Early and late improvement of left ventricular function after drug eluting stent implantation for chronic total occlusions

S. Kirschbaum[1], R-J. M. van Geuns[1], T. Baks[1], G. Krestin[2], P. W. Serruys[3], and P. J. de Feyter[1]

[1]radiology and cardiology, Erasmus Medical Center, Rotterdam, Zuid-Holland, Netherlands, [2]radiology, Erasmus Medical Center, Rotterdam, Zuid-Holland, Netherlands, [3]cardiology, Erasmus Medical Center, Rotterdam, Zuid-Holland, Netherlands

Background

The long-term effect of recanalisation of a chronic total coronary occlusion (CTO) on left ventricular function and volumes is currently unknown. Therefore, we studied the effect of drug-eluting stent implantation for CTO on left ventricular function and volumes at 5 months and 3 years follow-up.

Methods

MRI was performed in 21 patients before successful drug-eluting stent implantation for CTO and at 5 months and 3 years after recanalisation. Segmental wall thickening and left ventricular volumes and function were quantified on cine-images, and the transmural extent of the infarction (TEI) was scored on delayed enhancement images.

Results

A significant decrease in mean end-diastolic volume index (86±14 ml/m^2 to 78±15 ml/m^2; p=0.02) and mean end-systolic volume index (35±13 ml/m^2 to 30±13ml/m^2; p=0.03) was observed three years after drug-eluting stent implantation. Mean ejection fraction tended to improve (60±9% to 63±11%; p=0.11). At 5 months, segmental wall thickening was improved significantly in segments with < 25% TEI (18±24% to 47±28%; p<0.001), tended to improve in segments with 25%-75% TEI (21±18% to 23± 23%; p=0.89) whereas segments with > 75% TEI did not improve (4±33% to -2±16%; p=0.30). Interestingly, at 3 years follow-up a further increase in segmental wall thickening was observed in segments with < 25% TEI (to 67±48%; p=0.03) and in segments with 25%-75% TEI (to 39±42%; p=0.03) whereas segments with > 75% TEI remained severely dysfunctional (to 13±41%; p=0.42).
The end diastolic wall thickness at baseline was related to the improvement in wall thickening at follow up (R=0.41, p=0.005).

Conclusion

Left ventricular function improves after drug-eluting stent implantation for CTO. Improvement of left ventricular function is seen in up to three years after recanalisation.