ARRHYTHMIAS

Incidence in childhood small, but a serious complication in children with congenital heart disease

The most common arrhythmia in childhood – supraventricular tachycardia 1 : 25 000

<table>
<thead>
<tr>
<th>Normal heart rate</th>
<th>sleeping child</th>
<th>wakefulness</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 2 years</td>
<td>60 – 120</td>
<td>90 – 160</td>
</tr>
<tr>
<td>3 – 10 years</td>
<td>50 – 110</td>
<td>65 – 120</td>
</tr>
<tr>
<td>11–15 years</td>
<td>40 – 100</td>
<td>60 – 120</td>
</tr>
</tbody>
</table>
1. Origin of excitation
2. Heart rate
3. QRS axis orientation
4. Intervals
5. Morphology of P wave
6. Morphology of QRS
7. Morphology ST segment T event. U wave
Physiological arrhythmias

Respiratory arrhythmia – very often in children
During inspiration acceleration of heart rate, during expiration retardation of heart rate
After load / running…/ respiratory arrhythmia disappears during acceleration of heart rate

Supraventricular extrasystoles - about 12/h in 14% children during 24 hours follow up

Ventricular extrasystoles – common, occurring in 1-2% of normal infant and up to 50% of healthy teenagers and adults, during exercise testing disappear

Atrioventricular disturbances of conduction - in 11% of children during sleep
1. **Congenital arrhythmias**
   a/ prenatal impairment of conducting system by inflammation
   b/ systemic lupus erythematosus in mother
   c/ impairment of conducting system in the heart with congenital heart disease

2. **Others obtained**:
   a/ postoperative
   b/ boreliosa, viral diseases of myocardium
   c/ disorders in Na,K, Ca levels in plasma
   d/ influence of hormones
   c/ drug intoxication
   d/ hypoxia
   e/ tumors

3. **Idiopathic**
Diagnostic tools

History

Physical examination
ECG in rest and during exercise testing
Holter – ECG during 24 hours
Electrofysiological studies
Echocardiography

Therapy

drugs
kardiostimulation
Cathetrization and surgical ablation
BRADYCARDIA

Incidence:
newborns, teenagers, sportsmen, in hypothyreosis, after intracranial injure with increase of intracranial pressure, therapy with Digoxin, beta blockers, hyperkalemia, cardiac surgery for congenital heart disease

Cause:
dysfunction of sinoatrial node
atrioventricular disturbances of conduction I.-III.
/danger = sudden loss of consciousness due to cardiac arrest or ventricular fibrillation, sudden death/

ECG diagnosis
The atria and ventricules beat independently in complete AV block, incomplete AV block is characterized by interruption of conduction at intervals
Drug therapy:
- Heart rate below 40/min
  - Atropin 0.1mg/5kg i.v.
  - Isoprenaline - from 0.05 ug/kg/min to at least 0.5ug/kg/min

When cardiostimulation??
- a/ Ventricular rate in newborn and infant below 55/min / in CHD below 65/min/
- b/ Ventricular rate below 45/min in children
- c/ Syncope, heart failure, fatigue during exercise
SUPRAVENTRICULAR TACHYCARDIA

Is defined as a very rapid heart rate up 200/min with narrow QRS complexes
1 : 25 000

a/ reentry phenomenon
b/ arrhythmogenic focus outside the sinus node

Epidemiology:
CHD, result of cardiac surgery due to CHD, stress, WPW sy, kardiomyopathy, myokarditis

Physical examination:
Heart rate - 200-300/min
infants- change of behavior, problems with feeding, sweating, cyanosis, heart failure symptoms
children - palpitation, nausea
ECG
Narrow QRS complexes, wave P is in wave T, RP shorter than PR, heart rate up 200/min
TERAPHY of supraventricular tachycardia:

Vagal stimulation
/ the face in cold water, emetic reflex………/

**adenosine** - ADENOCOR /Sanofi-Winthrop/- 0,1 - 0,3 mg/kg i.v. 
/quick bolus/

**propafenon** - RYTMONORM / Knoll/ - 1 mg/kg i.v. during 5min

**verapamil** - ISOPTIN /Knoll/ - 0,1 mg/kg i.v. during 30s

**Kardioversion** 0,25 - 0,5 J/kg

**Digoxin**