Perivenous application of fibrin glue reduces early injury to the human saphenous vein graft wall in an ex vivo model.

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Abstract:

OBJECTIVES: From animal and clinical studies it is known that prevention of 'over-distention' of vein grafts by using extravascular support ameliorates the arterialization process in vein grafts with subsequent more favorable patency. The most ideal support is a biodegradable, porous, elastic graft (Biomaterials, 15 (1994) 83). However, a specific graft meeting these criteria is not available yet. Fibrin glue on the other hand, although used for other purposes in cardiac surgery, theoretically meets the criteria for ideal extravascular support. In this ex vivo study, we evaluated the possible beneficial effect of perivenous application of fibrin glue.

METHODS: Segments of human vein graft obtained during CABG procedures in 14 consecutive patients were placed in a side loop of the extracorporeal perfusion circuit. In this way the study vein grafts did meet identical circumstances as the vein grafts implanted. Perfusion in the loop was started with a flow just enough to counteract the collapse of the vein, usually about 8 mm Hg, and alternately around the segments fibrin glue was applied or no perivenous support was administered as control. After 1 min of soldification, perfusion was started with a pressure of about 60 mm Hg (non-pulsatile flow). Perfusion was maintained for 60 min, after which the grafts were collected for light microscopic and electron microscopic assessment.

RESULTS: Light microscopy and electron microscopy showed remarkable attenuation of endothelial

cell loss and less injury of smooth muscle cells of the circular muscle layer of the media in the fibrin glue supported vein grafts compared to the non-supported group.

CONCLUSION: Fibrin glue is able to accomplish adequate external vein graft support, preventing overdistention, in an ex vivo model. This provides a basis for clinical application. Further investigation is necessary to evaluate long-term effects.