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MEETING ABSTRACT Open Access

Tiprotec preserves endothelial function after cold ischemia and warm reperfusion: comparison between Saline, Custodiol and Tiprotec

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Background/Introduction

Background: Coronary artery bypass surgery provides excellent patency rates, however the early/late graft failure reduces the long-term benefit of myocardial revascularization.

Aims/Objectives

We investigated the effectiveness of generally used Saline, Custodiol solutions and a new solution (Tiprotec) at preserving endothelium after cold ischemia and warm reperfusion injury.

Method

Aortic transplantations were performed in Lewis rats. Aortic arches stored in Saline, Custodiol and Tiprotec solutions for 2 hours, then were transplanted into abdominal aorta. Two, 24 hours and 1 week after transplantation, the implanted grafts were harvested. Endothelium-dependent and-independent vasorelaxations were investigated in organ bath. DNA strand breaks were assessed by TUNEL-method, mRNA expressions by quantitative real-time PCR and the expression of CD-31 and α-SMA by immunochemistry.

Results

Severely impaired endothelial function and integrity of implanted aortic grafts were shown after 2h in the Saline, Custodiol group (maximal vasorelaxation to acetylcholine: control:91 ± 2%, Saline:26 ± 5%, Custodiol:24 ± 5%, CD31 positive area control:96 ± 2%, Saline:35 ± 13% Custodiol:54 ± 5%, $p < 0.05$, respectively), however a preserved endothelial function was observed in the Tiprotec group when compared to the Saline and Custodiol group (maximal vasorelaxation:46 ± 7%, CD31 positive area:54 ± 10%, $p < 0.05$). After 1 week, endothelial function were partially recovered in all groups, however it was significantly better in the Tiprotec group (maximal vasorelaxation to acetylcholine: Saline:42 ± 3%, Custodiol:48 ± 3%, Tiprotec:56 ± 3%, CD31 positive area: Saline:56 ± 5%, Custodiol:54 ± 4%; Tiprotec:83 ± 6%, $p < 0.05$, respectively). In addition, mRNA levels of Bax, Bcl-2, eNOS, VEGF-2 and caspase-3 were significantly altered in both groups.

Discussion/Conclusion

Tiprotec appears to be superior for the preservation of endothelial- and smooth muscle cells of bypass graft after cold storage and warm reperfusion in our murine model.

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