Libertas Academica
FREEDOM TO RESEARCH

Open Access: Full open access to this and thousands of other papers at http://www.la-press.com.

Clinical Medicine Insights: Case Reports

Successful Revascularization to Right Coronary Artery by Percutaneous Coronary Intervention after Endovascular Therapy for Leriche Syndrome

Takeshi Niizeki[1], Kazuyoshi Kaneko[2], Shigeo Sugawara[2], Toshiki Sasaki[1], Yuichi Tsunoda[1], Yasuchika Takeishi[3] and Isao Kubota[4]

[1]Department of Cardiology, Okitama Public General Hospital, Yamagata, Japan. [2]Department of Cardiology, Nihonkai General Hospital, Yamagata, Japan. [3]Department of Cardiology and Hematology, Fukushima Medical University, Fukushima, Japan. [4]First Department of Internal Medicine, Yamagata University School of Medicine, Yamagata, Japan.

ABSTRACT: A 69-year-old man with effort angina was admitted to our institution. Echocardiography showed poor left ventricular systolic function with akinesis of the anterior wall and severe hypokinesis of the inferior wall. We performed coronary angiography, which revealed two diseased vessels including chronic total occlusion in the left anterior descending artery and severe stenosis in the right coronary artery (RCA). In addition, aortography revealed aortoiliac occlusive disease known as Leriche syndrome. As the patient's symptom was stable, we first planned to perform endovascular therapy (EVT) for Leriche syndrome to make a route for intra-aortic balloon pumping. We prepared a bi-directional approach from bi-femoral arteries and a left brachial artery. The guidewire was passed through the occlusive area using the retrograde approach. The self-expanding stents were deployed by a kissing technique. At one week after EVT, a 6Fr sheath was inserted from the right radial artery and an intra-aortic balloon pump was successfully inserted through the right femoral artery for percutaneous coronary intervention (PCI) to the RCA. Two drug-eluting stents were successfully deployed to RCA after using an atherectomy device (rotablator). We reported the case as a successfully performed PCI to the RCA after EVT for Leriche syndrome.

KEYWORDS: percutaneous coronary intervention, peripheral intervention, Leriche syndrome

CITATION: Niizeki et al. Successful Revascularization to Right Coronary Artery by Percutaneous Coronary Intervention after Endovascular Therapy for Leriche Syndrome. *Clinical Medicine Insights: Case Reports* 2014:7 33–36 doi: 10.4137/CCRep.S13551.

RECEIVED: November 3, 2013. **RESUBMITTED:** January 12, 2014. **ACCEPTED FOR PUBLICATION:** January 14, 2014.

ACADEMIC EDITOR: Athavale Nandkishor, Associate Editor

TYPE: Case report

FUNDING: Author(s) disclose no funding sources.

COMPETING INTERESTS: Author(s) disclose no potential conflicts of interest.

CORRESPONDENCE: takeshi.niizeki@okitama-hp.or.jp

Introduction

In the era of aging, we and others often observe patients with combined severe peripheral artery disease (PAD) and coronary artery disease (CAD).[1] It is difficult for these patients to decide suitable treatment strategies. The Leriche syndrome with total occlusions of the infrarenal aorta and the bilateral iliac arteries is a variant of type D in Trans-Atlantic Inter-Society Consensus (TASC). Recently, aortoiliac occlusive disease (AIOD) is increasingly treated with endovascular techniques such as angioplasty and stenting regardless of disease severity.[2] We reported a case that achieved successful revascularization for severe CAD, two diseased vessels with reduced left ventricular function, after endovascular therapy (EVT) for Leriche syndrome.

Case Presentation

A 69-year-old male was referred to our hospital with effort angina. His coronary risk factors included cigarette smoking and hypertension. His chest X-ray did not show pulmonary edema. A routine hemogram and biochemistry data were normal. Electrocardiogram showed ST-T depression in II, III, and aVF leads and abnormal Q wave in V1–4 leads. Echocardiography showed poor left ventricular systolic function (left ventricular ejection fraction 20%) with akinesis of the anterior

wall and severe hypokinesis of the inferior wall. As shown in Figure 1, coronary angiography showed chronic total occlusion at the proximal portion of the left anterior descending artery (LAD) and the distal part was supplying with poor collaterals (Rentrop I) from the right coronary artery (RCA) via septal channel. In addition, two severe stenoses was revealed in the proximal RCA. Myocardial scintigraphy showed no viability of broad anterior area. Although revascularization for the RCA should be taken into consideration, aortography revealed chronic total occlusion between the terminal aorta and both external iliac arteries (Fig. 2). As the patient's symptom was stable after admission, we planned treating Leriche syndrome with EVT first to maintain a route for intra-aortic balloon pumping (IABP) or percutaneous cardio pulmonary support (PCPS). We selected EVT first because (1) open surgery was difficult because of a horseshoe kidney and (2) endovascular mortality was low. We prepared bi-directional approach sites via the bi-femoral arteries and left brachial artery with the 6Fr system, Zemex sheath 25 cm (Zeon Medical Corporation, Tokyo, Japan) inserted from bi-femoral arteries and Destination 90 cm (Terumo Corporation, Tokyo, Japan) from the left brachial artery. Attempt to pass the occlusion site using a 0.018 inch Treasure wire (Asahi Intecc Corporation, Aichi, Japan) backed-up with a 4Fr Unite catheter (Asahi Intecc Corporation, Aichi, Japan) was performed from both antegrade and retrograde approaches; the guide wire was finally passed through the obstructed area using retrograde approach. Intravascular ultrasound (IVUS) (Visions PV.018, Volcano Corporation, USA) revealed the vessel diameter and confirmed that the wire was in the true lumen. Before stenting, pre-dilatation was performed with a small balloon [Jackal RX 6.0 × 80 mm (Kaneka Corporation, Osaka, Japan)]. The self-expanding stents [E-Luminexx 10 × 120 mm (Medicon, Inc., Osaka, Japan)] were implanted after pre-dilatation by kissing stenting technique as in a previous study.[2] After stent implantation, post-dilation was performed with a Jackal RX 9.0 × 80 mm balloon (Kaneka Corporation, Osaka, Japan) at 10 atm (Fig. 3). To prevent increasing contrast volume, staged strategy was selected for the treatment of CAD. At seven days after EVT, percutaneous coronary intervention (PCI) was performed by inserting a 6Fr sheath from the right radial artery and IABP from the right femoral artery via a 7Fr sheath (Fig. 4A). With the back-up of a 6Fr guiding catheter (Back Up Left 3.5, Heartrail II) (Terumo Corporation, Tokyo, Japan), the lesion was easily crossed with a 0.014 inch coronary guidewire (Sion: Asahi Intecc Corporation, Aichi, Japan). Microcatheter (Corsair: Asahi Intecc Corporation, Aichi, Japan) and IVUS (Eagle Eye Platinum, Volcano Corporation, USA) crossings were attempted, but they could not pass because of the heavy calcification of the proximal RCA lesion. After ballooning with a small balloon (Tazuna 1.5 mm, Terumo Corporation, Tokyo, Japan), the microcatheter finally passed. The guide wire was then changed to Rotawire floppy (Boston Scientific Corporation, Miami, USA) through the microcatheter and a rotablator (Rotalink Plus 1.5 and 1.75 mm burr, Boston Scientific Corporation, Miami, USA) could be crossed. Promus Element 3.5 × 24 mm and Promus Element 3.0 × 24 mm (Boston Scientific Corporation, Miami, USA) were implanted from RCA ostium to mid-RCA with the guidance of IVUS and post-dilatation was performed at the RCA stent site with an NC Quantum Apex 3.5 × 12 mm (Boston Scientific Corporation, Miami, USA) (Fig. 4B). After the PCI, the patient was hemodynamically stable and IABP was retrieved successfully. Angina and claudication have shown complete improvement in the six months after procedure.

Discussion

Here we report that revascularization of the RCA was successfully performed by PCI with the support of IABP inserted from the right femoral artery after EVT for Leriche syndrome. This reported case has combined CAD and PAD and revealed effort angina by CAD including two diseased vessels. EVT has been widely used in patients with AIOD every year. As the diagnostic performance of PAD has been sensitive, advanced EVT techniques and devices have been developed as a less invasive treatment with shorter length of hospital stay, and

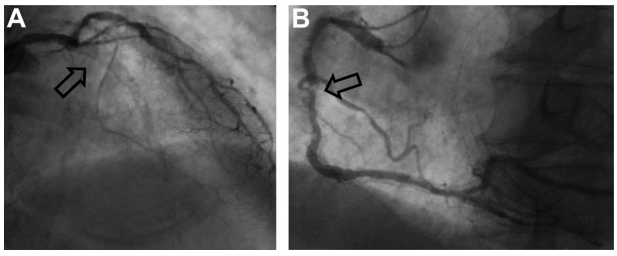

Figure 1. (**A**) Left coronary artery (right anterior oblique view). Coronary angiogram showed chronic total occlusion at the proximal portion of LAD. (**B**) RCA (left anterior oblique view); collaterals were from the RCA via the septal channel (Rentrop I). The RCA had severe stenosis with heavy dense calcium. The arrows in the figures show the lesions.

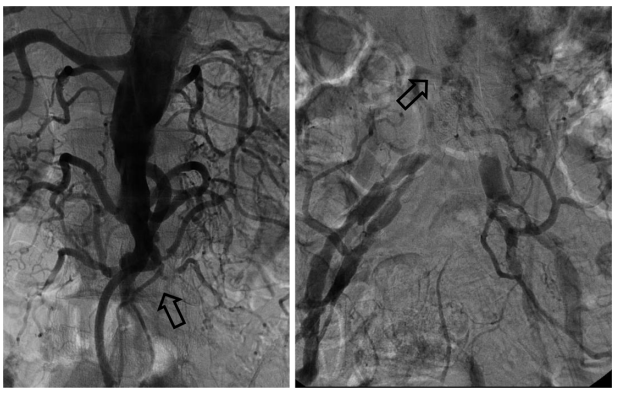

Figure 2. Aortography revealed chronic total occlusion from terminal aorta to both external iliac arteries with heavy calcification. The arrows in the figures show the lesions.

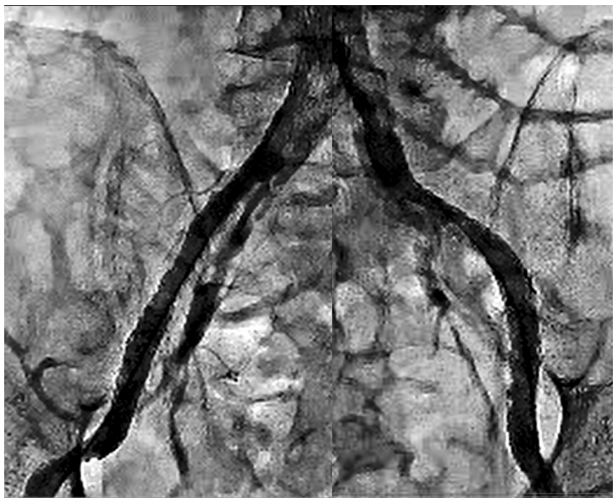

Figure 3. Guide wire passed through the occlusion site from retrograde approach. Two stents (E-Luminexx 10.0 × 120 mm) were implanted with the kissing technique.

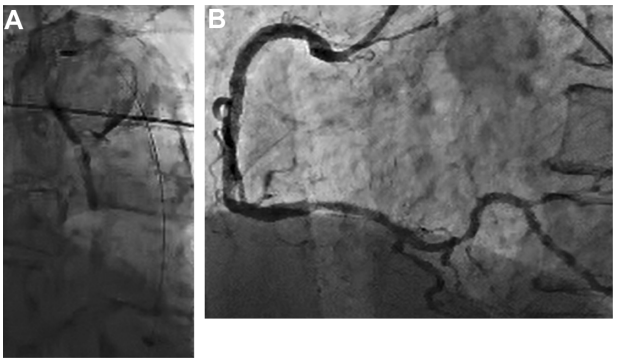

Figure 4. (**A**) PCI was performed by inserting a 6 Fr sheath from the right radial artery and IABP from the right common femoral artery. (**B**) After rotational atherectomy, Promus Element 3.5 × 24 mm and Promus Element 3.0 × 24 mm were implanted in the RCA with the guidance of IVUS.

lower medical cost compared to surgical repair.[3] In addition, increased experiences of interventionists have prompted the utilization of EVT. Thus, EVT currently has been acknowledged as the treatment of choice for AIOD, although complex lesions such as type D in the TASC II document are recommended for surgical treatment.[4] A recent report suggested that EVT could be used as first-line or complementary treatment in patients with severe AIOD.[2] In addition, Soga Y et al. reported that self-expandable stent for severe AIOD was suitable for safety and good results.[2] In the management of Leriche syndrome, EVT with stenting is a suitable, less perioperative mortality alternative to aorto-bifemoral grafting with similar long-term durability.[5–7] Although Poulias GE et al. showed the utility of aorto-femoral bypass with early success and late favorable outcome for AIOD, the results of EVT for AIOD was also good with high primary and secondary patency rates.[5,8,9] Thus, we selected EVT, and not open surgery, according to (1) comorbidity (horseshoe kidney), (2) less procedural mortality and good patency rate, and (3) patient's understanding and decision.

As RCA lesion was jeopardized and the patient had poor left ventricular systolic function, revascularization either by CABG or PCI should be performed with the assistance of support devices such as IABP. Thus, we performed EVT for Leriche syndrome to maintain a route for IABP first before PCI. Although primary patency rates are lower than surgical revascularization, re-interventions can often be performed with high secondary patency rate comparable to surgery.[9] This point is one of the merits of EVT compared with open surgery. Thus, we believe that EVT is an important option for the treatment of AIOD. In addition, because 30 day operative mortality and complication calculated by the Japan score[10] was high (17.1%) in this case, we chose PCI as a therapeutic strategy for the RCA instead of CABG.

Hirsch AT et al. reported that the major causes of death in PAD patients are cardiovascular diseases.[11] Furthermore, it has been reported that about 50% of patients with symptomatic PAD might concomitantly develop acute myocardial infarction and stroke.[2] If a patient with Leriche syndrome would suddenly develop unstable acute coronary syndrome, the cardiopulmonary support device could not be promptly utilized via the femoral artery, which may limit the strategy. Therefore, because the prevalence of CAD in patients with PAD is high,[1] the examination of polyvascular disease is important. However, it remains unclear whether PCI affects the prognosis of patients with PAD. Further studies are needed to elucidate the prognostic effect of EVT and PCI in patients with polyvascular disease.

Conclusion

We reported the case as a successfully performed PCI to the RCA after EVT for Leriche syndrome. It is important that the decision on therapeutic strategy be based on patient general status and life expectancy in each vascular disease.

Author Contributions

Wrote the first draft of the manuscript: TN. Agree with manuscript results and conclusions: TN, KK, SS, TS, YTs, YTa, IK. Jointly developed the structure and arguments for the paper: TN, KK, SS, TS, YTs, YTa, IK. Made critical revisions and approved final version: TN, KK, SS, TS, YTs, YTa, IK. All authors reviewed and approved of the final manuscript.

DISCLOSURES AND ETHICS

As a requirement of publication the authors have provided signed confirmation of their compliance with ethical and legal obligations including but not limited to compliance with ICMJE authorship and competing interests guidelines, that the article is neither under consideration for publication nor published elsewhere, of their compliance with legal and ethical guidelines concerning human and animal research participants (if applicable), and that permission has been obtained for reproduction of

REFERENCES

1. Lloyd-Jones D, Adams RJ, Brown TM, Carnethon M, Dai S, De Simone G, et al. Heart disease and stroke statistics – 2010 update: a report from the American Heart Association. *Circulation*. 2010;121:e46-e215.
2. Soga Y, Iida O, Kawasaki D, Yamauchi Y, Suzuki K, Hirano K, et al. Contemporary outcomes after endovascular treatment for aorto-iliac artery disease. *Circ J*. 2012;76:2697–704.
3. Hans SS, DeSantis D, Siddiqui R, Khoury M. Results of endovascular therapy and aortobifemoral grafting for Transatlantic Inter-Society type C and D aortoiliac occlusive disease. *Surgery*. 2008;144:583–9.
4. Norgren L, Hiatt WR, Dormandy JA, Nehler MR, Harris KA, fowkes FG, et al. Inter-Society Consensus for the management of peripheral arterial disease (TASK II). *J Vasc Surg*. 2007;45(suppl S):S5-S67.
5. Poulias GE, doundoulakis N, Prombonas E, Haddad H, Papaioannou K, Lymberiades D, et al. Aorto-femoral bypass and determinants of early success or late favorable outcome. Experience with 1000 consecutive case. *J Cardiovasc Surg (Torino)*. 1992;33:664–78.
6. Hans SS, DeSantis D, Siddiqui R, Khoury M. Result of endovascular therapy and aortobifemoral grafting for Transatlantic Inter-Society type C and D aortoiliac occlusive disease. *Surgery*. 2008;144:583–9.
7. Burke CR, Henke PK, Hernandez R, Rectenwald JE, Krishnamurthy V, Englesbe MJ, et al. A contemporary comparison of aortofemoral bypass and aortoiliac stenting in the treatment of aortoiliac occlusive disease. *Ann Vasc Surg*. 2010;24:4–13.
8. Lagana D, Carrafiello G, Mangini M, Lumia D, Caronno R, Castelli P, et al. Endovascular treatment of steno-occlusions of the infraranal abdominal aorta. *Radiol Med*. 2006;111:949–58.
9. Moise MA, Alvarez-Tostado JA, Clair DG, Greenberg RK, Lyden SP, Srivastava SD, et al. Endovascular management of chronic infrarenal aortic occlusion. *J Endovasc Ther*. 2009;16:84–92.
10. Kurazumi H, Mikamo A, Fukamitsu G, Kudou T, Sato M, Suzuki R, et al. Validation of the JapanSCORE versus the logistic EuroSCORE for predicting operative mortality of cardiovascular surgery in Yamaguchi University Hospital. *Gen Thorac Cardiovasc Surg*. 2011;59:599–604.
11. Hirsch AT, Haskal ZJ, Hertzer NR, Bakal CW, Creager MA, Halperin JL, et al. ACC/AHA 2005 guidelines for the management of patients with peripheral arterial disease (lower extremity, renal, mesenteric, and abdominal aortic): executive summary a collaborative report from the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Vascular Medicine and Biology, Society of Interventional Radiology, and the ACC/AHA Task Force on Practice Guidelines (Writing Committee to Develop Guidelines for the Management of Patients With Peripheral Arterial Disease). *J Am Coll Cardiol*. 2006;47:1239–312.