**ABSTRACTS – Poster 343A**

**997-8** Left Ventricular Contractility in a Cyanotic, Univentricular Swine Model

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To study the effects of right ventricular exclusion and cyanosis (RVX) on left ventricular (LV) function, we created a swine model of tricuspid atresia with a bidirectional Glenn shunt by diverting inferior vena cava blood to the left atrium (IVC-LA) and superior vena cava blood to the pulmonary artery using Gore-Tex shunts. One month later we studied baseline contractility, hemodynamics and LV contractile response to frequency (atrial pacing) and β-adrenergic (dobutamine) stimulation. Contractility was assessed by the slope of the end-systolic pressure-volume relationship (ESPVR). LV volume was measured by the conductance catheter method. The RVX data (n = 7) were compared with non-surgical controls (n = 7) and a cyanotic group (n = 7), which had undergone only the IVC-LA connection. All 3 groups had similar baseline hemodynamics and contractility. All had significant increases in contractility in response to atrial pacing and dobutamine. However, although all groups had a similar chronotropic response to dobutamine, the contractile response in both the RVX and cyanotic groups was significantly less than that in controls (graph).

![Graph](image)

We conclude that RVX exclusion with cyanosis decreases contractile reserve to β-adrenergic stimulation, but that this decreased reserve is induced by cyanosis rather than by the functional absence of the right ventricle.

**997-9** Preload Dependence of the End-Systolic Wall Stress-Velocity of Fiber Shortening Relation in the Neonatal Left Ventricle

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The left ventricular (LV) end-systolic wall stress-rate corrected mean velocity of fiber shortening relation (ESS-Vcf) has been utilized as a single-beat, load-insensitive index of contractility in children. To assess the effects of changes in preload on the ESS-Vcf relation in the neonatal LV, 22 piglets (age 7 ± 1 days, weight 2.9 ± 0.2 kg) were instrumented with epicardial ultrasonic dimension transducers and a LV micromanometer. After autonomic blockade, preload was varied by transient vena caval occlusions (VCO). End-diastolic volume fell 20 ± 8% and end-diastolic pressure fell 66 ± 40% (both p < 0.001) during VCO resulting in a significant shift in the ESS-Vcf relation as shown for one typical animal.

![Graph](image)

These findings demonstrate that the ESS-Vcf relation is significantly preload dependent and may have limited utility as a single-beat index of contractility in the neonatal left ventricle.

**997-10** Administration of Intravenous Triiodothyronine Has a Positive Inotropic Effect on the Neonatal Left Ventricle

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Intravenous triiodothyronine (T3) has been advocated as a positive inotropic agent. However, there is controversy as to whether T3 exerts a positive inotropic effect or whether it improves cardiac performance by alleviating loading conditions. The possible inotropic effects of T3 on the neonatal heart have not been previously evaluated in the immature heart. The cardiac response to T3 was examined in 16 neonatal piglets (7–9 days old, 2.8 ± 0.1 kg) instrumented with epicardial ultrasonic dimension transducers and a left ventricular (LV) micromanometer. After autonomic blockade, data acquisition was performed at steady state and during transient inferior vena cava occlusions. Control animals (n = 8) received no drug; T3 animals (n = 8) received 1.2 μg/kg of T3 as an intravenous bolus. The slope of the preload recruitable stroke work (PRSW) relationship, a load-independent index of ventricular function, was used to evaluate changes in LV inotropic state. At baseline, heart rate (HR), mean ejection pressure (MEP), and diastolic pressure (EDP) increased with T3 (329 ± 52 vs 285 ± 48 mmHg) and the slope of the PRSW relationship were the same for both groups (p > 0.2). Three hours after drug infusion; HR and EVD were not significantly different between groups (p > 0.05). There was a trend towards a lower EDP. (3.8 ± 0.9 vs 5.8 ± 1.5 mmHg) with an increased CO (329 ± 52 vs 285 ± 48 mmHg) and ESD (68 ± 7 vs 63 ± 5 mmHg) in the T3 animals which did not reach statistical significance (p > 0.05). However, the slope of the PRSW relationship had significantly increased in the T3 group compared to the control animals (61.0 ± 14.1 erg·cm -103 vs. 46.3 ± 9.0 erg·cm -103, p < 0.05), indicating an increase in inotropic state. These data demonstrate that T3 administration has a positive inotropic effect on the neonatal left ventricle.