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Abstract: Arterial plaque rupture and thrombus characterise ST-elevation myocardial infarction (STEMI) and may aggravate delayed arterial healing following durable polymer drug-eluting stent (DP-DES) implantation. Biodegradable polymer (BP) may improve biocompatibility. We compared long-term outcomes in STEMI patients receiving BP-DES vs. durable polymer sirolimus-eluting stents (DP-SES). We pooled individual patient-level data from three randomised clinical trials (ISAR-TEST-3, ISAR-TEST-4 and LEADERS) comparing outcomes from BP-DES with DP-SES at four years. The primary endpoint (MACE) comprised cardiac death, MI, or target lesion revascularisation (TLR). Secondary endpoints were TLR, cardiac death or MI, and definite or probable stent thrombosis. Of 497 patients with STEMI, 291 received BP-DES and 206 DP-SES. At four years, MACE was significantly reduced following treatment with BP-DES (hazard ratio [HR] 0.59, 95% CI: 0.39-0.90; p=0.01) driven by reduced TLR (HR 0.54, 95% CI: 0.30-0.98; p=0.04). Trends towards reduction were seen for cardiac death or MI (HR 0.63, 95% CI: 0.37-1.05; p=0.07) and definite or probable stent thrombosis (3.6% vs. 7.1%; HR 0.49,
95% CI: 0.22-1.11; p=0.09). In STEMI, BP-DES demonstrated superior clinical outcomes to DP-SES at four years. Trends towards reduced cardiac death or myocardial infarction and reduced stent thrombosis require corroboration in specifically powered trials.