TECHNICAL REPORT

Magnetic Resonance Angiography for Postnephrectomy Arteriovenous Fistula

L. Develing*, T. Leiner and P. J. E. H. M. Kitslaar

1Afdeling Algemene Chirurgie, 2Afdeling Radiodiagnostiek, Academisch Ziekenhuis Maastricht

Key Words: Arteriovenous fistula; Heart failure; Magnetic resonance angiography; Nephrectomy; Renal artery; Renal vein.

Introduction

Arteriovenous fistula (AVF) of the renal pedicle is a rare complication of nephrectomy. Just 68 cases have been described since the first report in 1934.1-3 As cardiac failure is a frequent and serious sequela, closure of the fistula is indicated in all cases. Conventional angiography has been considered the best technique to identify the anatomical orientation of the fistula. We used Contrast-Enhanced Magnetic Resonance Angiography (CE-MRA) in the diagnostic work-up of this case with superior results.

Report

A 47-year-old man was referred to the vascular surgeon for analysis of an iliac bruit on the left side, which had been found at physical examination for chronic low back pain. This pain had been present for 25 years, predominantly left-sided with radiation to the upper abdomen and the left leg without any relation to exercise. At the age of 21 he had undergone a left nephrectomy after a traffic accident. No cardiovascular risk factors nor cardiac symptoms were present. Physical examination revealed a systolic bruit over the distal aorta and left iliac region.

Colour-coded Doppler ultrasonography did not reveal any significant abnormalities of the distal aorta and iliac arteries, but did suggest an AVF at the left renal pedicle. T1-weighted CE-MRA during injection of 35 ml of gadolinium-DTPA confirmed this finding (Fig. 1). Cardiological investigation revealed a dilatation of the left ventricle with a cardiac output of 8.1 l/min.

As the haemodynamic alterations did not pose a serious hazard for operation, pre-operative endoluminal closure of the AVF3 was not performed. By a transperitoneal approach the remnant of the left renal artery was occluded with metal clips. Postoperatively no complications were noted. His lumbar and abdominal pain disappeared completely and the cardiac output decreased to 5.2 l/min. CE-MRA was repeated and showed complete disappearance of the fistula (Fig. 2).

Discussion

Imaging techniques for renal AVF have been well described. The standard work-up consists of color-coded Doppler ultrasonography for confirmation of the clinical diagnosis, followed by angiography to visualise the local anatomical relations. As CE-MRA is increasingly used in the diagnostic process of various arteriovenous fistulae,4 it has also become an option in the imaging of iatrogenic renal shunts.5 Although comparative studies are still lacking, we suggest colour-coded Doppler ultrasonography as a screening study in suspected lesions of this kind, and CE-MRA for confirmation and to determine the
therapeutic approach. Advantages of CE-MRA are its non-invasive nature, the use of a non-nephrotoxic contrast agent, the short duration of the procedure, the excellent resolution of both arterial and venous structures, and the possibility of tridimensional viewing. The suggested approach seems appropriate for high-flow iatrogenic renal AVF. Experience with low-flow variants has not been reported, probably because these are asymptomatic.

In our patient colour-coded Doppler ultrasonography followed by CE-MRA gave all the information required for a successful operation.

References


Accepted 15 October 2001