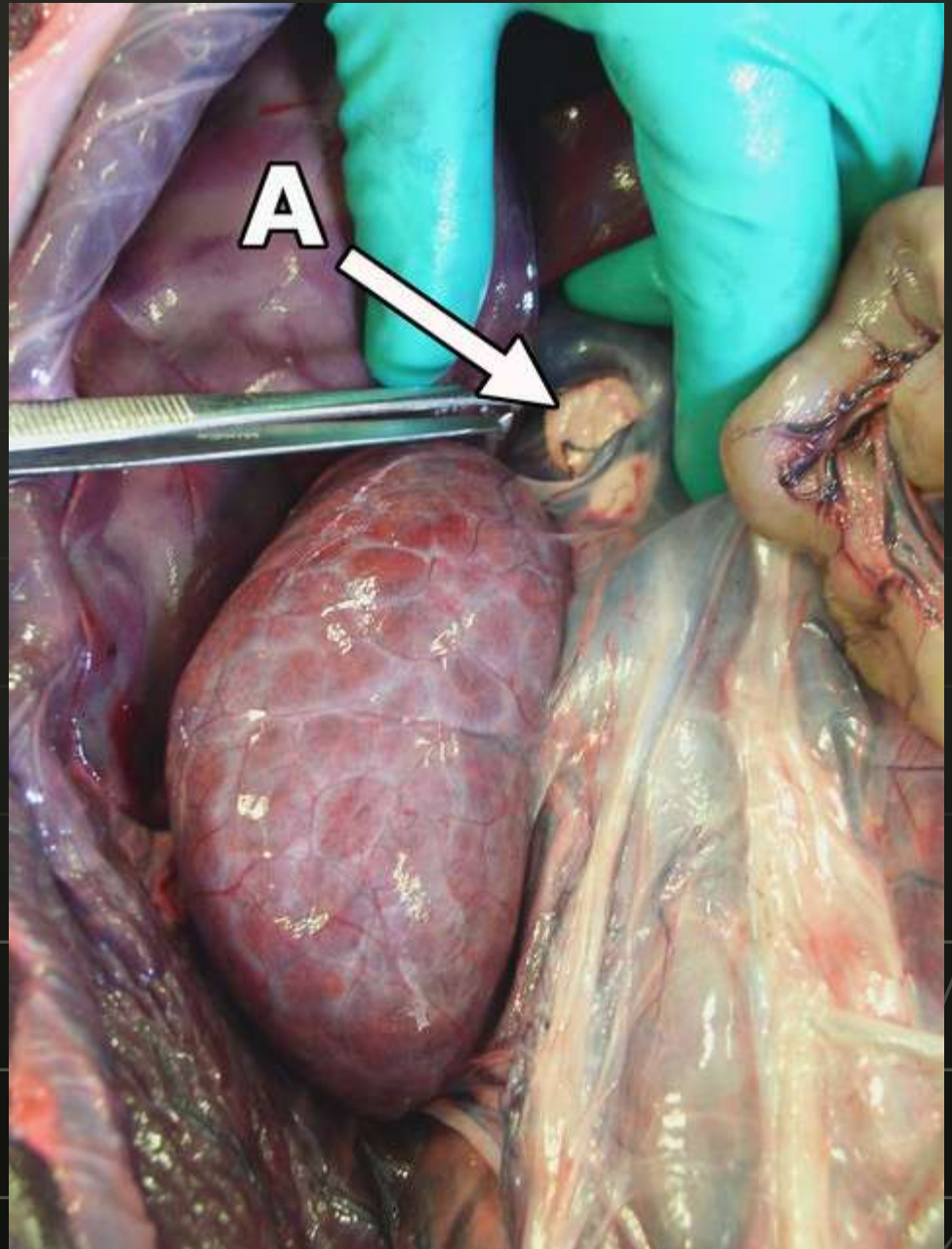


# Adrenal glands



# Imaging methods

- Plain X-ray
- Ultrasound
- CT
- MRI
- Angiography

# Plain X-ray

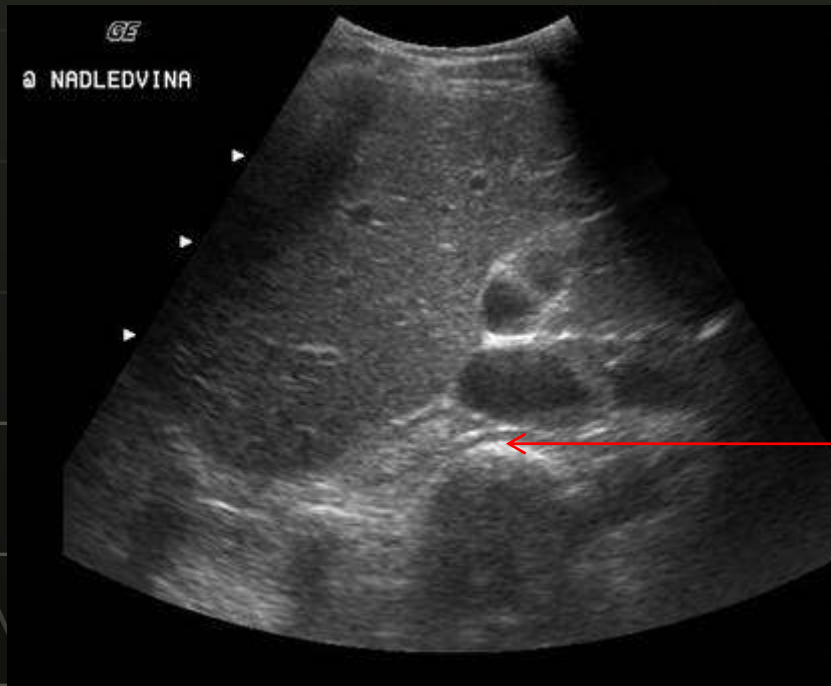
## ■ Calcifications

- haemorrhage
- tuberculosis
- tumor

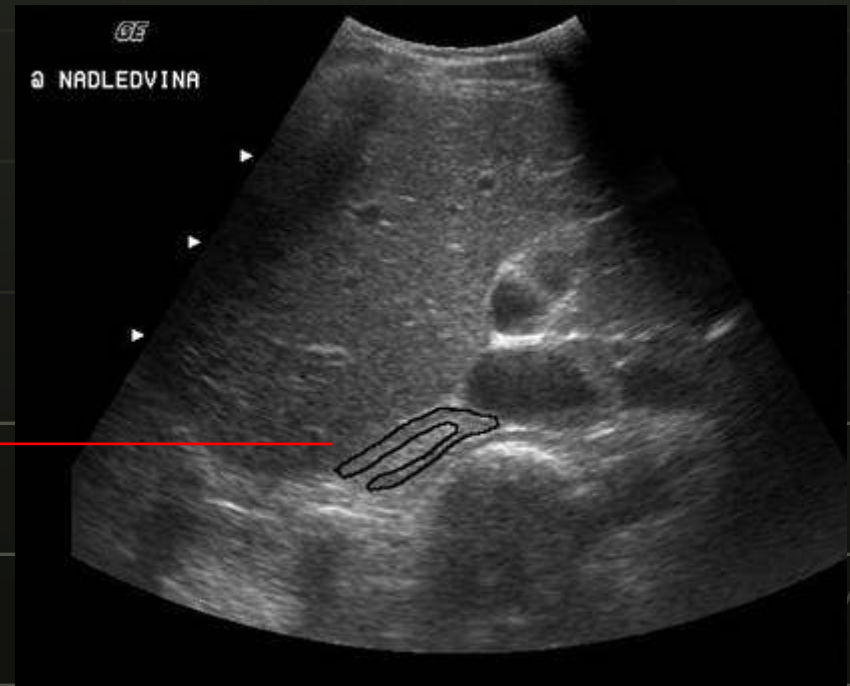


# Ultrasound

- Normal adrenals are usually invisible (exclusion: children and asthenics)
- US is less reliable than CT (gas, obesity)

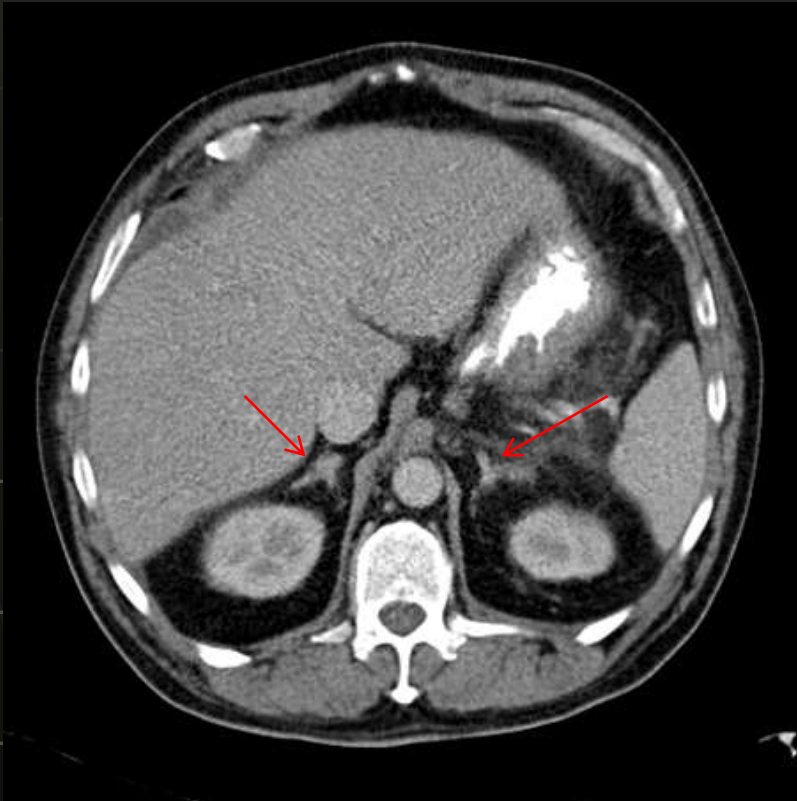


Normal right adrenal gland

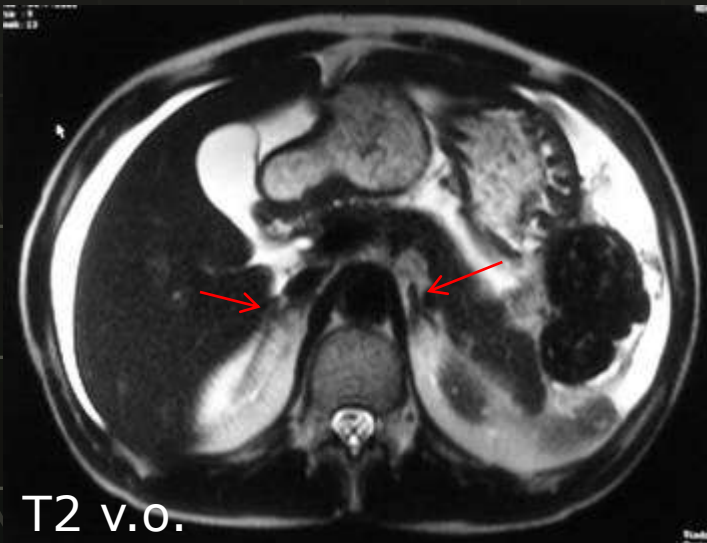


# CT

- More reliable than US  
(not limited by gas and obesity)

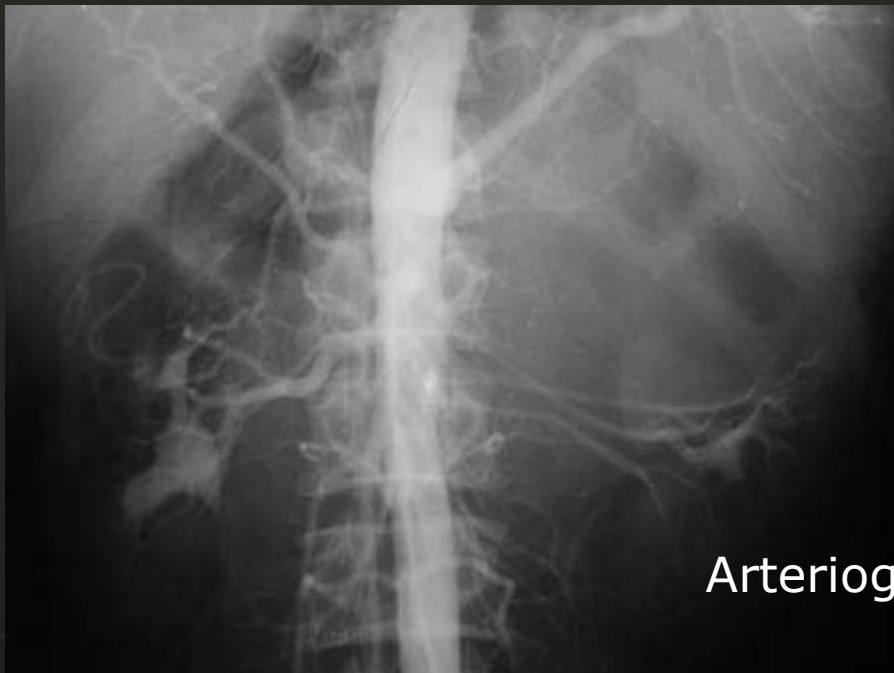


# MRI



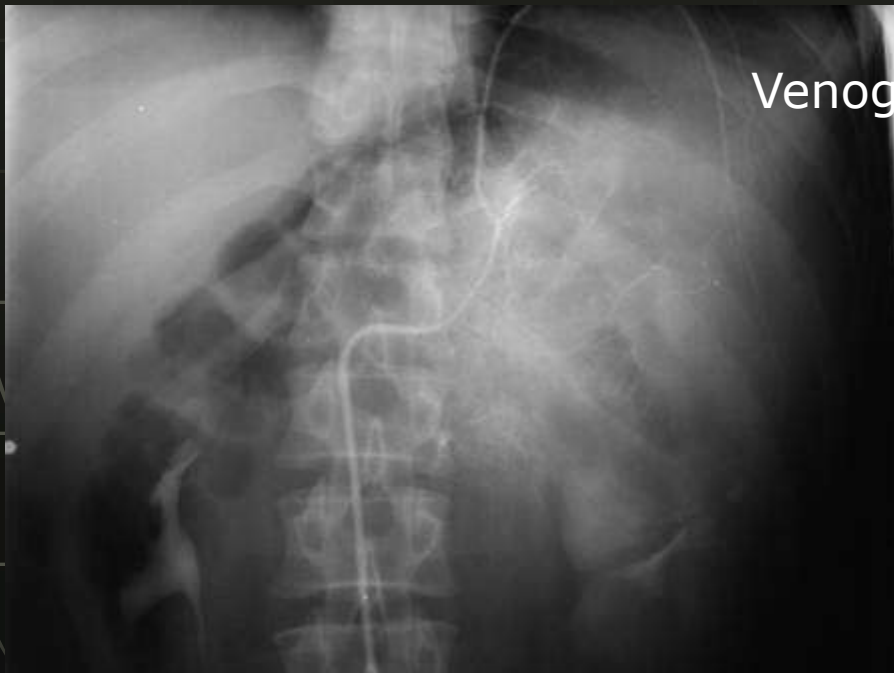
# Angiography

- Arteriography – pathologic vascularization  
(e.g. pheochromocytoma)
- Venography – level of adrenal hormones in venous blood
  - upper and lower part of IVC
  - renal veins



Arteriography

Adrenal carcinoma



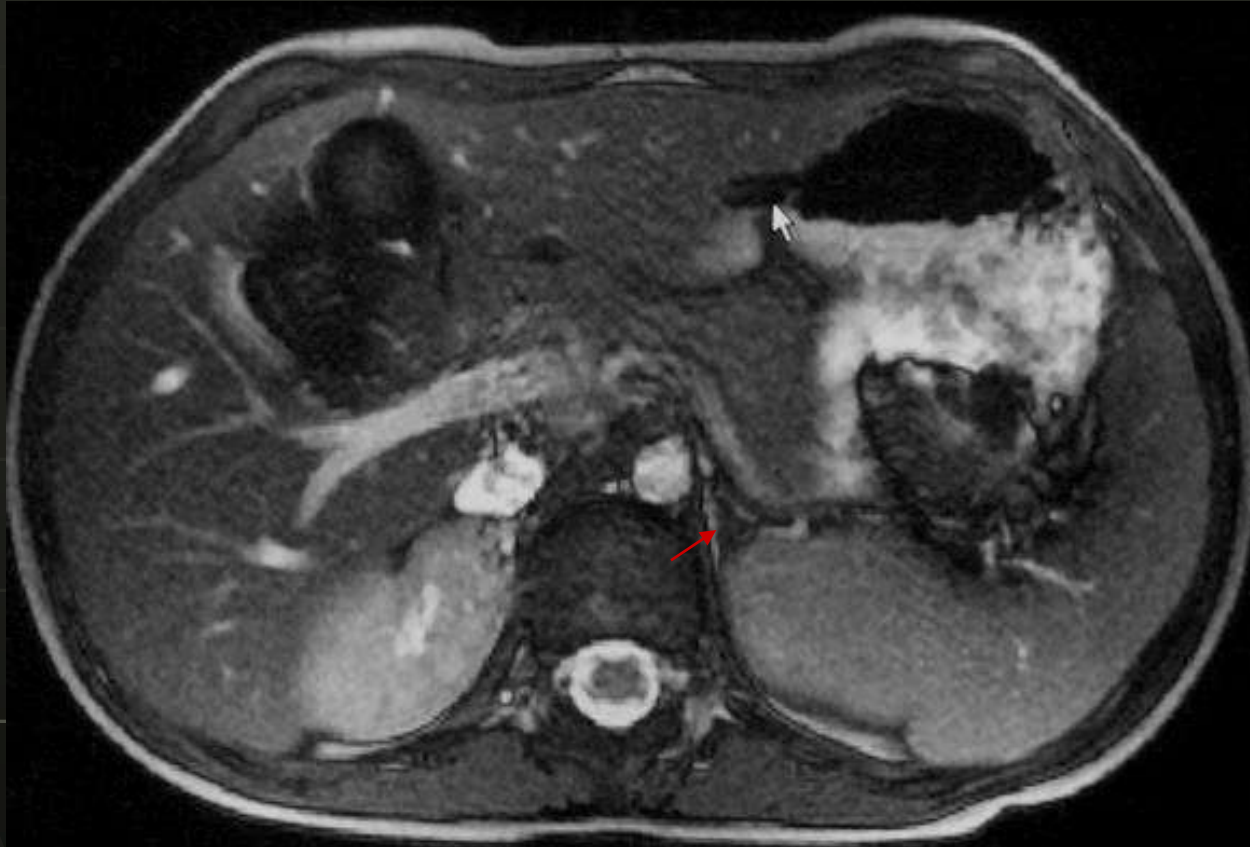
Venography



# Pathological conditions

- Atrophy
- Hypoplasia
- Hyperplasia
- Primary tumors
  - hormonal inactive
  - hormonal active
    - cortex - adenoma
      - carcinoma
      - myelolipoma
    - medulla - pheochromocytoma
      - neuroblastoma (children)
- Metastases (from lung, breast, kidney)
- Bleeding
- TB

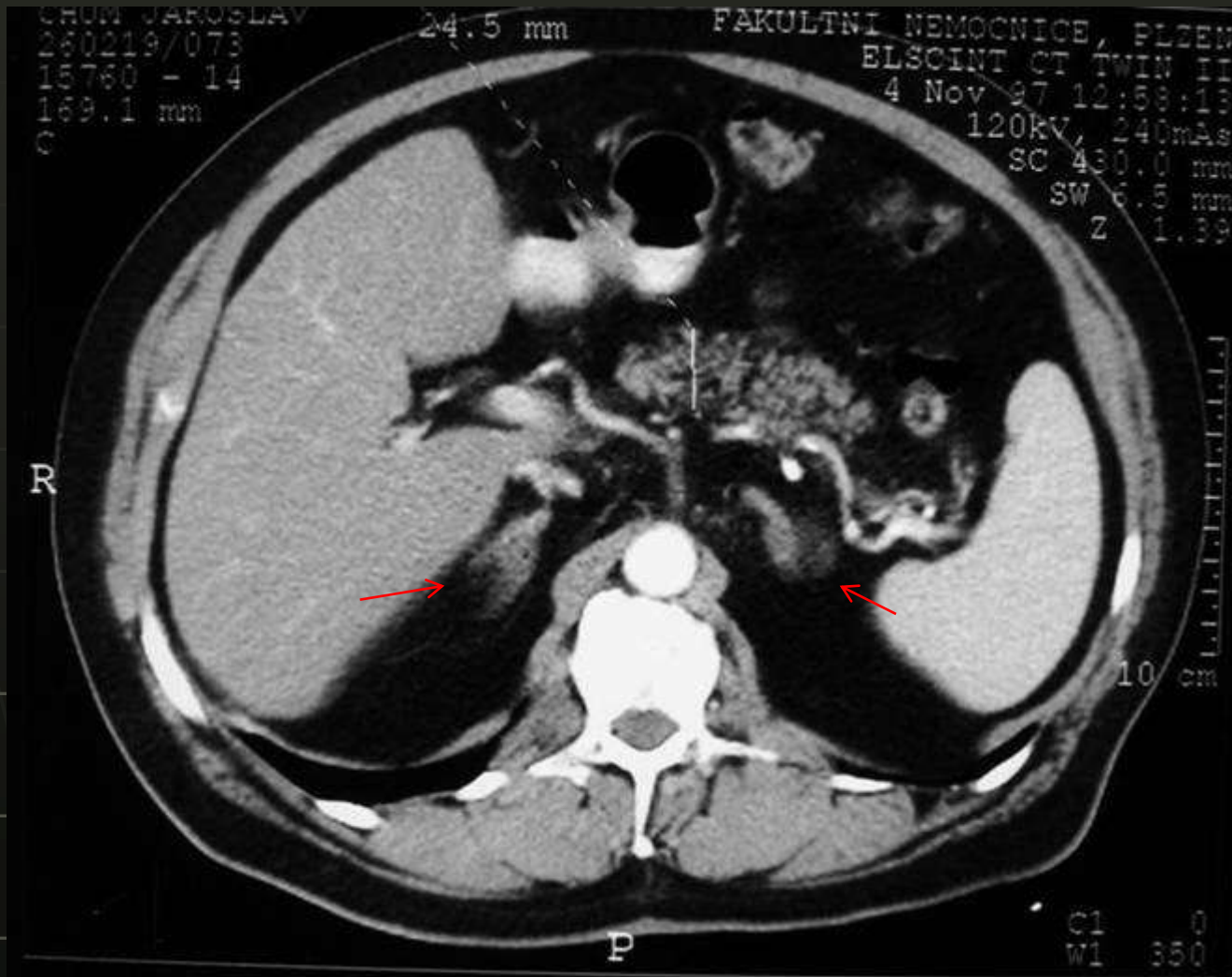
# Hypoplasia / aplasia



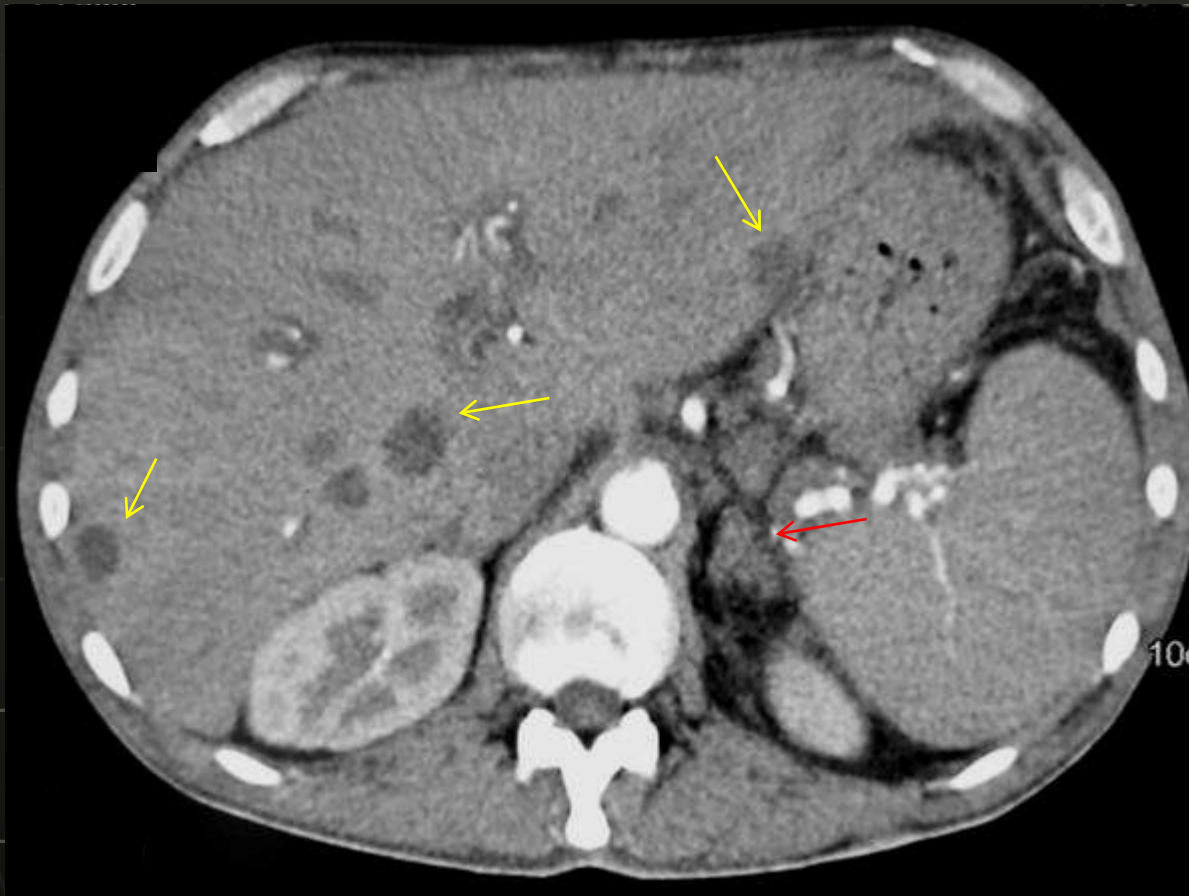
girl with adrenal insufficiency

hypoplasia aplasia on the right side, hypoplasia on the left side

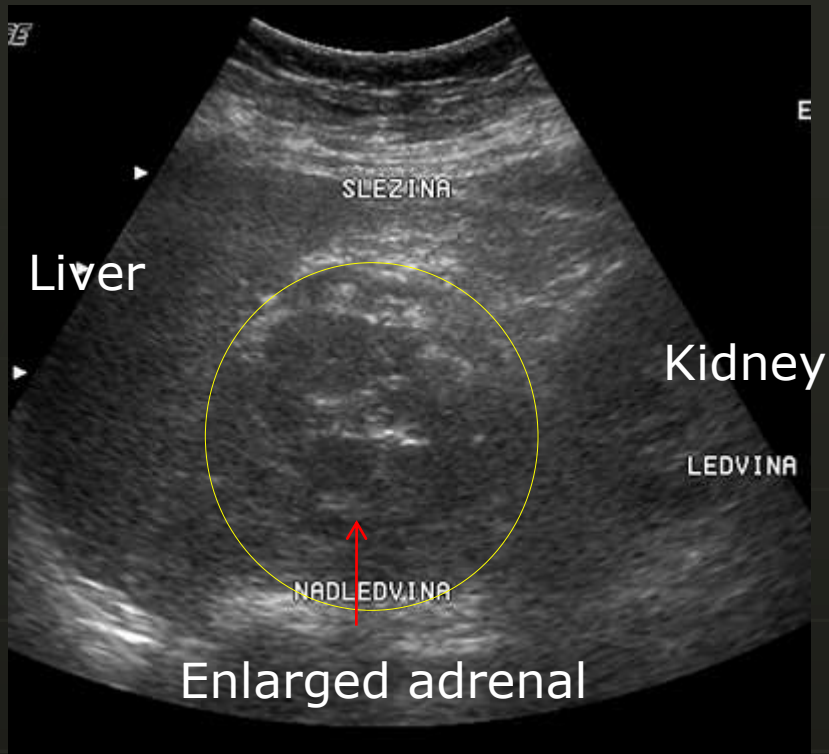
# Hyperplasia



# Septic activation



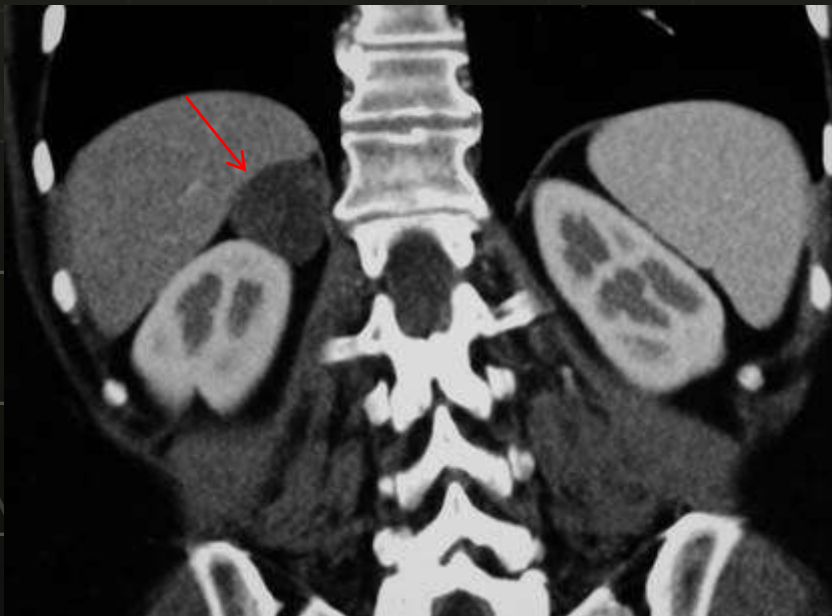
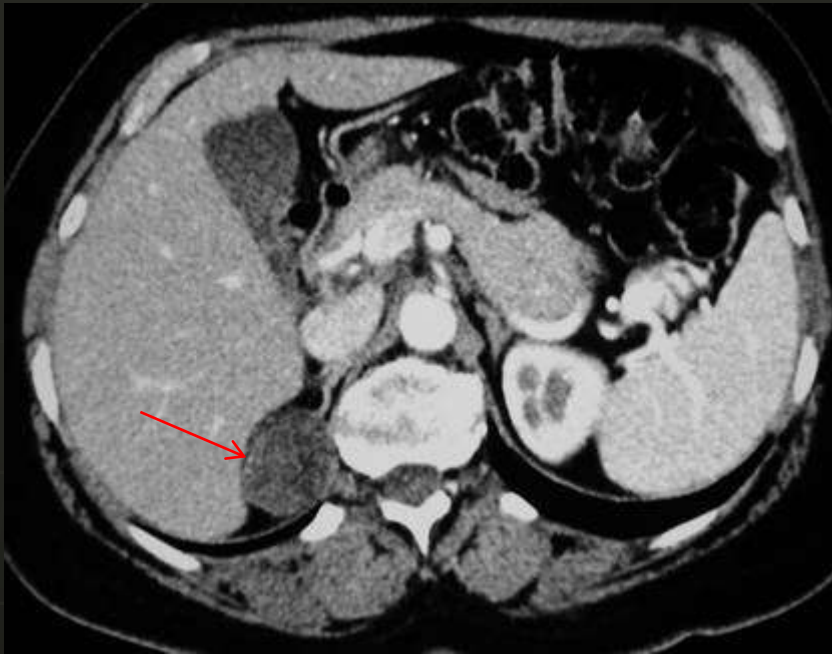
Enlargement of the **left adrenal gland**, multiple **liver abscesses**



# Adenoma

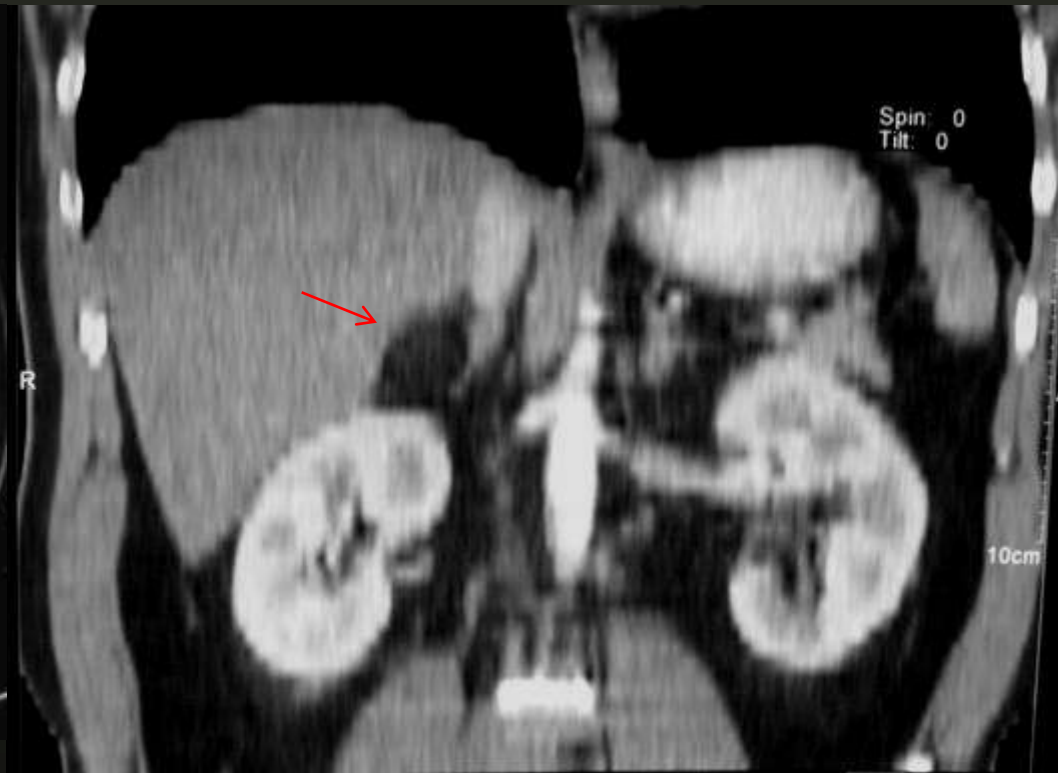
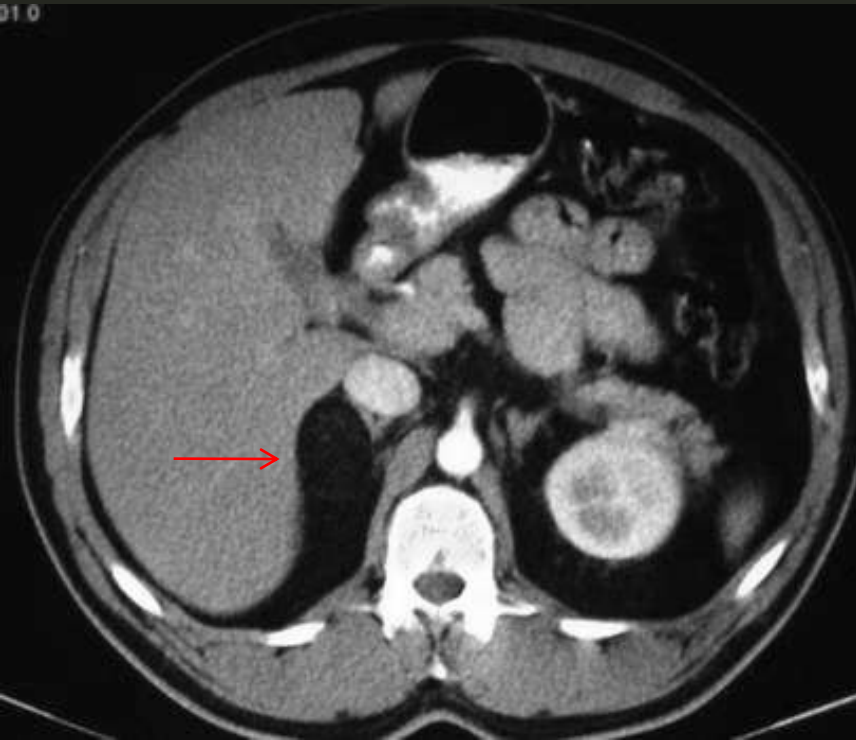
Low density on CT  
(lipoid content)





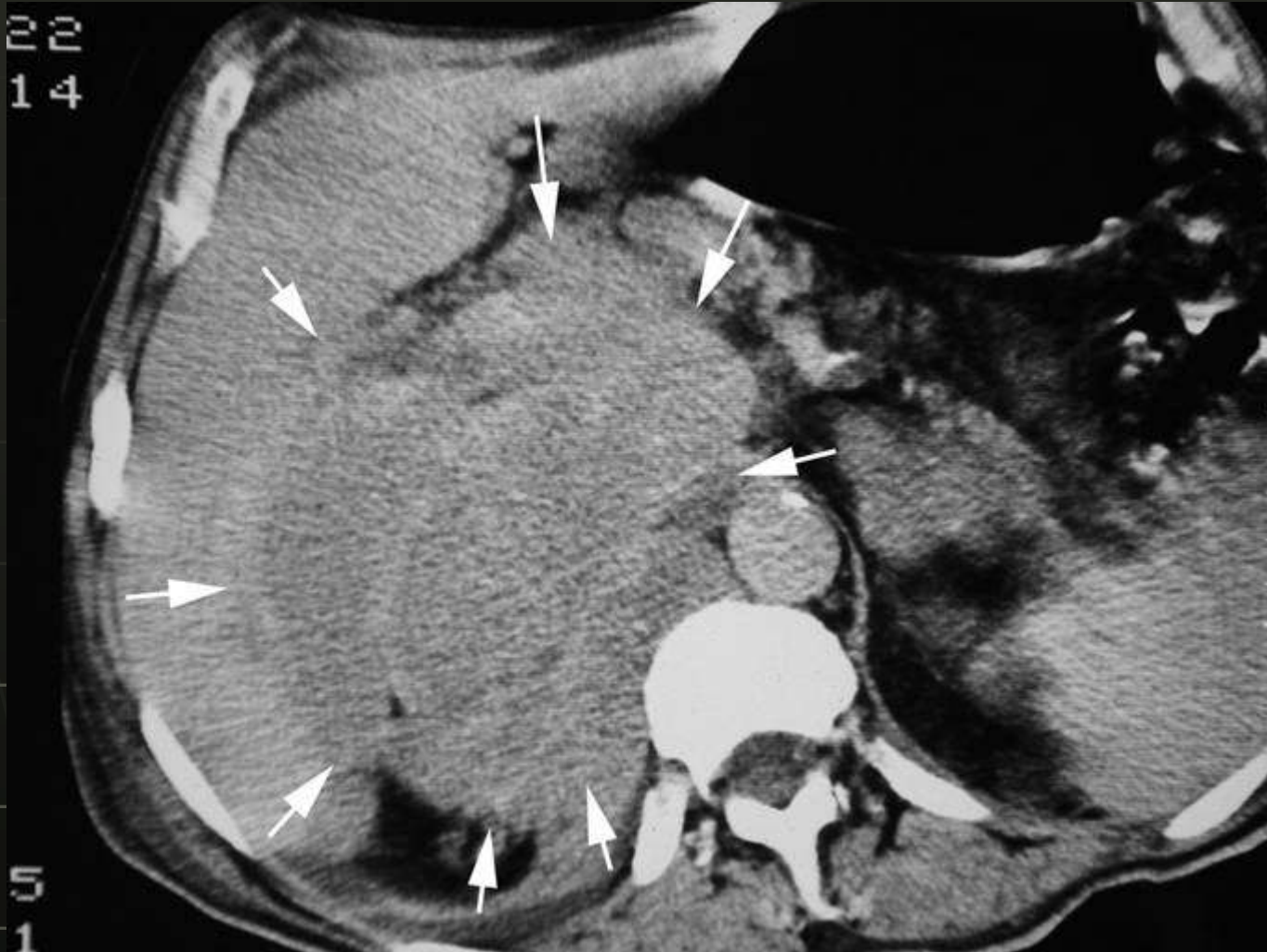


# Myelolipoma

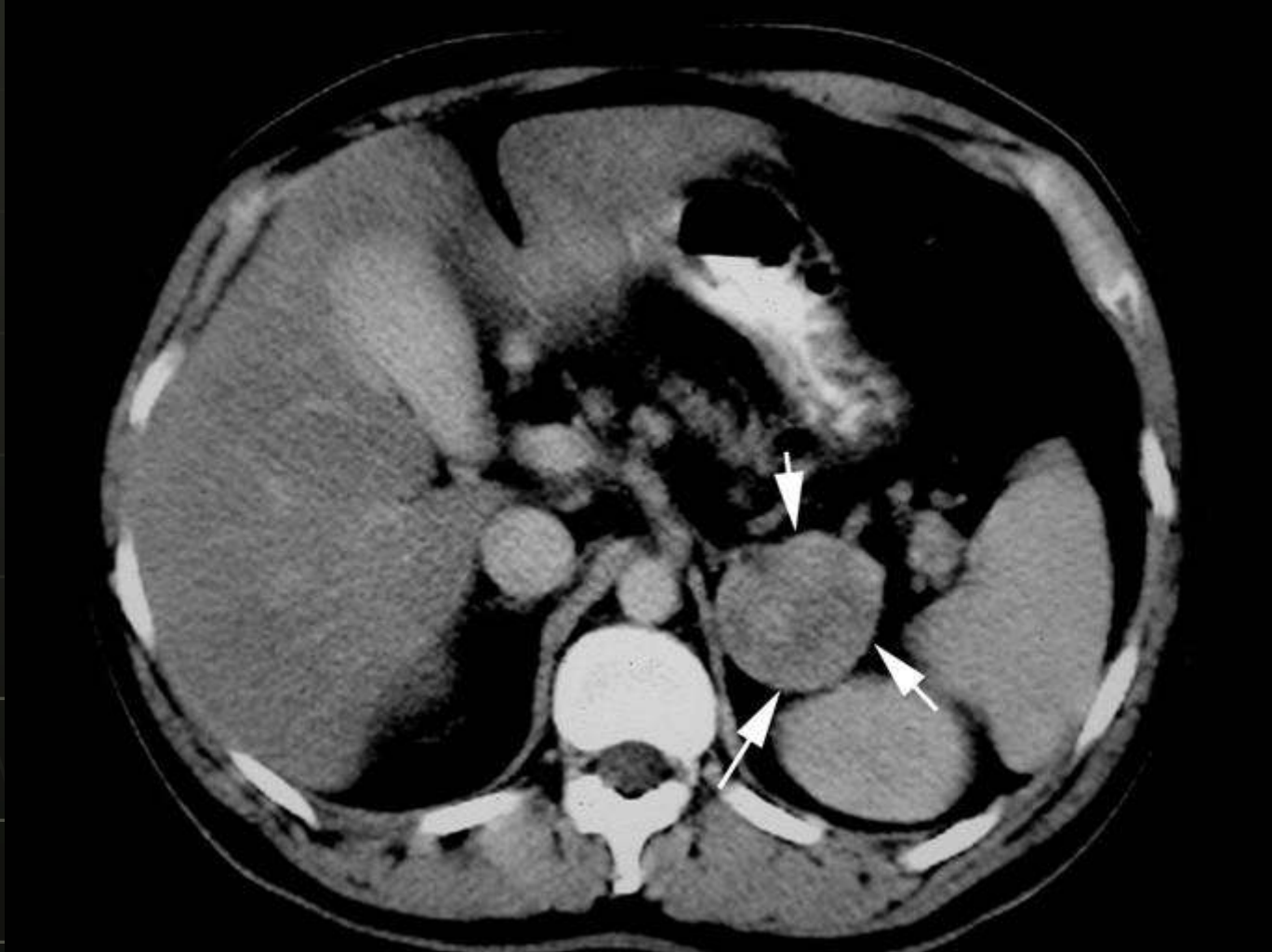


Contains fat and bone marrow  
Density on CT same as fatty tissue

# Carcinoma



# Pheochromocytoma



# Neuroblastoma

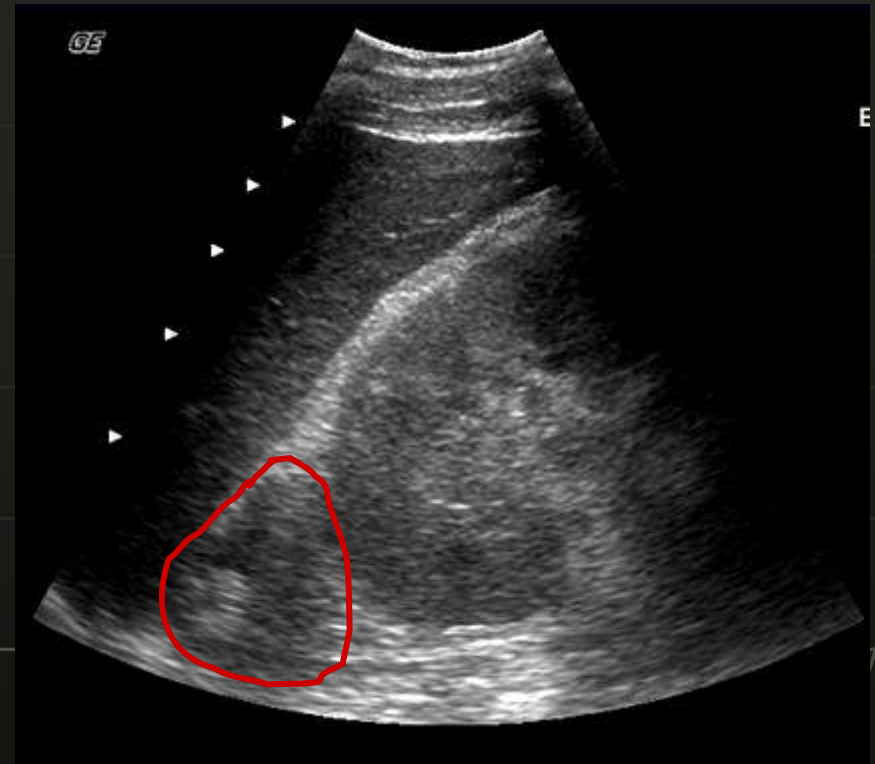
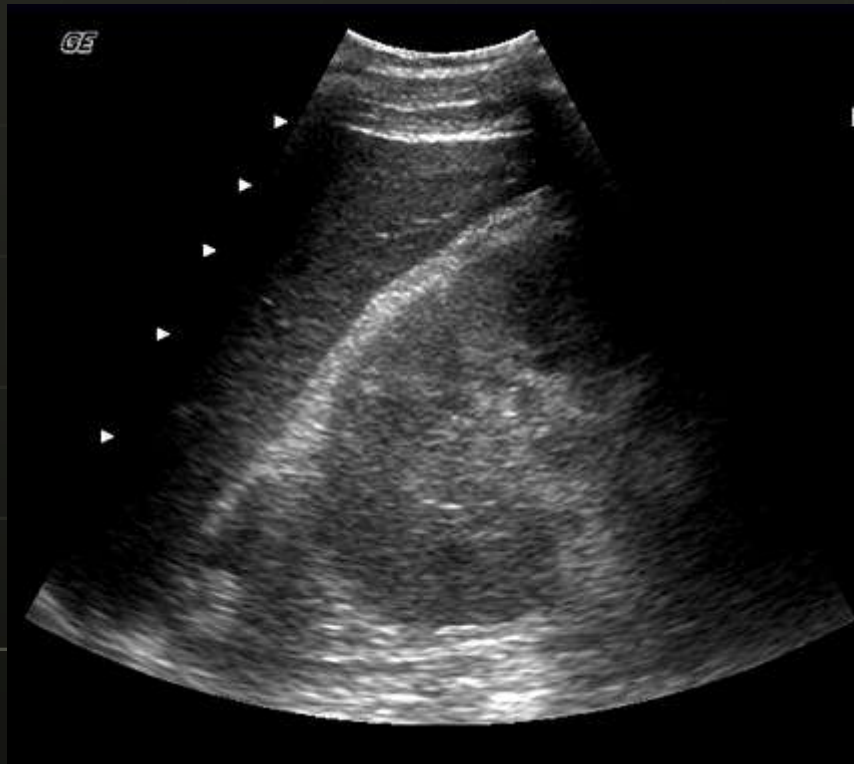


## Metastases to the skull

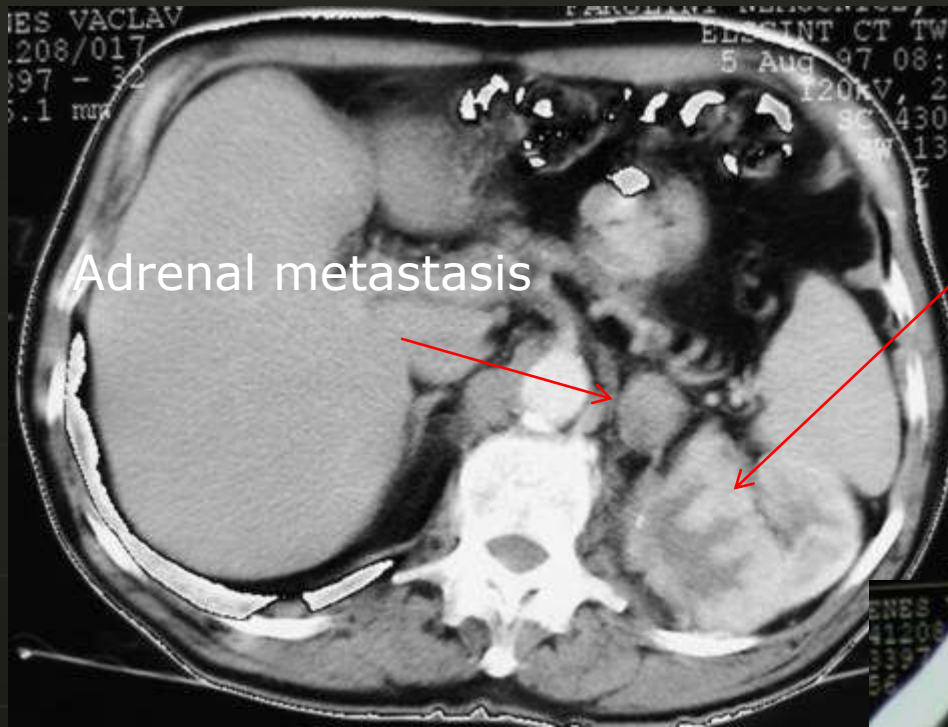


Malignant tumor  
Children

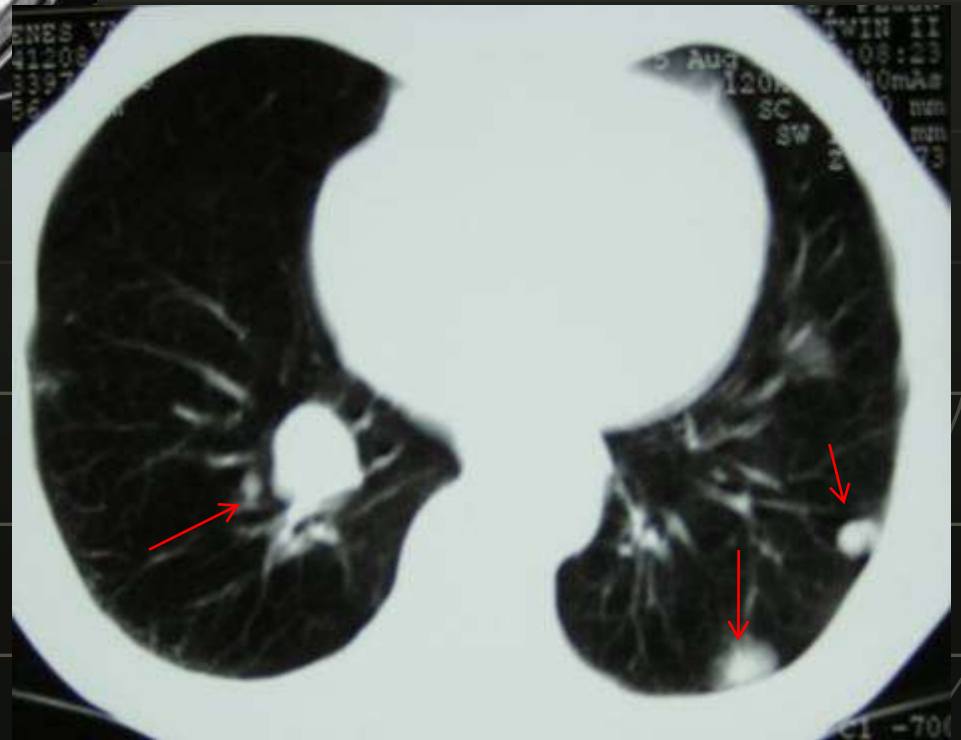
# Metastases



bronchogenic carcinoma



Primary tumor of the left kidney



Conventional renal carcinoma

Metastases to the lungs

# Haemorrhage



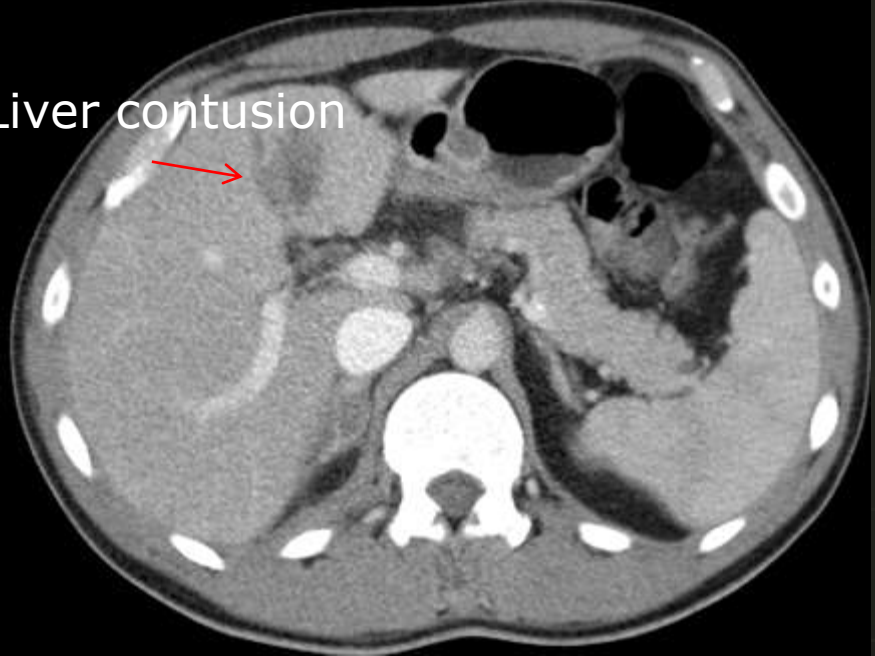
Enlargement, density 40-80 HU

# Posthaemorrhagic pseudocyst



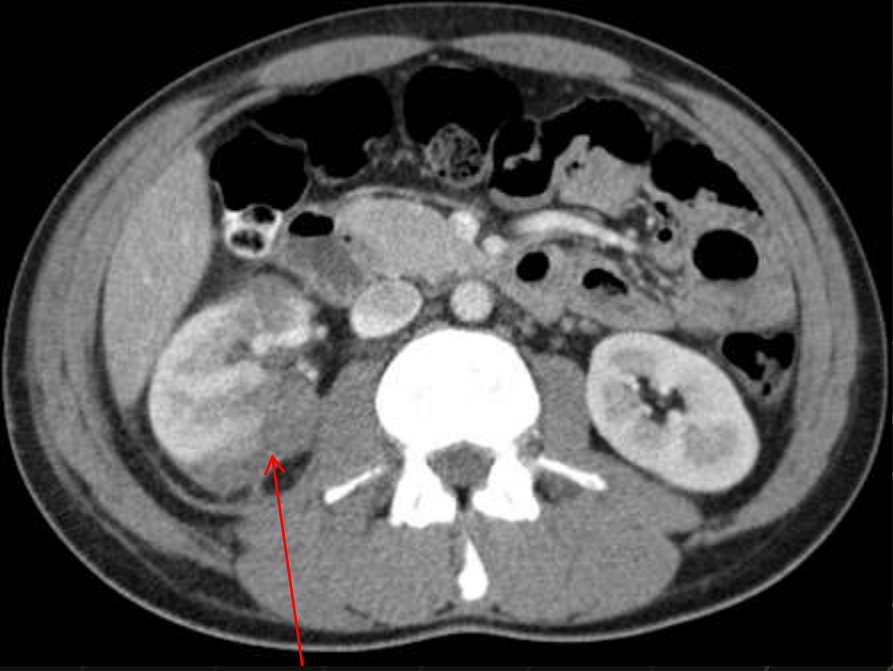
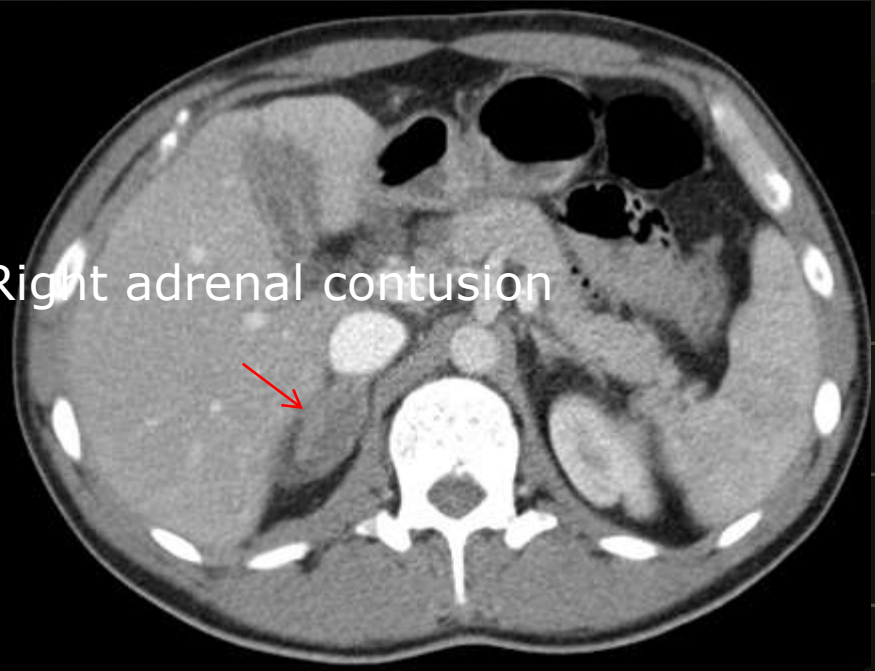
hyperintensity on T1 and T2 images - methemoglobin

Liver contusion



# Contusion

Right adrenal contusion



Right kidney contusion

# Posttuberculous calcifications

(Addison's disease)

