The Left Atrial Appendage
L Alvarez-Ayuso, J Roda, J Castillo-Olivares

Citation

Abstract
Heterotopic heart transplantation is a useful, low-cost model for the experimental study of graft viability and function without the implication of the effects of extracorporeal circulation. We performed heterotopic heart transplantation in Large White-Landrace pigs to analyze early myocardial ischemia-reperfusion-induced oxidative damage. We employed the technique described by Matsui et al. [1], with two modifications: (i) the anastomosis of the donor aorta was performed in ascending aorta of the recipient and (ii) due to the marked weakness of the atrial wall, we used the tip of a venous catheter as a bridge between the right donor atrial appendage and left recipient atrial appendage to avoid the need for suture. The technique was performed successfully in 10 animals with a mean weight of 20.6 ± 2.9 kg, but failed in 3 of 4 animals in which the mean weight was 11.7 ± 2.3 kg. In the latter group, upon introduction of the catheter into the recipient atrial appendage, extreme bradycardia, recipient heart dilatation and, 2 to 3 minutes later, refractory heart failure (asystole) developed. The oxygenation and acid-base and electrolyte balances at that time were found to be adequate. A possible cause of this complication could have been the passage of preservation solution (University of Wisconsin solution) from donor right atrium to recipient left atrium. However, we consider that, had this been the case, the volume could scarcely amount to more than a few drops since the attempt was made to withdraw the solution in its entirety prior to undertaking implantation. Moreover, this circumstance could have also occurred in larger animals. On the other hand, once the two atria were connected, the flow direction was reversed to pass from recipient left atrium to donor right atrium. As the blood filled the chambers of the graft, the air was drawn out by puncturing the tip of both ventricles and, finally, the aorta was unclamped. The rapidness with which the complication developed and its coincidence with the stretching of the atrial appendage to allow introduction of the venous catheter suggest it may be related to the stimulation of pressure receptors or to the stretching of the left atrial appendage. While in adult animals (or those surpassing a certain body weight), these receptors modulate the pressure-volume relationship over the medium or long term [2], in immature animals or those with lower body weight (piglets), they may elicit much more acute responses, such as those observed by us in pigs weighing 14 kg or less.

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CORRESPONDENCE TO

Lourdes Alvarez Ayuso.
Rafael Bergamín 9, 10-B
28043 Madrid. Spain.
Fax no. 34 1 373 7667
E-mail: lalvarez@hpth.insalud.es

References

Author Information

Lourdes Alvarez-Ayuso, Ph.D.
Assistant, Experimental Surgery, Hospital Puerta de Hierro, INSALUD

Jorge R Roda, M.D.
Resident, Cardiac Surgery, Hospital Puerta de Hierro, INSALUD

Jose Luis Castillo-Olivares, Ph.D.
Head Service, Experimental Surgery, Hospital Puerta de Hierro, INSALUD