ADRENAL GLANDS & RETROPERITONEUM

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Unknown Case

18 mo. old with weight loss, irritability

Diagnosis ?

A. Lymphoma
B. Neuroblastoma
C. Wilms’ Tumor
D. Leukemia
For comparison:

**Wilms' tumor**

( median age: 3 1/2 yrs. )

**Neuroblastoma**
- Calcification > 85%
- Encases vessels
- Crosses midline
- Spinal canal extension
- Metastases:
  - bone common
  - lungs rare

**Wilms Tumor**
- Calcification=10%
- Displaces vessels
- Doesn’t usually cross
- No extension to spinal canal
- Metastases:
  - lungs common
  - bone rare
Unknown Case

35 y.o. male with abdominal fullness and bone pain

Diagnosis?

A. Non-Hodgkin's lymphoma
B. Lymphangiomatosis
C. Retroperitoneal liposarcoma
D. Metastasis
Unknown case

45 yo female with bilateral flank pain and rising creatinine

Diagnosis?

A. Transitional cell CA
B. Retroperitoneal fibrosis
C. Lymphoma
D. Tuberculosis
Unknown Case

Abdomen radiograph

Contrast-enhanced CT

14 month old, mother feels lump

(case continued)

Abdomen radiograph

Contrast-enhanced CT

Diagnosis?

A. Neuroblastoma
B. Wilms' tumor
C. Retroperitoneal teratoma
D. Angiomyolipoma
Unknown Case

Contrast-enhanced CT

68 y.o. with pelvic pain, dysuria, and hematuria

(continued)

Excretory urogram; 15 min.
(coned view of bladder)
ADRENAL

Benign lesions

Diagnosis?

A. TCC of the bladder
B. Diverticulitis
C. Prostate carcinoma
D. Sigmoid carcinoma
Case: History of non small cell lung carcinoma

Precontrast = 20 HU Postcontrast = 120 HU Washout = 50HU

Unknown Case

Chem. shift: in-phase
Chem. shift: out-of-phase

Diagnosis?
A. Myelolipoma
B. Adrenal adenoma
C. Adrenal cyst
D. Pheochromocytoma
Case: History of non small cell lung carcinoma

Bilateral adrenal adenomas, lipid rich on right, lipid poor on left

<table>
<thead>
<tr>
<th>Technique</th>
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<tbody>
<tr>
<td>Injection</td>
<td>150 ml contrast at 2 ml/sec</td>
</tr>
<tr>
<td>Initial Enhanced attenuation</td>
<td>measured at 60 sec</td>
</tr>
<tr>
<td>Delayed attenuation</td>
<td>measured at 15 minutes</td>
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<tr>
<td>Measure</td>
<td>ROI at least 1/2 size of mass</td>
</tr>
<tr>
<td>% Relative Washout (adenomas &gt; 40%)</td>
<td>82 (59-96) 92 (79-98) 11 (4-32)</td>
</tr>
<tr>
<td>% Enhancement Washout (adenomas &gt; 60%)</td>
<td>86 (65-98) 92 (79-98) 11 (4-34)</td>
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</tbody>
</table>

n = 166 patients (adenoma 127, nonadenoma 39) (from Caoli et al)
MR Imaging features

- Chemical shift imaging
  - Accuracy 96 to 100%

Axial T1 WI (a) in-phase and (b) out-of-phase images show an isointense mass in the left adrenal gland with loss of signal on out-of-phase image suggesting a fat rich adrenal adenoma.

Adrenal myelolipoma

giant myelolipoma
ADRENAL

Malignant lesions

Adrenal cortical CA
Case

History withheld

Pheochromocytoma

• Composed of chromaffin cells
• Malignant – 10 to 13%
• Extra-adrenal – 10%
  – Paragangliomas: base of brain to epididymis, usually sympathetic chain in retroperitoneum
• Diagnosis is by assay of catecholamines and their metabolites in blood or urine.
• Syndromes
  – MEN type 2
  – Von-Hippel Lindau disease
  – Neurofibromatosis
  – Carney’s triad

Enhancing mass in the right adrenal gland (arrow). This was a pheochromocytoma.

Pheochromocytoma

- Rounded or oval masses of similar density to liver on non-contrast-enhanced scans.
- Central necrosis is frequent
- Enhance markedly after injection of intravenous contrast medium

Axial (a) non-contrast and (b) post-contrast images showing an enhancing mass in the right adrenal gland. Central cystic areas may be due to necrosis. Coronal (c) reformat shows the suprarenal location of the mass.


Pheochromocytoma

- MRI —
  - Hypointense on T1-weighted images and markedly hyperintense on T2-weighted images
  - 35% atypical signal intensity on T2-weighted images
  - Enhance markedly following injection

Right adrenal Pheochromocytoma: T2 coronal (a) and axial (b) image showing a isointense mass superior to the kidney with small cystic areas in it. Out of phase (c), Precontrast (d), and post contrast T1(e) images show a mildly enhancing mass.
Pheochromocytoma

- NM –
  - Iodine 131 metaiodobenzylguanidine (MIBG) or indium-labelled penetrotide (Octreoscan), particularly helpful for extra-adrenal lesions

Patient with MEN syndrome with a Pheochromocytoma and medullary thyroid CA. Focus of increased uptake in the left adrenal gland consistent with a pheochromocytoma and another focus of increased uptake in the right inferior thyroid which was shown to be consistent with a solid lesion on US. This was a medullary thyroid carcinoma. MRI confirmed the pheochromocytoma in the left adrenal gland (red arrow)

RETROPERITONEUM

PELVIC LIPOMATOSIS
Pelvic lipomatosis

Bladder shape: "inverted pear"
Cystitis glandularis
(metaplasia)

Pelvic lipomatosis

Lymphoma
Idiopathic retroperitoneal fibrosis
Idiopathic retroperitoneal fibrosis
Retroperitoneal fibrosis associated with AAA

LYMPHOMA
RETROPERITONEAL LIPOSARCOMA

Lymphoma
Perinephric liposarcoma

RP liposarcoma

typical perinephric location
Renal angiomyolipoma
(exophytic; "mushroom")

Liposarcoma
(renal margin intact)
exophytic "mushroom" AML
Unknown case

Diagnosis?
A. Lymphoma
B. Leiomyosarcoma
C. Retroperitoneal liposarcoma

Leiomyosarcoma of IVC
RETROPERITONEAL TERATOMA

Retroperitoneal teratoma
Retroperitoneal teratoma

Retroperitoneal teratoma
PELVIC TERATOMA
90% newborns & infants; 80% benign

Sacral Teratoma