

**Clinical Cardiology:
Advances in Contrast
Echocardiography/
Myocardial Perfusion**

Monday Afternoon

PERSISTENCE OF ALBUNEX® (ALB) ULTRASOUND CONTRAST AGENT: IN-VITRO STUDY OF THE EFFECTS OF PRESSURE AND ACOUSTIC POWER ON PARTICLE SIZE, AND THE DURATION OF CONTRAST AND DOPPLER ENHANCEMENT. Robin Shandas, David J. Sahn, Gary Bales, Taher Elkadi, Kwong-Kun Yau, Morteza Gharib, Univ Calif San Diego, CA.

0372

LV contrast intensity after intravenous ALB injection varies with the cardiac cycle, raising questions about the pressure related stability of the particle. We explored pressure stability and the influence of acoustic power on ALB effect in an in-vitro pulsatile model at receiving chamber (RC) pressures between 10-160 mmHg. Ultrasound imaging was performed at 5MHz along with 3.5MHz color Doppler at maximal and minimal levels of acoustic power output on a VingMed CFM scanner. We also studied the effects of static RC pressure on particle size and survival using a new phase shift laser Doppler device (Dantec). An inverse relationship existed between RC mean pressure and the duration of both echo and Doppler enhancement (r=0.95 and r=0.94, respectively). At 40-80 mmHg RC pressures, contrast persistence determinations were shorter at the higher compared to the lower acoustic power output (p<0.05). On laser Doppler study, particle size decreased as RC pressure increased prior to particle disruption. Higher RC pressures compress the ALB micro particle and decrease its half-life. Increased acoustic output may also shorten ALB effect.

The Safety of Sonicated Human Albumin (Albunex) for Repeated Echocardiographic Studies in Experimental Animals. Bernard P Geny, Paul D Pion, Mark D Kittleson, William Bommer. Schools of Veterinary Medicine and Medicine, University of California, Davis, California

0373

Albunex (ABx) (sonicated human albumin) (HA) in HA carrier has been developed to provide an echo contrast agent for cardiac output, intracardiac shunt, and myocardial perfusion evaluations in humans. Although studies have evaluated the safety of single ABx injections in animals and humans, relatively little data are available for repeated injections. We performed ABx injections initially and at 3 weeks and carrier (HA) injections at 5 to 7 weeks after the initial exposure in a total of 7 animals (5 dogs, 2 cats) while monitoring for adverse clinical reactions (ACR), mean percentage change in mean pulmonary artery pressure (xPA), mean systemic arterial pressure (xAP), cardiac output (xCO) and echocardiographic left ventricular shortening fraction (xFS). The results are shown in the table below with the number of animals in parentheses.

Injection	#ACR	xPA	xAP	xCO	xFS
ABx (Initial)	0(7)	+2.2(5)	-2.7(4)	-1(4)	+1.4(4)
ABx (second)	death(1) agitation(5)	+59(5)	-46(4)*	-41(4)*	-37(5)
Albumin	agitation(2)	+106(2)	-57(2)	-65(2)	-60(2)

The initial injection of ABx was well tolerated without significant hemodynamic changes. Repeat injections after 3 weeks produced adverse clinical effects and hemodynamic alterations. These effects appear to be the result of an allergic response to HA. The antigenicity of the sonicated fraction is unknown. We conclude that repeated injections of ABx in animals (interspecies) consistently caused adverse reactions and further studies of repeated injections in animals and humans (intra species) may be indicated to evaluate the safety of this new agent.

Combined Glucose-Albumin Solution is Better Than Pure Albumin Solution to Opacify the Left Ventricle After Peripheral Venous Injection. Shoa L Lin, Shuenn J Ho, Tsui L Hsu, Chen H Chen, Shih P Wang, Mau S Chang, Benjamin N Chiang. Veterans General Hospital-Taipei, Taiwan, R.O.C.

0374

The microbubble size of the pure 5% albumin (A) solution or a combined solution of A adding any one of the 10%, 20%, 25%, 30%, 35%, or 50% glucose under microscopy was assessed after sonication. The potential for transpulmonary passage into the left ventricle(LV) of pure A and 5% albumin-50% glucose(A-G) solution were also evaluated after peripheral injection in 5 dogs. A total of 100 injections(8ml each) were performed. Contrast echo was judged as 0: no contrast; 1: faint contrast partially filling the LV; 2: Contrast filling the LV; 3: dense contrast fully opacifying the LV. **Results:** The microbubble radius of all combined albumin-glucose solutions was smaller than that of pure A solution (9±2 um). The A-G solution had the smallest microbubble radius (7±1 um). Definite (>grade 2) LV contrast was seen in 16%(8/50) of A and 100%(50/50) of A-G solution injections. The peak videodensity of A and A-G solution in LV was 21.7% and 44.5% respectively as bright as that in the right ventricle. Thus, the A-G solution is superior than pure A in smaller microbubble size and effective opacification of LV after peripheral venous injection in dogs.

Contrast Enhanced Color Doppler Imaging of Left Heart Chambers - First Clinical Results Harald Becher, Helene von Bibra, Kilian Glänzer, Reinhard Schlieff, Birgit Aupperle, Hans Vetter. Med.Poliklinik, Bonn, I.Med.Klinik, TU München and Clinical Research, Schering AG, Berlin, FRG

0375

Previous studies have demonstrated an improved sensitivity of color Doppler (CD) imaging by echo enhancing agents. In a first clinical trial we evaluated the efficacy of intravenous SH U 508 in enhancing CD recordings of the left heart. 20 patients with mitral valve disease or coronary artery disease were investigated before and after intravenous injections of 10 ml SH U 508 (200 and 300 mg/ml). The CD recordings (apical views) were analyzed using off line color image processing.

Images with good delineation of flow signals from tissue echos were obtained in 19/20 patients after injection of 200 mg/ml SH U 508 and in 17/20 after 300 mg/ml. Maximum diastolic flow areas in the left atrium (% of the cross section areas) increased from 15±18% to 55±28%, p<0.01 after injection of 200 mg/ml SH U 508. In the left ventricle the areas increased from 29±14% to 54±16%, p<0.01. The CD enhancement was observed over a period of 5 -16 cycles.

Conclusion: CD imaging with intravenous SH U 508 provides improved flow display of the left heart without impairment of tissue detection.