ELECTROCARDIOGRAM
IN THE
NEWBORN INFANT

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ELECTROCARDIOGRAM IN THE NEWBORN

INTERPRETATION AND DIAGNOSTIC CRITERIAS

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1) Sinus rhythm- P-QRS sequence with a normal mean P-axis (positive P’s in I and aVF). Also indicative of situs solitus.

2) Right axis deviation- negative QRS complexes in lead I and positive in aVF.

3) Normal septal forces – (q waves in V6-V7) indicate the presence of a left/posterior anatomic left ventricle.

4) Normal RV forces – Rs pattern in V1 with negative T waves.

Imp: Normal electrocardiogram.

#2 49 days - male
Rate 139

Right axis deviation of the mean P axis (negative P’s in lead I and positive in aVF). Situs inversus? No, because a qR pattern and also negative T’s in lead I indicate a technical mistake- reversal of the arm leads! Repeat!
#3 2 weeks - male
Rate 158

1) Sinus rhythm – Situs solitus (positive P’s in leads I and aVF).

2) Right axis deviation. - (negative QRS’s in I and positive in aVF).

3) Right atrial enlargement – (peaked P’s in II and V2).

4) Normal septal forces – (q’s in V6-V7).

5) Right ventricular hypertrophy – (dominant R’s and positive T’s in V3R-V1). Normally, T waves in V3R and V1 should become negative after a week of age.

#4 1 day - female
Rate 152

1) Sinus rhythm – Situs solitus

2) Right axis deviation.

3) Right atrial enlargement – (prolonged PR interval, should be less than 110 in the newborn, and peaked P’s in V2)

4) No q’s in V6-V7!

5) qR pattern in V3R (reversal of septal depolarization) indicate severe RVH or hypertrophy of the right sided ventricle and/or hypoplasia of the left sided ventricle!

6) Non-specific ST-T changes.
#5  1 day – female
Rate 158  Cyanotic newborn with decreased pulmonary blood flow on CxR

1) Sinus rhythm – Situs solitus
2) Normal QRS axis!
3) Right atrial enlargement
4) No septal forces seen in V6-V7 but presence of rS in V3R-V1 suggest normal septal forces.
5) Decreased RV forces (rS pattern in V3R-V1).
6) Non-specific ST-T changes and a prolonged QTc (>450 ms).

Common congenital cardiac anomalies with cyanosis in the newborn infant due to inadequate pulmonary blood flow:

<table>
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<tr>
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<th>PV atresia</th>
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<td>QRS axis</td>
<td>RAD</td>
<td>Normal</td>
<td>LAD</td>
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QRS pattern V1:
- R
- rS
- rS
- rsR’

Diagnosis: Pulmonary valve atresia with a hypoplastic right ventricle.
ELECTROCARDIOGRAM

IN THE

INFANT AND CHILD

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Rate 100
PR 134
QRS 82
QT 329
QTc 424
--AXIS--
P 69
QRS 105
T 42

COMMENT:
ROUTINE
INDIC

SHAND HOSPITAL
Def: 100CS
Room: PEDCI
Oper: 207

7 years Female
Rate 66
PR 122
QRS 116
QT 384
QTc 402

--AXIS--
P -65
QRS -44
T 100

16 years Male
ELECTROCARDIOGRAM IN THE INFANT AND CHILD

INTERPRETATION AND DIAGNOSTIC CRITERIAS

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#1  4 years  Male
Rate 91

1) Sinus rhythm - P-QRS sequence with a normal mean P axis (positive P’s in leads I and aVF). Also indicative of situs solitus.

2) Normal QRS axis (positive QRS complexes in I and aVF).

3) Normal PR and QTc intervals.

4) Normal septal forces (q waves in V6-V7), indicate the presence of a left/posterior anatomic left ventricle.

5) Normal RV forces (rS pattern in V3R and V1 with negative T’s).

Imp: Normal electrocardiogram

#2  11 year – Male
Rate 99

Sinus arrhythmia  (R-R interval varies with respiration)

Imp: Normal electrocardiogram
#3 7 year Female  
Rate 100

1) Sinus rhythm – Situs solitus.

2) Right axis deviation (negative QRS complexes in I and positive in aVF).

3) Right atrial enlargement (peaked P waves in II and V1-V2).

4) Normal septal forces (q waves in V6-V7).

5) Right ventricular hypertrophy – volume overload (rsR in V3R-V1).

Clinical diagnosis: Atrial Septal Defect (ostium secundum).

#4 2 years Male  
Rate 105

1) Sinus rhythm – Situs solitus.

2) Superior QRS axis (negative QRS complexes in I and aVF with a qR pattern in aVL).

3) Right atrial enlargement (peaked P waves in II and V3R-V1).

4) Normal septal forces (q waves in V6-V7).

5) Right ventricular hypertrophy – volume overload (rsR in V3R-V1).

Clinical Diagnosis: Atrial Septal Defect (ostium primum – endocardial cushion defect).
#5 2 months  Male
Rate 150

1) Mild sinus tachycardia (normal P axis).
2) QRS axis at +90
3) Normal septal forces (q waves in V6-V7).
4) Right ventricular hypertrophy – pressure overload (dominant R waves in V3R-V1 with positive T waves).

Clinical diagnosis: Pulmonary valve stenosis, moderate.

#6 2 months  Male
Rate 120

1) Sinus rhythm (positive P waves in I and aVF).
2) Normal QRS axis or minimal right axis deviation.
3) Normal septal forces (q waves in V6-V7).
4) Right ventricular hypertrophy – pressure overload at systemic level (100% rR’ in V1 with biphasic T waves).

Clinical diagnosis: Tetralogy of Fallot.
15 years  Female
Rate 68

1) Sinus bradycardia
2) Prolonged PR interval (165 ms)
3) Righ axis deviation
4) Abnormal septal forces (no q waves in V6-V7).
5) Severe RVH (reversal of septal depolarization with a qR pattern in V3R and V1)

Clinical Diagnosis: Transposition of the Great Arteries, S/P Senning operation for hemodynamic correction.

6 months  Female
Rate 132

1) Sinus rhythm
2) Normal QRS axis
3) Normal RV forces (rS pattern in V3R-V1 with negative T's).
4) Left ventricular hypertrophy – volume overload (deep q waves in V6-V7 with ST segment elevation ("coving") and peaked T waves).

Clinical diagnosis: Patent Ductus Arteriosus
#9 6 years Male
Rate 98

1) Sinus rhythm
2) Normal QRS axis
3) Suggest left atrial enlargement (broad P waves in lead II)
4) Normal RV forces (rS pattern in V3R-V1 and negative T’s).
5) Left ventricular hypertrophy – pressure overload with “strain” (small q waves and dominant R waves in V6-V7 with flat ST segments and relatively small T waves).

Clinical diagnosis: Aortic valve stenosis, moderately severe.

#10 4 years Male
Rate 97

1) Sinus rhythm
2) Right axis deviation (the area of the S waves in I are greater than the area of the R waves).
3) Right bundle branch block (slow terminal QRS forces with rsR’ pattern with deeply negative ST-T’s in V3R-V1 and a QRS duration of greater than 120 ms). QTc is prolonged (>450 ms) secondary to the RV conduction delay).

Clinical diagnosis: S/P repair of a tetralogy of Fallot.
Narrow QRS tachycardia with no obvious P waves is consistent with a supraventricular tachycardia.

1) Probable sinus rhythm

2) Short PR interval

3) Left axis deviation (positive QRS complexes in I and negative in aVF).

4) Slow initial QRS forces (delta waves) indicate the presence of a Wolff-Parkinson-White syndrome, type B (negative QRS complexes in V3R-V1). This type of W-P-W is seen in Ebstein's anomaly of the tricuspid valve.