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Case Report

A RARE CASE OF RAPIDLY ENLARGING MYELOLIPOMA IN SICKLE CELL DISEASE

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ABSTRACT

Objective: Adrenal myelolipoma (AM) is a benign tumor composed of mature fat cells and hemopoietic elements. Most AMs are incidental findings on imaging and clinically asymptomatic. The purpose of this case report is to describe a rare case of AM and explore its clinical manifestations, imaging features, and treatment.

Methods: In this study, we report a case of a rapidly growing right AM in a patient with uncontrolled hemoglobin sickle cell disease. A 38-year-old male presented to our institution's endocrine surgery clinic for evaluation of an enlarging right adrenal mass. This mass was incidentally found during an abdominal ultrasound performed for transaminitis and thrombocytopenia. Patient was asymptomatic without any abdominal discomfort, back pain, nausea, or vomiting.

Results: Patient was lost to follow up until 2018. Follow-up computed tomography scan in 2018 showed the right adrenal mass measuring 12.3 cm in greatest dimension with significant macroscopic fat. Given the imaging features, AM was the presumed diagnosis. However, with a medical history of uncontrolled sickle cell disease, extramedullary hematopoiesis and rapidly growing liposarcoma could not be ruled out. Surgical excision was performed due to size and significant tumor growth. Diagnosis was confirmed with histopathology and revealed myelolipoma.

Conclusion: Image characteristics can be helpful in diagnosis of AM; however, the appearance of this lesion on computed tomography can be similar to other adrenal gland pathologies such as liposarcoma and mass-forming extramedullary hematopoiesis. Percutaneous needle biopsy may be indicated if the diagnosis remains unclear. **(AACE Clinical Case Rep. 2020;6:e54-e58)**

Abbreviations:
AM = adrenal myelolipoma; **CT** = computed tomography; **EMH** = extramedullary hematopoiesis; **SCD** = sickle cell disease

INTRODUCTION

With frequent use of imaging modalities, adrenal masses are routinely discovered after cross-sectional imaging. The differential diagnoses of adrenal incidentalomas include myelolipoma, pheochromocytoma, congenital adrenal hyperplasia, adenoma, and carcinoma. Biochemical testing and follow-up imaging are commonly used to differentiate between these adrenal masses. Adrenal myelolipoma (AM) is the only adrenal tumor with pathognomonic imaging features and can be diagnosed radiographically. These benign adrenal carcinomas are managed conservatively and surgery is reserved for rapidly growing or symptomatic tumors (1). Here, we report a case of a giant fat-containing right adrenal mass in a patient with uncontrolled sickle cell disease (SCD).

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CASE REPORT

A 38-year-old man with a past medical history of type 2 diabetes mellitus and hemoglobin SCD presented for initial evaluation to the endocrine surgery clinic in 2014. He was referred for evaluation of an incidentally discovered right adrenal mass while undergoing an abdominal ultrasound performed for transaminitis and thrombocytopenia (Fig. 1). The patient was asymptomatic without any abdominal pain, weight gain, or symptoms attributable to mass effect. His only complaint was fatigue which he ascribed to his SCD. At this time, a biochemical profile including plasma metanephrines and low-dose dexamethasone suppression test were normal. Given the significant growth in size of the mass during the follow-up period, the patient was scheduled for surgery but was lost to follow up. He presented again to our clinic in 2018 to reestablish care and discuss surgery.

Review of prior imaging studies performed for different clinical indications showed the right adrenal mass measuring only 1 cm in 2001 and 4.4 cm in 2011 with rapid growth on follow-up imaging studies (Fig. 2). An abdominal magnetic resonance image without contrast (to assess renal insufficiency) in 2014 showed an 8.4-cm right adrenal mass demonstrating intermediate heterogenous T2 signal most suggestive of soft-tissue signal intensity. In-phase and opposed-phase T1 images and fat-suppressed sequences confirmed both microscopic and macroscopic fat, respectively (Fig. 3). In 2015, computed tomography (CT) scans without contrast showed progressive enlargement to 9.6 cm and 10.1 cm with gross macroscopic fat. Splenic and osseous changes consistent with known SCD were also seen.

A follow-up CT scan in 2018 showed the right adrenal mass now measuring 12.3 cm in greatest dimension; however, it also showed significantly more macroscopic fat (Fig. 4). Again, splenic and osseous changes related to SCD were demonstrated.

The patient's initial laboratory investigations were unremarkable. Hemoglobin was 13.1 g/dL (reference range is 13.7 to 17.5 g/dL), white blood cell count was 7.4 10^3/μL (reference range is 3.7 to 10.3 10^3/μL), platelet count was 113 10^3/μL (reference range is 155 to 369 10^3/μL), mean corpuscular volume was 78 fL (reference range is 79 to 98 fL), and mean corpuscular hemoglobin was 28 pg (reference range is 26 to 32 pg).

His biochemical investigations were also normal. Normetanephrine was 0.35 nmol/L (reference range is <0.9 nmol/L), metanephrine was <0.2 nmol/L (reference range is <0.5 nmol/L), serum bilirubin was 1.7 mg/dL (reference range is 0.2 to 1.1 mg/dL), blood urea was 8 mg/dL (reference range is 7 to 21 mg/dL), serum creatinine was 1.0 mg/dL (reference range is 0.8 to 1.3 mg/dL), total calcium was 8.8 mg/dL (reference range is 8.9 to 10.2 mg/dL), fasting blood glucose was 401 mg/dL (reference range is 74 to 99 mg/dL), alanine aminotransferase was 64 IU/dL (reference range is 11 to 41 IU/dL), and aspartate aminotransferase was 43 IU/dL (reference range is 12 to 40 IU/dL). A low-dose dexamethasone suppression test showed appropriate suppression with a morning cortisol level of 1.7 μg/dL (reference range is <1.8 μg/dL).

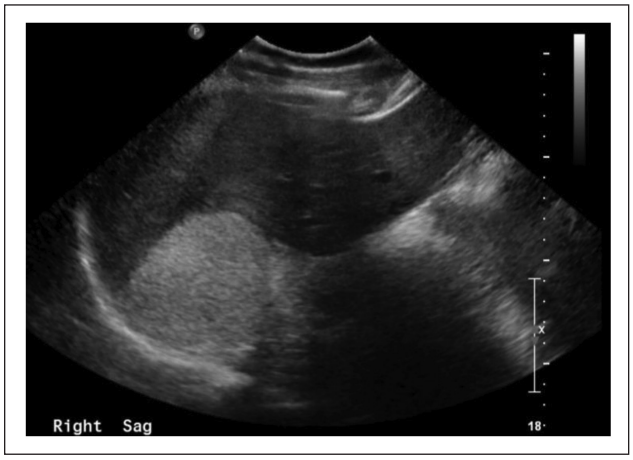

Fig. 1. Sagittal ultrasound image of the right suprarenal region demonstrates a diffusely echogenic right adrenal mass.

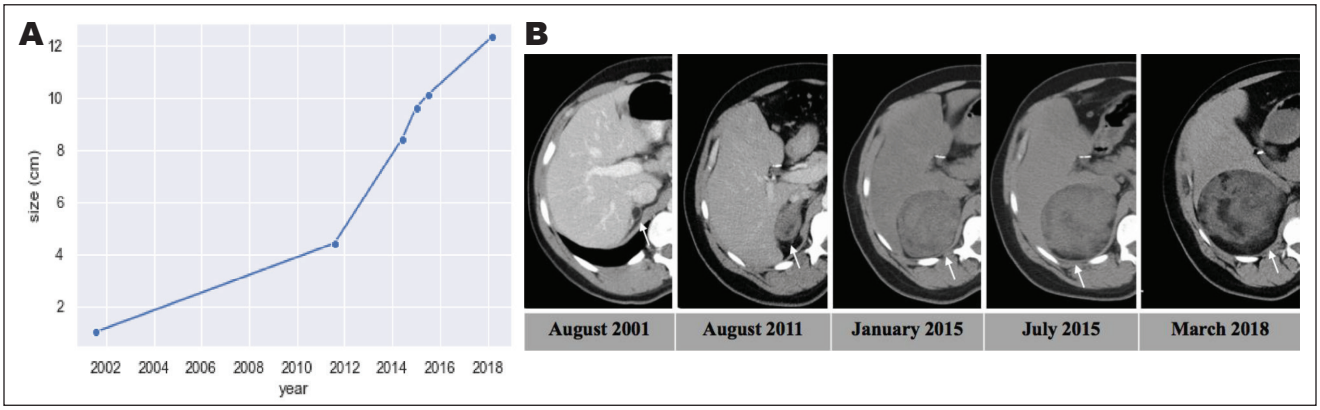

Fig. 2. Graph of tumor size (*A*) in August 2001, August 2011, January 2015, July 2015, and March 2018 measured on axial computed tomography images. Multiple axial computed tomography images (*B*) showing growth of the fat-containing right adrenal mass over time (white arrows).

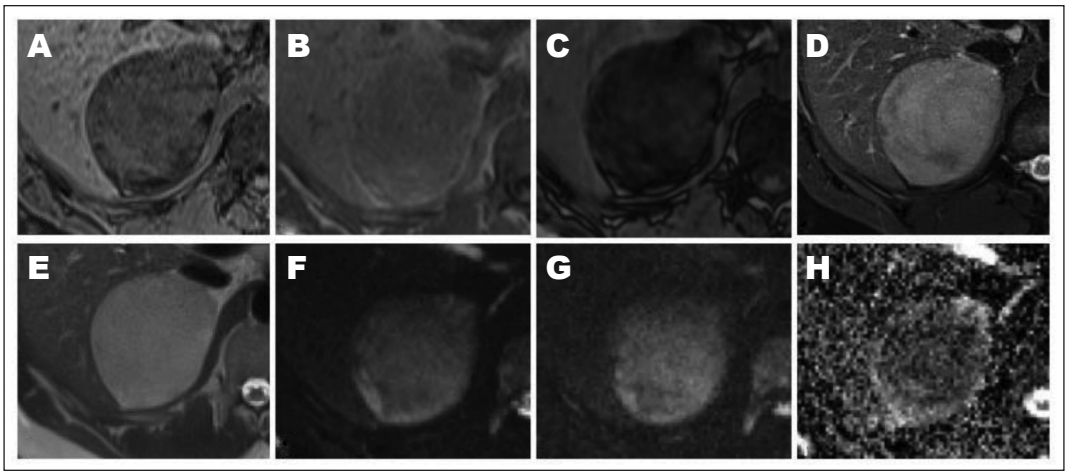

Fig. 3. (*A*) Axial T1-weighted magnetic resonance image (MRI) with fat saturation pre-contrast. Axial in-phase (*B*) and out-of-phase (*C*) T1 MRIs show a right adrenal mass with a decrease in signal intensity on the out-of-phase image and regions of India ink artifact indicating the presence of intracellular and extracellular lipids. (*D*) Axial T2-weighted MRI with fat saturation. (*E*) Axial T2 single-shot fast spin echo MRI shows an 8.4-cm mass with intermediate T2 hyperintense mass involving the right adrenal gland. Axial diffusion-weighted images with low b-value (*F*), high b-value (*G*), and corresponding apparent diffusion coefficient (*H*) demonstrating mild restricted diffusion. *MRI* = magnetic resonance image.

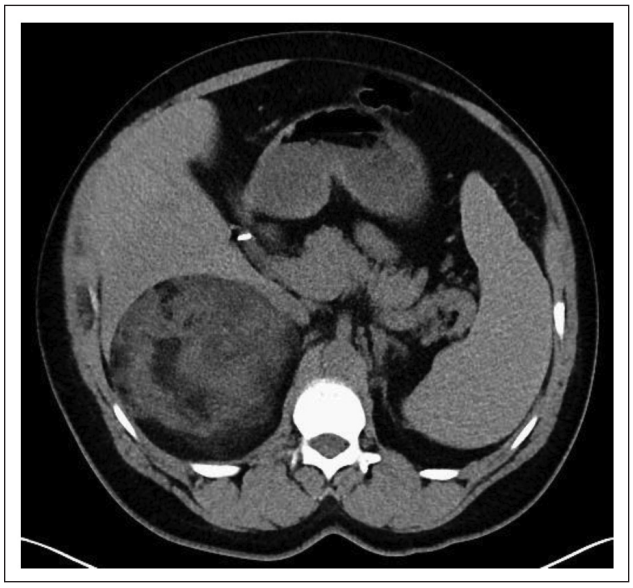

Fig. 4. Noncontrast axial computed tomography image showing a large heterogenous adrenal mass containing macroscopic fat. The mass measured 12.3 × 12.1 × 9.3 cm.

The patient was readmitted to the hospital in 2019 for a sickle cell crisis with a hemoglobin of 8.6 g/dL (reference range is 13.7 to 17.5 g/dL) and platelet count of 83 $10^3/\mu L$ (reference range is 155 to 369 $10^3/\mu L$). An uncomplicated laparoscopic hand-assisted right adrenalectomy was performed with an uneventful postoperative course. The specimen measured 17.0 × 14.5 × 8.0 cm. Scant adrenal tissue was identified on the surface of the mass which measured 3.7 × 0.7 cm. The definitive diagnosis was confirmed with histopathology and revealed AM. The patient has been non-compliant with following up with hematology for appropriate SCD management and had an episode of sickle cell crisis 1 year after the surgery.

DISCUSSION

The presence of macroscopic fat within an adrenal mass at imaging is suggestive of AM in most cases (1,2). However, mass-forming extramedullary hematopoiesis (EMH) is another type of fat-containing mass that should be considered in the differential diagnosis in patients with hematologic disorders. Myelolipoma of the adrenal gland is a benign tumor that consists of mature fat cells and hematopoietic cells such as myeloid tissue. AMs are asymptomatic in most cases but can cause abdominal pain, flank pain, mass-effect, or retroperitoneal hemorrhage in large sizes. These tumors are incidentally found in the course of abdominal cross-sectional imaging evaluation or at autopsy (1-3).

EMH is a physiological response secondary to insufficient blood cell production and bone marrow function (4-6). EMH can be seen in hematologic diseases such as hemoglobinopathies, myeloproliferative disorders, lymphomas, leukemia, and hemolytic anemias (4,5). EMH commonly occurs outside of the bone marrow in the reticuloendothelial system such as the spleen and liver, but can rarely be seen in organs such as brain, adrenals, pleura, bowel, and breast (7-10). EMH in the adrenals is rare and is thought to be a compensatory mechanism secondary to altered hematopoiesis in patients with hemolytic disorders (8). A few cases of EMH involving the adrenal glands have been reported in patients with SCD, beta-thalassemia, and hereditary spherocytosis (5,7-9).

The pathogenesis of AM in SCD is unknown. One of the proposed theories is that increased erythropoietin levels

in chronic hemolytic disease might stimulate metaplasia of embryonic stem cells to myeloid tissue (11). Multiple cases of AM have been reported in patients with thalassemia and SCD (12-14). There is no documented association between hemolytic diseases and AM. However, it is possible that the hematopoietic stress in chronic anemia stimulates the metaplasia of adrenal stromal cells to myeloid tissue and results in the rapid growth of the tumor in this population (15).

AMs and mass-forming EMH share common characteristics on imaging and histology. On imaging, AM is confidently diagnosed when an encapsulated mass originating from the adrenal gland contains fatty tissue. Adrenal EMH, often similar in appearance, appears as a well-defined mass composed of fat and variable internal soft-tissue. On histology, they are both composed of mature adipose tissue and variable amounts of hematopoietic elements (2,3,16). Genetic evaluation to confirm clonal origin of myelolipomas has been reported and may be helpful to distinguish EMH when clinical history is confounding (16,17). Therefore, EMH maybe underdiagnosed in this patient population, as genetic evaluation is not routinely performed.

Management of fatty adrenal masses is dependent on the tumor size, symptoms, and suspicion for malignancy. There have been multiple studies on treatment guidelines. Yalagachin and Bhat (18) suggested that surgery is indicated in functional tumors or tumors ≥6 cm. Smaller tumors with benign imaging characteristics can be managed conservatively. Bokhari et al (19) concluded that patients with symptomatic tumors or tumors >7 cm can undergo elective surgical resection. Laparoscopic is the standard surgical approach due to minimal postoperative complications, blood loss, and shorter hospital length of stay. However, open resection might be a better option for lesions ≥10 cm (20).

In this case, the patient was clinically asymptomatic and his tumor was metabolically inactive. However, due to the size of the mass and its significant growth over time, surgical excision was performed and the tumor was successfully removed by right laparoscopic hand-assisted adrenalectomy. Pathological studies of the specimen confirmed the diagnosis of AM. Genetic testing of the specimen was not performed as this was unlikely to alter the clinical management.

CONCLUSION

Rare cases of rapidly enlarging AM can be seen in patients with hematologic disorders. AM are benign neoplasms that can be difficult to differentiate from EMH. Percutaneous needle biopsy might be indicated if the diagnosis remains unclear. Management of AM depends on the size and symptoms. Surgical excision is recommended in symptomatic patients or lesions ≥10 cm (18). Smaller or asymptomatic lesions should be managed conservatively.

DISCLOSURE

The authors have no multiplicity of interest to disclose.

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