Renal artery fibromuscular dysplasia: in vivo optical coherence tomography insights

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A 66-year-old woman with long-term essential hypertension presented with poorly controlled blood pressure in spite of six antihypertensive drugs. Percutaneous renal denervation was indicated as a treatment of resistant arterial hypertension. Renal angiography showed ‘strings of beads’ appearance characteristic of fibromuscular dysplasia (FMD) in the mid-segment of the right renal artery (Panel A).

Optical coherence tomography (OCT) confirmed the diagnosis of medial fibroplasia showing the ‘strings and beads’ appearance in the longitudinal reconstruction (Panel B). Cross-sectional images showed several luminal stenosis due to media layer hyperplasia and fibrosis, with areas of intimo-media layer dissections and aneurysm formations, alternating with segments of normal three-layer appearance (Panels C–I). (Panel C) Three-layer appearance of the arterial wall (intima: white arrow, media: blue arrow, adventitia: yellow arrow) at the bottom and medial fibroplasia (asterisks) with an intimal dissection (red arrow) communicating with a little aneurysm formation at the top. Medial fibroplasia contains areas of low backscattering probably related with muscle cells and areas of high backscattering in the inner half of the media corresponding with collagen deposition. (Panel D) Three-layer appearance. (Panel E) intimo-medial dissection (red arrow). (Panel F) Luminal stenosis secondary to focal medial fibroplasia (asterisk). (Panel G) Ruptured medial fibroplasia with an aneurysm formation. (Panel H) Another intimo-medial dissection (red arrow). (Panel I) Small medial fibroplasia that protrudes into the lumen of the renal artery. As this case illustrates, OCT provides unique insights on the underlying pathology of FMD, showing detailed ‘in vivo’ histology information.

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