



## Case Report

## Intravascular findings of fibromuscular dysplasia on optical coherence tomography



Kazuki Mizutani (MD)<sup>a,\*</sup>, Akira Itoh (MD)<sup>b</sup>, Kenichi Sugioka (MD)<sup>a</sup>, Ryushi Komatsu (MD)<sup>b</sup>, Takahiko Naruko (MD, FJCC)<sup>b</sup>, Minoru Yoshiyama (MD, FJCC)<sup>a</sup>

<sup>a</sup> Department of Cardiovascular Medicine, Osaka City University Graduate School of Medicine, Osaka, Japan

<sup>b</sup> Department of Cardiovascular Medicine, Osaka City General Hospital, Osaka, Japan

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## ABSTRACT

We present the case of a 29-year-old woman with right renal artery stenosis caused by fibromuscular dysplasia (FMD) who underwent optical coherence tomography (OCT)-guided percutaneous transluminal renal angioplasty. Using OCT, we could clearly observe intimal fibroplasia and medial hyperplasia that was indicative of FMD. Based on diagnosis of FMD by OCT, this patient was treated with plain old balloon angioplasty that resulted in adequate luminal opening without intimal dissection confirmed on final angiography and OCT.

**<Learning objective:** Fibromuscular dysplasia (FMD) is most often diagnosed based on its characteristic appearance on angiography but it is insufficient. Although pathological examination is needed for definite diagnosis, it is not realistic. Therefore, it is important to assess the detailed intravascular findings of culprit and non-culprit lesions in FMD with optical coherence tomography.>

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## Introduction

Fibromuscular dysplasia (FMD) is a noninflammatory and nonatherosclerotic disease of medium-size arteries accounting for 10% of all causes of renovascular hypertension [1]. FMD is usually seen in young women and can cause uncontrolled hypertension that is often resistant to antihypertensive medication. Renovascular hypertension induced by FMD can be successfully treated by surgical or catheter intervention. Percutaneous transluminal renal angioplasty (PTRA) with or without stent placement has become the preferred treatment [2]. However, it is often difficult to definitively diagnose FMD only by angiographic findings, especially to differentiate FMD from vasculitis [3]. Fundamentally, we need to examine histological findings in detailed three layers of renal artery for definite diagnosis of FMD. The high resolution of optical coherence tomography (OCT) allows easy assessment of intravascular characteristics and morphology [4]. In this case report, we describe OCT-guided PTRA for FMD renal artery stenosis.

## Case report

A 29-year-old woman with a headache and hypertension presented to our institution for evaluation of renovascular hypertension.

Despite amlodipine and telmisartan treatment, her blood pressure (BP) was uncontrolled [systolic BP (SBP): 156 mmHg, diastolic BP (DBP): 80 mmHg]. The patient had no other risk factors for atherosclerosis besides hypertension, and no family history of FMD.

Contrast-enhanced computed tomography showed severe long tubular stenosis in the middle of the right renal artery and significant loss of right renal mass compared with the left kidney (Fig. 1A). In this patient, FMD in other vessels were not involved. As this patient had a wish for babies, withdrawal of medication was expected. Therefore, we decided to perform PTRA for the culprit lesion, using both intravascular ultrasound (IVUS) and OCT for guidance. We used the C7-XR™ OCT intravascular imaging system (St. Jude Medical Inc., St. Paul, MN, USA). First, we assessed the culprit lesion by angiography. We acquired right femoral access, and performed angiography with a 6-French RDC catheter (Boston Scientific, Natick, MA, USA). Angiography revealed a long tubular stenosis in the middle of the renal artery, which was classified as type 2 FMD (Fig. 1B). Continuously, IVUS catheter was pulled back from distal to proximal region (Fig. 2A and C). It showed only

\* Corresponding author at: Department of Cardiovascular Medicine, Osaka City University Graduate School of Medicine, 1-4-3 Asahi-machi, Abeno-ku, Osaka 545-8585, Japan. Tel.: +81 6 66453801; fax: +81 6 66466808.

E-mail address: [ikki1127@gmail.com](mailto:ikki1127@gmail.com) (K. Mizutani).

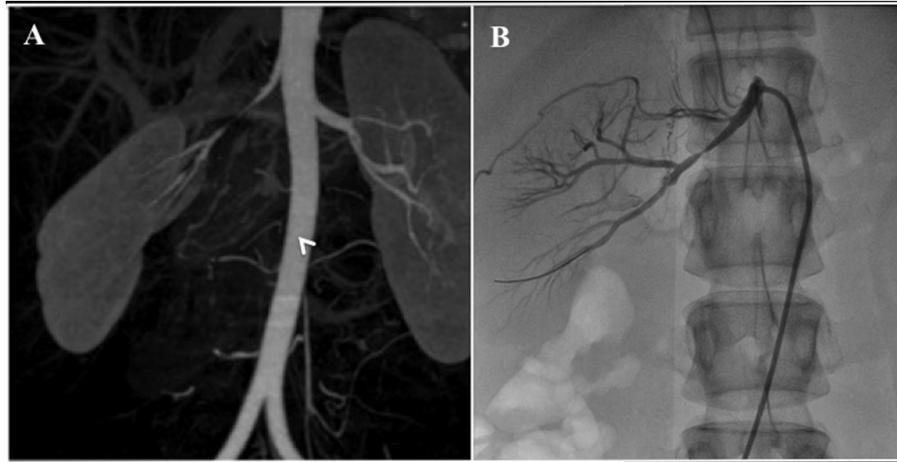


Fig. 1.

Contrast-enhanced computed tomography and renal angiography. (A) Severe stenosis at middle of right renal artery, and loss of right renal mass. (B) Long tubular stenosis which was considered as type 2 by angiographical classification of fibromuscular dysplasia.

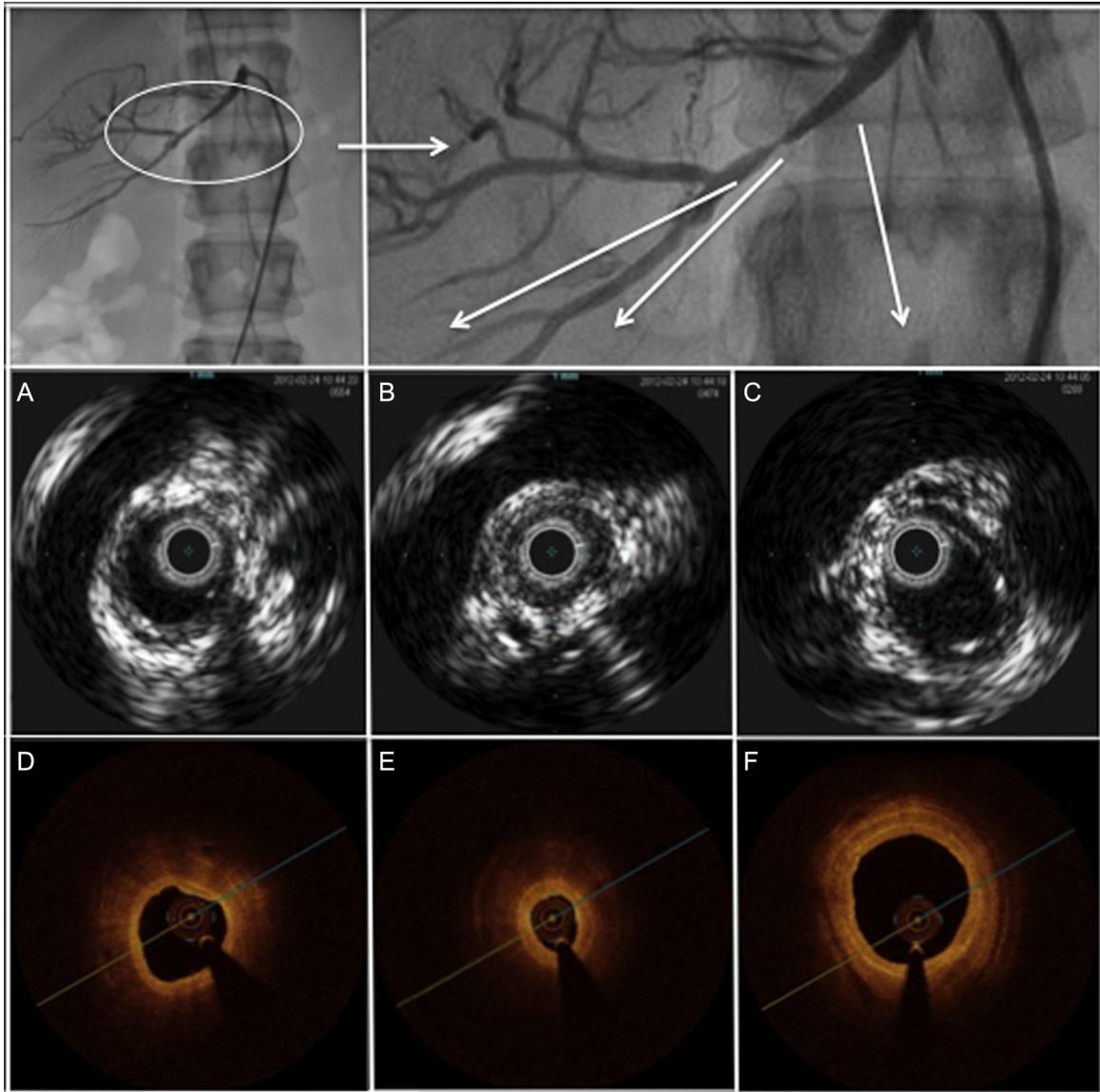


Fig. 2.

Intravascular ultrasound (IVUS) and optical coherence tomography (OCT) findings of culprit and non-culprit lesion. There were no atherosclerotic and fibromuscular changes in non-stenotic lesions (A, C, D and F). IVUS showed only thickening of intima-media complex (B). On the other hand, using OCT, intimal fibroplasia and medial hyperplasia could be visualized in culprit lesion (E).

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