Journal of Medical Imaging & Case Reports

https://doi.org/10.17756/micr.2020-037

Case Report

Open Access

A Case of Tuberous Sclerosis Without Cutaneous and Specific Neurological Symptoms, Presenting with Cardiorenal Manifestation

Michele Figuera[1], Alessio La Manna[2], Elnaz Rahbari[3] and Antonio Granata[3*]

[1]Radiology Unit - "Policlinico-Vittorio Emanuele" Hospital - Catania, Italy
[2]Cardiology Unit – Policlinico-Vittorio Emanuele Hospital - Catania, Italy
[3]Nephrology and Dialysis Unit - "Cannizzaro" Hospital, Catania, Italy

[*]Correspondence to:
Dr. Antonio Granata, MD
Nephrology and Dialysis Unit
Cannizzaro Hospital
Paradiso n°78/a I-95024 Acireale
Catania, Italy
Tel: +39 095 7435077
Fax: +39 095 7435195
E-mail: antonio.granata4@tin.it

Received: December 30, 2019
Accepted: March 02, 2020
Published: March 03, 2020

Citation: Figuera M, La Manna A, Rahbari E, Granata A 2020. A Case of Tuberous Sclerosis Without Cutaneous and Specific Neurological Symptoms, Presenting with Cardiorenal Manifestation. *J Med Imaging Case Rep* 4(1): 1-3.

Copyright: © 2020 Figuera et al. This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC-BY) (http://creativecommons.org/licenses/by/4.0/) which permits commercial use, including reproduction, adaptation, and distribution of the article provided the original author and source are credited.

Published by United Scientific Group

Abstract

Tuberous sclerosis complex is a rare disease characterized by the "classic triad" of seizures, mental retardation and facial angiofibroma. We describe a case of a young man who developed an unusual onset of tuberous sclerosis complex with cardiac and renal involvement in the absence of neither skin abnormalities nor common central nervous symptoms involvement such as seizure, developmental delay, behavioral problems.

Keyword

Tuberous sclerosis complex, Seizures, Mental retardation, Facial angiofibroma, Central nervous symptoms

Case Report

A 25-year-old man was admitted for syncope. He presented to the emergency department with tachycardia (HR:160 bpm) and hypotension (BP: 100/60 mmHg) and tachipnea (RR: 36 atti/min). Physical examination was normal. Past medical history was negative expect a recent episode of macrohematuria. Laboratory test upon admission was within the range, in spite of microhematuria and leukocyturia in urinalysis. ECG showed the presence of polymorphic ventricular tachycardia. The transthoracic echocardiogram showed interventricular septal fatty infiltration. Cardiac magnetic resonance confirmed the presence of fatty foci located in the myocardium of the interventricular septum (Figure 1). Due to the recent episode of macrohematuria, abdominal ultrasonography was performed, and it revealed the presence of multiple, bilateral renal angi fomyolipoma. Considering the presence of Iodine Allergy, abdominal and brain magnetic resonance were done which showed the presence of bilateral renal angiomyolipoma (Figure 2) and multiple subependymal brain nodules (Figure 3). Here, the diagnosis was made on the basis of diagnostic criteria of tuberous sclerosis complex (3 major clinical features as seen in table 1). As data from literatures suggest that mTOR inhibitors are indicated for patients who are not good candidates for surgical options, in consideration of symptomatic interventricular fatty infiltration, everolimus 4 mg/m^2 was started. According to some studies the dose of everolimus was then titrated in to achieve a serum trough concentration of 5 to 10 ng/mL [1-3]. Renal angiomyolipomas were monitored with ultrasonography and subependymal brain nodules with brain magnetic resonance.

Discussion

Tuberous sclerosis complex (TSC) is an inherited autosomal dominant

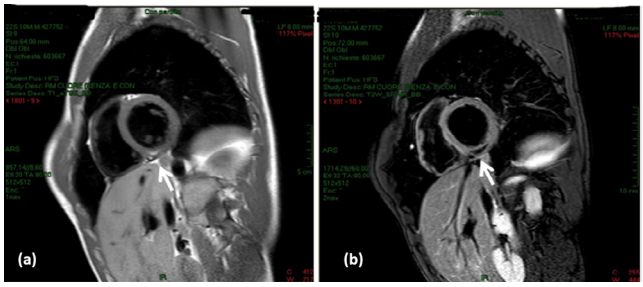

Figure 1: (a) T1-weighted and **(b)** T2-weighted short-axis cardiac magnetic resonance techniques show intramural high signal fatty foci and fat suppression, respectively at basal inferior segment (white arrow).

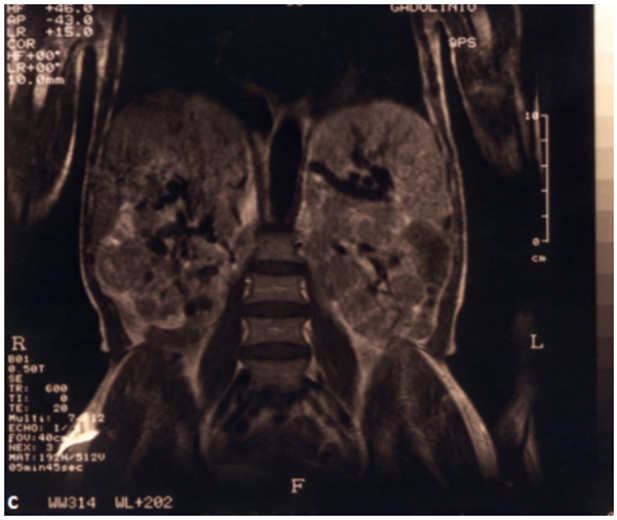

Figure 2: Bilateral renal AML.

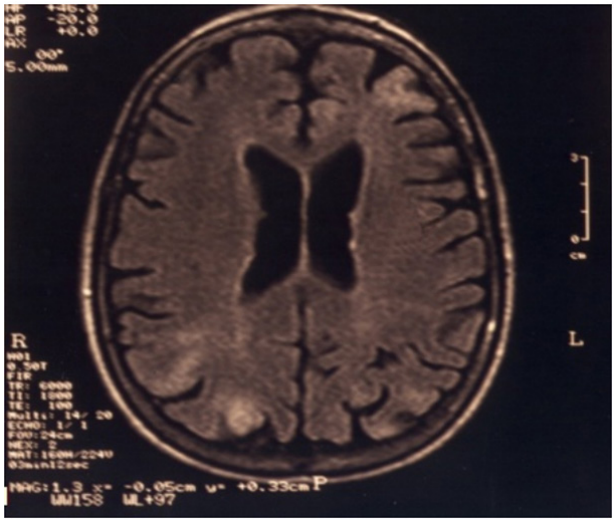

Figure 3: Multiple subependymal brain nodules

genetic with multi organ systems involvement, including multiple benign hamartomas of the brain, eyes, heart, lung, liver, kidney, and skin. The diagnosis of TSC can be made clinically or through genetic testing which confirm the mutation in either the TSC1 gene or the TSC2 gene. TSC is characterized by presence of multiple benign tumors in different organs, including the brain, heart, skin, eyes, kidney, lung, and liver with an increased risk of malignancy in TSC (Table 1).

Table 1: Diagnostic criteria of tuberous sclerosis complex.

Major Clinical Changes	Minor Clinical Features
Hypomelanotic macules (≥ 3, atleast 5 mm diameter)	Skin lesions (1 to 2 mm hypomelanotic macules
Angiofibromas (≥3) or fibrous cephalic plaque	Dental enamel pits (≥3)
Ungual fibromas (≥2)	Intraoral fibromas (≥2)
Shagreen patch (connective tissue nerves)	Retinal achromic patch
Multiple retinal hamrtomas	Multiple renal cysts
Coritcal dysplasias (includes tubers and cerebral white matter radical migration lines)	Nonreal hamartomas
Subependymal nodules	
Subependymal giant cell astrocytoma	
Cardiac rhabdomyoma	
Lymphangioleiomyomatosis (LAM)*	
Angiomyolipomas (≥2)	

Definite TSC: Two major clinical features, or one major and two or more minor clinical features.

Possible TSC: Either one major clinical feature or two or more minor clinical features.

Fifty percent of individuals with TSC have cardiac involvement, mostly rhabdomyomas.

Rhabdomyomas are benign tumors which can be focal, diffuse or infiltrating type [4]. Tumors are typically located in the ventricles, are able to compromise ventricular and valve function or even can result in outflow obstruction. If they are located in the atria, they will be able to compress the coronary arteries [5].

Echocardiography is the imaging modality of choice for assessing cardiac involvement in TSC. Cardiac magnetic resonance imaging (MRI) also provide more findable details about ventricular systolic function and more information for surgical planning. mTORs are indicated for TSC-associated tumors in different organs, but to our knowledge a few studies exist about the effects of mTOR on cardiac rhabdomyomas [2, 3, 6, 7]. The origin of TSC is an inactivating mutation in the genes encoding either hamartin (TSC1) or tuberin (TSC2), which normally act to inhibit mammalian target of rapamycin to regulate cell growth and proliferation [8].

Renal angiomyolipomas occur in approximately 50-80% of tuberous sclerosis patients. In almost all cases they are asymptomatic and less frequently they present with a flank pain, a palpable tender mass or gross hematuria. Indeed, clinical onset of TSC with sudden hemorrhage is rare [9].

Conclusion

Tuberous sclerosis complex is a rare disease and it is usually characterized by the "classic triad" of seizures, mental

retardation and facial angiofibroma. The case we describe represents an unusual onset of tuberous sclerosis complex, in the absence of neither skin abnormalities nor common central nervous symptoms involvement such as seizure, developmental delay, behavioral problems. It is important to keep this syndrome in mind in the presence of cardiac fatty foci, even in the absence of the classic diagnostic criteria.

Disclosures

None.

References

1. Hinton RB, Prakash A, Romp RL, Krueger DA, Knilans TK, et al. 2014. Cardiovascular manifestations of tuberous sclerosis complex and summary of the revised diagnostic criteria and surveillance and management recommendations from the International Tuberous Sclerosis Consensus Group. *J Am Heart Assoc* 3(6): e001493. https://doi.org/10.1161/JAHA.114.001493
2. Castro-Monsalve J, Alvarado-Socarras JL, Mantilla KA, Forero L, et al. 2018. Cardiac rhabdomyomas in tuberous sclerosis complex. *J Pediatr* 192: 264. https://doi.org/10.1016/j.jpeds.2017.09.050
3. Bornaun H, Öztarhan K, Erener-Ercan T, Dedeoğlu R, Tugcu D, et al. 2016. Regression of Cardiac rhabdomyomas in a neonate after everolimus treatment. *Case Rep Pediatr* 2016: 8712962.
4. Franz DN. 2018. Which cardiac findings are characteristic of tuberous sclerosis complex (TSC)? Eds: Kao A. Medscape.
5. Freedberg RS, Kronzon I, Rumancik WM, Liebeskind D. 1988. The contribution of magnetic resonance imaging to the evaluation of intracardiac tumors diagnosed by echocardiography. *Circulation* 77(1): 96-103. https://doi.org/10.1161/01.cir.77.1.96
6. Tiberio D, Franz DN, Phillips JR. 2011. Regression of a cardiac rhabdomyoma in a patient receiving everolimus. *Pediatrics* 127: e1335-e1337. https://doi.org/10.1542/peds.2010-2910
7. Mlczoch E, Hanslik A, Luckner D, Kitzmüller E, Prayer D, et al. Prenatal diagnosis of a gigantic cardiac rhabdomyoma in tuberous sclerosis complex- a new therapeutic option with everolimus. *Ultrasound Obstet Gynecol* 45(5): 618-621. https://doi.org/10.1002/uog.13434
8. Dahdah N. 2017. Everolimus for the treatment of tuberous sclerosis complex–related cardiac rhabdomyomas in pediatric patients. *J Pediatr* 190: 21-26. https://doi.org/10.1016/j.jpeds.2017.06.076
9. Granata A, Basile A, Figuera M, Mignani R, Fiore CE. 2009. Spontaneous retroperitoneal hemorrhage due to massive rupture of renal angiomyolipoma treated with nephrectomy: an unusual onset of tuberous sclerosis complex. *Clin Nephrol* 71(4): 441-444. https://doi.org/10.5414/cnp71441