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Kwashiorkor

Kwashiorkor is an acute form of childhood protein-energy malnutrition characterized by edema, irritability, anorexia, ulcerating dermatoses, and an enlarged liver with fatty infiltrates. The presence of edema caused by poor nutrition defines kwashiorkor. Kwashiorkor was thought to be caused by insufficient protein consumption but with sufficient calorie intake, distinguishing it from marasmus. More recently, micronutrient and antioxidant deficiencies have come to be recognized as contributory. Cases in the developed world are rare.

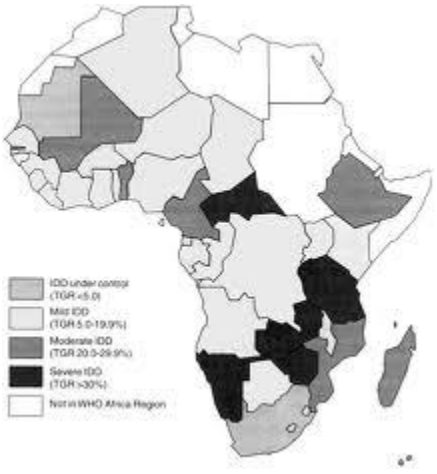
Jamaican pediatrician Dr. Cicely D. Williams introduced the name into the medical community in her 1935 Lancet article. The name is derived from the Ga language of coastal Ghana, translated as "the sickness the baby gets when the new baby comes",and reflecting the development of the condition in an older child who has been weaned from the breast when a younger sibling comes. Breast milk contains proteins and amino acids vital to a child's growth. In at-risk populations, kwashiorkor may develop after a mother weans her child from breast milk, replacing it with a diet high in carbohydrates, especially starches, but deficient in protein.

Typical ulcerating dermatosis seen on a Malawian child with kwashiorkor.

One of many kwashiorkor cases in relief camps during the Nigerian–Biafran War.

The defining sign of kwashiorkor in a malnourished child is pedal edema (swelling of the feet). Other signs include a distended abdomen, an enlarged liver with fatty infiltrates, thinning hair, loss of teeth, skin depigmentation and dermatitis. Children with kwashiorkor often develop irritability and anorexia.

Victims of kwashiorkor fail to produce antibodies following vaccination against diseases, including diphtheria and typhoid. Generally, the disease can be treated by adding protein to the diet; however, it can have a long-term impact on a child's physical and mental development, and in severe cases may lead to death.



In dry climates, marasmus is the more frequent disease associated with malnutrition. Another malnutrition syndrome includes cachexia, although it is often caused by underlying illnesses. These are important considerations in the treatment of the patients.

There are various explanations for the development of kwashiorkor and the topic remains controversial. It is now accepted that protein deficiency, in combination with energy and micronutrient deficiency, is necessary but not sufficient to cause kwashiorkor. The condition is likely due to deficiency of one of several types of nutrients (e.g., iron, folic acid, iodine, selenium, vitamin C), particularly those involved with anti-oxidant protection. Important anti-oxidants in the body that are reduced in children with kwashiorkor include glutathione, albumin, vitamin E and polyunsaturated fatty acids. Therefore, if a child with reduced type one nutrients or anti-oxidants is exposed to stress (e.g. an infection or toxin) he/she is more liable to develop kwashiorkor.

Nutritional ignorance can be a cause. Dr. Latham, director of the International Nutrition Program at Cornell University cited a case where parents who fed their child cassava failed to recognize malnutrition because of the edema caused by the syndrome and insisted the child was well-nourished despite the lack of dietary protein.

One important factor in the development of kwashiorkor is aflatoxin poisoning. Aflatoxins are produced by molds and ingested with moldy foods. They are toxified by the cytochrome P450 system in the liver, the resulting epoxides damage liver DNA. Since many serum proteins, in particular albumin, are produced in the liver, the symptoms of kwashiorkor are easily explained. It is noteworthy that kwashiorkor occurs mostly in warm, humid climates that encourage mold growth.

Protein should be supplied only for anabolic purposes. The catabolic needs should be satisfied with carbohydrate and fat. Protein catabolism involves the urea cycle, which is located in the liver and can easily overwhelm the capacity of an already damaged organ. The resulting liver failure can be fatal. This means in patients suffering from kwashiorkor, protein must be introduced back into the diet gradually.

In a study of twins from Malawi, kwashiorkor affected one twin in 50% of a study group, but both twins only 7% of the time. When gut bacteria from the twins were transplanted into germ-free mice, the mice receiving bacteria from affected twins lost more weight on a typical Malawian diet consisting largely of corn flour and water with some vegetables. It was speculated that transplantation of fecal bacteria may help affected children.

References

1. ^ [a] [b] Ciliberto, H.; Ciliberto, M; Briend, A; Ashorn, P; Bier, D; Manary, M (2005). "Antioxidant supplementation for the prevention of kwashiorkor in Malawian children: Randomised, double blind, placebo controlled trial". *BMJ* **330** (7500): 1109. doi:10.1136/bmj.38427.404259.8F. PMC 557886. PMID 15851401.
2. ^ Liu, Theodore; Howard, Renée M.; Mancini, Anthony J.; Weston, William L.; Paller, Amy S.; Drolet, Beth A.; Esterly, Nancy B.; Levy, Moise L. et al (2001). "Kwashiorkor in the United States: Fad Diets, Perceived and True Milk Allergy, and Nutritional Ignorance". *Archives of Dermatology* **137** (5): 630–6. PMID 11346341.
3. ^ Williams, Cicelyd. (1935). "Kwashiorkor". *The Lancet* **226** (5855): 1151. doi:10.1016/S0140-6736(00)94666-X.
4. ^ "Jamaica Gleaner : Pieces of the Past: A Pioneer, A Survivor: Dr. Cicely Williams". *"... she asked an African nurse if it had a name. She learned it was called "kwashiorkor" meaning the sickness the older child gets when the next baby is born. Cicely surmised that this meant that weanling children were not receiving enough to eat"*. Retrieved 2009-12-27.
5. ^ "Merriam Webster Dictionary". Retrieved 2009-04-05.
6. ^ Pretorius, PJ; De Villiers, LS (1962). "Antibody response in children with protein malnutrition". *The American journal of clinical nutrition* **10**: 379–83. PMID 14037411.
7. ^ "Mortality and Burden of Disease Estimates for WHO Member States in 2002" (xls). *World Health Organization*. 2002.
8. ^ Krawinkel, M (2003). "Kwashiorkor is still not fully understood". *Bulletin of the World Health Organization* **81** (12): 910–1. PMC 2572384. PMID 14997244.
9. ^ Jones, Nicola (2011). "Do gut bacteria worsen malnourishment?". *Nature*. doi:10.1038/news.2011.151