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Assessing and managing adrenal lesions

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Adrenal lesions are a frequent incidental finding on cross sectional imaging.

Adrenal incidentalomas (lesions >1cm) are found in approximately 4% of abdominal CT scans. The two key aspects of evaluation are hormonal function (biochemical status) and malignant potential (imaging characteristics).

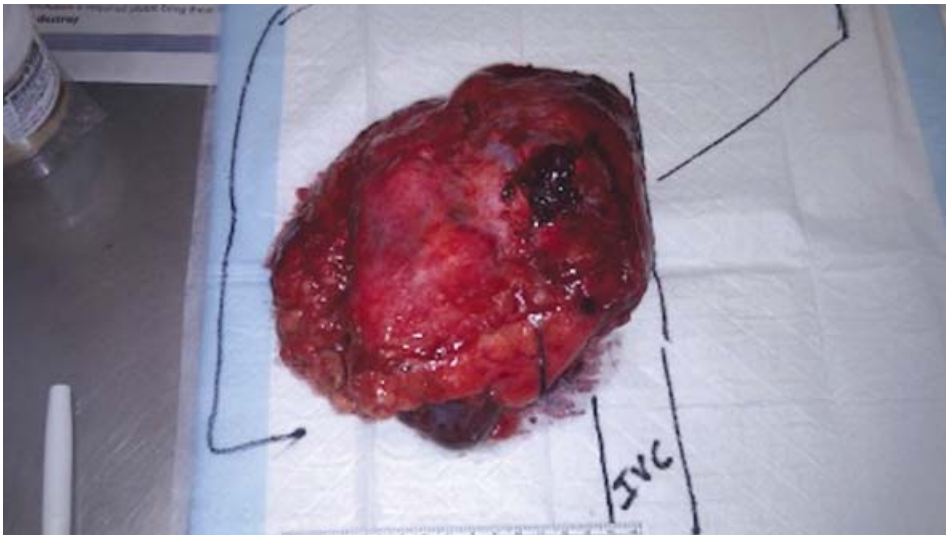
Hormonal assessment

The three common hormonal systems that require assessment are:

Aldosterone/Renin Ratio-Primary hyperaldosteronism (Conn's Syndrome): An underdiagnosed entity causing hypertension. Hallmarks include refractory hypertension and hypokalaemia. The typical Conn's adenoma is a 1-2cm, CT imaging benign adenoma.

Plasma Metanephrines: Patients with Phaeochromocytoma are often asymptomatic. Paroxysmal symptoms indicate the typical intermittent catecholamine release by the tumour.

These include palpitations, flushing, sweating, headache, tremor, and anxiety. The typical phaeochromocytoma is a lesion >2cm with a high Hounsfield unit on CT scan.



Right Adrenal Sarcoma resected with involved right kidney

Cushing's Syndrome - 1mg Dexamethasone suppression test: Patients with Cushing's Syndrome may be asymptomatic. Classical features include moon faces, acne, obesity, striae, easy bruising, osteoporosis, hypertension and poor wound-healing. The patient takes 1mg of Dexamethasone at 11pm the night before the morning serum cortisol is sampled.

Cushing's adenoma is typically >3cm with benign imaging characteristics.

Malignant potential

The imaging characteristics are key to the triaging of adrenal masses.

Adrenal Syndromes and Neoplasms

Syndrome	Symptoms	Signs	Screening test
Cushing's syndrome or subclinical Cushing's syndrome	May be asymptomatic Moon face, acne, buffalo hump, supraclavicular fat-pads, central obesity, striae, easy bruising, poor wound-healing, emotional and cognitive changes	Hypertension Hyperglycaemia Hyperlipidaemia Osteoporosis	1 mg overnight dexamethasone suppression test
Conn's syndrome	Mostly asymptomatic Muscle cramps, periodic paralysis, headaches, palpitations Polydipsia, polyuria	Refractory hypertension Hypokaleamia (<3.5 mmol/L)	If hypertensive, plasma aldosterone to plasma renin activity ratio
Phaeochromocytoma	May be asymptomatic Palpitations, flushing, sweating, headache, tremor, anxiety	Severe hypertension Weight loss	Plasma Metanephrines
Adrenocortical carcinoma	Mass effect Palpitations, flushing, sweating, headache, tremor, anxiety, hirsuitism, gynaecomastia, amenorrhoea, infertility	Severe hypertension Weight loss	Plasma metanephrines and serum androstenedione, testosterone, DHEAS
Metastasis	Mass effect Usually non-functional	Malignant disease elsewhere	Usually non-functional Plasma metanephrines, Renin/ Aldosterone ratio, 1mg Dex suppression test

Key messages

- A patient with adrenal incidentaloma requires assessment of hormonal function and risk of malignancy
- Findings to suggest referral include abnormal biochemistry and adrenal lesion >3cm
- Surgery may be laparoscopic or open.

Most adrenal incidentalomas are benign non-functional adrenal adenomas. The incidence of benign non-functional adrenal adenoma increases with age.

The following features are typical of benign adrenal adenomas:

- A 1-3 cm uniform/ homogenous lesion
- A CT non-contrast Hounsfield unit (<10)
- High contrast washout and rounded, well demarcated margins.

CT features that raise concern for malignancy are size >3cm, irregular margins, heterogeneity and invasion of adjacent structures.

Malignant adrenal neoplasms are either primary or secondary. Primary adrenal malignancies are carcinoma, sarcoma, or lymphoma. They are usually large masses (5-20cm).

These are rare but highly aggressive requiring early referral to a specialist adrenal surgeon.

Secondary adrenal malignancy may arise from many solid tumours as the adrenal gland is a common site of metastasis. Necessarily a history of malignancy is suggestive.

Surgery for adrenal lesions

Most benign tumours – functional or non-functional – and most metastatic lesions of the adrenal gland can be safely and successfully excised via a minimally invasive approach.

Laparoscopic adrenalectomy requires dissection of viscera overlying the adrenal gland (e.g. liver; pancreas; spleen). Prone Retroperitoneoscopic Adrenalectomy has become popular because this approach provides more direct access to the adrenal gland, requiring less dissection, resulting in quicker patient recovery.

Open resection is reserved for large benign adrenal neoplasms (>7cm) and primary adrenal malignancies. Adrenocortical carcinoma is a rare and highly aggressive malignancy.

Open resection without breach of tumour margin is critical to minimise the risk of recurrence. This may involve en-bloc nephrectomy if there is invasion of the kidney.

After unilateral adrenalectomy, the remaining adrenal is sufficient to maintain normal hormonal homeostasis. MF

Author competing interests – Dr Ming Yew is the first WA provider of Prone Retroperitoneoscopic Adrenalectomy surgery.