Nitric oxide in cardiac transplantation

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Abstract:
The endothelium of coronary arteries has been identified as an important organ locally regulating coronary perfusion and cardiac function by paracrine secretion of nitric oxide (NO) and other vasoactive mediators. Therefore, the established organ procurement in cardiac transplantation using hypothermic storage solutions designed to preserve myocytes but not endothelial cells has to be critically discussed.

Heart transplantation is a prestigious high-end treatment for end-stage heart failure patients with promising survival rates: 84% one-year and 65% five-year survival. However, these survival rates are still far from being satisfying requiring further research in organ preservation and perioperative management.

This review will focus on possible strategies to improve donor and recipient management in regard to a functional endothelium and NO. The following topics will be addressed: (1) NO and ischemia/reperfusion, to understand the mechanisms that lead to NO depletion and its consequences. (2) NO and hypothermia, to understand the effects of hypothermia on the endothelium. (3) Current status of donor and recipient management, to describe the strategies used today. (4) Possible new approaches: NO-scavenging and NO-substitution, to describe the recent research that is performed in this area including some of our own results. (5) Outlook in donor and recipient management, to give possible new directions, deducted from our current knowledge.

Key words: nitric oxide, heart transplantation, donor and recipient management