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Case report

CASE REPORT

Resistant hypertension: drug-eluting balloon for revascularization of bilateral renal fibromuscular dysplasia

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Learning point for clinicians

- Resistant hypertension in young adults suggests possible secondary aetiologies, with renal artery stenosis being one of the most common.
- A frequent cause of renal artery stenosis is represented by fibromuscular dysplasia, an idiopathic vascular disorder.
- Angioplasty is the treatment of choice.

Case presentation

A 25-year-old man with resistant hypertension, reduced renal function [glomerular filtration rate (GFR) 51 ml/min/1.73 m^2] and nephrotic proteinuria was referred to our Hypertension Centre. Increased blood pressure (BP) values were found 1 year earlier and medical therapy (amlodipine and irbesartan) was ineffective.

Duplex-Ultrasound was performed, showing bilateral renal artery stenosis (RAS) affecting the middle portion of both vessels. Stenoses were haemodynamically significant, as systolic peak velocities were 280 cm/s in the right renal artery (RRA) and 300 cm/s in the left renal artery (LRA). The luminal diameter was markedly decreased with evidence of long and fibrous lesions. Hence, angiography was performed and eccentric plaque involving 80–90% of LRA middle portion was seen, while a diffuse, critical, non-eccentric stenosis was found in the mid-RRA, confirming the diagnosis of focal fibromuscular dysplasia (FMD). Given severe symptoms, we opted for a bilateral percutaneous trans-luminal angioplasty (PTA) through two inflations in both the RRA and the LRA (Figure 1) (BOSTON emerge 4.0 × 20 at 22 ATM balloon). Then, drug-eluting balloon (DEB) was bilaterally employed through inflation (18 ATM for 60 s) and slow deflation to minimize the dissection risk (B-BRAUN SeQuent® Please). No complications occurred. We observed a normalization of BP (120/70 mmHg) after few hours while GFR reached normal values after 48 h. Once anti-hypertensive agents were suspended, at 3- and 12-month follow-up, we found optimal BP values and proteinuria finally resolved after 4 months.

Discussion

FMD is an idiopathic non-atherosclerotic, non-inflammatory vasculopathy that may affect all districts arteries, causing stenosis. Renal and internal carotid arteries are the most commonly involved. This condition may be either symptomatic or clinically silent and is able to cause haemodynamic changes.[1] Pathological classification of FMD lesions in renal arteries was based on the most damaged arterial wall layer. However, this classification is no longer applicable in modern clinical practice

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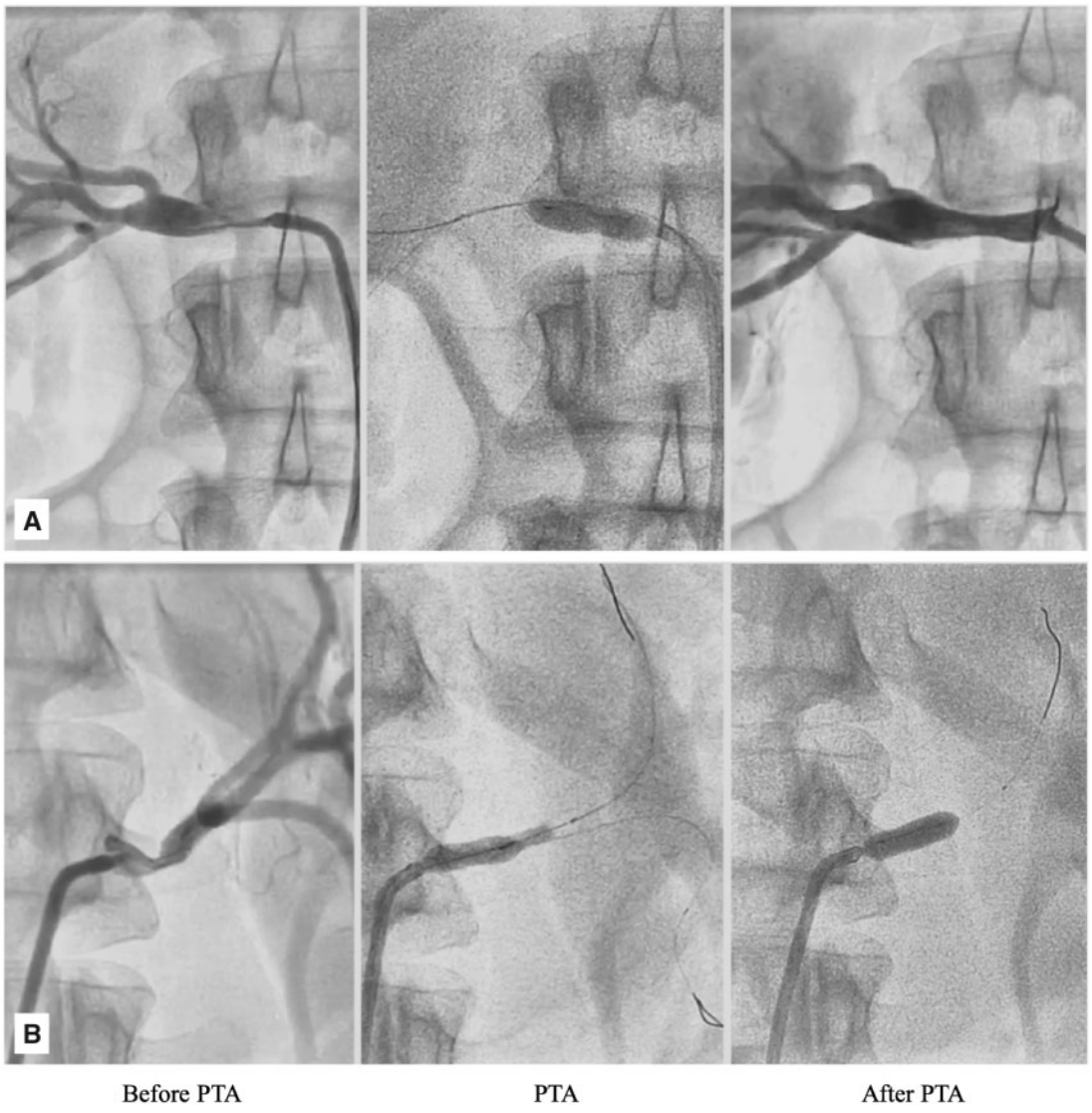

Figure 1. Angiographic findings of stenosis, PTA procedure and vessel appearances after PTA in right renal artery (**A**) and left renal artery (**B**). PTA, percutaneous transluminal angioplasty.

according to a recent International Consensus, whereas the terms 'focal FMD' and 'multifocal FMD' (the so-called 'string of beads') should be preferred, based on lesions' angiographic appearances.[2]

Angioplasty remains the therapy of choice in RAS caused by FMD and stenting should be reserved for selected cases.[2] Nonetheless, arterial elastic memory represents a major issue, leading to the need for second intervention and/or poor BP outcomes.[3] Notably, endovascular procedures may also play a crucial role in atherosclerotic RAS, allowing renal function improvement and better BP control.[4,5] We treated our young patient through DEB, a semi-compliant angioplasty balloon covered with anti-restenosis drugs which are released into the vessel wall during inflation. DEBs active substances are lipophilic with a high absorption rate through the vessel wall, in order to compensate for the short period of contact between the inflated balloon and the vessel wall itself. At present, the drug of choice in DEBs is paclitaxel, an antimitotic agent that inhibits cell division, thus avoiding smooth-muscle cells replication and neointimal hyperplasia.[6] In our patient, given the presence of signs/symptoms of renal ischaemia, we simultaneously revascularized both arteries during the procedure. We assume that this approach was successful since both BP normalization and full GFR recovery could be regarded as direct benefits from the bilateral revascularization with no influence from the contralateral kidney compensatory effect.

Our case indicates that bilateral RAS angioplasty through DEB is a safe and effective alternative treatment in young patients with renal FMD. In fact, in this condition, the risk of early restenosis is higher than in atherosclerotic RAS, due to greater arterial elastic memory. Moreover, our case report emphasizes the importance of concurrent revascularization of both renal arteries in the same angioplasty session, especially when RAS is complicated by renal ischaemia.

Informed consent for publication was obtained from the patient.

Conflict of interest. None declared.

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