Adult Human Vascular Endothelial Cells Seeded onto No-React® Treated Bovine Internal Mammary Arteries: An in Vitro Study

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Background
Alternative grafts are under investigation as the number of patients with re-operations and insufficient autologous bypass material increases. This study was performed to compare endothelial cell seeding on bovine internal mammary arteries and polytetrafluoroethylene grafts.

Methods
Twelve seeded bovine mammary internal arteries were divided into two groups (n=6 each); group I endothelial cell seeded, group II endothelial cell seeded with fibrin glue pre-coating. Similar the polytetrafluoroethylene graft were divided into two groups, group III endothelial cell seeded and group IV endothelial cell seeded with fibrin glue pre-coating. Grafts were mounted during seeding and rotated for up to 3 hours. During the conditioning phase, a continuous surveillance of the circulating medium was performed and adjusted to maintain optimal cell viability.

Results
Two million endothelial cells were inserted for each grafts. Seeding endothelial cell density was in group I 1.29 x 10^5 ± 0.09 x 10^5 cells/cm² in group III and 0.84 x 10^5 ± 0.11 x 10^5 cells/cm². After coating the grafts with fibrin glue, cell density significantly increased in group II 2.27 x 10^5 ± 0.17 x 10^5 cells/cm² and group IV 1.35 x 10^5 ± 0.08 x 10^5 cells/cm², respectively (p<0.003) and (p<0.002). In both graft-types there was a non-significant number of endothelial cell loss after the conditioning phase.

Conclusions
It seems to be possible to seed endothelial cells onto bovine internal mammary arteries. Endothelial cell density almost doubled as compared to polytetrafluoroethylene grafts and seems to favor biological graft matrices.

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