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Adrenal Oncocytoma Presenting as Cushing Syndrome: A Rare Clinical Entity

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ABSTRACT

A 15-year-old girl presented with rapid weight gain over a couple of months, depression, and suicidal tendencies. On subsequent evaluation she was found to have Cushingoid features such as centripetal obesity, hirsutism, moon facies, irregular menstrual cycles, and mood disorders. Her blood biochemistry showed raised basal serum cortisol levels and was positive for low and high dexamethasone suppression tests. An ultrasound of the abdomen and later a 64-slice multi-detector computed tomography (MDCT) of the abdomen confirmed an enhanced right-sided adrenal tumor approximately 32 mm x 27 mm x 25 mm.

The patient was subjected to open adrenalectomy, and subsequent histopathology revealed adrenal oncocytoma. Postoperative recovery was uneventful. Her serum cortisol done on the eighth postoperative day showed a normal value. Herein we report a rare case of adrenal oncocytic adenoma presenting with Cushing syndrome.

INTRODUCTION

Oncocytoma refers to the tumor that is composed of oncocytes. The term "oncocyte" was first used by Hamperl [1] in 1950. Oncocytomas are tumors commonly seen in salivary glands, the thyroid, or the kidney, and they are rarely seen in the lungs, parathyroid gland, ovary, or pituitary gland. As such, oncocytomas are rare, adrenal oncocytomas are rarer, and adrenal oncocytomas presenting as Cushing syndrome are rare. Only 45 cases have been reported worldwide. We report a rare case of right-sided adrenal oncocytic adenomas presenting as Cushing syndrome in a young girl.

CASE REPORT

A 15-year-old female presented with a history of rapid weight gain, facial puffiness for a duration of 4 months, acne, and increased hair growth over her face and upper back for a duration of 2 months. She had an episode of severe depression with suicidal tendencies beforehand. On physical examination, Cushingoid features such as centripetal obesity, moon facies, irregular menstrual cycles, increased facial and body hair, and buffalo hump were seen. Her bone mineral densitometry showed osteopenia. Routine blood investigations were within normal limits. Her basal serum cortisol level was elevated (33.4 mcg/dl). Her serum DHEA sulfate was low (18.1 mcg/dl) and both low-dose and high-dose dexamethasone suppression tests were positive, indicating a primary adrenal pathology.

An ultrasound of the whole abdomen showed a right-sided, small (30 mm x 19 mm), hypoechoic suprarenal lesion. Subsequently, a 64-slice MDCT scan was done, which showed a relatively well-defined, lobulated, dense, soft-tissue mass arising from the lateral limb of the right adrenal gland, measuring approximately 32 mm x 27 mm x 25 mm (Figure 1). A dynamic contrast study showed moderate enhancement. Laparoscopic exploration was planned but because of lack of expertise in advanced laparoscopy, it was converted to open surgery. During the operation, the mass was found to be a well-encapsulated, dark grey lesion in close proximity to the liver,

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superiorly, and inferior vena cava, medially. On manipulation of the mass, her blood pressure did not fluctuate. The mass was completely removed. The operating time was 120 minutes. Blood loss was approximately 150 ml and no blood transfusion was required.

Postoperative recovery was uneventful. Her basal serum cortisol level came down to 3.19 mcg/dl on the eighth postoperative day. Macroscopic pathological examination of the tumor showed a soft and grey-yellow appearance, about 3.0 cm × 2.5 cm × 2.5 cm. No focal hemorrhage and necrosis were present. Microscopic sections of the tumor showed circumscribed tumor nodules with peripherally condensed adrenal tissue. The cells were present in nests and cords, and they showed abundant, granular, eosinophilic oncocytic cytoplasm. The nuclei were round with powdery chromatin. There were no mitotic figures, necrosis, broad fibrous bands, or evidence of capsular or vascular invasion. The Weiss grading was 1, as shown in Table 1. Immunostaining with Ki-67 was negative. The histopathological diagnosis was adrenocortical oncocytoma (Figure 2).

DISCUSSION

Predominantly composed of oncocytes, oncocytomas are ultrastructurally characterized by cytoplasm packed with numerous mitochondria [2]. It is a neoplasm composed entirely of oncocytes and occurs in various locations throughout the whole body. It commonly involves the kidney, thyroid, and salivary glands, but it is seldom found in the pituitary, parathyroid glands, respiratory tract, lachrymal gland, and choroids plexus [3]. Adrenocortical oncocytoma is very rare. The first case was reported in 1986, and only 45 cases have been described in the literature [4-8] to date.

The adrenocortical oncocytomas have their own structural characteristics. Most are large, rounded, capsulated, and well circumscribed, with an average diameter of 8 cm (from 2 to 20 cm). The lesions tend to be brown, yellow, or mahogany on cut sections. Some tumors show areas of hemorrhage and necrosis. The classic central radiating scar that has been described in renal oncocytomas is not always present in adrenocortical oncocytomas. The microscopic appearance of oncocytomas includes cells arranged in solid, trabecular, tubular, or papillary patterns. The tumor cells are highly eosinophilic and granular, which may be attributed to the presence of numerous mitochondria as seen by electron microscopy. The neoplastic cells seldom have pleomorphic nuclei or mitotic figures [9,10]. In some cases, through immunocytochemical study, vimentin was diffusely expressed, whereas AE1/AE3 cytokeratin was detected in only some cells [11]. Immunostaining for Ki-67 has been reported to be helpful in distinguishing adrenocortical adenomas from carcinomas [12,13]. The detection of Ki-67 in some adrenocortical oncocytomas may be interpreted in at least 2 ways: supporting the diagnosis of low-grade carcinoma or increased proliferative activity of oncocytomas [14].

Figure 1. A 64-slice MDCT scan of the abdomen of the patient showing the tumor on the right side.

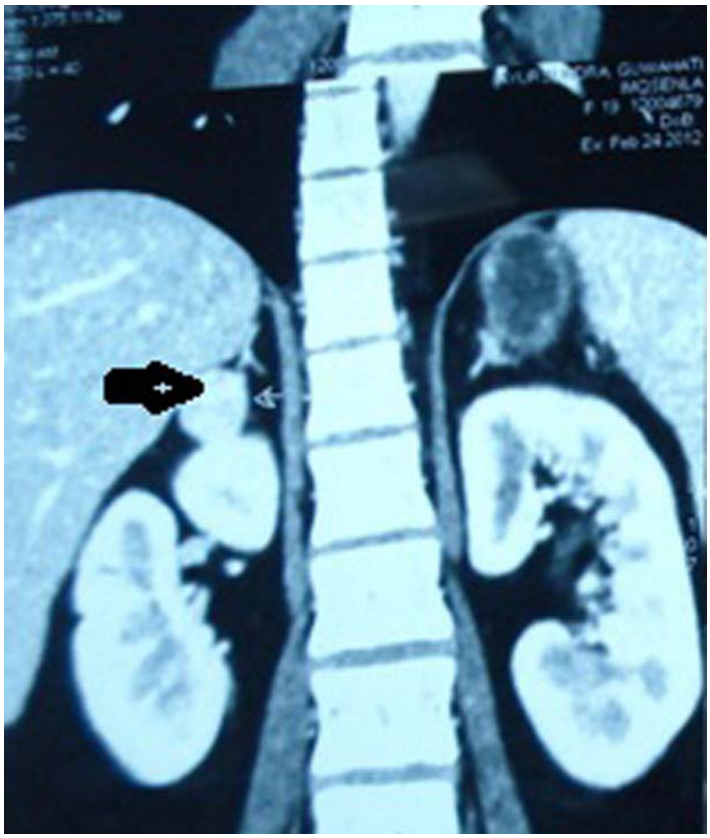
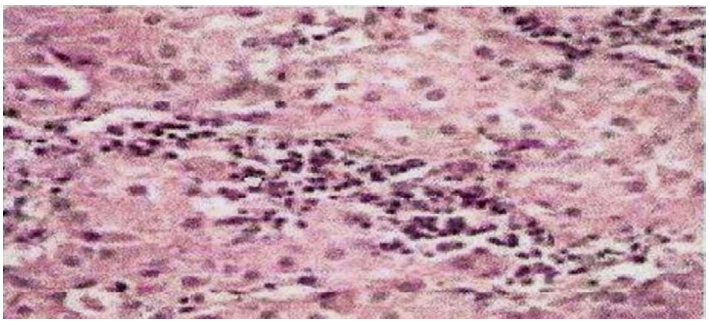


Figure 2. A microscopic appearance of the tumor.



Generally, an oncocytoma is regarded as a benign tumor, but a malignant variant with local invasion and distant metastasis was described in 1991; it had invaded the inferior vena cava

Table 1. Weiss score.

High Nuclear Grade	Eosinophilic Cyctoplasm	Necrosis	Mitotic Figures	Atypical Mitotic Figures	Capsular Invasion	Vascular Invasion	Sinusoidal Invasion	Diffuse Architecture	Total Score
-	+	-	-	-	-	-	-	-	1

and metastasized to the liver [15]. Since then, further cases with malignant features have been reported [7,16,17]. The system of Weiss, which is based on 9 histological findings, including a high nuclear grade, eosinophilic cytoplasm, diffuse architecture, necrosis, mitotic figures, atypical mitotic figures, capsular invasion, venous invasion, and sinusoidal invasion, has been developed for distinguishing benign from malignant adrenocortical oncocytomas [18]. According to the Weiss system, the presence of 3 or more of the 9 criteria indicates that the neoplasm is malignant. Clinically, the tumors occur in patients aged from 15 to 77 years [19], with a significant female-to-male predominance (2.5:1) [2]. Oncocytic neoplasms of the adrenal cortex were non-functioning in most of the cases, with the exception of 3 cases. Xiao et al. [20] identified an adrenocortical oncocytoma in a 53-year-old woman who presented with Cushing syndrome. Erlandson and Reuter [21] reported a female patient who was incidentally found to have a 5 cm virilizing adrenocortical oncocytoma and a coexisting urinary bladder tumor. After surgery, this patient's 17-ketosteroid level returned to normal [22]. Kabayegit et al. [23] reported the third case—a 31-year-old man with Cushing syndrome. To our knowledge, we are presenting the fourth case report of a functioning adrenal oncocytoma. Adrenocortical oncocytoma is a rare benign tumor with the potential for malignant change later. It is a non-functional mass in most cases, with Cushing appearance seen in some patients. The masses can be detected by imaging examination, and the diagnosis is confirmed by histopathological examinations. Adrenalectomy is the treatment of choice, and regular follow-up evaluation is essential.

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