



SUCCESSFUL RESUSCITATION OF NON-HEART-BEATING-DONOR (NHBD) CARDIAC ALLOGRAFTS AFTER HEMORRHAGIC CARDIAC ARREST.

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The use of NHBDs has been proposed to alleviate the critical shortage of donor cardiac allografts for transplantation. One source of NHBDs includes trauma victims suffering irreversible hemorrhagic shock. **Hypothesis:** NHBD cardiac allografts can be resuscitated within 15 minutes of normothermic global hemorrhagic shock. **Methods:** Ischemic arrest was achieved by exsanguination in 16 adult pigs and maintained over 15 minutes of total circulatory arrest. Each heart was then excised and reperfused for 2 hours with autologous blood in the beating, working state using a simple perfusion circuit. Afterload was standardized at 100 cmH₂O. Myocardial function and tissue pH were measured with intracavitary catheters and a pH electrode, respectively. **Results:** (M±SD) 14 hearts successfully converted to a working state. Over the 2 hour reperfusion period, left ventricular developed pressure (LVDP) was 84 ± 6 mmHg, cardiac output (CO) was 1266 ± 271 ml/min, coronary flow was 613 ± 104 ml/hr, and heart rate was 126 ± 5 bpm. Metabolic parameters were comparable to baseline values.

Arterial	Baseline	2 Hours Resuscitation
pH	7.40 ± 0.03	7.50 ± 0.04
pCO ₂ (mmHg)	48.3 ± 10.9	28.5 ± 3.3
pO ₂ (mmHg)	444.8 ± 73.2	602.9 ± 42.6
HCO ₃ (mmol/L)	31.1 ± 2.5	26.3 ± 2.6
O ₂ saturation (%)	100	100
Mixed venous O ₂ saturation (%)	--	91.7 ± 2.9
Myocardial tissue pH	7.17 ± 0.21	7.33 ± 0.25

Conclusion: Swine hearts harvested after 15 minutes of total circulatory arrest can be resuscitated to normal contractile and metabolic function. These findings demonstrate the possible use of resuscitated NHBD hearts for transplantation, thus increasing the availability of organs.