CASE REPORT

Bilateral adrenal adenomas with catecholamine excess mimicking gastrointestinal pathology

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Introduction

Adrenal adenomas are mostly non-secretory and are discovered as incidental findings on imaging [1,2]. They are non-hormonally active tumours of the adrenal cortex and are diagnosed more frequently with the increasing use of cross-sectional imaging. These lesions are believed to have an incidence of up to 4% in the general population, which increases with age and is slightly higher in women. However, a minority are hormonally functional and able to produce and release cortisol, aldosterone, or catecholamines, which can produce unique clinical syndromes. Phaeochromocytoma is the classical catecholamine-secreting adrenal tumour and should be considered in patients presenting with hypertension and elevated catecholamine metabolites. Bilateral disease is uncommon but is more frequently associated with hereditary syndromes [1,3]. Some cases can masquerade as gastrointestinal or renal disease, resulting in delayed diagnosis. A precise aetiology has not been identified, but genetic mutations, sustained hormonal stimulation, or familial endocrinopathies have been suggested as potential contributing factors. Functional adenomas require adrenalectomy and are best done by laparoscopy. The other indication for surgery is for lesions with malignant features. [1,2,3,5]

Case description

A 38-year-old male with a history of intellectual disability presented with persistent nausea, vomiting, significant weight loss (15 kg), intermittent abdominal pain, haematuria and new-onset hypertension and tachycardia. He was a smoker and lived at home with his carer. He was not on any regular medications. There was a strong family history of multiple cancers, including thyroid, breast, bowel, and brain malignancies.

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Computerised tomography of abdomen and pelvis (CTAP) revealed a right ureteric calculus, possible acalculous cholecystitis and bilateral adrenal nodules. Adrenal nodules measured 1.8 cm and 2.3 cm on the right and left sides, respectively. Patient's hypertension was managed with beta-blockers and calcium channel blockers.

He underwent right side uretero- pyeloscopy and JJ stenting and laser lithotripsy a few weeks later. A subsequent ultrasound scan revealed a normal gallbladder without calculi.

A dedicated adrenal CT showed >80% contrast washout in both adrenal lesions, consistent with benign adenomas (Figures 1 and 2).

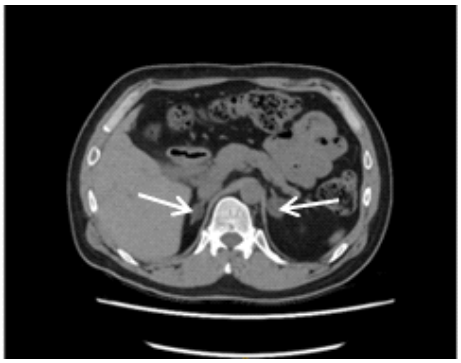

Figure 1: Axial CT Abdomen – Bilateral adrenal adenomas

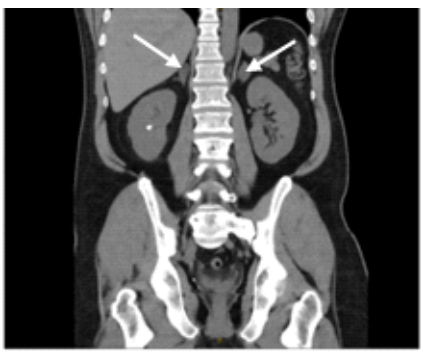

Figure 2: Coronal CT Abdomen – Bilateral adrenal adenomas superior to the kidneys
Nodule in the right adrenal gland measuring 1.4 cm in diameter with a density of -14 HU and nodule in the left adrenal gland measuring 2.3 cm and a density of 4 HU

Biochemical testing showed markedly increased 24-h urinary normetanephrines (values: 4.55–4.94 µmol/day; (reference range: <2.3 µmol/day) and plasma normetanephrine 1289 pmol/L; (ref <900), which suggested catecholamine excess. Plasma metanephrine and 3-methoxytyramine were normal. Thyroid function showed elevated free T4 and low-normal TSH, with negative thyroid antibody levels. There was wide variability in cortisol levels on admission (23–700 nmol/L), consistent with episodic cortisol secretion.

The patient was discussed at a multidisciplinary meeting to decide on further management. Given the elevated normetanephrine levels, bilateral phaeochromocytoma was considered in the differential diagnosis. The plan included repeat catecholamine measurements (serum and urine), 3-methoxytyramine, morning cortisol, PTH levels, thyroid ultrasound, and dexamethasone suppression testing. The repeat analysis was normal soon after the acute illness settled and again after three months. He will be kept under observation by a general practitioner and repeat CT and hormone analysis after one year.

Discussion

Phaeochromocytoma is an uncommon catecholamine-secreting adrenal tumour that may present with non-specific gastrointestinal symptoms including nausea, vomiting and abdominal pain, resulting in delayed diagnosis [1,3]. Excess of catecholamines may induce non-specific gastrointestinal symptoms including, nausea, vomiting, and abdominal pain leading to the misdiagnosis of biliary or pancreatic disease. The patient discussed presented with gastro-intestinal symptoms and imaging revealed adrenal adenomas as well as a renal stone. After treating the renal calculus and controlling hypertension CT with adrenal protocol as well as hormone studies were performed. CT confirmed bilateral benign adrenal adenomas with raised catecholamine levels. When the source of catecholamine excess is uncertain, further functional imaging may help identify the secreting adrenal lesion. Imaging modalities such as 68Ga-DOTATATE PET/CT, 18F-FDOPA PET/CT and 123I-MIBG scintigraphy can help determine whether the disease is unilateral or bilateral [6]. However, as repeat biochemical studies were normal, no further functional imaging was performed and conservative management with surveillance was considered appropriate.

To decide on management, conservative or surgical, it is necessary to have a multidisciplinary approach, involving endocrinologists, surgeons, radiologists, and geneticists [4]. Bilateral adrenal lesions should prompt consideration of an underlying hereditary syndrome, as bilateral disease is more frequently associated with genetic causes than unilateral disease. Multiple Endocrine Neoplasia type 2 (RET mutation) and von Hippel–Lindau (VHL) syndrome are well-recognised causes of bilateral phaeochromocytoma. Therefore, genetic counselling and consideration of genetic testing, including RET and VHL mutation analysis, are recommended in patients presenting with bilateral adrenal lesions, particularly in those with a suggestive family history, as the results may influence patient management and family screening [3,6]. Indications for adrenalectomy are functioning adenomas and those with features suggestive of malignancy.

At the multidisciplinary meeting, it was decided to observe for a period and repeat the hormonal assay, as the lesions were benign. It was not possible to determine whether the initial catecholamine excess originated from one adrenal lesion or both. Given the benign appearance of both adrenal lesions on imaging and the normalisation of repeat biochemical studies, the multidisciplinary team agreed that conservative management with surveillance was the most appropriate approach. Repeat studies soon after the acute illness settled, as well as after three months, were normal. The panel decided to keep the patient under the GP's observation and to repeat imaging and hormonal assays after one year. The decision to be conservative was made as the hormonal rise was transient and the lesions were benign and less than 4cm in size. [1,2,3] Although most adrenal adenomas are benign, phaeochromocytomas carry a recognised risk of malignancy, reported in approximately 10% of cases and up to 20% in some series. This highlights the importance of ongoing clinical, biochemical and radiological follow-up [3,6]. Furthermore, bilateral adrenalectomy is the standard surgical treatment for confirmed bilateral functioning disease. However, this leaves the patient with permanent adrenal insufficiency and the need for lifelong steroid replacement. In selected patients, cortical-sparing adrenalectomy may be an option to preserve some adrenal function, although it is not commonly performed. For this reason, the risks and benefits of surgery need to be carefully considered before proceeding [3,6]. These risks were considered greater given the patient's intellectual impairment.

Conclusion

In managing adrenal adenomas, a multidisciplinary decision-making approach is important for determining whether to pursue surgical excision or observation. Non-functioning benign adenomas can be safely observed, with repeat

investigations at intervals. This case highlights the importance of careful assessment and multidisciplinary discussion when managing patients with bilateral adrenal lesions. Careful follow-up is equally important in selected patients managed conservatively, particularly when the initial biochemical abnormalities are transient.

Ethical approval

Not applicable; publication approved with written informed consent

Institution where study was performed

Mildura Base Public Hospital, Victoria, Australia

Patient consent

Written informed consent was obtained from the patient's legal guardian for publication of this case report and accompanying images.

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Learning Points:

- Bilateral adrenal lesions should be assessed for hormonal activity, even when they appear benign on imaging.
- Elevated catecholamine levels during acute illness should be repeated after recovery before diagnosing phaeochromocytoma or considering surgery.
- Multidisciplinary review is important when deciding between surgery and surveillance in patients with bilateral adrenal lesions.