



Published on *CD-adapco* (<http://www.cd-adapco.com>)

[Home](#) > Distribution and Magnitude of Shear Stress after Coronary Bifurcation Lesions Stenting with the Classical Crush Technique: A New Predictor for In-Stent Restenosis

Distribution and Magnitude of Shear Stress after Coronary Bifurcation Lesions Stenting with the Classical Crush Technique: A New Predictor for In-Stent Restenosis

Journal of Interventional Cardiology

Pages:

330-340

Volume:

23

Issue:

4

Date:

Sunday, August 1, 2010

DOI:

<http://dx.doi.org/10.1111/j.1540-8183.2010.00571.x>

Background: Wall shear stress (SS) plays an important role in the initiation and proliferation of coronary atherosclerosis, especially for bifurcations. Stenting in the coronary artery will cause many different changes in velocity, flow, cross-sectional area, and especially the wall SS. However, it is still unknown how much wall SS distribution varies with stenting in coronary bifurcation.

Objective: The purpose of this study was to investigate the magnitude and distribution of wall SS after the classical crush stenting for bifurcation lesions.

Methods: Eleven patients with true coronary bifurcation stenting by the classical crush technique were included. We studied the difference of wall SS between restenosis and nonrestenosis groups in these patients. The differences in SS between preprocedure and postprocedure, as well as between immediately postprocedure and after an 8-month follow-up, were also analyzed. Diameter stenosis or minimal lumen diameter were measured by quantitative coronary analysis. The commercial CD STAR-CCM+ was used to calculate the SS.

Results: At baseline, the SS in all the segments of all patients was high. The baseline SS of the restenosis group was 50% lower than the nonrestenosis group. Immediately after percutaneous coronary intervention (PCI), the SS in both areas decreased; however, the SS of the nonrestenosis group decreased to its lowest level possible while the SS of the restenosis group decreased moderately. Eight months later, the SS of all the segments of the nonrestenosis group remained persistently low at the same level of right after PCI. In contrary, the SS in the restenosis group returned to near its baseline level.

Conclusion: From our study, after a 2-stent crush technique using drug-eluting stents (DES), the degree of SS reduction appears to predict in-stent restenosis (ISR). A SS decrease to its lowest level and remaining homogeneously low is a prime condition to prevent ISR. A baseline low SS, which decreases minimally after PCI and recovers to around its baseline level,

appears to be the setting for restenosis. These conditions can be evaluated as predictors of lesions that may need surveillance angiography and proper IVUS evaluation to prevent future in-stent restenosis.

Rights:

2010 Wiley Periodicals Inc.

Author Name:

Z.H. Hu

S.L. Chen

J.J. Zhang

S.J. Shan

Z.Z. Liu

F. Ye

J. Kan

H.M. Xu

K. Nguyen

T. Kwan

T. Nguyen

T. Hoang

Industries:

Products:

CD-adapco is the world's largest independent CFD focused provider of engineering simulation software, support and services. We have over 30 years of experience in delivering industrial strength engineering simulation.

Source URL: <http://www.cd-adapco.com/journal/distribution-and-magnitude-shear-stress-after-coronary-bifurcation-lesions-stenting>