

Adrenal Adenoma – Imaging Camouflages on MDCT

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A B S T R A C T

Introduction: with the advent of multidetector computed tomography, adrenal incidentalomas are being increasingly detected. Although existing CT protocols help in distinguishing adrenal adenomas from other lesions, increasing size and heterogeneity pose a diagnostic challenge.

Case Series: 67 year old female presented with vague pain abdomen and post-menopausal bleeding. USG and CT showed a large heterogeneously enhancing mass in left suprarenal lesion resembling an adrenocortical carcinoma. HPE was proven to be an adenoma.

46 year old female presented with vague abdominal pain. USG and CT revealed a large heterogeneously enhancing soft tissue density lesion in left adrenal gland resembling a pheochromocytoma. However HPE showed adrenal adenoma.

Conclusion: An atypical adrenal adenoma is a possible differential considering the common incidence of the lesion. Adrenal adenoma can camouflage as other more sinister pathologies on imaging.

Keywords: Adrenal Adenoma, Imaging Camouflages, MDCT

INTRODUCTION

With the advent of multidetector computed tomography, incidental adrenal lesions are being increasingly identified¹. These lesions called incidentalomas are seen in patients investigated for other abdominal indications. Most of these incidentalomas are adrenal adenomas with a reported incidence of 2% to 8%². Characterization of an adrenal mass as benign or malignant is critical and imaging plays a key role in influencing the clinical management of patients³. Hence it is imperative on part of the radiologist to guide the clinician in further management of such incidentalomas.

CT, because of its low cost and high accuracy, is recommended as the initial imaging modality for evaluating an incidental adrenal mass^{5,6}. Most lipid rich adenomas have a density less than 10 HU on unenhanced CT which is highly specific for an adenoma^{4,1}. Lipid poor adenomas have density > 10 HU on unenhanced scan and show good washout on contrast enhanced CT on adrenal protocol (60 seconds and 15 minutes post contrast)⁴.

Another feature of adenomas is the rapid washout of contrast. An absolute washout of > 60% and relative washout of > 40% is highly sensitive for detection of an adenoma^{1,3,4}.

Chemical shift MRI also helps in problem solving with adenomas showing a signal drop out on out of phase imaging^{4,3}.

The typical adenoma measures less than 3 cm³. Diagnostic ambiguity results, however, when these incidentalomas are

large and heterogeneous¹, where in the washout values are unreliable as ROI for calculation of HU values gives a wide range.

Size of these adenomas are an important factor guiding the further management. Lesions less than 4cm which require follow up imaging for interval growth. However those more than 4cm require undergo surgical intervention and further workup to rule out malignancy.⁷

In this case report we present 2 such cases where incidental adrenal adenomas presented as adrenocortical carcinoma and pheochromocytoma respectively on imaging.

CASE 1

67year old female patient presented with lower abdominal pain and postmenopausal bleeding. Routine blood investigations were normal. Patient was subjected to ultrasound abdomen. A large heterogeneous lesion with internal vascularity was noted in the left suprarenal region. Uterus showed thickened endometrium. Patient was subjected to Contrast enhanced CT in adrenal protocol for further characterisation of the lesion. A large well-defined soft tissue attenuation lesion of 18 to 24HU on unenhanced scan. On post contrast study, heterogeneously intensely enhancing lesion with non-enhancing areas of necrosis was noted in the left suprarenal region measuring 6 x 7.2 x 6.4cm. Lesion showed persistent enhancement on 15minute delayed scan. Left adrenal gland was not separately visualised. The lesion was noted abutting

the left kidney inferiorly and pancreatic tail anteriorly, medially abutting the left diaphragmatic crux. Arterial supply was noted to directly arise from the abdominal aorta above the origin of renal artery. As the lesion was heterogeneous, absolute and relative washout values were not reliable. No associated lymphadenopathy was noted. Endometrial thickening was noted. Rest of the visualised organs were normal.

Owing to the large size of the lesion, heterogeneity and the enhancement pattern, differential diagnosis of adrenocortical carcinoma and pheochromocytoma were given. However, Urinary metanephrines were negative. Patient was subjected to ultrasound guided biopsy of the lesion which revealed an adenoma. Due the large size of the lesion and high index of suspicion, excision of the lesion was performed. Post excision histopathology also revealed an adrenal adenoma. Endometrial biopsy showed cystoglandular hypoplasia of endometrium. A thickened endometrium in this case can probably be attributed to a functional adrenal adenoma secreting sex steroids.

Thus this large heterogeneous adenoma with washout values not corresponding to adenoma range mimics an adrenocortical carcinoma.

CASE 2

46 year old female presented with vague pain abdomen. She was subjected for routine ultrasound abdomen which revealed a well – defined heterogeneous hyperechoic mass in right suprarenal region showing internal vascularity. Routine blood investigations were unremarkable. Further, contrast enhanced CT in adrenal protocol showed a well-defined lobulated heterogeneous soft tissue density lesion of 15 to 20HU in right adrenal gland measuring 4 x 3.8 x 4.8cm. The right adrenal gland was not separately visualised. The lesion showed intense heterogeneous enhancement and persistent enhancement in delayed phase. An absolute washout of 55% and relative washout of 38% was calculated. Absolute and relative washout values were unreliable due to heterogeneous nature of the lesion. Given the imaging findings, a diagnosis of adrenal pheochromocytoma was made. However urinary metanephrines were normal. The patient was subjected to a follow up scan 3 months later where slight increase in size of the lesion and focal loss of fat planes with the liver was noted. Hence clinician decided to excise the lesion. Post excision histopathology revealed an adrenal adenoma

Thus this heterogeneous adenoma with washout values not corresponding to adenoma range mimics a pheochromocytoma.

DISCUSSION

A study by Szolar et al⁸ showed that the mean attenuation of adenomas was significantly lower than those of adrenocortical carcinomas and pheochromocytomas.) on nonenhanced CT scans. The mean attenuation values for nonadenomas (ie, adrenocortical carcinomas, pheochromocytomas, and metastases) were significantly higher than the value for adenomas on the 1-minute contrast-enhanced CT scans. There was more overlap in attenuation between adenomas and nonadenomas on contrast-enhanced scans than on nonenhanced scans. The contrast washout values in

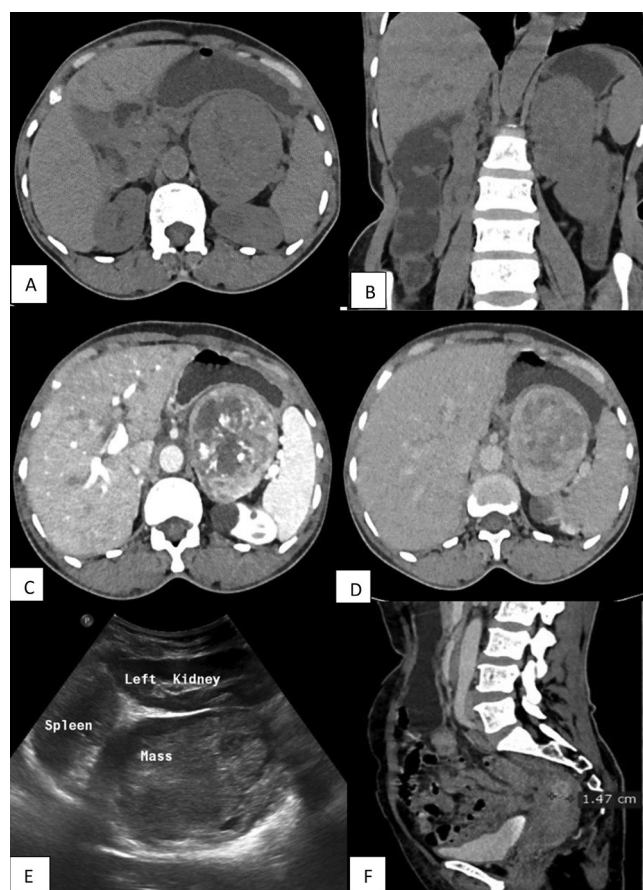


Figure-1: A: Axial unenhanced; B: coronal unenhanced CT images showing large heterogeneous mass lesion in left suprarenal gland. C: Contrast enhanced 1min; D: 15 min delayed scans shows heterogeneous enhancement with nonenhancing areas of necrosis. Persistent enhancement seen in 15min delayed scan. E: Ultrasound image showing the lesion closely abutting spleen and kidney. F: Sagittal contrast enhanced CT images showing endometrial thickening.

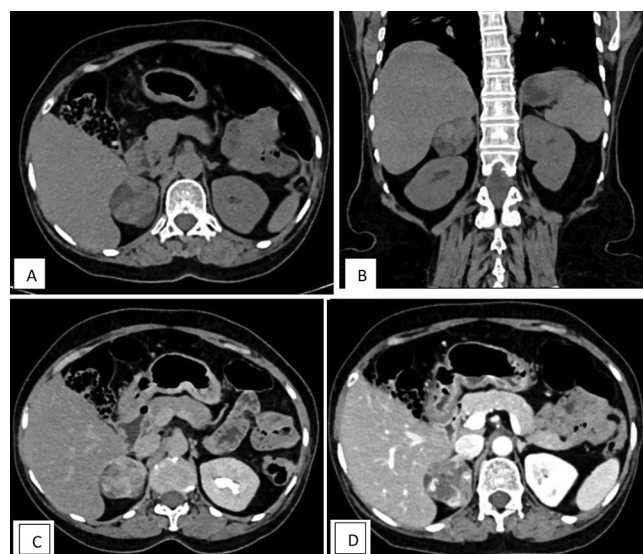


Figure 2: A: Axial unenhanced; B: Coronal unenhanced CT showing heterogeneous lesion in right suprarenal gland. C: Axial 1 min; D: 15 min delayed scans showing heterogeneous enhancement with nonenhancing areas and persistent contrast enhancement

adrenocortical carcinomas and pheochromocytomas are significantly less than that in adrenal adenomas.

With respect to size and appearance, adrenocortical carcinoma is typically a large mass with the majority measuring more than 6 cm⁹. Tumors were inhomogeneous at nonenhanced CT, owing to the presence of necrosis. After contrast material infusion, adrenocortical carcinoma enhances heterogeneously, typically has an Relative washout of less than 40%. However, the large size and heterogeneity are more reliable indicators of the diagnosis than are washout values, which vary depending on which part of the mass is sampled⁹. Except for recurrence, metastasis and venous tumor emboli which occur in the cases of adrenal carcinoma, no definite computed tomographic features can be found that enable the identification of adenomas with the maximal diameter greater than 5 cm from adrenal carcinomas¹².

The comparative study of Szolar⁸ et al showed that pheochromocytomas were significantly larger than adenomas but not larger than metastases. Blake et al¹⁰ noted that nonsecretory lesions were larger than functional masses. At CT, the attenuation of pheochromocytomas can be homogeneous (particularly if small) or heterogeneous (ie, larger lesions). Pheochromocytomas may have abundant intracellular fat or regions of cystic degeneration¹¹. Washout characteristics are variable.

Large adrenal tumors are rare and most often malignant with and incidence of malignancy ranging from 10 % - 53%¹³.

Previously Masugi¹⁴ et al described a non-functional adenoma with a diameter of 5.5cm, Denzinger¹⁵ et al reported an adenoma with diameter of 18cm. to date the largest histologically proven case of adenoma has been reported by Boazhong¹⁶ et al.

CONCLUSION

Large size of the lesion and heterogeneity pose a significant diagnostic problem in distinguishing an adrenal adenoma from the more sinister adrenocortical carcinoma and pheochromocytoma. Thus an atypical adrenal adenoma is a possible differential considering the common incidence of the lesion. Adrenal adenoma can camouflage as other pathologies on imaging.

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