Circulating Endothelial Progenitor Cells in Patients who Underwent Late Coronary Stent Thrombosis

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Background: An important factor that may contribute to the development of late stent thrombosis (ST) after drug eluting stent (DES) implantation is delayed arterial healing and poor endothelialization. Endothelial progenitor cells (EPCs) have been shown to play a prominent role in repair and re-endothelialization following vascular injury, such as balloon angioplasty. We, therefore, hypothesized that patients who develop late ST may have reduced levels and/or function of EPCs, as a factor contributing to their risk of ST.

Methods: Patients who developed late (>4 weeks following stenting) ST, within the past 3 years, were compared to a matched group of patients who underwent stenting and did not develop complications [matching according to gender, age, diabetes status, type of stent (DES vs. BMS), and current treatment with aspirin, clopidogrel and statins]. All patients had blood samples taken at least 3 months from the ST or index procedure. The percentage of peripheral mononuclear cells expressing VEGFR-2, CD133 and CD34 was evaluated by flow cytometry. EPC colony forming units (CFU) were grown from peripheral blood mononuclear cells, characterized, and counted following 7 days of culture on fibronectin-coated wells.

Results: The two groups (n=15 each) were well matched (93.3% men, mean age 60-62 years, 33.3% diabetes, 80% DES). The proportion of mononuclear cells co-expressing VEGFR-2 and CD133 or VEGFR-2 and CD34 was similar in both groups. However the mean number of CFU was lower among the patients who underwent late ST (Table).

Conclusions: In this preliminary study it appears that patients who had undergone late coronary ST have reduced levels of EPC CFUs, which reflects impaired EPC functional properties. These findings require validation by larger studies, but may contribute to the understanding of the pathogenesis of late ST.

	ST group (n=15)	Control group (n=15)
CD133+, VEGFR-2+ cells (%)	0.67±0.6	0.85±0.6
CD34+, VEGFR-2+ cells (%)	1.17±1.3	1.42±1.1
EPC CFUs (per 10^6 cells)	5.3±2*	11.2±5*

*P=0.002