Comparative Hemodynamic Effects of Transcatheter Closure of Atrial Septal Defects in Adult and Elderly Patients

Sergey Yalonetsky, Yitzhack Schwartz, Asaad Khoury, Liat Gelerenter - Yaniv, Yulia Braver, Avraham Lorber

Cardiology, Pediatric Cardiology & GUCH, Rambam Health Care Campus, Haifa, Israel

Objectives: There are controversial opinions about the effectiveness of transcatheter ASD closure in adults and especial in elderly patients. The purpose of the study was to evaluate and to compare the hemodynamic changes after transcatheter ASD closure in two age groups of patients:40 -59 years old and 60 years and older .

Methods: Retrospective analysis of the patient files.

Results: Forty six patients were evaluated (23 in the each group). Elderly patients had higher prevalence of cardiovascular risk factors and established coronary artery disease. There was no statistically significant difference between the two groups in Qp/Qs values, ASD diameter and occluder size.

The elderly patients had significantly higher baseline systolic pulmonary artery pressure level -53+16.2 vs 39+7.7 mmHg, p=0.003 (Figure 1). One year following the procedure the mean reduction of PAp values was 11.3% in Group 1 and 19 % in Group 2 (p=0.099). While significant baseline tricuspid regurgitation (TR) was more frequent in elderly patients , no significant TR was observed in both groups one year following the procedure.

Conclusion: transcather ASD closure induces a significant hemodynamic improvement which was even more beneficial in the elderly patients in comparison
with the 40-59 years old patients.

Balloon Mitral Valvotomy in Infants and Children with Severe Mitral Stenosis

Tamir Dagan [1], Elchanan Bruckheimer [1], Abraham Matityahu [2], Michael Berant [1], Rami Fogelman [1], Einat Birk [1]

[1] Heart institute, Schneider Children Medical Center of Israel, Petach Tikva, [2] Pediatric Heart Unit, Heart institute, Kaplan Medical Center, Rehovot, Israel

Severe mitral stenosis due to rheumatic heart disease (RDH) or congenital mitral stenosis (CMS) is rare in our population. Balloon valvotomy is the treatment of choice in rheumatic MS and is preferable in some forms of CMS. The procedure in children, especially infants, is challenging due to their size. We report our experience in children between 2004-2007.

Methods: 8 consecutive patients (7F, 1M) (3 CMS 5 RHD) median age 10y (0.2-17) with severe MS were referred for catheterization. Following general anesthesia and percutaneous femoral access, hemodynamic and TEE evaluation were performed. Trans-septal puncture was attempted in all patients. Through a balloon or coronary catheter a stiff wire was placed in the left ventricle. Balloon size was chosen according to BSA. All dilations were performed with Tyshak II balloons.

Results: Trans-septal access was successful in 8 patients. In 7 balloon dilation was successful. Baseline Doppler mean gradient across the valve was 19±3.2mmHg and post balloon dilation decreased to 6.7±2.2mmHg [$p<0.01$]. Estimated systolic RVp decreased in 6/7 patients. There were no complications. MR changed in up to +1 degree in 4 patients and no change recorded in 3 patients. In one patient with CMS we could not cross the valve safely.

Conclusion : Balloon mitral valvotomy is safe and successful in pediatric RHD mitral stenosis and can be considered for some anatomical types of severe CMS in infants.

Incidence of Congenital Heart Defects in Very Low Birth Weight and Extremely Low Birth Weight Infants

Max Godfrey [1], Michael Schimmel [2], Cathy Hammerman [2], Benjamin Farber [3], Yoram Glaser [3], Amiram Nir [3]

[1] Pediatrics, [2] Neonatology, Pediatrics, [3] Pediatric Cardiology, Pediatrics, Shaare Zedek Medical Center, Jerusalem, Israel

Objective:

The incidence of congenital heart defects (CHD) in neonates has been studied thoroughly. However, there are few studies on the incidence in very low birth weight (VLBW) neonates. This study examined the incidence of congenital heart defects in VLBW infants and extremely low birth weight (BW) infants.

Methods:

A retrospective analysis of the population in the level III B, 30-bed neonatal intensive care unit (NICU) at Shaare Zedek Medical Center, Jerusalem, Israel was performed. VLBW (BW≤1500 grams) infants born between 2001 and 2006 who survived more than 48 hours were included. All the infants were examined daily by a physician, and infants with heart murmurs, or other clinical signs of heart disease, were referred for echocardiography. Findings of Patent Ductus Arteriosus and Patent Foramen Ovale were not included in the analysis. Atrial Septal Defects 5.5 mm or larger were regarded as CHD. All echocardiography examinations were performed by a senior pediatric cardiologist. Comparison of proportions was performed using Chi square test.

Results:

During the study period there were 505 VLBW live-born infants. Four hundred and thirty seven infants met the inclusion criteria. Of these, 225 (51.5%) were males and 281 (64.3 %) underwent echocardiography. CHD was detected in 19 infants (4.4%), significantly higher than the published incidence of 5-8/1000 live birth in the general population ($p<0.0001$). In the sub-group of 154 infants with BW < 1000 grams there were 10 (6.5%) with CHD. In the sub-group of 283 infants with BW 1000-1500 grams there were 9 (3.2 %, P=0.19 vs VLBW) with CHD. The most common defects were ventricular septal defects (n = 8; 42.1%), atrial septal defects (n = 4; 21.1%) and pulmonic valve stenosis (n = 2; 10.5%). There was one each of Tetralogy of Fallot, coarctation of the aorta, mitral valve prolapse, aorto-pulmonary collaterals, and atrio-ventricular canal defect.

Conclusions:

Our observation shows a seven-fold higher incidence of CHD in the VLBW infants and an eleven-fold higher incidence in the extremely-low BW infants, as compared to the reported incidence of 0.5-0.8% in the general population. As not all infants underwent echocardiography, and minor cardiac defects may have been missed in our VLBW infants, the true incidence may be even higher than reported here.

The reasons for the higher incidence of CHD in premature infants are unclear. We speculate

Schneider Children's Hospital Experience with Radio Frequency Ablation for Supra Ventricular Tachycardia in a Pediatric Population

Daniel Fink [4], Alexander Mazur [3], Moshe Swissa [2], Michael Berant [1], Tamir Dagan [1], Elchanan Bruckheimer [1], Leonard Blieden [1], Einat Birk [1], Rami Fogelman [1]

[1] Pediatrics, Cardiology, Schneider Children's Hospital, Petach Tikva, [2] Cardiology, EP, Kaplan Medical Center, Rehovot, [3] Cardiology, EP, Rabin Medical Center, Petach Tikva, [4] Pediatrics, Cardiology, HaEmek Medical Center, Afula, Israel

Objective: To present the Schneider Children's Hospital 7 years experience with catheter ablation for supra-ventricular tachycardia (SVT).

Study design: A total of 274 consecutive patients with SVT or overt accessory pathway (AP) underwent catheter ablation. One hundred eighty seven (68%) patients had WPW or concealed AP, eighty (29%) had atrio-ventricular nodal reentry tachycardia (AVNRT) and seven (3%) had ectopic atrial tachycardia (EAT)

Results: The mean age of the population was 13.4±4.2 years with a median of 14.1 and range of 0.2-25.5 years. The immediate success rate was (95%) 260/274 (175/187 (93.6%) for AVRT, (78/80 (97.5%) for AVNRT and 7/7 (100%) for EAT). During a mean follow-up of 37±26 months, 14 patients had recurrence of arrhythmia with a long term successful rate of (90%) 246/274 (163/187 (87%) for AVRT, 77/80 (96%) for AVNRT and 7/7 (100%) for EAT. The mean fluoroscopy time was 32.1±24.2 with a median of 24 and range of 5-135 minutes. The mean number of RF application was 4.1±3.3 with a median of 3 and range of 1-22. Among the 14 patients with the failed ablation, 2 had AVNRT, 2 left sided AP, 7 right sided AP, 2 para-Hisian AP and 1 Mahaim fiber. The mean fluoroscopy time was significantly higher in the failed ablation in comparison with the successful ablation (73±29.6 vs 29.5±21.6 minutes, respectively $P<0.001$). It was one major complication (TIA).

Conclusions: Our long term results demonstrate that a well organized setting for the ablation therapy in children with SVT can achieve a high rate successful with very low rate of complications.

Normal Values, Range and Upper Limits, of NT-pro B-type Natriuretic Peptide in Infants and Children Analysis of Combined Data From 4 Studies

Amiram Nir [1], Angelika Lindinger [3], Manfred Rauh [6], Benjamin Bar-Oz [2], Stephanie Laer [5], Lynn Schwachtgen [3], Andreas Koch [6], Jan Falkenberg [4], Thomas Mir [4]

[1] Pediatric Cardiology, Shaare Zedek Medical Center, Jerusalem, [2] Neonatology, Hadassah - the Hebrew University Medical Center, Jerusalem, Israel, [3] Klinik fuer Kinderkardiologie, Universitaetsklinikum des Saarlandes, Homburg/Saar, [4] Klinik fuer Kinderkardiologie, Universitaeres Herzzentrum, Universitaet, Hamburg, [5] Institut fuer klinische Pharmakologie, Universitaet Duesseldorf, Duesseldorf, [6] Klinik fuer Kinderkardiologie, Universitaetsklinikum Erlangen, Erlangen, Germany

Background: The natriuretic peptides are biochemical markers for heart disease in adults and children. Both B-type natriuretic peptide (BNP) and the amino terminal segment of its prohormone (NT-proBNP) can be measured on commercial laboratory platforms and are widely used. The peptide levels are age and assay dependent. Normal value range and its upper limits are essential in order to facilitate the use of these markers in the pediatric population. This study is a summation of four studies that measured NT-proBNP levels in normal infants and children using electrochemiluminescent immunoassay (Roche Diagnostics, Mannheim, Germany). It is the largest published to date.

Methods: Age intervals for upper limits of normal were chosen for intervals where there was no age dependent peptide level change. Since NT-proBNP levels are not normally distributed, and log-transformation results in normal distribution, all statistics were performed on log-transformed data.

Results: There were 690 subjects, aged from birth to 18 years, 325 (47%) were males. NT-proBNP levels are shown to be very high in the first days of life with drastic decline in the first weeks. The peptide levels continued to decline gradually with age, with significant decrease between age 1 month and 18 years ($r=0.43$, $p<0.001$). Male and female levels were only different in the age group of 10 years to 14 years (medians: male 38 pg/ml, female 56.5 pg/ml, $p=0.002$). However, the upper limit of normal for males and females was not different even in this age group. The mean values and upper limits of normal of NT-proBNP levels are shown in the table

Age interval	n	mean±SD	95%tile	97.5%tile
0-2d	43	2,820±3,725	11,987	13,222
3-11d*	84	1,800±2,795	5,918	6,502
>1m to ≤1y	50	143±206	646	1,000
>1y to ≤2y**	38	123±125	413	675
>2y to ≤6y	81	73±82	289	327
>6y to ≤14y	278	46±64	157	242
>14y to ≤18y	116	36±54	158	207

* no data between 12 days and 30 days; ** a significant decrease with age in this age interval; Values are in pg/ml.

Conclusions: NT-proBNP levels are elevated in the first days of life and decrease drastically thereafter. There is a mild gradual decline with age throughout childhood. Girls have somewhat higher levels during puberty. Normal range for each age group is established.

Cryoablation of Atrioventricular Reentrant Tachycardia in Pediatric Patients

Moshe Swissa[2], Alexander Mazur[3], Daniel Fink[4], Michael Berant[1], Tamir Dagan[1], Elchanan Bruckheimer[1], Leonard Blieden[1], Birk Einat[1], Rami Fogelman[1]

[1] Pediatrics, Cardiology, Schneider Children's Hospital, Petach Tikva, [2] Cardiology, EP, Kaplan Medical Center, Rehovot, [3] Cardiology, EP, Rabin Medical Center, Petach Tikva, [4] Pediatrics, Cardiology, HaEmek Medical Center, Afula, Israel

Objectives: To describe our experience with cryoablation of accessory pathway with close proximity to the atrio-ventricular node (AVN).

Background: Radiofrequency (RF) ablation has become established therapy for tachyarrhythmias for both adult and pediatric population. However challenges remain in term of the safety and efficacy of RF ablation in specific locations. Cryo-therapy may be particularly useful for ablation of septal tachycardias.

Methods: A total of 12 patients with SVT or overt accessory pathway (AP) underwent 14 cryo-ablation procedures. Six patients had right antero-septal AP, 4 had para Hisian AP and 2 right mid-septal AP. Electrophysiology study was performed with diagnostic catheters. Cryomapping and cryoablation were performed with a 7F, 4mm tip catheter (freezer, Cryocth Technologies Inc., Canada). Cryomapping was performed at -35^0C for a maximum of 60 seconds and Cryoablation for 4 minutes at -80^0C. Acute successes was defined as noninducibility of SVT and conduction block over the AP.

Results: The mean age of the population was 17.5±6 years with a median of 17.6 and range of 8.6-35 years. All of the patients except one had previous ablation (mean of 1.5±0.9 with a median of 1 and range of 0-3. The immediate success rate was 100% (12/12). During a mean follow-up of 12±10.3 months, 3 patients experienced recurrence of arrhythmia two of them had successful second procedure with a total long successful rate of 11/12 (92%). All 12 patients had AP close to the His area. There were no permanent cryo-related complication or adverse outcome. One patient had mechanical ablation of the AP and one patient had transient complete AVB, occurred during an "insurance" cryomapping, with immediate return to normal AV conduction upon cessation of application.

Conclusions: Cryoablation is a safe and effective alternative for the treatment of SVT due to AP with close proximity to the AVN in children.