

**The 12-Lead Surface ECG in Patients with Congenital Defects of the Atrioventricular Canal: Insights into the Adaptation of the AV Conduction to the Variation of the Patients' Heart Rate**

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Introduction: A diagnostic feature of common AV canal defect – affected Patients lies in their ECG. We describe here the characteristics of the ECGs of Patients with complete and partial CAV and compare them with a cohort of normal, age-matched subjects.

Methods: We retrospectively searched our ECG database for suitable tracings and found the pre-surgical ECGs of 51 patients aged 0- 4 months and the normal ECGs of 58 subjects, aged 0-4 months, with regular cardiac anatomy. We calculated the duration of the PQ, RR intervals and QRS complex and the QRS axis, the PQ/RR ratio, the mean PQ interval and QRS complex duration and the mean QRS axis in each group. The relationship between the PQ/RR (PQ duration normalized by the RR interval) and the RR interval was expressed as a correlation coefficient. Data were compared using appropriate Student's t-tests. A p value < 0.05 was required to refuse the null hypothesis.

Results: In the case group, the mean PQ interval length was  $130.00 \pm 0.03$  msec, the mean QRS duration was  $69.76 \pm 16.45$  msec; the mean QRS axis on the frontal plane stood at  $46.90^\circ$ ; 21 (45%) Patients had a leftward axis deviation ( $-83^\circ - +18^\circ$ ), 3 (5.8%) subjects displayed incomplete right bundle branch block, 3 (5.8%) had signs of biventricular hypertrophy.

In the control group, the mean PQ interval and QRS duration were respectively  $100 \pm 0.02$  msec and  $59.22 \pm 6.76$  msec. The mean QRS axis was  $+99.54^\circ$  (range:  $+30 - +184$ ).

Conclusions: Pre-surgery ECGs are significantly abnormal in Patients with CAV. Moreover, the PQ interval, which summarizes on the surface ECG the AV conduction, displays a significantly reduced increase along with that of the heart rate in children with CAV defects not surgically treated, when compared to normal, age-matched subjects. Differences in the morphology of the AV junction could possibly explain these differences, although we cannot exclude that in these Patients the conduction system may be congenitally different, and that this may also relate to their later tendency to non surgery - related AV blocks, as a possible expression of the wearing off of their conduction system.