

Role of MRI in the evaluation of status epilepticus

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Abstract

The role of Diffusion Weighted Magnetic Resonance Imaging in the evaluation of various intracranial lesions has been evolving and increasing since its initial introduction as newer uses are being explored constantly. We review the imaging features of 41 cases of extra axial intracranial tumors and evaluate the role of diffusion weighted imaging in their diagnosis. Diffusion weighted imaging provides additional information in differentiating various intracranial tumors, in differentiating arachnoid cysts from epidermoid cysts, defining cystic/necrotic components of tumors.

Key Words: Apparent Diffusion Coefficient (ADC), Central Nervous System (CNS), Diffusion Weighted Imaging (DWI), Magnetic Resonance Imaging (MRI).

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Received Date: 04/07/2017 Revised Date: 30/07/2017 Accepted Date: 16/09/2017

DOI: <https://doi.org/10.26611/100498>

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20 September 2017

INTRODUCTION

Status Epilepticus is defined as a continuous seizure lasting more than 30 min, or two or more seizures without full recovery of consciousness between any of them with an incidence of ~35 per 100,000. Mortality from Status Epilepticus varies from 3–50%. In elderly patients, refractory status epilepticus (RSE) may lead to death in over 76% cases. The lifetime prevalence of SE in persons with epilepsy range from 1–16% with the condition being more frequent among men, blacks, and the aged.

MATERIALS AND METHODS

Prospective cross sectional study of status epilepticus cases admitted at Gandhi medical college from February 2014 to February 2015. Here in we report 20 cases of status epilepticus. We subjected them for MRI study and diagnosed to have specific etiologies. Cases with history of trauma, ICSOL and pregnant females were excluded.

OBSERVATIONS AND RESULTS

The peak age incidence is between 0 -10years.

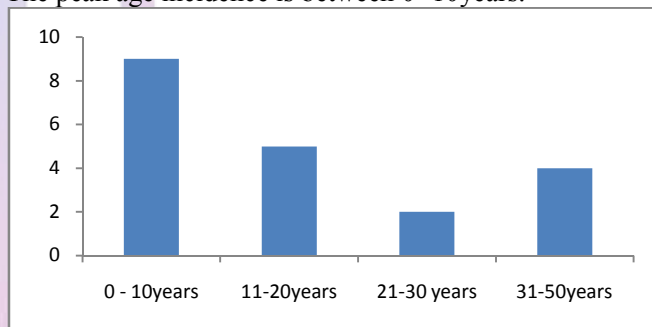


Figure 1:

Frequency is noted more in males compared to female

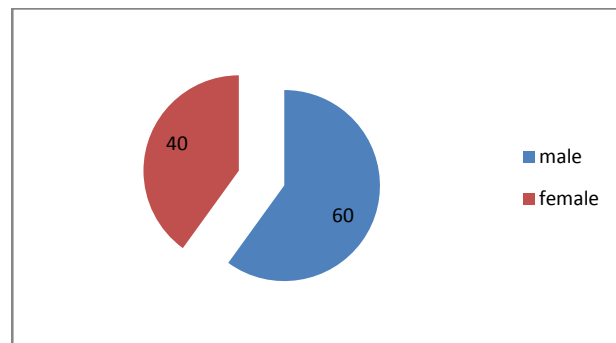


Figure 2:

DISCUSSION

Status epilepticus is the most common medical neurological emergency in childhood and is associated with significant morbidity and mortality^{1,2}. Status Epilepticus is defined as a continuous seizure lasting more than 30 min, or two or more seizures without full recovery of consciousness between any of them. Prolonged SE can lead to cardiac dysrhythmia, metabolic derangements, autonomic dysfunction, neurogenic pulmonary edema, hyperthermia, rhabdomyolysis and pulmonary aspiration. Permanent neurologic damage can occur with prolonged SE. Refractory status epilepticus (RSE) is defined as continuous or repetitive seizures lasting longer than 60 min despite treatment with a benzodiazepine (lorazepam) and another standard anticonvulsant (usually phenytoin/fosphenytoin) in adequate loading dose. About 9–31% of patients with status epilepticus may fail to respond to standard treatment. This subgroup of RSE has greater morbidity and mortality. Malignant SE is a severe variant of RSE, in which the seizure fails to respond to aggressive treatment with even anesthetic agents. It typically occurs in young patients (18–50 years) in the setting of encephalitis. SE

may be classified broadly as convulsive SE and nonconvulsive SE. Convulsive SE (CSE) can be further classified into (a) tonic–clonic SE, (b) tonic SE, (c) clonic SE and (d) myoclonic SE. Generalized tonic–clonic SE is the most common form of SE. Nonconvulsive SE (NCSE) refers to continuous or near-continuous generalized electrical seizure activity lasting for at least 30 min, but without physical convulsions. Central nervous system tumor or infection, stroke, low antiepileptic levels, alcohol withdrawal and metabolic derangement are the most frequent causes³. The most common age group affected is 0 to 10 years. Most of the patients were males, with male to female ratio being 3:2. Stroke was found to be the most common condition noted in patients presenting with status epilepticus accounting for 25%. Second most common condition is neurocysticercosis in patients presenting with status epilepticus accounting for 15%. There are further advancements in the diagnostic modalities with SPECT. Correlative studies between ictal clinical semiology and ictal rCBF changes are now being undertaken⁴.

STROKE

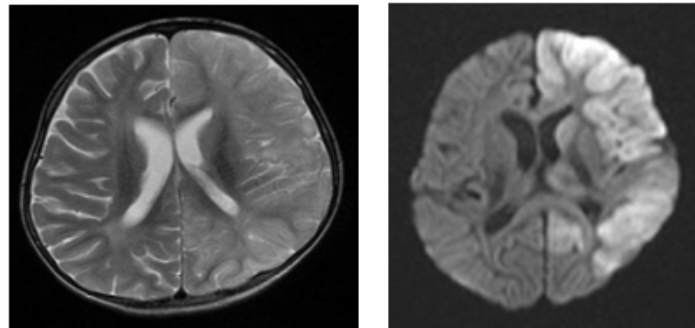


Figure 3:

Accounts for 25% of cases of status epilepticus in the present study. Changes in cerebral blood flow, hypoxia, involvement of the cerebral cortex by hemorrhage or infarct, and development of epileptogenic changes in cortical neurons, their connections, or their environment have been proposed as potential mechanisms underlying seizures in patients with stroke⁵. SE was not associated with a higher mortality rate but with higher functional disability. Early-onset SE (within the first 7 days after stroke) was associated with a higher risk for SE recurrence and a higher mortality rate than late-onset SE

(after 7 days after stroke). Focal hemodynamic alterations related to focal ictal activity have also been reported by Jackson *et al.* and Detre *et al.* employing the blood oxygenation level-dependent (BOLD) MRI method^{6,7}. Periictal neurologic deficits and neuroimaging findings of cerebral cortical T2 hyperintensity and diffusion restriction are well-known mimics of stroke⁷. Evidence of cytotoxic edema secondary to epileptic activity itself has been reported by several authors,^{8,9} along with reduced ADC values in the perilesional region of a brain tumor¹⁰.

NEUROCYSTICERCOSIS



Figure 4:

Accounts for 15% of cases of status epilepticus in the present study. The most common presentation of parenchymal NCC is with seizures. Seizures are reported in 70–90% cases. Status epilepticus has been reported in 1.7–32% of children

MESIAL TEMPORAL LOBE SCLEROSIS

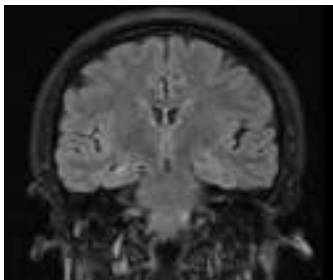


Figure 5:

Accounts for 5% of cases of status epilepticus in the present study. The most common association with MTS in humans is febrile convulsion in childhood^{11,12}.

MOYA MOYA DISEASE

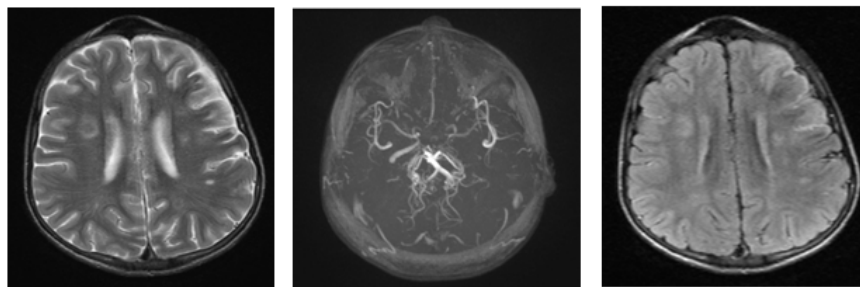


Figure 6:

Accounts for 5% of cases of status epilepticus in the present study.

METABOLIC DERANGEMENTS

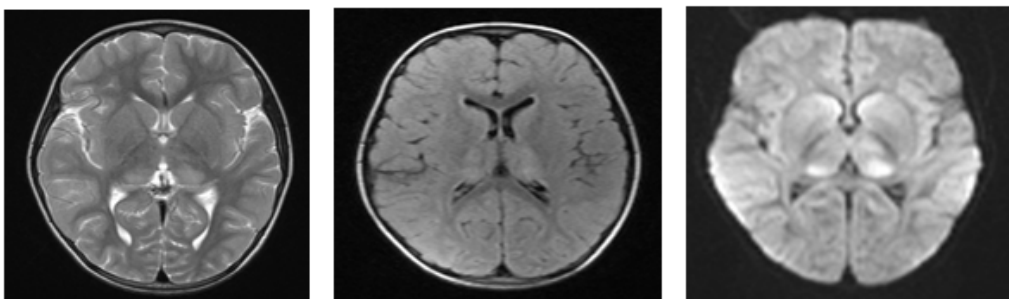


Figure 7:

Accounts for 10% of cases of status epilepticus in the present study.

GLIOSIS

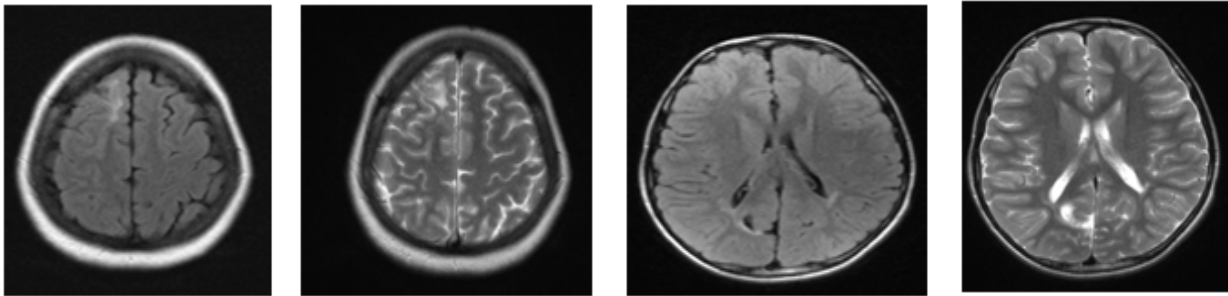


Figure 8:

NORMAL PRESSURE HYDROCEPHALUS

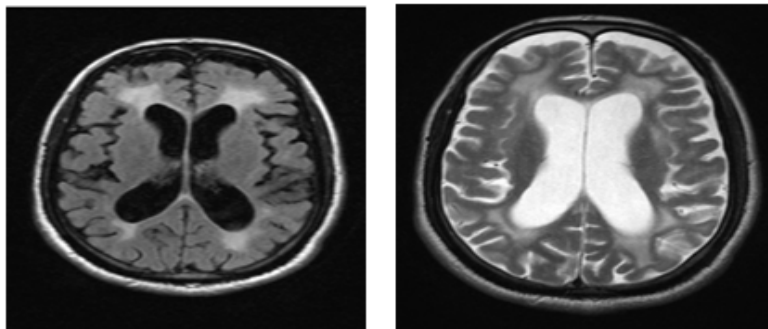


Figure 9:

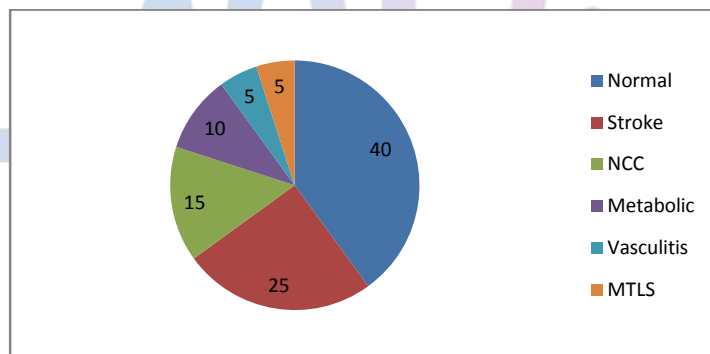


Figure 10:

CONCLUSION

MRI with standard protocol is essential and highly sensitive in identifying the etiology for the development of Status epilepticus.

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Source of Support: None Declared
Conflict of Interest: None Declared

