Backgrounds

Overstretch damage after bare metal stent (BMS) placement could trigger cell proliferation and in-stent restenosis (ISR). Newer Co-Cr BMS has thinner stent struts, which designs to minimise cellular response to injury. We aimed to investigate neointimal growth, as well as vasomotor function after overstretch using Co-Cr BMS in a pig coronary model.

Methods

15 vessels in five pigs were assigned to receive BMS (stent struts 91 μm) implantation with either S/A ratio 1.3 (group I, n=7) or 1.5 (group II, n=8). Quantitative coronary angiography (QCA) and optical coherence tomography (OCT) were performed at 14 days after stent implantation. Coronary vasomotor function was evaluated by incremental acetylcholine (Ach; 10⁻⁷ and 10⁻⁶ M) and nitroglycerin (NTG, 400μg) infusion before stent implantation and at 14 days. Endothelial response to Ach was measured at 5–10 mm distal to the stent edge.

Results

Both QCA and OCT showed that in-stent stenosis of group I were significantly smaller than group II at 14 days (QCA-late loss (LL), 1.22±0.21 mm vs 1.79±0.17 mm; OCT % AS, 17.0±7.9% vs 26.9±10.7% at 14 days, p<0.05 and 0.001, respectively). Linner regression analysis QCA-LL is proportional to obtained S/A ratio (r=0.60, p<0.05). Endothelium-dependent vasomotion at distal non-stented reference segments was no difference between groups. The mean coronary diameter changes at Ach 10⁻⁷ M and 10⁻⁶ M was 2.1±0.2% and 2.1±0.2% in group I; 2.2±0.2% and 2.1±0.2% in group II (p>0.05, accordingly). There was also no difference before and at 14 days after stent implantation.

Conclusion

The progression of neointimal hyperplasia after BMS implantation is positively associated with the extent of coronary artery injury. Coronary endothelial function is preserved after BMS implantation at 14 days, which is independently of overstretch degree.