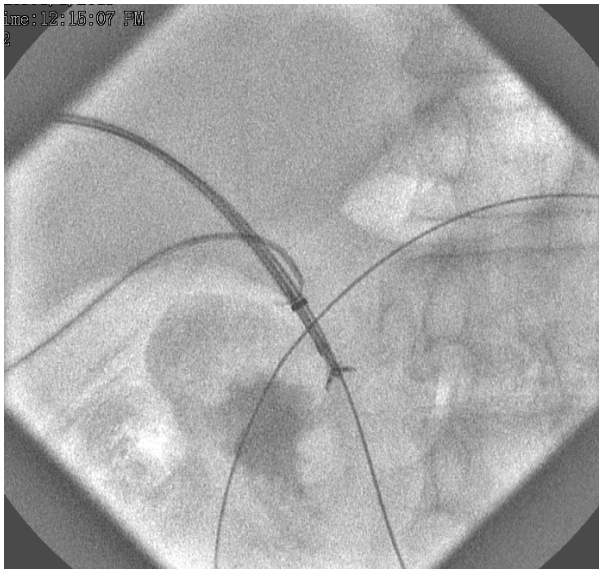


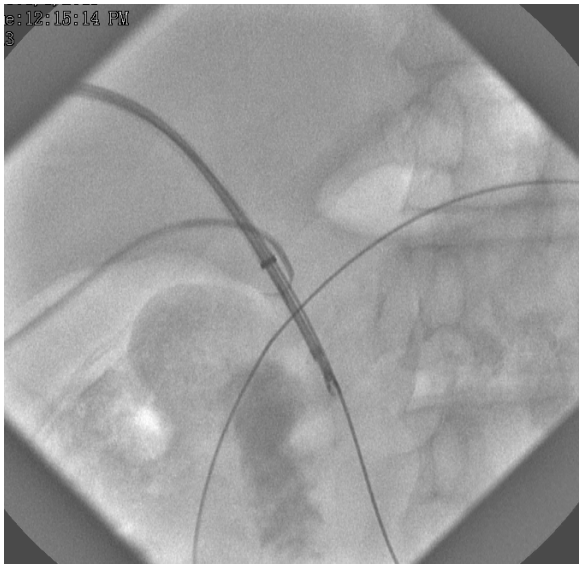


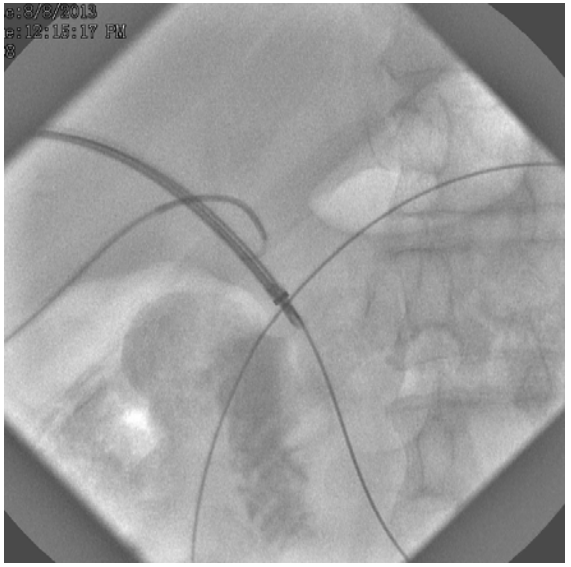
GB neck

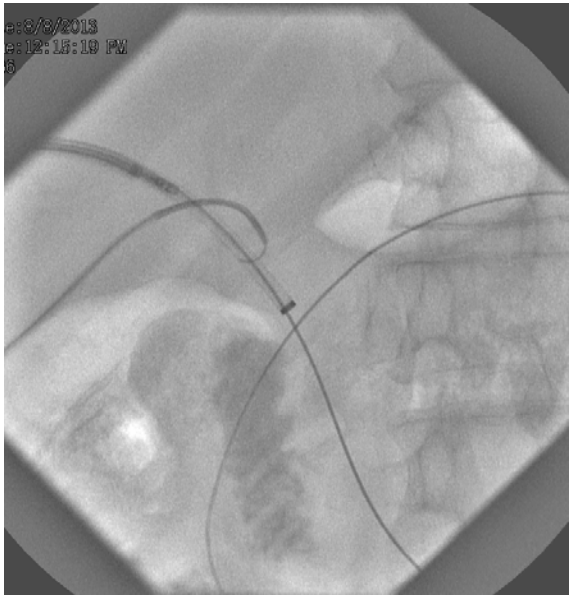
# *Intraductal biopsy*



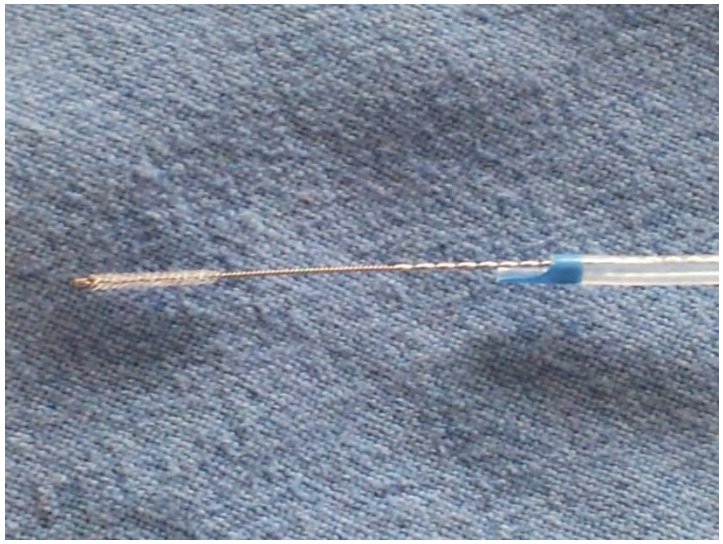


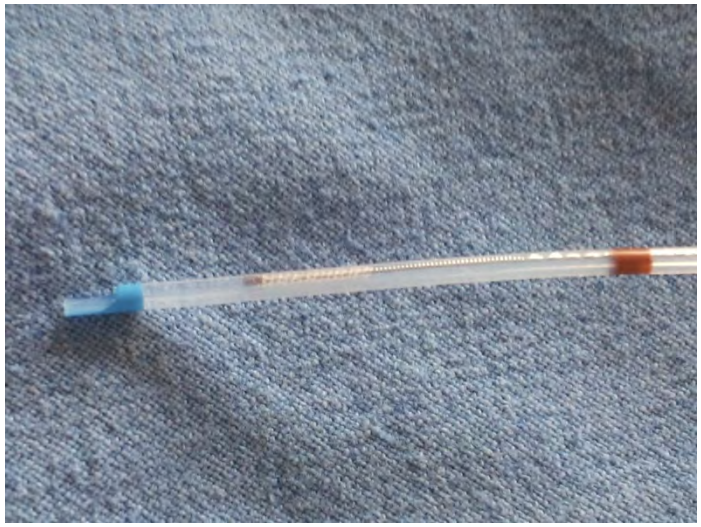






# *Intraductal brush cytology*





*Thank You*