

Lifeblood Medical, Inc.

Ten Hour Preservation of Guinea Pig Isolated Hearts Perfused at Low Flow with Air-Saturated Lifor® Solution at Room Temperature: Comparison to ViaSpan®

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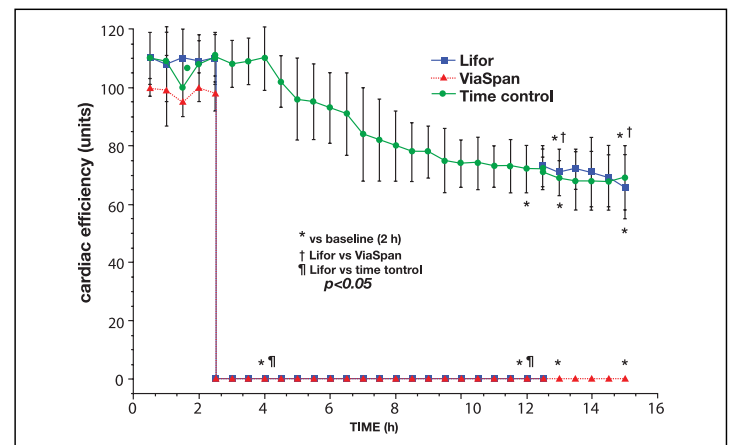
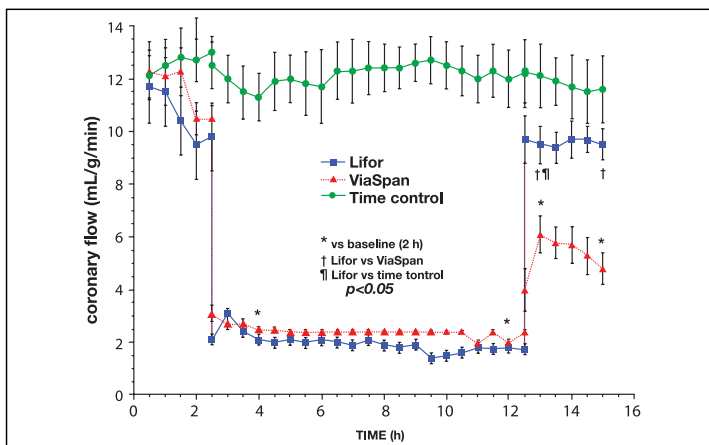
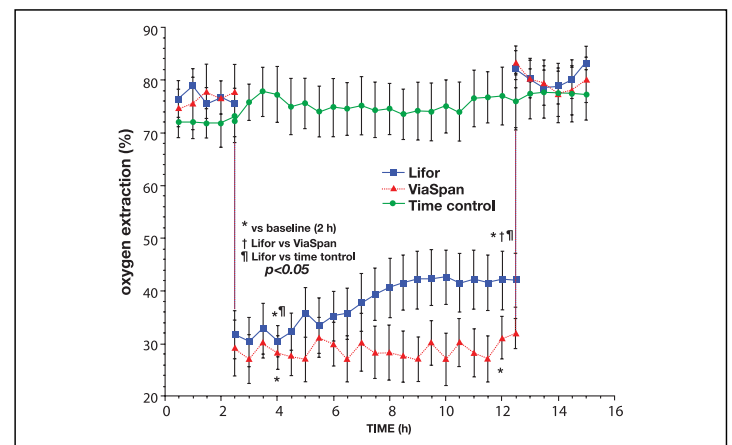
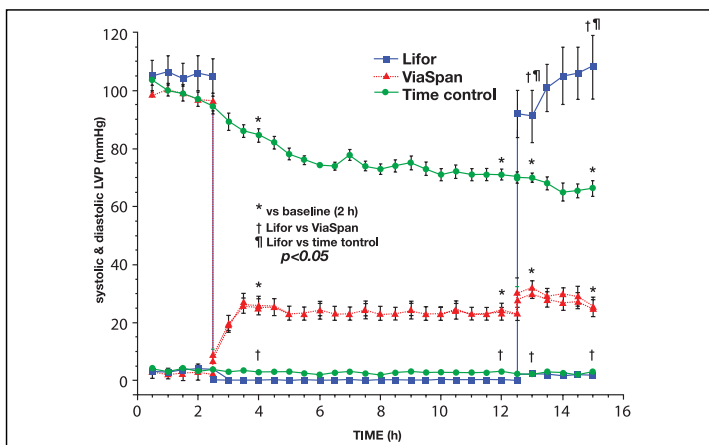
Introduction

There is no suitable solution to preserve hearts for longer than 5 h between donor explant and recipient implant. Lifor® is a proprietary, fully artificial preservation medium containing both a non-protein oxygen and nutrient carrier (nanoparticles) and cellular nutrients, including amino acids and sugars. We proposed that recirculated Lifor® solution would satisfactorily preserve guinea pig isolated hearts perfused at low flow with no added O₂ at room temperature for 10 h.

Materials & Methods

Hearts were isolated from 21 guinea pigs and initially perfused at constant pressure with Krebs-Ringer's (KR) solution equilibrated with 97% O₂ and 3% CO₂ at 37°C. Heart rate, inflow and outflow O₂ tension, coronary flow and isovolumetric left ventricular pressure (LVP) were measured. After baseline values were obtained, hearts were perfused with 300 mL of recirculated Lifor® or ViaSpan® equilibrated with room air at 15% of control flow at 26°C for 10 h. After the test period, hearts were perfused as during the baseline period for another 2 h. An untreated group perfused with KR solution for 15 h served as a time-control group.

Results



Conclusions

In this experimental model, which consisted of a very low flow coronary recirculation system at room temperature and room air, Lifor® solution was superior compared to Viaspan® for heart preservation up to 10 h. The experimental conditions of this study were set up to mimic the condition of transporting and preserving human hearts for transplant. An obvious limitation is that the use of a small animal, non-working heart model for a study of preservation solutions may not reflect the clinical conditions or use of these solutions in the human heart. Additional studies are needed to determine the optimal conditions and maximal length of protection afforded by Lifor® preservation solution and to compare Lifor® with other available preservation solutions.