RESPIRATORY FAILURE IN PEDIATRICS

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BY

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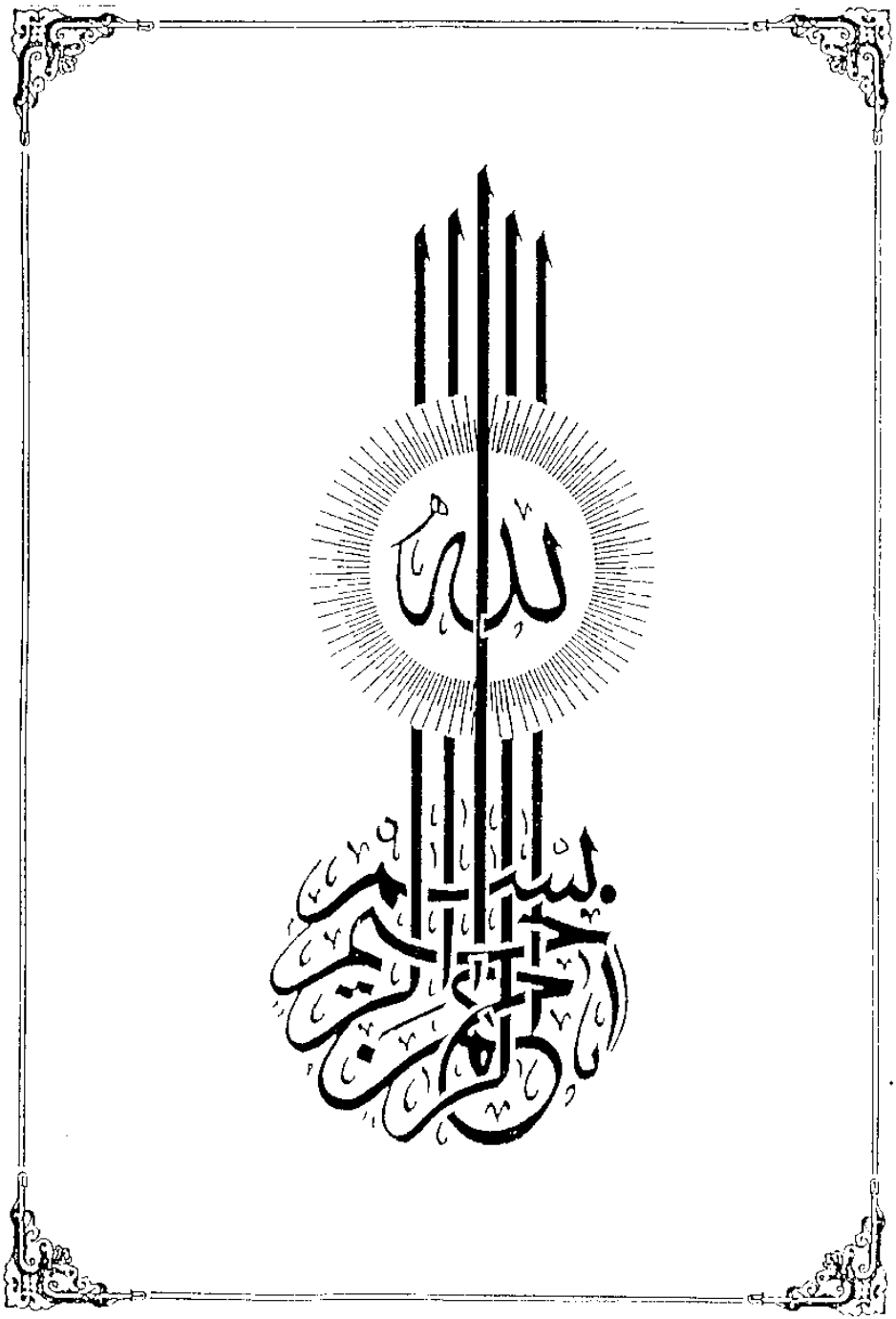

C O N T E N T S

INTRODUCTION

RESPIRATORY FAILURE IN PEDIATRICS

Respiratory failure is a term widely used in clinical pediatrics. This disorder occurs when the lungs fail to fulfil their primary function of delivering oxygen and removing carbon dioxide. Serious impairement of lung function posses a threat to life which in many cases can be averted if proper treatment is provided (Simpson, 1978).

Respiratory failure is one of the most common causes of death in infants. During the first year of life the age-specific death rate from respiratory disease alone is 12.5 per 1000. The incidence decreases during the childhood and adolescent years (Newth, 1979).

There are many disorders which cause respiratory failure in children. With such a diversity of causes, one might expect to find a wide spectrum of complaints and physical manifestations. However, the cardinal clinical manifestations are the signs

and symptoms that accompany hypoxemia (Balk and Bone, 1983).

Recently, respiratory muscle dysfunction has been recognised to cause or contribute to the development of respiratory failure in thoracopulmonary disorders (Rochester and Arora, 1983).

The emphasis in diagnosis and management of respiratory failure must be on measurements of arterial blood gases. If good clinical judgment and a thorough knowledge of the natural history of the disease can be combined with the intelligent assessment of oxygenation, ventilation, and acid-base status as afforded by an understanding of arterial blood gases and the physiologic principles involved, the managment of many of these small patients can be exceptionally rewarding (Newth, 1979).

Respiratory failure has many complications. Awareness of these complications enables more prompt treatment as they occur. In many instances, pulmonary and extrapulmonary complications of acute respiratory failure may be prevented by prophylactic therapy (Pingleton, 1983).

The management of respiratory failure has been greatly facilitated by the development of respiratory or general pediatric intensive care units in many children's hospitals in which sophisticated monitoring, supportive therapy and definitive treatment for children with acute potentially reversible life-threating illness can best be provided (Simpson, 1978).

AIM OF THE ESSAY

This essay aims to define respiratory failure and its sequelae as a life-threating disorder. It aims to study the incidence of respiratory failure and its relation to age. It will mention a historical review about this disorder since it becomes frequently recognized.

It will give a complete idea about the etiology of respiratory failure and the most common causes of it.

The clinical and laboratory diagnosis of respiratory failure will be discussed. It will provide a complete study of the pulmonary and extrapulmonary complications of respiratory failure and the methods of diagnosis, treatment, and prophylaxis of these complications.

This essay provides a complete evaluation of the different lines of treatment and support of the critically ill patients with respiratory failure with a great emphasis on the role of the intensive care unit in the management.

REVIEW OF LITERATURE

- Definition and incidence.
- History.
- Etiology.
- Pathophysiology of respiratory failure.
- Types of respiratory failure.
- Clinical manifestations.
- Complications.
- Treatment.

DEFINITION AND INCIDENCE

DEFINITION AND INCIDENCE

The first step in understanding respiratory failure is to develop a definition. Unfortunately, there is no uniform definition to include all causes of respiratory failure (Martin, 1977).

All clinics agree that there is a defect in the respiratory system resulting in an arterial oxygen tension and/or arterial carbon dioxide tension outside the normal expected range (Bone, 1981).

Most clinicians would agree that respiratory failure is present when the pulmonary system is unable to meet the metabolic demands of the body (Newth, 1979).

The patient is acutely dyspneic, the arterial oxygen tension is less than 50 mm Hg with the patient breathing room air, the arterial carbon dioxide tension is greater than 50 mm Hg and there is decrease in the arterial pH. Not all patients fulfill all four of these criteria, but most exhibit at least two of them (Balk and Bone, 1983).

About two-thirds of the cases of respiratory failure in children occur in the first year of life;

of these, approximately 50 per cent occur in the newborn period. This remarkably high incidence in infancy can be attributed largely to structural immaturity (and, in the case of neonates, to congenitally abnormal development as well) of the various organs of the ventilatory pathway. During the first year of life (excluding the first 28 days of neonatal life) the age-specific death rate from respiratory disease alone is 12.5 per 1000. The incidence decreases during the childhood and adolescent years (Newth, 1979).

H I S T O R Y

HISTORY

Prior to 1950, acute respiratory failure was not recognized frequently. It was difficult to measure arterial blood oxygen and carbon dioxide partial pressures, and oxygen therapy was difficult to control (Campbell, 1979).

Bulbar and anterior horn cell poliomyelitis was one of the major causes of respiratory failure. Effective vaccines have essentially eliminated poliomyelitis as a cause of respiratory failure. With the advant of easily obtainable methods for arterial blood gas analysis came an appreciation for the true incidence of respiratory failure. It soon became obvious that respiratory failure can result from a myriad of causes. This realization ushered in the modern era of treatment of respiratory failure, consisting of a coordinated approach to the patient in the setting of a critical care unit (Balk and Bone, 1983).

Using the modern methods of therapy, fewer deathes were attributed to progressive hypoxemia and more deathes to multiorgan failure. Sepsis, disseminated intravascular coagulation, cardiac arrhythmias, acute renal failure, and iatrogenic starvation have

been recoginzed in increasing proportions. These critically ill patients requiring total life support are also subject to a high incidence of iatrogenic complications (Abramsom, et al., 1980).