CLINICAL VIGNETTE

Slow Growth of a Small Pheochromocytoma Over 11 Years

Ian Zaun, MS2[1] and Run Yu, MD, PhD[2]

[1]Drexel University College of Medicine
[2]Division of Endocrinology, UCLA David Geffen School of Medicine, Los Angeles, California

Introduction

Pheochromocytoma is an endocrine tumor derived the adrenal medulla. Classically pheochromocytoma presents with labile hypertension with paroxysmal palpitation, headache, and sweating. In contemporary clinical practice, however, pheochromocytoma more often presents as an incidentally identified adrenal mass.[1] Although pheochromocytoma diagnosis algorithm with biochemical testing and imaging is well established, the diagnostic criteria are mostly based on larger tumors. Small pheochromocytomas pose unique diagnostic challenges as they are often ignored by radiologists and clinicians, and are associated with borderline biochemical test results even if the appropriate tests are performed.[2] We describe a small pheochromocytoma that has been present for 11 years before it was diagnosed.

Case Description

A 64-year-old female presented to endocrine for a right adrenal mass. Five months before presentation, she had undergone laparoscopic hysterectomy for uterine fibroids. Intraoperatively, a solid lesion was noted in the left kidney. Abdominal and pelvic MRI confirmed the left kidney mass but also identified an enhancing, 1.60-cm right adrenal mass (Figure 1, top panels). In retrospect, the right adrenal mass had been present as an enhancing, 0.85-cm mass on an MRI for characterizing a left kidney cyst 11.5 years before. Three and half years later (8 years before presentation), the same mass had grown to 1.25-cm, shown on MRI for uterine fibroids. The adrenal mass was described in the imaging report but biochemical tests were not performed. She did not have history of hypertension, headache, sweats, palpitations, hypokalemia, or Cushingoid stigmata. Multiple family members had malignancies but none had history of pheochromocytoma. Her father had kidney and thyroid cancers with unclear histology. Biochemical studies were obtained by the referring physician shortly before presentation to endocrinology. Labs included normal levels of renin and aldosterone and suppressed cortisol level by dexamethasone. Plasma metanephrine level was normal at 0.18 nmol/L (normal reference range <0.49) but normetanephrine was elevated at 2.21 nmol/L (<0.89). Physical examination at endocrinology did not reveal remarkable findings. CT with adrenal protocol to characterize the adrenal mass in detail showed the mass had a pre-contrast attenuation of 44 Hounsfield units, a post-contrast attenuation of 102 Hounsfield units, and delayed attenuation of 59 Hounsfield Units (Figure 1, bottom panels). Based on the small tumor size, moderately elevated biochemical test result, and imaging features, the right adrenal mass was diagnosed as a pheochromocytoma. The patient underwent left partial nephrectomy and right adrenalectomy. Surgical histology showed clear cell renal cancer and confirmed pheochromocytoma. Genetic testing did not find mutations related to renal cancer or pheochromocytoma.

Discussion

Diagnosis of a small incidentally identified adrenal mass can be challenging as the associated symptoms and biochemical test results are often subtle and may be absent or normal.[2] Biochemical tests are needed to examine whether there is evidence of excess secretion of cortisol or aldosterone, or pheochromocytoma. This patient, is only biochemical abnormality was moderately elevated plasma normetanephrine level, suggestive of possible pheochromocytoma but could be a false positive, as most moderately elevated plasma normetanephrine levels are false positives.[3] The crux to diagnosis of small pheochromocytomas is interpreting biochemical test results in the context of tumor size and imaging characteristics.[2] Although correlation between pheochromocytoma biochemical test levels and tumor size is generally poor but there is a rough positive correlation. As the adrenal mass in this patient was only 1.6-cm, the moderately elevated plasma normetanephrine level was more likely a true positive. Imaging characteristics and previous imaging findings are also very helpful in making the correct diagnosis of an incidentally identified adrenal mass, including pheochromocytoma.[2,4] In this patient, imaging characteristics of the right adrenal mass including high attenuation on pre-contrast CT >20 Hounsfield units and enhancement after contrast administration on MRI and CT suggested malignancy (including metastasis) but were also consistent with pheochromocytoma.[4] The slow growth of the adrenal mass over 11 years makes malignancy very unlikely and favors the diagnosis of pheochromocytoma.[5,6] Although most pheochromocytomas are removed once diagnosed, the speed of growth of the pheochromocytomas is assessed in patients with neglected adrenal masses, and in patients with genetic syndromes involving pheochromocytoma who harbor such tumors.[5,6] Generally,

pheochromocytomas grow slowly and are unlikely to grow explosively over time. Medium sized pheochromocytomas (4-6cm) would probably take more than 10 years to develop. Small pheochromocytomas still need to be removed in most cases. The removal of small pheochromocytomas is to prevent future symptoms and complications and to prevent a potentially life-threatening hypertensive crisis which may be triggered by common medical procedures such as endoscopy or minor surgery.[2] It is recommended that unilateral small pheochromocytomas be removed in any patient with a reasonable life expectancy. Small pheochromocytomas are diagnosed more and more commonly and this trend is likely to continue due to increased awareness of pheochromocytomas as a cause of secondary hypertension and increased incidental findings from an increased rate of unrelated imaging studies.[1,2] However, only roughly a quarter of patients with small pheochromocytomas can expect improvement of preoperative hypertension after tumor removal suggesting that the pheochromocytoma did not significantly contribute to their hypertension, if present pre-operatively.[2]

Our case illustrates that small pheochromocytomas grow slowly and are associated with only moderately elevated pheochromocytoma biochemical tests but exhibit classical imaging features of pheochromocytoma. Correct diagnosis of small pheochromocytomas can be reliably made after careful consideration of their uniqueness.

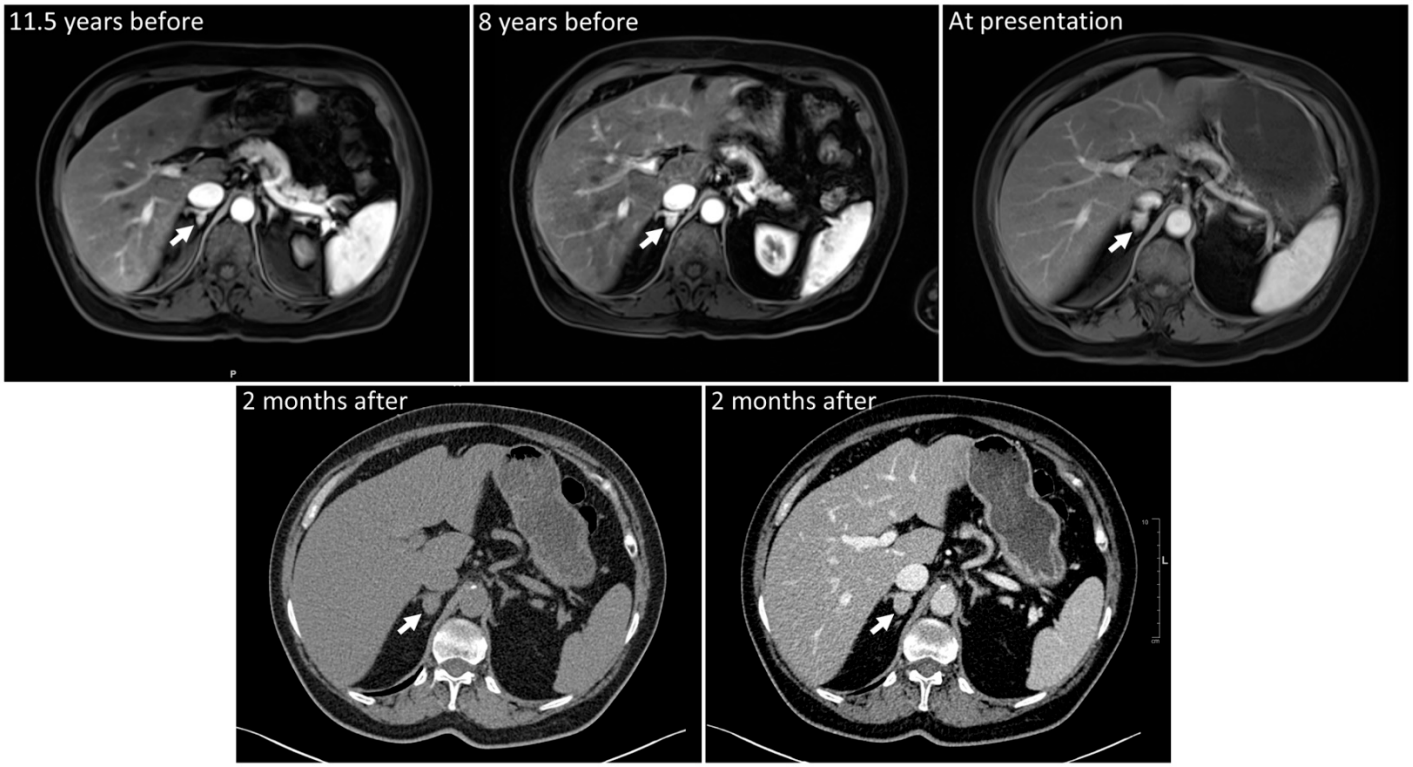

Figure 1. MRI and CT axial images of the adrenal mass. Top, MRI with gadolinium enhancement; bottom, CT without (left) and with contrast (right). Arrows, adrenal mass.

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