

Therapeutic nutrition

Lecture - 3 -



Learning objectives

At the end of this lecture student would be able to :

- 1-Determine protein constituents & its recommended allowances .
- 2-Classify amino-acids & proteins .
- 3-Identify essential amino-acids .
- 4-Illustrate functions of proteins .
- 5-Discuss malnutrition disorders .
- 6-Outline measures & factors affecting protein requirement .
- 7-Identify the chemical amino-acid score of certain nutrients .

Diseases related to protein deficiency

Malnutrition illnesses

Two main groups of such illness :-

A-)Caloric deficiency (Starvation) :-

□ Starvation is a term applied when there is partial or total deprivation of food and water . This lead to gradual wasting of body tissues.

□ Chronic starvation occur in many parts of the world It is due to caloric content of diet below minimal requirement and inadequate specific nutrients specially proteins .

□ In children , there will be :-

1. Retardation of growth (failure to gain weight and height) .
2. Physical and mental activities are less .
3. Reduced resistance to infection .

□ In adults , there will be :-

1. Emaciation .
2. Lethargy .
3. Vitamin deficiency .
4. Odema .

B-)Protein deficiency diseases:-

1.) Marginal hypo-proteinaemia:-

- It may accompany other pathological conditions .It may occur without starvation .**
- It is fairly common complication of debilitating diseases .**
- It may follow sever burns , extensive surgery , big wounds , gastric ulcers , liver and kidney diseases .**
- It may accompanied by edema but very rare .**

□ Its etiology :-

- 1. Deficiency intake of protein (in quality and quantity) .**
- 2. Failure of digestion and absorption .**
- 3. Abnormal destruction or loss of amino acids (as in sever burn or nephritis) .**

2.)Sever protein starvation with edema

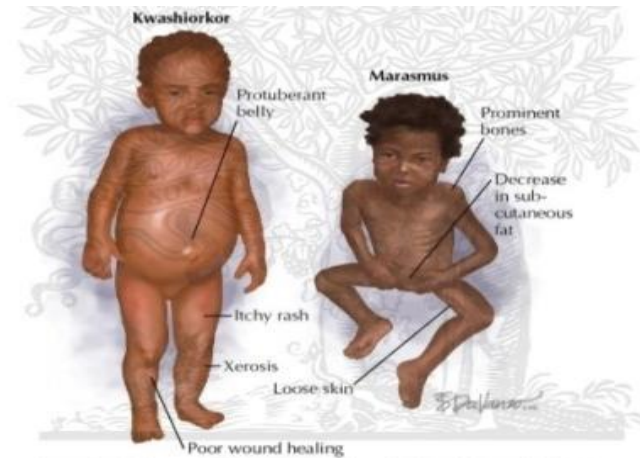
- It is seldom encountered except during wars or famines where there is a prolonged food shortage .
- There will be loss of weight, loss of appetite , reduced resistance and diminished strength .**
- It may be accompanied with other diseases .**
- Laboratory investigations are used to confirm the diagnosis .**
- There will be a delayed wound healing and postural edema .**

Kwashiorkor disease

It is sever form of protein deficiency .

It is characterized by :-

- 1.)Retarded growth in late breast feeding , weaning and post weaning period .
- 2.)Alteration in skin and hair pigmentation (flag hair)
- 3.)Odema .
- 4.)fatty infiltration with cellular necrosis and fibrosis in the liver tissue .
- 5.)Heavy mortalities (high mortality rates) .



Evaluation of proteins

The parameters used for such an evaluation include the estimation of :

- 1- The biological value
- 2- Digestibility coefficient
- 3- Protein efficiency ratio and net protein utilization .

Net protein utilization (NPU)

It is considered of more practical value because it is the product of biological value and digestibility coefficient divided by 100 .

In exact terms , *it is the proportion of ingested protein that is retained in the body under specified conditions for the maintenance and / or growth of the tissues .*

Assessment of protein nutrition

A battery of tests have been suggested to assess protein nutrition which are :

- 1- arm muscle circumference
- 2- creatinine – height index
- 3- serum albumin and transferrin
- 4- total body nitrogen

Serum albumin concentration is the best measurement for state of proteins nutrition in the present time and it should be more than 3.5 g/dl

I- a level of 3.5 g/dl is considered mild degree of malnutrition

II- a level of 3.0 g/dl --- sever mal nutrition

III- Serum albumin and transferrin assess the ability of liver to synthesize proteins .

Protein requirements

It is customary to express protein requirements in terms of body weight .

The Indian Council of Medical Research in 1989 recommended **1.0 g protein / kg** body weight for an Indian adult assuming a NPU of 65 for the dietary proteins

Factors affecting protein requirement

1.) **Tissue growth** :-

Any period of growth need additional proteins supplement in food .e.g.during pregnancy , special periods during reproductive life .

2.) **Diet** :-

□ Taking sufficient amounts of non protein calories in diet can play a protein sparing effect for energy production .

3.) Illness or disease

The presence of any illness will increase the protein requirement specially illness accompanied by high fever (because of tissue destruction and raised basal metabolic rate) . Also in cases of extensive trauma , burns , major surgery , ...etc .

Measures of protein requirements

Two basic measures are considered :-

1.)Protein quantity

Daily requirement for adult is (0.8 - 1 gm/Kg/day) , should take in consideration stage of growth and development , pregnancy , lactation , and age.

2.)Protein quality

Since the value of protein depends on its content of Essential Amino Acids .

Thank you

