4 YEAR OLD BOY WITH GENERALIZED OEDEMA

This case study aims to
- Help understand the various clinical presentations of childhood protein energy malnutrition
- Differentiate between marasmus and kwashiorkor
- Discuss the management of a child with kwashiorkor

Case
Hari is a 4 year old boy. His mother has brought to the primary health centre. He says that the boy appears 'swollen' and that he is highly irritable. The boy has a half a 'pav' and half a glass of milk for breakfast, his lunch consists 1 small chapatti. In the night he eats half a vati of rice.

On examination, the positive findings are
- Weight 11kg
- Reddish colour hair
- Generalized oedema
- Moon facies
- Abdominal distension
- Hepatomegaly.
- Skin- dark, dry, with crazy pavement dermatosis

Systemic examination is normal

1. Based on the above history and examination, the diagnosis is
   a) Marasmus
   b) Kwashiorkor
   c) Marasmic kwashiorkor
   d) None of the above

Marasmus vs. kwashiorkor
- Protein-energy malnutrition (PEM) applies to a group of related disorders that include marasmus, kwashiorkor, and intermediate states of marasmus-kwashiorkor.
- The term marasmus means withering or wasting. Marasmus involves inadequate intake of protein and calories and is characterized by emaciation
- The term kwashiorkor means "the sickness of the weaning," and it refers to an inadequate protein intake with reasonable caloric (energy) intake
- Edema is characteristic of kwashiorkor but is absent in marasmus
- marasmus represents an adaptive response to starvation, whereas kwashiorkor represents a maladaptive response to starvation
• Children may present with a mixed picture of marasmus and kwashiorkor, and children may present with milder forms of malnutrition. Jelliffe suggested the term protein-calorie (energy) malnutrition to include both entities

2. **What are the causes of protein energy malnutrition?**
   • The most common cause of malnutrition is inadequate food intake. Preschool-aged children in developing countries are often at risk for malnutrition because of their dependence on others for food, increased protein and energy requirements, immature immune systems causing a greater susceptibility to infection, and exposure to nonhygienic conditions
   • Ineffective weaning secondary to ignorance, poor hygiene, economic factors, and cultural factors.
   • Gastrointestinal infections precipitate clinical protein-energy malnutrition because of associated diarrhea, anorexia, vomiting, increased metabolic needs, and decreased intestinal absorption. Parasitic infections play a major role in many parts of the world.
   • Chronic diseases, such as cystic fibrosis, chronic renal failure, childhood malignancies, congenital heart disease, and neuromuscular diseases, contribute to malnutrition.
   • Fad diets, inappropriate management of food allergies, and psychiatric diseases, such as anorexia nervosa, can also lead to severe protein-energy malnutrition.

3. **What are the clinical features of kwashiorkor?**
   • The symptoms vary from lethargy, apathy, irritability to inadequate growth, loss of muscular mass, secondary immunodeficiency and edema
   • Renal function is decreased; the liver and the heart may enlarge
   • Dermatitis is common; the hair is sparse, thin and dyspigmented
   • Infections, vomiting and diarrhea are common.
   • There are signs of vitamin and mineral deficiencies; delayed bone growth
   • Mental changes may occur, followed by stupor, coma and death

4. **How would you investigate this child?**
   • Detailed dietary history, growth measurements, body mass index (BMI), and a complete physical examination are indicated.
   • Sensitive measures of nutritional deficiency in children include height-for-age or weight-for-height measurements less than 95% and 90% of expected, respectively, or greater than 2 standard deviations below the mean for age
   • WHO recommends the following laboratory tests:
     o Blood glucose
     o Examination of blood smears by microscopy or direct detection testing
     o Hemoglobin
     o Urine examination and culture
     o Stool examination by microscopy for ova and parasites
     o Serum albumin
     o HIV test
     o Electrolytes

Lab findings in kwashiorkor include
• low albumin concentration
- low plasma glucose
- ketonuria
- low plasma amino acids
- decreased K+, Mg++
- low cholesterol

5. **How would you treat this child?**
   - Correction of fluid and electrolyte abnormalities: The most common electrolyte abnormalities are hypokalemia, hypocalcemia, hypophosphatemia, and hypomagnesemia.
   - Treatment of infections
   - Macronutrients by dietary therapy: Milk-based formulas are the treatment of choice. At the beginning of dietary treatment, patients should be as the child wants. After 1 week, intake rates should approach 175 kcal/kg and 4 g/kg of protein for children. A daily multivitamin should also be added.

**References**