

# Vitamin A Deficiency in an Elderly Patient: A Diagnostic Challenge in the Age of AMD

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**Abstract:** The presentation of vitamin A deficiency (VAD)-induced ocular complications can be challenging to diagnose in elderly patients, particularly due to the overlap with age-related macular degeneration (AMD) symptoms. This case report details the presentation, diagnosis, and management of an 88-year-old female with vision loss, highlighting the ocular manifestations of presumed VAD. Despite vitamin A levels being at the lower end of the normal range, the patient's symptoms and spectral domain optical coherence tomography (SD-OCT) findings suggested insufficient levels, leading to thinning of the outer nuclear layer. This case underscores the necessity of considering VAD in differential diagnoses of unexplained vision impairment, particularly in individuals with a history of intestinal malabsorption, while also emphasizing the importance of distinguishing VAD from AMD in elderly patients.

**Keywords:** vitamin A deficiency, malabsorption syndrome, age-related macular degeneration

## Introduction

Vitamin A deficiency (VAD) remains a significant public health concern globally, affecting millions, particularly in low and middle-income countries.<sup>1</sup> It is one of the leading causes of preventable blindness in children and can contribute to severe visual impairment and ocular diseases in adults.<sup>2</sup> Recent studies indicate that VAD can also impact individuals in developed countries, especially those with malabsorption syndromes, chronic liver diseases, or those following restrictive diets.<sup>3</sup>

Vitamin A plays a crucial role in maintaining ocular surface health through its involvement in mucus production, and its deficiency can lead to various ocular manifestations.<sup>4</sup> The spectrum of eye diseases associated with VAD, collectively termed xerophthalmia, ranges from night blindness and conjunctival xerosis to keratomalacia, potentially resulting in irreversible blindness.<sup>5</sup>

Diagnosing VAD in elderly patients presents unique challenges, particularly due to the potential overlap of symptoms and findings with age-related macular degeneration (AMD).<sup>6</sup> Recent advances in imaging technologies, such as short-wavelength autofluorescence (SW-AF), near-infrared autofluorescence (NIR-AF), and spectral domain optical coherence tomography (SD-OCT), have become invaluable in distinguishing between VAD and other retinal conditions like AMD.<sup>7</sup>

## Case Presentation

An 88-year-old woman presented with gradual vision loss not accounted for by her measured visual acuity. Her medical history was significant for an intestinal resection two decades prior. A detailed examination through SD-OCT revealed marked thinning of the outer nuclear layer (ONL) and irregularities in the interdigitating and ellipsoid zones, indicative of retinal damage potentially related to VAD.

Her dietary history revealed insufficient intake of vitamin A-rich foods. Blood tests showed vitamin A levels at 20 µg/dL (reference range: 20–80 µg/dL), supporting a diagnosis of subclinical VAD. This nuanced presentation highlights the complexity of diagnosing VAD, where clinical manifestations can precede laboratory abnormalities.

The patient was started on oral vitamin A supplementation (10,000 IU daily) and advised to increase dietary intake of vitamin A-rich foods. Follow-up was scheduled for 4 weeks post-treatment initiation to reassess symptoms and serum vitamin A levels.

## Discussion

The pathophysiology of VAD-related ocular disease involves disruption of the visual cycle, leading to photoreceptor dysfunction and death.<sup>8</sup> Retinal changes, as noted in the patient's SD-OCT, are characteristic of VAD and can progress to irreversible damage if not addressed timely. Recent literature emphasizes the need for a multidisciplinary approach to manage such patients, involving dietitians, primary care physicians, and ophthalmologists.<sup>9</sup>

Distinguishing VAD from AMD in elderly patients is crucial for appropriate management. While both conditions can present with vision loss and retinal changes, certain OCT findings can help differentiate between the two. In our case, the presence of ONL thinning and irregularities in the interdigitating and ellipsoid zones, without the characteristic drusen formation seen in AMD, pointed towards VAD.<sup>10</sup>

The consensus on treatment revolves around correcting the deficiency through dietary modification and supplementation. High-dose oral vitamin A supplementation is recommended for severe cases, with guidelines suggesting specific dosages based on the severity of the deficiency and the patient's age.<sup>11</sup>

This case highlights the critical role of early recognition and treatment of VAD to prevent ocular complications. It also stresses the need to regularly monitor at-risk populations, including those with gastrointestinal disorders affecting nutrient absorption.

This case report has several limitations. First, we were unable to perform SW-AF or NIR-AF imaging, which could have provided additional insights into the differential diagnosis. Second, the long-term follow-up data is not yet available, limiting our ability to assess the full impact of vitamin A supplementation on the patient's visual function and retinal structure.

## Conclusions

This case report illustrates the subtle presentation of VAD leading to ocular dysfunction in an elderly patient and emphasizes the importance of a thorough dietary and medical history in patients with unexplained visual symptoms. It also highlights the diagnostic challenge of differentiating VAD from AMD in this age group. Prompt diagnosis and treatment of VAD are crucial to prevent permanent visual impairment, underscoring the need for healthcare providers to be aware and vigilant, especially in patients with risk factors for malabsorption.

## Ethical Statement

This case report was conducted in accordance with the Declaration of Helsinki. The collection and evaluation of all protected patient health information were performed in a HIPAA (Health Insurance Portability and Accountability Act)-compliant manner.

## Informed Consent Statement

The patient provided informed consent for diagnosis, treatment, and follow-up, as per the standard of care in the United States. Written informed consent for the publication of details was obtained from the patient. Institutional approval was not required to publish the case details.

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## Disclosure

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