

COMPLEMENT ACTIVITY IN
PROTEIN-CALORIE MALNUTRITION
AND INFANTILE RICKETS.



Thesis
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INTRODUCTION

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The complement system is the primary humoral mediator of antigen antibody reactions.

It consists of at least fifteen chemically and immunologically distinct serum proteins which are capable of interacting with each other, with antibody and with cell membranes (Cooper, 1982).

Malnutrition may cause secondary deficiency of complement components and functional activity of complement. Although synthesis of complement system is depressed, serum of some patients also appear to contain immune-complexes and anticomplement factor which could accelerate depletion (Suskind et al, 1976) .

Rickets is considered one of nutritional disorders, so vitamin D deficiency could alter complement activity.

AIM OF THE WORK

AIM OF THE WORK

Is to study the complement activity in some cases of protein-calorie malnutrition and infantile rickets which may be one of the factors leading to repeated infections.

REVIEW OF LITERATURE

Protein-Calorie Malnutrition:

Definition

Incidence

Classification

Presentation

Liability for Infection.

PROTEIN-CALORIE MALNUTRITION (PCM)

Protein-calorie Malnutrition in young growing children is one of the most widespread nutritional problems in many developing countries today (Reddy et al, 1976).

Definition

Protein-calorie malnutrition is a sociomedical problem resulting from two main factors, a diet that is quantitatively and qualitatively inadequate, and superimposed stress usually of infecteous origin. (Scrimshaw and Moises, 1965).

Incidence of P.C.M. in Egypt:

Estimation of the incidence of PCM in Egypt had been carried out in different field areas (Shukry and Kamel 1974).

According to Abd El Hamid et al (1978) the incidence of PCM was 26.45 %. They reported that the incidence of PCM was higher in females than males. On the other hand El-Behairy et al. (1976) found that females were not more affected.

The incidence of PCM was the lowest during first six months of life. This was related to the fact that breast milk is the rule in this age and is considered satisfactory from nutritional point of view. While during the second six months of life the incidence of PCM increased as breast milk was insufficient to meet all dietary requirements and the supplements given were mostly sugary fluids of deficient nutritional value. (Abdel Fattah et al, 1984).

The highest incidence of P.C.M. was observed in second year of life, this is due to the fact that children were mainly dependant on breast milk in first year of life, but in second year breast milk becomes insufficient together with improper supplementation and after weaning the usual diet is cereal grains, starchy roots, and over diluted milk. So in all these cases there is insufficient intake of calories and proteins of high biological value. By the end of the fourth year the incidence of PCM had markedly dropped. (Abd El Hamid et al, 1978).

Classification of P.C.M.

Protein-calorie malnutrition can be classified according to Wellcome classification (1970) into;-

- a. Weight less than 60% of expected
 - . without oedema → marasmus.
 - . with oedema → marasmic kwashiorkor

- b. Weight between 60% and 80% of expected:
 - . without oedema → underweight
 - . with oedema → Kwashiorkor

If the weight is above 80% of expected for age the child is considered normal.

This classification is widely used.

There is another classification which is depending on anthropometric measurements such as weight/head circumference, arm circumference/age, arm circumference/head circumference, and arm muscle circumference/age.

While the classification which is depending on clinical signs is considered less sensitive, since clinical signs of PCM generally appear late (Shukry and Kamel, 1974).

Presentation of P.C.M.

According to the variability of clinical and biological presentation of PCM it is classified into:-

1. Marasmus:

The clinical picture of marasmus results from an inadequate caloric intake due to insufficiency of the diet, to improper feeding habits or due to metabolic abnormalities or congenital malformations (Behar and Viteri, 1978).

Initially, there is failure to gain weight, followed by loss of weight until emaciation results (usually weighing less than 60% of the standard weight), with loss of subcutaneous fat. The muscles is also extremely atrophic. The skin is thin, flaccid and wrinkled. All these features make up the typical face of the marasmic child which has been described as that of very little old man (Barness, 1983).

2. Kwashiorkor (kwo):

The feeding of a child with a diet very low in proteins but which provides enough energy to satisfy the child's needs, results in the clinical picture of severe protein deficiency recognized as kwashiorkor.

Apathy and anorexia are the early manifestations of kwo. When well advanced, it results in inadequate growth, loss of muscular tissue, increased susceptibility to infection, and pitting oedema which is the main clinical characteristic of kwo, on which the diagnosis is based. Secondary immunodeficiency is one of the most serious and

constant manifestation. Enlargement of liver may occur early or late, fatty infiltration is common. There are many other manifestations in children with kwo as skin changes, hair changes, and anaemia (Behar and Viteri 1978; Forfar and Arneil 1984).

3. Intermediate or combined forms:

Pure kwo without some degree of preceding or accompanying caloric deficiency is seldom seen. Much more frequently the signs and symptoms of kwo develop in a child who already has a more or less advanced degree of energy deficiency. They have been described as marasmic kwashiorkor (Behar and Viteri, 1978; McMurray et al, 1981).

Liability for infections in PCM:

The synergism between malnutrition and infection has been well documented (Olusi et al, 1976).

Haller et al (1978) reported that malnutrition favours the development of diseases, particularly in children. It has been shown that up to 50% of children with PCM may suffer from a variety of severe and often fatal infection. This effect of malnutrition has been related to decreased complement activity and reduced serum concentration of some complement components, impaired