

Diagnosis and treatment evaluation of in-stent restenosis of carotid artery stenting using optical coherence tomography

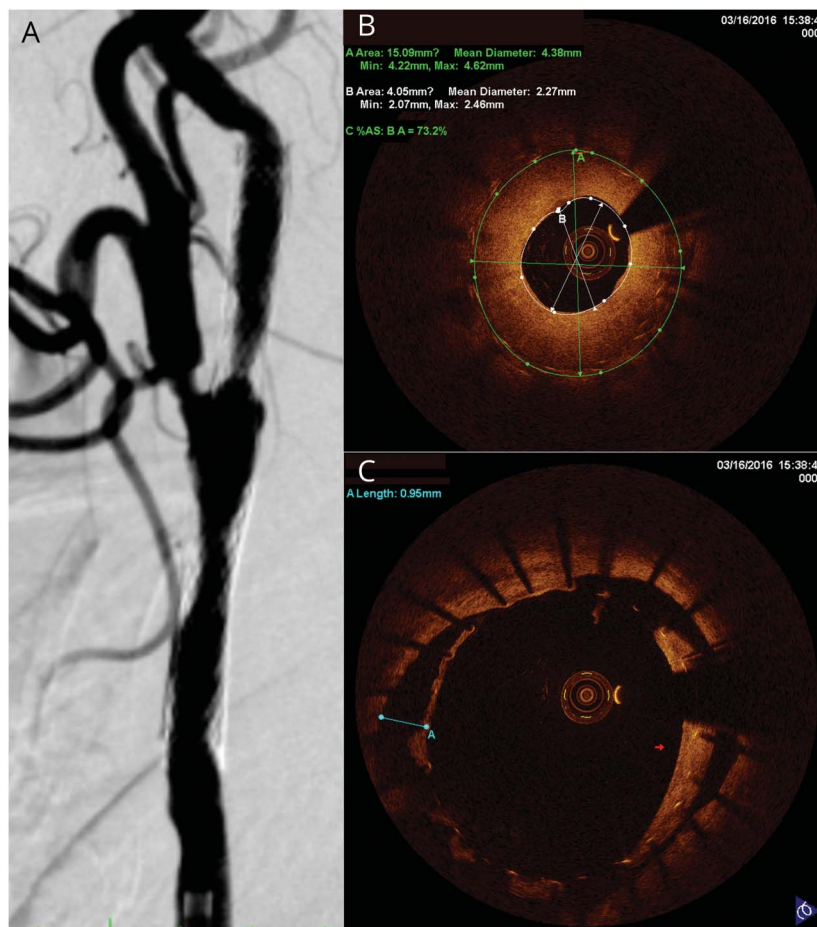
Rui Liu, MD, PhD, Qin Yin, MD, Min Li, MD, Ruidong Ye, MD, PhD, Wusheng Zhu, MD, PhD, and Xinfeng Liu, MD, PhD

Neurology® 2019;92:99-100. doi:10.1212/WNL.0000000000006743

Correspondence

Dr. X. Liu
xfliu2@vip.163.com

Figure 1 Diagnosis of in-stent restenosis (ISR) after carotid artery stenting using optical coherence tomography



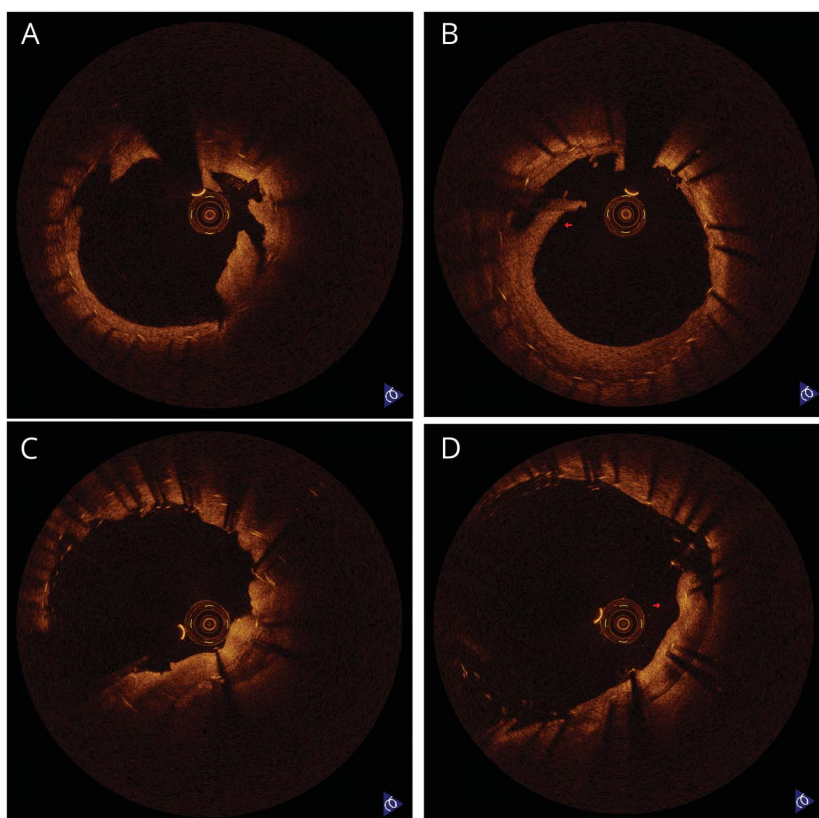
(A) Angiography with ISR detected. (B) Severe ISR (73.2%) with fibrotic neointimal growth over the deployed stent struts at the midportion of the stent. (C) Stent malapposition, stent struts neointimal formation, and unhealed artery dissection can be observed on cross-section image of carotid bifurcation.

A 65-year-old man underwent balloon angioplasty and repeat carotid artery stenting (CAS) due to in-stent restenosis (ISR). Intravascular optical coherence tomography (OCT) showed a severe ISR with fibrotic neointimal growth (figure 1). Post 6.0 × 30 mm balloon angioplasty, OCT showed intimal disruption and artery dissection (figure 2). After the 8 × 40 mm stent fully expanded, OCT showed stent struts well apposed, but tissue protrusion from the spaces between stent struts can be observed (figure 2). OCT allowed measurement of intimal

From the Department of Neurology, Jinling Hospital, Medical School of Nanjing University, China.

Go to Neurology.org/N for full disclosures. Funding information and disclosures deemed relevant by the authors, if any, are provided at the end of the article.

Figure 2 Optical coherence tomography (OCT) evolution of balloon angioplasty and precise 8 × 40 mm stent implantation for in-stent restenosis



(A) Substantial intimal disruption was observed at the stenosis segment of internal carotid artery. (B) Artery dissection caused by balloon angioplasty. (C) Tissue protrusion was clearly visualized at the stenosis segment of internal carotid artery. (D) The disrupted intima were attached to a regular lumen contour with little space residual according to the stent expanding.

hyperplasia after the CAS and observation of intimal disruption and stent strut apposition intraoperatively.^{1,2}

Author contributions

All authors: conception and design, acquisition of data, analysis and interpretation of data. Dr. R. Liu: drafting the article. Dr. Ye: critically revising the article. Dr. X.F. Liu: approved the final version of the manuscript on behalf of all authors.

Study funding

No targeted funding reported.

Disclosure

R. Liu, Q. Yin, M. Li, and R. Ye report no disclosures relevant to the manuscript. W. Zhu reports receiving financial support

from Jiangsu province (China) social development project fund (grant BE2016748). X. Liu reports receiving financial support from The National Natural Science Foundation of China (grant 81530038) and National Key R&D program of China (grant 2017YFC1307900). Go to Neurology.org/N for full disclosures.

References

1. van Haften AC, Bots ML, Moll FL, de Borst GJ. Therapeutic options for carotid in-stent restenosis: review of the literature. *J Vasc Interv Radiol* 2010;21:1471–1477.
2. Bonati LH, Ederle J, McCabe DJ, et al. Long-term risk of carotid restenosis in patients randomly assigned to endovascular treatment or endarterectomy in the Carotid and Vertebral Artery Transluminal Angioplasty Study (CAVATAS): long-term follow-up of a randomised trial. *Lancet Neurol* 2009;8:908–917.

Neurology®

Diagnosis and treatment evaluation of in-stent restenosis of carotid artery stenting using optical coherence tomography

Rui Liu, Qin Yin, Min Li, et al.

Neurology 2019;92:99-100

DOI 10.1212/WNL.0000000000006743

This information is current as of January 7, 2019

Updated Information & Services	including high resolution figures, can be found at: http://n.neurology.org/content/92/2/99.full
References	This article cites 2 articles, 0 of which you can access for free at: http://n.neurology.org/content/92/2/99.full#ref-list-1
Subspecialty Collections	This article, along with others on similar topics, appears in the following collection(s): All Imaging http://n.neurology.org/cgi/collection/all_imaging Infarction http://n.neurology.org/cgi/collection/infarction Stroke prevention http://n.neurology.org/cgi/collection/stroke_prevention
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: http://www.neurology.org/about/about_the_journal#permissions
Reprints	Information about ordering reprints can be found online: http://n.neurology.org/subscribers/advertise

Neurology® is the official journal of the American Academy of Neurology. Published continuously since 1951, it is now a weekly with 48 issues per year. Copyright © 2019 American Academy of Neurology. All rights reserved. Print ISSN: 0028-3878. Online ISSN: 1526-632X.

