IMMUNOGENICITY OF AORTIC VALVE ALLOGRAFTS DOES NOT CORRELATE WITH PRESENCE OF ANTIGEN

Flavian M. Lupinetti, David M. King, Hazem El Khatib, Sue Ann Thompson, The University of Michigan, Ann Arbor, MI

Previous studies have demonstrated that prolonged storage of rat allograft valves in nutrient medium at 4° C diminishes, but does not eliminate, the immunogenicity of these grafts, as measured by duration of second-set skin graft survival. Cryopreservation, on the other hand, does not alter the immunogenicity of these grafts. To determine whether immunogenicity is correlated with the presence of immunocytochemically-positive antigen, aortic valves were harvested from adult male Brown Norway rats. Valves were examined in the fresh state, after cryopreservation or after storage in nutrient medium at 4° C for 3-14 days. The valves were studied using mouse monoclonal antibodies of the OX 18 and OX 6 clones, which label class I and class II antigens, respectively. Three or more valves were studied in each group. The results of these studies were compared to the length of survival of a second-set skin graft placed 3 weeks after heterotopic valve implant into the abdominal aorta of recipient allogeneic rats.

PREPARATION	OX18	OX6	SKIN GRAFT SURVIVAL (DAYS)
Fresh	+	-	4.5
4° x 3 days	-	-	4.9
4° x 7 days	-	-	5.2
4° x 14 days	-	-	6.1
Cryopreserved	-	-	4.3

Immunocytochemical observations were the same in valve leaflets, aorta, and myocardium. It is concluded that the presence of antigen in unimplanted valve allografts as detected by immunocytochemical staining does not correlate well with the capacity of these grafts to elicit an immunologic response. This suggests that presence of antigen is not a valid guide to ultimate immunologic consequences, and should not guide the use and management of allograft aortic valves.

IN-VITRO MEASUREMENT OF HIGH PEAK FLUID PRESSURE GRADIENTS ACROSS PROSTHETIC HEART VALVES AT CLOSING

Ronald F. Carey, Bruce A. Herman, Matthew R. Myers, Food and Drug Administration, Rockville MD USA

Mechanical stability and durability of prosthetic heart valves are dependent upon the stresses to which the components are subjected in vivo. To determine maximum dynamic pressure gradients upon occluder impact at valve closing, we evaluated four different valve types (tilting disk, bi-leaflet, ball-in-cage, pericardial), mounted in both the mitral and the aortic position of a pulse duplicator. Using Millar sensor-tipped catheters on either side of the valves, we measured high negative pressure pulses in the left atrium, at the moment of mitral valve closure, and high positive pressure pulses in the aorta, at the moment of aortic valve closure. Pulse widths were often less than one millisecond and pulse amplitudes were as large as 700 mm Hg (for one of the tilting disk valves). Similar pulses were also observed for the other valve types but with amplitudes on the order of, or less than, the maximum systolic ventricular pressure. Pulse amplitude was not strongly dependent upon cycle rate, stroke volume, or systolic pressure over normal ranges of these parameters. The amplitude was, however, strongly dependent upon geometry. A model of acoustic wave propagation accounts qualitatively for the presence of the pulses in the atrium and in the aorta and for the lack of such in the open ventricle of our duplicator. These results suggest that catheterization of animals with valve implants be performed, with appropriate instrumentation (responsive to at least 5 kHz), to evaluate stresses critical to valve reliability.

THE CONTINUITY EQUATION TESTED IN A BILEAFLET TILTING DISC AORTIC PROSTHESIS

John Chambers, Graham Jackson, Philip Deverall, Edgar Sowton. Cardiac Department, Guy's Hospital, UK.

The continuity equation is valid for a population of aortic valves, but its accuracy in individual valves is uncertain. In bileaflet tilting disc prostheses, obstruction to forward flow is small and individual variability in opening action minimal. In these valves effective orifice area should be close to the manufacturer's measured orifice area. We therefore studied 57 patients aged 58 ± 11 years at a mean of 3.6 months after implantation with a CarboMedics aortic prosthesis. Nine had additional mitral implants. All prostheses were clinically normal. We used a phased array system (Hewlett Packard 77020A) with a 2.5 MHz duplex and a 1.9 MHz continuous wave probe. Peak subaortic and transaortic velocities were averaged over 5 beats. Mean transaortic flow, derived from the subaortic flow profile, ranged from 141 to 450 ml/s. Effective orifice area was 1.8 ± 0.4 cm^2 (mean ± SD) and measured orifice area, 2.0 ± 0.4 cm^2. The correlation between effective and measured orifice area was moderate ($r = 0.72$, $p < 0.00001$), but the 95% range for the differences between individual pairs of values was 0.15 ± 0.63 cm^2. Discrepancies probably arose in the estimation of subaortic cross-sectional area and subaortic velocity.

We conclude that the continuity equation may be inaccurate in an individual valve and should not be used in isolation to make clinical decisions.

Wednesday, March 6, 1991
8:30AM–10:00AM, Room 313, East Concourse
Prognosis After Myocardial Infarction I

8:30

PROGNOSTIC SIGNIFICANCE OF EARLY POSTINFARCTION ISCHEMIA: THE GISSI-2 IRES RESULTS.

The GISSI-2 IRES (Ischemia Residua) Study Group.

Early residual ischemia (ERI: transient >1mm ST depression and/or >1mm MI remote ST elevation and/or T wave inversion) was documented during the CCU phase in 35/453 (8%) unselected GISSI-2 pts aged ≤70 yrs and prospectively enrolled 24 hrs after their first MI in the IRES study.
ERI, associated with angina in all but 3 pts, was unrelated to sex, age, Q or non Q MI, anterior or inferior MI location, thrombolytic agent (SK or tPA) and time (1-6 hrs) of administration. Multivessel >70% CAD was more frequent in pts with vs without ERI (54% vs 33%, $p<0.05$).
In the CCU phase, cardiac events (CE: 4 deaths, 14 non-fatal re-MI and 2 urgent revascularizations) occurred in 34% of pts with vs 2% without ERI ($p<0.001$). During the in-hospital post CCU period, CE (2 deaths, 5 re-MI and 6 revascularizations occurred in 17% of pts with and 2% without ERI ($p<0.05$). At 6 month follow-up in 352 medically treated pts, CE (5 deaths, 13 re-MI and 46 angina) occurred 11% of pts with and 19% without ERI (NS).
We conclude that ERI identifies a subset of pts with a higher risk of in-hospital CE, particulary in the CCU phase.