SHORT REPORT

Atherosclerotic Renal Artery Stenosis Mimicking Fibromuscular Dysplasia

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Renal artery stenosis; Renovascular hypertension; Fibromuscular dysplasia; Integrated backscatter-IVUS

Abstract
We experienced a case with atherosclerotic renal artery (RA) stenosis mimicking fibromuscular dysplasia (FMD). In this case, renal angiography, which is considered the ‘gold standard’ for diagnosing FMD, demonstrated a typical ‘string-of-beads’ sign. However, integrated backscatter intravascular ultrasound (IB-IVUS) showed severe atherosclerotic stenosis of the RA with a large amount of lipid pool. Therefore, we decided to perform adjunctive stent implantation which is considered optimal treatment of atherosclerotic RA stenosis. Our case suggests that IVUS evaluation might be useful for an accurate diagnosis and to help develop a treatment strategy for revascularisation.

Introduction

Fibromuscular dysplasia (FMD) of renal artery (RA) is an important cause of secondary hypertension (renovascular hypertension, RVH), which results in renal dysfunction. Atherosclerosis in RA is mostly the major cause of RVH. By contrast, FMD is recognized as a non-atherosclerotic disease. The accurate diagnosis as the cause of RVH is crucial for optimal treatment strategy. We report a case with atherosclerotic RA stenosis mimicking FMD.

Case Report

An 85-year-old man was admitted to our hospital for detailed investigation of worsening renal dysfunction and resistant hypertension treated with three anti-hypertensive drugs. An abdominal bruit was heard, and accelerated flow (peak systolic velocity: 450 cm s⁻¹) was detected by non-invasive duplex ultrasound in the middle segment of the right RA. Laboratory tests revealed hypokalaemia, high plasma aldosterone concentration and high plasma renin activity. According to these observations, RVH was suspected due to right RA stenosis. Renal angiography was performed to confirm the diagnosis. Significant unilateral stenosis was observed in the right RA. Moreover, renal angiography, which is considered the ‘gold standard’ for
diagnosing FMD, demonstrated a typical ‘string-of-beads’ sign (Fig. 1).\textsuperscript{1,2} Subsequently, conventional intravascular ultrasound (IVUS) and integrated backscatter-IVUS (IB-IVUS) were performed to obtain more detailed information on the renal artery wall to clarify the aetiology of RA stenosis (Figs. 2 and 3). Contrary to our expectations,

Figure 1  Renal angiography. (A) Renal angiography showed a "string-of-beads" sign in the right RA (white arrows). (B) Significant stenosis was observed from a different angle (arrowhead). (C) Renal angiography showed no significant stenosis in the left RA. RA; renal artery.

Figure 2  IVUS image. Longitudinal conventional IVUS image demonstrates severe stenosis in the middle segment of the right RA. IVUS; intravascular ultrasound.
IB-IVUS showed severe atherosclerotic stenosis of the RA with a large amount of lipid pool. Accordingly, we decided to perform adjunctive stent (Palmaz Genesis 6.0 × 18 mm) implantation in addition to balloon dilatation (Figs. 4 and 5). After revascularisation, the patient’s renal dysfunction and resistant hypertension improved.

**Figure 3** Conventional IVUS (upper panels) and IB-IVUS images (lower panels). The grey-scale IVUS image revealed low echoic atherosclerotic plaque with signal attenuation. IB-IVUS analysis showed that the plaque had lipid-rich characteristics. The blue colour corresponds to lipid pool, the green colour corresponds to fibrosis, the yellow colour corresponds to a mixed lesion and the red color corresponds to calcification. IB-IVUS; integrated backscatter-IVUS. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)
A month later, the patient was free of anti-hypertensive drugs.

Discussion

Histologically, FMD is commonly recognised as fibroplasia without atherosclerotic, inflammatory arterial disease. Gowda et al. previously reported that typical IVUS images in RA FMD were characterised by endoluminal abnormalities, including discrete, fixed, eccentric ridges; fluttering membranes; and/or spiralling longitudinal folds. In our case, these IVUS findings indicative of FMD were not observed. Therefore, we thought that RVH could be due to atherosclerotic stenosis, but not FMD of the RA. The ACC/AHA 2005 practise guidelines did not recommend stent implantation (except for bailout stenting) to treat RA stenosis in patients caused by FMD, because the long-term prognosis is good with just conventional balloon angioplasty. By contrast, stent placement is recommended for patients with atherosclerotic RA stenosis. In a patient with atherosclerotic RA stenosis mimicking FMD, IVUS evaluation might be useful for an accurate diagnosis and to help develop a treatment strategy for revascularisation.

Conflict of Interest

None.

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References