Late Stent Thrombosis Following Implantation of a Drug Eluting Stent Presenting as Acute Myocardial Infarction: A Case Report

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Citation

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Abstract

Drug eluting stents (DES) have made a great impact on the practice of interventional cardiology and a wide range of coronary lesions are being subjected to angioplasty with drug eluting stents. One important problem encountered with their use is late stent thrombosis. We herein report a case that presented as acute anterior wall myocardial infarction three months after drug eluting stent implantation in left anterior descending artery despite continued use of aspirin and clopidogrel.

INTRODUCTION

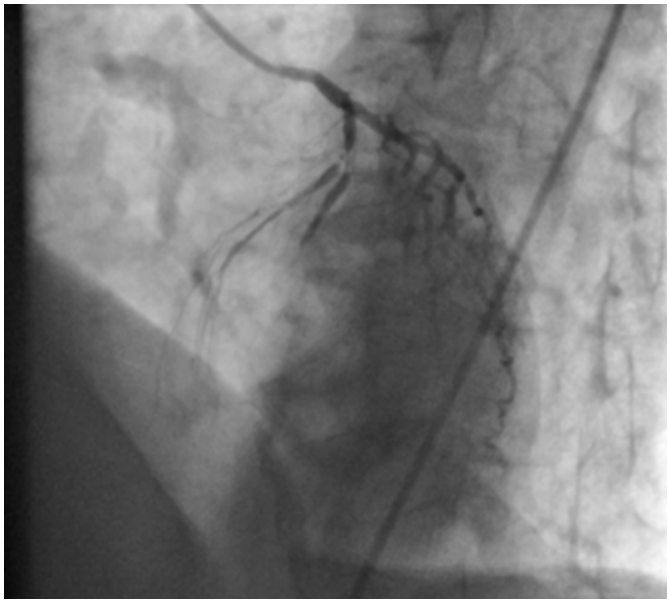
Drug eluting stents have revolutionized the practice of interventional cardiology. They have been conclusively shown to reduce restenosis, late loss, target vessel revascularization and target vessel failure.[1,2,3] However an important problem associated with usage of drug eluting stents is the occurrence of late stent thrombosis (later than one month after implantation) which is being increasingly reported.[4,5] It Is also referred to as late angiographic stent thrombosis (LAST). It usually presents as frank ST elevation MI and the result can be disastrous. The reported incidence is 0.3% to 0.72%[5]. The usual cause of this problem is stopping of one or both antiplatelet agents by the patient.

CASE REPORT

A patient aged 55 yrs presented on 05.06.06 with acute anterior wall myocardial infarction within two hours of the onset of chest pain. Earlier he had documented anterior wall MI in October 2005. He did not receive thrombolytic therapy at that point of time as he came after several days of chest pain. Patient was a chronic smoker and stopped smoking after the first event. He was not a diabetic or hypertensive. He underwent diagnostic coronary angiography which showed a proximal 90% lesion in LAD. The left circumflex and right coronary arteries were normal. The left ventricular angiography showed good left ventricular function with ejection fraction of 54%. Patient was subjected to angioplasty with a bare metal stent (Duraflex 2.5x14 mm) on 26th of October 2005. He developed unstable angina in the month of March 2006 and he was also found to have developed diabetes during this admission. Patient was subjected again to angiography and was found to have critical 99% in-stent stenosis (Figure 1).

Figure 1

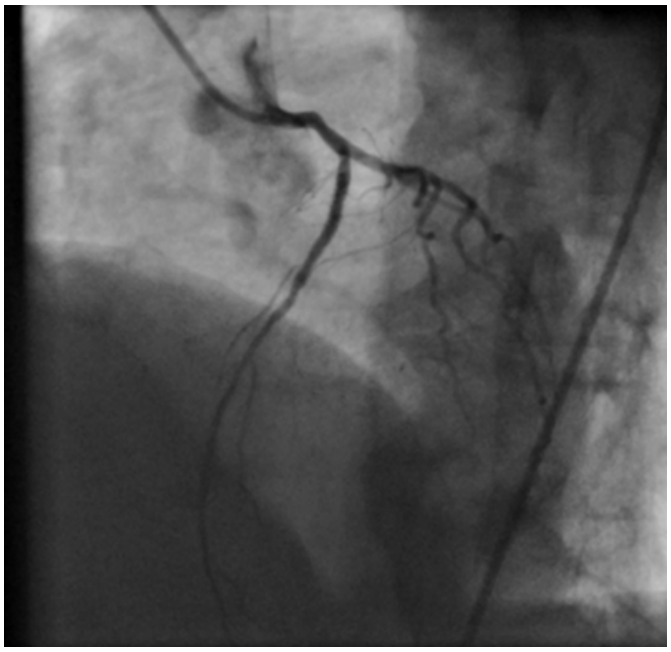
Figure 1: Coronary angiogram showing critical instent stenosis of proximal LAD.



After stabilization he underwent angioplasty this time with a 2.5x30 mm drug eluting stent (Endeavor, Medtronic Inc, Minneapolis, MN.)(Figure2).

Figure 2

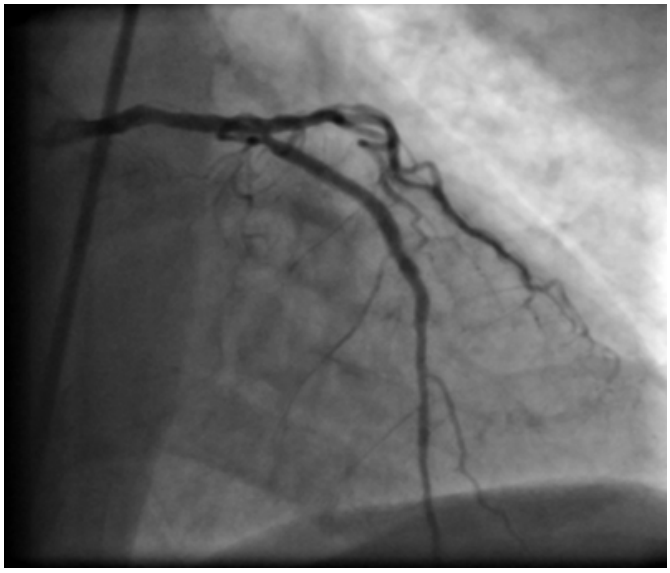
Figure 2: Post DES result showing no residual stenosis.



We choose to use a long stent as there was some negative remodeling on either side of the bare metal stent. Post-implantation, the stent was dilated with a 2.5x10 mm balloon up to a pressure of 15 atms. The end result was good. Patient was given Inj. abciximab periprocedurally. He was prescribed Aspirin 325 mg OD and Clopidogrel 75 mg OD. His diabetes was controlled with Insulin and he was also prescribed angiotensin converting enzyme inhibitors and beta-blockers. Patient has been taking his medications regularly including both antiplatelet agents. He was doing well for 3 months when he developed once again extensive ST elevation anterior wall MI. His blood pressure was 140/100 mm Hg and heart rate 84/min at presentation. He was not in left ventricular failure. He was administered 1.5 million units of streptokinase intravenously. He responded well with relief of chest pain and resolution of ST segment elevation. After one week he was taken up for repeat coronary angiography which showed that the stent was patent with no intimal hyperplasia or intra luminal radiolucency (Figure 3).

Figure 3

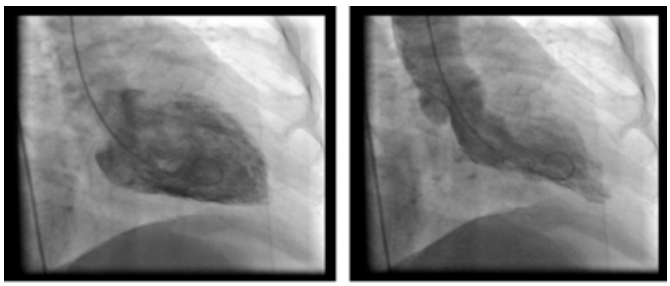
Figure 3: Angiogram done one week after thrombolytic therapy showing no residual thrombus or significant instent stenosis



There were no other lesions. His left ventricular function was well preserved with ejection fraction of 48%(Figure 4) Cilostozol 100 mg twice daily was added to his existing regimen of Aspirin and Clopidogrel. Patient had no recurrence of symptoms during follow-up of three and half months.

Figure 4

Figure 4 : Left ventricular angiogram in diastole (panel A) and in systole (Panel B) one week after thrombolytic therapy



Panel A Panel B

DISCUSSION

Late stent thrombosis is a matter of concern for interventional cardiologists. Several mechanisms of late stent thrombosis have been postulated: a local drug effect delaying endothelialization or results in the formation of a dysfunctional endothelium, a hypersentivity or inflammatory reaction to the polymer[6], or the development of neointimal hyperplasia with occlusive thrombus formation as the acute

event. Furthermore, it is known that previous treatment with brachytherapy is associated with an increased risk of late stent thrombosis when on monoantiplatelet therapy.[7]Late stent thrombosis usually occurs in patients who have stopped either one or both antiplatelet agents.[5] In our case the patient developed delayed stent thrombosis despite being on medications regularly. Late stent thrombosis has been reported from the randomized trials following implantation of taxol [8] as well as sirolimus eluting stents [9]. In the real world practice the incidence may be more.

Late stent thrombosis was a significant problem with the QP2 stent programme (now discontinued). The continuing occurrence of stent thrombosis (3.2%, 7.1% and 10.3% at 1,6, and 12 months) in the Study to Compare Restenosis Rate between QueST and QuaDDS-OP2 (SCORE) trial was attributed to the long duration of high-dose drug release and proinflammatory nature of the polymer sleeves.[10]

It is not that late stent thrombosis was not reported with bare metal stents. Wang F et al have published their experience with stent thrombosis from the bare metal stent era and compared early stent thrombosis to late stent thrombosis[11]. Of a total of 1191 patients undergoing coronary stenting, acute (less than 24 hours) plus subacute (1 to 30 days) stent thrombosis occurred in 0.92% (11 patients). A further 0.76% (9 patients) developed late stent thrombosis after 30 days.

The mean time of late stent thrombosis was 109 days (range 39 to 211 days). All these patients presented with acute myocardial infarction. All these patients were receiving aspirin but not clopidogrel or ticlopidine at the time of stent thrombosis event. The results of this study demonstrate that late stent thrombosis represents a relatively large proportion of all stent thrombosis (almost 50%). In another series by Colombo et al, 40% of stent thrombosis (0.6% of a total of 1.5%) occurred greater than 2 months after stent implantation[12]. In another randomized trial of brachytherapy, the incidence of late stent thrombosis was 5.3% in the brachytherapy group and 0.8% in the non-brachytherapy group, a figure almost identical to the incidence reported in the different trials quoted above[13]. Moussa et al showed that patients with subacute stent thrombosis had a smaller final stent diameter, more stents/lesion, a smaller final balloon size, and more than one stent type/lesion compared with patients who did not develop subacute stent thrombosis[14]. It is probable that early stent thrombosis is related in part to inadequate deployment. On the other hand, angiographic characteristics were quite similar between control patients and patients with late stent thrombosis, suggesting that abnormal endothelialization, residual thrombus, or persistent intimal tears rather than inadequate stent deployment, or possibly a combination of both factors, may predispose to late thrombosis. It appears from the above publications that late stent thrombosis is not confined to drug eluting stents or stented coronaries undergoing brachytherapy but is a more generalized phenomenon.

In our case one might argue that stent thrombosis has not been demonstrated. But given the facts that patient developed acute myocardial infarction following drug eluting stent implantation and that thrombolytic therapy has promptly reversed the ST-segment elevation and angiography done later could not demonstrate any other lesion that could have produced the event, one can only conclude that it was the late stent thrombosis that led to the acute myocardial infarction in this patient. There are a few other interesting features as well. It is a case of late stent thrombosis following Endeavor stent (ABT 578-ZOTAROLIMUS) which has not been reported previously (although an incidence of 0.5% early stent thrombosis was described in the drug eluting stent arm of the Endeavor II trial, presented at ACC 2005). It happened while the patient was on both antiplatelet agents and lastly the patient responded very well to systemic thrombolytic therapy. We have earlier reported 8 cases of early stent thrombosis treated with systemic thrombolytic therapy with encouraging results[15]. In the light of recent evidence that addition of cilostozol to dual antiplatelet therapy offers further protection against future coronary events following coronary stenting, one should consider adding this drug as well to the patient's prescription.[16,17]

CONCLUSION

It is important to report cases of late stent thrombosis following DES implantation as they are quickly replacing bare metal stents. Patients should be counseled about the need for using dual antiplatelet therapy indefinitely. Those patients who may require a non-cardiac surgery in near future should perhaps be subjected to angioplasty with bare metal stents in which case discontinuation of antiplatelet therapy for a few days may not be of consequence.

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