Adrenal Incidentalomas: A Disease of Modern Technology

The adrenal incidentaloma (AI) is an adrenal tumour greater than 1 cm in diameter that is discovered incidentally during imaging or a mass that appears on a CT scan done for other purposes and frequently causes much grief to the clinician who is unsure how to act. Incidentalomas are benign, non-secretory, and of no clinical significance but may be (or have the potential to become) functional and/or malignant. For this reason the discovery of an adrenal incidentaloma should trigger a cascade of investigations. In this article, we review the most appropriate approach to dealing with this increasingly common and frequently frustrating entity.

The number of AIs is increasing rapidly due to increased use of cross sectional imaging and improving imaging technology. Prinz et al addressed the potential hazards of detecting increasing numbers of asymptomatic adrenal masses on CT in 1982 and identified the importance of interpreting these lesions in the context of other clinical information. With the ethical and diagnostic dilemmas (in addition to economic considerations) that their discovery can raise, incidentalomas have been labelled diseases of modern technology.

Reviews of abdominal CT series suggest a 1-5% prevalence of AIs. The overall frequency of adrenal masses discovered on autopsy in a report of 25 studies was 6%. The frequency of AIs increases with age, from 0.2% in 20-29 year olds to 7% in subjects older than 70 years. The differential diagnosis is broad and includes subclinical Cushing's syndrome (5.6-14.4%), clinically silent phaeochromocytoma (5-10%) and rarely aldosterone-producing adenomas (1%) or sex-hormone secretory tumours (1%). Approximately 60% of AIs are benign non-secretory adenomas with 2.5-4.7% being malignant.

So should all AI be followed, and how do we separate the incidentalomas that need further investigation? Bullow et al evaluated the risk of primary adrenal malignancy and/or endocrine morbidity in 229 patients with AI followed a mean of 25 months. Hypersecreting tumours were detected in 2% of the 11 patients who underwent adrenalectomy, no case of primary adrenal malignancy was observed. The size of the AI is highly predictive of the likelihood of malignancy. Studies suggest that more than 90% of adrenal masses greater than 4 cm in size are malignant or have a high risk of malignant potential. It is recommended, therefore, that a unilateral adrenal mass should be managed by open or laparoscopic resection if greater than 4 cm. A mass that enlarges greater than 1 cm in the first year of follow-up imaging at 6, 12 or 24 months should also be removed.

Most small adrenal incidentalomas remain stable in size (87%). A mass that enlarges greater than 1 cm on follow-up imaging is also important, as the smaller an adrenal carcinoma is at diagnosis, the better the prognosis. Radiological assessment of an adrenal mass using Hounsfield units (HU) is also important. The Hounsfield scale uses a non-contrast CT attenuation value that to differentiate adrenal adenomas from non-adenomas.

A mass that enlarges greater than 1 cm on follow-up imaging at 6, 12 or 24 months should also be removed. Testing for Al requires an AI measures less than 10 HU (approximately the density of fat) on unenhanced CT, the likelihood it is a benign adenoma approaches 100 percent, and a HU less than 20 has a specificity of 96.9% for a benign adenoma. Post-contrast CT or delayed phase imaging CT may also aid in the diagnosis with a post-contrast washout less than 40-50% suggestive of malignancy. The frequency of adrenal malignancy is highly dependent on the findings and the proportion of malignancies is low. A review of the literature found that post-contrast enhanced CT with a sensitivity and specificity of close to 100% has meant that fine-needle aspiration biopsy is rarely indicated as it is a potentially hazardous with little diagnostic benefit. Functional testing is also recommended, the possibility of subclinical Cushing's syndrome or phaeochromocytoma mandates screening for these conditions. Failure to detect a silent phaeochromocytoma pre-operatively, if a decision has been taken to remove the adenoma, could be a fatal error. Screening for hyperaldosteronism and sex-hormone production on the other hand, can be limited to those with hypertension and virilization respectively.

The question of when surgical intervention is required is at the crux of the AI dilemma. In 2003 the National Institute of Health (NIH) provided confirming advice regarding the management of clinically incidental adrenal masses is complicated by the limited number of adequate studies, the low prevalence of adrenal cortical carcinomas, and the relatively low incidence of progression to hyperfunction. Notwithstanding these facts, several algorithms have been proposed regarding the optimum diagnostic and follow-up strategy for AIs.

In summary, AIs are a growing problem discovered when imaging patients, usually with CT, for other reasons. Careful imaging evaluation regarding density, size as well as CT contrast evaluation or MRI in some cases, as well as a careful history and a thorough work up for functionality are crucial factors in helping to determine the appropriate course of action to take. In summary, simple cases, in fact it follows to ensure stability is all that is required, but some cases will require surgery.

References
