Journal of the
Bahrain Medical Society

Tareq N et al., J Bahrain Med Soc. 2021;33(3):46-48

CASE REPORT

Alport Syndrome: The Eye as a Window to the Human Body

Aysha Tareq Nusef[1*], Abdulla Almoosa[2], Wael Wagih Aly[3]

[1]Ophthalmology Senior House Officer, Department of Ophthalmology, King Hamad University Hospital, Kingdom of Bahrain.

[2]Ophthalmology Registrar, Department of Ophthalmology, King Hamad University Hospital, Kingdom of Bahrain.

[3]Ophthalmology Consultant and Head of the Department, Department of Ophthalmology, King Hamad University Hospital, Kingdom of Bahrain.

***Corresponding author:**
Aysha Tareq Nusef, Ophthalmology Senior House Officer, Department of Ophthalmology, King Hamad University Hospital, Kingdom of Bahrain. E-mail: sh-aisha@hotmail.com

Received date: February 3, 2021; **Accepted date:** July 11, 2021; **Published date:** September 30, 2021

Abstract

Alport syndrome (AS) is a rare genetic disease affecting type four collagen production, causing renal, auditory, and ophthalmic manifestations. This case report is about a 32-year-old male who was a known case of renal insufficiency and secondary hypertension and was referred to the ophthalmology department due to blurred vision. Based on the patient's history and ophthalmological findings, AS was diagnosed. Ophthalmic examination showed anterior lenticonus associated with sensorineural hearing loss (SNHL) and impaired renal function. This clinical case report sheds light on the role of ophthalmology in diagnosing AS.

Keywords: Collagen, Crystalline lens, Hereditary nephritis, Ophthalmology, Renal insufficiency, Sensorineural hearing loss

Introduction

Alport syndrome (AS) is an X-linked genetic disorder caused by the lack of a significant element of the cellular basement membrane which is collagen type four. The typical phenotype is linked to basement membrane mutation of the glomerulus, cochlea, cornea, lens capsule, and retina.[1-4] This disorder is a triad of sensorineural hearing loss (SNHL), renal impairment, and ocular manifestations. Ocular involvement includes anterior lenticonus that is a cone-shaped elevation of the anterior lenticular interface, posterior polymorphous corneal dystrophy, and fleck retinopathies.[1,2,5,6]

Case Presentation

A 32-year-old male who was a known case of end stage renal disease and secondary hypertension presented to the ophthalmology clinic at King Hamad University Hospital with bilateral gradual, progressive painless diminution of vision which required frequent changing of eyeglass prescription. On examination, there was bilateral oil droplets reflex (Figure 1) associated with anterior lenticonus (Figures 2 & 3). Fundus examination showed grade 3 hypertensive changes with macular edema. Visual acuity wasn't improving with subjective refraction, although objective refraction was showing high

myopia despite the normal axial length on A-scan (23 mm).

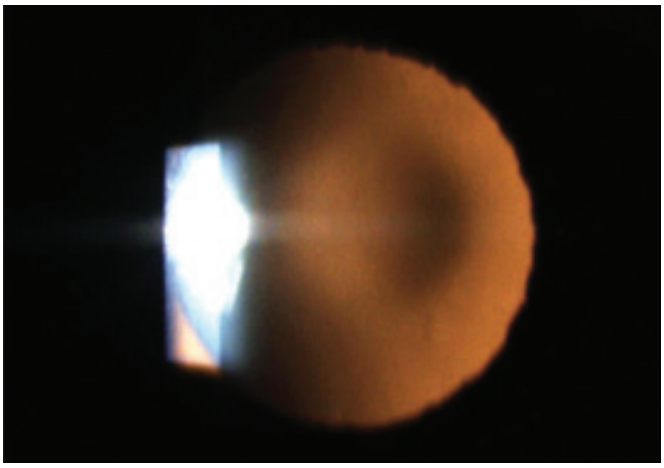

Figure 1: Oil droplet reflex

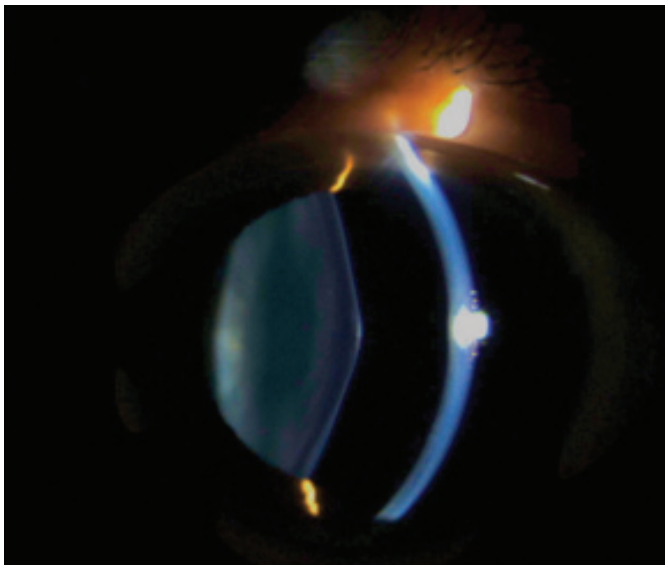

Figure 2: Slit lamp photo showing anterior lenticonus

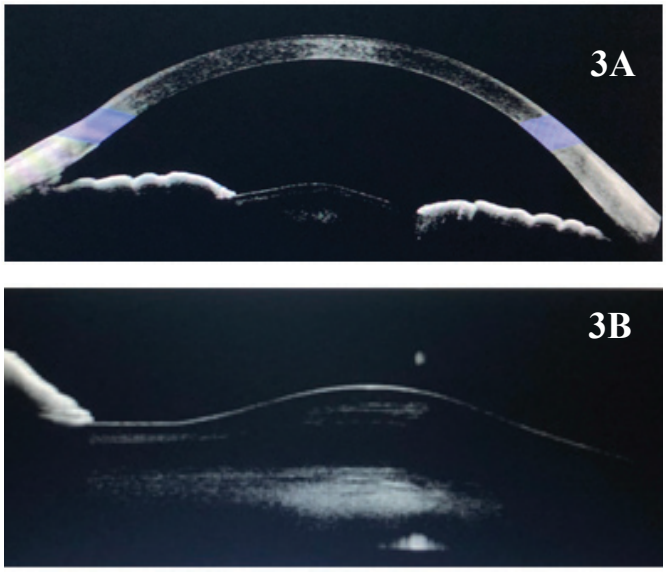

Figure 3: (A) Anterior segment optical coherence tomography showing anterior lenticonus, (B) Magnified image of anterior lenticonus

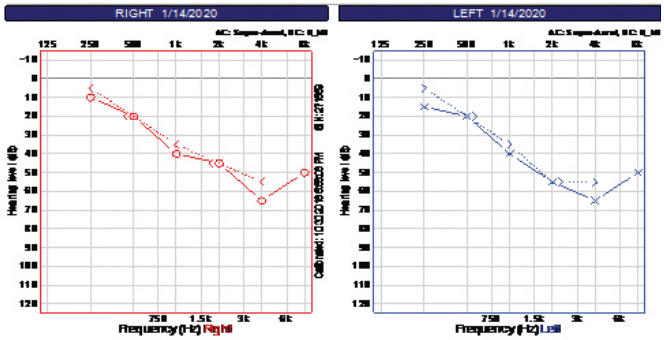

Figure 4: Audiometry showing bilateral sensorineural hearing loss (SNHL)

The presence of the anterior lenticonus suggested a provisional diagnosis of AS. On conducting a systematic review, the patient complained of chronic hearing problems. Audiometry was performed and showed bilateral SNHL (Figure 4). Family history revealed that the patient's maternal uncle passed away at a young age allegedly with auditory, visual, and renal problems. There was no consanguinity.

The renal function test was severely abnormal with a high creatinine level (125 umol/L). Blood pressure was uncontrolled (200/100 mm Hg). Nephrology consultation was carried out with a high suspicion of AS based on the clinical findings of bilateral anterior lenticonus, SNHL, and renal impairment. The patient was referred to a specialized nephrology center abroad, where he underwent renal transplantation, after which the renal biopsy showed an abnormal basement membrane, resulting from aberrant collagen type four chains which strongly suggested the diagnosis of AS.

A year later, blood pressure was normal, and hypertensive retinopathy had regressed. The patient was advised to undergo bilateral lensectomy with implantation of a multifocal intraocular lens.

Patient consent was obtained for the publication.

Discussion

The triad of progressive hematuric nephritis, progressive hearing loss, and the presence of ophthalmic findings, including anterior lenticonus, posterior polymorphous dystrophy, and fleck retinopathies, illustrates the manifestations of AS.[4-6] The most familiar form of AS is X-linked inheritance, and it includes a defect in the COL4A5 gene, which is responsible for coding α-5-chain of type four collagen.[6-8]

The kidneys are the most severely affected in AS. The earliest clinical sign is hematuria, which is the first presentation of the syndrome in children. Renal biopsy along with genetic tests are the gold standard methods for diagnosing AS.[8-10]

Common ocular signs of this disorder are dot-and-fleck retinopathy that is seen in around 85% of the afflicted adults, and anterior lenticonus that affects around 25%. Renal and lenticular pathologies are not typically established in childhood, but they exacerbate with time and often coexist with the beginning of nephritic impairment. The existence of anterior lenticonus is pathognomonic for the diagnosis, and it indicates a worse prognosis.[6] Gradual deterioration of vision secondary to anterior lenticonus requires patients to frequently change their spectacles.[11]

X-linked AS might demonstrate other ophthalmic manifestations. Corneal changes include corneal opacity, microcornea, corneal arcus, and posterior polymorphous dystrophy. Lenticular changes include cataract formation, microspherophakia, posterior lenticonus and spontaneous lens capsular rupture. Retinal changes include abnormal retinal pigmentation and temporal thinning.[5,6,11]

Conclusion

Careful case history recording accompanied with prudent clinical examination is vital for an accurate clinical diagnosis. This patient presented initially with misleading hypertensive retinopathy, which uncovered the hidden AS. This emphasizes the role of ophthalmological examination in diagnosing this syndrome. Ophthalmic examination is effective in establishing the diagnosis and predict the prognosis of nephropathy. It proves the fact that the eyes are the windows to the human body since the majority of systemic diseases have an associated ocular manifestation, even the rare ones.

Author Contribution

All authors share equal efforts towards (1) Substantial contribution to conception and design, acquisition, analysis, and interpretation of data; (2) Drafting the article and revising it critically for important intellectual content; and (3) Final approval of the manuscript version to be published.

Potential Conflicts of Interest

None.

Competing Interest

None.

Sponsorship

None.

References

1. Nozu K, Takaoka Y, Kai H, *et al*. Genetic background, recent advances in molecular biology, and development of novel therapy in Alport syndrome. *Kidney Res Clin Pract*. 2020; 39(4):402-413.
2. Cosgrove D, Liu S. Collagen IV diseases: A focus on the glomerular basement membrane in Alport syndrome. *Matrix Biol*. 2017; 57-58:45-54.
3. Hale LJ, Little MH. Shining a Light on Alport Syndrome. *Cell Chem Biol*. 2018; 25(5):497-498.
4. Tiwari US, Aishwarya A, Kujur R. Bilateral combined anterior and posterior lenticonus in Alport's Syndrome. *Rom J Ophthalmol*. 2018; 62(3):228-230.
5. Bamotra RK, Meenakshi, Kesarwani PC, et al. Simultaneous Bilateral Anterior and Posterior Lenticonus in Alport Syndrome. *J Clin Diagn Res*. 2017; 11(8):ND01-ND02.
6. Suranyi E, Nagy V, Berta A, et al. Alport Patients without Classic Ocular Symptoms Have Smaller Lens Diameter. *Med Sci Monit*. 2019; 25:2274-2277.
7. Geogikninan FN. Unusual presentation of Alport syndrome - a case report. *University Journa l of Surgery and Surgical Specialities*. 2019; 5(4).
8. Kashtan C. *Alport syndrome: facts and opinions*. *F1000Res*. 2017; 6:50.
9. Warady BA, Agarwal R, Bangalore S, et al. Alport Syndrome Classification and Management. *Kidney Med*. 2020;2(5):639-649.
10. Kashtan CE. Alport Syndrome: Achieving Early Diagnosis and Treatment. *Am J Kidney Dis*. 2021;77(2):272-279.
11. Halawani LM, Abdulaal MF, Alotaibi HA, *et al*. Development of Posterior Lenticonus Following the Diagnosis of Isolated Anterior Lenticonus in Alport Syndrome. *Cureus*. 2021; 13(1):e12970