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Laparoscopic Surgery in a Patient With Bilateral Adrenal Myelolipoma

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ABSTRACT

Adrenal myelolipoma is a rare benign adrenal tumor composed of adipose tissue and hematopoietic elements. Myelolipomas are often asymptomatic. The preferred diagnostic imaging modality is computed tomography (CT), which shows focal fatty density within the mass. Surgical intervention is recommended if the mass is larger than 5 cm. A 52-year-old female patient was referred for chronic dull abdominal pain. CT demonstrated left side (6.5 cm x 7 cm) and right side (1 cm x 2.5 cm) well-outlined adrenal masses with a fat density in the suprarenal regions. They were hormonally nonfunctional. The patient underwent laparoscopic left adrenalectomy. The right mass was left intact because of its small size. There were no complications. Histopathological examination revealed myelolipoma. Laparoscopic adrenalectomy can be a safe and effective treatment for select cases.

KEYWORDS: Myelolipoma; Adrenal; Laparoscopy

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Abbreviations and Acronyms
CT, computed tomography
ML, myelolipoma
MRI, magnetic resonance image
US, ultrasound

INTRODUCTION

Myelolipoma (ML) is a rare, benign, tumor-like neoplasm of the adrenal gland that was first described by Gierke in 1905 [1]. It is composed of variable amounts of mature adipose tissue and hematopoietic bone marrow elements. Most patients with adrenal ML are usually asymptomatic, hormonally nonfunctional, and without splenomegaly or hematopoietic disorders. In the past, these conditions were usually discovered as incidental findings at autopsy or during surgery for unrelated diseases [2]. Currently, computed tomography (CT) and magnetic resonance imaging (MRI) can be used to detect these tumors.

Most ML tumors are unilateral but show no predilection to one particular side. Tumor size varies from several millimeters to more than 30 cm [3]. As reported by Han et al in 1997 [4], 85% of 20 patients with adrenal ML were of white race/ethnicity. The reported male-to-female ratio ranges from 1:1 to 2:3. No other generalizations have been reported in the literature.

A very large ML may be palpable. Occasionally, a patient may present with abdominal or flank pain or hematuria due to a large ML or from spontaneous hemorrhage. These symptoms are more likely when the ML is predominantly composed of myeloid tissue [5]. Rupture can occur in a large ML following blunt trauma.

The preferred diagnostic imaging modality is CT, which shows focal fatty density within the mass. MRI also accurately depicts both microscopic and macroscopic fat using chemical shift imaging and explicit fat saturation technique, respectively. Myelolipomas may be discovered incidentally on ultrasound (US), which otherwise is not used routinely to characterize adrenal neoplasms [3].

The present case report is not a novel one, but it is important to report such cases from different areas of world with different surgeon experience in order to better understand the feasibility of new techniques in all settings.

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CASE REPORT

A 52-year-old female patient was referred to our medical center for dull abdominal pain in the left side that had been present for several months. She reported no nausea or vomiting and did not have a prior history of urinary tract disease, neurologic events, or any other medical problems. She had no history of any abdominal surgery.

Routine hematological parameters like hemoglobin, complete blood count, and peripheral blood smear were within normal limits. Blood glucose, urea, creatinine, sodium, potassium and bicarbonate levels, and urine analysis were normal. US evaluation of the abdomen revealed a solid echogenic mass in the left and a similar smaller one in the right suprarenal regions.

CT demonstrated left side (6.5 cm x 7 cm) and right side (1 cm x 2.5 cm) well-outlined adrenal masses containing fat density (Figure 1). The right and left kidneys were normal. MRI revealed that the masses had high signal intensity on both T1- and T2-weighted images and fat suppression on fat-suppressed images. Based on these appearances, a diagnosis of adrenal ML was made.

Several tests were done to evaluate whether or not the adrenal masses were functional. The 24-hour test of urine catecholamines was normal, ruling out pheochromocytoma. Both plasma and urinary cortisol levels were normal, ruling out Cushing's syndrome. The plasma aldosterone and plasma renin activity were within normal values.

A laparoscopic procedure was planned for the patient. The operation was done under general anesthesia. A nasogastric tube and a urethral catheter were placed before the operation. Laparoscopy was done with the patient in the lateral decubitus position and with a transperitoneal approach. We used an Olympus laparoscope (Olympus-Europa GmbH, Hamburg, Germany). The primary entrance site was the umbilicus, using a direct trochar insertion method. Figure 2 contains photographs of 4 parts of the procedure. A pnemoperitoneum was made with CO_2. After colon medialization, access to the retroperitoneum was achieved. The left adrenal mass became distinguishable and was dissected. A LigaSure devise (Valleylab, Boulder, CO, USA) was particularly useful in some situations for dissection and bleeding control. At the end of the procedure, the mass was placed into an endobag to prevent tumor spillage and was removed through a small skin incision. The right adrenal mass was left intact because of its small size.

There was no significant bleeding or any other complication during the procedure. Operation time was 75 minutes. The day after surgery, the urethral catheter and nasogastric tube were removed. A liquid diet was started and then a regular diet was resumed. The patient was ambulated. She was discharged from the hospital 2 days after surgery in good condition. She had no complications during 6 months of follow-up.

Histopathological examination revealed mature adipose and hematopoietic tissues and an increased numbers of adrenocortical cells. Adrenal ML was confirmed.

DISCUSSION

The adrenal myelolipomas in the present case were unusual because the presentation is typically unilateral. Bilateral localization with development in an ectopic adrenal gland or in extra-adrenal gland has been reported [6].

Adrenal myelolipomas tend to grow very slowly and their size and weight vary significantly. The largest reported tumor is 6 kg in weight [7]. Fewer than 40 reported cases have presented with clinical signs and symptoms of the adrenal mass and complication leading to surgical removal [8]. The most frequent clinical symptoms are abdominal pain and hypertension caused by hemorrhage, necrosis, or mechanical compression by a large tumor [9]. Frequent association with obesity and type 2 diabetes mellitus and hypertension has been noted as possibly coincidental [10]. The myelolipomatous tissue can replace either the tumorous or hyperplastic adrenocortical cells or may simply represent secondary degenerative changes.

Differential proliferation of the undifferentiated mesenchymal stem cells of the adrenal cortex into myeloid and adipose tissue in response to infection, stress, and necrosis has been the projected view for aetiopathogenesis [11]. Demonstration of hypodensity within an adrenal mass by CT scan is virtually diagnostic of ML. Desai et al [12] felt that a nonfunctioning radiolucent solid adrenal mass by CT scan with no neovascularity on angiography is biochemically most likely ML.

Management of Myelolipoma

Treatment of ML is conservative unless if it is asymptomatic and < 5 cm in size. If the tumor is > 5 cm, surgical intervention is recommended because a large tumor could not be differentiated from necrosis in adrenal carcinoma or renal angiomyolipoma and retroperitoneal liposarcoma. Additionally, a large tumor has a risk of spontaneous rupture with retroperitoneal bleeding [13].

Regular radiological follow-up may be an alternative way to avoid a surgical procedure [14]. Surgical excision may also be needed when cytological and histological examination of the

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Figure 1. Abdominal CT scans of the patient demonstrating right and left adrenal masses.
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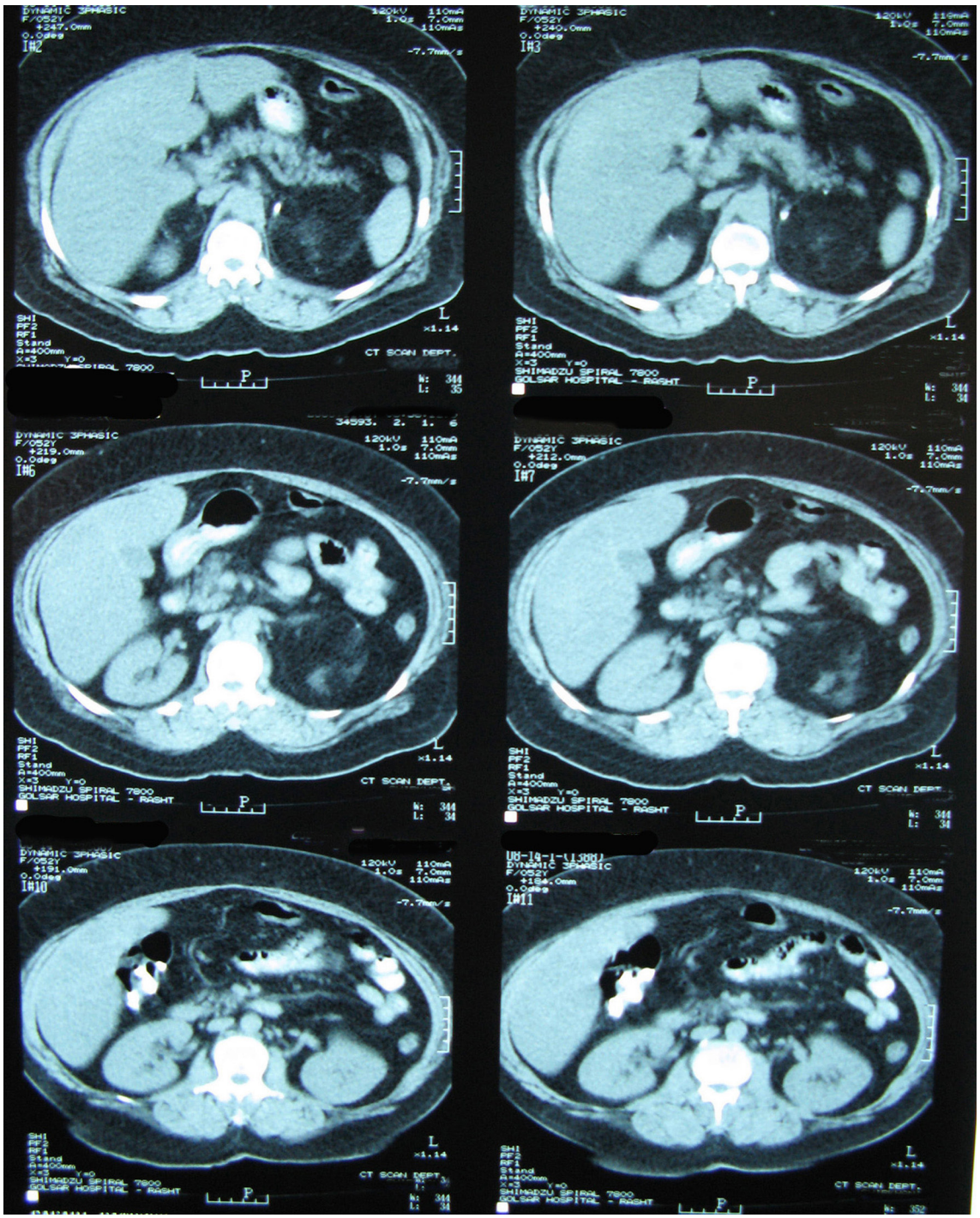

Figure 2. Laparoscopic dissection of the left adrenal myelolipoma (4 views).
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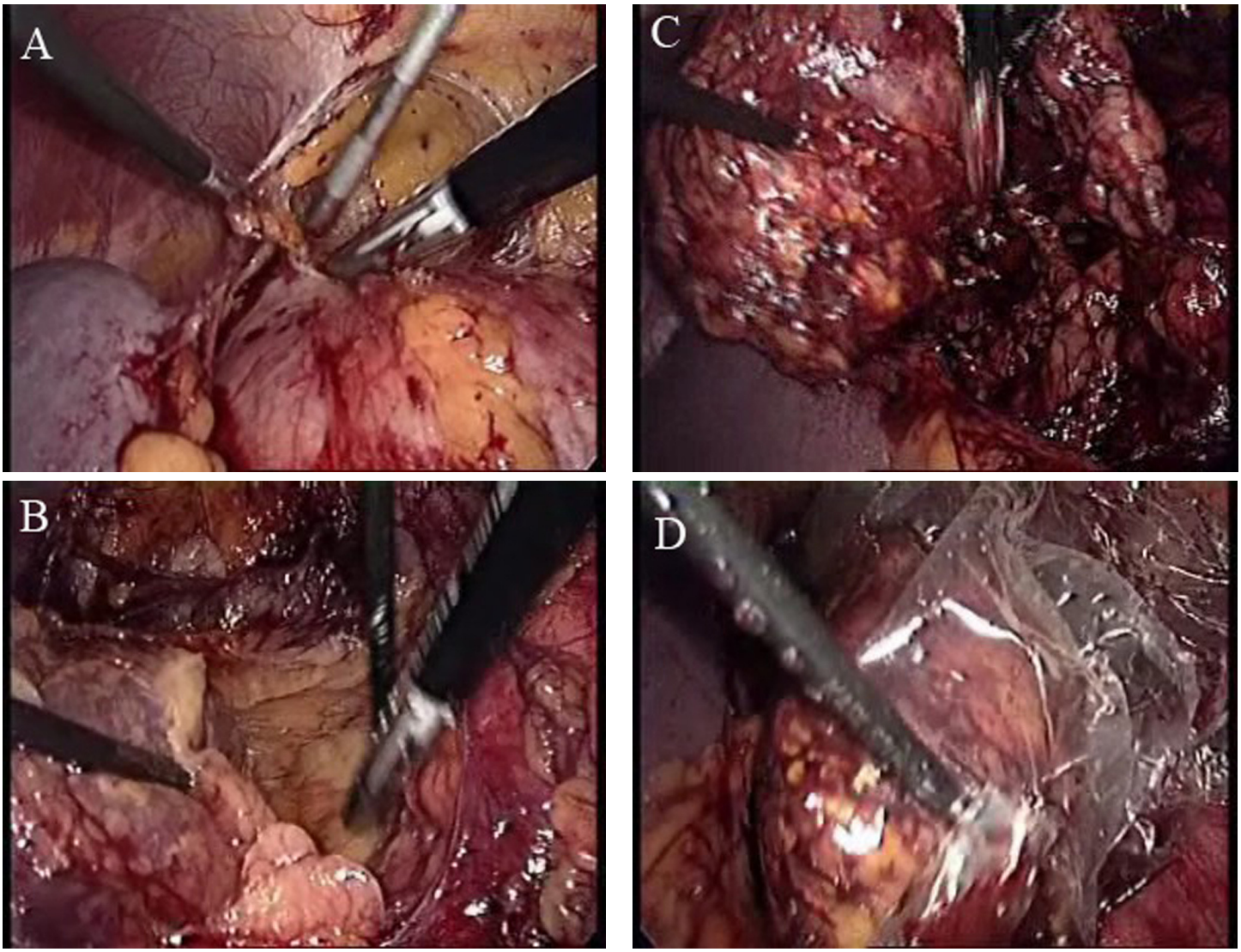

fine-needle aspiration biopsy material is not sufficient to see fat and myeloid cells together for the definitive diagnosis [9,15,16].

Laparoscopic adrenalectomy is now the gold standard method for the treatment of adrenal tumors except for huge pheochromocytomas or invasive malignant tumors. The shorter convalescence with a laparoscopic approach compared with open adrenalectomy has been accepted from the very beginning. Several series have shown that laparoscopic adrenalectomy is associated with better cosmetic results, decreased blood loss [17], less postoperative pain and narcotic use, and reduced length of hospital stay [18] when compared with open surgery. Surgical experience in open and advanced laparoscopic surgery is needed for laparoscopic resection of large adrenal tumors [19,20]. The adrenals can be removed laparoscopically via a transabdominal (anterior or lateral) or retroperitoneal (lateral or posterior) approach. The anterior transabdominal approach offers the advantage of a conventional view of the abdominal cavity and allows a bilateral adrenalectomy to be performed without the necessity of repositioning the patient [21].

CONCLUSION

The adrenal gland ML is a rare neoplasm. The diagnosis is improved by medical imaging. This tumor is usually benign with

a good prognosis. Despite a lack of high-level evidence in its favor, laparoscopic adrenalectomy has practically replaced open surgery in the management of small and medium-sized benign functioning and nonfunctioning adrenal lesions, because it has proven to be as effective as open adrenalectomy with less associated morbidity.

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