Transmyocardial laser revascularisation in a sheep model of ischemic cardiomyopathy

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Objective
To analyze the effect of transmyocardial laser revascularisation (TMR) on myocardial flow and function in ischemic cardiomyopathy.

Methods
Ischemic cardiomyopathy was induced in 7 sheep by the application of coronary stenosis (CS) on the left anterior descending and circumflex coronary artery. After 10 weeks transmyocardial channels was created using a Holmium YAG laser. Myocardial function was analyzed by echocardiography taken at baseline and every second week after surgery and after TMR. Myocardial perfusion was measured by colored microspheres, injected at baseline, after CS, before and after TMR and at 20 weeks. The hearts were retrieved at 20 weeks for light microscopic examination.

Results
Wall thickening fraction (WTF) decreased significantly during 10 weeks after CS and left ventricular end-diastolic cavity area increased progressively. Immediately after TMR, WTF decreased. It recovered gradually to the pre-TMR level. Myocardial blood flow (MBF) was significantly decreased in the LAD and LCX territory at 10 weeks after CS, and progressively increased in both area’s after TMR as compared to the pre-TMR values. Light microscopical examination revealed channel patency in 49.4%. At the edges of the surrounding scar a dense cappilary network was observed.

Conclusions
In an experimental model of ischemic cardiomyopathy, MBF improved at 10 weeks after TMR. However immediately post-TMR, a severe but transient depression of cardiac function was noticed. Histological analysis of lased channels suggests angiogenesis in the channels and the surrounding scar. There was no improvement of myocardial function.

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