Nutritional disorders / Questions and case reports

1. **A girl, 17 years old, measures 170 cm and weighs 45 kg. Her average daily intake of energy nutrients is 100 g of carbohydrates, 20 g of protein and 15 g of fat.**
   - 1. What is its daily energy intake (in kcal, kJ)?
   - 2. What is the value of her basal metabolism? Use a rough estimate, i.e., BMR = 24 × weight in kg.
2. **Kwashiorkor manifests itself:**
   - A - Growth retardation
   - B - Loss of subcutaneous fat
   - C - Hypoalbuminemia
   - D - Edema
3. **Which vitamins are absorbed directly in the gut?**
   - A - Folic acid
   - B - Biotin
   - C - B12
   - D - E
   - E - Pantothenic acid

Answers

Question 1.

- 1. The girl consumes 100 × 4 = 400 kcal carbohydrates, 20 × 4 = 80 kcal proteins and 15 × 9 = 135 kcal fats, a total of 615 kcal / day, which is 615 × 4.18 kJ = 2,570.7 kJ.
- 2. 24 × 45 = 2,880 kcal / d = 2,880 × 4.18 kJ = 12,038.4 kJ

Question 2.

- **A - Right**
- B - Wrong- subcutaneous fat is preserved unlike in marasmus
- **C - Right**
- **D - Right**

Question 3.

- **A - Right**
- **B - Right**
- C - Wrong - B 12 must first be linked to the "intrinsic factor"
- D - Wrong - vitamin E is absorbed along with fats in micellar form
- **E - Right**

Case Reports

A 78 years old woman

She has lived in a retirement home for 2 years. In recent months, she has had difficulty walking, experienced paresthesia, and numbness in her legs. A neurologist diagnosed her with peripheral neuropathy. He suspected that she is experiencing inadequate nutrition, especially with regards to vitamin intake. He examined the concentration of transketolase in erythrocytes.

Questions:

1. **What causes transketolase deficiency?**
2. **What are the symptoms of thiamine pyrophosphate deficiency?**

Answers

1. It is a deficiency of vitamin B1 (thiamine diphosphate), which is a cofactor of enzymes in the conversion of pyruvate and 2-oxoglutarate to acetyl-CoA (pyruvate dehydrogenase) and succinyl-CoA (2-oxoglutarate dehydrogenase) and further in the pentose cycle, where it is a coenzyme of transketolase (catalyzes the transfer of a 2-carbon unit from xylulose-5-phosphate to ribose-5-phosphate to form sedoheptulose-7-

phosphate).
2. The body contains only thirty times the daily requirement. Peripheral neuropathy, muscle weakness, dementia, and heart failure occur with chronic malnutrition (or one-sided nutrition or an increased need such as chronic alcohol abuse). It can also be Wernick's encephalopathy (memory loss, nystagmus) or beriberi. By administering B1, the situation improves very quickly. One of the laboratory tests is a comparison of glucose utilization before and after thiamine diphosphate administration. The most sensitive method is to determine the catalytic concentration of transketolase in the hemolysate. An increase of 20% after B1 administration is a sign of deficiency.

A 68 years old man

He was on parenteral nutrition for established malnutrition. He had pernicious anemia . The attending physician ordered a blood sample to be taken to determine B12 level.

Questions:

1. Was this examination necessary in the patient? (Note: This is a relatively expensive examination.)

Answers

1. It wasn't. In this case, it is enough to monitor the blood count and thus monitor vitamin B 12 supplementation. However, the stomach needs to be examined in more detail for the possibility of cancer, which is very suspicious in atrophic gastritis accompanied by pernicious anemia, especially in weight loss seniors.

References

Related articles

- Marasmus
- Kwashiorkor
- Metabolic syndrome
- anorexia nervosa

Other chapters from the book MASOPUST, J., PRŮŠA, R .: Pathobiochemistry of metabolic pathways

Source

- MASOPUST, Jaroslav and Richard PRŮŠA. *Pathobiochemistry of metabolic pathways.* 1st edition. Prague: Charles University, 1999. 182 pp. 208-210. ISBN 80-238-4589-6 .