Adrenal Incidentaloma

Endocrine Surgical Oncology
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“Worry gives a small thing a big shadow”
Swedish proverb
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What is the extent of the clinical problem?

What are the appropriate investigations?

Who needs surgery?

Who should do it?

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“There is no question, however, that apparently ‘functionless’ adrenal cortical neoplasms do occur”

Arch Int Med, 1941
Kepler and Keating.

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1-4% of abdominal CT scans

Autopsy incidence of 2-5%
  • 0.5% when < 30yrs
  • 3.0% when > 50yrs
  • 7.0% when > 70yrs

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What has been the impact on clinical practice?

• Linear increase in adrenalectomies since mid 1990’s
• 3 fold and 8 fold increase in surgery for Conn’s and phaeochromocytoma respectively

Sidhu et al. ANZ J Surg, 2002
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What has been the impact on clinical practice?

- Total number has doubled
- Rate has increased by 50%
  - Unchanged for malignancy
  - Doubled for benign lesions

Saunders et al. World J Surg, 2004

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Have the patients benefited?

- **YES** - increased recognition of surgically correctable causes of hypertension
- **MAYBE** - surgery for cancer in the last 10-12 years does predict improved survival (though stage of presentation has not changed)


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Have the patients benefited?

“We must be cautious not to alter the indications for operation …… solely because our technical and surgical skill allow safer operations…”

Saunders et al

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“The indication for surgery is not just being able to perform the operation”

Anonymous
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What is it?
- Cysts, myelolipomas,
- Primary tumors of retroperitoneum, stomach, pancreas

In a patient with a known primary malignancy elsewhere:
- 25-72% chance of an adrenal mass being a metastasis
- Often small and bilateral
- Will have same imaging characteristics as primary cancer of the adrenal
- Lung, melanoma, renal cell, colon, breast

Young WR Jr. Endocrinol Metab Clin NA, 2000
Shen WT, Sturgeon C, Duh QY. Journal of Surgical Oncology, 2006

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Is it functioning?

Is it malignant?

What is it?

82% non functioning adenomas
5% sub clinical Cushing syndrome
5% phaeochromocytomas
5% adrenocortical carcinomas
2.5% metastatic
1% aldosterone producing adenomas

Young WR Jr. Endocrinol Metab Clin NA, 2000
Shen WT, Sturgeon C, Duh QY. Journal of Surgical Oncology, 2006

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What is it?
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**Subclinical Cushing’s Disease**
- autonomous cortisol secretion
- lack typical signs and symptoms
- may have insulin resistance, hypertension, osteoporosis, obesity
- some risk of developing overt Cushing syndrome

**Investigation of the Adrenal Incidentaloma**

- **History and physical**
- **Laboratory investigations**
- **Imaging**

**Investigation of the Adrenal Incidentaloma**

- **History and Physical**
  - Past history of malignancy or endocrine disease
  - Clinical evidence of Hypertension, Cushing’s disease, malignancy

**Investigation of the Adrenal Incidentaloma**

- **Laboratory**
  - Phaeochromocytoma
    - Plasma metanephrines or
    - 24 hr urine metanephrines, VMA, catecholamines
  - Cushing’s
    - Overnight dexamethasone suppression test
    - 24 hr urine cortisol
Investigation of the Adrenal Incidentaloma
Aldosterone producing adenoma
• Plasma aldosterone to renin ratio
  • >25 indicates Conn’s

Virilizing and feminizing adrenal tumors
• DHEA
• Androstenedione
• Testosterone, estrogens

Imaging for the Adrenal Incidentaloma
CT Scan
• Size
• Appearance
• Attenuation

Imaging for the Adrenal Incidentaloma
CT Scan
Attenuation
• < 10 Hounsfield units unenhanced --> benign
• > 60% washout on enhanced CT --> benign
Imaging for the Adrenal Incidentaloma

Magnetic Resonance Imaging

- Avid enhancement
- Delayed washout
- Brighter T2 weighted images
  - All suggest malignancy
  - Overlap with benign lesions is significant

- Chemical shift MRI may help
  - Loss of signal intensity from in phase to out of phase images suggest lipid rich adenoma
Imaging for the Adrenal Incidentaloma

Other Modalities

- PET Scan
- Iodocholesterol Scan
- MIBG Scan
- Octreotide Scan

Choyke PL. J Am Coll Radiol, 2006
Al-Hawary MM. Best Practice and Research, Clinical Endocrinology and Metabolism, 2005
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Size does matter

Or does it?
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- 92% of adrenal cortical carcinomas are >6 cm
- 25% of adrenal masses >6 cm are cancers
- 6% of adrenal masses 4-6 cms are cancers
- 2% of adrenal masses <4 cm are cancers

History of other malignancy influences the association of size and malignancy

- 3 and 4 cm lesions can rarely be malignant

Other factors need to be considered
- Imaging characteristics
  - Patient age
  - Co-morbidities
  - Secretion of multiple hormones increases cancer risk

ShenWT, Sturgeon C, Duh QY. Journal of Surgical Oncology, 2006

Investigation of the Adrenal Incidentaloma

What is the role of Fine Needle biopsy?
- Probably no role for routine use
- Always rule out function beforehand
- May have limited role for patient with known primary malignancy and undiagnosed adrenal mass

Sturgeon C, Kebebew E, SCNA, 2004

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Who deserves an operation?

A functioning tumor

Suspicion of malignancy
- Size - > 5 cm in anyone
  - > 3 or 4 cm in selected patients
- Suspicious imaging characteristics
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**Surgical Approach**
Laparoscopic is procedure of choice in most situations
Size will have an influence
Preoperative or intraoperative suspicion for malignancy does not preclude laparoscopic removal but the threshold for opening should be low

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“Although limited experience exists with large and malignant tumors, it appears the technical abilities of the operator …. are the limiting factors”
Gumbs AA, Gagner M. Best Practice and Research Clin Endocrinology and Metabolism, 2006

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**Follow Up**
• Proper investigations and interval remain unproven
• Studies are small, variable length of follow up
• Larger and suspicious masses have generally been surgically removed

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**Follow Up**
• 5-25% will increase in size
• Up to 20% will develop hormone overproduction
• Risk of malignancy probably rare
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Follow Up

- CT imaging at 3-6 months, 12-18 months and possibly 27-30 months
- Biochemical testing for 3-5 years


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New Directions

- More accurate imaging
- Robotics in adrenal surgery
- MIS surgery and malignancy
- Role of partial adrenalectomy

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Summary

- Not a rare clinical problem
- Proper investigation and follow up are crucial
- Surgery – an appropriate approach by a suitable team

Adrenal Surgery

Who’s domain is it?

Operative time, blood loss, length of stay are not influenced by high or low volume centers

Adrenal Surgery

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