

Magnetic Resonance Imaging Evidence of Hippocampal Sclerosis – A Case Report

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Abstract

Case Report

Hippocampal sclerosis is a central nervous system disorder where nerve cells become non vital and scar tissue formation is seen in the hippocampus. This condition is associated with cases of temporal lobe epilepsy, a disease where patients experience unusual sensations, and complaints of altered emotions and behavior, muscle spasms and sometimes convulsions. Although there is strong association, it is not proved whether hippocampal sclerosis causes temporal lobe epilepsy or temporal lobe epilepsy causes hippocampal sclerosis. It is possible that both conditions are linked to another underlying abnormality. The hippocampal region is located in an area of the brain called the medial temporal lobe.

Keywords: Hippocampal sclerosis, Magnetic resonance imaging, Medial temporal lobe.

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INTRODUCTION

Hippocampal sclerosis is a pathological condition of the central nervous system where there is severe loss of neuronal cells and gliosis occurs in Hippocampal region. Sir Wilhelm Sommer first described Hippocampal sclerosis in 1880 [1]. Hippocampal sclerosis can be detected both in living persons by MRI and in dead persons by autopsy. Hippocampal sclerosis affected patients will have same symptoms and dementia progression like patients affected with Alzheimer's disease (AD) and commonly misdiagnosed as having Alzheimer's disease. But clinical and pathologic findings suggest that hippocampal sclerosis has characteristics of a progressive disorder although the underlying cause remains elusive [2].

Possible causes include

Ageing

Hippocampal sclerosis is relatively common among elderly people (individuals over the age of 85 years), association between this disease and ageing remains unknown [3].

Vascular risk factors

Hippocampal sclerosis was associated with vascular risk factors also. Compared to Alzheimer's disease, Hippocampal sclerosis cases were associated with a history of stroke or hypertension, evidence of

small vessel disease, but less likely to have associated with diabetes mellitus [4]

Socioeconomic status

People from low socioeconomic status have increased incidence of heart disease, lung cancer, and diabetes. Main causes are the result of poor diet, low levels of exercise, dangerous jobs (exposure to toxins etc.) and increased levels of smoking and alcohol intake in socially deprived populations. Hesdorffer *et al.* found that low socioeconomic status may have a cumulative effect for the risk of developing epilepsy over a lifetime [5].

Symptoms

There is evidence of segmental loss of pyramidal neurons, granule cell dispersion and reactive gliosis in Hippocampal sclerosis. This means that pyramidal neuronal cells are lost, granule cells are spread widely or driven off, and glial cells are changed in response to damage to the central nervous system (CNS).

Generally, hippocampal sclerosis may be seen in some cases of epilepsy. We have to clarify the ill effects that most likely have caused the hippocampal sclerosis and have initiated the epileptogenic process. Temporal lobectomy in young individuals is commonly recognized as mesial temporal sclerosis with temporal lobe epilepsy. Hippocampal sclerosis is

an unrecognized cause of cognitive decline, typically presenting with severe memory loss.

Temporal lobe epilepsy

Hippocampal sclerosis is otherwise known as Ammon's horn sclerosis and is the most common type of neuropathological damage seen in individuals with temporal lobe epilepsy [6] This type of neuronal cell loss, primarily in the hippocampus, can be observed in approximately 65% of people suffering from this form of epilepsy. Hippocampal sclerosis is the most likely origin of chronic seizures in temporal lobe epilepsy patients, rather than the amygdala or other temporal lobe regions. Hippocampal sclerosis is a distinctive feature of the pathology associated with temporal lobe epilepsy.

CASE STUDY

A 32 year old female presented with complaints of headache radiating to neck for the past 6 months and vertigo. Not associated with vomiting, loss of consciousness, fever and head injury. MRI brain was performed in axial, coronal and sagittal sections in T2, T1, FLAIR and diffusion weighted sequences.

Hippocampus appears small in size (Fig 1, 2). On T2 axial section hyperintense signal was seen in the region of right hippocampus with dilatation of ipsilateral temporal horn (Fig 4). Cerebellar folia were looking prominent.

All these features are suggestive of hippocampal sclerosis.

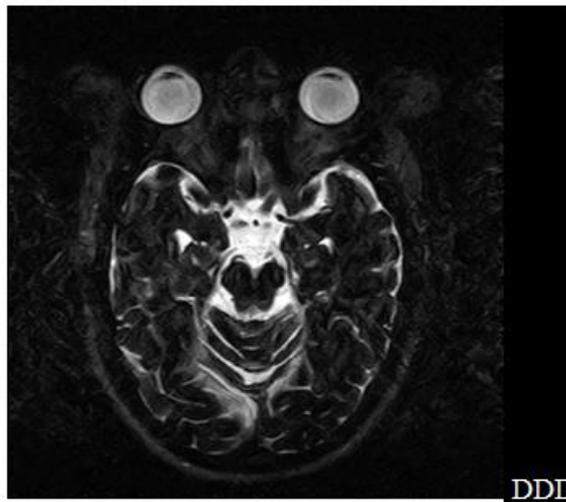


Fig-1: MRI axial section shows hippocampal atrophy

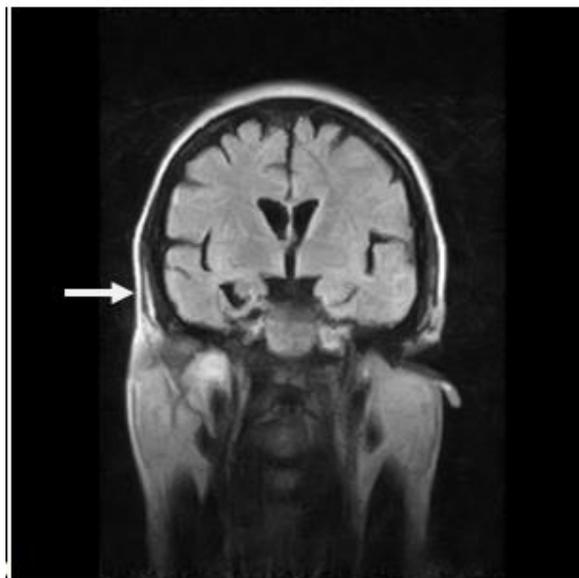


Fig-2: MRI coronal section shows hippocampal atrophy

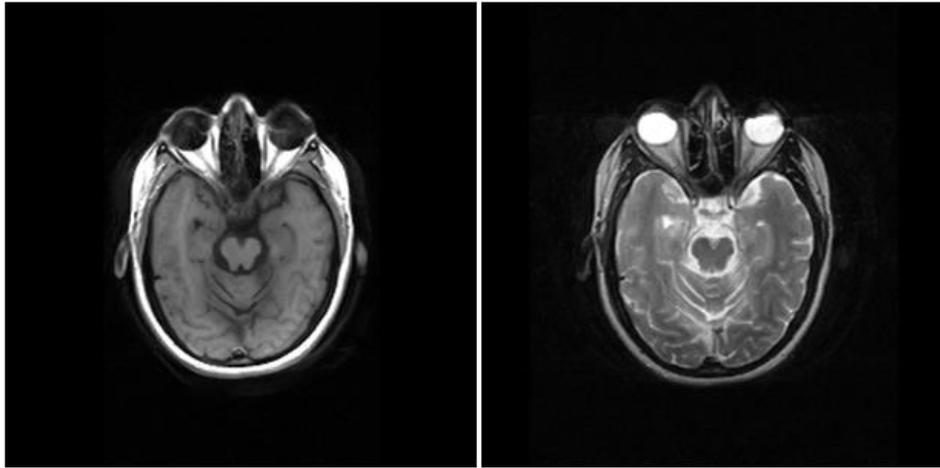


Fig-3 & 4: MRI T1 and T2 axial section shows hypointensity and hyperintensity respectively in right hippocampus with dilatation of ipsilateral temporal horn

DISCUSSION

Using magnetic resonance imaging (MRI) scans, we can observe a decrease in size which is the main change seen in the hippocampus when it is affected by hippocampal sclerosis. When viewing samples of the hippocampus under a microscope, we can appreciate the loss of individual nerve cells and that scarring has developed. It is believed that this damage would have been caused by excessive amounts of some neurotransmitters, the chemicals that carry signals between nerves, being released. These particular neurotransmitters bind to special receptors on nerve cells, causing calcium to enter; in excess, calcium overload leads to cell death.

MRI is the prime modality of choice to evaluate the hippocampus. Findings include reduced hippocampal volume and hippocampal atrophy.

Researchers who investigated Hippocampal sclerosis have suggested that febrile fits occurring in childhood, might injure the brain, damaging the hippocampus and leading to temporal lobe epilepsy in later life. One more theory is that defects in the temporal lobe may predispose individuals to both hippocampal sclerosis and seizures. Alternatively, a combination of hereditary, environmental and developmental factors could make some people more prone to both epilepsy and sclerosis in the hippocampus.

CONCLUSION

Previously we had lot of controversies in the early application of MRI to patients with epilepsy, but now it is accepted that, in experienced hands of Neuroradiologists and with appropriate imaging sequences, and state of art MRI machines, MRI has the ability to detect hippocampal abnormalities with great sensitivity. MRI is the prime modality of choice to evaluate the hippocampus.

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