

# Renal artery aneurysm mimicking a solid parenchymal lesion

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**Abstract** A 40-year-old woman was referred to our department for further investigation of a renal mass identified at an ultrasound (US) examination carried out in a private clinic because of abdominal pain. The mass was oval and hypoechoic, measured about 20 mm in diameter and was located near the left renal sinus; color Doppler showed peripheral blood flow. US examination carried out in our department using different equipment confirmed the presence of the mass but revealed intralesional blood flow suggesting aneurysm. This diagnosis was confirmed at subsequent computed tomography (CT) scanning and magnetic resonance imaging (MRI). The patient refused to undergo surgery and she is currently being monitored and has suffered no sequelae.

**Keywords** Aneurysm · Color Doppler · Renal mass · Ultrasound

**Riassunto** Una donna di 40 anni giungeva alla nostra osservazione per la rivalutazione di una formazione renale identificata ad un esame ecografico effettuato esternamente per dolore addominale. Tale formazione, ovalare ipoecogena di circa 20 mm, era localizzata a livello del seno

renale di sinistra e mostrava al color Doppler segnale vascolare perifericamente. Il controllo ecografico da noi eseguito con apparecchiatura più performante confermava la presenza della formazione evidenziando tuttavia segnale vascolare al suo interno e ponendo il sospetto di aneurisma, confermato poi ai successivi esami TC ed RM. La paziente rifiutava di sottoporsi ad intervento chirurgico terapeutico ed è tuttora in follow-up senza sequele.

## Introduction

Renal artery aneurysms account for 22 % of all visceral artery aneurysms, and the prevalence in the general population is between 0.01 and 1 % [1]. These lesions seem to occur more frequently in women than in men, and they are usually solitary [2]. We report a case of intraparenchymal renal artery aneurysm mimicking an expansive solid mass.

## Description of the case

An otherwise healthy 40-year-old woman was referred to our department for further investigation of a mass in the left kidney identified at an ultrasound (US) examination carried out in a private clinic because of abdominal pain. The examination was performed using Logiq 500 US machine and revealed an oval, hypoechoic mass located in the middle third of the left kidney with finely irregular margins and measuring about  $22 \times 20$  mm in diameter; color Doppler showed peripheral blood flow (Fig. 1).

A solid lesion was suspected and the patient therefore underwent another US examination in our department

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**Fig. 1** Transverse scan of the left kidney showing a hypoechoic mass with no intralesional vascular signal

10 days later using Toshiba Aplio US system and a 2–5 MHz convex probe. Grey-scale US imaging confirmed the presence of the lesion as described above. However, color Doppler also revealed intralesional blood flow (Fig. 2) which communicated with a branch of the renal artery, thus suggesting aneurysm. This suspected diagnosis was confirmed after administration of intravenous contrast agent (SonoVue) (Fig. 3). Contrast-enhanced CT showed a saccular aneurysm measuring  $9 \times 9$  mm located at the bifurcation of the left renal artery with peripheral parietal thrombus and eccentric patent lumen (Fig. 4). In anticipation of embolization treatment, the patient also underwent MRI to evaluate the neck of the aneurysm. However, this examination was inconclusive (Fig. 5).

The patient subsequently refused to undergo angiography for a definitive characterization of the aneurysm, and

she also refused a possible endovascular procedure or surgical treatment of the lesion. She is currently undergoing clinical and instrumental follow-up and has suffered no complications. Informed consent was obtained from the patient for the publication of this case report and accompanying images.

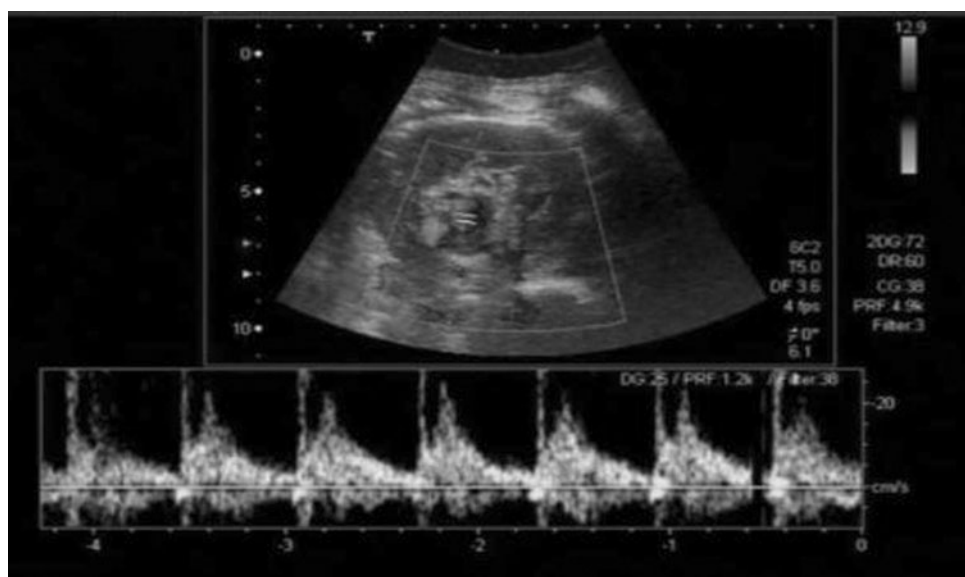
## Discussion

The most frequent conditions associated with aneurysm formation are atherosclerosis and renal artery fibrodysplasia [3], but aneurysm may also occur in connection with trauma, inflammatory diseases, polyarteritis nodosa, cigarette smoking and congenital disorders [4]. Aneurysm is often diagnosed incidentally in the course of investigation for hypertension, hematuria or abdominal pain. It is usually asymptomatic and few patients have specific symptoms, which are mainly caused by rupture, peripheral embolism or thrombosis [5]. About 70 % of aneurysms are associated with arterial hypertension [4]. In the present case, the patient had no history of congenital collagen disease and she was not affected by hypertension.

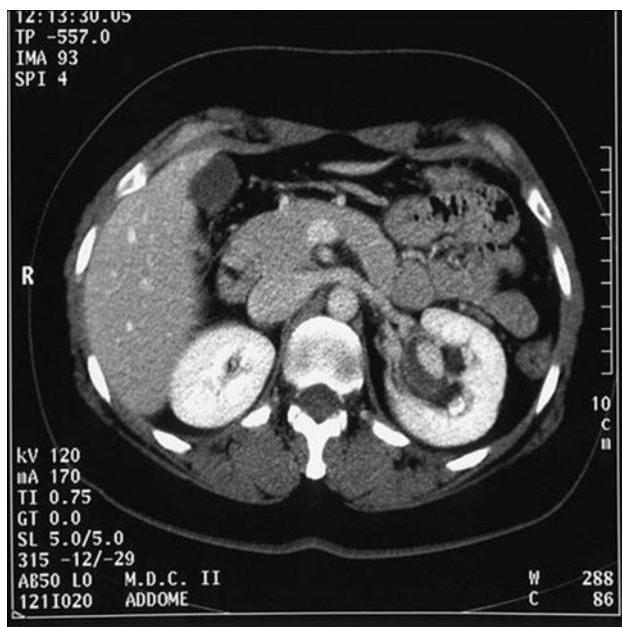
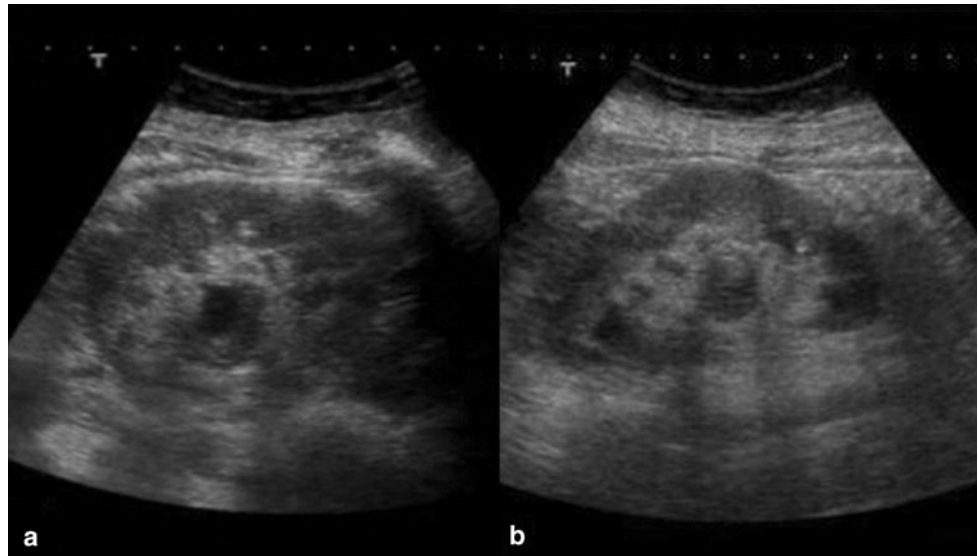
Most aneurysms are saccular lesions. The most frequent location is the bifurcation of the main renal artery, and in 90 % of cases the lesion is extraparenchymal [6], as in the present case.

US examination is often the first step in the diagnosis of renal aneurysm, and color Doppler provides additional information useful for differentiating an aneurysm from a solid renal lesion, cyst or hydronephrosis. Color Doppler evidences the presence of intralesional turbulent flow in communication with the renal artery; however, flow signal may not always be detectable due to the presence of

**Fig. 2** Transverse scan of the left kidney showing a hypoechoic mass with turbulent intralesional flow



**Fig. 3** The aneurysm before (a) and after (b) administration of contrast agent

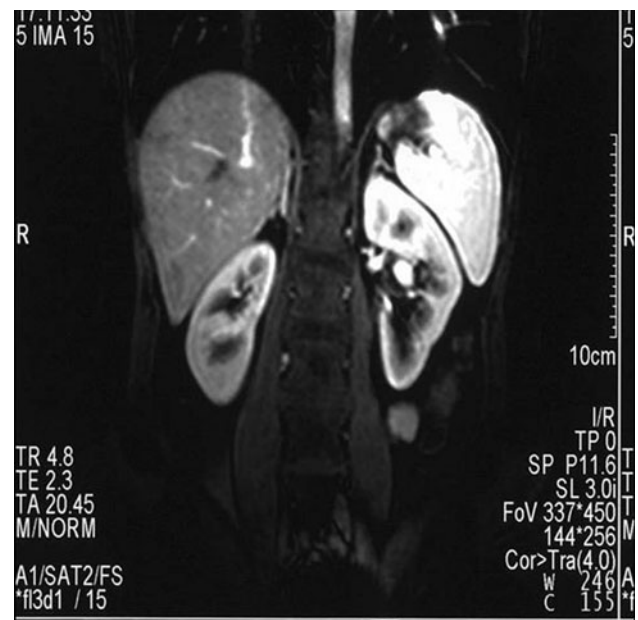


**Fig. 4** Abdominal contrast-enhanced CT showing partially thrombosed renal artery aneurysm

calcification or thrombosis [7]. CT and MRI are essential for an accurate evaluation of the size, location and characteristics of the aneurysm [8, 11].

In this patient, the initial US examination did not show the characteristic vascular signal indicating the presence of an aneurysm, but the use of more sensitive US equipment and administration of contrast agent made it possible to make a correct diagnosis which was confirmed using “second-level” diagnostic techniques.

Appropriate treatment of a renal aneurysm depends on the patient’s age, sex and blood pressure as well as the characteristics of the aneurysm, and it is carried out to prevent rupture which is the most feared complication [9];



**Fig. 5** Contrast-enhanced coronal MRI scan evidencing the presence of aneurysm in the left renal sinus

particularly young pregnant women are at risk of rupture [10]. If the lesion measures less than 20 mm in diameter, is asymptomatic and presents no risk factors for rupture, clinical and instrumental follow-up may be sufficient. If the lesion exceeds 20 mm in diameter, if the patient is a young woman or affected by hypertension unresponsive to medical therapy or there is sign of peripheral embolism, the aneurysm requires endovascular or surgical treatment. Endovascular treatment may involve stenting or coil embolization if it is a narrow-necked aneurysm [5, 6, 12].

The present patient had a borderline lesion, but there was no apparent risk of rupture, so she refused treatment

and she is currently undergoing clinical and instrumental follow-up and has suffered no complications.

In conclusion, renal artery aneurysm should be included in the differential diagnosis if a mass is identified near the renal sinus, particularly if no vascular signal is exhibited at color Doppler examination, as aneurysm may mimic a solid or cystic lesion.

**Conflict of interest** V. Vitale, M. Di Serafino, and G. Vallone declare that they have no conflict of interest.

**Informed consent** All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2005 (5). Informed consent was obtained from all patients for being included in the study.

**Human and animal studies** This article does not contain any studies with human or animal subjects performed by the any of the authors.

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