ABSTRACTS

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ORAL PRESENTATIONS

O1. Evaluation of safety, and role of, epinephrine challenge test in diagnosis of LQTS in children

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Objectives: Evaluation of safety, and role of, Epinephrine Challenge Test (ECT) in diagnosis of long QT syndrome (LQTS) in children and its prospective value in predicting the correct genotype.
Methods: 30 children (9.5±3.9 years, 16 male, 14 female) with an uncertain diagnosis of LQTS were tested. An epinephrine bolus (0.1 ug/kg) was followed by a continuous infusion (0.1 ug/kg/min) for 5 minutes. 12-lead ECGs were recorded (pre-test, post bolus and every 30 seconds for 5 minutes). QTc (V5) was measured at baseline, 1-2 minutes after bolus (peak effect), and at 3-5 minutes (steady-state effect). Based on literature data, LQTS1 genotype was predicted if QTc peak increase (³35ms) was maintained at steady-state and LQTS2 if the increase (³80 ms) was not maintained at steady-state. Genotype was predicted, based on test outcome, and LQT genes including KCNQ1 (LQTS1) and/or KCNH2 (LQTS2) were analyzed.
Results: Mean QTc at baseline was 443±26.5 ms, 501.5±39.1ms at peak effect and 483.8±47.6 ms at steady-state. QTc prolonged significantly in 17/30 children (12 LQTS1 and 5 LQTS2 responses). The test was negative in 12/30. QTc prolongation followed by a vaso-vagal syncope occurred in 1 patient after being dripped. The test was thus not performed. Arrhythmias were not observed except in 1 patient where pre-existent ventricular extrasystoles increased in frequency. Genotype prediction was correct in 11/30 (37%) (LQTS1-1, negative DNA test-10), incorrect in 14/30 (46%) and pending in 5/30 (17%). In 26/30 (87%), the test result influenced management: β-blockers started (12), continued (8) and stopped (2), and no therapy started (4).
Conclusions: ECT is safe, quick, affordable and easy to perform in children with suspected LQTS, assisting the diagnostic process and helping management decisions, especially where the test is negative. Its role in guiding DNA analysis order appears more limited. Limitations: lack of an adequate control group and lack of a gold standard for diagnosing LQTS.

O2. Side-effects of beta-blockade in patients with LQTS or CPVT

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Long QT syndrome (LQTS) and congenital polymorphic ventricular tachycardia (CPVT) can both lead to ventricular arrhythmias and recurrent syncopal episodes or sudden cardiac death. Beta-blockade can prevent many of these episodes. However, beta-blockers can have serious side-effects. We therefore reviewed our patients with LQTS and CPVT, and evaluated the use of beta-blockers, side effects and reasons to stop or change therapy. The study population consisted of 14 LQTS patients (11±6 years old) and 18 CPVT patients (12±3 years old). Of the 14 patients with LQTS, 12 could be genotyped. Only 1 patient with LQT3 was severely symptomatic and received an ICD, all others were asymptomatic. Of the 18 CPVT patients, 15 could be genotyped. Four patients were symptomatic; 2 of them received an ICD. Thirty patients had a clear indication for beta-blockade, while 2 patients were of a young age without symptoms. Of these 30 patients, 8 did not use medication (in 2 because they were lost to follow-up; in 6 because parents refused preventive medication). In the 22 patients that actually used beta-blockers, 6 patients had serious complaints that led to changes in medication. Two patients had extremely cold hands, and complaints of near syncope, 1 patient suffered from extreme tiredness, 1 patient had behavioral problems, and 2 patients of pubertal age frequently forgot medication and suffered from consequent near syncope. Many complaints were reduced or disappeared after changing dosage or kind of beta-blocker. Concluding, many patients with LQTS or CPVT wrongly do not use beta-blockers, while many patients have side effects from these medications. It is therefore essential to give good instructions to patients, and search for the optimal beta-blocker therapy.

O3. Ventricular repolarization-rate-dynamics in patients with LQTS focussing on the T-wave alternans

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Introduction: We analyzed the prevalence and occurrence of macroscopic, true T-wave alternans (TWA) with substantial amplitude changes in long QT syndrome (LQTS) patients, searching for preceding triggering patterns, particularly an incremental rise in heart rate frequency.
Methods: 12-lead Holter ECG from 24 LQTS patients and 14 ECG from healthy controls were scanned interactively and systematically for TWA episodes by using a specially developed software. In order to have a complete representation of all 12 ECG leads, the calculated RMS lead was used. Three categories were distinguished: A) Slow-fast pattern (type 1), B) Fast-slow pattern (type 2), and C) No-change pattern (type 3).
Results: The analysis revealed that the occurrence of TWA episodes was less dependent on sudden changes in heart rate than anticipated previously. Only about 25% of all registered TWA episodes showed a dynamic heart rate response correlating to type 1. The majority (65%) of the episodes showed no statistically significant changes in the cardiac dynamics, i.e. type 3. Additionally, far more TWA episodes than expected were found in the examined collective. Thus, the meaning of TWA as a marker of ion channel disease appears to be more important to identify patients with borderline QT time prolongation. The severity level of the TWA episodes seems to illustrate the degree of the electrical/physiological imbalance.
Discussion: In patients with potential ion channel diseases, T wave morphology and T wave morphology changes should be considered as important clues to a more vulnerable repolarization. An automatic reliable screening method for TWA in patients with suspicion of LQTS would be desirable, which is not yet available. Currently, complex manual analyses remain necessary. We conclude that TWA analysis could be a helpful tool to identify patients at risk.

O4. Behavior of the T wave peak-to-end interval in childhood

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Aim: The T wave peak-to-end interval (Tpe) on surface ECG reflects transmural dispersion of ventricular repolarization, an index of ventricular arrhythmia risk. We evaluated changes in age, heart rate, and ECG leads (II and V5) which may affect this interval.
Methods: We enrolled 215 completely healthy children. A digital 12 lead ECG was recorded (Marquette GE) and stored. Intervals measured: RR (mean of 10), QT, JT and T descending limb in leads II and V5. Peak T wave amplitude in leads II and V5 was measured. Tpe/QT and Tpe/JT were analyzed in leads II and V5. Bazett and Fridericia formulae were applied to Tpe for heart rate changes. Significance level was set at $p<0.05$.
Results: Mean age was 4.59 years (0.1–18.2 years). Mean Tpe in lead II was 65.6+11 msec vs 65.7+10 msec in lead V5, showing good correlation, $r=0.84$ ($p<0.001$). Mean Tpe Bazett for leads II and V5 was 88+14msec, and mean Tpe Fridericia for leads II and V5 was 79+12 msec. Mean Tpe/QT II was 21.3%+3.5 and 21.3%+3.6 for Tpe/QT V5, both ratios correlating well, $r=0.82$ ($p<0.001$). Mean Tpe/JT II was 27.5%+4.7 and 27.6%+4.8 for V5, $r=0.83$ ($p>0.001$). Mean peak T amplitude in lead II was 0.42+0.17 mV vs mean 0.45+0.22 mV in lead V5 ($p=0.027$). Tpe showed an inverse relationship with heart rate. Bazett and Fridericia formulae correct Tpe. Heart rate and age correlated poorly with Tpe (II and V5) ($r=-0.36$ and -0.17, respectively). Heart rate correlated reasonably well with Tpe/JT V5, $r=0.47$ ($p<0.001$).
Conclusions: In children, Tpe leads II and V5 show good correlation. Tpe increases with age and is inversely related to heart rate. Tpe Bazett and Tpe Fridericia provide good correction for heart rate changes. Tpe/QT and Tpe/JT increase with increasing heart rate.

O5. QT interval in 24-hour ambulatory ECG in children with long QT syndrome

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In children with long QT syndrome (LQTS) with high risk of ventricular arrhythmias and sudden cardiac death, Holter ECG monitoring is an important diagnostic procedure, but there is little information available about QT interval during recordings in children. The aim of the study was to analyze changes of ventricular repolarization in children with LQTS. In 39 children and adolescents with LQTS (age 0.9 to 21.3 years, mean 10.7 years), QT, QTc (Bazett formula) interval was measured every four hours (02.00, 06.00, 10.00, 14.00, 18.00, 22.00) and in different heart rates (HR) during day and night. Results were compared to results of 37 healthy children. QT interval was similar in girls and boys with circadian changing; shorter in daytime and longer at night. All measured intervals were longer in LQTS children than in healthy children, and the differences were statistically significant at 2 am and pm. QTc interval was stable during 24 hours. During day and night, QT interval shortened when HR was faster; QTc interval slightly prolonged with faster HR. In children with LQTS, QTc interval was longer with statistical differences at day and night when HR was slow. QT to RR ratio was higher when HR was faster.
Conclusions: In LQTS children, as in healthy children, we observed circadian changing of QT interval which was longer at night. QT interval was shorter when HR was faster. QTc interval was stable during twenty-four hours but slightly prolonged when HR was faster.

O6. Gaining access for EP study in vena cava inferior thrombosis by dilatation and mechanical thrombolysis with rotablation in a three-month-old boy

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Case Report: We report a three-month-old male infant (3.3 kg, 52 cm) with complex univentricular heart (CCTGA, AVSD, PA, cor triatriatum sinistrum, subaortic stenosis) suffering from drug-resistant supraventricular tachycardia (AVRT) after cardiac surgery (modified BT-shunt, atrioseptectomy, anuloplasty of AV-valve, and resection of subaortic stenosis). Because of insufficient response to various antiarrhythmic drugs (sotalol, metoprolol, flecainide and amiodarone) interventional therapy was indicated. At the beginning of the procedure, a 2cm long total thrombotic occlusion of the vena cava inferior -around a central venous line inserted from the groin - was detected. This made an inferior access to the heart impossible. To achieve proper therapy, the thrombus was removed by rotablation and dilatation followed by systemic lysis. Using a 6F long sheath to cover the reopened part of the cava inferior in order to prevent embolization of residual thrombus parts, an accessory pathway on the left lateral aspect of a common AV-valve could be ablated by HF application and tachycardia was terminated. On follow-up, the vena cava inferior remained patent. Four weeks later, the child died in multiorgan failure due to septicemia. Recanalization by dilatation and rotablation of thrombotic venous occlusion is an option for gaining access to the heart in total venous occlusion. We describe mechanical thrombolysis with the 7F "clotbuster" (ev3©).

O7. Idiopathic ventricular tachycardia in children: curative therapy with radiofrequency ablation

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Idiopathic ventricular tachycardia (IVT) is quite rare and only a few children are seen in each individual center. There is a lack of clear guidelines regarding the necessity and indications for prophylactic antiarrhythmic or curative treatment. The aim of this study was to review the clinical picture of IVT and evaluate the efficacy and safety of radiofrequency ablation (RF) therapy in children.
Material and Methods: The subjects of the study were 16 children with IVT. Mean age at onset of IVT was 12

years. All patients underwent electrophysiological study. Non-fluoroscopic mapping technology (CartoTM) was used in 1 case. RF was performed in all children (mean follow-up period: 46 months).
Results: Six children with IVT were free of symptoms. Complaints included palpitation in 4 patients and symptoms of circulatory disorder in 6 (tendency for the higher rate of VT and more premature contractions and VT episodes in 1 day were noticed in 5 of them). All children after RF were alive and only 1 complication (complete RHBB) occurred. Success at last follow-up included 5 children with left IVT and six with right IVT.
Conclusions: Catheter ablation seems a promising therapeutic option in IVT in children. It is safe enough and should be considered as the therapy of choice even in children without symptoms if they wish to live an active social and physical life.

O8. Is electroanatomic mapping and navigation beneficial? A retrospective comparison of the impact of electroanatomic mapping and navigation in pediatric patients with arrhythmias and AVNRT

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We examined the success, failure, and complication rates of cryoablation and radiofrequency ablation procedures as well as fluoroscopy time and overall procedure time before and after the utilization of electroanatomic mapping and navigation (EM/N). We retrospectively searched the electrophysiology database at The Children's Hospital, Denver, Colorado for all pediatric patients undergoing cardiac ablation. Group I (pre-mapping) consisted of 50 consecutive subjects just prior to the introduction of EM/N. Group II (post-mapping) consisted of the first 50 consecutive subjects after a learning period of EM/N (first 50 EM/N cases). The results of continuous variables were compared which showed no difference for age, height, weight in Groups I and II. These procedures were performed with the same physicians and operators without a change in overall approach. There was a 100% success rate and 4% minor complication rate in Group I and a 90% success rate and 4% minor complication rate in Group II. The prevalence of preexisting heart disease was 6% in Group I and 10% in Group II. Mean fluoroscopy time was 22±14.5 and 15±15.4 minutes ($p<0.01$) and total procedure time was 210.8±54.5 and 186.3±71.8 minutes ($p=0.06$) in Groups I and II, respectively. There was a significant decrease in fluoroscopy time and a trend toward decreased total procedure time with the use of EM/N. However, this technique has not increased the overall success rate of cardiac ablation procedures, nor decreased the complication rate.

O9. Adverse effects of Wolff-Parkinson-White syndrome with right septal or paraseptal accessory pathways on cardiac function

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Introduction: Wolff-Parkinson-White (WPW) syndrome with right septal or paraseptal accessory pathways causes eccentric septal mechanical activation and may provoke left ventricular (LV) dyssynchrony and dysfunction. Study aim was to evaluate the effect of radiofrequency catheter ablation (RFA) on LV function.
Patients and Methods: Transthoracic echocardiography and ECG recordings were analyzed in 34 patients (age: 14.2±2.5 years) with right septal or paraseptal accessory pathways before and after successful RFA (median follow-up: 1 day). Detailed analysis of mechanical dyssynchrony was performed in 5 patients using echocardiographic 2D strain analysis.
Results: LV ejection fraction was decreased (<55%) in 24/34 patients (71%). After RFA, QRS duration was normalized (129±19 versus 90±11ms, $p<0.0001$), LV function improved (fractional shortening: 33±6 versus 38±5%, $p<0.0001$; ejection fraction: 50±10 versus 57±9%, $p=0.0012$) and septal-to-posterior wall motion delay decreased (104±87 versus 64±49ms, $p=0.007$). In the 5 patients evaluated, 2D strain analysis revealed early inward systolic motion of basal interventricular septum (site of pathway insertion) accompanied by stretch of the LV free wall, followed by septal relaxation concurrent with free wall contraction as the cause of LV dysfunction. Intraventricular mechanical delay decreased from 292±125 to 118±37ms after RFA.
Conclusions: WPW syndrome with right septal or paraseptal accessory pathways causes LV dyssynchrony and jeopardizes global LV function. RFA resulted in mechanical resynchronization and improved LV function. Even in the absence of arrhythmias, RFA of right septal or paraseptal pathways may be considered in patients with decreased LV function.

O10. Clinical and electrophysiological findings in patients with WPW syndrome post-cardiac arrest

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Rapid atrioventricular conduction via accessory pathway (AP) may lead to ventricular fibrillation and cardiac arrest (CA). From 90 children with WPW who had ablation procedure in our Department, 6 survived cardiac arrest. There were 2 girls and 4 boys. The mean age at cardiac arrest episode was 11 yrs 8 months (range: 7 mos to

17 yrs). Prior to CA, 2 of them had short episodes of palpitations without any documented tachycardia, and none of them had syncope. The EPS study was performed after discontinuation of any antiarrhythmic drug and in 5 of them under general anesthesia. Two children had multiple AP (1 pt - 2, 1pt – 3 APs). One patient had very wide AP ranging from right anteroseptal region to right lateral region. AP localizations were: parahisian -2, vena cordis media -1, left lateral -2, left posterior -1, left anterior -1, midseptal -1, postseptal -1.The mean antegrade effective refractory period of AP during pacing CL460ms from CS was 300ms (range: 190ms to 370ms). The retrograde conduction via AP was found in 3 children with the mean ERP AP 270ms. RF ablation was effective in 3 children - all with 1 AP. Two children (with multiple APs and wide AP) are still waiting for second procedure and 1 (with 3 APs) had second procedure.
Conclusions: Cardiac arrest may be the first symptom of WPW syndrome. The conduction features of accessory pathways may vary. Multiple and wide APs make ablation more difficult.

O11. Electrophysiological effects of sevoflurane versus propofol in children with Wolff-Parkinson-White syndrome

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Objective: Evaluate the use of sevoflurane in electrophysiological (EP) studies and radiofrequency (RF) ablation in children with Wolff-Parkinson-White (WPW) syndrome.
Methods: A prospective study was performed in 15 patients with WPW syndrome programmed to EP study and RF ablation. Anesthetic induction was carried out with fentanyl (2 μ kg-1), propofol (3 mg kg-1) and vecuronium (0.1 mg kg-1), while maintenance was secured with propofol (100 μg min-1), bolus dose fentanyl and vecuronium when required. The EP study (EPpropofol) was performed using 4 tetrapolar intracardiac electrocatheters. Sinus node function, sinoatrial conduction, ventriculo-atrial conduction, antegrade and retrograde accessory pathway refractory periods and induced orthodromic tachycardia characteristics were studied. Subsequently, propofol was changed to sevoflurane (1MAC), repeating previous measurements. The parameters obtained, EPpropofol and EPsevoflurane, were compared by means of Wilcoxon test.
Results: Patient age was 9.3+6 years. Following sevoflurane administration, a prolongation of accessory pathway antegrade effective refractory period (EPpropofol 283+22 ms; EPsevoflurane 298+25 ms; p=0.004) and of 1:1 ventricle-atrial conduction minimum pacing cycle (EPpropofol 244+41 ms; EPsevoflurane 273+28 ms; p=0.028) was observed. There were no significant changes in the rest of the measurements (sinoatrial function, AV conduction). There were no changes in tachycardia characteristics. Ablation of the accessory pathway was successfully performed in all patients.
Conclusions: Sevoflurane induces electrophysiological changes in the accessory pathway properties, without interfering in the EP study and posterior RF ablation result.

O12. Ventricular resynchronization by single-site left ventricular epicardial pacing in children

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Introduction: Clinical trials indicate that dyssynchronous left ventricular (LV) contraction due to right ventricular pacing or left bundle branch block (LBBB) has a negative impact on LV function. Study aim was to evaluate whether epicardial single-site LV pacing in children improves LV function and synchronization.
Patients and Methods: We report on 5 children with echocardiographic signs of LV dyssynchrony due to long-term right ventricular apex (RVA) pacing (n=4; RVA pacing duration 8.2±2.4 years) or LBBB (n=1) with drug-resistant congestive heart failure combined with congenital heart disease. All children were treated with single-site epicardial LV free wall pacing.
Results: After 1 month of single-site LV pacing, LV ejection fraction increased (43±6 versus 55±8%), LV end diastolic volume decreased (82±37 versus 76±39 ml/m^2) as compared to pre-implant measurements. QRS duration was reduced (167±12 versus 151±33 ms). Interventricular mechanical delay decreased (65±16 versus 21±16 ms) and intraventricular synchrony was restored (septal to posterior wall motion delay: 311±27 versus 103±71 ms). Accordingly, the difference between segments with earliest and latest negative circumferential strain decreased (200±40 versus 105±20 ms).
Conclusions: After 1 month of single-site LV pacing, conventional echocardiographic measurements as well as TDI and 2D strain echocardiography indicated improved ventricular synchronization in children with previous RVA pacing or LBBB with congestive heart failure. The positive effect of single-site LV pacing on ventricular resynchronization must be proven in a larger patient cohort with prolonged follow-up.

O13. EURIPIDES – a European database for cardiac resynchronisation therapy (CRT) and implantable cardioverter-defibrillator (ICD) devices in children and adults with congenital heart disease (CHD)

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Background: Indications for ICD therapy and CRT have been established for adult patients without cardiac anomalies. High variety and relatively low number of patients with CHD hamper the development of guidelines. Aim of the EURIPIDES registry – an international joint project of AEPC and ESC - is to collect data about the current use of CRT and ICD therapy in pediatric patients and adults with CHD

and to describe the outcome of these patients.
Method: The EURIPIDES registry has been built as a web-based database, which allows online entry and crosscheck of all relevant data. It will cover indication, implant data and annual follow-up of patients with ICD, ICD-CRT and CRT devices. Database entry will require written informed consent of patients or parents. Patients will receive an ID number, which will allow follow-up submissions from different institutions. A steering committee will manage the database, report to the AEPC and ESC and answer research questions. Every submitting person can apply for data release for research projects.
Conclusion: The EURIPIDES registry offers the optimal platform for large-scale research on all aspects of device implantations. It may help to answer numerous questions about ICD or CRT device therapy in this very special patient group. Everyone is invited to contribute and to benefit from this unique European effort to improve the care of these patients.

O14. Pacemaker lead infection

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Infection on pacemaker's lead is a rare but severe pacing complication. Its characteristics will be described in a pediatric population.
Methods: All pediatric patients with lead infections were compiled from two institutions.
Results: From 1993 to 2006, 12 children (11/12 boys) were admitted for lead infection. Their average age was 12 (1.5-16 years). The pacing indication was atrioventricular block for 11 (4/11 post-operative) and Long QT syndrome (1 patient). Infection diagnosis was made 11.5 months after implantation (0.5-60 months). Diagnosis was based either on fever (9 patients) and/or local symptoms (5 cases). The mean interval between the beginning of symptoms and diagnosis was 30 days. Two patients had had dental caries and 2 others skin infection shortly before. Staphylococcus was found in 6 patients, streptococcus in 4 and no bacterial identification was made in the last 2. Eight patients had vegetation identified by transthoracic echocardiography (4 patients) and/or transesophageal echography (5 patients). Half of the population had peripheral embolism. All patients except 1 were treated by lead extraction with an average delay of 14 days after the antibiotic treatment was started. The extraction was made transvenously (6 patients) or by surgery for large vegetation or for additional valvular plasty (5 patients). One patient died; the 11 others survived and have a new stimulation device with no infection since.
Conclusion: Lead infection happens shortly after implantation but the diagnosis is often delayed. Most cases of infection come from staphylococcus through skin injury. Peripheral embolisms are often associated with intracardiac vegetation. Device extraction is mandatory, which is more often surgical than in adults because of vegetation size. Outcome is good with no infection recurrence.

O15. Fetal heart block vs blocked supraventricular bigeminy - A clinical dilemma?

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AV-block (AVB) and blocked supraventricular bigeminy (BB) are common causes of fetal bradycardia. Whereas BB resolves spontaneously without treatment, congenital AVB might respond to steroid treatment if incomplete at time of diagnosis. As steroid treatment has potentially serious side effects, a correct diagnosis is of major importance.
Objectives: Evaluate the magnitude of the clinical problem in differentiating fetal AVB from BB and the potential of current and new Doppler echocardiographic techniques in making a correct diagnosis.
Methods and Results: Retrospective analysis of 78 consecutive patients from 1990 to 2007, referred to a tertiary center of fetal cardiology, for evaluation of bradycardia +/- suspicion of heart malformation. Mean gestational age at diagnosis was 28 weeks. Patients were divided into two groups. Group 1 (HF<100) comprised 25 fetuses with BB (10 sustained, 15 intermittent) of which 3 later developed supraventricular tachycardia. Twenty-one had AVB (2 incomplete, 19 complete) of which 6 had a cardiac malformation. Intermittent BB was usually diagnosed in late gestation, whereas almost all cases of sustained BB and AVB were diagnosed during the second trimester. The Doppler diagnosis made at the first examination was not revised in any case. BB was usually easy to identify in late gestation, whereas differentiation between BB and AVB was more difficult during the second trimester. Group 2 (HF>100) included 15 fetuses with intermittently blocked premature supraventricular contractions. Of 17 fetuses with regular heart rate, 4 were postnatally diagnosed with long QT syndrome.
Conclusion: BB is a common cause of fetal bradycardia. During mid-gestation it is frequently sustained and with a higher degree of resemblance with AVB. However, using new Doppler techniques, a correct diagnosis can still be made.

POSTER PRESENTATIONS

P1. Active-fixation atrial leads: the medium-term results in children: a retrospective study

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Background: Despite the increasingly widespread use of active-fixation atrial leads, clinical follow-up of pacing lead outcomes in children is lacking. The aim was to analyze pacing parameters follow-up. We performed a retrospective observational study of pacemaker implants active-fixation atrial leads.
Methods: A total of 42 patients underwent implantation of DDDR or AAIR pacemaker. In Group 1 patients, atrial lead was implanted at appendix or interatrial septum; in Group 2 patients, atrial lead was implanted at free wall of atrium. All lead-related measurements and complications were recorded.
Results: There were no differences between groups with respect to threshold, amplitude and impedance. These

measurements remained stable over the long-term. Two lead fractures occurred in Group 2. One lead dislodgement occurred in Group 1 and 2 loss of sensing lead function occurred in both groups.
Conclusion: Active-fixation leads are generally associated with stable long-term pacing parameters and position of atrial lead with respect to pacing parameters is unimportant.
Key words: Active-fixation atrial leads, children.

P2. Long QT syndrome: clinical experiences of our clinics

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Long QT syndrome (LQTS) is a cardiac channelopathy characterized by prolonged ventricular repolarization and increased risk of sudden death secondary to ventricular dysrhythmias. The clinical presentation ranges from dizziness to syncope and sudden cardiac death. In this study, we report clinical aspects of 17 patients (10 boys and 7 girls) with the diagnosis of LQTS. The mean age of patients was 7±4.4 years (range: 0-14 years) at time of diagnosis. The clinical presentations of patients were as follows: fetal bradycardia (1), convulsion (1), family history (1), deafness and syncope (1), cyanosis (1), syncope (10), cardiac arrest (1), and tachycardia (1). In the diagnosis of the disease, we have used ECG, Holter monitorization, exercise test, epinephrine test and clinical features and family history. Family history for LQTS was positive in 5 patients and in 8 patients there was consanguinity between parents. QTc measurement was 0.46-0.8 msn on rest ECG. We have used beta-blockers in 16 patients and mexiletine in 1 patient for treatment. Mortality rate was 17.6% in our study. We implanted pacemaker in 3 patients and intracardiac defibrillator in 3 other patients. Genetic analysis was done in 3 patients: in 1 patient there was no mutation, in 1 patient homozygous p.R594Q gene and in 1 patient heterozygous KCNQ1 gene mutation were obtained. LQTS is one of the important causes of unexplained syncope with exertion and sudden cardiac death in children and young adults. Arrhythmias can be controlled with medical therapy in most of the cases but in resistant patients intracardiac defibrillators and in severe bradycardia permanent pacemakers must be considered. Genetic study and counselling are important in the diagnosis and the treatment of LQTS and prevention of sudden cardiac deaths.

P3. Catecholaminergic polymorphic ventricular tachycardia (CPVT) with structural heart disease is caused by a mutation in calsequestrin 2 that leads to increased spark-mediated calcium leak in cardiomyocytes

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The 26-year-old index patient presented with recurrent syncopes, structural changes of the right ventricular wall due to fibro-fatty replacement of the myocardium, and CPVT. A sister of the index patient, showing the same phenotype, had suddenly died at the age of 15. Mutation screening of the cardiac calcium-binding protein calsequestrin 2 (CASQ2) gene revealed a heterozygous missense mutation changing a highly conserved amino-acid of the CASQ2 protein. Testing of the ARVC genes DSP, JUP, PKP2, DSG2, DSC2, and 55 exons of the RYR2 gene did not show any alteration. The CASQ2 mutation, that was not present in 322 control chromosomes, is located in the highly conserved core domain II of the protein. Functional analysis of the mutation using adenoviral transfer and calcium measurement techniques showed that the mutation depressed calcium transients and increased the spark-mediated calcium leaks of the sarcoplasmic reticulum. Our study shows for the first time that a mutation in CASQ2 causes the ARVC/CPVT phenotype and that an altered calcium homeostasis in cardiomyocytes is the underlying pathophysiological mechanism.

P4. Brugada syndrome in pediatric age: a case report

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Brugada syndrome is a rarely seen disease during pediatric ages and is a clinical entity characterized with right bundle branch block, ST elevation in V1-3 precordial derivations on ECG and sudden death. In this report, we present a 6-year-old child who was found motionless in his bed early in the morning and was resuscitated in an emergency unit. Brugada syndrome pattern was detected on his ECG at admission to our department and implantable defibrillator was implanted in addition to oral beta-blocker therapy. After an eventless period of 29 months, frequent ventricular fibrillation attacks were observed and successfully terminated by ICD. ICD therapy is a lifesaving therapy mode in children with Brugada syndrome.

P5. Long QT and Wolff-Parkinson-White syndromes associated with VSD

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Long QT syndrome associated with syncopal episodes was first described in 1957 by Jervell-Lange-Nielsen. Wolff-Parkinson-White (WPW) syndrome is a preexcitation syndrome characterized by short PR and delta wave in ECG and supraventricular tachycardia episodes. A patient with WPW and long QT syndromes coexisting with VSD is presented.
Case Report: A newborn with cardiac murmur and

dysrhythmia is presented. In cardiologic evaluation, there was pansystolic murmur in physical examination. The EKG revealed short PR with delta wave, and long QTc was also calculated. By echocardiography, muscular VSD was detected. Supraventricular tachycardia episodes were detected in 24-hour ambulatory ECG records. Electrolyte levels were in normal ranges and no arrhythmogenic medication was applied yet. Evaluation of the family revealed mother with deafness but normal QTc and healthy father and siblings. Follow-up was done by propranolol for dysrhythmia and clinical follow-up for VSD.
Conclusion: WPW and long QT syndromes are rare diseases. Although WPW and long QTc separately are relatively frequent conditions, to our knowledge, the coexistence of these two entities is a rare condition.

P6. Catecholaminergic polymorphic ventricular tachycardia as a cause of syncope

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Catecholaminergic polymorphic tachycardia (CPVT) is an ion channel disease due to defective genes coding regulator proteins "ryanodine" and "calsequestrin", which play a role in calcium secretion. We present a case admitted with syncope, found to have sinus bradycardia and diagnosed as CPVT. A 9-year-old girl had fainted during physical activity. She had mild cranial trauma and confusion lasting a few minutes. There were no convulsive movements or enuresis. She had breath-holding spells during infancy and mild mental retardation with low academic performance in primary school. Family history was negative for arrhythmia, sudden death or pacemaker implantation. Bradycardia was detected in the emergency room. Physical examination revealed a functional murmur. Neurological examination was normal. Electrocardiogram (EKG) showed sinus bradycardia with a rate of 45 beats per minute (bpm). PR and QTc intervals were normal. Echocardiography excluded anatomic or functional abnormalities. Thyroid functions, electroencephalogram, cranial CT and MRI were normal. In 24-hour Holter monitorization, heart rate ranged between 32 and 120 bpm (average 53 bpm) and rare monomorphic premature ventricular beats without couplets or ventricular tachycardia attacks were present; no escape beats were observed. The electrocardiograms of the parents and two siblings were normal. During treadmill exercise test using Bruce protocol, heart rate increased to 169 bpm at stage 4 and the number of ventricular beats increased; couplets were observed. No increase in QTc interval was found. Isoproterenol stimulation test confirmed the polymorphic ventricular tachycardia in heart rates over 120 bpm. Beta–blocker treatment was started. CPVT is a rare arrhythmia which should be considered in patients presenting with syncope during adrenergic stimulation and found to have normal QT interval.

P7. Functional changes of myocardial impulse conduction in patients with Duchenne's muscular dystrophy

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Duchenne's Muscular Dystrophy (DMD) is an X–linked recessively inherited disease which also affects the heart muscle. In addition to myocardial contraction changes, conduction disturbances may cause ECG changes with or without clinical dysrhythmias. In our study, we performed a 12–lead ECG and calculated in all leads the QT and JT values as well as the QTc and JTc values and dispersions in 43 DMD patients (8.79±3.0 years old) and 34 healthy children (9.52±3.1 years old). We also investigated whether or not there was a correlation between these criteria and dysrhythmias detected on 24 hour Holter ECG monitorizations. The study group's 78±20 ms QTc dispersion value compared to the control group's 50.9±16.5 ms value and the study group's 77.6±20.5 ms JTc dispersion value compared to the control group's 50.8±17.7 ms value revealed a significant increase. The study group's Holter ECG monitorization revealed 66.6% sinus tachycardia and 16% ventricular extrasystole (VES), but no correlation was noted regarding QTC and JTc dispersion differences due to the ventricular dysrhythmia incidence. These results revealed from standard ECG findings obtained in DMD patients are not a clue for dysrhythmia. In this study, designed to show the changes in myocardial electrophysiological functions of DMD patients and the relation of these to ventricular dysrhythmia, we could not reveal any relation between QTc and JTc dispersion anomalies and ventricular dysrhythmia. The reason for this might be that the dysrhythmias failed to be detected in Holter monitorization with 24-hour record. Other studies with longer recording might be required.

P8. Arrhythmias associated with dilated cardiomyopathy in children

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Dilated cardiomyopathy (DCM) is the most common form of cardiomyopathy in children. The aim of this study was to evaluate electrocardiographic changes and arrhythmias in children with DCM. The clinical profile and course of 62 Turkish children (mean age 50.3±47.0, range 3 to 173 months) with DCM, admitted to the Pediatric Cardiology Department between 1997 and 2006, were evaluated for electrocardiographic changes and arrhythmias. Age, gender, symptoms, etiology, drugs, echocardiography, electrocardiography (ECG), 24 hour rhythm Holter monitoring and outcome were also documented. During the mean follow-up 2.9±3.2 years (range 1 day to 10 years), 11 patients (17.7%) died. Left ventricular hypertrophy was observed in a majority of patients (46 patients, 74.2%). Sinus tachycardia in 27 patients (43.5%), frequent ventricular extrasystole in 10 (16.1%), frequent supraventricular extrasystole in 5 (8.0%), prolongation of the QT interval in 6 (10%), ventricular tachycardia in

5 (8.0%, 2 of them died), supraventricular tachycardia in 2 (3.2%), sinus bradycardia in 2 (3.2%), and atrial fibrillation in 2 patients (3.2%, both died) were observed. Life-threatening arrhythmias are common in children with DCM. These patients need a careful follow-up at short time intervals for electrocardiographic changes.

P9. Retrospective analysis of ventricular tachycardia patients in our clinic

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The aim of our study was to define the clinical characteristics of patients diagnosed as VT in our clinic. There were 76 patients (41 males, 35 females) and there was no underlying heart disease in 22 of the patients (28.9%). Mean age of patients was 11 (range: 0.1-33 years). Five (6.6%) patients had a story of successful resuscitation for sudden cardiac death. Twenty-two patients (28.9%) were idiopathic VT with absence of underlying heart disease. There were 18 patients (23.6%) in each group with ion channel and cardiac muscle diseases. Twelve patients had previous operation for congenital heart disease. Five patients (0.6%) had VT on surface ECG. In 18 patients (23%), VT was induced with exercise test. Ambulatory ECG monitoring revealed VT in 32 of 76 patients (42%). Fifty-seven patients had electrophysiologic study and in 46 of them VT was induced. Sixteen patients were treated with radiofrequency catheter ablation (RFCA). All patients treated with RFCA were idiopathic VT; 12 of 16 were successful (75%). Six patients with short VT periods had no medical or other treatment. Thirteen (17%) patients had ICD and 8 of them appropriate shocks. Nine patients died (11.8%), and 5 of them had dilated cardiomyopathy. There were 2 sudden deaths. In conclusion, VT is not rare in children and the most common reasons were ion channel and myocardial diseases. The prognosis was good in the idiopathic group compared to other groups. Myocardial disease-related VT carries poor prognosis. RFCA is a choice of treatment for idiopathic VT. In cases with high risk of ventricular fibrillation and sudden death, ICDs should be considered.

P10. Epicardial ablation of life-threatening ventricular tachycardia in an infant

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Ventricular tachycardia (VT) in infants and young children with an otherwise normal heart is a rare disease and rarely leads to death. We present a boy aged 10 months who was admitted to our Department because of syncope. Until that time he was completely healthy. The family history was negative. The ECG revealed VT with rate of 300 per minute. There were two morphologies of VT: left axis deviation and QS morphology in precordial leads; and second type: left axis deviation, R in V1 and V2 and QS in V3-V6. No cardiac defect was found, and the LV function was normal. Amiodarone iv with metoprolol per os was started. The VT runs became slower and were not sustained, but were still present. The treatment was changed to sotalol with metoprolol and next propafenone with amiodarone, but sinus rhythm could not be restored. After 2 months, VT became more incessant and slowed down only after amiodarone infusion. The serum level of amiodarone was low. He developed progressive heart failure with anuria. The repeated DC shock stopped VT only for a few beats. The child was immediately cooled down to 35°C and kept under general anesthesia on amiodarone and metoprolol. After a couple of hours epicardial cryoablation on RV apex and near interventricular septum was performed. After the procedure, short runs of VT were still present although VT rate was lower (100-120 per minute). Mexiletine was added. The child was discharged on amiodarone, mexiletine and metoprolol. All arrhythmias were stopped 2 months later.

Conclusion: Failure of conventional medication makes hybrid therapy necessary.

P11. Radiofrequency catheter ablation of accessory pathways in children

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Introduction: Radiofrequency (RF) catheter ablation has become the procedure of choice for patients with supraventricular tachycardia. The authors analyzed the first three-years' experience with this method in children with preexcitation.

Methods: RF ablation was performed in 66 children (mean age 14.8 years, 30 girls) with preexcitation; 58 had tachycardia attacks. In 52 children, Wolff-Parkinson-White (WPW) syndrome was determined on ECG, and in 4 aborted sudden cardiac death was the first symptom. In 3 patients (pts) hypertrophic and in 1 dilated cardiomyopathy was diagnosed, 3 had secundum atrial septal defect, and 2 mitral valve prolapse.

Results: Twenty-eight pts had right accessory pathway (AP) (superoparaseptal -8, inferoparaseptal -7, free wall -7, septal -2, coronary sinus -2, vena cordis media -2), 33 left AP (free wall -15, posteroinferior –11, superior –4, inferior –3), 5 double AP, and 2 pts also had atrio-ventricular nodal reentry tachycardia. In 8 pts during the procedure, atrial flutter/fibrillation was induced, and in 1 electrical cardioversion was necessary. In 61 children, the RF ablation was successful; 5 still had WPW syndrome (2 with hypertrophic cardiomyopathy, 2 with 2 APs, 1 with septal AP). In 5 pts, WPW syndrome returned some days after the procedure; the second RF ablation was successful. There were no serious complications; 5 children had local hematoma, 1 -false aneurysm, 15 -supraventricular premature beats, 6 –ventricular premature beats, and 2 -transient I/II° atrioventricular block on Holter ECG.

Conclusions: RF catheter ablation is an effective procedure for children with accessory pathways; in some patients, a second ablation procedure may be necessary.

P12. Radiofrequency catheter ablation in children with atrioventricular nodal re-entry tachycardia

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Introduction: Radiofrequency (RF) catheter ablation has become the procedure of choice for patients with supraventricular tachycardia (SVT). Our first three-year' experience with this method in children with atrioventricular nodal re-entry tachycardia (AVNRT) was analyzed.
Methods: The RF ablation was performed in 36 children (mean age 15.6 years, 24 girls) with AVNRT. All children had had SVT attacks with heart rates from 165 to 240 beats per minute, with the longest lasting over 20 hours. Most of the children were on permanent medication (beta-blockers, sotalol, and propafenone). In 1 child, aortic stenosis with insufficiency was diagnosed, 1 had secundum atrial septal defect, 1 mitral valve prolapse, and in 1 boy cardiac pacemaker was implanted because of vasovagal syncopes.
Results: The RF catheter ablation followed by electrophysiology testing was performed under general (10 children) or local (26 children) anesthesia. Thirty-five patients had common form of AVNRT (slow-fast), and 1 girl had uncommon form (fast-slow) of the tachycardia. In all children, ablation or modification of the slow pathway was successfully performed with no serious complications; in 1 patient spontaneously terminated atrial flutter was induced. Early after the procedure, 1 child had slight pericardial effusion, and 2 girls had transient sinus tachycardia over 100 beats per minute. Mean follow-up period was 1 year. In 3 children (8.3%), AVNRT returned: 2 were re-started on beta-blockers, and in 1 the second procedure of RF ablation was effective.
Conclusion: In children with AVNRT, radiofrequency catheter ablation is an effective procedure and it is possible to avoid serious complications.

P13. Significance of the junctional rhythm during ablation of septal accessory pathways

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Objective: In this study, the frequency and clinical significance of junctional rhythm (JR), which is commonly observed during ablation of atrioventricular nodal reentrant tachycardia and believed to result from thermal injury to the AV node, in ablation of septal accessory pathways was investigated.
Material and Methods: 171 patients who had manifest preexcitation due to a septal accessory pathway and were ablated during sinus rhythm were enrolled. The accessory pathway location was anteroseptal in 19 cases, midseptal in 42 and posteroseptal in 110 cases. When JR was observed during ablation, ventriculoatrial (VA) conduction and the rate of the JR were closely monitored. RF application was terminated immediately in instances of VA block, prolonged VA interval or rapid JR (CL<300 msec). Energy application was continued for 60-90 seconds in successful sites.
Results: Success was achieved in 166 cases (97%). JR was observed in 67 cases (39%). Frequency of JR was highest in cases with midseptal pathways (55% vs 36% for posteroseptal, p=0.030; and 26% for anteroseptal, p=0.039). In a follow-up of 41±12 months, 7 patients (4%) recurred and all were successfully ablated in a repeat procedure. Permanent first degree AV block developed in one patient with anteroseptal pathway. No major complications were noted.
Conclusion: JR may be noted in up to one-third of septal pathway ablations, most frequently in midseptal pathway ablations. We think that when JR develops during septal pathway ablations, energy application can be continued cautiously in order not to reduce the ablation success.

P14. Slow pathway ablation using two catheters

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Objective: Catheter ablation procedures are effective treatment options for atrioventricular nodal reentrant tachycardia (AVNRT). In our study, we aimed to present the long-term follow-up results of patients with AVNRT who underwent slow pathway ablation with 2 catheters instead of the conventional technique with 3 or 4 catheters.
Material and Methods: Ninety-two consecutive patients (55 females; mean age: 38±18) who underwent slow pathway ablation with 2 catheters were enrolled in the study. A diagnostic catheter was placed at the high right atrium and an ablation catheter was placed at the His region. After the tachycardia was induced with programmed or incremental atrial pacing and the differential diagnosis was made, the His region was localized with the ablation catheter and the slow pathway was ablated with the integrated approach.
Results: Procedure time was 42±18 minutes, and fluoroscopy time was 10±6 minutes. Mean RF pulse was 4±2 and mean RF duration was 180±105 seconds. Success was defined as noninducibility of the tachycardia and presence of no more than 1 echo beat and was achieved in all cases. No AV blocks or major complications were noted. One patient (1%) recurred in the follow-up of 18±5 months and was treated successfully in a repeat procedure.
Conclusion: Slow pathway ablation with the use of 2 catheters instead of the conventional 3 or 4 catheters in select cases is safe and effective. The major advantages of this technique are its economy, shorter procedure and fluoroscopy durations, and shorter exposure of the patient and laboratory staff to radiation.

P15. Radiofrequency catheter ablation in patients with congenital heart disease

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Objectives: In this study, we evaluated 17 patients with congenital heart disease and tachyarrhythmia who were treated with radiofrequency ablation (RFA).
Methods-Results: The mean age of the patients was 13.4 years. Nine patients had intracardiac surgery before the ablation. Four of the 17 patients had Ebstein's anomaly, 3 had tetralogy of Fallot, and 2 had tricuspid atresia, secundum atrial septal defect and complete atrioventricular septal defect. Ten patients (53%) had atrioventricular reentry tachycardia (AVRT), and 5 patients had atrial flutter and fibrillation. Five patients with AVRT had manifest Wolff-Parkinson-White syndrome. Treatment with RFA procedure was completely successful in 12 (70%). Three-dimensional mapping was performed in 3 patients. None of the patients had any complication after the ablation procedure.
Conclusion: RFA treatment is an effective and safe treatment method in patients with congenital heart disease and tachyarrhythmia. The success rate may be increased by three-dimensional mapping and navigation in selected patients.

P16. Radiofrequency catheter ablation in patients with idiopathic monomorphic ventricular tachycardia

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Management of patients with ventricular tachycardia (VT) is often difficult. Sustained monomorphic VT is most often associated with structural heart disease such as healed myocardial infarction and cardiomyopathy. However, no apparent structural abnormality is identified in some patients with VT. Medical treatment is often ineffective. Idiopathic ventricular tachycardia is defined as VT arising in a patient with no evidence of structural heart disease using electrocardiography, echocardiography and angiography. Because of its usual hemodynamic stability, its focal origin and the lack of surrounding scar, idiopathic VT has been highly amenable to radiofrequency catheter ablation. In selected patients, radiofrequency catheter ablation can terminate the episodes, provide clinical improvement and protect the patient from the side effects of anti-arrhythmic agents. The results of studies in 11 patients with idiopathic monomorphic VT treated by radiofrequency catheter ablation are reported.

P17. Transcatheter cryothermal ablation of junctional ectopic tachycardia in children

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Objective: Junctional ectopic tachycardia (JET) is a rare arrhythmia in the normal heart, frequently refractory to pharmacologic agents. Radiofrequency (RF) ablation can compromise atrioventricular (AV) node function with inadvertent AV block. The purpose of our study was to show our experience with catheter cryoablation technique.
Methods: Clinical and electrophysiologic data of 2 patients who underwent transcatheter cryothermal ablation for the treatment of JET are presented.
Results: Patient 1: A 4-month-old patient with JET with variable tachycardia rate (150-240 bpm) resistant to multiple pharmacologic measures. After cryomapping with a 7Fr, 4-mm-tip Cryocath Freezor catheter at -30ºC within the triangle of Koch immediately posterior to the His potential, a transient second degree AV block resulted. Cryotherapy at -80ºC during 4 minutes at a close slightly posterior area without His potential, combined with another 4-minute application near the coronary sinus ostium, made tachycardia uninducible with and without isoproterenol infusion. No complications were recorded in the follow-up.
Patient B: A 4-year-old patient with multiple and symptomatic refractory JET. RF ablation procedure was unsuccessful. Cryomapping with a 7Fr, 6-mm-tip Cryocath Freezor catheter at -30ºC and therapy application at -80ºC during 4 minutes in the area just posterior to His potential terminated the tachycardia, prolonging AV conduction and inducing transient slow nodal AV rhythm. The patient presented sinus rhythm at discharge.
Conclusions: Cryothermal catheter ablation is a safe and effective treatment for JET in children. Catheter stability due to cryoadhesion during ablation, reversibility of cryothermal mapping and the ability to produce smaller and defined lesions can explain results as they are supported in the literature.

P18. Determination of recurrence rate of initially successful ablation of supraventricular tachycardia by transesophageal electrophysiology in children

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Objectives: Experience in the treatment of supraventricular tachycardia (SVT) by radiofrequency ablation (RFA) and data regarding recurrence rates in children are still limited. This study aimed to determine the recurrence rate of successful radiofrequency ablation of SVT by transesophageal electrophysiology (TEEPS) in children.
Methods and Results: A total of 61 patients (5-21 years old) treated with RFA were included in the study. TEEPS was performed at least 2 months after RFA. Diagnoses of patients were: AVNRT (25 patients -41.3%), Wolff-Parkinson-White (23 patients -37.7%), ectopic atrial tachycardia (3 patients -4.9%), AVRT (6 patients -9.8%),

permanent junctional reciprocating tachycardia (2 patients -3.3%) and Mahaim tachycardia (2 patients- 3.3%). A total of 54.8% of patients had no symptoms after RFA. Recurrence rate was 23% in our study and 4 of these patients were symptom-free. TEEPS was normal in 24 patients who had complained of tachycardia or chest pain. There were no complications because of TEEPS.
Conclusion: Recurrence after initially successful ablation occurs commonly in children. In our study, recurrence rate was 23%. TEEPS seems effective and safe in evaluating symptoms of patients and planning of treatment.

P19. Signal-averaged electrocardiography in children with Wolff-Parkinson-White syndrome

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Ventricular late potentials (LPs) detected on the body surface signal-averaged electrocardiography (SA-ECG) have been shown to predict malignant ventricular arrhythmias and sudden cardiac death in adults with myocardial infarction and cardiomyopathy. In children, post tetralogy of Fallot correction LPs were associated with a history of arrhythmias. There is little information available about SA-ECG in children with Wolff-Parkinson-White (WPW) syndrome.
Material and Methods: In 56 children with WPW syndrome (mean age 14.8 years), SA-ECG was performed (3 bipolar orthogonal leads X, Y, Z triggered with R wave were amplified, more then 200 beats were averaged after filtering with 40–250Hz filter). Standard parameters were analyzed: the filtered QRS complex duration (fQRS), duration of the low amplitude <40uV signals (LAS40) and the root mean square amplitude of the terminal 40 ms of the QRS complex (RMS40). Results were compared to results in 31 healthy children (mean age 13.5 years). Results in children with WPW syndrome vs healthy controls were as follows: fQRS=130 vs. 83 ms ($p<0.05$), LAS40=25 vs. 24 ms ($p>0.05$), and RMS40=72 vs. 81mV ($p>0.05$). There were no differences between patients with WPW syndrome and with normal, left axis deviation or right axis deviation on ECG. LPs were detected in 5 (8.9%) versus none of the children in control group and none had ventricular arrhythmias.
Conclusions: In children with WPW syndrome, only fQRS was statistically longer on SA-ECG than in healthy children. Occurrence of LPs in children with WPW syndrome did not predict ventricular arrhythmias.

P20. A case report: isotretinoin (13 cis retinoic acid) associated premature ventricular contractions

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We describe a 17-year-old boy who presented with premature ventricular contractions (PVCs) on electrocardiogram while on isotretinoin (Roaccutane–Roche) treatment for nodular facial acne for 6 months. He complained of tiring easily during exercise. No other symptom was present but heart sounds was arrhythmic on cardiovascular examination. 12-lead electrocardiogram and 24 hour Holter monitoring showed frequent single, bigeminy, trigeminy, and quadrigeminy uniform PVCs. Transthoracic echocardiography was normal and PVCs disappeared during exercise testing with normal effort capacity. After stopping the treatment, 24 hour Holter monitoring and exercise testing were completely normal. The temporal relationship between isotretinoin treatment and patient-documented arrhythmia suggests a drug-related cause. Cardiac side effects have been rarely reported with isotretinoin treatment. There have been a few reports of isotretinoin-related sinus or atrial tachycardias. This is the first described case about isotretinoin-related ventricular arrhythmia. In our opinion, clinicians should be more careful while using isotretinoin because of the possible arrhythmogenic effect of this drug.

P21. Transient complete atrioventricular block in a neonate caused after jugular central venous catheter placement

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We present a case of trauma-induced complete AV block after placement of a central venous catheter. A macrosomic infant who was hospitalized for evaluation and supportive therapy underwent transjugular central venous catheter placement for vascular access problem. After placement of the catheter, bradycardia was detected and in ECG complete AV block was detected. In chest X-ray, the catheter was in the region of the right atrium. The catheter was drawn back to the vena cava superior and prednisolone was continued, which was also used for resistant hypoglycemia. In the follow-up period, nearly 10 days after the application, rhythm returned to normal sinus rhythm/first degree AV block. Steroid therapy was discontinued at the end of two weeks. In last ECG records, there was first degree AV block and no hemodynamic instability in clinical follow-up. Central venous catheters may sometimes be needed in the newborn period, but especially in jugular or subclavian access, the risk of sinus node trauma is present. Hence, extra care is needed. If there is a trauma and rhythm problem is present, as in post-surgery patients, anti-inflammatory agents, especially steroidal, are effective in treatment.

P22. Electrocardiographic findings of substance abuser street children

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Substance abuse is prevalent in adolescent street children and death is reported as secondary to aspiration, accidental trauma, asphyxia, cardiac arrhythmia, anoxia, vagal inhibition and respiratory depression. In this study, we examined electrocardiographic and echocardiographic findings from 53 street male adolescents and compared

results to 61 controls in the same age group. The street children smoked cigarettes (98.1%) and had used/were using thinner (73.6%), glue (75.5%), hashish (79.2%), morphine/products (24.5%), ecstasy (37.7%), anti-emetics (13.2%) and alcohol (60.4%). On examination, their blood pressures were lower than in the control group. On electrocardiogram, PR, QRS, QT were found to be longer ($p<0.05$) than in the healthy controls. Although it was not statistically significant, QTc duration was also longer than in the control group. Street children should be examined regularly by electrocardiography for arrhythmias.

P23. A late-onset and drug-resistant junctional ectopic tachycardia after an arterial switch operation

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Junctional ectopic tachycardia (JET) mostly occurs in the early period after cardiac surgery in children. It may be life-threatening, and should be managed immediately. Although there is no documented first-line treatment, amiodarone, digitalis or beta-blockers are useful and effective medications for JET.
Case Report: A follow-up patient, who underwent an arterial switch operation in the neonatal period, presented to the clinic with the complaints of episodic palpitations, and fatigue and weakness during these episodes. He was 3-years-old and ECG showed a supraventricular tachycardia attack (heart rate: 280-300/minute). In the intensive care unit, a beta-blocker (metoprolol) was given intravenously. Heart rate decreased to 180-200/minute and a checked ECG showed that the main rhythm was a JET. Thirty-six hours later, despite intravenous beta-blocker, JET with high rate did not stop. Beta-blocker was stopped and digitalization was ordered. During this period, sustained or non-sustained SVT attacks occurred. Twenty-four hours after digitalization, he still had a clinically important JET (heart rate 160-180/minute), so digoxin was stopped and amiodarone was begun intravenously. However, 3 days later, TSH and liver enzymes increased mildly, and bilateral pleural effusion developed. Amiodarone was stopped. Echocardiographically, the child had right atrial dilation, a mild dilation of right ventricle, a secundum type ASD, and a mild-to-moderate neopulmonary stenosis. Hemoglobin, white cell, C-reactive protein, electrolytes, magnesium and calcium levels were all normal. Finally, JET was managed with sotalol.

P24. A case with Wolff-Parkinson-White syndrome first presented with a devastating event: aborted "sudden cardiac death"

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Wolff-Parkinson-White (WPW) syndrome is a cardiac conduction disorder that can present with potentially life-threatening consequences. Sudden death very rarely occurs as the initial presentation of WPW syndrome. In this case report, we describe a previously asymptomatic 13-year-old female patient with WPW syndrome first presented with aborted sudden cardiac death as an initial manifestation of her disease. The risk of sudden death is always present with WPW syndrome, and it is the motivating force in the evaluation and treatment of this syndrome. Current diagnostic modalities are accurate in identifying patients with WPW syndrome, but lack the sensitivity to predict sudden cardiac death.

P25. Laser lead extraction: a case report

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The number of patients with pacemakers or implantable cardioverter defibrillators (ICD) has risen markedly. Consonant with this trend, an increasing number of lead extraction procedures have been eventually required. In this case report, we present a 16-year-old patient who underwent two lead extractions. The patient had admitted to another hospital with fatigue and chest pain and was diagnosed as complete heart block at the age of 11 years. The mother had Sjögren syndrome. DDD pacemaker was implanted from left subclavian venous approach in our hospital. In the outpatient clinic follow-up, we detected pacemaker battery depletion and lead fracture. Complete laser extraction of two leads and new VDD pacemaker implantation were achieved under general anesthesia. In selected pediatric patients, laser lead extraction may be safely used.

P26. Congenital complete AV block due to maternal lupus: a case report

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Congenital complete heart block may occur as a serious complication of maternal lupus. There is irreversible fibrosis in the conduction system of the heart due to passive transmission of maternal anti-SS A/Ro and anti-SS B/La antibodies.
Case Report: A 32-week-old fetus diagnosed as fetal bradycardia since the 25^{h} week of pregnancy was evaluated with fetal echocardiography. He had bradycardia with regular rhythm and the heart rate was 50-55/minute. There were no cardiac failure and/or hydrops fetalis findings. In the mother, anti-SS A/Ro and anti-SS B/La antibody titers were high; maternal lupus was diagnosed. The baby was born via sectio at the 34th week of pregnancy without complication. His APGAR score was 6 within 1, and 8 within 5 minutes. He was 2280 g, and his heart rate was 48-52/minutes. During follow-up, complete AV block was documented with ECG and Holter monitoring. Echocardiographic findings were normal at the beginning, and his exercise tolerance was good. When he was 22-days-old, control echocardiography showed mild dilation of both ventricles. At 1 month of age, and nearly 3000 g, a cardiac pacemaker was implanted surgically. He is currently 4 months old with a good clinical condition.