

Electrocardiographic Alterations and Heart Rate Variability in Cirrhotic and Cholestatic Children

**Thesis
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Presented By
Mohy El Din Ahmed Kotb
M.B., B. Ch.

Supervisors

Prof. Dr. Nabil Abd El Aziz Mohsen
Professor of Paediatrics
Faculty of Medicine
Cairo University

Dr. Zahra Mohamed Ezz El Din
Assistant Professor of Paediatrics
Faculty of Medicine
Cairo University

Dr. Faten Abd El Aziz
Assistant Professor of Paediatrics
Faculty of Medicine
Cairo University

Faculty of Medicine
Cairo University
2001

بِسْمِ اللَّهِ

الرَّحْمَنِ الرَّحِيمِ

و

بِهِ نَسْتَعِينُ

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Abstract

Patients with cirrhosis were reported to have an impaired autonomic regulation of the heart, as evaluated by 24-hour heart rate variability. This impaired autonomic regulation involves both sympathetic and parasympathetic branches of the autonomic nervous system (Lazzeria et al., 1997 and Oliver et al., 1997). It was reported to relate to the severity of liver cirrhosis (Dilon et al., 1994).

The 24-heart rate variability assessment is a powerful non-invasive tool to assess the sympathovagal balance of the heart (Lazzeri et al., 1997).

Patients with cirrhosis were also reported to have QT interval alterations (Garcia et al., 1999). The presence of a cirrhotic myocardiopathy was proposed, it is still a speculation (Acosta et al., 1999).

Deoxycholate and cholate, the main bile acids in jaundiced serum were suggested to be the toxic substance responsible for heart function alterations in children with cholestasis (Bogin et al., 1983).

The aim of this work was to study ECG alterations and heart rate variability in Egyptian cirrhotic and cholestatic children.

Key Word

Electrocardiograph

Heart Rate Variability

Liver cirrhosis

Cholestasis

Autonomic dysfunction

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List of Abbreviations

AMA	Antimitochondrial antibodies
ANA	Antinuclear antibodies
ALT	Alanine aminotranseferases
ASD	Atrial septal defect
AST	Aspartate aminotranseferases
AV	Atrio-ventricular
Bil D	Direct bilirubin
Bil T	Total bilirubin
CHF	Congestive heart failure
dRR average	Average of RR intervals differences
dRR MD	Mean deviation of RR intervals differences
dRR SD	Standard deviation of RR intervals differences
ECD	Endocardial cushion defect
ECG	Electrocardiograph
EHBA	Extrahepatic biliary atresia
TGA	Transposition of great arteries
Hb%	Haemoglobin percent
HF	Power in high frequency range
HRV	Heart rate variability
LAH	Left atrial hypertrophy
LBBS	Left bundle branch block
LF	Power in low frequency range
LF/HF	Low frequency/ High frequency ratio
LKM	Liver kidney microsomal antibodies
LPLs	Left pericordial leads
LV	Left ventricle
LVH	Left ventricular hypertrophy

NN50 count	Number pairs of adjacent N-N intervals differing by >50ms in the entire recording
No	Number
PFIC	Progressive familial intrahepatic cholestasis
PIBR	Paucity of intrahepatic biliary radicals
PNN50	N-N50count divided by the total number of all N-N intervals
PSA	Power spectral analysis
PVC	Premature ventricular contraction
QTc	QT interval corrected to heart rate
RAH	Right atrial hypertrophy
RBBB	Right bundle branch block
RBCs	Red blood corpuscles
RMSSD	The square root of the mean of the sum of the squares of differences between adjacent N-N intervals
RPLs	Right pericordial leads
RR average	Average RR intervals
RR MD	Mean deviation of RR intervals
RR SD	Standard deviation of RR intervals
RV	Right ventricle
RVH	Right ventricular hypertrophy
SD	Standard deviation
SDANN	Standard deviation of the averages of NN intervals in all 5 min segments of the entire recording
SDNN	Standard deviation of all NN intervals
SD index	Mean of the standard deviations of all NN intervals for all 5 min segments of the entire recording
SDSD	Standard deviation of differences between adjacent N-N intervals
SMA	Smooth muscle antibodies

SVT	Supraventricular tachycardia
ULF	Ultra low frequency
VLF	Power in VLF range
VSD	Ventricular septal defect
VT	Ventricular tachycardia
WBC	White blood cells
WPW	Wolf-Parkinson-White syndrome



***Introduction and Aim of
the Work***

Introduction And Aim of Work

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Review of literature

Chapter I

CHOLESTASIS

Definition

Cholestasis (from the Greek chole; bile; and stasis; stop) is defined by decrease or absence of bile flow into the duodenum (Erlinger, 1999). The clinical definition of cholestasis is any condition in which substances normally excreted into bile are retained. The histopathological definition of cholestasis is the appearance of bile within the elements of liver (Whittington, 1996).

Incidence

Idiopathic neonatal hepatitis in 1/5,000 - 10,000 and Biliary atresia has been detected in 1/10,000 - 15,000 live births. The estimated incidence of Alagille's syndrome is approximately 1 in 40,000 live births (Whittington, 1996). Intra-hepatic bile duct paucity appears much less commonly, in about 1/50,000-75,000 live births (Balistreri, 2000). Incidence of choledochal cyst is 1 in 13,000 to 15,000 population in Western countries, but rates as high as 1 per 1000 live births have been described in Japan (Mc Evoy and Suchy, 1996).

Classification of Cholestasis

A. Congenital Infection

- i. Toxoplasmosis
- ii. Rubella
- iii. Varicella
- iv. Cytomegalovirus
- v. Herpes simplex
- vi. Syphilis