

Case Report

Subacute Thrombosis Following Implantation of Zotarolimus-Eluting Stent

SOCRATES KOROVESIS, ELEFThERIOS GIAZITZOGLOU, DEMOSTHENES G. KATRITSIS

Department of Cardiology, Athens Euroclinic, Athens, Greece

Key words:

Endeavor, zotarolimus, stents, thrombosis.

Endeavor (Medtronic Europe SA) is a new zotarolimus-eluting stent with a favourable safety profile reported in early trials. We report a case of subacute thrombosis following deployment of an Endeavor stent in the distal left anterior descending coronary artery, despite optimum loading with and continuation of clopidogrel therapy as well as previous administration of a IIb/IIIa inhibitor.

Stent thrombosis following sirolimus- or paclitaxel-eluting stent implantation ranges between 0.4 to 1%, and usually occurs 6 hours to 6 weeks after the procedure.¹⁻³ Drug-eluting stent thrombosis has been strongly associated with discontinuation of antiplatelet therapy and is usually seen within the two weeks after cessation of treatment.^{4,5} Endeavor is a novel zotarolimus (ABT-578)-eluting stent that has undergone initial trials with a high success rate and a low incidence of stent thrombosis.⁶

We report on a case of subacute thrombosis of an Endeavor stent, despite optimum loading with and continuation of clopidogrel therapy as well as previous administration of a IIb/IIIa inhibitor.

Case presentation

A 45-year old male, hypertensive and smoker, presented with an anteroseptal myocardial infarction. Treatment with aspirin (250 mg per os), clopidogrel (600 mg per os), and intravenous enoxaparin, eptifibatid and beta blockade was immediately commenced and the patient was taken to the catheter laboratory.

Transthoracic echocardiography revealed impaired left ventricular systolic

function with inferior akinesia, hypokinesia of the anterolateral wall and an overall ejection fraction of 35%. Coronary angiography revealed a totally occluded left anterior descending artery (LAD) at its midcourse (Figure 1, left panel), and a proximally totally occluded right coronary artery without any collateral filling. Balloon angioplasty (2.0 × 15 mm), followed by stenting of the LAD lesion with implantation of two overlapping Endeavor (Medtronic, Europe SA) stents (2.75 × 14 mm and 2.5 × 24 mm at 10 Atm), was performed 4 hours after chest pain onset with an excellent angiographic result (Figure 1, right panel). Post-angioplasty angiograms revealed a tight lesion in the distal LAD (Figure 2, left panel), which was not deemed to require intervention at that time.

Two days later the patient continued to experience chest pain at rest, with ST-segment depression on the electrocardiogram (ECG). Coronary angiography showed no residual stenosis at the site of the implanted stent. Therefore, the distal LAD lesion was considered responsible for ongoing ischaemia and a further stent implantation (Endeavor 2.5/18 mm) was performed at the distal LAD lesion after predilatation with a 2.0/12 mm balloon (Figure 2, right panel), with a good angiographic result. Glycopro-

Manuscript received:
January 31, 2006;
Accepted:
April 9, 2006.

Address:
Demosthenes Katritsis

Athens Euroclinic,
9 Athanassiadou St.
115 21 Athens, Greece
e-mail:
dkatrits@otenet.gr

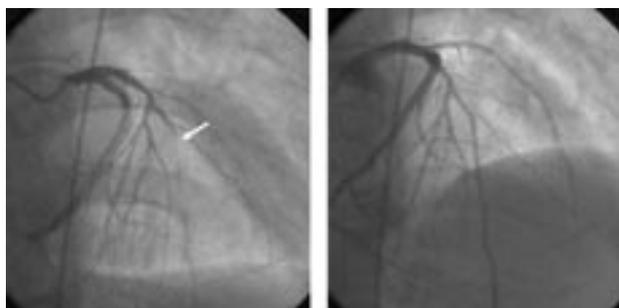


Figure 1. Left panel: Baseline coronary angiography showing total occlusion in the mid segment of the LAD (arrow). Right panel: Coronary angiography after stenting of the mid segment of the LAD with two overlapping Endeavor stents. LAD: Left anterior descending artery.

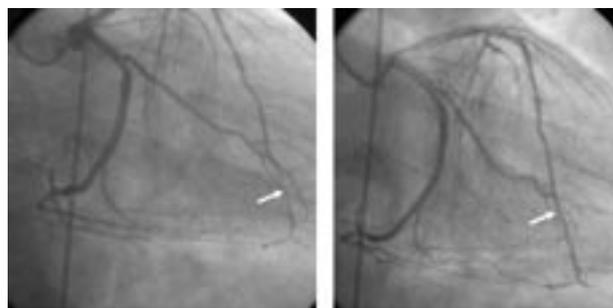


Figure 2. Left panel: Coronary angiography showing a tight lesion in the distal segment of the left anterior descending artery (arrow). Right panel: Post-stent implantation coronary angiography reveals a very good result.

tein IIb/IIIa antagonist was not administered during the second procedure.

Three days later the patient again complained of mild chest pain with minor ECG changes and new cardiac enzyme elevation. Repeat angiography revealed total occlusion at the distal LAD lesion (Figure 3, left panel). Balloon angioplasty with a 1.5×12 mm, followed by a 2.5×12 mm balloon inflated at 12 Atm, was performed, with restoration of normal distal flow and no residual stenosis at the site of the stent (Figure 3, right panel).

Recovery was uneventful and the patient was discharged after three days. Platelet count and coagulation profile were unremarkable. Six months post discharge the patient is asymptomatic, with improvement of left ventricular ejection fraction, and stress echocardiography showed no evidence of ischaemia.

Discussion

Endeavor is a new stent, based on the Driver stent plat-

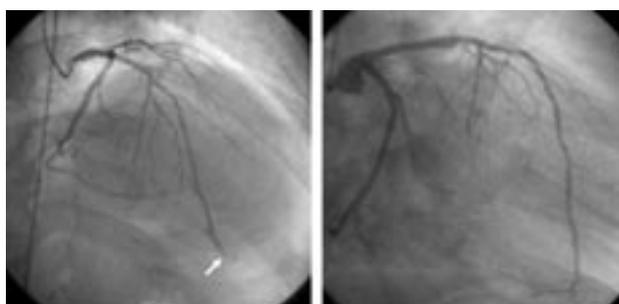


Figure 3. Left panel: Stent occlusion three days after implantation (arrow). Right panel: Coronary angiography showing restoration of the left anterior descending artery lumen following balloon angioplasty.

form, coated with phosphorylcholine and the anti-proliferative agent ABT-578 (zotarolimus). ABT-578 is a synthetic analogue of rapamycin that inhibits the cell cycle in the late G1 phase.⁷ In previous trials the Endeavor stent has been reported to have a very favourable safety profile. No stent thrombosis was reported in 232 patients of the ENDEAVOR III trial within 30 days following stent implantation, whereas the incidence of stent thrombosis in the ENDEAVOR II trial (595 patients with stents) was 1% at 30 days post-implantation.⁶

Local factors such as flow-limiting dissections and areas of low flow, as well as the presence of adjacent vulnerable plaques, have been identified as independent predictors of stent thrombosis.⁹ In our case, there was distal location of the stented lesion close to the end of the LAD, where the vessel was of relatively small calibre (2.5 mm). These adverse anatomical factors, such as small vessel diameter, may have contributed to stent thrombosis despite the optimum treatment with antiplatelet agents. In addition, clinical factors such as impaired left ventricular ejection fraction may have contributed to subacute stent thrombosis. During the second procedure no GP IIb/IIIa antagonist was administered because the indication was not strong. So far, most cases of drug-eluting stent thrombosis seem to be more closely related to antiplatelet therapy, and especially aspirin discontinuation.^{1,2,4} The possibility of aspirin and clopidogrel resistance was weak, since no thrombosis of the proximal stent was evident. Our case provides further evidence that in the era of drug-eluting stenting, adverse anatomical factors such as small vessel size do predispose to stent thrombosis despite optimum use of antiplatelet medication.

References

1. Jeremias A, Sylvia B, Bridges J, et al: Stent thrombosis after successful sirolimus-eluting stent implantation. *Circulation* 2004; 109: 1930-1932.
2. Regar E, Lemos PA, Saia F, et al: Incidence of thrombotic stent occlusion during the first three months after sirolimus-eluting stent implantation in 500 consecutive patients. *Am J Cardiol* 2004; 93: 1271-1275.
3. Katritsis DG, Korovesis S, Karabinos I, et al: Sirolimus- vs paclitaxel-eluting stents. A comparison of two consecutive series in routine clinical practice. *J Interv Cardiol* 2006; 19: 39-42.
4. McFadden EP, Stabile E, Regar E, et al: Late thrombosis in drug-eluting coronary stents after discontinuation of antiplatelet therapy. *Lancet* 2004; 364: 1519-1521.
5. Karvouni E, Korovesis S, Katritsis DG: Very late thrombosis after implantation of sirolimus eluting stent. *Heart* 2005; 91: e45.
6. ENDEAVOR II and ENDEAVOR III trials: Available at <http://www.tctmd.com>
7. Buellesfeld L, Grube E: ABT-578-eluting stents. The promising successor of sirolimus- and paclitaxel-eluting stent concepts? *Herz* 2004; 29: 167-170.
8. Wang F, Stouffer GA, Waxman S, et al: Late coronary stent thrombosis: early vs. late stent thrombosis in the stent era. *Catheter Cardiovasc Interv* 2002; 55: 142-147.
9. Cutlip DE, Baim DS, Ho KK, et al: Stent thrombosis in the modern era: a pooled analysis of multicenter coronary stent clinical trials. *Circulation* 2001; 103: 1967-1971.