



Case Report

Iliac artery fibromuscular dysplasia successfully treated by balloon angioplasty guided by intravascular ultrasound and pressure wire measurements: A case report



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ABSTRACT

A 71-year-old woman was admitted with a 6-month history of lower limb intermittent claudication. She had well-controlled hypertension and no other risk factor of atherosclerosis. Angiographic findings revealed the “string of beads” pattern in bilateral renal arteries and external iliac arteries. She was diagnosed with combined renal and iliac fibromuscular dysplasia (FMD) and underwent balloon angioplasty for bilateral external iliac arteries. Angiography did not accurately show the severity of stenosis and the location of intraluminal obstruction. In contrast, intravascular ultrasound (IVUS) with pressure gradient measurements using a wire clearly identified the primary site of stenosis and determined the treatment efficiency. In conclusion, FMD of the external iliac arteries was successfully treated by balloon angioplasty guided by IVUS and pressure wire measurements.

<Learning objective: External iliac artery fibromuscular disease is relatively rare. Angiography is effective for diagnosing this disease; however, angiography has limitations in terms of plaque characterization, measurement of vessel size, and determination of procedural end. In this study, a case of a 71-year-old woman with FMD of the external iliac arteries was successfully treated with balloon angioplasty guided by IVUS and pressure wire gradient measurements.>

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Introduction

Fibromuscular dysplasia (FMD) is a rare autosomal dominant disorder primarily affecting young and middle-aged women. This non-atherosclerotic non-inflammatory disease causes abnormal growth of vascular smooth muscles, resulting in the narrowing of small-to-medium size arteries. While FMD can attack all arterial beds, the most common sites are renal, carotid, and vertebral arteries, followed by the iliac, mesenteric, and axillary arteries. This disorder may cause stenosis, occlusion, aneurysm, and/or dissection of the arteries. These patients eventually suffer from hypertension, strokes, or heart attacks [1].

External iliac artery FMD is a rare and usually asymptomatic disorder. Most cases are initially diagnosed as fibromuscular disease involving external iliac arteries in asymptomatic patients undergoing arteriograms for other reasons, such as suspected renovascular hypertension [2]. The clinical symptoms of symptomatic iliac FMD are distal emboli (blue toe), chronic ischemia (intermittent claudication, critical limb ischemia), and dissection [3]. We report a rare

case of an elderly woman admitted for severe claudication and diagnosed with FMD of the renal and bilateral external iliac arteries. Limb ischemia caused by iliac artery FMD was successfully treated by intravascular ultrasound (IVUS)-guided balloon angioplasty and pressure wire measurements.

Case report

A 71-year-old woman visited our institution complaining of fatigue in both legs after a 100-m walk for the past 6 months. Her medical history included chronic atrial fibrillation and well-controlled hypertension with amlodipine (5 mg/day). Her bilateral lower extremity pulses were weak. Her ankle-brachial indexes (ABI) were reduced to 0.85 on the right side and 0.80 on the left side (normal range: 0.91 or more). Based on these symptoms, the patient was diagnosed with typical peripheral artery disease (PAD) and severe (grade 3) claudication, according to the Rutherford classification.

Doppler echocardiography revealed bilateral diffuse stenosis of the external iliac arteries. The Doppler waveforms were biphasic in both femoral arteries. Peak systolic velocity (PSV) was 259 cm/s in the right iliac artery and 309 cm/s in the left iliac artery (normal range: 97–141 cm/s) [4]. Furthermore, B-mode ultrasound images revealed unusual patterns of diffuse stenosis in both iliac arteries

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Fig. 1. Three-dimensional computed tomography angiogram of the external iliac arteries showing the bilateral “string of beads” pattern.

with increased right and left PSV, which was suggestive of non-atherosclerotic iliac artery stenosis. These patterns appeared to suggest severe tortuous normal vessels, and the stenosis did not present intimal thickening. Three-dimensional computed tomography (3DCT) angiography showed multifocal stenoses with the classical “string of beads” appearance pattern in both external iliac arteries (Fig. 1). Because of the “string of beads” pattern in the iliac arteries, Doppler echocardiography of the renal artery was performed, and bilateral mid-renal artery stenosis with elevated PSV in the right (218 cm/s) and left renal arteries (258 cm/s) was observed.

Diagnostic angiography was performed to characterize iliac and renal artery stenosis. The renal artery angiogram exhibited the

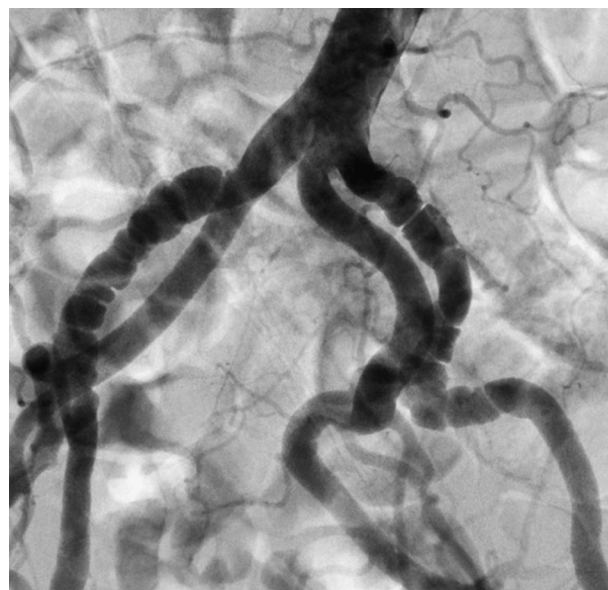


Fig. 3. Digital subtraction angiography of bilateral external iliac arteries showing the “string of beads” pattern.

typical “string of beads” pattern in bilateral renal arteries, thereby confirming the diagnosis of bilateral renal artery FMD (Fig. 2). The iliac artery angiogram also revealed the typical “string of beads” pattern in both external iliac arteries (Fig. 3). The rows of ring-like stenosis reached 50–75% of the normal vessel diameter, with enlargement in both external iliac arteries. Because the patient had well-controlled hypertension and normal kidney functions, interventional therapy for renal FMD was not indicated [5]. Balloon angioplasty was indicated for the treatment of iliac artery claudication.

Interventional procedure

First, a 5 Fr 10-cm Radifocus sheath introducer II H (Terumo, Tokyo, Japan) was inserted in the left brachial artery, and 4000 units of unfractionated heparin was injected in the artery. Then,



Fig. 2. Digital subtraction angiography of the renal arteries showing the typical “string of beads” pattern in the right and left arteries.

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