Childhood blindness in Tanzania

In many parts of Africa, including Tanzania, measles is considered the principal cause of childhood blindness. In poor environments, vitamin A deficiency is common, and measles increases the susceptibility to vitamin A deficiency. The relationship between measles and vitamin A deficiency is sold as a result of the vitamin A requirements for proper immune function and for the production of antibodies. In areas where vitamin A deficiency is common, measles is often associated with a characteristic xerophthalmia, which is characterized by a dry, red, inflamed eye. This condition can lead to blindness if left untreated.

CAUSE OF MEASLES BLINDNESS

During measles infection, the virus replicates in the corneal epithelium, producing red, inflamed eyes, and causing many children to keep their eyes closed. However, healthy and well-nourished children in developed countries do not develop corneal ulceration and necrosis. What then is responsible for the severe ocular damage in African children? Several factors have been suggested.

• Vitamin A deficiency: One of the strongest candidates is vitamin A deficiency. Severe vitamin A deficiency results in corneal ulceration and necrosis. What then is responsible for the severe ocular damage in African children? Several factors have been suggested.

• Vitamin A status: The picture amongst Tanzanian children appears to be similar. In a review of the pediatric wards at Muhimbili, Kinsho and Sommer did not find any cases, that day, on the measles ward, but found some children with corneal destruction who had recently experienced an episode of measles (9). Some Indonesian children presenting with severe measles already had corneal ulceration. Others developed corneal destruction 2-4 weeks later, in association with a deterioration in their general nutritional status. All had severely depressed vitamin A levels. Most were also protein deficient, which also impairs vitamin A metabolism.

• The high prevalence of measles in Tanzania is associated with a high prevalence of vitamin A deficiency. This association is not necessarily causal, but it suggests that vitamin A deficiency is a risk factor for measles blindness.

RECOMMENDATIONS

In February 1981, a first national seminar on the problem of vitamin A deficiency in Tanzania was held at the Institute of Nutrition, Dar es Salaam. It drew participants from the Tanzania Food and Nutrition Centre, Muhimbili Medical Centre, Regional Ophthalmologists (AMOs) from Dodoma, Arusha and Iringa and representatives from the Ministries of Health and Agriculture. The seminar discussed the problems of vitamin A nutrition, its relation to various diseases in particular measles, and made recommendations on launching vitamin A deficiency control measures.

Given the serious nature of the problem, the Vitamin A Coordinating Committee decided it requires urgent investigation.
Two lines of inquiry were suggested: try and determine whether vitamin A and protein deficiency, or other factors were responsible for measles blindness; and attempt to document the presence or absence of xerophthalmia in Tanzania.

Measles Blindness: It was proposed that all children admitted to Muhimbili have a careful eye examination, and be followed regularly for up to one month. Those who develop typical corneal ulceration and matched controls, would be intensively studied. Parameters of concern include vitamin A and protein status; general systemic status (malaria, tuberculosis); severity of measles; presence of herpes virus; etc.

The results would be compared with children of similar age, sex, and measles severity but without corneal ulcers. Similarly though simpler studies on measles cases in Mwanza would confirm or disprove the belief that regional variations exist. Results would be further confirmed by a therapeutic/diagnostic trial of the use of vitamin A.

Children with corneal ulcers, and age/sex controls with normal corneas admitted to the general pediatric wards at Muhimbili will be studied in similar fashion, since many of the blinding cases present after the acute measles episode have subsided.

Xerophthalmia: Given the strong suggestions that vitamin A deficiency is at the heart of the problem, it was decided to undertake a relatively simple search for pure xerophthalmia before deciding to launch a detailed survey. All AMO-Ophthalmologists would attend a short training seminar in the recognition of xerophthalmia. For one year, they would examine, once a week, all children hospitalised with malnutrition, keeping a simple record of the numbers examined.

All children found to have xerophthalmia, of whatever severity, would have their age, sex, clinical changes and measles-history recorded. The absence of xerophthalmia cases in a particular hospital does not prove xerophthalmia is absent from that region, since cases might simply not come to the hospital. But identification of large numbers of cases would suggest that a serious problem of vitamin A deficiency exists in the region, requiring further investigation and attention.

GOALS

The major results of both studies should provide sufficient information to answer two basic questions, both for Tanzania and Africa as a whole: is vitamin A deficiency the mechanism by which measles results in blindness, and is xerophthalmia an important problem in its own right. The sooner these studies get underway the better; and the sooner the questions are answered, the sooner the number of children who will continue to be blinded each year.

REFERENCES:
