Personal data

- Age : 63
- Gender : male

Chief complain

- No specific symptom or discomfort
- A hepatic mass , found by abdominal sonography of routine health exam on 88-12-08

Past history

- 1984-3-3 Old CVA with cerebral hemorrhage, op:craniotomy
- 1990-3-14 suspected post-op seizure
- MK1995 Hyperlipidemia,f/u at CV OPD
  BPH diagnosed,without operation

Physical examination

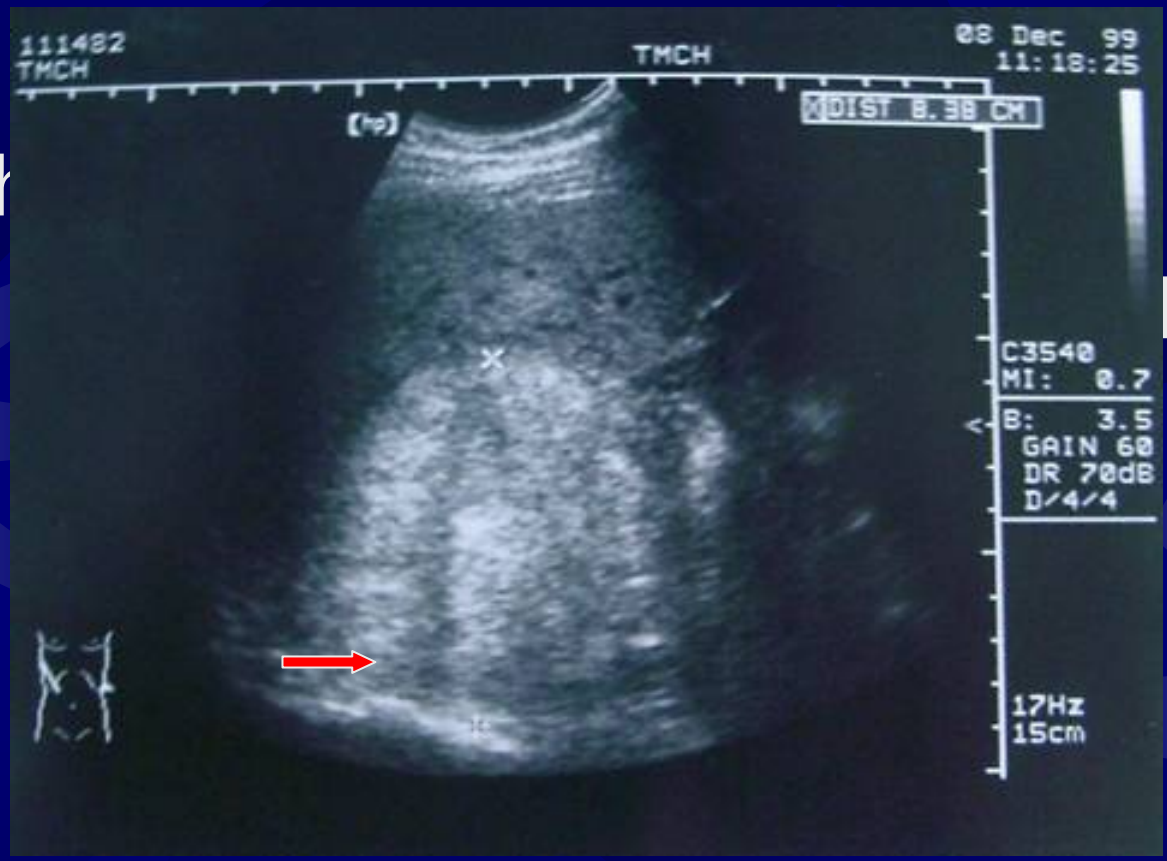
- Vital signs : stable
- No particular finding
- Abdomen : no palpable mass
  no tenderness

Lab data

- PT, aPTT : WNL
- CBC/DC : WNL
- Urine routine : negative
- Stool routine : negative
- Biochemistry : Chol 251 ↑
  TG 251 ↑
- Serum VMA : 4.82 (<8mg/day)
- STD: negative
- HBV, HVC : negative
- AFP, CEA : WNL

Sonography (1999-12-08)

- A h



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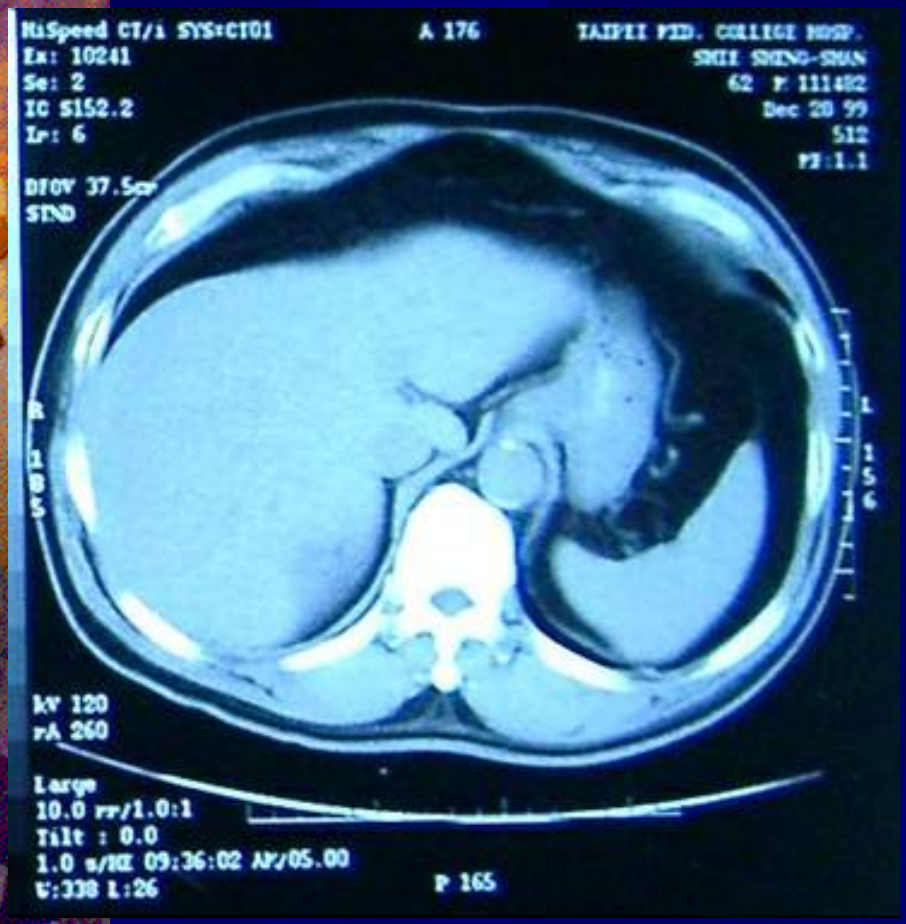
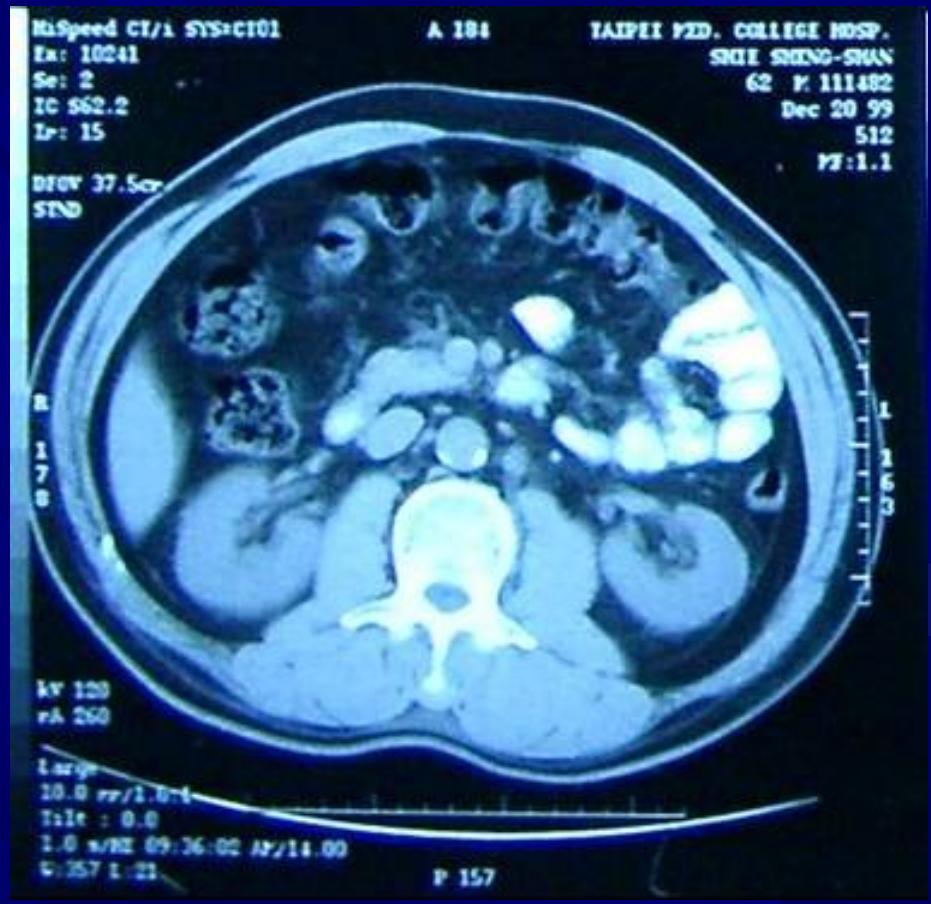
A hyperechogenic mass above the right side kidney

CT – pre-contrast-1 (1999-12-20)

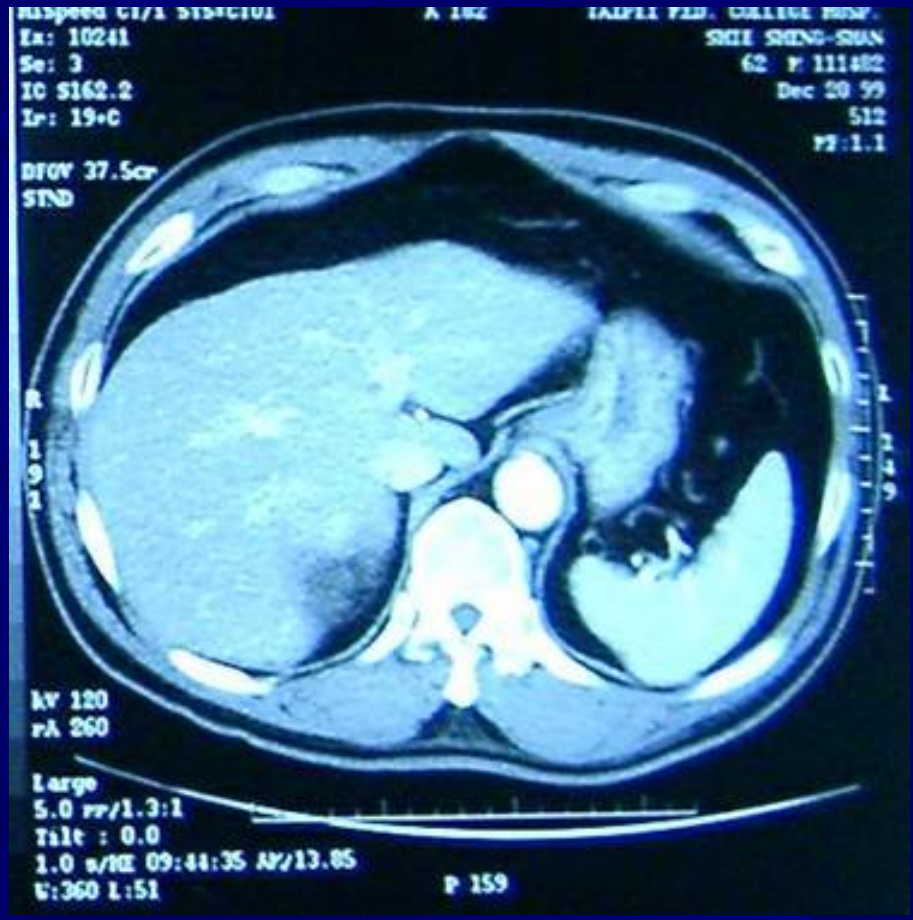


A large, well-defined and low- density mass at the right suprarenal region

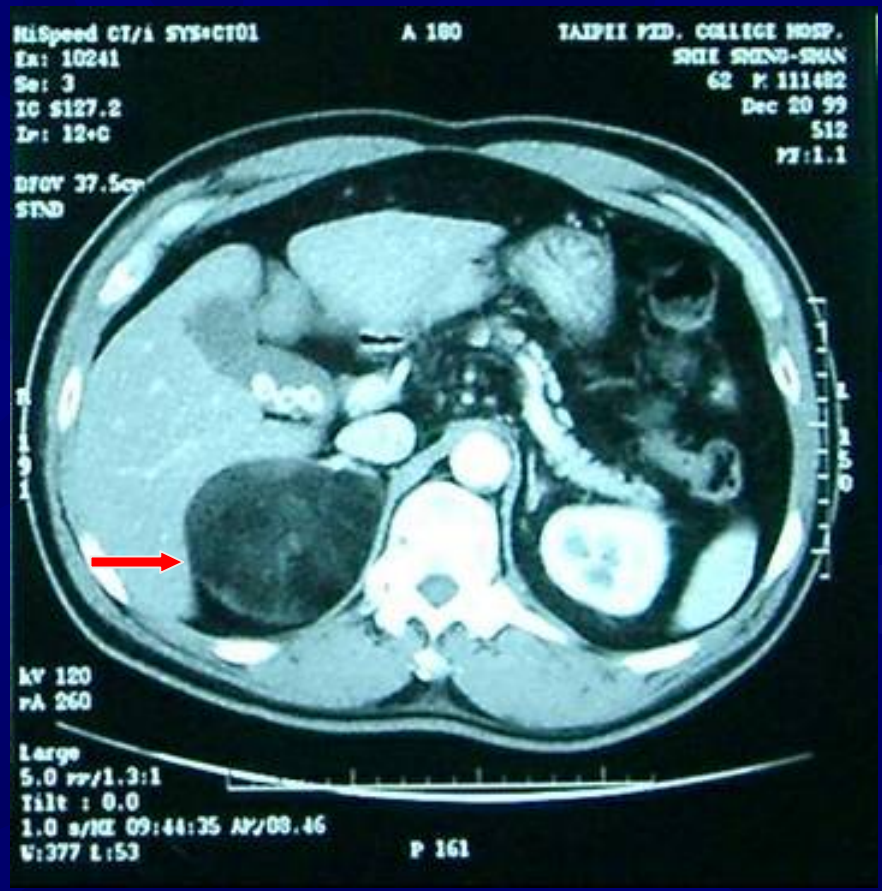
CT – pre-contrast-2 (1999-12-20)



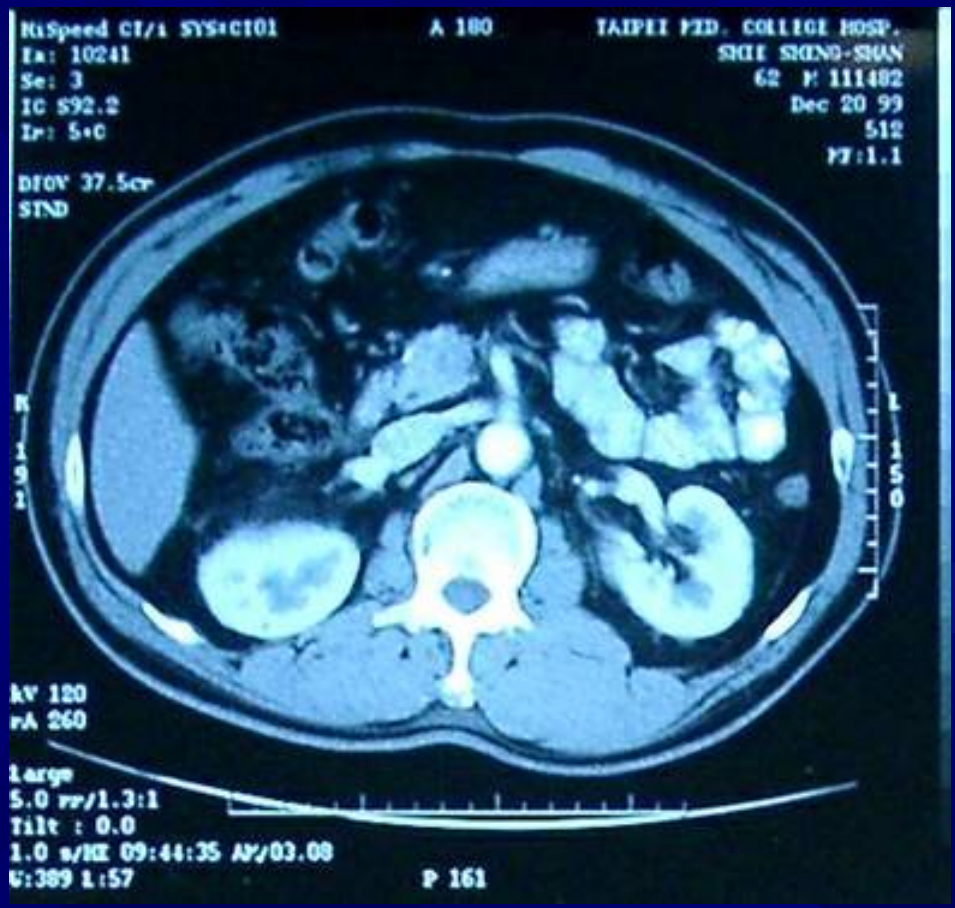
CT – arterial phase-1 (88-12-20)



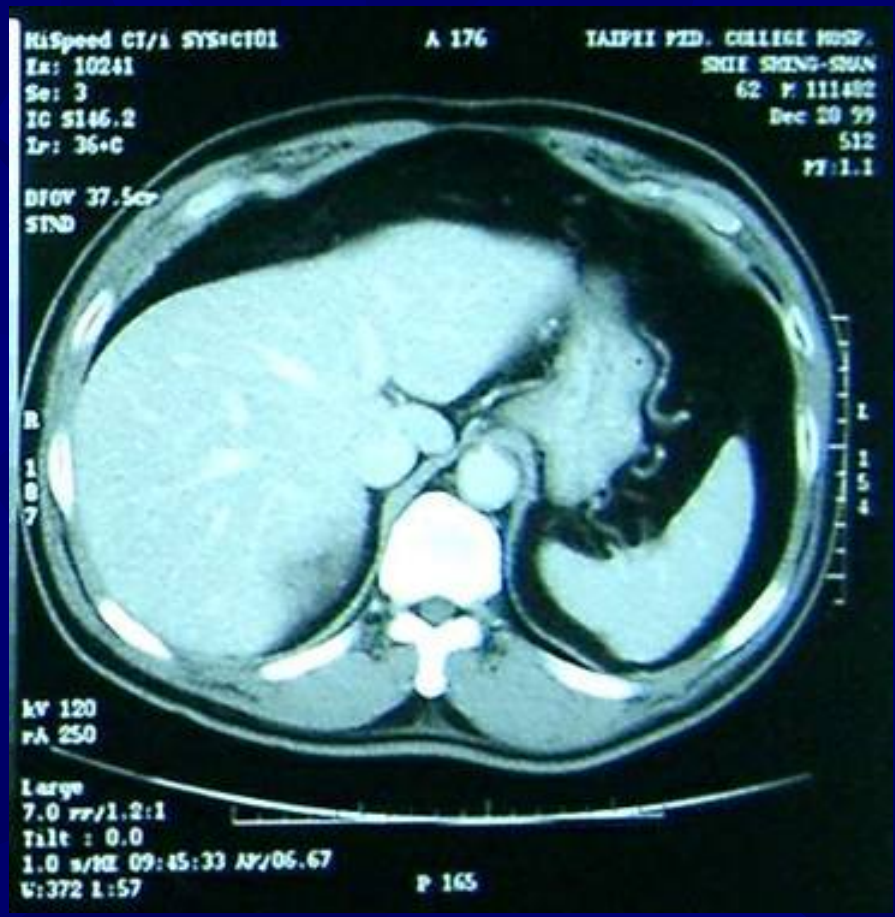
CT – arterial phase-2 (88-12-20)



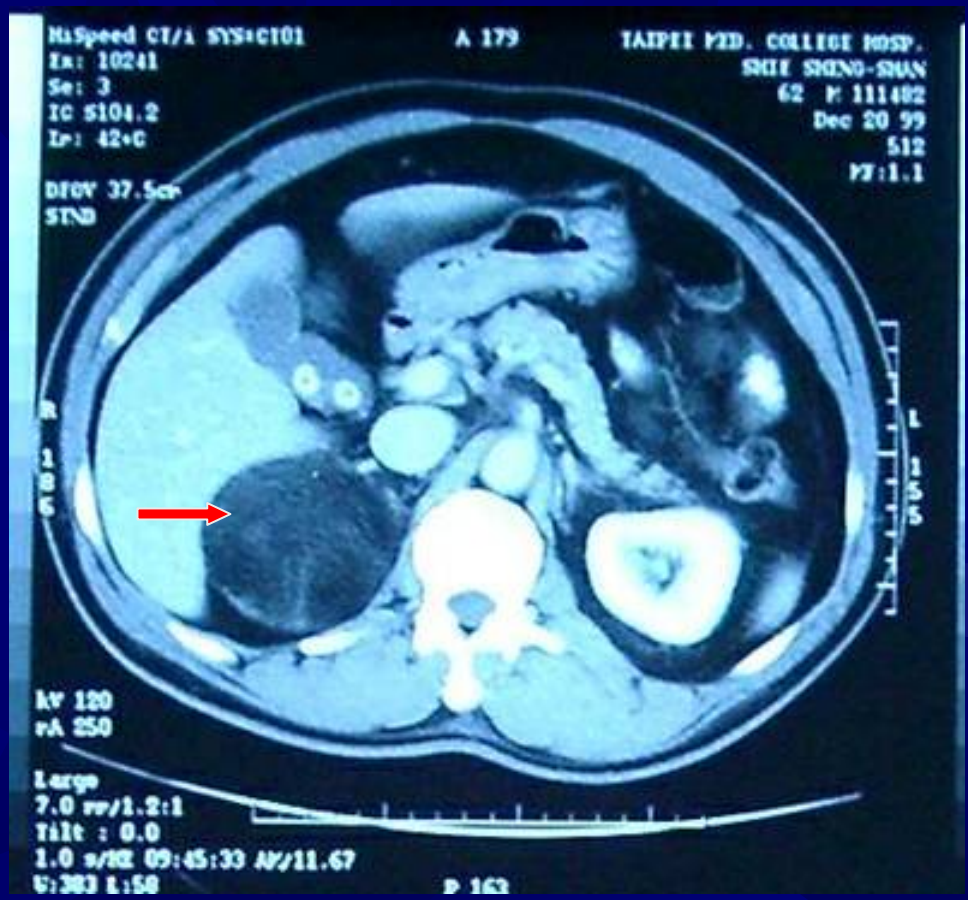
CT – arterial phase-3 (88-12-20)



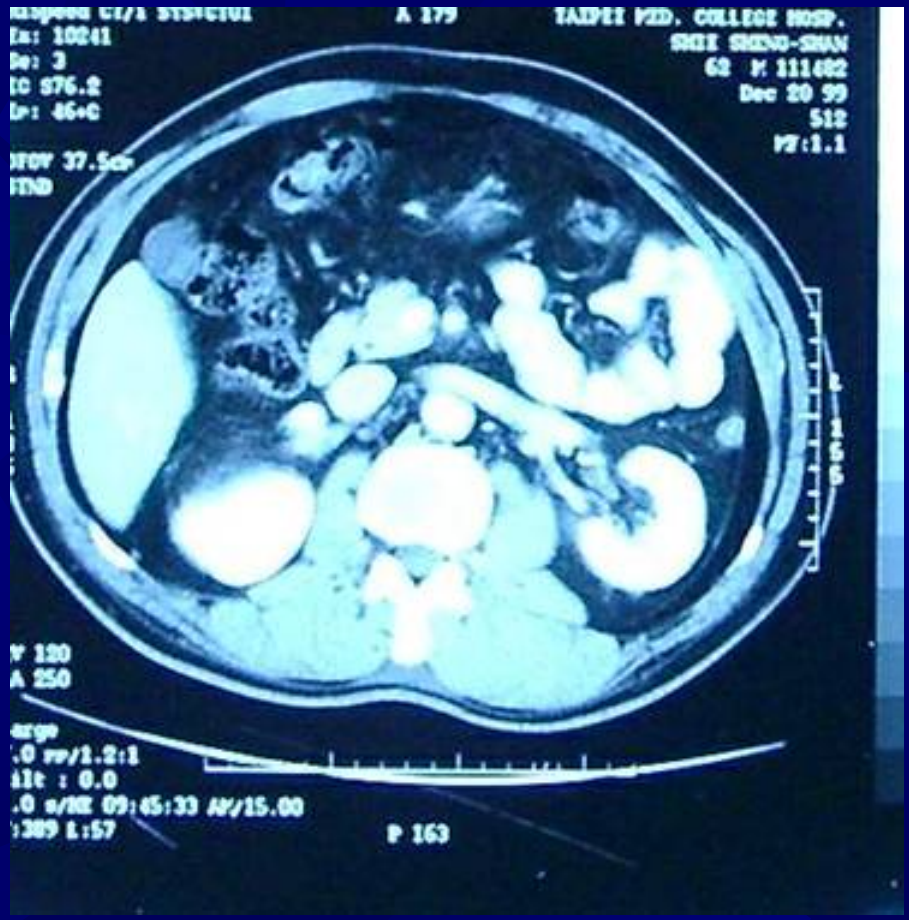
CT – portal phase-1 (88-12-20)



CT – portal phase-2 (88-12-20)



CT – portal phase-3 (88-12-20)



Angiography (2000-9-1-18)

A hypovascular tumor above the right side kidney

Summary of image findings

- Sonography : A hyperechogenic mass above the right side kidney
- CT : A large, well-defined and low-density mass at the right suprarenal region, about 10cm
  Gall stones
- Angiography : A hypovascular tumor above the right side kidney

Differential diagnoses-1

- Adrenal adenoma
- Metastatic cancer
- Adrenal carcinoma
- Adrenal cyst
- Pheochromocytoma
- Adrenal hyperplasia
- Myelolipoma

Differential diagnoses-2

- Neuroblastoma
- Angiomyolipoma
- Retroperitoneal liposarcoma
- Adrenal hemorrhage
- Adrenal abscess

Adrenal adenoma

- Functional : usually less than 1cm
  electrolyte abnormalities
- Non-functional : usually less than 3cm

Metastatic cancer

- Commonly from lung, kidney, melanoma, breast, GI tract and ovary
- Commonly unilateral
- Less well-defined, larger than adenoma
- Have a thick , irregular enhancing rim after injection of IV contrast medium

Adrenal carcinoma

- Most exceed 6cm in diameter at the time of presentation
- CT : heterogeneous, with areas of necrosis and calcification
- 15 % <6cm and may resemble adenomas

Adrenal cyst

- Uncommon, usually unilateral
- More often in women than in men
- Well-defined, thin-walled fluid-filled structures
- No enhancement after the injection of IV contrast medium

Pheochromocytoma

- Frequently very large
- 10% are bilateral
- Screening :
  1. 24hrs urine metanephrine
  2. 24hrs urine VMA
  3. consider plasma catecholamine test

CT : round mass, necrosis→fluid-filled centre

Myelolipoma

- Rare and benign
- Composed of fat and bone marrow tissue
- Usually asymptomatic and nonfunctioning

Neuroblastoma

- Calicification : 90%
- Displace the kidney inferiorly and laterally
- Displace and encase the major retroperitoneal vessels

Angiomyolipoma

- Commonly larger than 4cm
- CT : the presence of fat associated with a mass lesion
- Renal arteriography : two very distinct patterns of abnormality(avascularity and hyper-vascularity)

Retroperitoneal liposarcoma

- Have a variable appearance, which merely reflects their tissue composition
- Classified into myxoid, lipomatous and sclerosing histological subtypes
- CT : fluid, fat or muscle respectively

Adrenal hemorrhage

- Usually clinical silent
- Seen on CT in 2% of patients who sustain severe trauma
- Round or oval adrenal haematoma(83%)
- Uniform adrenal enlargement (9%)
- Diffuse irregular haemorrhage obliterating the gland (9%)
- Non-traumatic factors : anti-coagulants, bleeding disorders, stress, hypotension and septicemia

Adrenal abscess

- Rare, most bring found in neonates with pre-existing adrenal hemorrhage.
- Appears as a thick-walled cystic lesion

Most likely diagnoses

- Adrenal myelolipoma
- Renal angiomyolipoma
- Retroperitoneal liposarcoma

Pathology

- 11.0×9.5×10.0 cm in size
- Grossly, red-yellowish, fragle and glistening tissue
- Microscopically, shows a picture of myelolipoma of the adrenal gland which largely is replaced by mature adipose tissue admixed with unremarkable hematopoietic elements.
- No evidence of malignancy is seen.

Discussion

Myelolipoma

Background

- Rare benign neoplasm composed of mature adipose tissue and a variable amount of hematopoietic elements
- Most lesions are small and asymptomatic
- Most tumors are unilateral but show no predilection to one particular side. Tumor size varies from several millimeters to larger than 30 cm

Pathophysiology

- The most widely accepted theory, as cited by Meaglia and Schmidt in a 1992 study of the natural history of adrenal myelolipoma, is the existence of metaplasia of the reticuloendothelial cells of blood capillaries in the adrenal gland in response to stimuli such as necrosis, infection, or stress.

Frequency

- In the US - Incidence varies from 0.08-0.4% at autopsy

Mortality / Mobidtity

- No death rate has been reported in the literature because of the rarity of this lesion. Myelolipomas do not undergo malignant transformation.
- The primary complication, which is uncommon, is spontaneous rupture of the mass, resulting in retroperitoneal hemorrhage. Rupture and hemorrhage also can occur following blunt trauma

Epidemiology

- **Race -** As reported by Han et al in 1997 in 1 series of 20 patients, 85% of patients with adrenal myelolipoma were Caucasian. No other generalizations have been reported in the literature.
- **Sex -** Mostly, the male-to-female ratio is 1:1
- **Age -** Lesions most commonly occur in patients in their fifth to seventh decades, although they have been seen in patients aged 12-93 years.

Anatomy

- Most myelolipoma lesions occur within the adrenal gland. Rarely, myelolipomas can exist in extraadrenal locations, such as the presacral retroperitoneum, perirenal and pararenal retroperitoneum, mediastinum, liver, and muscle fascia

Clinical details-1

- Most myelolipomas are asymptomatic and hormonally nonfunctional. Occasionally, patients present with nonspecific abdominal or flank pain secondary to intratumoral or peritumoral hemorrhage, tumor necrosis, or mechanical compression from tumor bulk. Other rare presenting symptoms include hematuria and abdominal mass

Clinical details-2

- Myelolipomas rarely have been associated with endocrine disorders such as Cushing syndrome, Conn syndrome, and congenital adrenal hyperplasia. In 85% of these patients, the abnormality involves the pituitary adrenal axis

Clinical details-3

- Patients with small asymptomatic myelolipomas are monitored clinically for symptoms. Routine follow-up radiologic tests appear unnecessary for small lesions. Symptomatic tumors are treated by adrenalectomy. Occasionally, large silent tumors are excised to prevent the occurrence of rupture

Preferred examination & images

- The fatty component of a myelolipoma is macroscopic in most patients and is diagnostic when discovered on cross-sectional imaging
- The preferred imaging modality is CT, which shows focal fatty density within the mass. MRI also accurately depicts both microscopic and macroscopic fat using chemical shift imaging and explicit fat saturation technique, respectively. Myelolipomas may be discovered incidentally on ultrasound (US), which otherwise is not used routinely to characterize adrenal neoplasms

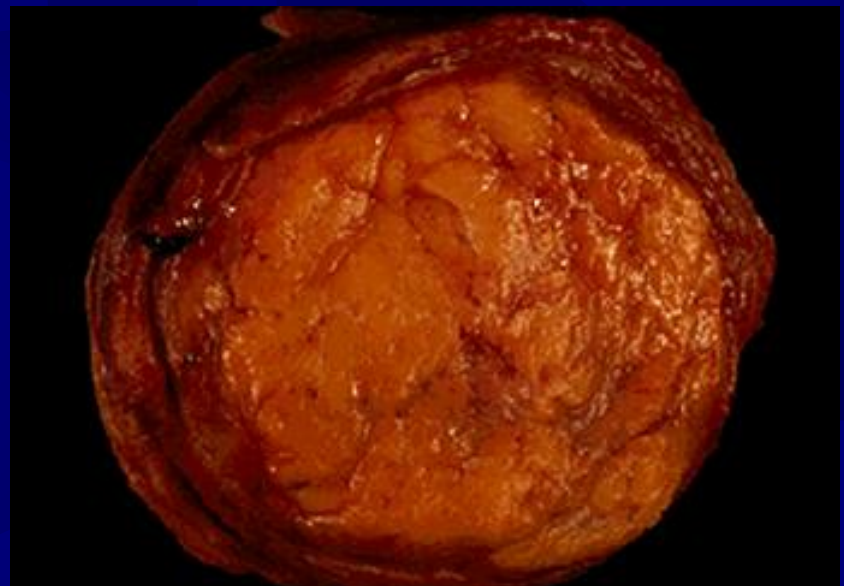
Limitations of techniques-1

- Occasionally, myelolipomas can enlarge enough to make the organ of origin difficult to discern on CT, resulting in a differential diagnosis that includes renal angiomyolipoma and retroperitoneal liposarcoma or lipoma. In these patients, the multiplanar capability of MRI can help define the tissue planes and confirm that the mass is adrenal in origin

Limitations of techniques-2

- Some myelolipomas may have a larger amount of hematopoietic tissue and no recognizable fat, making them impossible to distinguish from well-differentiated retroperitoneal malignancies or other adrenal tumors on CT or MRI. Percutaneous biopsy may be necessary to establish a diagnosis

Macroscopic images



- The specimen demonstrates the cut surface of a myelolipom
- Note the tan color tinged with yellow.
- The yellow color is due to the neoplastic fat cells (the lipoma portion).
- The tan color is due to the marrow elements ("myelo" portion

References

- Peter A. , Martin L.wastie Diagnostic imaging, 4th edition
- Grainger & Allison's Diagnostic Radiology, 4th edition