A computational approach to design a restenosis criterion

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Abstract

The use of Drug Eluting Stents (DES) has been an important advancement in the treatment of in-stent restenosis. However despite all the progress made in DES procedures the rate of restenosis remains relatively high. Mathematical modeling and numerical simulation can play an important role in identifying zones with higher risk of restenosis. The local delivery of a therapeutic agent, from a biodegradable stent implanted in a coronary artery, is mathematically modeled and numerically simulated. The aim of the approach is to give a contribution to locate future restenosis in patients who received a DES, particularly to understand why restenosis is more frequent near calcified plaques, malapposed struts and in the case of underexpanded stents. Extensive computational results lead to the design of a restenosis criterion.

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