08:30 - 10:30 S7 - Pediatric Cardiology Hall G

Chairs: **L. Blieden**
A. Nir

08:30 **Single Stage Repair of Aortic Coarctation and Ventricular Septal Defects in Neonates.**
G. Amir, G. Frenkel, J. Katz, T. Dagan, E. Bruckheimer, M. Berant, B. Vidne, E. Porat, E. Birk
Petach Tikva

08:45 **End to Side repair for Neonatal Aortic Coarctation: Long and Mid Term Result**
D. Spiegelstein, J. Danieli, U. Katz, S. Preisman, D. Loberman, D. Mishaly
Ramat Gan

09:00 **Surgery for Aortic Coarctation in the Neonate : Results of Extended Arch Reconstruction Using either Left Thoracotomy or Mid-sternotomy.**
G. Amir, G. Frenkel, J. Katz, T. Dagan, B. Vidne, E. Bruckheimer, E. Porat, M. Berant, E. Birk
Petach Tikva

09:15 **Teaching Functional Echocardiography for Non Cardiologists – Mission Possible**
E. Zalzstein, S. Kobal, A. Golan, D. Landau, O. Masner, K. Marks, J. Richardson, E. Shany, E. Zmora
Beer Sheva

09:30 **Two-Dimensional Strain Imaging: Angle Independence in Assessment of Myocardial Performance**
J. Golender, Z. Perles, S. Gavri, N. El-Laham, A. Ta-Shma, H. Kashani, A.J. Rein
Jerusalem

09:45 **2D Strain Analysis: A Novel Robust and Fast Method for Assessment of Fetal Cardiac Function**
A. Ta-Shma, S. Gavri, Z. Perles, J. Golender, A.J. Rein
Jerusalem

10:00 **Outcome of Infants and Children with Acute Heart Muscle Disease. Results from centers with no pediatric heart transplantation**
L. Kampel, Z. Perles, A.J. Rein, N. El-Lahham, J. Braun, B. Farber, A. Nir
Jerusalem

10:15 **Pregnancy in Complex Congenital Heart Disease**
L. Blieden, A. Dadashev, R. Hirsch
Petach Tikva

Single Stage Repair of Aortic Coarctation and Ventricular Septal Defects in Neonates.

Gabriel Amir [1], Georgy Frenkel [1], Jacob Katz [4], Tamir Dagan [3], Elhanan Bruckheimer [3], Michael Berant [3], Bernardo Vidne [1], Eyal Porat [2], Einat Birk [4]

[1] Heart Surgery, Pediatric Heart Surgery, Schneider Medical Center, [2] Heart Surgery, Rabin Medical Center, [3] Pediatric Anesthesia, [4] Pediatric Anesthesia, Schneider Medical Center, Petach Tikva, Israel

Introduction: The surgical approach to the treatment of aortic coarctation and ventricular septal (CoA VSD)defects in neonates is controversial. Some advocate initial repair of the coarctation (CoA) in the neonatal period, and a later elective repair of the VSD. Using this approach they suggest that the surgical risk is lower albeit the patient has to 2 operations through 2 different incisions. Others suggest single stage repair of both defects in the neonatal period through midsternotomy, this approach utilizes either circulatory arrest or antegrade cerebral perfusion (ACP) and is thought to be more complex and risky. For the last 2 years we have been performing single stage repair of CoA VSD. The purpose of this study is to evaluate our early results.

Materials and methods: Retrospective analysis of all hospitalization and clinic charts of neonates that underwent repair of CoA VSD between January 2007 and November 2008.

Results: 21 patients underwent surgical correction for CoA VSD. All of them had single stage repair through midsternotomy using ACP.19 patients underwent full repair while 2 patients were banded due to VSD anatomy. One patient (2kg) had intra-operative balloon dilatation of the aortic valve. There was one operative mortality and there were no neurologic complications. 2 patients required permanent pacing due to CAVB, one patient required a Ross Konno operation due to progressive LVOTO disease one year after the initial operation. There were no significant gradients across the CoA repair upon discharge.

Conclusion: Single stage repair of CoA VSD can be safely performed in the neonatal period.

End to Side repair for Neonatal Aortic Coarctation: Long and Mid Term Result

Dan Spiegelstein [1], Joseph Danieli [2], Uriel Katz [2], Sergey Preisman [3], Dan Loberman [1], David Mishaly [1]

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Background

Many surgical techniques to fix a coarctation of the aorta incorporate abnormal tissue in the final repair with a significant incidence of recurrent obstruction requiring intervention. By connecting the descending aorta to the proximal aortic arch (end-to-side aortic anastomosis) we eliminate the isthmus and hypoplastic distal arch tissue from the anastomotic site. We retrospectively analyzed our experience in repair of aortic coarctation by using end to side aortic anastomosis technique in respect to the re-coarctation complication.

Methods

From January 1999 to August 2008, 118 patients underwent end to side anastomosis repair of aortic coarctation, via left thoractomy approach. Mean age was 28±34 days (1-217 days), with 86 patients (73%) in the neonate period (<30 days). Mean weight was 3.3±0.9 kg (2-7 kg), with 86% less then 4.0 kg. In 69 patients there were other cardiac anomalies, and 18 patients underwent concomitant cardiac procedure at the time of aortic coarctation repair. Late follow-up was completed in 113 patients (96%).

Results

There was no operative mortality, nor immediate complications related to the repair technique (Major bleeding, Re-open, vocal cord paralysis, distal organ ischemia etc.). Mean follow up was 18±23 month (3-110 month). None of the patients needed re-intervention for recurrent aortic coarctation, none of them had a peak gradient over 20 mmHg by Echo-Doppler. At follow up mean systolic pressure gradient across the repair site was 4.7±10.1 mmHg.

Conclusions

End to side anastomosis for aortic coarctation, provide excellent short and mid term results, for neonatal coarctation in respect to coarctation recurrence.

Surgery for Aortic Coarctation in the Neonate : Results of Extended Arch Reconstruction Using either Left Thoracotomy or Mid-sternotomy.

Gabriel Amir [1], Georgy Frenkel [1], Jacob Katz [4], Tamir Dagan [3], Bernardo Vidne [1], Elhanan Bruckheimer [3], Eyal Porat [2], Michael Berant [3], Einat Birk [3]

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Surgical approach to the repair of aortic coarctation in neonates evolved over time. Extended end to side has become the most commonly used technique of repair. This study evaluates our surgical approach and results in neonates following resection and extended end to side anastomosis for isolated aortic coarctation using either left thoracotomy or midsternotomy.

Patients and Methods: Retrospective analysis of all patient charts of neonates under 2 months of age that underwent repair of isolated aortic coarctation at Schneider Children's Medical Center between January 2007 and November 2008.

Results: 30 neonates were diagnosed with isolated aortic coarctation. 27 patients were operated on using left thoracotomy while 3 patients were operated through a mid-sternotomy approach due to severe hypoplasia of the transverse arch. There no operative deaths. One patient died 2 months after the operation due to severe progressive cardiomyopathy. 3 patients required re-intervention due to recurrent obstruction, one patient required intraoperative balloon aortic valvotomy. The remaining patients are asymptomatic, with no residual gradients

Conclusions: Tailored approach to the surgical repair of neonatal coarctation yields low mortality rate, low rate of residual or recurrent aortic arch narrowing. Clear criteria for using anterior approach for the repair of isolated neonatal coarctation need to be developed.

Teaching Functional Echocardiography for Non Cardiologists – Mission Possible

Eli Zalzstein [1], Sergio Kobal [2], Agi Golan [3], Daniella Landau [3], Oded Masner [3], Kyla Marks [3], Justin Richardson [3], Eilon Shany [3], Ehud Zmora [3]

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Background: Although ultrasonography has been used by neonatologists for many years, the approach to cardiovascular assessment and monitoring remains suboptimal owing to an over reliance on poorly predictive clinical markers such as heart rate or capillary refill time. Bed-side functional echocardiography (BFE) enables real-time evaluation of cardiac function and systemic hemodynamics.

We have introduced the use of BFE in our neonatal intensive care unit by a short "hands on" teaching course to senior neonatologists.

Method: Seven neonatologists, divided into 3 study groups, were instructed by pediatric cardiologists during 6 sessions to perform BFE. The first and last sessions were frontal lectures. Four other sessions, lasting an average of 45 minutes, were "hands-on" sessions. Step-by-step "Alignment-Rotation-Tilting" (ART) maneuvers were used to study 5 basic echocardiography views: long axis, short axis, 4 chambers, sub-costal and "duct cut".

Results: By the end of the course, all participants were able to perform all 5 views successfully. All neonatologists were able to perform BFE and evaluate 4 basic clinical situations: global function of the left ventricle, existence of a patent ductus arteriosus (PDA), measurement of ductal diameter and the direction of flow and evaluation of pericardial effusion.

Conclusion: BFE is a basic tool that can be easily mastered, and used by neonatologists to evaluate basic heart function and anatomy. We have shown that this mastery can be achieved by a short combined effort of dedicated pediatric cardiologists and enthusiastic neonatologists.

Two-Dimensional Strain Imaging: Angle Independence in Assessment of Myocardial Performance

Julius Golender [1], Zeev Perles [1], Sagui Gavri [1], Nael El-Laham [1], Asaf Ta-Shma [2], Hadassah Kashani [1], Azaria JJT Rein [1]

[1] Pediatric Cardiology, [2] Pediatrics, Hadassah Hebrew University Medical Center, Jerusalem, Israel

Background: 2D strain imaging (2DSI) is a novel technique for assessment of myocardial performance. This "speckle" tracking (non-Doppler) technique is assumed to be independent of the angle of insonation.
Aim: To test this assumption in children with a wide span of insonation angles.
Methods: We analyzed 2DSI studies of 30 children aged 61 months (0-219) with normal cardiac function at different angles of insonation using the GE Medical Systems software (Milwaukee, WI, USA). In apical four chamber view (A4CH) insonation angles for the septum ranged from 0° to 20° and for the free wall 15° to 40°. In parasternal long axis view (PSLA), insonation angles for the septum ranged from 5° to 45° and for the free wall 15° to 60°. Regional longitudinal velocity, regional strain and strain rate were measured for the septum and the free wall at increment angle of insonation of 5°.
Results: There was no significant variability of regional longitudinal velocity, strain and strain rate neither over the septum nor the free wall within the described angle span (ANOVA p=ns).
Conclusions: This in vivo study confirms that longitudinal velocity, strain and strain rate measured by 2DSI technique are not affected by the angle of insonation (up to 60°).

2D Strain Analysis: A Novel Robust and Fast Method for Assessment of Fetal Cardiac Function

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Purpose : Functional assessment of the fetal heart has always been a challenge. 2D strain analysis (2DSA) measures myocardial deformation regardless of angle of interrogation. We studied the utility of 2DSA in segmental and global assessment of myocardial function in the fetus.

Methods: 2DSA-based myocardial deformation parameters including segmental tissue velocity, strain and strain rate as well as biventricular global strain and strain rate were measured in 28 normal fetuses (20-38, median 28 gestational weeks). 2DSA data were compared to analogous Doppler derived tissue velocity imaging (TVI) parameters.

Results: 2DSA was feasible and highly reproducible in 94% of the fetuses. 2DSA-based tissue velocity (3.9±1cm/sec) was comparable to TVI-based velocity (4±1.6 cm/sec) in the right ventricle as well as in the left ventricle (2DSA velocity 3.3±0.6 versus TVI 3.1±0.9 cm/sec). Strain rate obtained by these 2 methods was also similar. Biventricular global strain and strain rate measured 16 ± 4 % and 1.6 ± .5 sec^{-1} respectively. Tissue velocity increased whereas segmental strain rate decreased throughout gestation. Strain remained unchanged. Global strain rate significantly decreased with gestational age (r = -0.7).

Conclusion: 2DSA allows fast and accurate quantification of segmental and global myocardial function in the fetus. 2DSA-based tissue velocity increases with gestational age whereas segmental and global strain rate decrease throughout gestation.

Outcome of Infants and Children with Acute Heart Muscle Disease. Results from centers with no pediatric heart transplantation

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Background

Pediatric acute dilated cardiomyopathy (DCM) is a potentially fatal disease. Heart transplantation (Tx) is utilized to improve survival. However, spontaneous recovery may occur. The prognosis of patients treated in centers with no Tx option was studied.

Methods

A retrospective review of infants and children (≤16 years) who presented with DCM (left ventricular shortening fraction, LVFS ≤ 25%) between 1992 and 2007 at Hadassah and Shaare Zedek Medical Centers was performed.

Results

There were 62 patients, mean age 2.5 years, mean LVFS 16.3% (LVFS<20% in 46 patients). Overall mortality was 27%, which is not different from the mortality reported in centers utilizing Tx (p=0.35). Higher LVFS at presentation (p=0.006) and the use of IVIG (p=0.018) were independently associated with better survival. Recovery (normalization of LVFS) occurred in 57% of survivors. Of the 38 patients who were eligible for Tx according to the AHA guidelines, 22 (58%) survived and 12 (32%) recovered.

Conclusions

This study shows that of patients who may have been Tx recipients in other centers, 58% survived and 32% recovered. These findings may reflect the impact of new anti-inflammatory and anti heart failure medications available. Specifically, our results suggest that the use of IVIG improves survival.

Pregnancy in Complex Congenital Heart Disease

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Pregnancy is one the most important issues pertaining to patients (pts) with complex congenital heart disease. We reviewed our database for patients (pts) with complete and congenitally corrected transposition of the great arteries (TGA and CTGA), Fontan physiology, Eisenmenger syndrome and unrepaired cyanotic heart disease, who sustained a pregnancy.

There were 36 women with 56 pregnancies: CTGA – 11 pts 24 preg, TGA - 10 pts (post atrial switch – 8 pts, post arterial switch – 2 pts) 13 preg, Fontan - 5 pts 6 preg, unoperated Fallot – 2 pts 3 preg, Eisenmenger – 8 pts 12 preg.

Five CTGA pts had additional anomalies or previous operations. TGA post atrial switch pts included two with bio-prosthetic tricuspid valve. All but one pregnancies in this group were uneventful. There was no deterioration of myocardial function or worsening tricuspid regurgitation.

Two Fontan pts received medication for early heart failure. One pt had termination of pregnancy due to fetal hypoplastic left heart. One pt had severe post partum bleeding, accelerated protein losing enteropathy and is now on chronic hemodialysis.

The two pts with unoperated TOF had three uneventful pregnancies and deliveries.

Two pts with ASD and Eisenmenger syndrome had 5 children before the diagnosis was made. 2 pts died in the immediate post partum period after successful delivery of their first baby. One pt with 2 children died at age 22 years.

Pregnancy can be successful and safe in pts with systemic right ventricle and unoperated cyanotic anomalies. Pregnancy in Eisenmenger syndrome remains dangerous and contraindicated. Pts with Fontan physiology may have serious complications.