Radiological Quiz

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62 year old male had onset of symptoms on 6th July 1999. He became confused while having his meal and started mixing food. He did not respond on being called by his wife. He remained confused for 5 minutes thereafter. A history of 1-2 similar episodes per month

despite being on Sodium Valproate therapy was elicited. All routine investigations were normal, EEG was also normal. The MR images of the case are given. What is your diagnosis?

Fig. 1a : FLAIR coronal section of the brain

Fig. 2a : FLAIR coronal section showing sclerosis of right hippocampal region with dilatation of temporal horn of ipsilateral lateral ventricle

Fig. 1b : T1W coronal section of the brain

Fig. 2b : T1W coronal section of the brain shows right sided hippocampal atrophy with dilatation of the ipsilateral temporal horn

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Answer to the quiz

Mesial Temporal Sclerosis

FLAIR coronal images of the patient reveal sclerosis and atrophy of the right Hippocampal region with evidence of dilatation of temporal horn of the right lateral ventricle. Mesial Temporal Sclerosis (MTS) is a specific entity associated with intractable partial complex seizures not responding to medical therapy and often requiring surgery. It is seen in young adults and often a history of febrile convulsions is present [1]. Mechanism for excitotoxicity induced neuronal death is related to overproduction of excitatory amino acids following seizures. This causes excessive activation of N-methyl-D-aspartate receptors, which causes unregulated entry of calcium ions into the cells leading to neuronal oedema and cell death. Pathologically, there is focal gliosis associated with atrophy of the hippocampal region of the temporal lobe. Other findings include, asymmetry of the fornix and dilatation of the ventricles [2]. Though CT scan may show the changes in form of atrophy of the hippocampal region and dilatation of the ventricles, MRI is more specific in defining the changes.

In majority of the cases, diagnosis may be made using high resolution MR sections through this region. It consists of utilizing conventional spin echo or fast spin echo T2 WI and inversion recovery using FLAIR sequences. Images are obtained in a plane parallel to the pons and midbrain. FLAIR sequences are particularly useful in distinguishing focal hyperintense signal of MTS from hypointense signal of surrounding CSF. Typical features include focal gliosis of amygdala and hippocampus, loss of grey white matter differentiation and focal enlargement of the temporal horn

[3].

The degree of prolongation of T2 relaxation time is associated with severity of hippocampal atrophy in temporal lobe epilepsy but not in Alzheimer's disease. The T2 relaxation times are typically prolonged in temporal lobe epilepsy to the tune of 8-20 msec, one of the commonest causes being MTS [4].

MR spectroscopy shows a decrease in N-acetyl aspartate (NAA) peak and normal or slight increase in creatine (Cr) and choline (Cho) peaks. NAA/Cho=Cr signal ratio is a more sensitive test. The relative decrease in NAA peak reflects neuronal loss, whereas the increase in Cho and Cr signal represents astrocytosis. Positron emission tomography (PET) and single photon emission tomography (SPECT) are also useful in localizing the seizure foci particularly in patients undergoing surgery when MR findings are inconclusive [5].

References

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