



CODEN [USA]: IAJ PBB

ISSN : 2349-7750

INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187

<http://doi.org/10.5281/zenodo.4127088>
Available online at: <http://www.iajps.com>

Research Article

FINDINGS OF MRI IN NEWLY IDENTIFIED CHILDREN SUFFERING FROM EPILEPSY

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Article Received: August 2020

Accepted: September 2020

Published: October 2020

Abstract:

Objectives: One of the major chronic neurological complication is epilepsy in children and it can affect 0.50% to 1.0% children. The main objective of this research work was to find out the prevalence rate and different kinds of structural abnormalities in the children suffering from epilepsy with the help of MRI (Magnetic Resonance Imaging).

Methodology: The research work was carried out in Aziz Fatima Hospital, Faisalabad. In this research work, we included children suffering from epilepsy who underwent MRI within six months after the identification of the disease from March 2015 to June 2020.

Results: Among 220 children; 59.55% (n: 131) children were present without any abnormalities and 45.45% (n: 89) children were present with having at least one single abnormality in findings of MRI. The most common recorded lesions were encephalomalacia, brain atrophy and hydrocephaly with 5.90% (n: 13), 5.45% (n: 12) and 4.55% (n: 10) patients correspondingly. 31.06% (n: 69) patients were present with one single abnormality while 9.09% (n: 20) patients were present with 2 or greater lesions.

Conclusion: There was high rate of abnormality in the examination through MRI in newly identified children suffering from epilepsy. This high rate of abnormality was just because of recently emerging epilepsy. Additionally, 9.09% (n: 20) patients were present with concomitant abrasions. There was detection of secondary lesions in the patients present with abnormality of corpus callosum, atrophy, hydrocephaly, hydrocephaly and encephalomalacia. There were unknown primarily formed abrasions, there is need of further research work for the consolidation of the results of this research work.

KEYWORDS: Abnormality, Consolidation, Hydrocephaly, Abnormality, Concomitant, Neurology, Prevalence Rate.

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Please cite this article in press Muhammad Asad Awan et al, *Findings Of MRI In Newly Identified Children Suffering From Epilepsy*, Indo Am. J. P. Sci, 2020; 07(10).

INTRODUCTION:

One of the most common neurologic complication is epilepsy in pediatrics. International League on the Epilepsy defines the epilepsy as minimum 2 reflex or unprovoked seizures greater than 24 hours apart. Epilepsy affects fifty million population in the whole world and half of these persons start to suffer from this complication in period of childhood [1-3]. King stated the abnormal findings of MRI when there was evaluation of all seizures as 35 in 263 (13.30%) patients [4]. With the rise in the availability of the MRI with high quality; some of the lesions not identified in CT scanning like mesial temporal sclerosis that are related with the pediatric onset seizures, can be identified [5-8]. There is superiority of magnetic resonance imaging to CT (Computed Tomography) is particularly in temporal lobes [9].

High-quality MRI has raised and changed the management and evaluation of epilepsy with the elaboration of underlying mechanisms [10]. Radiation lack is other feature of superiority of magnetic resonance imaging to computed tomography [11]. Most of the published imaging research work of pediatrics are targeting to clear the causes of acute seizures like trauma, CNS hemorrhage and meningitis to plan the fast as well as immediate treatment [12-14]. In a recent research work of the brain imaging of pediatrics suffering from epilepsy, 55.860% patients were present with the abnormal findings of MRI. Most important leading abnormality was brain atrophy [15]. The rationale of this research work was to determine the rate of prevalence and kinds of the structural abnormalities among newly diagnosed children suffering from epilepsy.

METHODOLOGY:

This study was a retrograde research work. In this research work, we evaluated the children with epilepsy who got treatment from March 2015 to June 2020 in Aziz Fatima Hospital, Faisalabad. We included 220

patients examined with help of MRI in the first 6 months of disease in this research work. The performance of MRI examination was carried out with the utilization of 1.50T (Siemens) and 3.0T (Siemens) with tool of pediatric epilepsy. There was following sequence of scanning in the standardized protocols; sagittal T-1 weighted spin echo, axial 3-dimensional spoiled gradient echo, axial T-2 weighted fast spin echo, recovery of coronal oblique fast fluid attenuated inversion, coronal oblique recovery of fast multi-planar inversion, b=1000 and axial diffusion. 26 minutes was the total time of imaging for all the sequences. A subset of 34 examinations was carried out on units of MRI at facilities of referring. These were carried out on the magnet systems with a variation from 0.50 to 1.50 Tesla and comprised of axial, sagittal on most of the patients, coronal images with the utilization of typical sequences. There was rating of adequate or better in the quality of scanning of these research works. We administered the Gadolinium as a contrast to MRI. SPSS V.20 was in use for the statistical analysis of the collected information. After that we described and compared all the findings.

RESULTS:

In this research work, a sum of 220 patient with detection of epilepsy underwent examination through MRI within six months of identification of disease; among them, 59.55% (n: 131) patients were present without any abnormality identified by magnetic resonance imaging. Among pediatrics, 40.45% (n: 89) patients showed the presence of abnormality in MRI findings. Total 31.36% (n: 69) patients were present with one single abnormality but 9.09% (n: 20) patients were present with two or greater abrasions. We categorized the findings as non-focal and focal lesions. There was detection of focal and non-focal lesions in 13.64% (n: 30) and 37.27% (n: 82) patients. The summary of the abnormal finding is present in Table-1.

Table-I: Abnormal Brain MRI Findings		
MRI Findings	Positive MRI Finding (n)	Percentage (%)
Focal lesions	30	13.64
Tumor	2	0.9
Cortical tuber	1	0.45
Mesial temporal sclerosis	1	0.45
Porencephalic cyst	3	1.36
Venous angioma	3	1.36
Hippocampal sclerosis	2	0.9
Cysts	7	3.18
-neuroglial cysts	3	1.36
-pineal cyst	1	0.45
-arachnoid cyst	3	1.36
Other focal lesions	8	3.37
-focal ischemic lesion	2	0.9
-focal gliosis	1	0.45
-previous hemorrhage	5	2.27
Focal encephalomalacia	3	1.36
Non- focal lesions	82	37.27
Axonal injury	1	0.45
Encephalomalacia	13	5.9
Hydrocephaly	12	5.45
-without shunt	11	5
-with shunt	1	0.45
Hypo myelination	5	2.27
Diffuse atrophy	10	4.55
Corpus callosum pathology	9	4.09
-hypoplasia	4	1.82
-dysgenesis	3	1.36
-agenesis	2	0.9
Cerebellar atrophy	5	2.27
-with cerebral atrophy	3	1.36
-without cerebral atrophy	2	0.9
Heterotrophy (pachygyria, polymicrogyria)	5	2.27
Periventricular leukomalacia	5	2.27
Leukomalacia	3	1.36
Gliosis	7	3.18
Mega cisterna magna	1	0.45
Increased signal intensity	6	2.72

The most common abnormality was encephalomalacia present in thirteen (5.90%) patients. There was report of focal encephalomalacia in three (1.36%) patients. Next most common complication was hydrocephaly in twelve (5.45%) patients. There was presence of generalized atrophy in ten (4.55%) patients. Total 2.27% (n: 5) patients were present with cerebellar atrophy. Within the group of patients of cerebellar atrophy; 3 patients were present with cerebral atrophy. Whereas two patients among them separated with

cerebellar atrophy. There was detection of corpus callosum in nine (4.09%) patients. There was presence of generalized gliosis in 7 (3.18%) patients. There was presence of periventricular leukomalacia in 2.27% (n: 5) patients. There was presence of leukodystrophy in 1.360% (n: 3) patients.

Among focal abrasions; there was prevalence rate of tumor in two (0.90%), porencephalic cyst in three (1.36%), venous angioma in three (1.36%) &

hippocampal sclerosis in only 2 (0.90%) patients correspondingly. There was presence of cysts in 3.18% (n: 7) patients, of which 3 were suffering from cortical neuroglial, 3 patients were arachnoid and only 1 patient was present with pineal cyst. There was detection of heterotrophy in 2.27% (n: 5) patients. There was detection of cortical tuber, mega cisterna magna and axonal injury in single patients of the research population. The prevalence rate of secondary lesion in abnormality of corpus callosum, cerebral atrophy, hydrocephaly and encephalomalacia were 77.780%, 60.0%, 50.0% and 50.0% correspondingly.

DISCUSSION:

Cumulative prevalence of disease of epilepsy is 3.0% in whole population and half of the population acquired this complication from their period of childhood. The incidence of epilepsy is much higher in the developing and undeveloped countries of the world [16]. Neuroimaging is very important to detect the etiology and guide the different therapeutic approaches. MRI has the ability to detect the non-specific abnormalities as atrophy, peri-ventricular leucomalacia, it has the ability to demonstrate the static remote abrasions as porencephaly. It is much beneficial for the detection of the sub-acute and chronic issues like disorders of metabolism and it is also vital for detecting the acute process needing emergent intervention as stroke, tumor, hydrocephalus and encephalitis [17].

In various research works assessing the findings of brain imaging in the epilepsy of childhood period, there was variation of the abnormal findings of MRI from 28.50 to 55.860% [18]. The findings of this current research work are consistent with these research reports. Betting demonstrated the abnormal findings of MRI in 24.0% patients who were present with idiopathic generalized seizures [19]. In this current research work, we enrolled the patients suffering from epilepsy only which may be the reason of the high abnormality rate. It is well acknowledged that normally epilepsy and hydrocephaly occur together. In a recent research work on four hundred and eleven pediatrics with hydrocephalus; 18.0% patients were stated to have the epilepsy [20]. Hydrocephaly was present in 5.450% patients of this research work; another research stated the 3.82% patients present with this abnormality. There is a rising evidence of the cerebellar atrophy among youngsters suffering from epilepsy. In some other research works, there was no presence of cerebellar atrophy [21].

One other important point is that there is existence of the abnormal findings in magnetic resonance imaging

associated with the prognosis of the disease. Gaillard in his research work stated that in partial seizures, the prediction of the outcome can be made with the initial results of MRI. In the same manner, the abnormalities of the temporal lobe epilepsies in MRI findings had been discovered to be only the independent prognosticator of seizure outcome. So, findings of the neuroimaging are vital in the setting of therapeutic approaches in period of childhood and to identify evaluation of this complication to period of adulthood age.

CONCLUSION:

There was presence of high rate of abnormality in the newly detected epileptic children in examination through epilepsy. Neuro-imaging particularly high MRI resolution to estimate the planning of treatment and prognostic outcome. Total 9.09% (n: 20) patients were present with greater than one abrasion on magnetic resonance imaging. There is need of further research works for the consolidation of the research works conducted in this research work.

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