

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/radcr

Case Report

Renal hematuric angiomyolipomas embolization: three cases and literature review [☆]

Ahoury N'guessan Judicael, MD^{a,*}, Salvatore Murgio, MD^b, Touré Aboulaye, MD^c, Fadi Tannouri, MD^b, Brou Késsé Marc Antoine, MD^a

^aDepartment of Radiology, Cardiology Institute, Abidjan, Côte d'Ivoire

^bDepartment of Angiography, Erasme Hospital in Brussels, Belgium

^cDepartment of Radiology, University Hospital in Cocody, Côte d'Ivoire

ARTICLE INFO

Article history:

Received 24 August 2021

Revised 1 October 2021

Accepted 2 October 2021

ABSTRACT

We report three cases of hemorrhagic renal angiomyolipoma successfully treated using embolization. Endovascular management of this complication is highlighted.

© 2021 The Authors. Published by Elsevier Inc. on behalf of University of Washington.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Keywords:

Angiomyolipoma

Hematuria

Embolization

Introduction

An angiomyolipoma (AML) is a benign kidney tumor consisting of fat tissue, smooth muscle cells and significant neovascularization. Such rich neovascularization can lead to spontaneous hemorrhage, causing hematuria and/or retroperitoneal hematoma in association with back pain [1]. While total or partial hemostatic nephrectomy can be used as a first-line treatment, embolization appears to be an effective and less invasive therapeutic alternative [2]. We report three cases admitted for hematuria, in whom imaging revealed a bleeding complication of a renal angiomyolipoma, successfully treated with embolization.

Observations

Case 1: A 41-year-old woman without relevant medical and surgical history was admitted for pain in right hypochondrium and flank, associated with a Murphy sign. An ultrasound revealed a heterogeneous lower hyperechoic mass in the right kidney. Computed tomography (CT) showed a lower right angiomyolipoma of 71mm, associated with an arterial aneurysm (versus pseudo-aneurysm) (Fig. 1A, B) and perirenal fat haematic infiltration. The hemoglobin level was 11g/dl. Endovascular approach with embolization using microparticles(300-500 μ m) in order to occlude the distal intratumoral vessels and coils for the feeding arteries and the

[☆] Competing Interests: The authors declare no conflicts of interest.

* Corresponding author.

E-mail address: ahouryjudi@yahoo.fr (A.N. Judicael).

<https://doi.org/10.1016/j.radcr.2021.10.009>

1930-0433/© 2021 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)



Fig. 1 – A-B; Enhanced CT showed a lower right angiomyolipoma with a perirenal hematoma, an intratumoral aneurysm versus pseudo-aneurysm (arrow). **c;** Enhanced CT performed one month after the embolization showed mass and partial renal parenchyma infarction (arrow)



Fig. 2 – A-B; CT with axial(A) and coronal(B) multiplanar reconstruction showed a left upper angiomyolipoma (stars) with a perirenal fat hematic infiltration (arrow). **C:** Arteriography showed a selective embolization injection with microparticles (arrow)

aneurysm was performed. No complication was noted. The follow-up CT performed after one month showed satisfactory devascularization of the angiomyolipoma (Fig. 1, C). One-year follow-up demonstrated the preservation of renal function, tumor shrinkage with no residual enhancement.

Case 2: A 58-year-old woman without relevant medical history except for arterial hypertension was admitted for lumbar pain radiating into the left inguinal and epigastric area. Patient also presented nausea, vomiting and haematuria. An abdominal CT revealed a left renal upper heterogeneous angiomyolipoma of 87 mm with active bleeding (Fig 2A, B) and a peri-renal hematic infiltration. The patient was hemodynamically stable with a hemoglobin level of 10g/dl. Embolization with microparticles (300-500 μ m and 500 -700 μ m) was successfully performed (Fig 2, C). The clinical and paraclinical exams demonstrated the preservation of renal function and no complications after a one-year follow-up.

Case 3: A 32-year-old woman without relevant medical history was admitted to the emergency department for a macroscopic hematuria associated with severe right lumbar pain. An abdominal CT showed a typical large heterogeneous right renal angiomyolipoma of 65 mm including fat tissue (Fig. 3A, B). There were also two small angiomyolipoma's of the left kidney, of 14 mm and 20 mm. Embolization was successfully performed using microparticles (300-500 μ m) and coils (2-10 mm maximal diameter and total length 20-140 mm) (Fig 3,C). The clinical and paraclinical exams showed the preservation of renal function and no complication after one year follow-up.

Discussion

Renal angiomyolipoma is most often discovered incidentally during imaging studies such as ultrasound, CT or MRI [3,4].

In its typical form, angiomyolipoma presents on ultrasonography as a rounded, well-circumscribed renal hyperechoic mass (compared to the renal cortex) and abdominal CT often enables confirmation of the positive diagnosis of angiomyolipoma, thanks to the demonstration of a fatty component within the renal mass, characterized by negative densities (classically inferior to -10 Hounsfield Units) [3,4].

In our case, we observed heterogeneous renal masses with fat density ranging from -10 HU to -40 HU.

In some cases, the revelation may be noisy, marked by back pain, high blood pressure, hematuria, or even a state of shock related to massive intra or peri-renal bleeding [5,6].

The different risk factors for hemorrhage in renal angiomyolipoma are well identified: the size of the tumor (more than four centimeters), multifocality and significant neovascularization [7,8].

Those tumors were previously managed by surgery. Endovascular approach is a less invasive technique offering a lower mortality and morbidity rate and preserve better the renal function [2]. Embolization is indicated for symptomatic angiomyolipoma or for preventive purposes when the mass is large, usually greater than four centimeters. The main in-

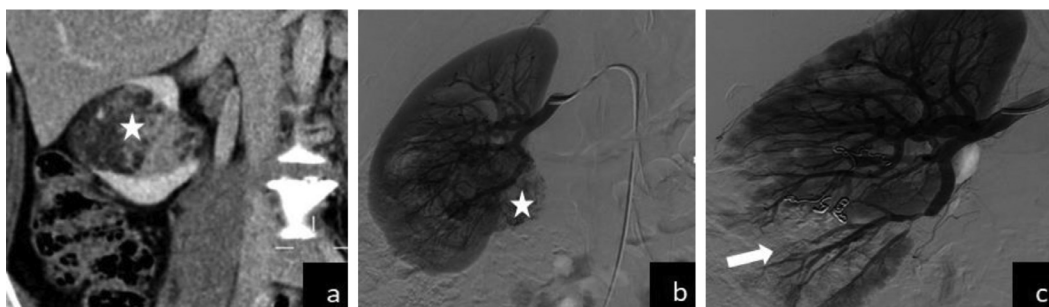


Fig. 3 – A: CT with frontal reconstruction: right renal angiomyolipoma (star) including fat tissue. B: Renal arteriography: opacification of the renal parenchyma and of the angiomyolipoma (star). c: Renal arteriography showing devascularization of angiomyolipoma (arrow)

dications of embolization are the size of the mass and/or a significant neovascularization [9]

Our three patients presented with severe pain and hematuria. One had a massive macroscopic hematuria probably related to the rupture of an intra-tumoral aneurysm or pseudoaneurysm. The objectives of emergency embolization are first to ensure hemostasis preserving a better renal function.

Embolization was successfully performed in our three cases using microparticles and/or coils. No complication was noted.

Clinical follow-up was generally simple and CTs showed tumor volume reduction and infarction. Several authors have reported 100% success rates [2,5,6,9,10]. Nevertheless embolization may be incomplete. Rare complications such as allergic reactions 0.6%, non-targeted embolization 2.3%, respiratory complications 2.0%, retroperitoneal hemorrhage 1%, and lesions of the punctured femoral artery, were reported in the literature review conducted by Murray and al [11]. However, these complications are not life-threatening.

Conclusion

Renal angiomyolipoma are usually incidental findings. When symptomatic, hematuria and retroperitoneal bleeding are common.

Percutaneous embolization is a minimal invasive technique with a high successful rate a very low rate of mortality and morbidity and a better preservation of renal function comparing to open surgery. It should be considered as a first line treatment.

REFERENCES

- [1] Bissler JJ, Kingswood JC. Renal angiomyolipomata. *Kidney Int* 2004;66:924–34.
- [2] Dabbeche C, Chaker M, Chemali R, et al. Role of embolization in renal angiomyolipomas. *J Radiol* 2006;87:1859–67.
- [3] Kurosaki Y, Tanaka Y, Kuramoto K, et al. Improved C.T. fat detection in small kidney angiomyolipomas using thin sections and single voxel measurements. *J. Comput. Assist. Tomogr.* 1993;17:745–8.
- [4] Lemaitre L, Claudon M, Dubrulle F, et al. Imaging of angiomyolipomas. *Seminars in ultrasound. C.T. and M.R.I.* 1997;18:100–14.
- [5] Khaitan A, Hemal AK, Seth A, et al. Management of renal angiomyolipoma in complex clinical situations. *Urol. Int.* 2001;67:28–33.
- [6] Radeleff B A, Heye Tobias, Lopez-Benitez R. Interventional management of acute bleeding giant renal angiomyolipoma: Report of three cases and review of the literature. *Euro J Radiol Extra* 2007;61:119–28.
- [7] Lemaitre L, Robert Y, Dubrulle F. Renal angiomyolipoma: growth followed up with C.T. and/or U.S. *Radiology* 1995;197:598–602.
- [8] Teichgraber KMU, Bucourt DM. Massive retroperitoneal hemorrhage from a giant renal angiomyolipoma treated by selective arterial embolization with an Amplatzer Vascular Plug II. *Acta Radiologica Short Reports* 2012;1:3.
- [9] Rosenov A, Schindewolf M, Baumgartner I, et al. Selective arterial embolizations of renalangiomyolipomas using 96% ethanol: a case series of 5 patients. *Clinical Medicine Insights: Case Reports* 2020;13:1–7.
- [10] Wang C, Yang M, Tong X, et al. Transarterial embolization for renal angiomyolipomas: a single center experience in 79 patients. *J. Int Med Res* 2017;45:706–13.
- [11] Murray TE, Doyle F, Lee M. Transarterial embolization of angiomyolipoma: a systematic review. *J. Urol.* 2015;194:635–9.