CONGESTIVE HEART FAILURE IN INFANCY AND CHILDHOOD

ESSAY

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(CARDIOLOGY)

by Mohamed

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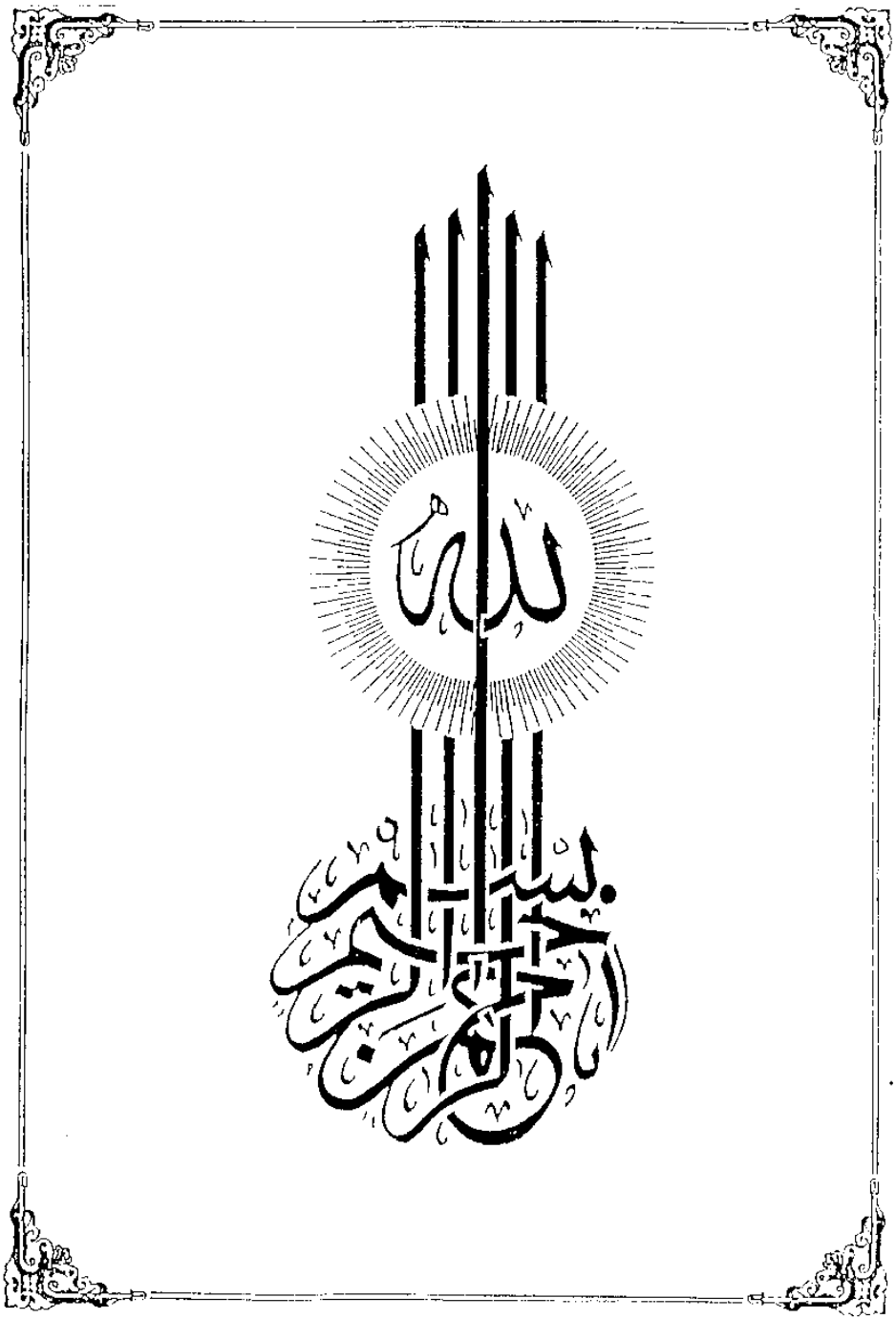

CONTENT

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INTRODUCTION AND AIM OF WORK

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Heart failure in infancy and childhood represents a clinical syndrome which reflect the inability of the myocardium to meet the metabolic requirement of the body including those needs incurred by growth process. This state may arise as a consequence of excessive work load imposed on cardiac muscle usually by structural defect (mechanical factors); inflammatory disease (myocardial factors); or from acombination of mechanical and myocardial factors.

The sequellae of these factors are manifested clinically by signs of pulmonary and systemic venous congestion, and the operation of adaptive mechanisms particularly those associated with increased adrenergic activity (Talner, N.S., 1983).

The aim of this review is to present the etiology; the haemodynamic changes; the clinical presentation;and the medical management of congestive heart failure in infancy and childhood.

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REVIEW OF LITERATURE

DEFINITION OF CONGESTIVE HEART FAILURE

The exact definition of heart failure is difficult. Heart failure can be defined as that condition in which the heart is no longer able to pump an adequate supply of blood for the metabolic needs of the body provided there is adequate venous return to the heart. (Schlant R.C. et al.,1982).

A simple definition of congestive heart failure is that the heart is unable to maintain an adequate output but to this should be added despite a normal venous pressure. (Oram S, 1981). Also congestive heart failure has been defined as a clinical syndrome characterized by abnormal sodium and water retention resulting from impaired cardiac function. (Fowler, N.O., 1980).

Myocardial dysfunction and myocardial failure are terms used to refer to mild and more marked decreased systolic performance of the myocardium. Dysdynamic myocardial failure is non specific term used to refer to the common form of secondary myocardial failure that develop after a period of increased ventricular perload or after load. A designation of dysdynamic failure implies

that the mechanical performance of myocardial contractility per unit mass is significantly decreased, however the overall cardiac (pump) function may be compensated and the cardiac out-put may not be abnormally decreased . Forward failure has been used to imply that most of the patient symptoms resulted from low cardiac out-put with the resultant symptoms of easy fatigability, weakness or even shock. Backward failure has been used to imply that most of the patient symptoms resulted from elevation of the venous pressure behind the failing ventricle. Left heart failure and right heart failure are clinical terms used to refer to condition in which the primary impairment is of the left side of the heart or of the right side of the heart respectively. Atrial failure is that condition in which the atrium fail to provide adequate filling of the ventricle in relation to venous return to the atrium, although isolated atrial failure rarely if ever produces failure of the entire heart , the development of atrial fibrillation or flutter can produce heart failure in patient with compensated heart failure particularly when marked ventricular hypertrophy is present and when atrial kick is important to maintain cardiac out-put.

Latent heart failure is that state in which heart failure is not present at rest but is apparent during periods of increased stress.

Compensated heart failure is that condition in which heart failure previously present but in which cardiac out-put is returned to normal or maintained at normal level by compensatory mechanisms or therapy. (Schlant R.C. et al., 1982).

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INCIDENCE OF CONGESTIVE HEART FAILURE IN INFANCY AND CHILDHOOD

Congenital cardiac defects are usually responsible for the occurance of heart failure in infancy and childhood although the frequency is difficult to assess. In the New England Infant Cardiac Program where approximately 350-450 high risk infants are admitted each year up to 80 % will have heart failure as a major component of their clinical presentation. After infancy the frequency of heart failure strikingly diminishes (Talner, N.S., 1983). In reviewing the case material at the hospital for sick children Torento approximately 20 % of 10.530 children with heart disease were found to have had heart failure at some time. 90 % of them were in the first year of life. (Keith, J.D., 1978).

Data from Pediatric Cardiology Unit University Collage Hospital Ibadan suggest that heart failure in the new born period commonly result from structural cardiac malformation (Jaiyesimi, F., 1981). In infants with congenital heart disease severe enough to cause death or require cardiac catheterization or surgery within the first year of life over 80 % have congestive heart failure as a major component of their illness (Plauth, W.H. et al., 1982).

AETIOLOGY OF CONGESTIVE HEART FAILURE IN INFANCY AND CHILDHOOD

There are several factors that if sufficiently severe will produce congestive heart failure in either infancy or childhood. These include valvular obstruction or insufficiency, mechanical obstruction of the heart as a whole as in pericardial diseases. The physiological effect of large intracardiac shunts that increase the load on one or both ventricles, the presence of high pressure in pulmonary or systemic circulation, inflammatory reactions in the heart muscle, or oxygen lack and finally certain metabolic disturbances such as hypo or hyperthyroidism.

One or more of these factors may be operating in the same child as in rheumatic fever where myocarditis is associated with valvular insufficiency; or in congenital heart disease with pulmonary stenosis and patnet foramen ovale where the right ventricle has a high pressure to maintain and at the same time being offered a cyanotic blood from the coronaries. A list of the various causes of heart failure in pediatric age group is shown in the table attached (Keith, J.D., 1978).

Causes of cargestive heart failure in infancy and child hood.

ortic [illegible] ductal defects	h. With ventricular septal defect
	i. With atrial septal defect
Arrhythmias	j. With miscellaneous combinations
	Complete heart block
	Complete heart block with endocardial fibroelastosis
	Paroxysmal tachycardia, supraventricular (atrial)
	Paroxysmal tachycardia, ventricular
	Persistent paroxysmal tachycardia
	Atrial flutter
	Fibrillation, atrial
	Fibrillation, ventricular
Atrial septal defects	Atrioventricularis communis
	Complete absence of atrial septum
	Persistent ostium primum
	Persistent ostium secundum
	Left ventricular-right atrial defect
Fistulae	Atrial septal defect with mitral stenosis (Lutembacher's syndrome)
	Arteriovenous fistulae (aneurysms), systemic, congenital
	Arteriovenous fistulae (aneurysms), systemic, acquired
Common ventricle	Common ventricle with D-transposition (complete)
	Common ventricle with normal great vessels
	Common ventricle with L-transposition (corrected) of great vessels
	Common ventricle with aplasia of the right ventricular sinus (single ventricle with rudimentary outlet chamber)
	Common ventricle with hypoplasia or aplasia of the left ventricular sinus
	Common ventricle with absent or rudimentary ventricular septum
	Common ventricle with absent right and left ventricular sinuses and ventricular septum
Mitral valve disease	Common ventricle with common atrioventricular valve (with pulmonary atresia)
	Mitral atresia (aplasia)
	Mitral stenosis (congenital)
Pericarditis	Mitral insufficiency (congenital)
	Constrictive pericarditis
	Idiopathic pericarditis
	Viral pericarditis
	Rheumatic pericarditis
	Tuberculous pericarditis
	Uremic pericarditis
Pulmonary vein anomalies	Postpericardiotomy syndrome
	Anomalous pulmonary veins (total), cardiac, into coronary sinus
	Anomalous pulmonary veins (total), cardiac, into right atrium
	Anomalous pulmonary veins (total), infracardiac, into ductus venosus
	Anomalous pulmonary veins (total), infracardiac, into portal veins
	Anomalous pulmonary veins (total), mixed
	Anomalous pulmonary veins (total), supracardiac, into left superior vena cava
Pulmonary artery and valve anomalies	Anomalous pulmonary veins (total), supracardiac, into superior vena cava
	Coarctation or stenosis of the pulmonary artery branches
	Pulmonary atresia with normal aortic root
	Acute cor pulmonale (embolism)
	Chronic cor pulmonale with emphysema
	Chronic cor pulmonale with pulmonary hypertension
	Fibrocystic disease (chronic cor pulmonale)
	Primary pulmonary hypertension
Miscellaneous	Absence of pulmonary valve
	Bacterial endocarditis (a pr[illegible] factor)
	Disseminated lupus erythematosus
	Periarteritis nodosa (polyarteritis)
	Dextrocardia, levocardia, and mesocardia with various types of cardiac shunts
	Ebstein's disease
	Endocardial fibroelastosis, primary, with valvular involvement
	Endocardial fibroelastosis, primary, without valvular involvement
	Endocardial fibroelastosis, secondary, with or without valvular involvement
	Glycogen-storage disease of the heart
	Hypertension (systemic)
	Hyperthyroidism
	Hypothyroidism
	Marfan's syndrome (arachnodactyly) *with* cardiac involvement

Miscellaneous	Muscular dystrophies (Friedreich's ataxia)
	Myocarditis, viral (idiopathic [illegible])
	Tumors of the heart
Rheumatic fever	Acute rheumatic fever
	Rheumatic aortic insufficiency
	Rheumatic aortic stenosis
	Rheumatic mitral insufficiency
	Rheumatic mitral stenosis
	Rheumatic mitral valvular disease
Tetralogy of Fallot	Atypical tetralogy of Fallot (acyanotic)
	Tetralogy of Fallot with tricuspid insufficiency
Transposition of the great vessels	Taussig-Bing malformation (transposition of the great vessels with overriding pulmonary artery)
	D-and L-transposition of the great vessels with cardiac shunts
Tricuspid valve anomalies	Tricuspid atresia (congenital)
	Tricuspid atresia with large ventricular septal defect
	Tricuspid atresia with dextrocardia
	Tricuspid atresia with D-transposition of the great vessels
	Tricuspid atresia with L-transposition of the great vessels
	Tricuspid stenosis (congenital)
	Tricuspid insufficiency
Ventricular septal defect	Ventricular septal defect (simple) isolated primary condition
	Ventricular septal defect with [illegible] aortic cusp
	Ventricular septal defect with tricuspid insufficiency
	Ventricular septal defect with tricuspid valvular perforation (ventriculoatrial defect, shunt LV to RA)

(Keith J.D., 1978).