Symptomatic kidney involvement in a child with tuberous sclerosis

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Tuberous sclerosis complex is an autosomal dominant disorder of cellular proliferation and differentiation with variable penetrance and a high spontaneous mutation rate that affects multiple organs, including the kidney. Kidney involvement is commonly asymptomatic and bilateral, and rare in childhood, especially under 10 years. Herein, we report a case of unilateral renal angiomyolipoma in a nine-year-old girl with tuberous sclerosis who had symptoms of pain and macroscopic hematuria.

Key words: tuberous sclerosis, renal angiomyolipoma.

Tuberous sclerosis (TS) is a disease characterized pathologically by the presence of hamartomas in multiple organ systems such as brain, skin, retina, bone, heart, lung and kidney. Its main clinical manifestations include epilepsy with intractable seizures, mental retardation, behavioral problems, and skin lesions[1,2].

The renal lesions in TS are angiomyolipomas and renal cysts, but renal carcinoma can also occur. Angiomyolipomas are found in an estimated 50 to 80% of the patients, but the real incidence of renal cysts is unknown[3,4].

Renal lesions can cause clinical problems secondary to hemorrhage or compression, which rarely cause end-stage renal failure[2].

Here we describe a patient with TS with unilateral renal angiomyolipomas who had pain and macroscopic hematuria. This case is worthy of attention because the symptoms occurred at an earlier age than expected.

Case Report

A nine-year-old girl with TS was admitted to our hospital with lumbar pain and macroscopic hematuria. She was born to non-consanguineous parents after a non-complicated pregnancy. The clinical onset of her condition was reported at around age 18 months with seizures. Her father and brother were also similarly affected and a paternal aunt had mental retardation. Her father was also diagnosed with renal carcinoma in another hospital. She irregularly took antiepileptic drugs until nine years, and had never undergone renal imaging as a part of routine evaluation and follow up. Her history revealed that she had paroxysmal flank pain and macroscopic hematuria since the age of six years. On examination, moderate mental retardation; large adenoma sebaceum on her nose, cheeks and chin; shagreen patch over the lumbosacral region; multiple hypopigmented spots over the trunk and limbs; several small angiofibromas, especially over the scalp; and brisk tendon reflexes were found. Other systemic and neurological findings were normal. Physical examination of the affected brother was identical to our index case.

The results of routine biochemical tests were normal. On her routine analysis, only microscopic hematuria was detected. Urine culture was sterile. Renal ultrasonography (USG) and computerized tomography (CT) revealed hyperechoic lesions with the same density as renal sinus fat tissue within the right kidney parenchyma, localized to the lower pole, which were defined as angiomyolipomas. Left kidney findings were normal (Fig. 1).

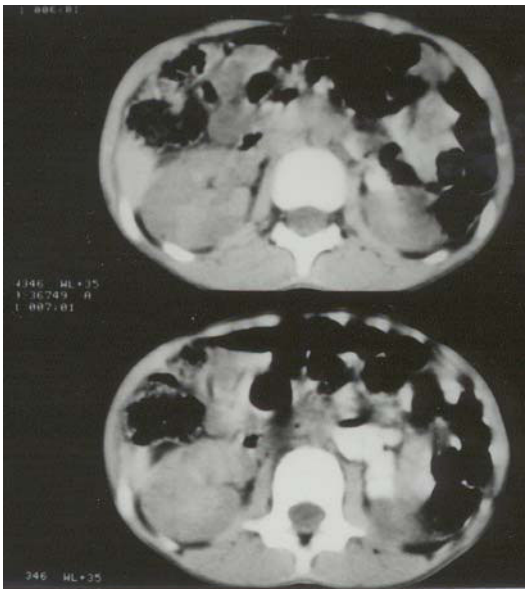

Fig. 1. Abdominal CT showing changes in the left kidney.

Discussion

The most common renal lesion in patients with TS is angiomyolipoma, found in an estimated 50 to 80% of the patients[4-6]. The tumor is composed of tissues normally present in the kidney, but these are of abnormal quantity, arrangement, or degree of maturation. Microscopic examination reveals fatty tissue consisting of mature cells, rich vascular tissue with many tortuous vessels, and smooth muscle[7].

Characteristically, the renal lesions of TS are usually relatively indolent and innocuous, but can become symptomatic because of renal enlargement and related complications[7]. The reported complications of renal angiomyolipoma include partial obstruction of the collecting system, sometimes urinary system infections or nephrolithiasis, and spontaneous hemorrhage, which can lead to hemorrhagic shock in 20% of the cases with angiomyolipomas[5,7]. Our patient had pain and macroscopic hematuria. Her urine culture was sterile and on her DMSA, no findings of pyelonephritis were detected. The tumor is usually benign, but there is a possibility that a renal carcinoma could develop. Our patient's father with TS was also diagnosed as renal cell carcinoma in another hospital.

The second lesion found in TS is the renal cyst. Its real incidence is unknown, but is less than that of angiomyolipoma. The cysts frequently occur in children with TS, and may be the first clinical manifestation of the disease. The incidence of angiomyolipomas increases with age, but the incidence of renal cysts does not appear to be age related[6,7].

The age at which renal lesions occur in patients with TS is highly variable. But in published series, most patients with angiomyolipoma were older than 10 years. In one study, the renal lesions in patients occurred when they were two months to 54 years old[5]. Most of them had angiomyolipoma. In another study, one newborn patient had solitary renal cyst and she had an asymptomatic father[6].

These two abnormalities in TS can occur separately or together and are usually multiple and bilateral. In several series, the incidence of renal lesions in patients with TS was found between 54 and 100%; the specific incidence is 47 to 73% for angiomyolipoma, 18 to 53% for renal cysts, and 12 to 27% for both lesions[5]. Although up to 12% of all persons may harbor small lipomas and angiomyolipomas, TS should be strongly suspected in patients with multiple or bilateral renal angiomyolipomas. Multiplicity and bilateral localization were important differences between the TS cases and the isolated angiomyolipomas. But our patient had unilateral angiomyolipoma. This could be related with her age.

Before the widespread availability of ultrasonography, CT and magnetic resonance imaging (MRI), angiomyolipomas were essentially indistinguishable from renal cell carcinomas. The ability to differentiate these tumors has a significant impact on treatment and prognosis[3,5]. The radiographic findings with intravenous pyelography (IVP) and angiography are similar. Ultarosongraphy may give a clue to the diagnosis, because it will show hyperechogenicity of the fat. Fat tissue produces typical images on CT, being more easily visualized by CT than MRI. In 95% of the case, a CT scan can differentiate angiomyolipoma from renal cell carcinoma. A radiolucent area within the mass indicates fat and is pathognomonic for angiomyolipoma[6-9]. If the margin of the tumor and kidney are indistinct or there is calcification within the mass, renal cell carcinoma should be suspected. Biopsy is not needed for the diagnosis and should be avoided because of risk of bleeding, which can lead to deterioration of renal function, sometimes necessitating nephrectomy.

In conclusion, periodic renal surveillance is indicated in children with TS complex to identify those with growing lesions who can be treated with embolization or partial nephrectomy before hemorrhage, which may result in loss of the kidney[3]. Renal ultrasonography must be performed every two to three years before puberty and yearly thereafter.

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