Adrenal Incidentalomas

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Disclosures

• None
Objectives
Learn something new

- On average, 12 newborns will be given to the wrong parents daily.
- The average human body contains enough iron to make a 3 inch nail.
- The brain is the same consistency as tofu.
- Humans share about 50 percent of DNA with bananas.
Background

• Frequent use of CT and MRI
• Better quality scans
• Asymptomatic incidental findings 16%
• Adrenal incidentalomas 3-5%
• Adrenal incidentalomas 10% @ autopsy
47 year old female presents to your office for follow up of an abnormal CT scan. She was seen in the ED and worked up for nephrolithiasis. She passed the stone but the "night hawk" radiologists commented on a 3.5 cm left adrenal mass and says she needs to follow-up with you.
Incidentaloma
What do we want to know?

- Is it benign or malignant?
- Is it hormonally active?
- Can we leave it alone or do we have to take it out?
- How do we do all this in a safe and cost effective way?
Differential

Adenoma
Hyperplasia
Myelolipoma
Hematoma
Cyst
Hamartoma
Neurofibroma
Ganglioneroma

Adrenal carcinoma
Pheo
Metastasis
Adrenal Mass

- Nonfunctioning adenoma: 60%
- Pheochromocytoma: 10%
- Cortisol producing adenoma: 5%
- Aldosteronoma: 5%
- Adrenocortical carcinoma: 5%
- Adrenal cyst: 5%
- Ganglioneuroma: 9%
- Myelolipoma: 1%
Herrera et al, Surgery 2003

Retrospective cohort study
Develop management guidelines for AI

- Do AI need routine endocrine eval?
- Is there a size below which AI may be observed?
- Which ones need follow-up evaluations?
Methods

61,054 CT scans reviewed
2066 had AI's
Excluded those with
  - Previous malignancy
  - Adrenal disease
  - Evidence of local invasion

259 patients qualified for study
Results

52 patients had adrenalectomy

5 had malignancy

No malignancy < 5 cm
Conclusions

Hormonal Screening AI > 1cm

Adrenalectomy if
- >4cm
- Hyperfunctioning

CT at 3 month intervals for those observed
208 patients
19 patients with hyperfunction
85 > 4cm

21 adenomas
17 ACC
13 pheo
12 Metastasis
10 Myelolipomomas
12 others
Findings: Kasperlik-Zaluska

Malignant tumors 3.2-20 cm

Benign tumors 1.5-21 cm

Most Adenomas <6 cm

All but 2 ACC's >6 cm
Recommendations: Kasperlik-Zaluska

- Size is sensitive but not specific
- Surgery for hyper secretory or > 4cm
- If observation repeat image at 1, 2 and 6 months
92 patients with AI's

- 88 had adrenalectomy for hyperfunction or AI > 3 cm
- 3 had FNA
- 1 had an autopsy

Luton et al, European Jr of Endo 2003
Findings: Luton

32 non functioning adenoma
10 functioning benign adenoma
2 ACC
10 Pheo
36 extra adrenal masses
Recommendations: Luton

• All patients with AI should have hormonal screening

• Surgery for AI >3 cm

• The greater the size the greater the chance of malignancy
Weakness of all studies

- When to test for hormonal excess?
- Which screening tests should be done?
- ACC very high compared to national average.
- Patients were excluded for no clear reason.
- Different modalities used to image
- Lack of consistent follow up.
Functioning Adenoma

- Adrenal mass
  - History and physical examination
    - Clinical suspicion
      - Cushing's syndrome
        - Serum cortisol
        - Urinary cortisol (optional)
        - ACTH
        - 1mg dexamethasone suppression test
      - Pheochromocytoma
        - Should always be evaluated
          - Plasma-free metanephrines (best)
          - 24h urine for catecholamines/metanephrines
      - Hyperaldosteronism
        - Serum potassium
        - Serum aldosterone levels
        - Aldosterone-to-renin ratio

Source: Cancer Control © 2002 H. Lee Moffitt Cancer Center and Research Institute, Inc.
# Evaluation of Hormonal Excess: There is No Consensus

<table>
<thead>
<tr>
<th>Clinical Signs and Symptoms</th>
<th>Functionality</th>
<th>Size and Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pheochromocytoma</strong></td>
<td>Screen: plasma free metanephrines. If elevated, do confirmatory test. <strong>Confirm</strong>: 24-hour urine catecholamines+metanephrines.</td>
<td>Size: &lt;4 cm or &gt;6 cm Features: round shape, smooth borders, sharp margins, density, contrast enhancement</td>
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<tr>
<td>Headache</td>
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<td>Palpitations</td>
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<td>Diaphoresis</td>
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<tr>
<td>Hypertension</td>
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<tr>
<td><strong>Cushing’s syndrome</strong></td>
<td>Screen: overnight dexamethasone suppression test. If serum cortisol is not suppressed to &lt;5 mg/dL, do confirmatory test. <strong>Confirm</strong>: 24-hour urine for free cortisol or midnight salivary cortisol.</td>
<td></td>
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<tr>
<td>Weight gain</td>
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<tr>
<td>Moon facies</td>
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<tr>
<td>Bruises easy</td>
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<tr>
<td>Poor wound healing</td>
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<td></td>
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<tr>
<td>Diabetes</td>
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<tr>
<td>Proximal muscle weakness</td>
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<tr>
<td>Hyperlipidemia</td>
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<tr>
<td><strong>Hyeraldosteronism</strong> (Conn’s syndrome)*</td>
<td>Screen: plasma aldosterone: plasma renin activity ratio. If ratio is &gt;20, do confirmatory test. <strong>Confirm</strong>: salt suppression test</td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
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<tr>
<td>Hypokalemia</td>
<td></td>
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<tr>
<td>Polyuria</td>
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<tr>
<td>Polydypsia</td>
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Follow up!
Incidental Findings Committee
October 2010

Managing Incidental Findings on Abdominal CT: White Paper of the ACR

Incidental Findings Committee

Berland and Silverman et al
Incidental Adrenal Mass (≥1 cm) Detected on CT or MR

- Imaging features are diagnostic
  - Myelolipoma, ca++ = benign, no F/U
  - HU ≤10 or ↓ signal on CS-MR = adenoma

- Imaging features not diagnostic
  - 1–4 cm
    - No history of cancer: consider resection
    - History of cancer: consider PET or biopsy

- No prior imaging
  - No history of cancer
    - Benign imaging features¹: Presume benign, consider 12 month F/U CT or MR
    - Suspicious imaging features⁴
      - Unenhanced CT or CS-MR
        - HU ≤10 or ↓ signal on CS-MR = adenoma
        - HU >10 or no ↓ signal on CS-MR
          - Adrenal washout CT
            - No enhancement (≤10 HU) = cyst or hemorrhage
            - APW / RPW ≥60/40%
              - Benign, no F/U
            - APW / RPW <60/40%
              - Adenoma¹
              - Biopsy if appropriate² or consider CS-MR if not done

- No prior imaging
  - History of cancer
    - Consider PET or biopsy

LEGEND

¹ If patient has clinical signs or symptoms of adrenal hyperfunction, consider biochemical evaluation
² Consider biochemical testing to exclude pheochromocytoma
³ Benign imaging features = homogeneous, low density, smooth margins
⁴ Suspicious imaging features = heterogeneous, necrosis, irregular margins
APW = Absolute Percentage Washout
RPW = Relative Percentage Washout
CS-MR = Chemical Shift MRI
F/U = Follow-up
HU = Hounsfield Unit
↓ = decreased
• CT is suspicious
• Not a met
• >3.5 4 CM
• Hyperfunctioning
• Grows on follow up
Laparoscopic Adrenalectomy
Removing adrenal gland
NWSS Experience

5-10 per year
From 2008-2013 we have done 31 cases
- 14 Non functioning adenomas
- 5 Pheochromocytomas
- 5 Aldosteronomas
- 3 ACC
- 1 Cortisol producing adenoma
- 3 other
## Outcomes after Lap Adrenalectomy

<table>
<thead>
<tr>
<th></th>
<th>UCLA</th>
<th>NSQUIP</th>
<th>NWSS</th>
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</thead>
<tbody>
<tr>
<td>Length of stay:</td>
<td>2.7</td>
<td>2.4</td>
<td>2.5</td>
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<tr>
<td>30 day mortality:</td>
<td>0.4%</td>
<td>0.0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>30 day morbidity:</td>
<td>15%</td>
<td>12%</td>
<td>16%</td>
</tr>
<tr>
<td>Transfusion rate:</td>
<td>0.0%</td>
<td>.1%</td>
<td>.1%</td>
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<tr>
<td>Length of surgery:</td>
<td>136</td>
<td>150</td>
<td>144</td>
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</table>
Adjusted Length of Stay

Length of Stay (Days)

Surgeon Volume Group

A  B  C  D  E  F

Thyroid  Parathyroid  Adrenal
Remember

• 5-10% increase in size when watched = resection

• 20% functioning = resection

• If prior history of malignancy 10-40% will be a met = consider FNA

• Risk of malignancy is rare (1/1000)
Thank you!