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Drug-eluting stents: some bare facts

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In this issue of *The Lancet*, Eugène McFadden and colleagues report four cases of coronary thrombosis that occurred many months after implantation of drug-eluting stents. Each case developed shortly after antiplatelet therapy was interrupted: in three patients when aspirin was discontinued, and in one patient when both aspirin and clopidogrel were stopped. Strikingly, in the two patients who had both a bare-metal and a drug-eluting stent, only the drug-eluting stent showed evidence of thrombosis. Although stent thrombosis has previously been reported with drug-eluting stents,[1,2] the patients reported by McFadden and colleagues deserve serious attention because of their extraordinarily late presentations. Two cases occurred 11 months after implantation of the drug-eluting stent, and two occurred after more than a year.

Balloon angioplasty is associated with restenosis rates of 30–40% and bare-metal stents with rates of 20–30%.[3,4] Bare metal stents have now been coated with polymers from which drugs such as sirolimus and paclitaxel are eluted. Because restenosis rates are less than 10% with drug-eluting stents,[5–7] there has been an explosive growth in their use over a very short period.

Coronary thrombosis has long been recognised as a rare but catastrophic complication after stent implantation. This event typically presents in the first few days after the procedure, almost always causes an acute myocardial infarction, and not uncommonly results in death. Thrombosis is associated with the use of undersized stents and with inadequate stent expansion. Consequently, optimally sized stents and deployment with high balloon-pressures have become the norm. These techniques, coupled with dual antiplatelet therapy with aspirin plus a thienopyridine, reduce stent thrombosis rates to under 2%. Because bare-metal stents become endothelialised within a few weeks of implantation, dual antiplatelet therapy is only required for 2–4 weeks. Rapid endothelialisation of such stents makes late thrombosis (>30 days after stent implantation) exceedingly rare.

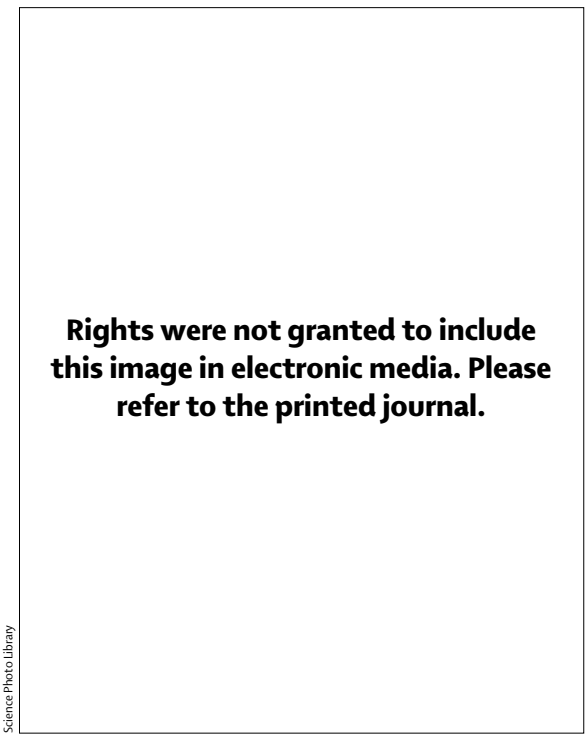
Until the advent of drug-eluting stents, late stent-thrombosis had been almost entirely limited to patients receiving coronary brachytherapy. Brachytherapy uses intracoronary radiation as a treatment for restenosis. Many cases of late thrombosis after brachytherapy have been reported. Animal studies show that late thrombosis is related to the delayed endothelialisation caused by brachytherapy.[8] Clinical trials indicate that prolonged treatment with dual antiplatelet therapy largely prevents this complication.[9,10]

Because drug-eluting stents also cause delayed endothelialisation, trial protocols with these stents have mandated more prolonged antiplatelet therapy than earlier trials with bare-metal stents. Prolonged and continuous antiplatelet therapy might explain why late thrombosis has not been prominent in the trials with drug-eluting stents. A pooled analysis we did in over 5000 patients in trials with drug-eluting stents showed similar rates of stent thrombosis in patients receiving bare-metal or drug-eluting stents.[11] However, because stent thrombosis is such a rare event, our meta-analysis had less than 50% power to exclude a two-fold higher risk of stent thrombosis with drug-eluting stents.

What can we do to avoid late thrombosis after implantation with a drug-eluting stent? First, we should strongly reflect on the potential clinical consequences before we insert such a stent. Will the patient need a subsequent surgical procedure necessitating the interruption of antiplatelet therapy? If so, a drug-eluting stent might not be the best choice. Will the patient be compliant with prolonged antiplatelet therapy? If not, a bare-metal stent might be preferable.

Second, we need more information about how to manage patients with a drug-eluting stent. We need large-scale registries and post-marketing surveillance studies. We also need to identify high-risk characteristics that may predispose to late thrombosis. Most importantly, we need to determine the optimum duration for antiplatelet therapy.

Third, we need to develop strategies to deal with the unanticipated interruption of antiplatelet therapy after implantation of a drug-eluting stent. In some cases, it might be advisable to do a surgical procedure without stopping antiplatelet therapy despite the increased bleeding risks. In patients for whom this is not possible, it might be better to stop antiplatelet therapy for less than the 5 days we currently wait. In cases of elective surgery, it might be best to delay the procedure until a year or more after implantation of the drug-eluting stent.



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Finally, drug-eluting stents are so new that many health-care professionals are not aware of the critical need for prolonged and continuous antiplatelet therapy. Therefore, both patients and physicians should be sensitised to the possibility of late stent-thrombosis if antiplatelet therapy is interrupted. The case reports by McFadden and colleagues strongly and persuasively suggest that stent thrombosis might occur many months after the implantation of a drug-eluting stent if prolonged and continuous antiplatelet therapy is not maintained.

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I thank Sandra Derghazarian for her help in the preparation of this manuscript.
I declare that I have no conflict of interest.

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Self-management in chronic illness

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Is there a prejudice called chronicism that is analogous to ageism or racism? In ageism or racism, an individual characteristic is identified and generalisations are made about all people who have the characteristic. These generalisations lead others to prejudge how individuals who have that characteristic might think, behave, or act. Scottish people certainly have at least one, and probably more than one, characteristic in common. For example, they were all born in Scotland. Similarly, all people aged more than 70 years have something in common: they were born before 1934. But people from Scotland differ in many more ways than they are similar. The same is true of people aged more than 70 years, and the same thing applies to people with chronic diseases.

The recognition that management of chronic disease will be a major part of health care in the 21st century, with implications for service delivery, organisation, and education, is welcome and is probably overdue.[1] Now that health-care workers are more aware of the importance of the management of chronic disease, they are developing plans to improve the situation. One strategy is to increase patients' knowledge about their condition, including the information they have about the disease, and their power and responsibility in making decisions and ensuring that necessary actions are taken. The style of service that drives such patients' education programmes has been labelled as patient-centred, the expert patient, the autonomous patient,[2] patient self-management, and the resourceful patient.[3] Interventions to improve knowledge, decision- making, and outcome can be grouped into two types (probably at opposite ends of the spectrum). One type of intervention is the generic model, epitomised by the chronic disease self-management programme. The other model focuses interventions on people with a