International Journal of Retina (*IJRETINA*) 2019 Volume 02, Number 01
P-ISSN. 2614-8684, E-ISSN.2614-8536

IJRETINA
International Journal of Retina

Usher Syndrome in Two Siblings, A Case Report

Teddy Kristiyan[1], Nadia Artha Dewi[2], Safaruddin Refa[2]
[1] *Resident Of Department of Ophthalmology,Faculty of Medicine Universitas Brawijaya*
[2] *Department of Ophthalmology,Faculty of Medicine Universitas Brawijaya*

ABSTRACT

***Introduction**: Usher Syndrome is a rare genetic disorder involving abnormalities in the retina and hearing, where the patients will experience blindness and hearing loss due to mutations of the gene. Blindness caused by Usher Syndrome has not been prevented until now, but the emphasis is more on focusing early diagnosis, especially patients with Retinitis Pigmentosa.*

***Methods**: This Case represent of two siblings with Retinitis Pigmentose (RP) and profound bilateral sensorineural deafness. Diagnosis based on patients decreases of vision since teenagers and worst at night, visual acuity and visual field examination in both patients, Ophthalmoscopic findings, and sensorineural deafness diagnosed by Ear, Nose, and Throat (ENT) department. Electroretinogram (ERG) was not carried out in the two patients because of the limitations of diagnostic facilities.*

***Results:** In both eyes of both siblings, ophthalmoscopic evaluation disclosed numerous bone spiculae at peripheral area. Humphrey perimetry showed a tunnel vision. The hearing test also showed a sensorineural hearing loss (SNHL).*

***Conclusion**: two affected member of the family were found to exhibit an usher syndrome, this pedigree supports the genetic cotransmission of the traits.*

Key words: Deaf-blind, Usher Syndrome, Retinitis Pigmentose (RP), Sensorineural hearing loss (SNHL)
Cite This Article: DEWI, Nadia Artha; KRISTIYAN, Teddy; REFA, Safaruddin. Usher Syndrome in Two Siblings, A Case Report. International Journal of Retina, [S.l.], v. 2, n. 1, feb. 2019. ISSN 2614-8536. Available at: <https://www.ijretina.com/index.php/ijretina/article/view/66>

INTRODUCTION

*Correspondence to:
Teddy Kristiyan,
Department of Ophthalmology,
Universitas Brawijaya,
teddykristiyan@gmail.com

Usher Syndrome is a rare genetic disorder, autosomal recessive, involving abnormalities in the retina and hearing, where the sufferer will experience blindness and hearing loss due to mutations of the gene. There are several divisions, but Usher Syndrome is divided into three subtypes; Type I, Type II and Type III. Usher Syndrome, also known as Hallgren Syndrome, Usher-Hallgren Syndrome, RP-Dysacusis Syndrome, and Dystrophic Retinae Dysacusis Syndrome. [1-5]

The incidence of Usher Syndrome is of 1.8 to 4.4 cases per 100,000 births. In America, it affects about 45,000 residents. According to a National Institute survey on Deafness and Other Communication Disorders, half of the patients with deafness disorders are patients with Usher Syndrome. In the severe case, there is deafness from birth, with an onset of RP incidence since the age of 10 years and blindness at the age of 20 years. [1-5]

Blindness caused by Usher Syndrome has not been prevented until now, but now the emphasis is more on focusing early diagnosis, especially patients with RP. It aims to prepare children with Usher Syndrome who have experienced hearing loss, help them to be able to communicate before they lose their vision.

This early diagnosis is also needed to help research centers about Usher Syndrome in mapping genetics and engineering genetic therapies that are being studied.[1, 5-7]

METHODS

Diagnosis based on history taking, visual acuity and visual field examination in both patients, Ophthalmoscopic findings, and sensorineural deafness diagnosed by Ear, Nose, and Throat (ENT) department.

RESULTS

In this case report, two patients were the second and the third of three siblings. The first patient was a

38-years-old man, the second was a 23-years-old woman. Both patients said that they have blurred vision when looking far and near and also it becomes worst at night. This blurred is felt since they are a teenager and getting worst. There is no history of trauma to the eye and using glasses. Both patients also experienced hearing loss in both ears.

Right and left ear has hearing decreases slowly since adolescence (middle school). There was no history of both ears buzzing. No history of dizziness, nausea, vomiting, fluid discharge ears, noise exposure, medication consumption, nose and throat complaints. Patients sometimes scrape their ears using cotton bud if it feels itchy. No history of head injury, mumps, measles, and chickenpox, hypertension, and diabetes. The previous history of the first patient had an ENT doctor, diagnosed with hearing loss and then given a hearing aid. The second patient once examined the ophthalmologist and was then given glasses to help her vision.

From the pregnancy history, there was no history of a disease or drug consumption by the patient's mother. Both patients were born normally, assisted by midwives, with the length and weight was normal. From the history of growth and development, there was no delay in walking. From the history of education, the two patients have a good educational background.

Currently, both patients have a family. The first patient has a wife and two kids, the first is 10 years old, and the second is 6 years old. Until now the children are in good health and there are no signs of hearing or visual impairment. The second patient has no children.

The first patient's naturalist visual examination, the right eye was obtained was 5/20, after the correction became 5/12 and not advanced with the pinhole. While the examination of the left eye obtained 5/30 naturalist vision after correction to 5/12 and not advanced with a pinhole. The second patient found the right eye naturalist vision was 2/60, after correction to 5/6 and not advancing with the pinhole. While examining the left eye, the naturalist vision of 2/60 is obtained after correction to 5/6 and not advancing with the pinhole.

From the anterior segment examination in both patients, it was found that the right and the left eye were within normal limits, from the examination of the posterior segment with funduscopy where signs of retinitis pigmentosa showed bone spiculae in the peripheral area and pale optic nerve papules. Amsler Examination, the two eyes have no defects. Examination of optic nerve function in both patients found that decreased contrast of vision in both eyes, while an impaired color vision of both eyes, was only found in the first patient.

On the field of view of the two patients using Humphrey's perimetry, a picture of tunnel vision was obtained in both patient's eyes.

From an examination of hearing function in both patients using Pure Tone Audiometry, there was a severe degree of sensorineural deafness in both ears. Speech audiometry, the first patient showed 70% right ear SDS value and 80% left ear, while the second patient showed 70% right ear SDS value and 90% left ear. From Tympanometry examination, both patients found Jerger A classification on the right ear and Jerger Axles on the left ear.

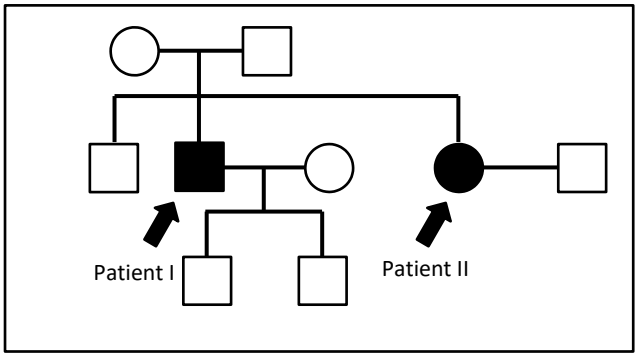


Figure 1**. Pedigree Patient. Patient were the second dan third from three siblings.**

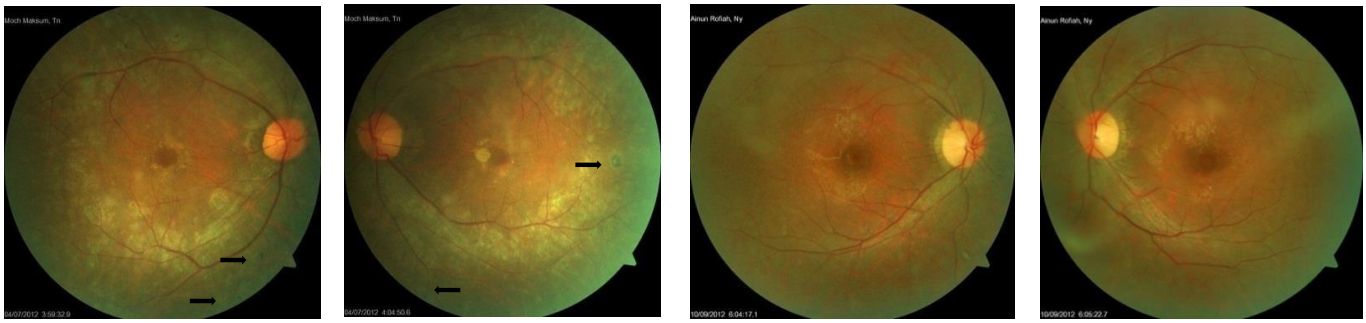


Figure 2. **Fundus photograph of the two patients. A pale image of the optic nerve appears and in the first patient a minimal bone spicula appears (arrow), while the bone spicula in the second patient is on the peripheral part, so it does not appear in the photo.**

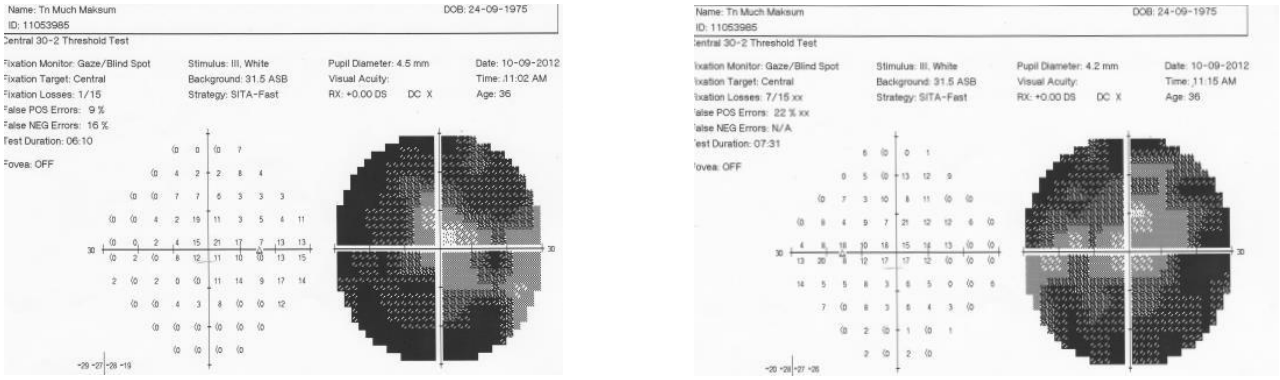


Figure 3. **Perimetric results of ODS patients I. Both eyes' visual field shows a tunnel vision.**

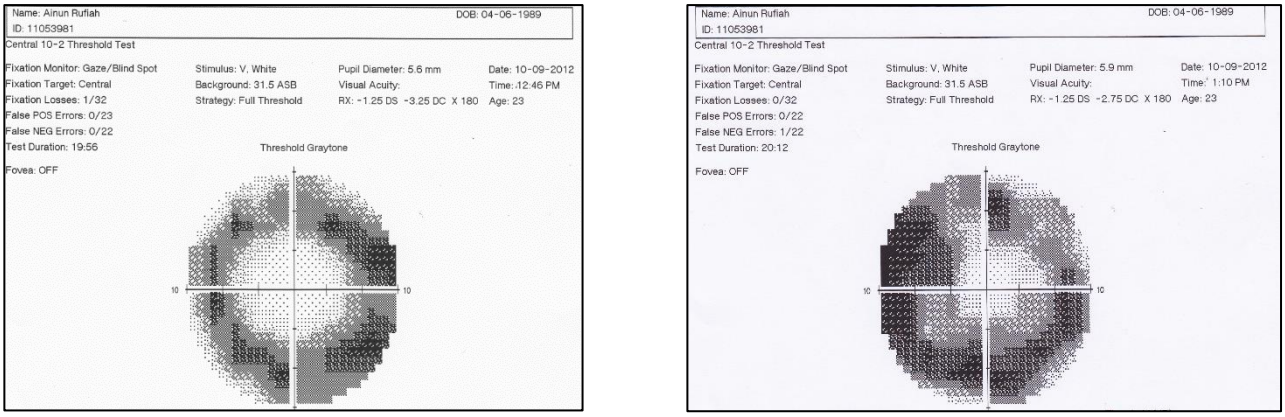
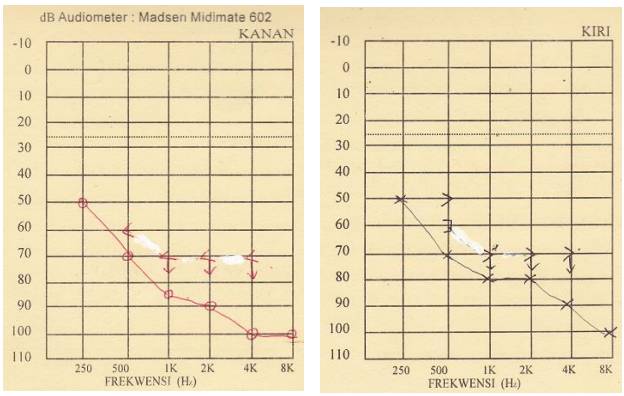


Figure 4**. The results of 10^0 central perimetry of patient II. With the focus of examination on the central 10^0 area, shows a clear picture of tunnel vision.**

Table 1**. Results of Speech audiometry and tympanometry examination in both patients. Sensorineural hearing loss was found in both patients**.

	Pasien I		Pasien II	
Audiometri tutur	**D**	**S**	**D**	**S**
SRT	83 dB	80 dB	74 dB	78 dB
SDS	70%	80%	70%	90%
Timpanometri	**D**	**S**	**D**	**S**
Compliance	0,51	0,26	0,32	0,49
Peak	-12	-29	-34	-23
Jerger	A	As	A	A
R.Stapedius	-	-	-	-

Patient I



Patient II

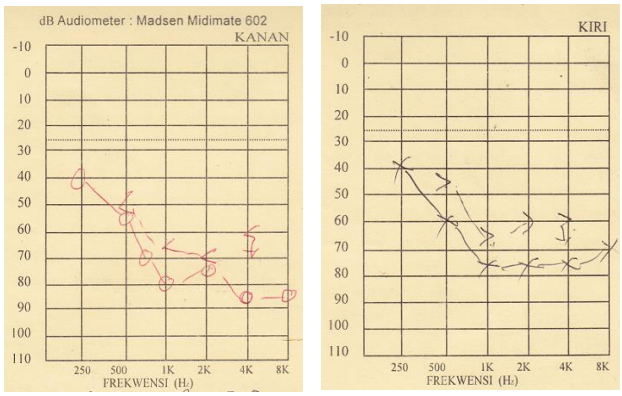


Figure 5. **The results of Pure Tone Audiometry examination from the right and left ears in both patients. Displaying a graphic image that coincides, showing sensorineural interference.**

DISCUSSION

The two patients were siblings of three. The oldest brother said doesn't have impaired vision and hearing. Patient I is the second and patient II is the youngest. This is possible because *Usher Syndrome* is inherited in an autosomal recessive manner. Children with manifestations of this syndrome generally inherit two genes of carrier *Usher Syndrome* from each of their parents. While for individuals who are known to have one parent carrier, then the likelihood of incidents of *Usher Syndrome* is 1%. [1, 3-6]

Both patients complained of blurred vision and decreased hearing from adolescence, without a history of delayed walking and balance disorders.

From the hearing examination, sensorineural deafness was obtained in both patients. This is consistent with the symptoms of *Usher Syndrome* type 2, which generally results in the onset of hearing loss in adolescence, without a balance disorder with the type of hearing loss that accompanies sensorineural deafness. Keats and Corey (1999) also revealed that most of the cases found were *Usher Syndrome* type 1 and type 2, of which between the two types, type 2 was the most commonly found. Because of the similar onset and appearance of RPs of the two types, enforcement of the diagnosis of *Usher Syndrome* more specifically can use ERG, wherein type 2 there is an A-wave. However, the ERG was not carried out in the two patients because of the limitations of diagnostic facilities. [6, 8, 9]

Visual impairment in patients is initially due to degeneration of rod cells, but in the subsequent process, cone cells are also affected by rod cell damage. This is because rod cells are the life support of cone cells. Even though RP is said to be "blindness" but it is rare to find RP patients with "no light perception" central vision. Pale optic nerve papillary appearance is one of the typical signs of RP, according to the degree of photoreceptor damage that occurs. The narrowed field of view from the results of perimetry shows a picture of photoreceptor damage that affects most of the retina of the two patients. Standard perimetric evaluation with a coverage of 300 posterior pattern areas is generally sufficient to assess general field conditions. But in cases with general depression, a central100 perimetry evaluation can better describe the patient's remaining field of view in the centralarea. Patient I was not subjected to central 100 repeat perimetry because it was not cooperative and complained of

dizziness during the examination. OCT examination was not done in both patients because of limited costs. [6, 10-14]

The condition of the anterior segment of the patient with *Usher Syndrome* is generally calm, according to Hamel's 2006 study, which states that inflammation is rarely found in the posterior segment. When inflammation occurs, it is generally mild and does not require special therapy. [15]

The fundus photograph of the two patients looked slightly different, the patient I had several features of bone spiculae, but in the patient II there was no picture of bone spiculae in the fundal photograph of the central area, because bone spiculea were still in peripheral area. The spread of bone spiculae requires varying time to spread from the edge area to the center. Another possibility is the difference in phenotype due to differences in variations in mutations that occur. This was revealed by Miles (2012), who found many cases in siblings with the same clinical type of *Usher Syndrome* but had different phenotypic manifestations. [8, 10]

The hearing test results using pure tone audiometry show a graph of air delivery and bone conduct which are both decreased and coincide with each other, this is in accordance with sensorineural deaf symptoms. The results of sensorineural deafness examination are in accordance with the pathophysiology of deafness in patients with *Usher Syndrome*, which is generally caused by damage and degeneration of hair cells in organon corti. From speech audiometry, the value of Speech Discrimination Score (SDS) ≥ 70% is obtained so that currently both patients are still possible to use the Hearing Aid. The other choice if deafness is the installation of a Cochlear Implant. [6, 8]

Although retinal damage cannot be prevented and treated until now, counseling regarding diseases, low vision therapy, and special education can generally help patients to be more independent in carrying out daily activities. Therapy in the field of ophthalmology that can be given is only supportive, namely educating patients about the use of sunglasses while outdoors and providing vitamin and antioxidant supplements. [5-7, 13]

CONCLUSION

A rare case of Usher Syndrome has been reported in two siblings. Diagnosis uses history and physical examination. There is no single effective therapy to cure this disease. Definitive therapy is still in the process of research and development for now. The poor prognosis of these two siblings is poor which is the therapy is only intended to help their daily lives.

REFERENCES

1. Roach L. Planning for Usher's-Related Vision Loss. Clinical Update: Retina. 2009;May. hal: 112-7.
2. Steidl SM, Hartnett ME. Clinical Pathway in Vitreoretinal Disease. New York: Thieme Medical Publisher, Inc; 2003. hal: 111.
3. Kelley PM, Weston MD, Chen Z-Y, Orten DJ, Hasson T, Overbeck LD, et al. The Genomic Structure of the Gene Defective in Usher Syndrome Type Ib (MYO7A). GENOMICS. 1997;40. hal: 73 - 9.
4. Astuto LM, Weston MD, Carney CA, Hoover DM, Cremers CWRJ, Wagenaar M, et al. Genetic Heterogeneity of Usher Syndrome: Analysis of 151 Families with Usher Type I. American Journal of Human Genetics. 2000;67. hal: 1569 - 74.
5. Mets MB, Young NM, Pass A, Lasky JB. Early diagnosis of Usher syndrome in children.
6. Transactions of the American Ophthalmological Society. 2000;98. hal: 237 - 45.
7. Venkatesh R, Trivedi HL, Lambat S, Lokhande S, Ghodke A, Soni N. Usher's Syndrome Type I. Bombay Hospital Journal. 2009;51. hal: 256 - 9.
8. MacDonald IM, Tran M, Musarella MA. Ocular Genetics: Current Understanding. Survey Of Ophthalmology. 2004;49. hal: 159 - 94.
9. Keats BJB, Corey DP. The Usher Syndrome. American Journal of Medical Genetics. 1999;89. hal: 158 - 66.
10. Lorenz B, Preising M. Usher Syndrome. Orphanet Journal of Rare Diseases 2004;3. hal: 1 - 7.
11. Miles C. Early Diagnosis of Usher Syndrome - Educational Opportunities and Chalenges. NAC. 2012;29. hal: 229 - 35.
12. Brown TJ. Retinitis Pigmentosa. Ophthalmology. 2005;10. hal: 234 - 44.
13. Grover S, Fishman GA, Brown J. Patterns of Visual Field Progression in Patients with Retinitis Pigmentosa. Ophthalmology 1998;105. hal: 1069 - 75.

14. Grover S, Fishman GA, Anderson RJ, Tozatti MSV, Heckenlively JR, Weleber RG, et al. Visual Acuity Impairment in Patients with Retinitis Pigmentosa at Age 45 Years or Older. Ophthalmology. 1999;106. hal: 1780 - 5.
15. Rotenstreich Y, Fishman GA, Lindeman M, Alexander KR. The Application of Chromatic Dark-Adapted Kinetic Perimetry to Retinal Diseases. Ophthalmology. 2004;111. hal: 1222 - 7.
16. Hamel C. Retinitis pigmentosa. Orphanet Journal of Rare Diseases. 2006;40. hal: 1 - 12.