Identification

- **Gender**：♀
- **Age**：**48** y/o
- **Marriage status**：Married

Chief complaint

- Left abdominal tenderness for years.

Present Illness

- This 48 y/o lady suffered from LUQ pain and tenderness for years. She had been a victim of left renal stones s/p ESWL 4 years ago. Abdominal pain radiated to left shoulder was also complained in recent months intermittently. Besides, chest tightness was also noted for months.

Present Illness

- PE revealed non-movable ovoid shaped mass about 6 cm x 7 cm at LUQ and Urinalysis showed microhematuria (3 ~ 4/HPF).

Lab data

- WBC: 13650
- Hb: 11.1
- Hct: 31.1%
- PLT:184
- GOT:23
- GPT:16
- CK:278
- CKMB:11.0
- LDH-L:122

Glu:95

Bun:10

Cr:0.6

Na:140

K:3.6

Chol:220

ALB:4.1

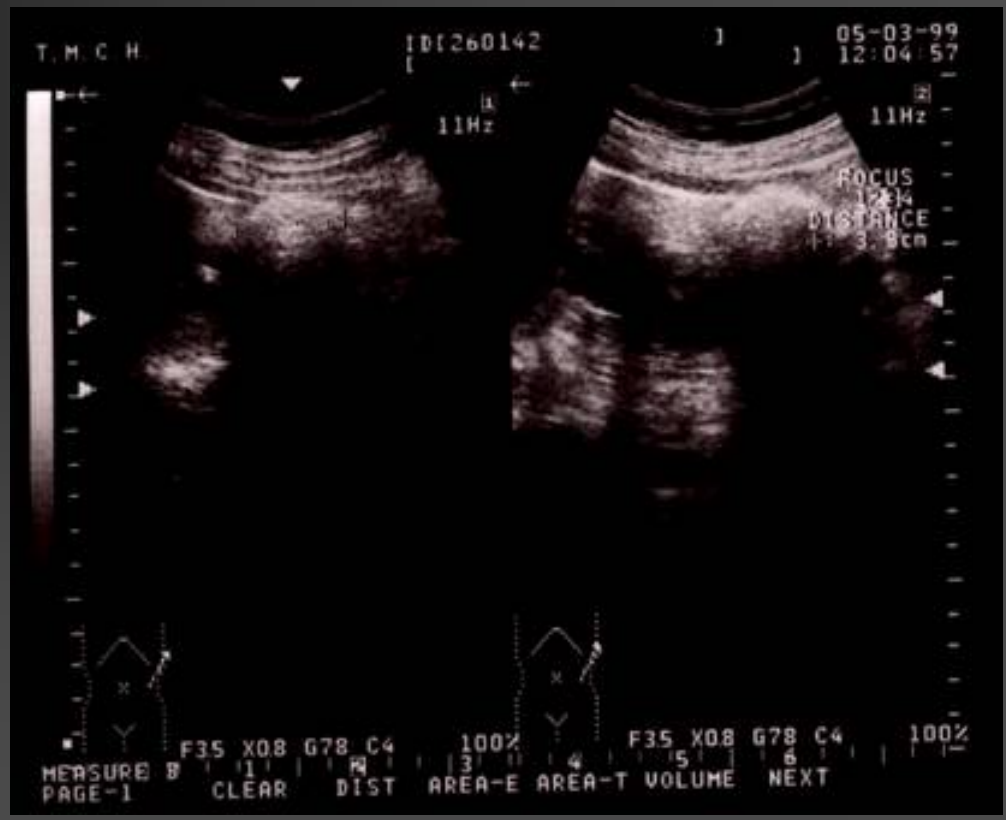
- Complete EKG: ST depression in V5, V6. T wave change in inferior leads (Lead 2,3 and AVF). → consider myocardial ischemia.
- Cardiac echo: trivial MR.
- CXR: neither cardiomegaly nor pulmonary lesions were noted.

Plain X ray

1. **little bowel gas**
2. **clear psoas muscle margin.**
3. **Amorphous calcified lesion at left renal region was noted.**

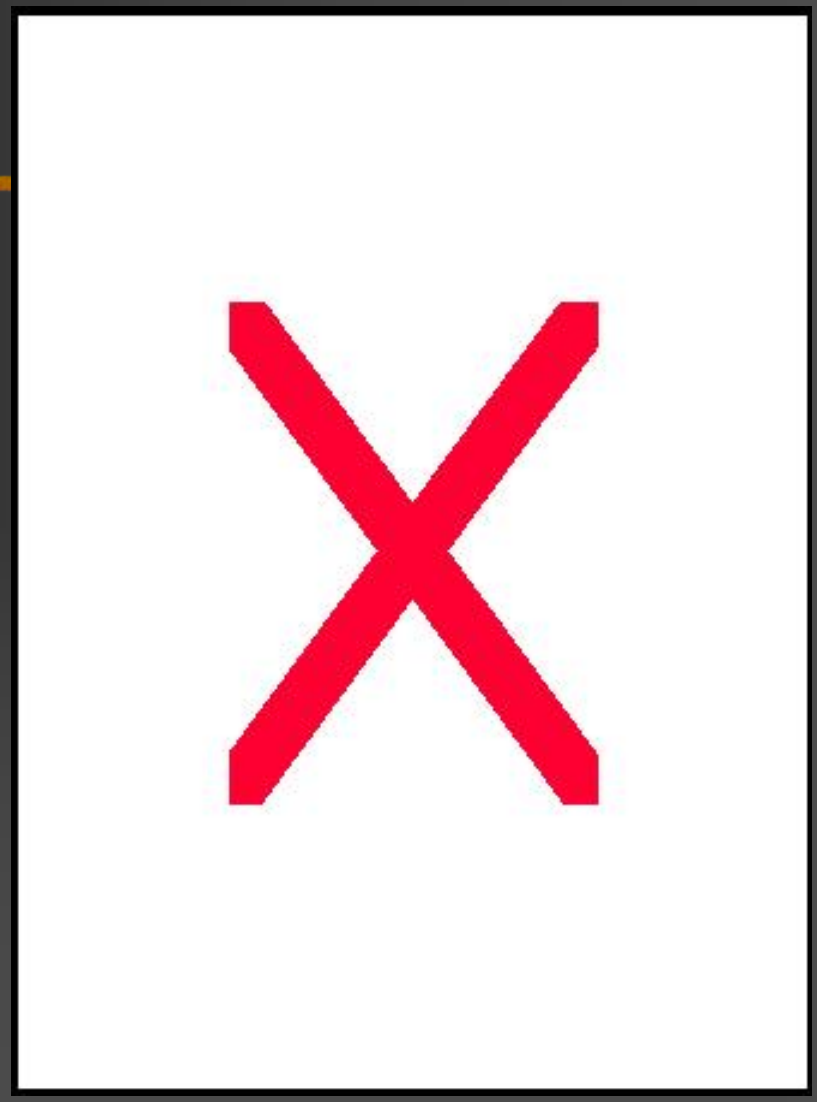
Abdominal echo

- Kidney: Bil nothing particular.
- LUQ: A hyperechoic mass with strong acoustic shadow near left kidney, measured 3.5 cm in diameter.
- Imp: LUQ mass, nature?



IVP

1. Amorphous calcified lesion at left renal region was noted.
2. Normal function and contour of the bilateral kidneys without evidence of hydronephrosis.
3. No significant obstructive uropathy along the bil urotract.



Lower GI series

- Evidence of calcified lesion at L’t retroperitoneum.
- Smooth passage of the barium milk without obstructive lesions through the esophagus, stomach and duodenum.

CT scan pre- contrast enhencement

- Amorphous calcified mass about 4.4 cm x 5.8 cm at left retrogastric space..
- No other significant abnormal findings

.

CT scan with contrast enhencement

CT scan with contrast enhancement

Differential diagnosis

- 1. Suspected post-traumatic calcified hematoma. → s/p ESWL.
- 2.Retroperitoneal tumors, the commonest malignancy are liposarcoma and fibrosarcoma (Desmoid).
- 3.Local aggression from RCC, gastric ca or colon ca.

Retroperitoneal hematoma

- Retroperitoneal bleeding is usually due to trauma or bleeding from kidney or renal vessels.
- Non-fatty retroperitoneal tumors. Recent hemorrhage → high density; old hemorrhage → liquefaction →low.

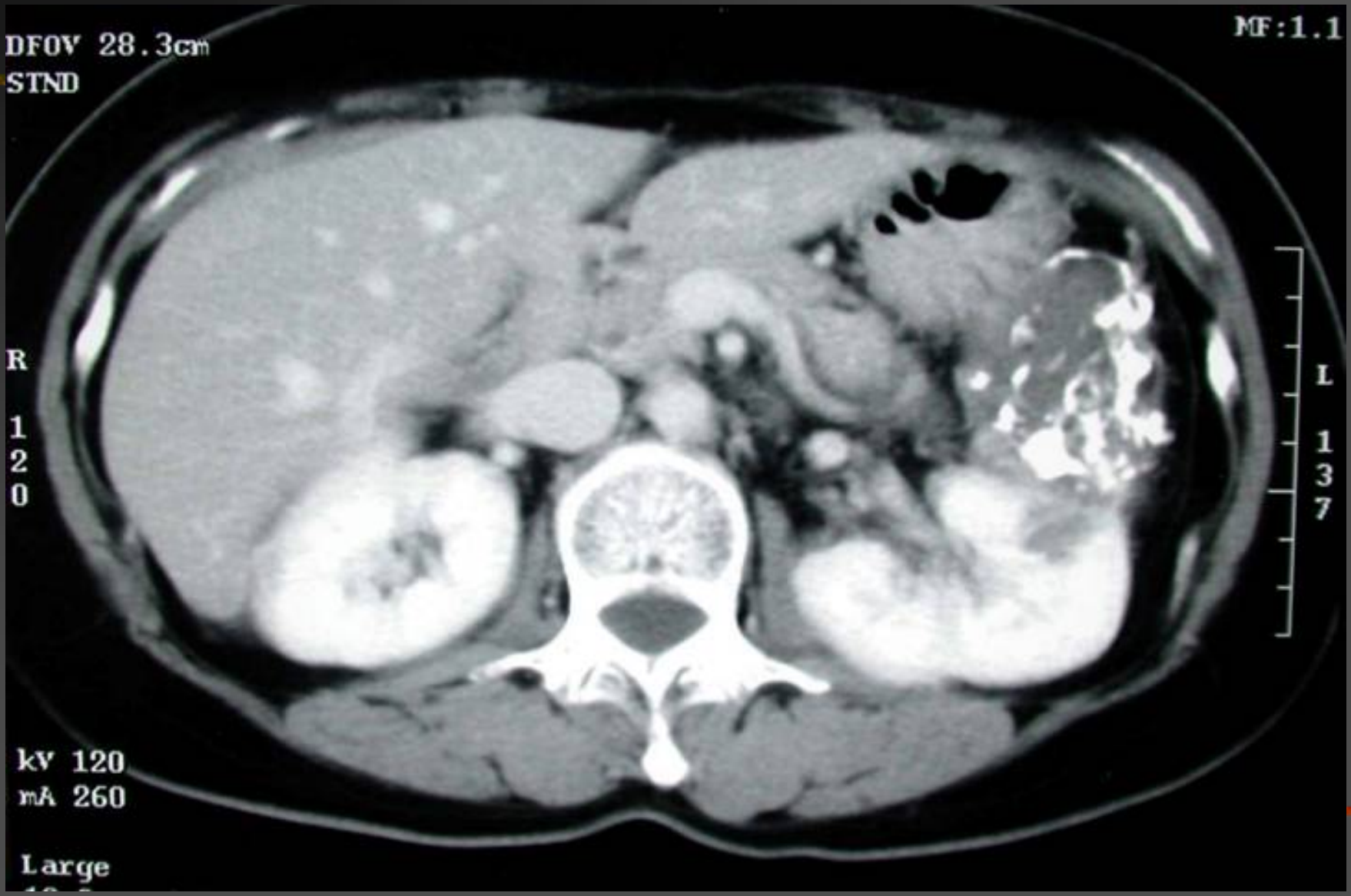
Retroperitoneal tumors

- Usually have reached considerable size while diagnosed.
- Primary tumors are rare. (about 0.3 ~ 3%.)
- Nerve origin or embyonic origin.
- The majority (60 ~ 85%) are malignant, 75% are mesodermal origin and 24% of nerve origin.

Retroperitoneal tumors

- Mesodermally derived tumors are those arising from adipose tissue, smooth and striated muscles, connective tissues, blood vessels, and lymphatic structures. These tumors are locally aggressive but rarely metastasis.

Aggression from Kidney



Unilateral Renal mass

- Tumor: benign → angiomyolipoma (associated with tuberous sclerosis), lipoma, renal fibroma.

Usually < 1cm in diameter, except Oncocytoma.

usually the identification of fat within the lesion indicate that it is benign.

- Inflammatory masses:renal abscess, xanthogranulomatous pyelonephritis, tuberculoma.

Unilateral Renal mass

primary malignant → RCC (86%), generally > 40 years (peak at 55 y/o).

- Solid or calcified cyst should be suspected of RCC
- Often lobulated mass, focal bulge in renal contour.
- Wilms tumor(12%): children before 5th years.
- renal sarcoma(2%).

secondary malignant→malignant lymphoma, TCC.

Tumor of renal parenchyma

- 85% → renal cell carcinoma.
- RCC usually occurs between 40 ~ 60 y/o.
- Mostly 6 ~ 7 cm in diameter in asymptomatic patients.
- Calcified (8~18%), usually central + amorphous, peripheral + curvilinear in cystic RCC

renal cell carcinoma

- Classic triad: flank pain (35~40%), abdominal mass (24 ~45%) and hematuria (50~60%) → 7 ~ 10%.
- Fever (11 ~15%), normochromic normocytic anemia (28~40%), paraneoplastic syndrome.
- Risk factors: smoking, obesity, Cadmium, Asbestos.

renal cell carcinoma

- Regional extension: into lymph nodes (9~23%), into main renal vein(21~35%), into IVC(4~10%).
- Patient with vena caval thrombus present with lower extremity edema, new variocele (2%), dilated superficial abdominal veins, albuminuria and even pulmonary emboli.

renal cell carcinoma

- Metastasis: 28% of patients have clinically apparent distant metastasis at presentation.
- lung(55%), lymph nodes(34%), liver(33%), bone (32%), contralateral kidney (11%).
- Bone pain, cough, **hemoptysis** (as initial symptoms of metastatic disease →9%)
- Incidence: tumor size < 3cm → 2.6%.
- 3~5cm → 15.4%.
- >5cm →78.6%

Tumor of the renal pelvis

- 10% of all renal tumors.
- TCC
- Associated with cigarette smoking, analgesic abuse and cyclophosphamide use.
- Hematuria.
- Filling defect on IVP.

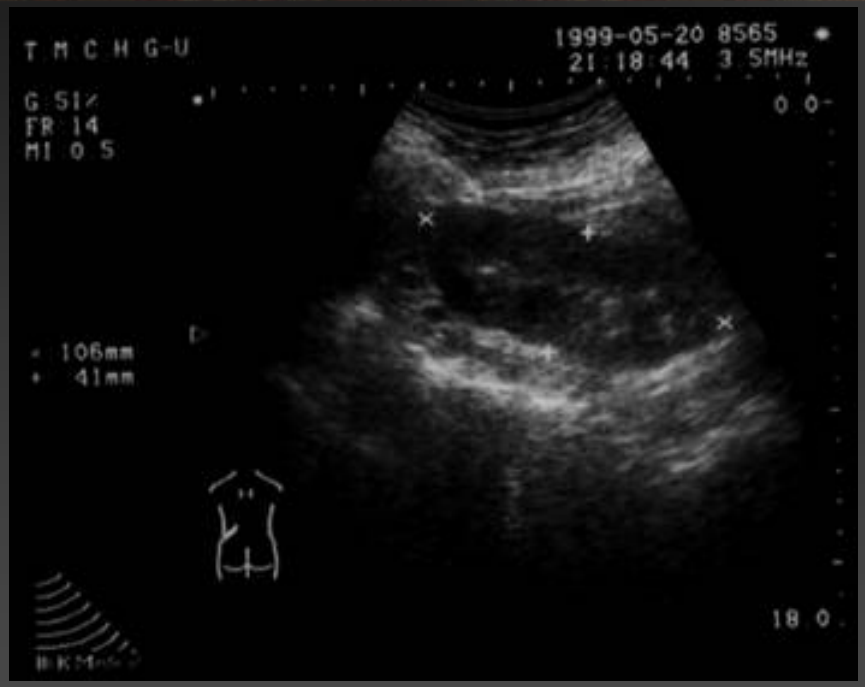
Surgical Treatment

- Exploratory Laparotomy and removal of LUQ abdominal mass on 88.4.27.

pathology

- Tissue: LUQ mass, 6 x 4.5 x 3.5 cm.
- Grossly, well-capsulated mass with thick fibrotic wall. On cut, it contains necrotic debris in the center. Calcification and ossification are also noted.
- Microscopically, most areas show marked ossification with marrow space formation, calcification, fibrosis and necrosis. Only some small foci display a picture of *renal cell ca of clear cell type.*

Renal ultrasound



- L't kidney: capsule intact. Size about 10.6 x 4.1 cm. No hydronephrosis. No hyperechoic density.
- R't kidney: size: 10.8 x 4.6 cm

Surgical treatment

- Left radical nephrectomy and lymph node dissection on 1999.5.21.

pathology

- Tissue: left kidney (about 10.5 x 7 x 4 cm) , perirenal fat tissue and lymph nodes.
- There is a bulging-out mass measuring 2 x 2 x 1.8 cm located at the anterior surface of the middle part of the kidney. It is ill-defined, yellowish with necrotic areas and hemorrhagic central portion.

Discussion

- Spiral CT in the diagnosis of renal masses

-BJU International (2000), 86 suppl. 1, 48-57

An evaluation of Bosniak's radiological classification of cystic renal masses

-BJU International (2000), 86, 607-609

MRI in the diagnosis of renal masses

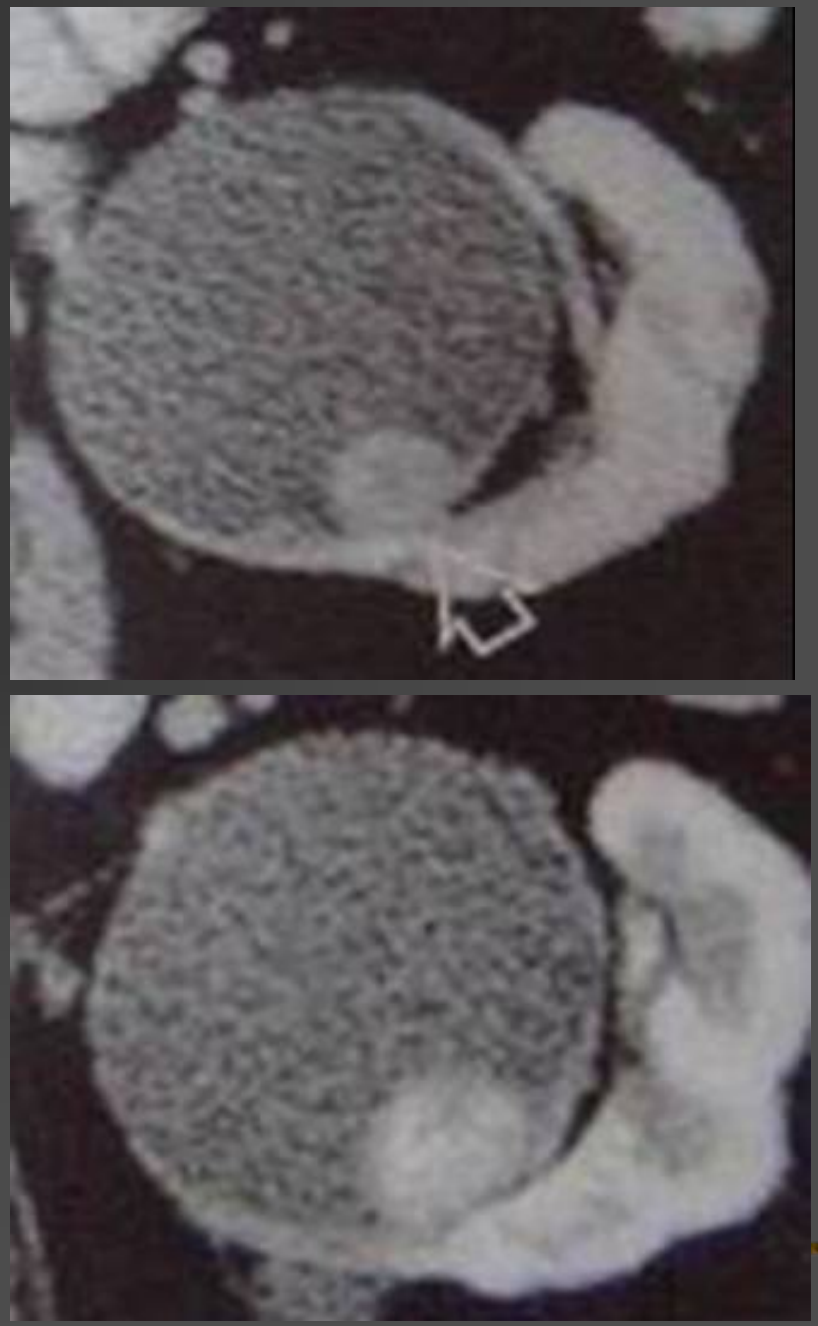
-BJU International (2000), 86 suppl. 1, 58-69

spiral Detection of renal masses in CT

- CMP (corticomedullary phase): there is enhencement of cortex but not the medulla at 30~60 s after IV contrast medium administration. The contrast medium is principally in the proximal tubules and the vascular system.
- NP(nephrographic phase): at 100~120 s.

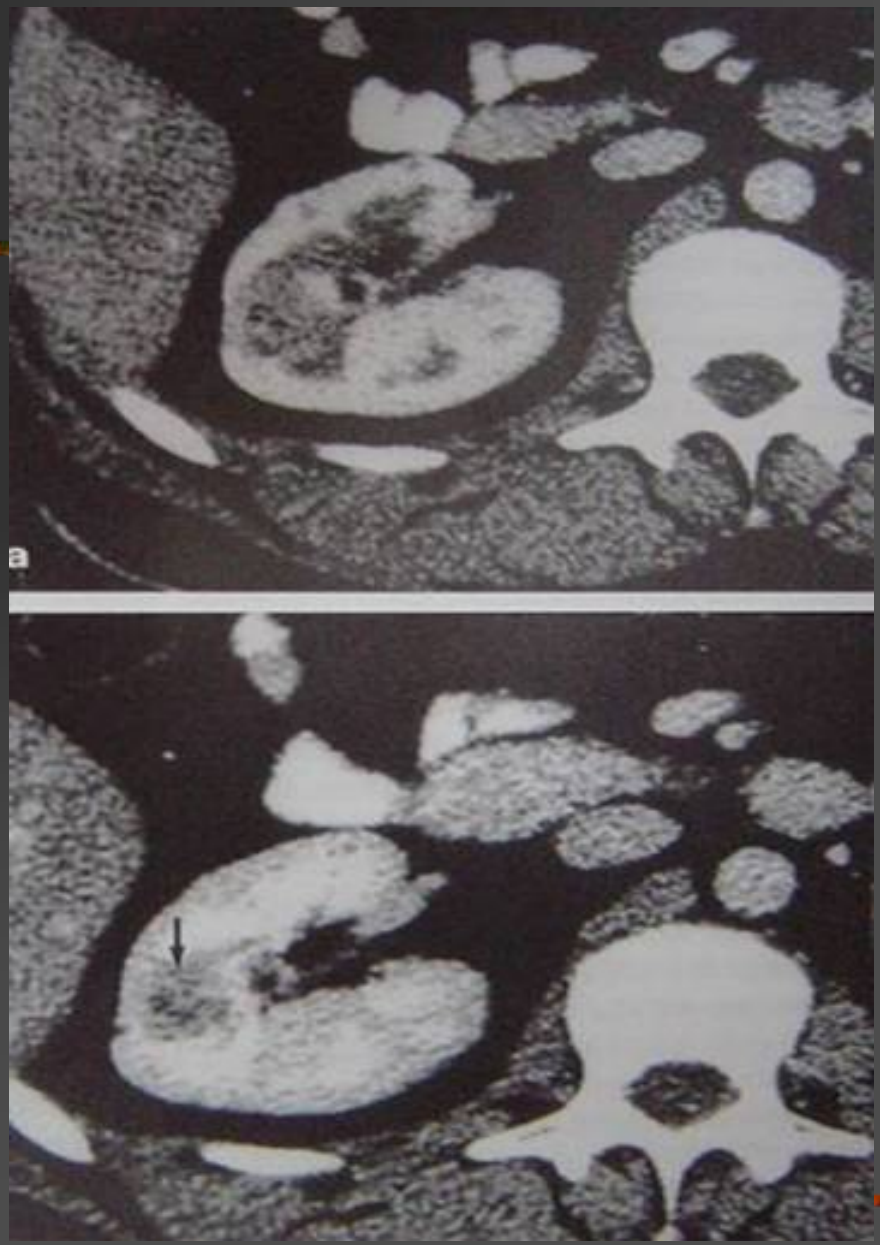
Detection of renal masses

- Thin-section CT can detect 47% of masses < 5mm and 75% of those 10-15 mm in diameter.
- Most small (< 1.5 cm) lesions are cysts, but even solid masses up to 2 cm may be overlooked if only CMP is used.
- The CMP alone showed 84% and NP alone showed 97% in one series



Detection of renal masses

- Above: CT scan of CMP (30s)
- Below: NP (75s).
- The solid tumor enhences less than the surrounding normal renal parenchyma.



Detection of renal masses

- Plain MRI: often difficult, because frequently the same signal intensity
- Delineation of tumors from the surrounding renal parenchyma is greatly improved after contrast enhancement.
- More than 1 cm in diameter mass.
- There are very few cases visible on MRI not been detected by CT or US.

Characterizing renal masses

- Cyst: the specificity of CT for the diagnosis of a benign cyst is very close to 100%. But the distinction between a complicated cyst (hemorrhage, calcification or infection) and a cystic tumor can be extremely difficult.
- The simultaneous incidence of neoplasm occurs in up to 30% of hemorrhagic cystic lesion.

Bosniak’s radiological classification for Cystic renal masses under CT

- Category 1: well-defined margin, no enhancement, homogenous and water-dense.
- Category 2: with a few thin septa (< 1mm), thin and fine calcification, hyperdense, no enhancement.
- Category 3:extensive thick and irregular calcifications, thick and irregular septa (> 1mm) or multiple septa.

Bosniak's radiological classification for Cystic renal masses under CT

- Category 4: irregular thickened walls or solid elements within, enhancement of cystic wall, septa or solid areas.
- Useful for category 1,3,4 because in distinguishing category 2 from 3 masses posed limitations and difficulties for recommending surgical rather than conservative management.

Bosniak's radiological classification for Cystic renal masses under CT

- High density cysts, with CT attenuation values of > 40 HU, without enhancement → benign.
- Most small renal cell cancer are solid and with attenuation values of > 20 HU on unenhanced scans.

Characterizing renal masses by CT

- Enhancement of >10HU→solid mass.
  >20HU→malignancy
- The vast majority of solid mass → RCC, but an attenuation value of < -15 HU in a mass indicate the presence of fat → angiomyolipoma.

Characterizing renal masses by MRI

- Advantage: multiplanar imaging capabilities allowing clear visualization of tumor extent and its relationship to surrounding tissues. The use of dynamic contrast enhanced sequences enables better delineation of intrarenal tumor extent.

Conclusion

- CT and US allow pre-therapeutic staging in about 90% of RCC. But the perirenal extent and infiltration of surrounding organs is often over-estimated with CT, resulting in false-positive findings or the description of high T stages.