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Case Report

Renal Artery Aneurysm Presenting with Hematuria

A. Qarro, M. Ghadouane, Y. Elharrech, R. Zaini, A. Ameur and M. Abbar

Urological Clinic, Military Hospital Mohamed the Fifth, Rabat, Morocco

ABSTRACT

Renal artery aneurysm is a relatively uncommon form of renovascular disease. Early diagnosis by appropriate imaging is essential in order to avoid emergency nephrectomy for rupture. We report a 78 year old man who presented with gross hematuria. Doppler ultrasound and CT showed aneurysm of the right renal artery. Because of hemodynamic instability, right nephrectomy was performed with a good outcome.

Key Words: Renal artery, aneurysm, treatment

Corresponding Author: Dr. Abdelmounaim Qarro, n°: 154, Bloc: D, OLD OJH, Kenitra, Morocco, Email: abdelmounaimqarro@yahoo.fr

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INTRODUCTION

Renal artery aneurysm (RAA) is a localized dilatation of the artery secondary to weakness of the arterial intima and media. Most RAAs are small (1–2 cm) and unilateral. The etiology of RAA is either congenital or acquired. The malformation is usually diagnosed by Doppler ultrasound, computerized tomography or renal angiography[1]. We report a patient who presented with macroscopic hematuria secondary to RAA.

CASE REPORT

The patient, a 78-year old man, presented with total, macroscopic hematuria for 10 days. Physical examination revealed right lumbar fossa tenderness. Abdominal ultrasound revealed right hydronephrosis with a lesion in the hilum of the kidney measuring 52mm in diameter and communicating with the renal pedicle. Doppler ultrasound showed enlargement of the right renal artery (52-44 mm) with atheroma and calcification, compatible with a saccular aneurysm of the right renal artery. There was no arterialisation of venous flow in the kidney.

Contrast-enhanced computerized tomography revealed a large right kidney with subcapsular hematoma. There were two lesions showing enhancement after IV contrast injection, compatible with intra-renal aneurysm of the right renal artery (Fig. 1). The nephrogram phase of the right kidney was hypodense. During follow-up there was aggravation of the hematuria with hemodynamic instability which required urgent nephrectomy. Pathologic study of the operative specimen showed aneurysmal dilatation of the renal artery communicating with the excretory system, with necrosis and pyelonephritis. Postoperative recovery was good.

DISCUSSION

RAA is uncommon. Rouppe (1770) described the first case in a sailor who died after a fall on his right flank. Autopsy revealed a large false aneurysm with rupture. Rouppe stated that RAA accounts for nearly 20% of all visceral aneurysms[1,2]. The incidence of RAA varies according to the way of diagnosis, from 0,009 % in an autopsy study to

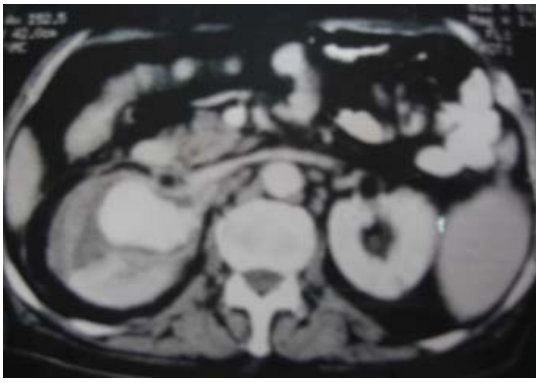

Fig. 1: CT scan shows intrarenal aneurysm of the right renal artery.

0.1-1.5 % in patients with hypertension who underwent arteriography[1]. The incidence was 0.3% in patients who underwent aortography, and 1.5% in a series of kidney donors[3].

Poutasse has classified these malformations into saccular, fusiform, dissecting, false and intrarenal aneurysms[4]. On average, patients' age ranged from 40–60 years. Extraparenchymal aneurysms predominate, comprising approximately 85% of RAA, and the rest (15%) are intraparenchymal. Of the extraparenchymal type, 70% are saccular, 20% fusiform and 10% dissecting. Of patients with RAA, 20% present with bilateral and 30% with multiple aneurysms. RAA occurs equally in men and women, although ruptures are more common in reproductive-aged women.

Most often, RAA is asymptomatic. Sometimes patients present with hypertension, hematuria, lumbar pain and, rarely, a palpable mass. They may present with hemorrhagic shock and pain due to dissection, thrombosis, renal infarct, rupture or bleeding into the excretory system with hematuria[1,3]. Factors predisposing to complications are hypertension, pregnancy, absence of calcification of the wall, and diameter >1.5 cm[1,3]. During pregnancy the risk of rupture is increased due to increased blood flow, intra-abdominal pressure and vascular changes secondary to increased steroid production. Rupture may cause mortality for both mother and foetus[5,6].

RAA can be secondary to Takayasu arteritis, fibro-muscular dysplasia, Kawasaki disease, polyarteritis nodosa, tuberculosis, neurofibromatosis, or Ehlers-Danlos syndrome[7]. RAA may appear as a vascular complication after kidney transplantation. It occurs in less than 1% of recipients, but can cause hypertension, renal dysfunction and even graft loss[8]. Mycotic RAA may be secondary to immunosuppression after renal transplantation[9].

The diagnosis may be confirmed with Doppler ultrasound, arteriography or spiral CT imaging. CT angiography and 3-dimensional reconstruction allow accurate pre-interventional planning by defining the precise size and location of the aneurysm, the presence of calcification, thrombosis or dissection. Magnetic resonance angiography (MRA) with gadolinium enhancement and 3-dimensional reconstruction can produce images similar in quality to those obtained with arteriography. Imaging studies can also differentiate between fibro-muscular dysplasia and pseudo-aneurysm, which may occur after kidney biopsy, penetrating (stab or gunshot) renal trauma, percutaneous nephrostomy or nephrolithotomy, endopyelotomy, ureteroscopy or endoscopic fulguration of upper urinary tract transitional cell carcinoma[10-14]. Renal artery pseudo-aneurysm may present many years after the injury. In cases of hematuria, flank pain and CT showing a tumour in the renal hilum, the patient should be questioned about previous abdominal trauma, as pseudo-aneurysms can rupture many years after the causative injury[14].

Endovascular treatment of RAA involves a stent graft placed under angiographic control across the neck of the aneurysm to exclude it from the circulation and preserve distal flow[15,16]. The stent is placed via a percutaneous femoral approach[17]. Angiography, which confirms the diagnosis, allows selective embolization of pseudo-aneurysms arising from interlobular arteries inside the parenchyma of the kidney[18-20]. It is minimally invasive, safe, effective for control of haemorrhage from a pseudo-aneurysm, and specifically indicated in patients with haemodynamic instability[19,22,23].

Surgery to prevent rupture is indicated for aneurysms >1.5cm in diameter, those asso-

ciated with pregnancy, and when the size of the aneurysm has increased on sequential angiography[3]. The objective of surgery is patch angioplasty using autologous saphenous vein, internal-iliac artery graft or prosthetic material[24]. It can be performed in vivo to reduce ischaemic time[3,25] or ex vivo, especially for intrarenal aneurysms, with auto-transplantation in the iliac fossa[3, 25-29]. RAA resection and reconstruction have been guided by a robot-assisted laparoscopic approach[30]. Nephrectomy is indicated for multiple intrarenal aneurysms, renal atrophy, infarct or prior failed revascularization, and may be inevitable for ruptured RAA[3,28]. The prognosis after rupture of RAA has improved in the last few decades, but rupture during pregnancy still carries a high mortality rate (56% for the mother and 78% for the fetus)[6].

RAA is rare, and often incidentally discovered during imaging. The treatment of choice is endovascular (angio-embolization or stent grafting under angiographic control). Follow-up with angiography is recommended to avoid emergency nephrectomy for rupture of RAA.

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