

Recurrent Xerophthalmia Associated with Vitamin A Deficiency Following Malnutrition Secondary to Bariatric Surgery

David Santiago G Castillejos, Abraham Paez, Ricardo Mata and David Castillejos*

Castillejos Eye Institute, San Diego, California, USA

*Corresponding Author: David Castillejos, Castillejos Eye Institute, San Diego, California, USA.

DOI: 10.31080/ASOP.2023.06.0639

Received: November 14, 2022

Published: April 18, 2023

© All rights are reserved by David Santiago G Castillejos, et al.

Abstract

Case Report and Methods: We report the case of a 55 year old male with a history of bariatric surgery in the year 2008, who presented to our clinic with complaints of gradual decrease in vision affecting both eyes. We found severe SPK in both eyes, corneal abrasion OD, dense cataracts and evidence of PRP for PDR. After optimization of the corneal surface, cataract surgery was performed OD. 1 week after cataract surgery, his right eye examination revealed severe superficial keratopathy, corneal edema, and a corneal erosion. Results: Vitamin A levels revealed severe vitamin A deficiency with a value of <2.5 ug/dl (normal levels: 20.1-62.0 ug/dl). The patient was managed with Vitamin A 20,000 units daily by mouth and Vitamin C, 1 g by mouth BID. His management also included hydrophilic contact lens with high O₂ permeability and PROKERA. The ocular surface health was successfully re-established after 25 days of treatment. Patient's BCVA improved from CF/4ft to 20/40 (OD). Conclusion: Physicians caring for patients with vitamin A deficiency should intentionally look for ophthalmological manifestations. In bariatric surgery, particular attention should be paid to clinical manifestations of vitamin deficiencies and other clinical and laboratory data indicating malnutrition.

Keywords: Bariatric Surgery; Xerophthalmia; Vitamin Deficiencies; Ocular Surface; Vitamin A

Abbreviations

SPK: Superficial Punctate Keratopathy; PRP: Panretinal Photocoagulation; PDR: Proliferative Diabetic Retinopathy; VA: Visual Acuity; CF: Count Fingers; SLE: Slit Lamp Examination; CDE: Cumulative Dissipated Energy; POD: Postoperative Day; BCVA: Best Corrected Visual Acuity; PF: Preservative Free; IOL: Intraocular Lens

Introduction

In the last 5 years, bariatric surgery has become the most popular type of surgery performed and is considered the only effective way of weight loss therapy in morbidly obese patients, i.e. body mass index >35. However, macronutrient deficiencies and malnutrition are common after most bariatric procedures and thus,

“pre and postoperative nutritional assessment and management are advised” [5]. Furthermore, we aimed to identify diagnostic and therapeutic measures that can prevent those complications. Restrictive bariatric surgery, such as “gastric banding” and “sleeve gastrectomy”, can be associated with vitamin deficiencies; and iron, folate, vitamin B1, B12, A and D deficiencies are associated with procedures that favor malabsorption, such as biliopancreatic diversion, duodenal switch and Roux-en-Y gastric bypass. Due to possible metabolic and surgical complications after bariatric surgery, patients need to undergo life-long medical and dietetic surveillance [3]. As a fat-soluble vitamin, 90% of Vitamin A is stored in the liver and may take up to 2 years for signs of deficiency to appear. Its prevalence in the developed world is expected to continue to increase as a result of the rising frequency of bariatric

surgery, cirrhosis, and extensive bowel resections. Vitamin A is an important nutrient for the normal function of the retina [1,2]. Vitamin A can be present in different forms that include retinol, retinal, and several pro vitamin A carotenoids. Vitamin A has multiples functions: it is important for growth and development, for the maintenance of the immune system, and for visual health. Vitamin A is fundamental for the retina’s visual cycle in the form of retinal, which combines with the protein opsin to form rhodopsin, the light-sensitive molecule necessary for low-light vision (scotopic vision) and it is also necessary for the other visual pigments responsible for photopic vision. Vitamin A plays a key role in the maintenance of the corneal and conjunctival epithelium. Vitamin A deficiency results in loss of mucus production by goblet cells, which in turn leads to decreased hydration and compromised ocular surface. The damaged epithelium is replaced by keratinized epithelium with atypical organization, which results in the development of superficial punctate keratopathy and corneal xerosis

Materials and Methods

The patient is a 55 year old hispanic male who presented to our clinic with complaints of gradual decrease in vision affecting both eyes. We found severe SPK in both eyes, corneal abrasion OD, dense cataracts and evidence of PRP for PDR. His medical history includes: Bariatric surgery (gastric bypass in 2008) diabetes mellitus type 2 (diagnosed in 1990) and Covid-19 (July 2020). His ocular history was significant for proliferative diabetic retinopathy with PRP, dry eye syndrome, SPK, episodes of recurrent corneal edema and recurrent corneal erosions at least since February 2020 with no other associated factors. On eye examination at presentation, his best corrected visual acuity was 20/200 in the right eye and 20/200 in the left eye. Slit lamp examination (SLE) revealed superficial punctate keratopathy 3+ in both eyes and nuclear cataracts N4 (LOCS III) in both eyes. Funduscopic exam: PRP for PDR with secondary optic pallor OU. Pachymetry OD 722, OS 682. After optimization of the corneal surface cataract surgery was scheduled OD and the patient underwent uneventful cataract surgery of the right eye on 8-03-21 (CDE 5.61, 10 min surgery). On his POD # 1 the exam was within parameters expected for first postop day (in patient with history of PDR), however, 1 week after cataract surgery he presented to our institution with complaints of blurred vision, pain, and tearing.

Results and Discussion

On eye exam: POD#1: OD VA 20/40. OS 20/70. OD: The cornea was clear and the anterior chamber deep with 1-2 + cells. IOL in the bag and in good position. One week after his cataract surgery, the patient presented to the clinic with a BCVA of CF/4ft (OD) and 20/60 OS (BCVA). Slit lamp examination revealed: OD severe diffuse superficial punctate keratopathy Figures 1 and 2, tear break-up time of 3 seconds, corneal edema, and corneal erosion. OS: stable. Fundoscopic evaluation showed PRP for PDR OU and secondary optic pallor, which was stable (aside from the fact that the view was limited due to corneal abnormalities OD). OS was stable. Since the patient had a history of dry eye syndrome with previous episodes of corneal edema and corneal erosions before any ocular surgery (with nonspecific treatment), laboratory tests were requested, including vitamin A levels. Lab Results and treatment The diagnosis of Vitamin A deficiency was supported by a value <2.5 ug/dl (normal range 20.1-62.0). We started treatment with preservative free artificial tears (PF) every hour, lifitegrast, ophthalmic solution 5% BID, ciprofloxacin QID eyedrops, loteprednol BID, Vitamin C 1 g BID by mouth, Vitamin A 20,000 units daily by mouth. Management also included hydrophilic contact lens with high O₂ permeability and PROKERA. One month after initial treatment, the patients examination showed no corneal edema or corneal erosion Figure 3. The visual acuity improved from CF/4ft to 20/40 OD. In subsequent examinations the vision and corneal surface have remained stable. OS remained stable.

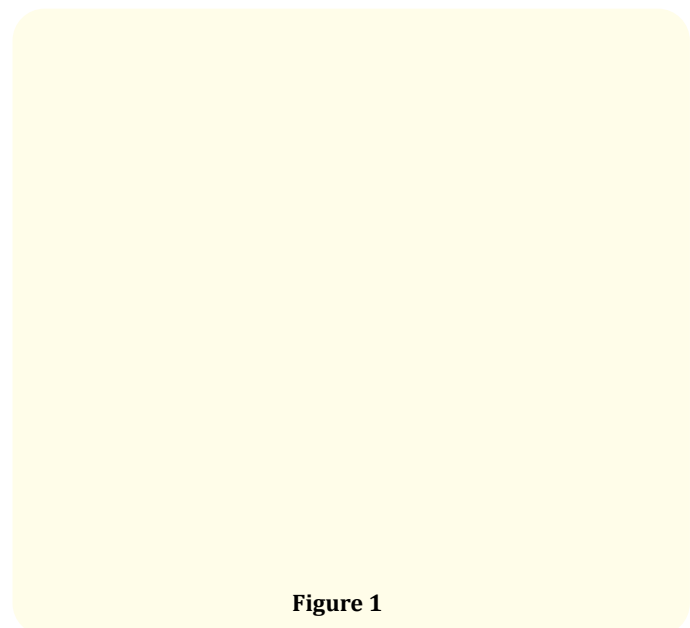


Figure 1



Figure 2



Figure 4



Figure 3

Conclusion

Visual outcomes of unrecognized and untreated xerophthalmia secondary to vitamin A deficiency can be devastating. Clinical suspicion of vitamin A deficiency in certain patient populations, such as those having undergone bariatric surgery or significant colon resection is warranted [4]. Once vitamin A deficiency is diagnosed, aggressive treatment should be started to protect the ocular surface with topical antibiotics, ocular surface lubrication, and anti-inflammatory drugs; the vitamin A deficiency should be addressed with a multidisciplinary approach.

Conflict of Interest

No

Bibliography

1. Marques Natalia Ponte Nogueira., *et al.* "Evaluation of the ocular surface following bariatric surgery". *Arquivos Brasileiros De Oftalmologia* 80.4 (2017): 247-251.
2. Stroh, Christine., *et al.* "Metabolic surgery and nutritional deficiencies". *Minerva Chirurgica* 72.5 (2017): 432-441.
3. Reed Donovan Stephen., *et al.* "Case Report of Recurrent Xerophthalmia Associated with Vitamin A Deficiency Secondary to Lipid Malabsorption Following Extensive Colon Resection" (2018). *Vitam Miner* 7 (3):179.
4. Mohapatra Sonmoon., *et al.* "Malnutrition in obesity before and after bariatric surgery". *Disease-a-Month: DM* 66.2 (2020): 100866.