

# Renal Angiomyolipoma

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A 28-year-old woman was admitted to our hospital due to severe left flank pain. She suffered from left flank pain for a long time, but she didn't pay attention to it. Recently, left flank pain became more severe, and also referred to all her left side body. She visited another hospital where computed tomography (CT) of abdomen was done, and revealed a huge fat-containing tumor in the left retroperitoneum (Fig.1). Then, she came to our out-

patient department (OPD) for second opinion, and was admitted for further surgical intervention.

On admission, physical examination showed nothing particular except mild knocking pain over the left flank. Laboratory examinations showed within normal limits including comprehensive renal function test. Because a huge fat-containing tumor in the left retroperitoneum on CT of abdomen was noted, surgical interven-

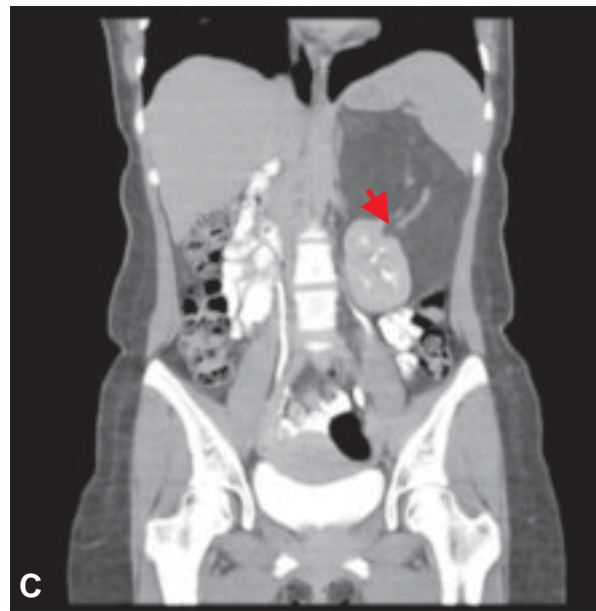
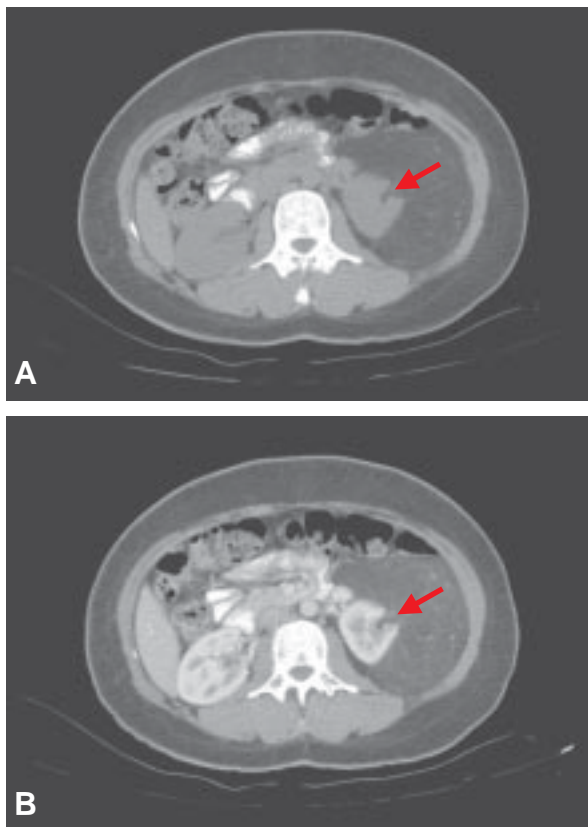


Fig. 1. Left renal angiomyolipoma. (A). Unenhanced axial CT of kidneys, (B). contrast-enhanced axial CT of kidneys, and (C). contrast-enhanced coronal CT of kidneys show a huge fat-containing tumor with scattered contrast-enhanced tubular structures (probably angiomas) within the tumor in the left retroperitoneum which causes medial and downward displacement of the left kidney. Cortical defect (arrow) is noted in the upper lateral portion of the left kidney which may indicate this left retroperitoneal fat-containing tumor originating from the cortex of the left kidney.

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tion was recommended. During operation, a yellowish tumor measured about 18×8×6cm in size in the left retroperitoneum was noted, angiomyolipoma of left kidney or left retroperitoneal liposarcoma was impressed. Tumor excision and left partial nephrectomy were performed, and the pathological report showed angiomyolipoma of left kidney. She was discharged in stable condition, and follow-up in our OPD was recommended.

Renal angiomyolipoma is a mixed mesodermal tumor composed of varying amount of mature adipose tissue, smooth muscle, and thick-walled blood vessels.<sup>1</sup> Renal angiomyolipoma usually occurs as a solitary unilateral renal tumor, and usually occurs in older women. But it may be associated with tuberous sclerosis, in which case it is usually multiple and bilateral. Clinical manifestations include flank or abdominal pain, fever, nausea, vomiting, hypertension, hematuria, anemia, and palpable abdominal or flank mass.<sup>2-4</sup> This tumor is prone to bleed, and causes intra-renal and retroperitoneal hemorrhage, and the patients may present in hypovolemic shock.<sup>5</sup> About 25% of cases present with retroperitoneal mass.<sup>6</sup>

If much fat is present within the tumor, the radiolucent areas within the renal mass shown in plain KUB may suggest the diagnosis. If the size of the tumor is big, a mass that locally enlarges the kidney and distorts and displaces the adjacent collecting system of the kidney is noted in intravenous urography (IVU). If the tumors are multiple and bilateral, they may simulate polycystic kidneys in IVU. The most striking angiographic findings of renal angiomyolipoma is the presence of many berry aneurysms of the interlobar and interlobular arteries of the kidney.<sup>7,8</sup> But sometimes differentiation from renal cell carcinoma by angiographic examination alone may be difficult. Renal angiomyolipoma appears a focal hyperechoic mass in the renal parenchyma on ultrasonography. But some renal cell carcinomas can also appear a hyperechoic mass, this ultrasonic finding can be suggestive but not pathognomonic of renal angiomyolipoma.<sup>9,10</sup> The demonstration of fat within a renal tumor on computed tomography (HU<-40) or magnetic resonance imaging (low signal in T1-weighted images) is considered diagnostic of renal angiomyolipoma, although few renal cell carcinomas containing fat or entrapment of renal sinus fat or perirenal fat, or liposarcoma arising from renal sinus or perirenal space have been reported.<sup>11,12</sup> The amount of fat in the renal angiomyolipoma and bleeding into the renal angiomyolipoma can make the diagnosis difficult.

In the past, the management of renal angiomyolipomas was total nephrectomy, and was determined primarily by acute hemorrhage or inability to distinguish them

from renal cell carcinoma. In recent years, abdominal CT and renal ultrasonography have the ability to make the correct diagnosis of renal angiomyolipomas possible in many cases.<sup>13-16</sup> Selective arterial embolization has been shown to be effective in treating acute, active hemorrhage, either alone or in conjunction with surgical intervention.<sup>17-20</sup> With these developments, most urologists currently recommend a conservative approach to the management of renal angiomyolipomas.<sup>21-23</sup> Oesterling et al reviewed 602 cases of renal angiomyolipomas in the literature.<sup>3</sup> They concluded that tumor size and symptoms were useful parameters in predicting the clinical course of these tumors. Based on these criteria, the proposed 4 recommendations of a systematic management scheme for all renal angiomyolipomas as follows: (1) Symptomatic tumors 4 cm or larger should be studied angiographically and considered for treatment by selective arterial embolization, enucleation or partial nephrectomy. (2) Asymptomatic neoplasms 4 cm or more should be monitored at frequent intervals (semiannually) with CT or ultrasonography. (3) Symptomatic lesions smaller than 4 cm should be observed if symptoms resolve promptly. If symptoms persist, angiography should be performed and selective arterial embolization or conservative surgical treatment should be considered. (4) Asymptomatic angiomyolipomas smaller than 4 cm should be observed at regular intervals (annually) with CT or ultrasonography. Modification of these recommendations may be appropriate as more experience is gained and as studies with longer followup of conservatively managed patients become available.<sup>3</sup>

## REFERENCES

1. Hajdu SI, Foote FW Jr. Angiomyolipoma of the kidney: report of 27 cases and review of the literature. *J Urol* 1969;102:396-401.
2. Ho YJ, Wang JH. Renal angiomyolipoma. *Chin J Radiol* 1979;4:169-76.
3. Oesterling JE, Fishman EK, Goldman SM, Marshall FF. The management of renal angiomyolipoma. *J Urol* 1986; 135:1121-4.
4. Steiner MS, Goldman SM, Fishman EK, Marshall FF. The natural history of renal angiomyolipoma. *J Urol* 1993;150:1782-6.
5. Mouded IM, Tolia BM, Bernie JE, Newman HR. Symptomatic renal angiomyolipoma: report of 8 cases, 2 with spontaneous rupture. *J Urol* 1978;119:684-8.
6. Adelman BP. Angiomyolipoma of the kidney. *AJR Am J Roentgenol* 1965;95:406-9.
7. Love L, Frank SJ. Angiographic features of angiomyolipoma of the kidney. *AJR Am J Roentgenol* 1965; 95:406-8.

8. Clark RE, Palubinskas AJ. The angiographic spectrum of renal hamartoma. *AJR Am J Roentgenol* 1972;114:715-21.
9. Forman HP, Middleton WD, Melson GL, McClennan BL. Hyperechoic renal cell carcinomas: Increase in detection at US. *Radiology* 1993;188:431-4.
10. Hartman DS, Goldman SM, Friedman AC, et al. Angiomyolipoma: ultrasonic-pathologic correlation. *Radiology* 1981;139:451-8.
11. Helenon O, Chretien Y, Paraf F, Melki P, Denys A, Moreau JF. Renal cell carcinoma containing fat: demonstration with CT. *Radiology* 1993;188:429-30.
12. Subramanyam BR, Bosniak MA, Horii SC, et al. Replacement lipomatosis of the kidney: diagnosis by computed tomography and sonography. *Radiology* 1983;148:791-2.
13. Bosniak MA. Angiomyolipoma (hamartoma) of the kidney: a preoperative diagnosis is possible in virtually every case. *Urol Radiol* 1981;3:135-42.
14. Bush WH Jr, Freeny PC, Orme BM. Angiomyolipoma: characteristic images by ultrasound and computed tomography. *Urology* 1979;14:531-5.
15. Pitts WR Jr, Kazam E, Gray G, Vaughan ED Jr. Ultrasonography, computerized transaxial tomography and pathology of angiomyolipoma of the kidney: solution to a diagnostic dilemma. *J Urol* 1980;124:907-9.
16. Shawker TH, Horvath KL, Dunnick NR, Javadpour N. Renal angiomyolipoma: diagnosis by combined ultrasound and computerized tomography. *J Urol* 1979;121:675-6.
17. Rosen RJ, Schlossberg P, Roven SJ, Rothberg M. Management of symptomatic renal angiomyolipomas by embolization. *Urol Radiol* 1984;6:196-200.
18. Moorhead JD, Fritzsche P, Hadley HL. Management of hemorrhage secondary to renal angiomyolipoma with selective arterial embolization. *J Urol* 1977;117:122-3.
19. Bosniak MA. The changing approach to the management of renal angiomyolipomas (an editorial). *Urol Radiol* 1984;6:194.
20. Eason AA, Cattolica EV, McGrath TW. Massive renal angiomyolipoma: preoperative infarction by balloon catheter. *J Urol* 1979;121:360-1.
21. Lingeman JE, Donohue JP, Madura JA, Selke F. Angiomyolipoma: emerging concepts in management. *Urology* 1982;20:566-70.
22. Pode D, Meretik S, Shapiro A, Caine M. Diagnosis and management of renal angiomyolipoma. *Urology* 1985;25:461-7.
23. Jardin A, Richard F, Le Duc A, Chatelain C, Le Guillou M, Fourcade R, Camey M, Kuss R. Diagnosis and treatment of renal angiomyolipoma (based on 15 cases). Arguments in favor of conservative surgery (based on 8 cases). *Eur Urol* 1980;6:69-82.