Drug-eluting stent and coronary thrombosis: biological mechanisms and clinical implications.

Abstract:
Although rare, stent thrombosis remains a severe complication after stent implantation owing to its high morbidity and mortality. Since the introduction of drug-eluting stents (DES), most interventional centers have noted stent thrombosis up to 3 years after implantation, a complication rarely seen with bare-metal stents. Some data from large registries and meta-analyses of randomized trials indicate a higher risk for DES thrombosis, whereas others suggest an absence of such a risk. Several factors are associated with an increased risk of stent thrombosis, including the procedure itself (stent malapposition and/or underexpansion, number of implanted stents, stent length, persistent slow coronary blood flow, and dissections), patient and lesion characteristics, stent design, and premature cessation of antiplatelet drugs. Drugs released from DES exert distinct biological effects, such as activation of signal transduction pathways and inhibition of cell proliferation. As a result, although primarily aimed at preventing vascular smooth muscle cell proliferation and migration (ie, key factors in the development of restenosis), they also impair reendothelialization, which leads to delayed arterial healing, and induce tissue factor expression, which results in a prothrombogenic environment. In the same way, polymers used to load these drugs have been associated with DES thrombosis. Finally, DES
impair endothelial function of the coronary artery distal to the stent, which potentially promotes the risk of ischemia and coronary occlusion. Although several reports raise the possibility of a substantially higher risk of stent thrombosis in DES, evidence remains inconclusive; as a consequence, both large-scale and long-term clinical trials, as well as further mechanistic studies, are needed. The present review focuses on the pathophysiological mechanisms and pathological findings of stent thrombosis in DES.