Abstract:
We aimed to assess the influence of different sirolimus analogues released from a uniform stent platform on re-endothelialisation and vascular healing responses. Bare metal stents (BMS) were coated with a fluoropolymer containing everolimus (EES), sirolimus (SES) or zotarolimus (ZES) to generate drug-eluting stents (DES) with identical stent backbones, drug loads and release kinetics. DES constructs and control BMS were implanted into the iliac arteries of rabbits and were analysed at 14 days by scanning electron microscopy (SEM) and confocal microscopy for en face evaluation of endothelialisation (n=6 for each stent), or at 28 days to determine histomorphometric characteristics (n=11 for each stent). SEM analysis revealed low degrees of strut re-endothelialisation within the DES without differences among groups, while the BMS control showed almost complete endothelialisation. Percent stenosis was significantly reduced in all DES compared to BMS. Strut-based fibrin analysis revealed significantly greater deposition in the DES compared to BMS, with EES showing maximum fibrin deposition among the DES groups. Sirolimus and its derivatives have similar effects on endothelial regrowth and neointimal thickening. The observation of greatest fibrin deposition in the experimental EES group indicates that everolimus may affect vascular healing differently.