MANAGEMENT OF CONGESTIVE HEART FAILURE IN

INFANCY AND CHILDHOOD

ESSAY

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by

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بِسْمِ اللهِ الرَّحْمٰنِ الرَّحِيمِ

" قالوا سبحانك لا علم لنا الا ما علمتنا
انك أنت العليم الحكيم "

صدق الله العظيم

سورة البقرة : آية ٣٢

بسم الله الرحمن الرحيم

To My Dear Wife

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Introduction

INTRODUCTION

The effective management of heart failure has been enhanced in recent years by expanding our knowledge with the factors that regulate the heart's performance.

The basic mechanisms of cardiac failure are the same for all ages. However, the pediatrician must recognize that the common causes, time of onset, and often the approach to treatment vary with age. In addition, the younger the infant is when he (or she) presents with signs and symptoms of heart failure, the worse the prognosis. Deterioration can occur rapidly and may result in death if the appropriate therapeutic measures are not taken.

Under these circumstances, initial therapy is aimed at stabilizing the patient for diagnostic studies as soon as possible.

AIM OF THE ESSAY

It is important to review the up-to-date management of heart failure as the the investigations and treatment are in considerable flux and show no sign of reaching an early settled consensus. The understanding of pathophysiologic aspects of cardiac decompensation is considered to be the cornerstone in management of the failed heart.

These aspects will be discussed and reviewed.

DEFINITION OF HEART FAILURE

Definition of heart failure is not entirely satis-factory but the term is usually used clinically to de-scribe a group of symptoms and signs which are reflec-tions of heart inability to discharge its contents ade-quately and maintain a cardiac output sufficient for the needs of the tissues inspite of supporting mechanisms (Godman, 1984).

Gewitz and Vetter (1983) described heart failure as a syndrome in which the heart cannot maintain a level of tissue perfusion adequate to meet metabolic needs.

In most patients, the clinician recognizes con-gestive heart failure by the manifestations of conges-tion, not by recognition of a low cardiac output. Indeed, in certain circumstances, gradual reduction of cardiac output over many months or years may be surpri-singly well tolerated by the patient with slowly pro-gressive congestive heart failure.

A more satisfactory clinical definition of congest-ive heart failure focuses on the phenomena of conges-tion. Thus, for the purposes of this article, congest-ive heart failure is defined as a clinical syndrome

characterized by congestion of the pulmonary or systemic circulation owing to increase in pulmonary venous or systemic venous pressure to the level of plasma protein oncotic pressure or above.

The manifestations of congestive heart failure are largely due to changes in compliance in the venous circuit accompanied by transudation of fluid. Increased venous pressure may reflect disease of the atrium or obstruction of the atrioventricular valve, as in mitral stenosis, or alterations in ventricular filling pressure and ventricular stiffness as a direct expression of myocardial abnormality.

However, the congestion of rightsided failure depends on retention of sodium by the kidney, which occurs whether the right or the left ventricle is diseased. The stimulus for sodium retention has not been fully expanded. Either or both ventricles may fail. While the most common cause of right ventricular failure is left ventricular failure, the right ventricle may fail independently as in corpulmonale. Right ventricular failure is much less common than left ventricular failure (Killip, 1985).

Heart failure must be distinguished from conditions in which there is circulatory congestion consequent to

abnormal salt and water retention, per se e.g. accumulation of excess salt and water due to salt retaining steroids, excess blood or fluid administration, acute glomerulonephritis, oliguria, or anuria. Circulatory congestion may also be due to an increased venous return and/or decreased peripheral resistance, e.g. arterio-venous fistula, beriberi, cirrhosis, severe anaemia (Eichna, 1960).

Latent heart failure is said to be present when heart failure is not present at rest but is apparent only during periods of increased stress, e.g. exercise fever, emotions.

Compensated heart failure is that condition in which heart failure was previously present,but in which cardiac output is returned to (or maintained at) a normal level at rest and is optimally distributed during exercise by compensatory mechanisms or by therapy (Schlant and Sonnenblick, 1982).

Aetiology

ETIOLOGY OF CONGESTIVE HEART FAILURE

There are several etiological classifications of congestive heart failure in pediatric age group. The major three etiological classifications are:

1) According to the pathophysiologic processes that contribute to the development of heart failure.

2) According to the anatomical structure.

3) According to the age group.

1. <u>According to the pathophysiologic process that contribute to the development of heart failure</u>:

Pathophysiology of congestive heart failure:

General features: a) Pressure overload.

b) Volume overload.

c) Decrease contractility.

d) Restricted filling.

a) <u>Pressure overload</u>:

Pressure overload is commonly caused by outflow tract obstruction such as valvular aortic stenosis or systemic hypertension. Similarly, the right ventricle can be affected by pulmonary stenosis or hypertension.

b) <u>Volume overload</u>:

Can be caused by several different conditions, such as aortic or mitral regurgitation.

High output states can also contribute to volume overload of left ventricle.

Selective volume overload of each ventricle can be caused by certain forms of congenital heart disease for example:

- a patient with an atrial septal defect and a large left-to-right shunt will have volume over-load of the right ventricle, whereas the left ventricle will be unaffected.

- Prolonged pressure or volume overload leads to intrinsic changes in myocardial contractility, which appear to be mostly irreversible. This decline in contractility eventually results in the common clinical syndrome of congestive heart failure.

c) <u>Decrease in the intrinsic contractility of heart muscle</u>:

- is examplified by conditions as volume and pres-sure overload and cardiomyopathies. Loss of muscle function as a cause of congestive heart