CASE REPORT

Usher Syndrome in Adult Nigerians: Report of Two Cases

Sebastian NN **NWOSU**[1,2,3]
Chikaodili U **NDULUE**[4,5]
Oluchi I **NDULUE**[4]
Chizoba U **UBA-OBIANO**[1,3]

[1]*Department of Ophthalmology*
Nnamdi Azikiwe University
Awka NIGERIA

[2]*Centre for Eye Health Research and Training*
Nnamdi Azikiwe University Awka NIGERIA

[3]*Guinness Eye Centre Onitsha*
Anambra State NIGERIA

[4]*Ebony Eye Specialist Clinic*
Onitsha Anambra State NIGERIA

[5]*Department of Oto-rhino-laryngology*
University of Benin Teaching Hospital Benin-City
Edo State NIGERIA

Author for Correspondence
*Prof Sebastian NN **NWOSU***
Guinness Eye Centre
PMB 1534 Onitsha
Anambra State NIGERIA

Phone: +234 803 190 7552
Email: sabenwosu@gmail.com

Received: September 24th, 2021
Accepted: December 15th, 2021
https://doi.org/10.5281/zenodo.6815923

DISCLOSURE
Conflict of interest: None

ABSTRACT

This is a report of Usher syndrome in adult Nigerians. Two adults aged 28 and 33 years had retinal degeneration, optic atrophy and visual fields defects consistent with retinitis pigmentosa. Each patient also had a hearing impairment and one patient had ataxia. These are features of Usher syndrome which usually manifests in the first and second decades of life. The late presentation of our patients reflects the inadequacy of the relevant services that could have facilitated early detection and management of the cases. Routine screening of pre-school children for visual and hearing loss is recommended for early detection of these cases.

***Key words**: Retinitis pigmentosa, Adult, Blind, Deaf, Nigeria*

INTRODUCTION

Usher syndrome describes a heritable, autosomal recessive deafness in the presence of typical features of retinitis pigmentosa.[1] It is the most common of the retinitis pigmentosa syndromes. Deafness is often congenital. The eponym for the disease has been credited to Charles Usher who in 1914 described two variants of the disease.[2] However, the first description of this syndrome was by Albrecht von Graefe in 1858.[1]

Kimberling *et al*.[3] estimated the population prevalence to be 1:6000 though earlier estimates had put it at 1.8–6.2 per 100000.[1] It has been commonly reported from Finland and also among Ashkenazi-Jewish populations in Europe.[1]

Clinically, Usher syndrome is grouped into 3 major categories namely, types 1,2 and 3, with types 1 and 2 being most common.[1] Type 1 disease is associated with congenital profound deafness, speech impairment, vestibular symptoms and childhood-onset retinopathy. Type 2 disease presents with non-progressive deafness and later onset retinopathy; there are no vestibular symptoms. Type 3 disease is also associated with non-progressive deafness, adult-onset retinopathy and hypermetropic astigmatism. The Hallgren syndrome is regarded by some authorities as the fourth variety of Usher syndrome; however other researchers feel that it is part of type 1 disease.[1] Features of Hallgren syndrome include congenital progressive deafness, ataxia and retinopathy.

Previous reports on Usher syndrome in Africa are scanty. In a review of hearing impairment in Africa with emphasis on the Cameroonian experience, Wonkam *et al.* mentioned Usher syndrome as possible cause of syndromic hearing loss.[4] Atipo-Tshibo and colleagues reported a case of 40-year-old Mauritanian with Usher syndrome and von Recklinghausen disease.[5] The published reports in Nigeria were in a child and among deaf students.[6,7] The present article is a report of two cases of Usher syndrome in adult Nigerians.

CASE REPORTS

Case 1

A 33-year-old Nigerian woman of Igbo ethnicity presented at the Guinness Eye Centre Onitsha on 5th June, 2018 with a history of bilateral visual obscuration since she was 8 years old. The poor vision was worse at night. She was also dumb and deaf. Occasionally she also experienced sandy sensation and increased lacrimation in each eye. There was no similar illness in her family. Her mother who gave most of her illness history was also the interpreter. There was no family history of consanguinity.

Examination showed a fully conscious lady with ataxic gait but not in distress. Blood Pressure (BP) was 100/70mmHg and pulse was 72/minute, regular, good volume. The visual acuity in each eye was counting fingers (CF) close to the face. The visual acuity did not improve with refraction or low vision optical aid. The right eye also had fleshy nasal pterygium which did not extend up to the pupillary margin. Otherwise the anterior segment in each eye was normal. On ophthalmoscopy after pupillary dilatation, the retina of each eye showed dense, widespread paravascular bone spicule pigments more concentrated in the mid-periphery of the retina; the retinal arterioles were markedly constricted and each optic disc was pale.

Apart from ataxic gait, detailed central nervous system examination, including assessment of cranial nerves was unremarkable. She could not fixate test target

on visual field examination. There was no perception of sound with both Rinne and Weber tuning fork tests. Electrophysiology, audiometry and genetic tests were not performed due to lack of facilities.

A diagnosis of Usher syndrome was made. Refsum disease, sporadic retinitis pigmentosa and Oguchi disease were differential diagnoses. The patient and her mother were counselled. Treatment given were cromolyn sodium (mast cell stabilizer) eye drop, vitamin A and C tablets; use of hearing aids was recommended. She was lost to follow up and efforts to trace her with a view to examining other family members were unsuccessful.

Case 2

A 28-year-old Nigerian woman of Igbo ethnicity presented on 2nd September 2019 with an 11-year history of night blindness and foreign body sensation in each eye. Patient was also deaf. She was the first in a family of 7 children (5 females and 2 males). None of her siblings had similar complaints; no history of similar illness in second degree relatives. She was not an offspring of consanguineous marriage.

Examination showed a well-nourished woman with a BP of 110/70mmHg and pulse rate of 78/minute regular, good volume. The right visual acuity was 6/18 and the left, 6/36. Refraction showed hypermetropia which improved the acuity to 6/9 in the right eye and 6/12 in the left. Ophthalmoscopy following pupillary dilatation, revealed the following in the retina of each eye: optic disk pallor, attenuated retinal arterioles and bone spicule pigments. Facilities for audiometry, electrophysiology and genetic tests were not available. Rinne and Weber tuning fork tests did not elicit sound perception. Central nervous system examination did not reveal any abnormality. The visual field in each eye showed peripheral contraction. A clinical diagnosis of Usher syndrome was made with Oguchi disease and Kearns-Sayre syndrome as differential diagnoses. The following were prescribed for her: eye glass, cromolyn sodium (mast cell stabilizer) eye drop, vitamin C and A tablets; she was also advised on the need for hearing aids. She defaulted from follow up and could not be traced.

DISCUSSION

There are some clinical conditions in which retinitis pigmentosa is associated with other abnormalities in the central nervous and musculo-skeletal systems. These are called retinitis pigmentosa syndromes of which Usher syndrome is one; others include Refsum disease, Albers-Schonberg syndrome (osteopetrosis), Friedrich ataxia, Kearns-Sayre syndrome, Norrie syndrome, Oguchi disease, etc.[1] In each of the cases herein reported the possibility of some of these syndromes were considered as differential diagnosis. In Case 1, Refsum disease was a differential diagnosis. However, other features such as poliosis, heterochromic iridis, dystopia canthorum and confluent eyebrows typical of Refsum disease were absent. In Case 2, Kearns-Sayre syndrome was included as a differential diagnosis. But the clinical features including chronic external ophthalmoplegia, which define Kearns-Sayre syndrome were lacking. Also considered in the two patients was Oguchi disease; however, there was no history of improvement of light sensitivity in the dark and Mizuo-Nakamura phenomena (disappearance of retinal discoloration in the dark) was not demonstrated in any of the patients.[1]

Diagnosis of Usher syndrome can be made based on clinical signs and symptoms though

evidence from ancillary investigations such as electrophysiology, audiometry and genetic tests is more definitive. The clinical manifestations and the severity of symptoms in Usher syndrome vary. Consequently, the Usher Syndrome Consortium put up criteria for the clinical diagnosis of the disease.[8] The diagnosis of Usher syndrome in our patients was based on history and clinical features consistent with manifestations of the disease, as we lacked facilities for the requisite ancillary investigations. Thus we were unable to definitively categorize the disease type nor pin-point the genetic variety in our patients. None-the-less, the history and clinical features in our patients suggest that Case 1 had Usher syndrome type 1 while Case 2 had adolescent onset disease and therefore regarded as type 2 Usher syndrome.

The present article reports on adults aged 28-33 years. This differs from previous reports from Nigeria in which the disease was diagnosed in children.[6,7] However the difference may be due to late presentation to our hospital as the patients had endured visual loss for 11 – 25 years before presentation. Factors militating against seeking health care early include cost, awareness of available services as well as beliefs and attitude towards orthodox medical care.[9] Ophthalmic service facilities in Nigeria are few and located in the urban areas; our hospital is the only publicly-owned eye hospital in Anambra State with immediate catchment of more than 6 million people. Both patients herein reported resided in remote rural areas.

While reports from developed countries suggest a prevalence of 1:6000, in the absence of community-based studies, the prevalence of Usher disease in Nigeria is not known. However, Abah and colleagues[7] in a study of students in a special school for the deaf in Kaduna, Nigeria reported that 4 out of 620 students had presumed Usher syndrome. In our hospital, 2 patients with Usher syndrome were recorded among 37 patients with retinitis pigmentosa seen over a 6-year period; 5876 new patients were seen in the hospital during the same period. These suggest that the hospital incidence of Usher syndrome and its prevalence in institutionalized deaf persons in Nigeria are low. However, in the absence of routine screening for hearing and visual loss among pre-school children, it is possible that some cases might be missed. In Usher syndrome, hearing loss often manifests before visual loss and the afflicted mainly reports to hospital on account of visual loss. This could in part explain the late presentation to hospital of our patients.

Reports from other parts of Africa also suggest a very low prevalence of Usher syndrome – the *raison d'etre* for publishing single case reports. While in the Cameroon it was suggested that Usher syndrome may be a cause of syndromic hearing loss[4], reports from Mauritania[5] and Algeria[10] point at consanguinity as an important predisposing factor. Our patients were not related and there was no history suggesting that either of them was an offspring of consanguineous marriage.

With only 7 cases (including the present report) from Nigeria over a period of 40 years, Usher syndrome may not rank high as a cause of ocular and otologic morbidity. But considering the level of incapacitation, efforts should be made to detect existing cases early and treatment/rehabilitation, including possibly cochlear implant instituted.[8,9] While for now there is no definitive cure, rehabilitation with low vision and hearing aids offer a new chance for enhanced vision and hearing for the patient. Having instituted rehabilitative measures such patients, in the absence of other ill health, should be reviewed 4-6 monthly.

Case 1 who was blind, deaf and dumb as well as having ataxic gait presented an extreme picture of human suffering which could have been ameliorated had her problem been detected and attended to when it manifested in childhood; in any case she did not keep follow up appointment and so lost the opportunity of further discussion of rehabilitative measures with us. Case 2 had visual improvement with optical aids and did not return for follow up. Our patients' poor attitude to follow up is typical of health-seeking behaviour in our environment;[7] hospital consultation is the last resort after all remedies including traditional medicine have failed to yield the desired result and follow up appointment is not kept if the patient does not perceive any new gain from such visit.

CONCLUSION

Our report of 2 cases of Usher syndrome adds to the growing literature on this disease which first report in Nigeria was made in 1981.[4] The present report differs from previous ones in that these were detected in adults and they were not the same people as the ones earlier reported. Our patients' history suggest that the onset of the illness was in *early* childhood (Case 1) and adolescent (Case 2). That they presented as adults may have been due to several reasons which we could not obtain from their histories. Usher syndrome while not a cause of early mortality, subjects the afflicted and the supporting family to a life time of suffering. But this could be mitigated through occupational training and rehabilitation.

Finally, Usher syndrome presents yet another opportunity for ophthalmologists, paediatricians and oto-rhino-laryngologists to work together. Eye and ear screening of pre-school children by a multidisciplinary team of ophthalmologists, paediatricians and oto-rhino-laryngologists is therefore recommended for early detection of persons with this disease. Currently Usher syndrome is not curable. While gene therapy raises some hope of cure, the practical approach for now is early detection and rehabilitation using optical and hearing aids. It needs be mentioned that hearing aids are not of much benefit to the Usher syndrome patients with vestibular areflexia. Cochlear implant may be preferred in such patients.[11,12]

REFERENCES

1. Gregory-Evans K, Pennesi ME, Weleber RG. Retinitis pigmentosa and allied disorders. In: Ryan SJ (Editor-in-Chief). Retina. Vol. 2. 5th Edition. New York: Elsevier Saunders 2013:787-815.
2. Usher CH. On the inheritance of retinitis pigmentosa with notes of cases. R Lond *Ophthalmol Hosp Rep* 1914; 19: 130-236.
3. Kimberling WJ, Hildebrand MS, Shearer AE. Jensen MI, Halder JA, Trzupek K, *et al.* Frequency of Usher syndrome in two paediatric populations: Implications for genetic screening of deaf and hard of hearing children. *Genetic Med* 2010; 12: 512-6.
4. Wonkam E, Noubiap JJN, Fokouo JVF, Oluwole OG, Nguefack S, Chimusa ER, Wonkam A, *et al*. Hearing impairment overview in Africa: the case of Cameroon. *Genes* 2020; 11:233-50
5. Atipo-Tsiba PW, Itiere OFA. Usher syndrome and von Recklinghausen's neurofibromatosis association: case report. Rwanda Medical Journal 2015; 72(3):23-24.
6. McMoli TE, Ijaduola GTE. Usher syndrome in a Nigerian child. *East Afr Med J* 1981; 58(12): 967-70.
7. Abah ER, Oladigbolu KK, Samaila E, Merral H, Ahmed AO, Abubakar TO. Ophthalmologic abnormalities among deaf students in Kaduna, northern Nigeria. *Ann Afr Med* 2011; 10(1): 29-33.
8. Smith RJH, Berlin CI, Hejtmancik JF, Keats BJB, Kimberling WJ, Lewis RA, *et al.* Clinical diagnosis of the Usher syndromes. Usher Syndrome Consortium *Am J Med Genet* 1994; 50:32-8.

9. Nwosu SNN. Beliefs and attitude to eye diseases and blindness in rural Anambra State. *Niger J Ophthalmol* 2002; 10: 16 - 20.
10. Abdi S, Bahloul A, Behlouli A, Hardelin JP, Markrelouf M, Boudjelda K, *et al*. Diversity of the genes implicated in Algerian patients affected by Usher syndrome. *PLoS ONE* 2016; 11(9): e0161893 doi: 10.1371/journal.pone.0161893
11. Cadieux JH, Firszt JN, Reeder RM. Cochlear implantation in non-traditional candidates: preliminary results in adolescents with asymmetric hearing loss. *Otol Neurotol* 2013; 34: 408-415.
12. Amusa YB, Adeniji AO, Eziyi JAE, Olarinoye TO, Adeyemo AO, Ogunniyi G. Cochlear implantation program among Nigerians (Black Africans). *Pakistani Journal of Otolaryngology* 2013; 29: 62-66.