



Inadequate Intake of Vitamin A Deficiency and their Supplementation in Eye Diseases

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DESCRIPTION

Xerophthalmia is a spectrum of eye diseases caused by severe Vitamin A Deficiency (VAD). Vitamin A is essential for the normal function and maintenance of the eye, especially the conjunctiva, cornea and retina. VAD can lead to dryness, inflammation, ulceration and scarring of the eye tissues, resulting in impaired vision and blindness. Xerophthalmia is one of the leading causes of preventable blindness in developing countries, affecting millions of children and pregnant women. The main cause of VAD is insufficient intake of vitamin A from dietary sources. Vitamin A is a fat-soluble vitamin that can be obtained from animal products such as fish, liver, poultry, meat, eggs and dairy products. These foods contain retinol, the active form of vitamin A that can be readily absorbed and utilized by the body. Vitamin A can also be derived from plant sources such as green leafy vegetables, yellow and orange fruits and vegetables, and red palm oil. These foods contain beta-carotene, a precursor of vitamin A that can be converted into retinol in the intestine. However, this conversion is inefficient and depends on several factors such as dietary fat, zinc and iron status.

In addition to inadequate intake, VAD can also result from impaired absorption or metabolism of vitamin A due to various diseases or conditions that affect the pancreas, liver or intestine. These include chronic diarrhea, intestinal parasites, inflammatory bowel disease, cystic fibrosis, celiac disease and gastric bypass surgery. Furthermore, VAD can be exacerbated by infections or inflammation that increase the demand for vitamin A or reduce its availability. For example, measles, respiratory infections, malaria and HIV/AIDS can worsen VAD and its consequences.

The risk factors for VAD and xerophthalmia are mainly related to poverty, malnutrition and poor sanitation. Children under five years of age are particularly vulnerable because they have high requirements for vitamin A for growth and development, but often have limited access to vitamin A-rich foods. Pregnant

and lactating women are also at risk because they need extra vitamin A for fetal and infant health. Other groups that may be susceptible to VAD include elderly people, alcoholics, vegetarians and vegans. The symptoms of xerophthalmia vary depending on the severity and duration of VAD. The earliest sign of VAD is night blindness, which is the inability to see in dim light due to reduced production of rhodopsin, a light-sensitive pigment in the retina. Night blindness can impair daily activities such as walking, driving and reading. If VAD persists, it can cause dryness and thickening of the conjunctiva (the membrane that covers the white part of the eye), leading to a condition called "Xerosis" that can make the eyes more prone to irritation and infection. As VAD progresses, it can affect the cornea (the transparent layer that covers the front of the eye), causing white spots or patches called Bitot's spots. These are deposits of keratinized epithelial cells that reflect light and impair vision. Bitot's spots are usually reversible with vitamin A supplementation. However, if left untreated, they can lead to corneal ulceration (erosion of the corneal surface) or keratomalacia (softening and liquefaction of the cornea). These are serious complications that can result in perforation of the eye globe, infection, scarring and blindness.

CONCLUSION

VAD can also damage the retina (the layer of nerve cells that converts light into electrical signals) by causing degeneration or detachment of the photoreceptors (the cells that sense light). This can lead to reduced visual acuity (sharpness), color vision defects or complete loss of vision. The diagnosis of xerophthalmia is based on clinical signs and symptoms as well as measurement of serum retinol levels. Serum retinol levels below 0.7 micromol/L indicate VAD, while levels below 0.35 micromol/L indicate severe VAD associated with xerophthalmia. Other tests that may be performed include conjunctival impression cytology (a technique that examines the cells scraped from the conjunctiva).

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