Case Report

Simultaneous Kissing Balloon Stenting Technique in Management of Two Branches of Right Renal Artery Bifurcation: A Case Report

Abstract

Atherosclerosis and fibromuscular dysplasia are the commonest types of diseases associated with renovascular hypertension, with atherosclerosis accounting for 70%–80% of all cases and the latter accounting for 10% of cases. We report a case of a 65-year-old asian male with stenosis of the right renal artery with early bifurcation treated by percutaneous balloon dilation and simultaneous kissing balloon stenting technique.

Keywords: *Bifurcation, percutaneous transluminal renal angioplasty, simultaneous kissing stenting*

Bilal Ahmad Baba, Arvind Sethi, Naresh Kumar Goyal

Department of Cardiology BLK Superspeciality Hospital, Pusa Road, New Delhi, India

Introduction

Atherosclerotic renal artery stenosis (RAS) usually involves the ostium and the proximal one-third of the renal artery main branch. Occasionally, atherosclerotic RAS involves renal artery bifurcations.[1,2] Renal artery angioplasty with stent placement can safely and successfully resolve atherosclerotic narrowing, but stent implantation in atherosclerotic RAS involving bifurcation is not only troublesome, but also challenging. Some researchers have concluded that, in small renal arteries, there remains a considerable risk of restenosis on the order of 40%.[3] A possible solution in small renal arteries might be drug eluting stents (DES), although this was not supported by the GREAT trial.[3] In the GREAT trial, the in-stent percent diameter stenosis, binary restenosis rates, late lumen loss, and repeat revascularization after renal artery stent implantation were lower in the sirolimus-eluting stent group than in the bare metal stent (BMS) group, but the difference was not statistically significant, which might be explained by the number of target vessels with reference caliber ≥5.0 mm.[4]

Case Presentation

A 65-year-old male was referred to our department for renal angiogram following 7 months of uncontrolled hypertension despite receiving medications. Initially, the patient presented with severe headache. Patient was a case of Type 2 diabetes mellitus (DM) and coronary artery disease apart from hypertension. He had no history of smoking or drinking alcohol. The result of his physical examination was unremarkable; his general, cardiovascular system, respiratory system, and abdominal examinations were unremarkable. Laboratory investigations revealed normal complete blood count, serum cholesterol, lipid profile, and renal function (serum creatinine 1.8 mg/dL). Ultrasound sonography (USG) Doppler showed his right kidney size was normal with measurement of 9.6 cm by 4.8 cm. Renal Doppler ultrasound confirmed RAS with renal resistive index of 0.53. Renal angiography confirmed stenosis of the right renal artery with early bifurcation [Figure 1a].

Endovascular procedure

Renal angiogram was obtained under the guidance of digital subtraction angiography (floor-mounted Artis zee; Siemens Medical Solutions, Munich, Germany) using the Seldinger technique with a 6-French sheath with 5-French JR Judkin catheter, and the osteo-proximal stenosis and stenosis of both branches and their respective distal flow on the right renal side were revealed [Figure 1a]. Intravenous, 3000 units of unfractionated heparin was given.

The decision was taken to perform percutaneous transluminal renal angioplasty

How to cite this article: Baba BA, Sethi A, Goyal NK. Simultaneous kissing balloon stenting technique in management of two branches of right renal artery bifurcation: A case report. Indian J Nephrol 2022;32:618-20.

Received: 15-05-2021
Revised: 12-04-2022
Accepted: 30-04-2022
Published: 22-11-2022

Address for correspondence:
Dr. Bilal Ahmad Baba, BLK Superspeciality Hospital, Pusa Road, New Delhi - 110 005, India.
E-mail: zaraambilal@gmail.com

Access this article online

Website: www.indianjnephrol.org

DOI: 10.4103/ijn.ijn_202_21

Quick Response Code:

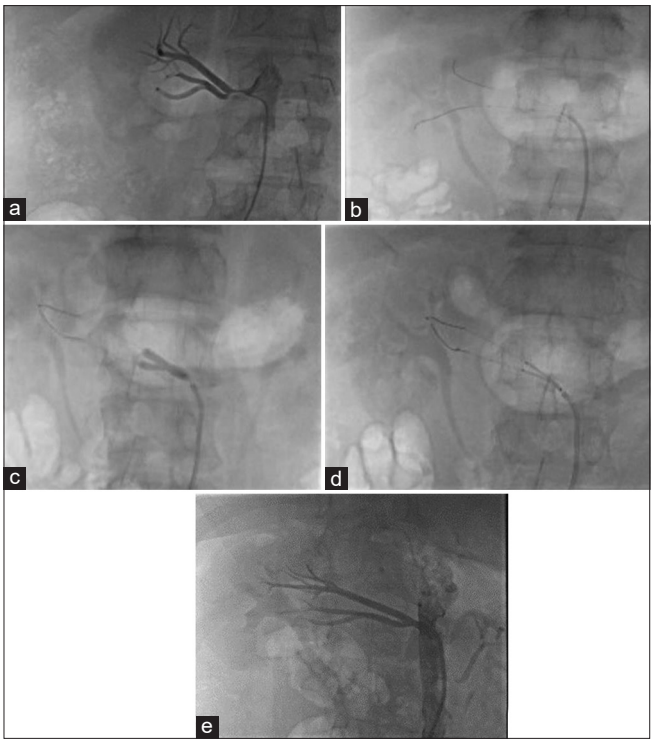

Figure 1: (a) Angiogram showing critical stenosis of the right renal artery (bifurcation lesion). (b) PTCA BMW wires crossed in both branches. (c) Simultaneous kissing balloon dilation of both renal branches. (d) Two drug-eluting stents placed in approximation (SKS technique). (e) Post-stenting arteriogram shows improvement in lumen and good flow in both branches

with drug-eluting coronary stents. The right femoral 6-French sheath was exchanged with 7-French introducer sheath (Terumo Interventional Systems, Tokyo, Japan). Then, 2000 units of heparin was repeated. Renal double curve (RDC) 55 cm catheter was used and the right renal artery was hooked; both lesions were crossed with balanced middle weight (BMW) wire [Figure 1b]. With two balloons of 3 mm × 15 mm (Biotronik, Berlin, Germany), both were dilated at the same time [Figure 1c]. Two drug-eluting balloon-mounted coronary stents, Abbott vascular XIENCE PRIME stents, measuring 4.0 × 18 mm in the upper division and 3.5 × 18 mm in the lower branch were placed in parallel (kissing position) [Figure 1d] and simultaneously inflated in both branches. A good angiographic result was obtained with no need for further ballooning. The final angiogram was obtained to confirm the position of the stent, the patency of the lumen, and distal blood flow [Figure 1e]. Finally, after the procedure, the patient was shifted to the critical care unit (CCU) and his blood pressure was monitored and recorded. It showed a significant reduction of blood pressure to 128/87 mmHg. After 24 h of observation, the patient was discharged home with aspirin (75 mg/day) and clopidogrel (75mg/day) with statins.

Discussion

We report a case of a 65-year-old male with stenosis of right renal artery with early bifurcation treated by percutaneous balloon dilatation and stenting of both branches. RAS is one of the common causes of secondary hypertension.[5-7] Atherosclerosis and fibromuscular dysplasia are the commonest types of stenosis associated with Renovascular hypertension (RVH). Severe stenosis may lead to loss of excretory function of the kidney. Despite its prevalence, atherosclerotic RAS (ARAS) is poorly defined. Its incidence ranges approximately from 30% among patients with coronary artery disease detected by angiographic study to 50% among elderly people or those with diffuse atherosclerotic vascular diseases.[8] ARAS is a progressive disease that may occur alone or in combination with hypertension and ischemic heart disease. Stent placement in this case is highly recommended because it has been shown to improve immediate and long-term outcomes.[9-11] Stent placement can play an integral role in therapy for patients with lesions difficult to treat with balloon angioplasty, as well as after a suboptimal balloon angioplasty result. Surgical reconstruction of the renal artery is generally performed only in patients with complicated renal artery anatomy or in those who require para-renal aortic reconstructions for aortic aneurysms or severe aortoiliac occlusive disease.

Conclusion

Renal angiography is the gold standard for diagnosing renal artery stenosis and allows further intervention in which percutaneous transluminal renal angioplasty can be performed in the same setting. Two-stent strategy is a good option in renal artery bifurcation diseases.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Misra S, Sturludottir M, Mathew V, Bjarnason H, McKusick M, Iyer VK.Treatment of complex stenoses involving renal artery bifurcations with use of drug-eluting stents. J Vasc Interv Radiol 2008;19:272-8.
2. Zheng B, Yan HB, Cheng SJ, Liu C, Wang J, Zhao HJ, *et al.* Prevalence of small diameter renal artery in patients referred to cardiac catheterization. J Cardiovas Pulm Dis 2010;29:101-4 (in Chinese).
3. Zähringer M, Pattynama PM, Talen A, Sapoval M.Drug-eluting stents in renal artery stenosis. EurRadiol2008;18:678-82.

4. Zähringer M, Sapoval M, Pattynama PM, Rabbia C, Vignali C, Maleux G, *et al.* Sirolimus-eluting versus bare-metal low-profile stent for renal artery treatment (GREAT trial): Angiographic follow-up after 6 months and clinical outcome up to 2 years. J Endo vasc Ther 2007;14:460-8.
5. Talenfeld AD, Schwope RB, Alper HJ, Cohen EI, Lookstein RA. MDCTangiography of the renal arteries in patients with atherosclerotic renal artery stenosis: Implications for renal artery stenting with distal protection. Am J Roentgenol 2007;188:1652-8.
6. Ho DS, Chen WH, Woo C. Stenting of a renal artery bifurcation stenosis. Catheter Cardiovasc Diagn 1998;45:445-9.
7. Colyer WR Jr, Cooper CJ. Management of renal artery stenosis: 2010. Curr Treat Options Cardiovasc Med 2011;13:103-13.
8. Jensen G, Zachrisson BF, Delin K, Volkmann R, Aurell M. Treatment of renovascular hypertension: One-year results of renal angioplasty. Kidney Int 1995;48:1936-45.
9. Lorin JD, Hirsh DS, Attubato MJ, Sedlis SP. A dual wire approach to severe ostial bifurcating renal artery stenosis. Catheter Cardiovasc Interv 2006;67:956-60.
10. Yan HB, Zheng B, Wu Z, Wang J, Zhao H-J, Song L, *et al.* Two-stent strategy for renal artery stenosis with bifurcation lesion. J Zhejiang Univ Sci B 2010;11:561-7.
11. Balk E, Raman G, Chung M, Ip S, Tatsioni A, Alonso A, *et al.* Effectiveness of management strategies for renal artery stenosis: A systematic review. Ann Intern Med 2006;145:901-12.