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# A 28-year-old patient with tuberous sclerosis associated with renal angiomyolipoma:A rare case report and literature review

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ABSTRACT

Tuberous sclerosis complex (TSC) is a genetically inherited disorder distinguished by the development of numerous benign neoplasms across multiple organ systems.

Renal angiomyolipoma represents 0.3% of all primary renal tumors and are classified as benign mixed mesenchymal neoplasms. In this report, we reported the clinical presentation of a 28-year-old individual who was received by the department of urology. The patient was admitted presenting with asymptomatic, macroscopic hematuria that had been ongoing for a period of 10 days. Subsequent diagnostic evaluations revealed an association between the presenting urinary condition and tuberous sclerosis complex with a concurrent renal angiomyolipom

## 1. Introduction

Tuberous sclerosis complex (TSC) is a genetic disorder characterized by the proliferation of multiple benign tumors in various organs, predominantly affecting the skin, brain, and kidneys. The prevalence of this condition is approximately 7–12 cases per 100,000 individuals.[1]

Renal angiomyolipoma constitutes only 0.3% of primary renal neoplasms and is a benign mixed mesenchymal tumor. It is characterized by a composite of abnormal vessels, immature smooth muscle cells, and adipose tissue. Two distinct types of angiomyolipoma exist, with 80% occurring as isolated cases and the remaining 20% being associated with the tuberous sclerosis complex. The solitary form of angiomyolipoma typically presents sporadically in the general population, predominantly affecting women in their fourth or fifth decade of life. However, the exact etiology and pathogenesis of the condition remain unclear.[2]

Possible alternative differential diagnoses may include neurofibromatosis type 1, Sturge-Weber syndrome, and von Hippel-Lindau disease, among other relevant conditions. To confirm a diagnosis of TSC, diagnostic tools such as magnetic resonance imaging (MRI), computed tomography (CT) scans, and genetic testing can provide effective assistance. Histologically, the detection of hamartomas, which are benign tumors comprised of an assortment of aberrant cellular elements, is indicative of TSC.[3]

The primary method of management for TSC involves providing supportive measures, which may include the administration of medications to alleviate symptoms as well as surgical intervention for tumor removal.[4] Herein, we present the case of a 28-year-old patient who was admitted to the urology department with the complaint of painless gross hematuria for 10 days that was accompanied by blood clots and oliguria. It turned out later that he had tuberous sclerosis complex associated with renal angiomyolipoma.

## 2. Case presentation

The patient, who was 28 years old and did not smoke or drink, was brought to the urology department complaining of 10 days of painless gross hematuria, which was followed by oliguria and blood clots. Upon doing a computed tomography (CT) scan, a kidney mass measuring 10

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× 15 cm was detected. The patient presents with a medical history of congenital deafness and mutism, intellectual impairment, and family skin lesions (Fig. 1), with the patient's brother and grandfather having comparable lesions. The patient had facial laser cauterization as a youngster for unknown reasons. Initial testing in the lab revealed: PLT: 264 × 10^9/L; HGB/HCT: 8.2 g/dL/27%.

After three blood units were transfused, the findings were as in Table 1.

A 12.5 × 10.5 cm soft tissue mass near the lower pole of the right kidney was discovered during a multi-section computed tomography (CT) scan of the abdomen and pelvis (Fig. 2). The tumor was connected to a non-functioning right kidney, had almost completely engulfed the kidney, and was immovable. There were clots of blood in the right renal vein, the bladder, and the ureter. There were many somewhat enlarged mesenteric lymph nodes in the mesenteric and pelvic areas, as well as around the abdominal aorta. The left kidney seemed to be functioning normally.

Clots that clogged the bladder were discovered during a cystoscopy and removed. There were no bladder tumors seen, and there was no ureteral orifice bleeding.

Specific skin lesions linked to the family history and renal masses were among the differential diagnoses that were taken into consideration. A tumorous right kidney with substantial surrounding adhesions, visible lymph nodes, and the absence of blood clots in the renal vein or inferior vena cava were among the operative findings. The periaortic lymph nodes were dissected along with a radical nephrectomy of the right kidney. Angiomyolipoma, which is typified by a combination of mature adipose tissue, smooth muscle, and blood vessels (hematoxylin and eosin stain), was confirmed to be the renal mass by histopathological analysis (Fig. 3). The ultimate diagnosis was tuberous sclerosis-related angiomyolipoma.

**Table 1**
Laboratory values.

| | | |
|---|---|---|
| PLT = 293 | | |
| Na/k = 139/3.5 | Ur/Cr = 41/1.45 | Glu = 97 |
| PT = 62% | W/N = 14/72% | HB/HCT = 10.6/34.5 |

## 3. Discussion

Approximately 1 in 50,000 people worldwide is thought to have tuberous sclerosis (TSC), an autosomal dominant disorder that affects multiple systems and is commonly diagnosed in children before the age of ten. Both males and females are equally susceptible to the condition, which can be diagnosed at any age.[1] Renal angiomyolipomas larger than 4 cm in diameter often present with flank pain, palpable masses, and hematuria. Kidney cysts, which occur in 30–45% of individuals with tuberous sclerosis, are associated with renal failure and hypertension.[2]

The severity of symptoms associated with tuberous sclerosis complex (TSC) varies widely, with many cases being asymptomatic.[1] TSC often presents with seizures and is frequently accompanied by significant cognitive impairment, with varying degrees of involvement of other organs.[2] Angiomyolipomas (AML) are common in individuals with TSC.[3] In our case, the patient presented with painless gross hematuria accompanied by blood clots, decreased urine output, hypomelanotic macules, facial angiofibromas, fibrofolliculomas, shagreen patches, confetti-like macules, and periungual fibromas.

The diagnosis of TSC can be established using the "Clinical

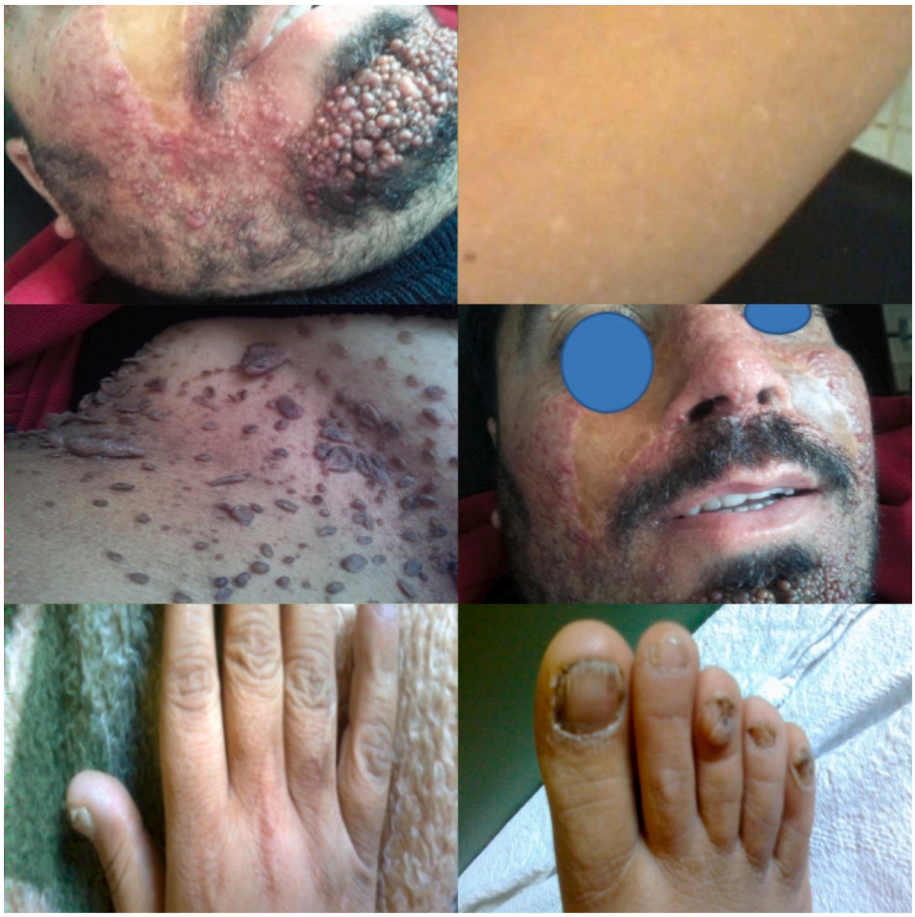

**Fig. 1.** Familial skin lesions.

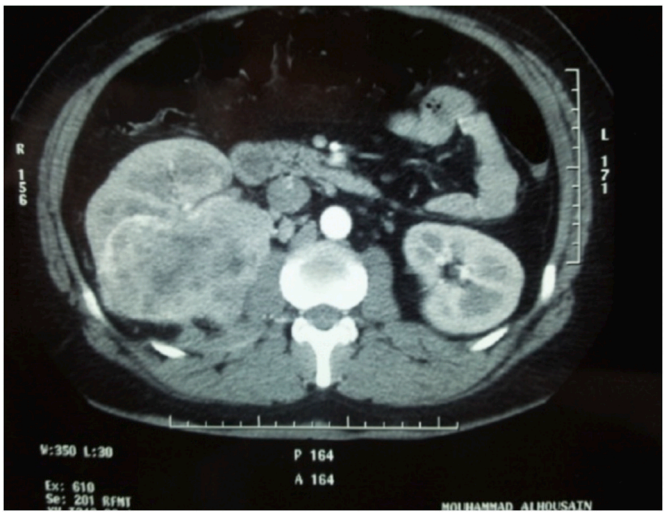


**Fig. 2.** A multi-section computed tomography (CT) scan of the abdomen and pelvis revealed a 12.5 × 10.5 cm soft tissue mass at the lower pole of the right kidney.

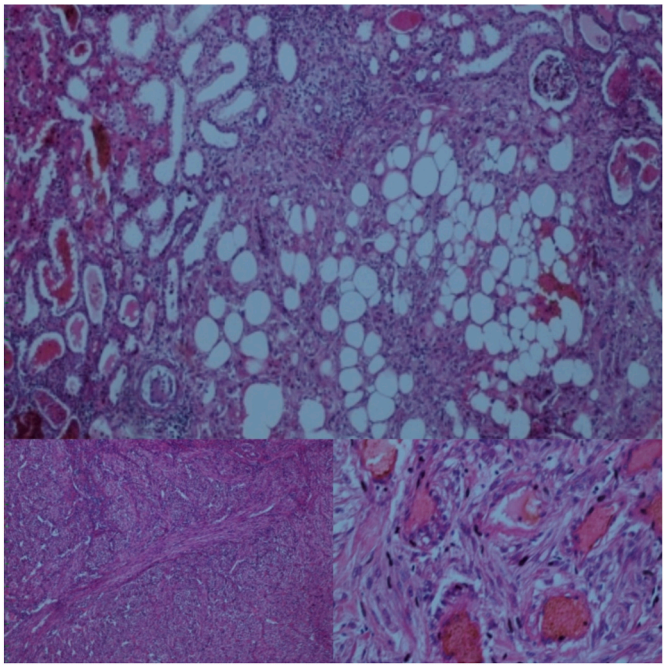

**Fig. 3.** Histopathological examination confirmed that the renal mass was an angiomyolipoma, characterized by a mixture of mature adipose tissue, smooth muscle, and blood vessels (hematoxylin and eosin stain).

Diagnostic Criteria" or "Genetic Diagnostic Criteria" as set forth by the International Tuberous Sclerosis Complex Consensus Group's 2021 recommendations for monitoring and management. A genetic diagnosis requires DNA from live cells showing pathogenic mutations affecting either TSC1 or TSC2 genes, independent of clinical symptoms. In contrast, the clinical diagnostic criteria consist of 7 minor features and 11 major features. For a definitive diagnosis, either more than two minor features or at least one major feature is required.[3–5] In this patient, the presence of a renal mass, distinct skin lesions, and a family history pointed to a diagnosis of TSC.

For the imaging workup of AML, MRI, CT, and ultrasound are utilized to detect the presence of fat within the lesions. Because renal cell carcinoma (RCC) and AML may share similar acoustic properties on imaging, CT is often used to evaluate the cases most likely to be AML. In instances where lesions lack visible fat content, more advanced imaging techniques, such as MRI, are helpful in confirming the diagnosis of AML.[4–6] In our patient, a multi-section CT scan of the abdomen and pelvis revealed a 12.5 × 10.5 cm immobile mass involving nearly the entire lower pole of the right kidney. Histopathology confirmed the diagnosis of angiomyolipoma.

Chronic renal disease is infrequently associated with TSC (2). Several differential diagnoses can be considered for macroscopic cystic renal lesions, including autosomal dominant polycystic kidney disease (ADPKD), TSC, von Hippel-Lindau disease, and mutations in the DICER1 gene.[6,7]

There are two things to think about while treating angiomyolipomas. First, there is the preventative procedure to lessen or stop the lesions from getting bigger. Mammalian targets of rapamycin inhibitors (mTORi) are advised as the first-line therapy for this preventative component. When angiomyolipoma lesions measure more than 3 cm, asymptomatic individuals may consider this prophylactic therapy.[6–8] A number of encouraging studies have recently revealed that individuals with tuberous sclerosis complex (TSC) may benefit from treatment by utilizing mTORC1 inhibitors to stop the growth of TSC tumors. This approach would provide a good safety profile and reduce angiomyolipoma volume by up to 50%. The particular binding of rapamycin to mTOR inhibits mTOR activity, which in turn promotes a decrease in cellular growth.[7–9] The side-effect load associated with mTOR inhibitors is substantial. Stomatitis, nasopharyngitis, headaches, coughs, hypercholesterolemia, and skin lesions resembling acne are among the common side effects.[3] Patients with complications like bleeding are treated in the second phase of the procedure.[9,10] Observation, embolization, and partial or complete nephrectomy are the available treatment options at this time. Treatment recommendations are often dependent on the patient's symptoms and the extent of the lesion. Lesions are categorized as small (less than 4 cm), medium (between 4 and 8 cm), or big (more than 8 cm) by Dickinson M et al. Conservative surgery is frequently necessary due to the multiplicity of these tumors and their bilaterality. Less than 4 cm tumors often exhibit no symptoms; therefore, routine monitoring is necessary and no action is necessary. The most erratic in behavior, medium-sized lesions need to be constantly monitored radiologically. In order to improve the likelihood of renal salvage, elective intervention should be started as soon as there are noticeable changes in the patient's size or symptoms. Large lesions, or those for which the diagnosis is unclear, necessitate the necessary drastic surgery.[4,5]

In this case, this patient underwent surgical treatment with a radical right nephrectomy and a complete perivascular lymphadenectomy and did not undergo drug therapy because he was poor.

## 4. Conclusion

In conclusion, the possible incidence of tuber sclerosis in patients with renal angiomyolipoma, especially if it is accompanied by the following skin symptoms: hypomelanotic macules, facial angiofibromas, molluscum pendulum, shagreen patches, confetti-like macules, and periungual fibroma, should be considered more, and vice versa.

## Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images and videos. A copy of the written consent is available for review by the editor of this journal.

## Ethics approval and consent to participate

Not applicable.

## Availability of data and material

Not applicable.

## Funding

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## CRediT authorship contribution statement

**Hasan Haydar:** Writing – review & editing. **Mouhammed Sleiay:** Writing – review & editing. **Mohammed Alqreea:** Writing – review & editing. **Ahmad Almohamed:** Writing – review & editing. **Doaa Alrajab:** Writing – review & editing. **Malak alsaleh:** Writing – review & editing. **Mohamad Yasin Lutfi:** Writing – review & editing.

## Declaration of competing interest

No conflict of interest.

## Acknowledgment

Not applicable.

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