Clinical Guideline

SUSPECTED ADRENAL 'INCIDENTALOMA'

SETTING Trust-wide

FOR STAFF Part 1 - Medical staff, including radiologists, who identify a possible case

Part 2 – Specialist medical staff within Endocrinology / Neuroendocrine MDT

PATIENTS Patients with an unexpected adrenal lesion following diagnostic imaging

BACKGROUND

'Incidentaloma' is an internationally accepted term for a lesion incidentally discovered through diagnostic imaging, without prior clinical suspicion of tumour / disease. Adrenal incidentalomas (AIs) encompass the following pathologies; [1,2,3,4,5]

Endocrinologically inactive (around 85-90% of cases)	Endocrinologically active (10-15% of cases)
o Adenoma	o Cortisol secreting adenoma (Cushing's)
o Myelolipoma	o Aldosterone secreting adenoma (Conn's)
o Neuroblastoma	o Carcinoma (any adrenal hormone)
o Ganglioneuroma	o Phaeochromocytoma
o Haemorrhage	o Congenital adrenal hyperplasia (bilateral)
o Cyst	
o Granuloma	
o Carcinoma	
o Metastasis	
o Amyloidosis / infiltrative disease	

- The prevalence of AIs is 2% in the general population but increases with age, being very rare in childhood, increasing to around 3% at aged 50 years and >7% in the over 70s [4,5]. The majority of lesions are benign [4,5], only 2% represent primary adrenal malignancies [4]. This guidance addresses AIs >1cm as those <1cm typically do not require further investigation unless clinical signs / symptoms dictate [4,5].

Part 1

REFERRAL TO ENDOCRINE TEAM

Medical staff who identify a possible adrenal incidentaloma should promptly refer the patient to the local (UHBristol or NBT) Endocrine Team for further investigation.

- **Please ensure that the patient and GP are aware of the referral.**
- **If there is immediate concern about malignancy or endocrine functionality then please also refer to the UHBristol neuroendocrine MDT by completing the appropriate proforma via the NET MDT co-ordinator**

Referral details should include

- Hospital Registration Number
- Surname
- Forename
- Date of Birth
- Date and place of diagnostic imaging
- Imaging report number

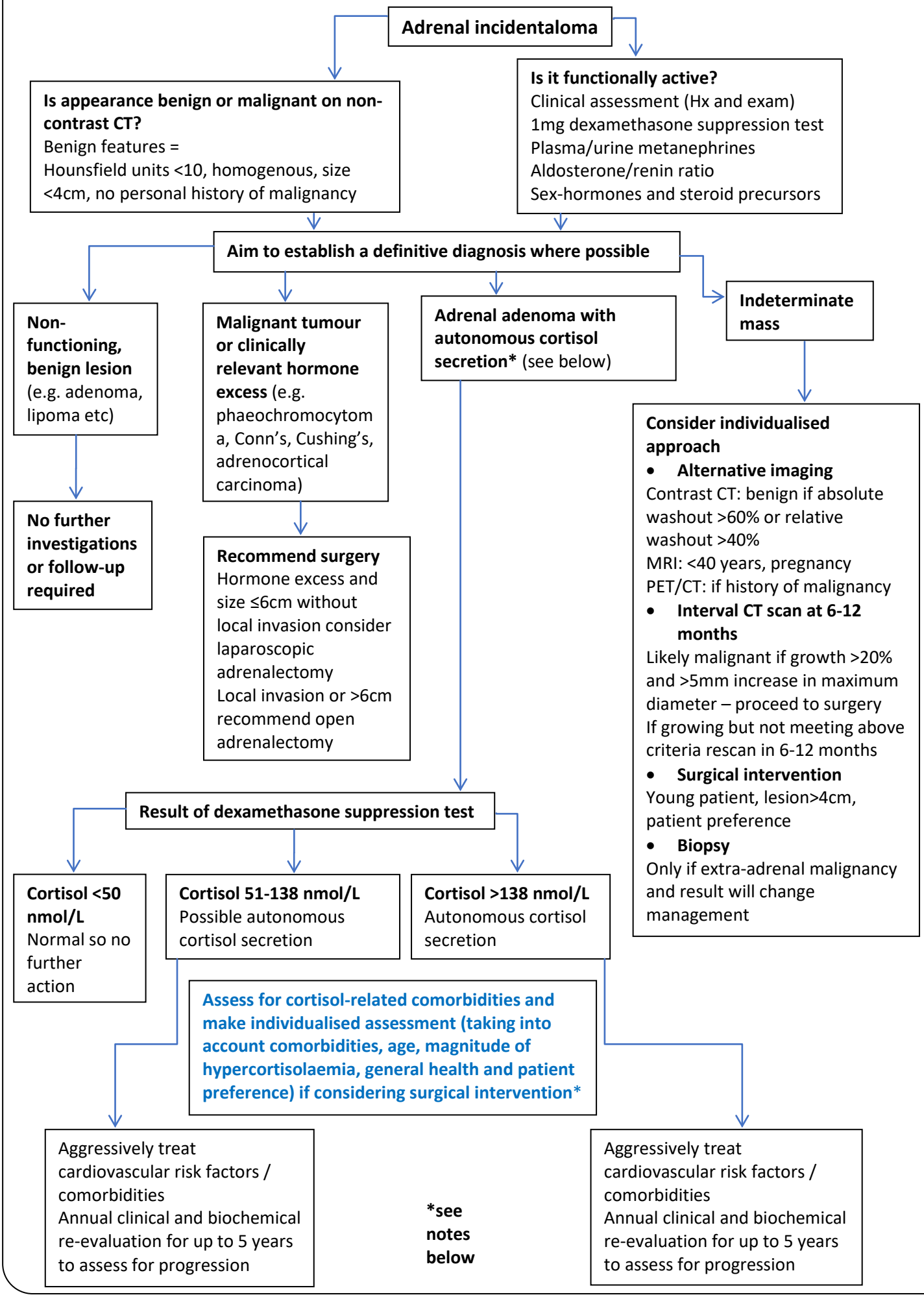
Part 2

ENDOCRINE TEAM ONLY

The algorithm below describes the diagnostic pathway

The data regarding long term follow up of these patients' remains fairly limited. However in patients where the baseline assessment confirms a benign and hormonally inactive lesion the risk of malignant transformation is 0.2% and the risk of developing overt adrenal hormone excess is at most around 2% and so a pragmatic approach to follow up is warranted with further assessment being indicated if the patient has new/progressive clinical signs or co-morbidities [5]. The majority of AIs can be discharged after a single baseline endocrine assessment [4].

This guideline is consistent with recent European Clinical Practice Guidance [5].


Adrenal incidentaloma
Is appearance benign or malignant on non-contrast CT?
Benign features =
Hounsfield units <10, homogenous, size <4cm, no personal history of malignancy
Is it functionally active?
Clinical assessment (Hx and exam)
1mg dexamethasone suppression test
Plasma/urine metanephrines
Aldosterone/renin ratio
Sex-hormones and steroid precursors
Aim to establish a definitive diagnosis where possible
Non-functioning, benign lesion (e.g. adenoma, lipoma etc)
Malignant tumour or clinically relevant hormone excess (e.g. phaeochromocytoma, Conn's, Cushing's, adrenocortical carcinoma)
Adrenal adenoma with autonomous cortisol secretion* (see below)
Indeterminate mass
No further investigations or follow-up required
Recommend surgery
Hormone excess and size ≤6cm without local invasion consider laparoscopic adrenalectomy
Local invasion or >6cm recommend open adrenalectomy
Consider individualised approach
• Alternative imaging
Contrast CT: benign if absolute washout >60% or relative washout >40%
MRI: <40 years, pregnancy
PET/CT: if history of malignancy
• Interval CT scan at 6-12 months
Likely malignant if growth >20% and >5mm increase in maximum diameter – proceed to surgery
If growing but not meeting above criteria rescan in 6-12 months
• Surgical intervention
Young patient, lesion>4cm, patient preference
• Biopsy
Only if extra-adrenal malignancy and result will change management
Result of dexamethasone suppression test
Cortisol <50 nmol/L
Normal so no further action
Cortisol 51-138 nmol/L
Possible autonomous cortisol secretion
Cortisol >138 nmol/L
Autonomous cortisol secretion
Assess for cortisol-related comorbidities and make individualised assessment (taking into account comorbidities, age, magnitude of hypercortisolaemia, general health and patient preference) if considering surgical intervention*
Aggressively treat cardiovascular risk factors / comorbidities
Annual clinical and biochemical re-evaluation for up to 5 years to assess for progression
*see notes below
Aggressively treat cardiovascular risk factors / comorbidities
Annual clinical and biochemical re-evaluation for up to 5 years to assess for progression

ENDOCRINE ASSESSMENT

If the initial history (including family history) and examination are suggestive of a functional endocrine syndrome then proceed as appropriate, otherwise follow guidance below.

Work-up to exclude endocrinological activity in adrenal incidentaloma with no obvious endocrine phenotype

- A phaeochromocytoma should be excluded using urinary fractionated metanephrines or plasma free metanephrines. Relevant interfering medications should be discontinued prior to testing. It is worth noting that a phaeochromocytoma is extremely unlikely if the imaging is consistent with a benign adenoma [4,5].

- An aldosterone/renin ratio (ARR) to exclude primary hyperaldosteronism should only be measured in adrenal incidentaloma patients who **also** have hypertension or unexplained hypokalaemia [4,5]. N.B. the ARR is affected by many anti-hypertensive agents; ideally use doxasozin alone for 4-6 weeks pre-testing and correct any hypokalaemia. If the ARR is elevated (refer to local laboratory range) then proceed to a confirmatory test e.g. saline infusion or fludrocortisone suppression and adrenal CT. Adrenal vein sampling should be considered unless patient <40years with clear unilateral >1cm adenoma [6]. Please see UHBristol formal primary hyperaldosteronism guidance.

- *All adrenal incidentaloma patients should have a 1mg overnight dexamethasone suppression test (ONDST = 1mg dexamethasone at 10-11PM followed by serum cortisol at 9 am next morning) to screen for autonomous cortisol secretion (previously termed subclinical Cushing's). For full detail see the algorithm above. It is important to note that even where autonomous cortisol secretion is identified, the risk of progression to overt Cushing's remains very low, at less than 1% [4,5]. However, this condition is the commonest functional abnormality in AI patients at up to 20% [4] and it may be associated with a number of cortisol-related comorbidities (hypertension, T2DM, obesity, dyslipidaemia, impaired glucose tolerance, osteoporosis) and potentially with increased cardiovascular morbidity and mortality [4,7]. There is no clear-cut outcome data that surgery reduces cardiovascular events or mortality [4] but there is some evidence of risk factor reduction post surgery; for example, one study showed a 25% remission of type 2 diabetes in the surgical group [8]. A surgical approach may be considered but given the uncertainty of how to demonstrate a causal link between autonomous cortisol secretion and co-morbidities, patients must be individually carefully counseled. It is often reasonable to ensure persistent autonomous cortisol secretion and/or progression of co-morbidities to validate any decision for surgery, Prior to proceeding to surgery a low-normal or suppressed morning ACTH should be demonstrated to confirm ACTH independent disease [5].

- Recommended tests to identify cortisol related co-morbidities are: BP, HbA1c/fasting glucose, fasting lipid profile and DEXA bone scan (particularly looking for asymptomatic vertebral fractures).

- Various medications may interfere with dexamethasone metabolism and this should be taken into account when interpreting the overnight dexamethasone suppression test. These include sertraline, fluoxetine, paroxetine, trazodone, citalopram, bupropion, venlafaxine, atorvastatin, simvastatin, verapamil, diltiazem, amlodipine, nifedipine, felodipine, irbesartan, losartan, olanzapine, quetiapine, proton pump inhibitors, propranolol, pioglitazone, clonazepam and topiramate [9].

- For adrenal incidentaloma patients (no overt Cushing's phenotype) with an ONDST result >138nmol/l (confirming autonomous cortisol secretion), additional testing may be considered:

basal morning ACTH, UFCs (urinary free cortisol), low dose dexamethasone suppression test, or salivary cortisol profiles [4,5].

- Longer-term biochemical surveillance may be required for patients with evidence of autonomous cortisol secretion who are not initially managed with surgery [5]. See algorithm above for follow-up guidance.

- Peri-operative glucocorticoid treatment in appropriate 'stress' dosages is recommended for all patients undergoing adrenal surgery where there is possible or confirmed autonomous cortisol secretion [4,5].

- Measure sex hormones and steroid precursors in adrenal incidentaloma patients only where clinical or imaging features are suspicious for adrenocortical carcinoma since >50% have abnormal hormone profiles [4,5]. Measure DHEAS, androstenedione, 17-OHP and testosterone in women and oestradiol in men and postmenopausal women. A urinary steroid profile can be considered [4,5].

RADIOLOGICAL ASSESSMENT

- Initial assessment of adrenal incidentalomas should ideally be with non-contrast CT [4,5]. If the appearances are not consistent with a benign adrenal mass (Hounsfield units <10[10]) then alternate baseline imaging, interval surveillance imaging or surgery may be indicated according to the endocrine assessment and other patient factors (see algorithm above).

- 30% of benign adenomas are "lipid-poor" and have Hounsfield units >10 – these therefore overlap in density with malignant lesions and phaeochromocytomas [11,12].

- There is a correlation between size and risk of adrenocortical cancer: 2% risk in AIs <4cm, 6% in AIs 4.1-6cm and 25% in AIs >6cm [4,13].

- Consider MRI as the primary imaging modality in children, adolescents, pregnancy or adults <40 years to reduce the radiation exposure. These groups require urgent assessment due to a higher than background malignancy risk [4,5].

- In patients with a past history of extra-adrenal malignancy and an indeterminate adrenal lesion on non-contrast baseline CT consider an FDG-PET CT scan to guide malignancy likelihood and to provide evidence regarding extra-adrenal lesions [4,5]. FDG-PET CT is only recommended in this sub-group as benign (especially functional) adrenal lesions may be FDG avid [4,14].

Special circumstances

- Bilateral adenomas: assess each lesion individually following the protocol above but in addition: a) measure 17-OHP to exclude congenital adrenal hyperplasia and b) test for adrenal insufficiency if suspected clinically or if imaging suggestive of bilateral infiltration or haemorrhage [4,5].

- Urgently assess the very young, adolescents, pregnant women or adults <40years as they have a higher likelihood of malignancy [4,5].

- Adrenal biopsies are rarely recommended for adrenal incidentaloma patients unless the patient has a history of extra-adrenal malignancy, an indeterminate result on imaging, a confirmed non-functioning lesion and where the histology would change management [4,5].

Table A

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