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Photo essay

Keratomalacia following malnutrition in an infant

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Abstract *Keratomalacia is a potentially blinding disease that is irreversible in most cases. It is rare in infants under six months especially in the developing countries. Proper parental counseling and education about maternal health, management of malnutrition and prompt ophthalmic intervention in the target population determines the overall visual outcome.*

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Vitamin A deficiency (VAD) due to malnutrition is endemic in developing countries such as southeast Asia and sub-Saharan Africa, where it is a leading cause of childhood blindness.[1,2,3] VAD accounts for 19-26% of visual impairment due to corneal blindness. Over five million children develop xerophthalmia annually and one fourth of these become blind. Keratomalacia following severe VAD, seen at 3 to 4 years of age, is mostly associated with underlying malnutrition due to poor weaning patterns, inadequate breast feeding, measles infection, etc.,. An increased incidence of VAD in infants younger than 6 months could be attributed to higher occurrence of diarrhea in non–breast-fed infants (2.3 times) when compared to the breast-fed infants.[4,5,6] Systemic events in the form of pneumonia, diarrhea, jaundice, vomiting, and septicemia may also precipitate in VAD. This condition is rare in the developed countries due to focus on a balanced diet and nutritional measures by the authorities. Although other contributors may be mal-absorption of vitamin A and its transport and storage which may develop following gastrointestinal surgery, malabsorption syndrome and dietary factors.[7] Vitamin A supplementation of lactating mothers (a single megadose of 209 mmol of retinol) and infants at the time of Diphtheria, pertussis and tetanus (DPT) and oral polio immunization {at 6, 10 and 12 weeks} along-with exclusive breastfeeding seem to be effective measures of addressing VAD in infancy.[8] The study showed apparently more benefit of this regimen in the Indian cohort.9 The benefit may be extended to the developing countries where the infectious causes of childhood mortality and morbidity are quite common . Lack of immunization and malnutrition in these countries also predisposes children to keratomalacia.[9,10]

A one and half month-old infant immunized for age developed bilateral keratomalacia, more severe in the right eye (OD) following an episode of diarrhea (Figure 1a-1b). Response to light with eye closure was evident. The infant had severe acute malnourishment (mid arm circumference-104 mm and weight for length {WFL} z score was less than -3). Right eye had a corneal abscess and the left eye (OS) had a near total corneal haze accompanied-with a central 1.5 x 1.5 mm ulcer. Pupil OS was circular and sluggish reactions. Ultrasound B-scan showed an anechoic posterior segment. Conjunctival swab specimen retrieved for culture studies demonstrated numerous pus cells without any microorganism. Immediate pediatric referral was sought and prompt administration of oral vitamin A 50,000 IU (day 0,1 and 14), oral antibiotics, topical administration of tobramycin and cefazoline (broad spectrum antibiotics) eye drops on hourly basis with a cycloplegic (Atropine eye ointment 1%) initiated. After 14 days, cornea OD appeared hazy however the cornea OS cleared significantly (Figure

Figure 1: (1a)-(1f): *Sequential patient photographs The infant developed bilateral keratomalacia with a corneal abscess in the right eye* ***(1a)*** *and 1 x 1 mm corneal ulcer with accompanying corneal haze in the left eye* ***(1b)****. After treatment with oral vitamin A, topical and systemic antibiotics, cycloplegic and lubricants, the congestion had disappeared, the corneal infiltrate significantly reduced in the right eye* ***(1c)*** *and the ulcer healed in the left eye* ***(1d****) by 3 weeks. Two weeks later, right eye showed a vascularized corneal opacity that started to form with absence of staining with fluorescein dye* ***(1e)*** *and the left eye demonstrated a infero-central 1 x 1 mm corneal opacity* ***(1f)****.*

1c, 1d). Another week later, the congestion had disappeared and the ocular surface appeared dry supporting our primary diagnosis of VAD (Figure 1e, 1f). Gradually, over a period of 4weeks, the ocular surface appeared wet and ulcers in both eyes healed on medical management, hence, evading the need for urgent keratoplasty. The child is kept on follow-up for monitoring visual acuity, fixation behavior and waitlisted for keratoplasty on a priority basis to prevent deep recalcitrant amblyopia. Exclusive breast feeding (EBF) was encouraged.

It is worthy to note that corneal transplantation in pediatric eyes is difficult with increased chances of graft failure. Optical iridectomy is a reasonably useful option in cases where penetrating keratoplasty is difficult.As seen presently, sometimes medical management may suffice in preventing urgent keratoplasty. Although prompt treatment is administered in cases presenting early, overall outcome remains poor and is worsened by the development of recalcitrant amblyopia. Keratomalacia remains an issue of major public health importance. Focus on EBF practices, maternal health along-with appropriate parental counseling may improve overall outcome and avert potentially blinding sequel. The current case is being reported to emphasize on the importance of urgent ophthalmic and systemic management of such serious conditions in infants.

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