CASE REPORT

Therapeutic Embolisation for Right Renal Arteriovenous Malformation

TK Tsang, CM Chan, MK Chan, AKH Lai, WK Wong

Department of Radiology and Imaging, Queen Elizabeth Hospital, Kowloon, Hong Kong

ABSTRACT
Renal arteriovenous malformations are abnormal communications between the intrarenal arterial and venous systems. These malformations are either congenital or acquired (often by iatrogenic means). Renal arteriovenous malformations are usually identified during the evaluation of gross haematuria. Treatment can be tailored to the individual patient. Options for therapy range from observation to embolisation to nephrectomy. This report is of a patient with right renal arteriovenous malformation that was successfully managed by percutaneous transfemoral embolisation.

Key Words: Arteriovenous malformations; Hematuria; Kidney; Therapeutic embolization

INTRODUCTION
Haematuria is the initial sign in most patients (up to 75%) with renal arteriovenous malformation (AVM). In the past, partial or total nephrectomy and arterial reconstruction were the most common methods of treatment. Transcatheter arteriographically directed embolisation has now gained widespread acceptance. This report is of a 55-year-old woman in whom congenital renal AVM was the cause of haematuria, who was successfully treated with angiographic embolisation.

CASE REPORT
A 55-year-old woman presented in 2006 with a history of haematuria since 2002. Intravenous urography and retrograde pyelogram at that time showed a small lobulated filling defect in the interpolar calyx of the right kidney. Subsequent ureteroscopy found that there was a pulsatile prominent vessel protruding into the calyceal lumen. Conservative treatment was adopted as the haematuria spontaneously subsided. There was no evidence of a urinary tract stone or malignancy, and follow-up magnetic resonance imaging (MRI) and computed tomography (CT) scan of the kidneys revealed no renal mass or abnormal vasculature.

The patient presented in 2006 with gross haematuria and right loin pain. Her haemoglobin level decreased from 117 g/L to 88 g/L (normal range, 120-150 g/L). Although no renal derangement was detected by renal function test, abundant red blood cells were seen in the urine sample. Flexible cystoscopy revealed blood clots in the right ureter and fresh blood was seen trickling from the right kidney. An angiographic examination of the right kidney was undertaken to determine the cause of the persistent haematuria. A right percutaneous transfemoral selective bilateral renal angiography was done using a 0.035 J tip guide wire, 5 F angiographic Sidewinder 1 catheter and 2.7 F Progreat Micro Catheter System (Terumo, New Jersey, USA). The vasculature of the left kidney was normal. Increased vasculature with an early draining vein was detected at the interpolar region of the right kidney. An AVM with prominent arterial feeder (Figure 1) and immediate filling of the renal vein and inferior vena cava was noted in the arterial phase (Figure 2). The feeding artery was occluded with glue (Histoscryl [B Braun Medical AG, Emmenbrucke, Switzerland] tissue adhesive diluted with lipiodol in a 1:4 ratio) superselectively (Figure 3). Postembolisation X-rays revealed complete occlusion of the feeding vessels and non-opacification of the arteriovenous nidus (Figure 4).
The patient was asymptomatic after the procedure and her urine became clear within 24 hours of embolisation. There was no further haematuria and the patient was discharged on the third postembolisation day. The patient remained free of haematuria at follow-up 1 month after the procedure. Her renal function, haemoglobin level, and blood pressure were normal at subsequent follow-up.

DISCUSSION
Congenital AVM is a rare occurrence with just over 200 cases reported in the literature; 14% to 27% of arteriovenous abnormalities are congenital. Two types of congenital renal AVM are described. Cirrroid AVM is the most common type, while cavernous congenital AVM is less common. Acquired renal arteriovenous anomalies are often termed renal arteriovenous fistula.

Idiopathic renal arteriovenous fistulas have the radiographic characteristics of acquired fistulas, but no cause can be identified. These fistulas are usually associated with renal artery aneurysms.

Management of AVM should be based on the cause and associated symptoms. Most congenital AVMs are small and asymptomatic, and close spontaneously. Therapeutic intervention is indicated for patients who have symptomatic AVMs presenting with persistent microscopic haematuria, massive haematuria, or frank rupture of the AVM. As this patient had frank haematuria, it was decided to embolise the AVM. In the past, partial or total nephrectomy and arterial reconstructive procedures have been the most common methods of treating symptomatic AVM. However, transcatheter arteriographically directed embolisation has now gained wide acceptance for the treatment of both congenital and acquired AVMs.

Figure 1. Right renal arteriography showing the nidus of congenital arteriovenous malformation involving a branch of interpolar segmental artery.

Figure 2. Opacification of a draining vein is detected in the early phase.

Figure 3. Embolisation in the feeding artery.

Figure 4. Postembolisation showing complete occlusion of the arteriovenous malformation.
Gelfoam is not desirable for the treatment of AVM because of its temporary embolic effect with risk of recanalisation. Coils and detachable balloons are not optimal for occluding the nidus of an AVM. The delivery catheters are not fine enough to negotiate the nidus for the placement of coils or balloons. Absolute ethanol is a good embolic agent, but the pain associated with ethanol embolisation requires general anaesthesia to be given. Adequate technical experience is also required for ethanol embolisation to control the flow and volume of the embolic agent. Tissue glue, which is a permanent liquid embolic material, was used for this patient due to its ability to penetrate and occlude at the level of the nidus of the AVM. Tissue glue also offers the advantages of low viscosity for easy injection through small catheters.

With the advances in the available techniques, angiographic embolisation should be considered as first-line therapy for renal AVM. The procedure is safe and effective, can be accomplished at the time of diagnosis, and avoids the need for surgical exploration.

REFERENCES