

Case Report

A case of Alport syndrome

Sai Indraneel Kaluvai*, Rajalakshmi K.V., Dayanandan Y.

Department of General Medicine, Saveetha Medical College, Chennai, Tamil Nadu, India

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*Correspondence:

Dr. Sai Indraneel Kaluvai,

E-mail: indraneelreddy10@gmail.com

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ABSTRACT

Alport syndrome is an inherited disease characterized by progressive renal failure, hearing loss and ocular abnormalities. It usually manifests as progressive form of glomerular disease that is often associated with sensorineural hearing loss and ocular abnormalities. The defects are caused by mutations in the genes that code for type IV collagen's alpha chains, which are the most important structural elements of basement membranes, including those in the kidney, cochlea, and eye. We present a 37-year-old female known case of chronic kidney disease on medical management came with complaints of shortness of breath and loss of appetite. Her 2 children are also affected. Her renal biopsy showed glomerulosclerosis, splitting, lamination of basement membrane. Pure tone audiometry revealed bilateral sensorineural hearing loss. Slit lamp examination showed bilateral lenticonus and distant direct ophthalmoscopy revealed oil droplet sign which confirms lenticonus with dot and fleck retinopathy. Hence diagnosed as a previously undetected case of Alport syndrome.

Keywords: Alport syndrome, Sensorineural hearing loss, Renal failure, Ocular abnormalities

INTRODUCTION

Alport syndrome is a heterogeneous genetic disease involving the basement membrane of the glomeruli, inner ear, retina, and lens capsule. It usually manifests as progressive form of glomerular disease that is often associated with sensorineural hearing loss and ocular abnormalities.¹ The defects are caused by mutations in the genes that code for type IV collagen's alpha chains, which are the most important structural elements of basement membranes, including those in the kidney, cochlea, and eye.² Patients develop hematuria, thinning and splitting of the glomerular basement membrane, mild proteinuria, which appears late in course, followed by chronic glomerulosclerosis leading to renal failure in association with sensorineural deafness and ocular abnormalities.

CASE REPORT

A 37-year-old female known case of chronic kidney disease on medical management came with complaints of

shortness of breath and loss of appetite for 1 month. On examination blood pressure was elevated, other vitals were stable. Bilateral fine scattered basal crepitations were auscultated. She has 2 children. 1st born is 21 years male with history of hearing loss, hematuria, proteinuria, no ocular abnormalities. Her second born 17 years female is also affected, having proteinuria, with no hearing loss and ocular abnormalities.

During her hospital stay routine investigation were being carried out, creatinine- 6.3, urea- 63. 24-hour urine protein showed 2 g/day. Patient was started on dialysis twice per week. Renal biopsy showed glomerulosclerosis, splitting, lamination of basement membrane. Pure tone audiometry revealed bilateral sensorineural hearing loss. Slit lamp examination showed bilateral lenticonus and distant direct ophthalmoscopy revealed oil droplet sign which confirms lenticonus with dot and fleck retinopathy. However genetic analysis was not done because of financial constraints. Hence diagnosed as a previously undetected case of Alport syndrome.

DISCUSSION

In 1927, Arthur C. Alport originally described a trio of symptoms in a family with hereditary congenital hemorrhagic nephritis, deafness, and ocular abnormalities. These disorders are the result of mutations in COL4A3, COL4A4, and COL4A5 collagen biosynthesis genes. The type IV collagen network, a structural element of the basement membranes of the kidney, inner ear, and eye, cannot be produced or assembled properly if any of these genes are mutated. The basement membranes, which separate and support cells in many tissues, are slender, sheet-like structures. The basement membranes of the kidneys are unable to filter waste from the blood and produce urine correctly when mutations inhibit the development of type IV collagen fibres, allowing blood and protein into the urine. Many people eventually develop renal failure as a result of the anomalies of type IV collagen in kidney basement membranes, which causes progressive scarring of the kidney.³⁻⁵

Approximately 85% of the patients with Alport syndrome have an x-linked inheritance of mutations in the Collagen chain on chromosome xq22-24. Female carriers have variable penetrance depending on the type of mutation. 15% have autosomal recessive disease. Rarely some kindred have an autosomal dominant inheritance.^{6,7} The

prevalence of Alport syndrome has been estimated at 1:10 000 live-births for x-linked arborescent syndrome and 1:50 000 live-births for autosomal recessive Alport syndrome. The median age of onset of end stage renal disease due to Alport syndrome in young untreated patients has been reported to be 22 years. The prevalence of end stage renal disease in women, were although, considered a rarity, but as many as 12% of them with Alport syndrome may progress to end stage renal disease by the age of 40.⁸

In Alport syndrome 70% of the patients generally develop renal failure and sensorineural deafness by age 30. The most typical manifestation, which usually affects all males, is persistent microscopic hematuria beginning as early as age 5. In 40% to 60% of cases during infancy and early childhood, gross hematuria recurs. Proteinuria appears later. The second most prevalent condition is bilateral sensorineural hearing loss, which affects 55% of males and 45% of females. In boys with X-linked disease, it becomes apparent in late infancy or early adolescence. 15–30% of cases of symptoms include the eyes. Alport syndrome's anterior lenticonus, sometimes known as the "oil droplet in water" look, is essentially its pathognomonic manifestation. Disease management entails prescribing angiotensin converting enzyme (ACE) inhibitor drugs to decrease proteinuria, renal transplantation and hearing aids. Studies have shown that per-emptive therapy is most effective in delaying renal failure.^{9,10}

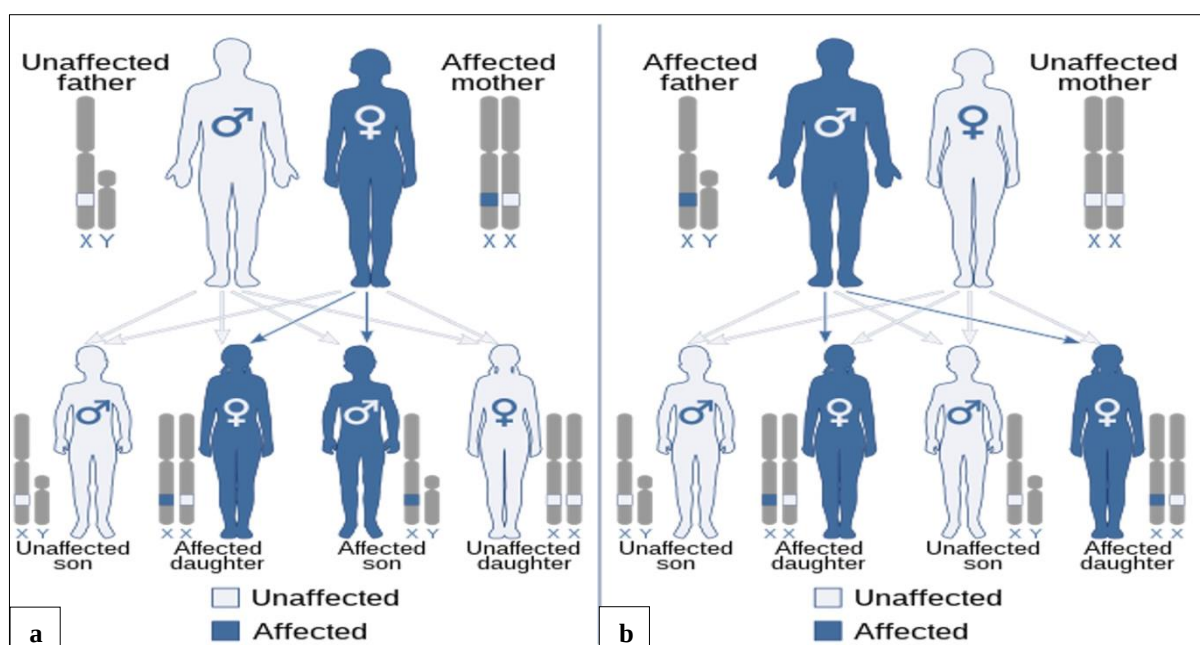


Figure 1: X-linked Alport syndrome from their (a) mother and (b) father, half of sons and daughters of the affected mother are affected. All the daughters of the affected father are affected.

CONCLUSION

Clinical evaluation should include careful eye examination and hearing tests in chronic kidney disease patients with family history to rule-out genetic disorders like Alport

syndrome. Renal biopsy and genetic testing can be used for diagnosis of Alport syndrome. Primary treatment is to control hypertension and renal progression with ACE inhibitors. Renal transplant is usually successful.

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REFERENCES

1. Oduware E, Iduoriyekemwen NJ, Ibadin M, Aikhionbare H. A Case Report of COL4A5 Gene Mutation Alport Syndrome in 2 Native African Children. *Case Rep Nephrol Dial.* 2021;11(3):308-13.
2. Kruegel J, Rubel D, Gross O. Alport syndrome--insights from basic and clinical research. *Nat Rev Nephrol.* 2013;9(3):170-8.
3. Hudson BG, Tryggvason K, Sundaramoorthy M, Neilson EG. Alport's syndrome, Goodpasture's syndrome, and type IV collagen. *N Engl J Med.* 2003;348(25):2543-56.
4. Tryggvason K, Heikkila P, Pettersson E, Tibell A, Thorner P. Can Alport syndrome be treated by gene therapy? *Kidney Int.* 1997;51(5):1493-9.
5. Kashtan CE. Familial hematuria due to type IV collagen mutations: Alport syndrome and thin basement membrane nephropathy. *Curr Opin Pediatr.* 2004;16(2):177-81.
6. Haldar I, Jeloka T. Alport's Syndrome: A Rare Clinical Presentation with Crescents. *Indian J Nephrol.* 2020;30(2):129-31.
7. Savige J, Colville D, Rheault M, Gear S, Lennon R, Lagas S, Finlay M, Flinter F. Alport Syndrome in Women and Girls. *Clin J Am Soc Nephrol.* 2016;11(9):1713-20.
8. Ghosh S, Singh M, Sahoo R, Rao S. Alport syndrome: a rare cause of uraemia. *BMJ Case Rep.* 2014;bcr2013201731.
9. Oni AO, Eweka AO, Otuaga PO, Odia JO. Alport's syndrome. *Saudi J Kidney Dis Transpl.* 2009;20(6):1087-9.
10. Kashtan CE, Michael AF. Alport syndrome. *Kidney Int.* 1996;50(5):1445-63.

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