The cornea in kwashiorkor

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Abstract:

The resistance of the cornea to infection is lowered in Kwashiorkor. There is more morbidity of the cornea among children who have been malnourished. Thus among 1,000 well-nourished children examined, there were only 2 (0.2%) children with corneal opacity, whereas among 200 children who were being treated for Protein-Calorie Malnutrition 4 (2%) had corneal lesions. The lowering of resistance of the cornea to infection must be explained on the basis of the histopathological change brought about by the state of malnutrition. In the main, this change affects the corneal epithelium. Furthermore clinical observation suggests that humoral defense reaction is impaired in Kwashiorkor. The eye has poor inflammatory vascular response in the presence of a severe corneal ulcer. The normal corneal epithelium acts as a defense barrier against bacterial infection by imperviousness of its cells. With the exception of gonococci, diphtheria bacilli, and viruses, the intact corneal epithelium is impervious to bacterial toxins ordinarily present. But in Kwashiorkor this barrier is weakened, as the corneal epithelium is thinned by atrophy, the cells are abnormal and may be keratinized. Epithelial abrasions, which commonly occur in severe Kwashiorkor, may permit the entry of bacteria, thus rendering the cornea more liable to infection. Vitamin A deficiency is probably not the main aetiologial factor in the pathogenesis of the corneal abnormality in Kwashiorkor children in Mulago. Primary Vitamin A deficiency is known to be rare in the native population in Uganda. The diet of even the poorer people contains adequate amount of the provitamin, mainly from green vegetables and fruits. Even in Kwashiorkor, the clinical manifestations of Vitamin A deficiency is rare. In this study no child with the authentic signs of Vitamin A deficiency was seen, nor did the estimations of serum carotenes indicate a severe deficiency state. Other workers in Mulago have stressed the rarity of Vitamin A deficiency. Similar observations have been made elsewhere in Tropical Africa. However, secondary Vitamin A deficiency occurs in Kwashiorkor, but the levels are not so low as to cause a clinical deficiency state. It has been observed that levels of Serum Vitamin A and Carotenoids must be virtually at zero or very low before its classical deficiency state Occurs. The histopathological changes observed in the cornea of Kwashiorkor children in Mulago cannot therefore be explained on the basis of Vitamin A deficiency alone. In the past the corneal changes in malnutrition, namely Xerosis Corneae and Keratomalacia have been attributed to Vitamin A deficiency alone. But the evidence for this is not convincing. These conditions were first described in areas where primary Vitamin A deficiency occurs, so that severe Vitamin A deficiency was a prominent feature of the state of malnutrition. In spite of the almost invariable presence of protein deficiency in all the cases, it is not clear why undue emphasis had always been made on Vitamin A. Although the eye lesions in malnutrition have for long been attributed to Vitamin A deficiency alone, it is becoming more generally considered as a multiple deficiency syndrome. Because of the relative unimportance of Vitamin A deficiency, it is postulated here that the primary aetiologial factor in the pathogenesis of the histopathological change in the cornea in Kwashiorkor children in Mulago is protein deficiency, with Vitamin A deficiency playing a secondary role. Protein is the body-building material and in its severe deficiency state, the growth of the body is arrested generally. This postulate is further
borne out by the fact that the condition of the eyes improves on dietary treatment of high protein value alone without Vitamin A supplement. In Uganda a child is more likely to develop protein deficiency but have an adequate intake of the easily available carotenes. There must be in the population a wide spectrum of protein malnutrition ranging from subclinical to frank Kwashiorkor and Nutritional Marasmus. Consequently there must be a large number of children whose corneae have been rendered less resistant to a variable extent by a state of protein malnutrition. This would explain why in underdeveloped countries measles causes so much blindness among children.