Protein energy malnutrition in severe alcoholic hepatitis: Diagnosis.

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Introduction

Protein–energy malnutrition (PEM), sometimes called protein-energy undernutrition (PEU), is a form of malnutrition that is defined as a range of conditions arising from coincident lack of dietary protein and/or energy (calories) in varying proportions. The condition has mild, moderate, and severe degrees [1,2].

Types include:

- Kwashiorkor (protein malnutrition predominant)
- Marasmus (deficiency in calorie intake)
- Marasmic kwashiorkor (marked protein deficiency and marked calorie insufficiency signs present, sometimes referred to as the most severe form of malnutrition)

PEM is fairly common worldwide in both children and adults and accounts for about 250 000 deaths annually. In the industrialized world, PEM is predominantly seen in hospitals, is associated with disease, or is often found in the elderly. Note that PEM may be secondary to other conditions such as chronic renal disease or cancer cachexia in which protein energy wasting may occur.

Protein–energy malnutrition affects children the most because they have less protein intake. The few rare cases found in the developed world are almost entirely found in small children as a result of fad diets, or ignorance of the nutritional needs of children, particularly in cases of milk allergy [3,4].

Prenatal protein malnutrition

Protein malnutrition is detrimental at any point in life, but protein malnutrition prenatally has been shown to have significant lifelong effects. During pregnancy, one should aim for a diet that consists of at least 20% protein for the health of the foetus. Diets that consist of less than 6% protein have been linked with many deficits, including decreased brain weight, increased obesity, and impaired communication within the brain in some animals. Even diets of mild protein malnutrition (7.2%) have been shown to have lasting and significant effects in rats. The following are some studies in which prenatal protein deficiency has been shown to have unfavourable consequences.

Decreased brain size: Protein deficiency has been shown to affect the size and composition of brains in rhesus monkeys. Monkeys whose mother had eaten a diet with an adequate amount of protein were shown to have no deficit in brain size or composition, even when their body weight amounted to less than one-half of that of the controls, whereas monkeys whose mothers had eaten low-protein diets were shown to have smaller brains regardless of the diet given after birth.

Impaired neocortical long-term potentiation: Mild protein deficiency (in which 7.2% of the diet consists of protein) in rats has been shown to impair entorhinal cortex plasticity (visuospatial memory), noradrenergic function in the neocortex, and neocortical long-term potentiation.

Altered fat distribution: Protein undernutrition can have varying effects depending on the period of fetal life during which the malnutrition occurred. Although there were not significant differences in the food intake, there were increased amounts of per renal fat in rats that were protein-deprived during early (gestation days 0–7) and mid (gestation days 8–14) pregnancy, and throughout pregnancy, whereas rats that were protein-deprived only late in gestation (gestation days 15–22) were shown to have increased gonadal fat [5].

Co-morbidity

A large percentage of children that suffer from PEM also have other co-morbid conditions. The most common co-morbidities are diarrhoea (72.2% of a sample of 66 subjects) and malaria (43.3%). However, a variety of other conditions have been observed with PEM, including sepsis, severe anaemia, bronchopneumonia, HIV, tuberculosis, scabies, chronic supportive otitis media, rickets, and keratomalacia. These co-morbidities tax already malnourished children and may prolong hospital stays initially for PEM and may increase the likelihood of death.

The general explanation of increased infectious comorbidity in malnourished people is that (1) the immune system is what prevents such diseases from being more widespread in healthy, well-nourished people and (2) malnutrition stresses and diminishes immune function. In other words, malnutrition tends to cause (mild or moderate) immunodeficiency, eroding the barriers that normally keep infectious diseases at bay.

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