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Case Report

Susac Syndrome with Typical Clinical Triad: First Case Report in Sri Lanka

Chaminda Kumara*, Janaka Peiris, Mary Muthukumarasamy and Mahinda Weerasekara

National Hospital, Kandy, Sri Lanka

***Corresponding Author:** Chaminda Kumara, National Hospital, Kandy, Sri Lanka.

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Abstract

Background: Susac syndrome is an exceedingly rare disease which is described as a typical triad of clinical manifestations, sensorineural hearing loss, encephalopathy, and branch retinal artery occlusion. It is infrequent to get all 3 clinical features in the start of illness. Susac syndrome was not reported before in Sri Lanka.

Case Presentation: A 32-Year-old apparently healthy female patient presented with severe headache for 3 days. She became drowsy and confused later. A history of left side hearing impairment was also reported. On examination she was drowsy and found to have generalized hyperreflexia with bilateral extensor plantar response. Magnetic resonance imaging of brain revealed classical "snowball lesions" in the corpus callosum while internal capsular lesions gave the appearance of "string of pearl." Pure tone audiometry confirmed the left side sensorineural hearing impairment. Fluorescein angiogram exhibited multiple branch retinal arterial occlusion. Patient was treated successfully with steroids and intravenous immunoglobulin.

Conclusion: We report the first case report of Susac syndrome in Sri Lanka. It is rare to get all 3 clinical components in the beginning of disease. Early and aggressive treatment can prevent permanent disability.

Keywords: Susac Syndrome; "Snowball" Lesions; "String of Pearl" Appearance; Retinocochleocerebral Vasculopathy; Arterial Wall Hyper Fluorescence

Abbreviations

SICRET: Small Infarctions of Cochlear, Retinal and Encephalic Tissue; MRI: Magnetic Resonance Imaging; FA: Fluoresceine Angiogram; CSF: Cerebrospinal Fluid; MPO: Myeloperoxidase; PR3: Proteinase 3; FLAIR: Fluid Attenuated Inversion Recovery; DWI: Diffusion-Weighted Image; ADC: Apparent Diffusion Coefficient; ADEM: Acute Disseminated Encephalomyelitis; AWH: Arterial Wall Hyper Fluorescence; AECA: Anti-Endothelial Cell Antibodies

Introduction

Susac syndrome is a rare disease which is also known as retinocochleocerebral vasculopathy or SICRET syndrome (Small Infarctions of Cochlear, Retinal and Encephalic Tissue). It is described as a typical triad of clinical manifestations; sensorineural hearing loss, encephalopathy, and branch retinal artery occlusion [1-3]. It has autoimmune background targeted to precapillary arterioles with associated microinfarcts, but the exact pathophysiology of this disease is yet to be understood [1,13]. Magnetic resonance imaging (MRI), audiogram and fluoresceine angiogram (FA) are key diagnostic aids. This is a case report of 32-year-old woman presented with severe headache, altered sensorium and unilateral hearing loss, and found to have classical investigation results supporting the diagnosis. To the best of our knowledge, this is the first case report of Susac syndrome in Sri Lanka.

Case Presentation

A 32-year-old female who was apparently healthy, presented to emergency treatment unit of National Hospital-Kandy in Sri Lanka on 7th of April in 2022. She had developed severe generalized headache associated with vomiting which was treated by her general

practitioner with analgesics and antiemetics. Though there was improvement of headache, patient became drowsy and confused after 3 days into illness. She also developed unsteadiness in walking and became incoherent. She was noticed to have global weakness. But she has not complained blurring of vision and there was no history suggestive of fits. Mother of this patient reported that patient had a disturbance of left side hearing when she was making a telephone call 3 days before admission. We could not reveal a history of fever and other systemic enquiry was unremarkable.

On arrival to the emergency treatment unit the temperature was 34.6 , the heart rate 88 beats per minute, the blood pressure 131/85 mmHg and oxygen saturation 99% while breathing ambient air. Glasgow Coma Scale was 11. Pupils were 4 mm in size and reactive to light. There was no neck stiffness, and she could move all four limbs. There were global hyperreflexia and bilateral extensor plantar response. Fundoscopic examination did not reveal papilledema.

Initial workup was based on few tentative diagnoses, namely acute disseminated encephalomyelitis, cerebral vein thrombosis and cerebral vasculitis. Hematologic tests revealed normal cell counts without anemia. Inflammatory markers including erythrocyte sedimentation rate and C-reactive protein were normal. Cerebrospinal fluid analysis showed high protein concentration(120mg/dl), 10 lymphocytes and normal CSF/serum sugar ratio. Antinuclear antibody titer was not significant and both MPO and PR3 antineutrophil cytoplasmic antibodies were not detected.

The striatum and left internal capsule were shown to have focal hypodensities on a non-contrast CT examination of the brain. The CT venogram revealed no evidence of cerebral venous sinus thrombosis. Magnetic resonance imaging of brain showed multiple small white matter and deep grey matter lesions with high T2W and FLAIR signal intensity in the supra and infratentorial compartments. Few lesions show diffusion restriction. Punctate microinfarctions in the posterior limb of the internal capsules gave the appearance of 'string of pearls'. Lesions in the corpus callosum showed typical involvement of the central fibers giving 'snowball appearance'. Low T1 signal changes, also referred to as 'T1 black holes' indicating chronic lesions were noted. There was no enhancement of the parenchyma or the leptomeninges. The MR angiography revealed no features of vasculitis and no occluded segments. And screening sagittal spine MR images did not reveal abnormalities.

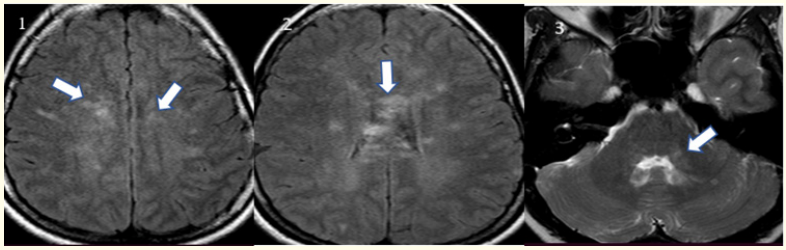

Figure 1: Axial FLAIR [1], [2] and T2W [3] images show multiple small, hyperintense lesions in the deep white matter, corpus callosum, cerebellum and middle cerebellar peduncles.

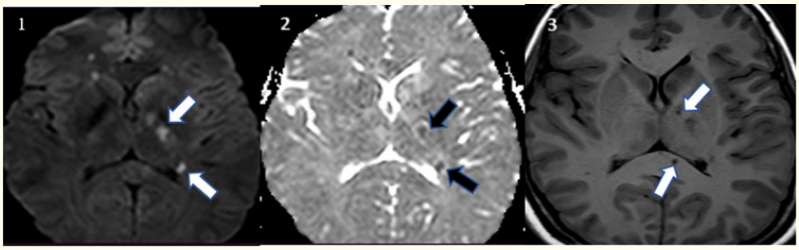

Figure 2: Diffusion weighted images and corresponding ADC map [1,2] show lesions with diffusion restriction. And the T1W images [3] show chronic T1 black holes.

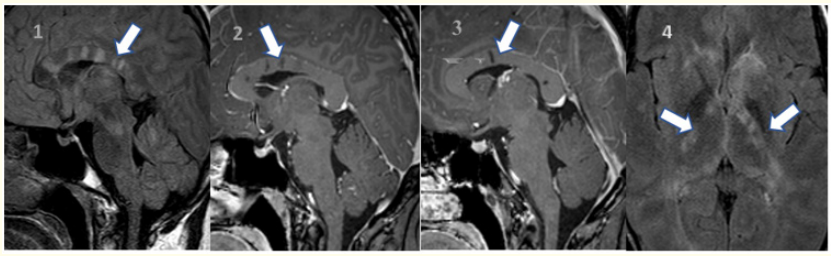

Figure 3: Pathognomonic imaging features of Susac syndrome with snowball lesions of the corpus callosum [1-3] and 'string of pearls' lesions of internal capsule [4].

With above charracteristic MRI features and the fact of hearing loss made us to think of the possibilty susac syndrome. Pure tone audiogram was requested and it confirmed the left side sensori-neural hearing loss as shown in figure 4.

Next step in our evaluation was fundoscopic examination and imaging of retinal vasculature with fluorescein angiography (FA) to arrive at our diagnosis. Significantly, it supported our diagnosis with characteristic features (Figure 5).

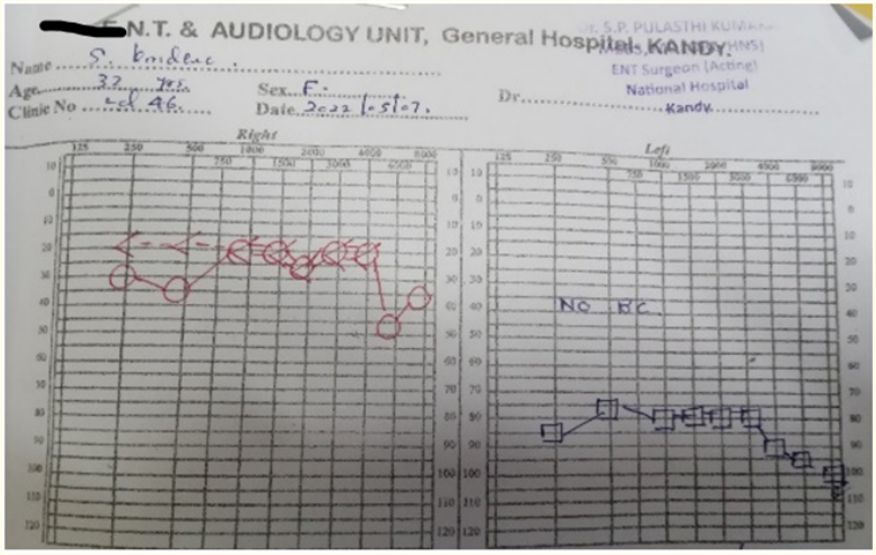

Figure 4: There is absent left side bony conduction and reduced air conduction.Right side conduction appeared normal.

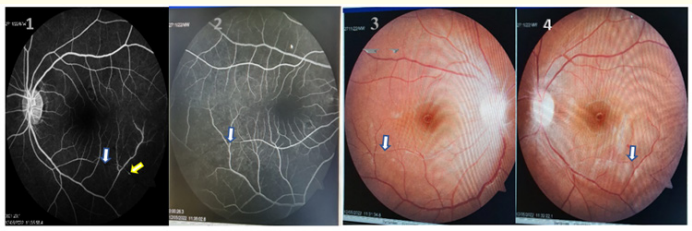

Figure 5: Fluorescein angiogram images [1,2] show branch retinal arterial occlusion with absent distal perfusion (white arrows). There is evidence of segmental arterial wall hyper fluorescence (yellow arrow). Fundoscopic views [3,4] showing occlusion of a branch retinal arteries with focal ischemic areas (white arrows).

So, all criteria for the diagnosis of Susac syndrome were fulfilled. Intravenous methylprednisolone 1g daily for 5 days were completed. She was started on intravenous immunoglobulin 0.4g/kg daily and continued for 5 days. Patient responded to treatment drastically and she could walk independently. Altered sensorium was improved. She was discharged with oral prednisolone 1mg/kg and mycophenolate mofetil 500mg twice daily.

Discussion and Conclusion

This disease entity was first described in 1979, and it was named as Susac syndrome in 1994 formally. In 1975 John O Susac who is an American neurologist found a woman with a triad of encephalopathy, branch retinal artery occlusion and deafness. With his colleagues he published this case in 1979 as microangiopathy of the brain and retina, and since then it was reported in different parts of the world [3]. It has a female predominance with female to male ratio 3:1, and primarily affect those who are in the age group of 20-40 years [5]. Annual incidence was investigated in Austria and found as 0.01/100000 [5].

This disease is believed to be due to an underlying autoimmune causation [13]. A recent autopsy study has suggested an endotheliopathy as the basic histopathological finding [15]. It typically causes a triad of encephalopathy, branch retinal artery occlusion and hearing loss [1-3]. However, all these features can be seen only in 20% of cases at the initial presentation [3]. Mostly it starts as an incomplete form, and later can develop other components of the disease [5]. The patient we treated had all 3 classic clinical features.

Headache, dysarthria, and neuropsychiatric symptoms such as memory impairment, personality changes may be the manifestations of encephalopathy [5,6]. Ophthalmological symptoms are less common as in our patient who did not complain visual impairment, as it affects peripheral small branch retinal arteries [8]. Otological involvement can present with hearing loss, tinnitus, vertigo, unsteadiness, and nystagmus [16].

Basic blood tests including inflammatory markers are usually not deranged. CSF analysis can be positive for mild lymphocyte pleocytosis and proteinorachia which we also noticed in our patient [17]. The use of MRI brain is crucial in determining the accurate diagnosis. Corpus callosal lesions with a 'snowball appearance' are pathognomonic and typically involve the central fibers of the callosal body and splenium without abutting the undersurface [7]. They are hyperintense in T2W and FLAIR sequences in the acute stage and show punched out holes in T1W images when chronic. Similar typical lesions of acute and chronic stages were seen in our case. Lesions also involve deep cerebral white matter, deep grey matter, brainstem, cerebellum, and cerebellar peduncles. A 'string of pearls' appearance due to punctate microinfarcts involving the internal capsule has been described. DWI/ADC sequences are frequently normal, but not in our case, where few lesions show diffusion restriction. And during the acute stage, lesions frequently enhance [10]. And leptomeningeal enhancement is described in about 33% of cases in the literature. In our case, non-enhancing leptomeninges may have been due to early steroid commencement prior to imaging. Multiple infarcts related to thromboembolic disease or vasculitis, and ADEM are all differential diagnoses based only on imaging findings.

Retinal branch arterial occlusion, vascular leakage, arteriolar wall hyper fluorescence (AWH) and signs of branch retinal ischemia are the well-known ophthalmological manifestations which may be evident in fundoscopic examination or FA [11]. AWH is pathognomonic for Susac syndrome [8]. Optical coherent tomography (OCT) is a tool that can demonstrate inner retinal layers ischemia [8,9]. Vestibulocochlear testing with pure tone audiometry is valuable to prove sensorineural hearing loss usually in the range of medium and low frequency [7]. In severe disease it can involve all frequencies as we noticed in this patient [7].

Definite diagnosis of Susac syndrome can be achieved when the triad of encephalopathy, sensorineural hearing loss and BRAO are present [7]. Mostly, it does not fulfill all criteria at the beginning, and considered probable Susac syndrome [1]. Central callosal lesions or 'snowballs' lesions and AWH are pathognomonic features that increase the sensitivity of diagnosis in incomplete cases. There are some reports of presence of anti-endothelial cell antibodies (AECA) in Susac syndrome [12,13]. But the sensitivity and specificity of AECAs are not well understood in this disease condition.

Early treatment can prevent long term sequela of SS [4]. A review of literature on treatment shows benefit from immunosuppressive drugs and Intravenous immunoglobulin. Corticosteroids, mycophenolate mofetil, azathioprine, methotrexate, cyclophosphamide, and rituximab are promising treatments that can be used successfully [4]. Treatment should be aggressive to avoid dreaded complications that can lead to dementia, visual loss, and deafness [6].

Declaration

Ethics approval and consent to participate

The study is approved by ethics committee of National Hospital Kandy.

Consent for Pulication

Written informed consent was obtained from patient for publication of this case report.

Availability of Data and Materials

Not applicable.

Competing Interests

The authors declare that they have no competing interests.

Funding

Not applicable.

Authors Contributions

Chaminda Kumara involved in investigation,diagnosis,treatme nt and preparing manuscript. Janaka Peiris Prticipated in investig ation,diagnosis,treatment and preparing manuscript. Mary Muththukumarasamy participated in radiological assessment. Mahinda Weerasekara participated in Ophthalmological assessment.

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