2:30

LATE OUTCOME AFTER PULMONARY BALLOON VALVULOPLASTY: COMPARISON TO A MATCHED SURGICAL CONTROL GROUP

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The late (>4 yr) effectiveness of balloon valvuloplasty (BV) was assessed in 19 children with valvar pulmonary stenosis (PS) and compared to the late outcome of surgical valvotomy in 19 age- and gradient-matched children. Age at treatment was 4.2±1.0 vs 4.7±0.8 years (mean±SE), and PS gradient was 76±5 vs 74±5 mmHg in the BV vs surgery groups respectively (p=ns). Late follow-up evaluation included Doppler echocardiogram, 24 hour Holter, and exercise treadmill test with breath-by-breath gas analysis.

	BALLOON	SURGERY	P Value
PS Gradient (mmHg)	24±3	16±2	0.01
PR (>trivial)	5	9	0.18
Ventricular Ectopy	1	13	<0.001
VO2 Max (ml/min/kg)	39±5	46±3	0.99
F/U Duration (yr)	5.4±0.3	11.2±0.5	<0.001

F/U-follow-up; mmHg-millimeters of mercury; PR-pulmonary regurgitation; VO2-oxygen consumption.

BV provided long-term gradient relief without significant restenosis. The residual PS gradient was slightly higher after BV than after surgical valvotomy, however the degree of PR was equivalent. Late ventricular dysrhythmias were significantly more common after surgical valvotomy. Complex ventricular ectopy (>Grade 1) was detected only in surgery patients (n=5). These data support the use of BV for children with PS, and suggest that late ventricular dysrhythmias may occur less commonly after BV than after surgical valvotomy.

3:00

NATURAL HISTORY OF MYOCARDIAL MECHANICS IN SINGLE LEFT VENTRICLE

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Left ventricular failure is common after the first decade in patients with single LV. We used echocardiography to study the evolution of LV size, shape, function and loading conditions in 41 patients 0.2 to 30 years old with tricuspid atresia (n=26) or single LV (n=15) prior to a Fontan or Glenn operation. LV dimensions and volume were measured from the M-mode and 2-D echos. Shape was assessed using the long axis:short axis dimension ratio. Indices of function included shortening fraction (SF) and velocity of shortening (VCFc). Circumferential and meridional end-systolic wall stress (ESSc and ESSm) were used to measure afterload. The ESSc-VCFc relation (SVI) was calculated as a load independent index of contractility.

The LV short axis dimensions and volumes were 1.4 - 1.8 and 2 - 3 times normal, respectively. The LV short axis dimension, adjusted for body size, increased more with age in patients with single LV than in normal subjects, while LV long axis dimension and volume increased in proportion to somatic growth. Concomitantly, the long axis:short axis dimension ratio fell from normal (1.9) toward unity. Both findings indicate a change in LV shape from ellipsoidal to spherical with increasing age rather than progressive enlargement. Afterload (ESSc and ESSm) rose progressively, becoming abnormal after 2 years of age (mean 3 and 6 SD above normal, respectively). The ESSm rose more than ESSc indicating redistribution of wall forces. The SF, VCFc, and SVI all decreased progressively with age ($r = -0.46$ & -0.52). Oxygen saturation, an indicator of pulmonary blood flow and volume work in single LV, was inversely correlated with SVI ($r = -0.42$).

In patients with single LV, the shape becomes more spherical with age, resulting in excessive and abnormally distributed wall stress. Since the usual relationship between ESSm and ESSc is not maintained, both must be measured to obtain an accurate estimate of afterload. This change in shape and load is associated with progressive deterioration of LV function and contractility, possibly because the mechanical advantage inferred upon an ellipsoidal LV by myofiber orientation is lost in a spherical LV. Volume work contributes independently to impairment of LV contractility.

2:45

INFECTIOUS ENDOCARDITIS IN CHILDHOOD MITRAL VALVE PROLAPSE

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Routine antiobiotic prophylaxis for infectious endocarditis (IE) remains controversial for pts with isolated mitral valve prolapse (MVP). We reviewed our 20 year experience with IE in childhood for pts with MVP. Of 48 cases, 7 (15%) had MVP as the site for IE. In pts with unoperated congenital heart disease and IE, MVP was the second most common underlying diagnosis accounting for 29% of cases. 4 children were known to have clinical MVP confirmed echocardiographically; 3 of 4 had known mild mitral regurgitation (MR). The 3 pts with previously undiagnosed MVP had no history of murmur but all had MR at the time of diagnosis with IE. In 3 pts, 2 of whom had known MVP, there was a history of a preceding event (dental work in 1, skin infection in 1, vaginal delivery in 1). Blood cultures were positive in 6 of 7 patients. In the seventh pt with negative blood cultures, the diagnosis of MVP with IE was confirmed at autopsy. Children with MVP and IE were significantly compromised: in addition to the pt who died, 3 pts developed congestive heart failure of whom 1 also had multiple systemic emboli; this child required urgent MV replacement. Another pt developed left-sided hemiparesis consequent to cerebral embolization. The remaining 2 pts with positive blood cultures had no serious complications but one has significant residual MR.

In the past, MVP has only rarely been reported as the site for IE. This series suggests that a diagnosis of MVP in childhood represents a significant risk for IE. Appropriate recommendations for antibiotic prophylaxis at predictable times of risk should be made for children with MVP as they are with all other forms of congenital heart disease.

3:15

LONG TERM LEFT ATRIOVENTRICULAR VALVE FUNCTION FOLLOWING SURGICAL REPAIR OF ATRIOVENTRICULAR SEPTAL DEFECT

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Long term left atrioventricular valve (LAVV) function was evaluated in 95 of 110 survivors of surgical repair of atrioventricular septal defect (AVSD) between 1975-1984. A complete AVSD (CAVSD) was present in 40 and a partial AVSD (PAVSD) in 55. Mean age at operation was 3.3 yrs (0.1-17.8 yrs) for the CAVSD and 5.5 yrs (1.1-14.3 yrs) for the PAVSD. Patients have been followed for 3 to 13 yrs (mean 8.3). Pulmonary artery banding was performed in 17 patients with a CAVSD prior to complete repair. LAVV regurgitation was evaluated by clinical examination, Doppler, and/or angiocardiography. Severity of LAVV regurgitation was graded as 0 for none or trivial, I for mild, II for moderate and III for severe.

	Preop	3 months po	1-2yrs po	>5yrs po
CAVSD				
0	55%	25%	22%	14%
I	37%	60%	65%	71%
II	8%	12%	10%	9%
III	0%	3%	3%	6%
PAVSD				
0	31%	16%	20%	27%
I	42%	71%	71%	62%
II	25%	11%	7%	9%
III	2%	2%	2%	2%

Three patients, 2 with CAVSD, required valve replacement 5, 6.6 and 9.2 years postoperatively. Previous pulmonary artery banding, pulmonary hypertension or pulmonary to systemic flow ratio did not affect the incidence or severity of LAVV regurgitation postoperatively. In this series, LAVV regurgitation increased in the early postoperative period but rarely progressed at late follow up.