Serum insulin like Growth Factor-I and Growth Hormone Levels in Children with Congenital Heart Disease, Relationship with Nutritional Status, Cyanosis and Left Vent Functions

Thesis

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By

Dalia Yehia Abd El-Fatah

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Under Supervision of

Prof. Dr. Karima Ahmed Abd El- Khalek

Professor of Pediatrics

Faculty of Medicine, Ain Shams University

Dr. Omneya Ibrahim Youssef

Lecturer of Pediatrics

Faculty of Medicine, Ain Shams University

Dr. Mahira Ismail El-Mogy

Lecturer of Clinical and Chemical Pathology

Faculty of Medicine, Ain Shams University

Faculty of Medicine

Ain Shams University

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List of Abbreviations

ACEI : Angiotension converting enzyme inhibitor
A_m wave : Late diastolic mitral annular velocity
AO : Aorta
A wave : Late diastolioc wave
ASD : Atrial septal defect
AV : Atrio-ventricular valve
AV : Atrio-ventriculo
AVSD : Atrio-ventricular septal defect
AVVR : Atrio-ventricular venous return
Awave : Early diastolic
BMI : Body Mass Index
CAHD : Congenital acyanotic heart disease
CCHD : Congenital cyanotic heart disease
CHDs : Congenital heart diseases
CHF : Congestive heart failure
DHEA : Dehydroepiandrosterone
DT : Deceleration time
D-TGA : Dextro-transposition of great arteries
EF : Ejection fraction
E_m wave : Early diastolic mitral annular velocity
E wave : Early diastolic wave
FS : Fractional shortening
GHD : Growth hormone deficiency
GH-RH : Growth hormone-releasing hormone
HGH : Human growth hormone
IGF-1 : Insulin-like growth factor-1
IGF-1R : Insulin-like growth factor-1 receptor
IGF-BPs : Insulin-like growth factor binding protein
IQ : Intelligence quotient
IVCT : Isovolumetric contraction time
IVRT : Iso volumetric relaxation time
L-TGA : Left- transposition of great arteries

LV : Left ventricular
LVEDd : Left ventricular end diastolic diameter
LVESd : Left ventricular end systolic diameter
LVMI : Left ventricular mass index
LVMPI : Left ventricular myocardial performance index
MPI : Myocardial performance index
MR : Mitral regurge
MRI : Magnetic resonance imaging
PDA : Patent ducts arteriosus
PS : Pulmonary stenosis
PVR : Pulmonary vascular resistance
PWT : Posterior wall thickness
rhGH : Recombinant human growth hormone
RV : Right ventricle
RVMI : Right ventricular mass index
SD : Standard deviation
S_m wave : Peak systolic mitral annular velocity
SVR : Systemic vascular resistance
SWT : Septal wall thickness
TDI : Tissue Doppler imaging
TGA : Transposition of great arteries
TOF : Tetralogy of Fallot
VSD : Ventricular septal defect

بسم الله الرحمن الرحيم

﴿ وأنزل الله عليك الكتاب والحكمة وعَلَّمَكَ مَا لَمْ تَكُن تَعْلَمُ وكَانَ فَضْلُ اللَّهِ عَلَيْكَ عَظِيماً ﴾

صدق الله العظيم

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Introduction

Congenital heart diseases refers to any anatomic defect in the heart and major blood vessels that is present at birth ***(Smith, 2001).***

Cardiac abnormalities occur with an incidence of 0.8 per 1000 live birth and represent 25% of all congenital malformations ***(Nemer et al., 2006).*** Congenital cardiovascular malformations (CCVM) present any society with an enormous burden of grief and expense; about eight percent of all deaths during the first year of life are due to CCVM and account for a third or more of infants deaths due to birth defects, more than that for any other congenital anomaly ***(Bailey and Berry, 2005).***

Failure to thrive and protein- energy malnutrition are well-recognized complications of Congenital heart diseases (CHDs) ***(Soliman et al., 2001).***

They are related to repeated respiratory infections, increased Oxygen consumption rate and changes induced by chronic hypoxia ***(Soliman et al., 2001).*** Hypoxia causes feeding difficulties, insufficient caloric intake, intestinal anoxia and venous congestion ***(Soliman et al., 2001),*** which causes hypermetabolism, reduction in nutrient ingestion, intestinal malabsorption of nutrient and malnutrition ***(Varan, 1999).***

Insulin- like growth factors (IGF) are growth hormones related peptides that play a major role in anabolic and mitogenic activities (***Soliman, 2000).*** The combination of decreased IGF-1

level and increased basal GH levels is associated with malnutrition and hypermetabolic states ***(Bentham, 1993).***

IGF are pronounced to have also effects in the pathogenesis of failure to thrive seen in CHD ***(Soliman et al., 2001).***

At present, there is a growing body of evidence implicating growth hormone (GH) and/or insulin-like growth factor-1 (IGF-1) in the intricate cascade of events connected with the regulation of heart development and hypertrophy ***(Lombardi, 1997*)**.

Aim of the Work

The aim of this work is to evaluate serum insulin- like growth factor IGF-1 and GH levels in children with Congenital heart diseases (CHDs) and to determine their relationship with nutritional status and left ventricular global function in these patients.

Congenital Heart Diseases (CHDS)

Definition:

Congenital heart diseases (CHDs) refer to any abnormality in cardiocirculatory structure or function that is present at birth even if it is discovered later ***(Park, 2008)***.

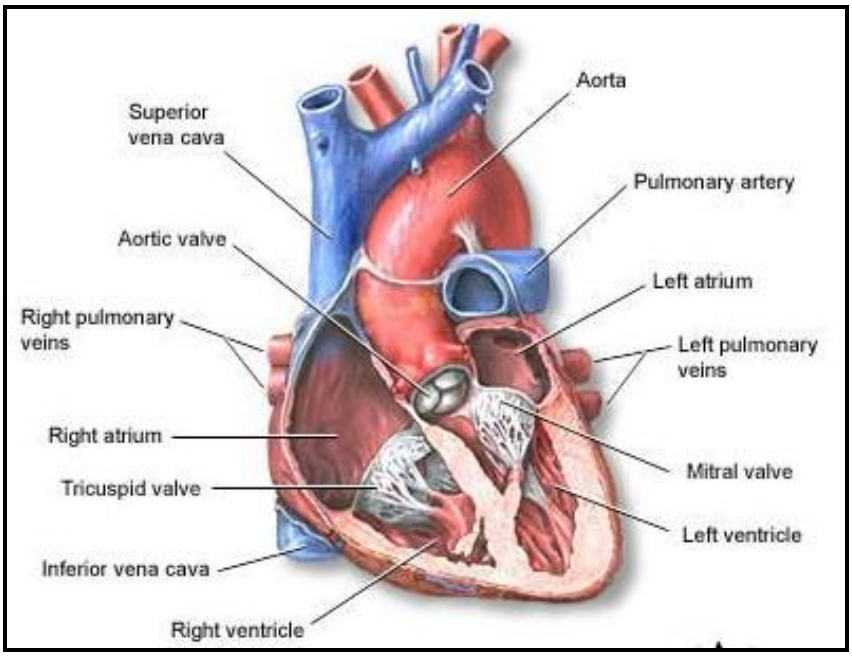

Fig. (1): Structure of a normal human heart ***(Park, 2008)*.**

The embryology of congenital heart disease:

The embryological development of the heart is an awesome and complex process that occurs between third and ninth weeks of gestation ***(Suddaby, 1999).***

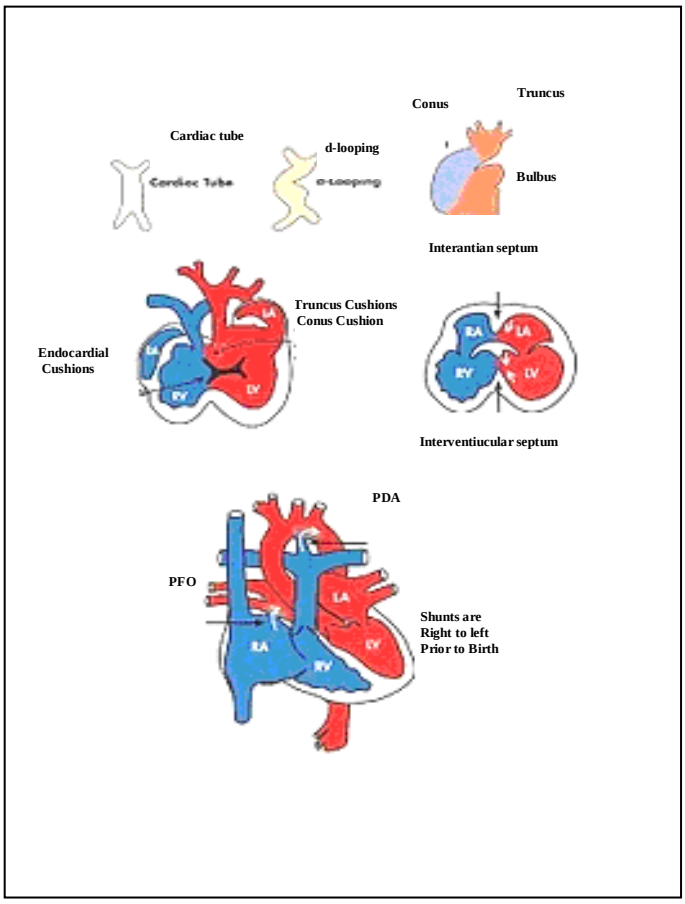

Fig.(2): CVS embryology ***(Heiden,2010).***

The heart begins as a single tube that septates into two tubes and begins to twist rightward onto itself, called ”d” looping. This tube will form an “S” shaped structure that will eventually form all the structure of the heart and begin pumping blood by the fourth week of life. The superior (top) portion of the tube will start to balloon out and will begin to form the atria. Meanwhile, the inferior (bottom) portion of the tube will balloon out and begin to form the ventricles .The middle portion of this tube will