SAGE Open Medical Case Reports
Volume 7: 1–3

DOI: 10.1177/2050313X19834159
journals.sagepub.com/home/sco
SAGE

Healing of femoral artery dissection after drug-coated balloon angioplasty: A case report with intravascular ultrasonography and angioscopy images

Taketsugu Tsuchiya[1], Minako Oda[2], Takaaki Takamura[2], Katsuhide Kitagawa[1], Koji Kajinami[2] and Michihiko Kitayama[1]

Abstract

Early 80s male with intermitted claudication underwent endovascular therapy for atherosclerotic stenosis at left external iliac artery and middle of superficial femoral artery. Patient also had chronic atrial fibrillation, diabetes mellitus, and hypertension. After stent deployment for external iliac artery lesion, a short superficial femoral artery lesion was performed with angioplasty using drug-coated balloon. The drug-coated balloon angioplasty resulted in 50% residual stenosis with linear dissection; however, provisional stenting was not performed as decent ante-grade blood flow allowed 10 extra minutes. Medication involved ongoing use of aspirin 100 mg and rivaroxaban 15 mg. Angiography post 3 months from index procedure showed external iliac artery and superficial femoral artery patency and healing of intimal dissection at superficial femoral artery lesion was estimated by intravascular ultrasonography. In angioscopy findings, red thrombus was seen in dissection cavity.

Keywords

Drug-coated balloon, dissection, femoropopliteal segment, direct oral anticoagulant

Date received: 12 November 2018; accepted: 5 February 2019

Introduction

Effective endovascular therapy for femoropopliteal segment is spreading around the world, though high-risk cases and lesions for vessel patency after procedure remain.[1] To solve this problem, new approaches are being developed using advanced drug technologies, including a promising 'nothing left behind' strategy.[2,3] Drug-coated balloon (DCB) angioplasty is a hopeful treatment; however, long-term drug effects are uncertain because DCB has not been extensively used in peripheral intervention yet. We are presently following a case where healing of dissection is apparent 3 months after DCB angioplasty was performed in the femoropopliteal segment.

Case report

An early 80s male presented for left leg intermittent claudication caused by atherosclerotic stenosis at left external iliac artery (EIA) and middle of superficial femoral artery (SFA). He also had chronic atrial fibrillation, diabetes mellitus, and hypertension. His informed consent allowed us to perform endovascular therapy. According to intravascular ultrasonography (IVUS) images, 8.0–40 mm S.M.A.R.T. control stent (Cordis, USA) was deployed for EIA lesion by contra-lateral approach and short (2 cm lesion length) SFA lesion was decided with DCB angioplasty. After preparation using 4.0–40 mm NSE balloon (Nipro, Japan), angioplasty using DCB (5.0–40 mm IN.PACT Admiral; Medtronic, USA) was done at nominal pressure for 5 min and resulted in 50% residual stenosis with linear dissection. Provisional stenting was not done because decent ante-grade blood flow allowed 10 extra

[1]Department of Trans-catheter Cardiovascular Therapeutics, Kanazawa Medical University Hospital, Kahoku, Japan
[2]Department of Cardiology, Kanazawa Medical University Hospital, Kahoku, Japan

Corresponding Author:
Taketsugu Tsuchiya, Department of Trans-catheter Cardiovascular Therapeutics, Kanazawa Medical University Hospital, 1-1 Daigaku, Uchinada, Kahoku 920-0293, Ishikawa, Japan.
Email: tsugu@quartz.ocn.ne.jp

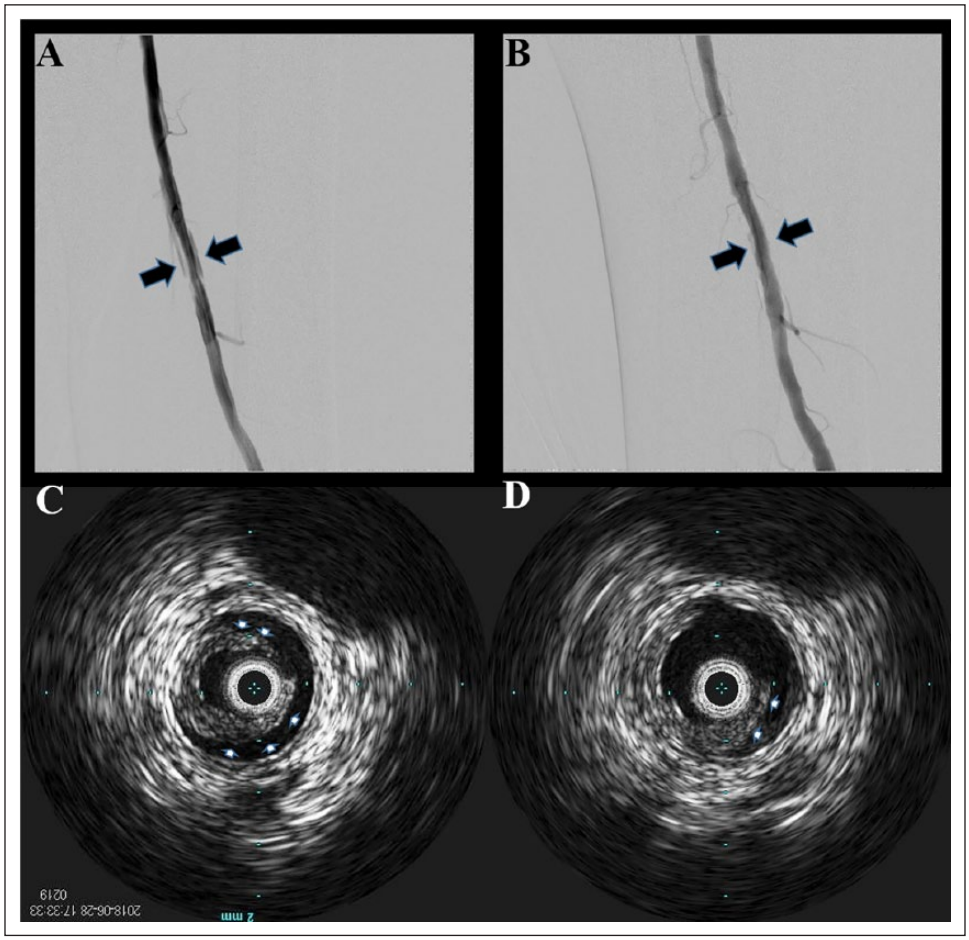

Figure 1. Panels A and B show digital subtraction angiography of superficial femoral lesion at the end of index procedure and at 3 months' follow-up period. Black arrows indicate the segments where intravascular ultrasonography (IVUS) findings were obtained. Panels C and D show those IVUS findings and white arrows indicate intimal flap.

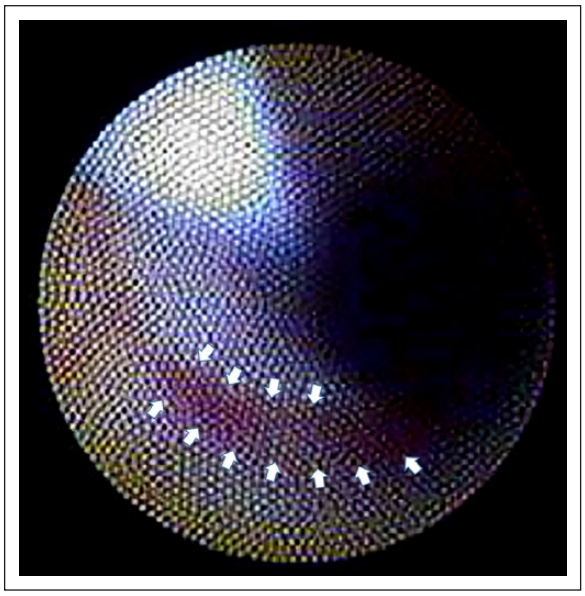

Figure 2. Angioscopy reveals red thrombus at dissection cavity (indicated by white arrows).

minutes. Medication involved ongoing use of aspirin 100 mg and rivaroxaban 15 mg. Angiography 3 months from index procedure showed EIA and SFA patency and healing of intimal dissection at SFA lesion was estimated by IVUS (Figure 1). In angioscopy findings, red thrombus was seen in dissection cavity (Figure 2) but no white granular materials were seen at DCB dilated segment.

Discussion

We reported that balloon angioplasty in SFA segment resulted in optimal dilatation and good outcomes were achieved;[4] however, balloon angioplasty sometimes leads to major intimal dissection. Depending on the magnitude of dissection occurrence, restenosis risk would be higher.[5] Based on these experiences, provisional stenting had been selected for dissection occurrences after balloon angioplasty in past nitinol stenting era. However, healing effect of DCB for dissection has been reported in coronary intervention recently.[6,7] In our case, linear dissection occurred after DCB angioplasty at the end of index procedure and healing change of intimal flap

was in IVUS findings 3 months later. We feel this observation could be important, showing possibility of dissection healing effect of DCB even in peripheral intervention – possibly similar to coronary intervention.

It is well-known that shorter lesions could have better prognosis in endovascular therapy.[8] The clinical course of our case might simply depend on its short lesion length, but further case studies might be necessary.

From angioscopy findings, thrombus might be suspect to have some role in the healing process of dissection from our case, but to the best of our knowledge, no reports have discussed these findings.

Using direct oral anticoagulants (DOACs) after procedure therapy, a recent report[9] showed non-inferior effect on vessel patency compared with standard dual antiplatelet therapy after SFA intervention. That report might involve almost half of patients who ended up with non-stenting strategy; however, prevalence of DCB use was not described.

Further prospective randomized investigation about dissection healing effect of DCB, role of thrombus, and efficacy of combination with DOAC use in peripheral intervention should be studied.

Conclusion

In this case, possible healing effect of DCB for dissection occurred in SFA segment was estimated in angiography and IVUS findings.

Acknowledgements

The authors would like to express special gratitude to Dr Kazuhiro Masuya for his participation in this case report. The authors thank Kanazawa Medical University's Assistant Professor Steve Burke for medical writing assistance.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

Our institution does not require ethical approval for reporting individual cases or case series.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Informed consent

Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

ORCID iD

Taketsugu Tsuchiya https://orcid.org/0000-0001-8152-7039

References

1. Soga Y, Iida O, Hirano K, et al. Utility of new classification based on clinical and lesional factors after self-expandable nitinol stenting in the superficial femoral artery. *J Vasc Surg* 2011; 54(4): 1058–1066.
2. Schneider P, Laird J, Tepe G, et al. Treatment effect of drug-coated balloons is durable to 3 years in the femoropopliteal arteries: long-term results of the IN.PACT SFA randomized trial. *Circ Cardiovasc Interv* 2018; 11: e005891.
3. Iida O, Soga Y, Urasawa K, et al. Drug-coated balloon vs standard percutaneous transluminal angioplasty for the treatment of atherosclerotic lesions in the superficial femoral and proximal popliteal arteries: one-year results of the MDT-2113 SFA Japan randomized trial. *J Endovasc Ther* 2018; 25: 109–117.
4. Tsuchiya T, Takamura T, Soga Y, et al. Clinical impact and risk stratification of balloon angioplasty for femoropopliteal disease in nitinol stenting era: retrospective multicenter study using propensity score matching analysis. *SAGE Open Med*. Epub ahead of print 18 July 2016. DOI: 10.1177/2050312116660116.
5. Fujihara M, Takahara M, Sasaki S, et al. Angiographic dissection patterns and patency outcomes after balloon angioplasty for superficial femoral artery disease. *J Endovasc Ther* 2017; 24(3): 367–375.
6. Piraino D, Cortese B, Buccheri D, et al. Healing after coronary artery dissection: the effect of a drug coated balloon angioplasty in a bifurcation lesion. A lesson from intravascular ultrasound analysis. *Int J Cardiol* 2016; 203: 298–300.
7. Piraino D, Buccheri D and Cortese B. Paclitaxel-coated balloon exerts late vessel healing and enlargement: a documented phenomenon with optical coherence tomography analysis. *Int J Cardiol* 2016; 203: 551–552.
8. Soga Y, Takahara M, Iida O, et al. Relationship between primary patency and lesion length following bare nitinol stent placement for femoropopliteal disease. *J Endovasc Ther* 2015; 22(6): 862–867.
9. Moll F, Baumgartner I, Jaff M, et al. Edoxaban plus aspirin vs dual antiplatelet therapy in endovascular treatment of patients with peripheral artery disease: results of the ePAD trial. *J Endovasc Ther* 2018; 25: 158–168.