PREVALENCE OF STENT FAILURE FOLLOWING BMS, 1ST- AND 2ND-GENERATION DES PLACEMENT: A PATHOLOGIC STUDY

Authors: Oscar David Sanchez, CVPath Institute, Gaithersburg, MD, USA

Aims: With increased complexity of percutaneous coronary intervention stent failure remains a concern and requires continued surveillance. Stent restenosis, thrombosis and fracture have been reported as time-dependent determinants of stent failure. The aim of the current study was therefore to explore the pathological correlates of stent failure by duration and stent type.

Methods and Results: In our registry of human autopsy cases, we evaluated 768 lesions; 315 had been treated with BMS, 362 with 1st Gen DES [Sirolimus Eluting Stent (SES) = 162, Paclitaxel Eluting Stent (PES) = 200]; and 91 with 2nd gen DES [Endeavor (E-ZES) = 13; Resolute (R-ZES) = 6; and Xience (EES) = 72]. All stented arteries were radiographed and embedded in methyl methacrylate plastic and serially sectioned. The prevalence of stent thrombosis, restenosis and fracture was determined based on histopathological findings and the clinical case histories. The mean duration (days) of implant was 1,124±1,207 for BMS, 492±587 for 1st Gen and 230±270 for 2nd Gen DES. There was no difference in acute stent thrombosis (<30 days, n=144 stents) between BMS (36.5%) and 1st gen DES (36.5%), however the prevalence was less in 2nd gen DES (16.6%) than in BMS (2.3%) or 2nd gen DES (4.6%) (P=0.001) at 31 to 365 days (n=281 stents); with implant duration >365 days (n=343); the very late thrombosis rate was highest in the 1st gen DES (19.8%) as compared to BMS (3.2%) or 2nd gen DES (0%) (P<0.0001). Restenosis was significantly higher in BMS compared to 1st and 2nd gen DES but no differences were seen between 1st and 2nd gen DES. Stent fracture was significantly higher in 1st gen DES (31.3%) as compared to 2nd gen DES (14.3%) or BMS (8.1%) (P<0.0001).

Conclusion: Acute stent thrombosis rates are similar between BMS, 1st and 2nd generation DES. However, beyond 30 days, thrombosis rates were highest in the 1st gen DES vs. BMS or 2nd gen DES. Restenosis rates although less than BMS remains a problem. These results endorse the improved clinical performance of 2nd gen DES, however persistence of restenosis and fractures confirms the need for sustained technological improvement.