ISSN: 2349-2678

Contents lists available at www.ijpba.in

International Journal of Pharmaceutical and Biological Science Archive

Index Copernicus Value 2015: 43.92

Volume 3 Issue 6 2015, Page No.22-25

STUDY USING COMPUTED TOMOGRAPHY TO DIAGNOSE EPILEPSY IN PATIENTS FROM CENTRAL INDIA

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ARTICLE INFO

Research Article

Received 16 Oct. 2015
Accepted 21 Dec. 2015

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ABSTRACT

Background: It is crucial to understand the etiopathogenesis of seizure disorder in order to plan and carry out effective treatment. However, in many instances, no lesion of any kind could be shown.

Aims & objectives: to analyse the CT scan features in patients with seizure disorders and classify the lesion's type.

Materials and methods: This study involved 100 patients who visited the radiology department of a medical college in central India with seizure disorders.

Observations and Results: In 45% of the cases when a cranial CT scan was analysed, it revealed normal findings, and in 55% of the cases, abnormal findings. Infectious, post-infectious, neoplastic, cerebrovascular disease, congenital lesions, traumatic lesions, post-traumatic sequela, tuberculous infection, and neurocysticercosis were the different categories for CT scan abnormalities. A frequent neurological condition with numerous etiologies is seizure disorder. An important diagnostic and predictive technique in the assessment of patients with seizure disorders is neuro imaging. In emergency cases, a CT scan is frequently the first course of action. An affordable diagnostic tool for poor nations with limited resources is the CT scan.

Conclusion: CT scanning is a helpful diagnostic tool in the assessment and treatment of patients with seizure disorders.

Keywords: brain, cranial, CT scan, seizure.

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INTRODUCTION

It is crucial to understand the etiopathogenesis of seizure disorder in order to plan and carry out successful treatment[1]. However, in many instances, no lesion of any kind could be shown. Additionally, a brain lesion that is organic in nature may frequently be linked to seizures[2-5]. For the detection and localization of structural abnormalities of the brain in patients with seizure disorder, advanced investigation techniques like computed tomography (CT scan), magnetic resonance imaging (MRI), position emission tomography (PET), single photon omission computerised tomography (SPECT), and isotope brain scanning have all proven to be extremely helpful. A CT scan can offer a sensitive and repeatable method for assessing a possible central nervous system lesion[6-8]. Whether or not other modalities, such as MRI, are available, it is frequently the inquiry of choice when examining the CNS lesion. Three essential parts make up a CT scan system: an imaging system, a scanning system, and a power supply. Most of the scanners currently in use are third-generation rotate-only systems[9-11].

Classification of seizures:

1. Partial seizure-
2. Simple partial seizure
3. Complex Partial seizure
4. Partial seizure with secondary generalization
5. Primary generalized seizure-
6. Absence or Petit mal seizure
7. Tonic clonic seizure or Grand Mal seizure
8. Tonic
9. Atonic
10. Myoclonic
11. Unclassified seizure-
12. Neonatal seizure
13. Infantile seizure

The patient's age and the type of seizure will determine the likely aetiology of a given episode. Perinatal hypoxia, ischemia, metabolic disturbance, developmental problem, genetic abnormality, trauma, acute CNS infection, and intracranial haemorrhage are among the frequent causes of newborns[12-15]. Frequent causes of febrile seizures in newborns and young children under the age of 12 include CNS infections, developmental and genetic abnormalities, and idiopathic reasons. Common causes of adolescent disease among those between the ages of 12 and 18 include trauma, infections, genetic disorders, brain tumours, drug addiction, and idiopathic reasons. The reasons of alcohol withdrawal in young adults between the ages of 18 and 35 are trauma, drug use, brain tumours, and idiopathic. Brain tumours, alcohol

withdrawal, cerebrovascular illness, metabolic disorder, idiopathic, Alzheimer disease, and other degenerative CNS diseases are typically the causes of elderly persons older than 35 years of age.

AIMS AND OBJECTIVES

1. To demonstrate the functions of the CT scan head in the assessment of seizure disorder patients.
2. To describe the type of lesion by doing a head CT scan on a patient with a seizure disorder.
3. Investigating seizure disorder's organic causes using a CT scan head characteristic.

MATERIALS AND METHODS

200 patients with seizure disorders who presented to various emergency, inpatient, and outpatient departments as well as those who were referred to the radiodiagnosis department of a medical college in central India were the subjects of this study. The patient's general information, including age, sex, place of residence, occupation, religion, drug use history, and dietary history, was documented. Each patient's presenting problem was described by the concerned referral practitioner, and this information was recorded. Depending on the situation, more information about the patient's current disease and medical history from the past was obtained from them. A general physical examination and a CNS examination were performed. Results of all investigations conducted, including X-rays of the skull, an EEG report, and various blood tests, were documented.

Following registration, each patient who presented with a seizure underwent a cranial computed tomographic evaluation on the high-speed NX/ 1 pro dual slice from GE and SomaTom art, a third-generation rotate type whole body CT scanner from Siemens, both of which were installed in our hospital.

Technique: The table was positioned according to the patient's needs while the patient remained supine. The head was restrained inside of a unique headrest with a unique head support. The patient was given instructions on how to avoid moving at all times and facilities for adequate immobilisation were provided. Children and patients who were agitated were drugged if necessary. A low resolution sagittal planning topogram scanogram was first obtained. The appropriate scan angle and planes were established using this image. The apex of the orbit and the external auditory meatus are easily defined by these fixed locations, which is why the orbit m et al. lines were chosen. The entire cerebral cavity and its contents were then cut into axial CT sections. Typically, slices with a thickness of 10 mm were used. Slice thickness was changed, though, to meet the needs.

In order to achieve a plane of section with a canthomeatal line angle of 15 to 20 degrees, the gantry was slanted appropriately. Utilized were computer programmes for measuring magnification, distance, and density as well as viewing at the appropriate window level. Following sensitivity testing, additional contrast-enhanced scans were carried out as and when necessary by IV injection of the proper dosage of contrast medium.

Results:

Table 1: Type of seizure distribution of 100 cases of seizure disorder

Sr. No.	Type Of Seizure	No Of Cases	%
1	Generalised	124	62
2	Partial	68	34
3	Unclassified/Infantile	8	4

Based on clinical features, seizures were divided into three categories: generalized, partial, and unclassified. Generalized seizures accounted for 62% of all seizures, while partial seizures accounted for 34% of all seizures.

Table 2: Age and sex distribution of 100 cases of seizure disorder

Age Group (In Years)	Sex		Total	%
	Male	Female		
0 - ≤ 16	32	18	50	25%
≥16 - <31	42	16	58	29%
≥31 - <46	30	12	42	21%
≥46 - < 61	22	10	32	16%
≥61 - <76	8	2	10	5%
>76	8	0	8	4%
	Total =142	Total=58		

The age range of 16 to 31 years saw the highest percentage of patients with seizures (29%) whereas the age group of less than 16 years saw 25% of occurrences. About 54% of all patients fall into one of these two age groups. Males (142) are afflicted 2.45 times more frequently than females (58).

Table 3: CT findings in the study 100 patients of seizure disorder

C T Diagnosis	No. Of Cases	%
Normal studies	90	45
Infective and post infective changes	34	17
Neoplasm	24	12
Cerebrovascular disease	16	8
Congenital malformation	14	7
Traumatic and posttraumatic sequele	8	4
Cerebral atrophy	6	3
Non-neoplastic cyst	4	2
Metabolic/ demyelinating disease	4	2

In this study, which included 200 seizure patients, 90 (45%) of the patients had normal lab results. 34 instances (17% of all abnormal scans) showed infectious and post-infectious alterations. There were 24 cases of neoplasm, 16 cases of cerebrovascular illness, 14 cases of congenital deformity, 8 cases of traumatic and posttraumatic sequelae, 6 cases of cerebral atrophy, 4 cases of metabolic/demyelinating disease, and 4 cases of non-neoplastic cysts. A total of 34 occurrences of seizure disorder among 200 patients with cerebral disease were caused by infectious and post-infectious complications. Meningitis and its aftermath were present in 12 cases, along with neurocysticercosis in 8, cerebral abscesses in 8, tuberculoma and its aftermath in 4, and congenital CMV infection in 2. Out of 100 seizure patients, tuberculous infection was the most prevalent infectious pathology, accounting for 6% of cases, including tubercular meningitis and tuberculoma in our research sample. Out of 100 patients, NCC was the most prevalent helmintic infection, occurring in 4% of cases.

DISCUSSION

The study involved 200 individuals who had been referred for a head computed tomography scan by a medical college in Central India and had a seizure disorder[16]. In this study, the age range of 16 to 31 has the highest proportion of affected patients, followed by 0 to 16 years. Males were 2.4:1 more likely than females to experience seizures. Out of 200 seizure cases, generalised seizures accounted for 62%, partial seizures for 34%, and the remaining cases were classified as unclassified. In 45% of the cases, analysis of the cranial CT scan revealed normal study. In 55% of cases, structural abnormalities were discovered during a CT scan. To help with diagnosis and therapy, an effort was made to categorise the type of lesion based on CT scan characteristics. 55% of patients had abnormalities found on their CT scans, which were categorised as being either infectious or post-infectious in 17% of cases, neoplastic in 12%, cerebrovascular disease in 8% of cases, congenital lesions in 7% of cases, traumatic lesions and post-traumatic sequelae in 4% of cases, cerebral atrophy in 3% of cases, and miscellaneous in 2% of cases, including non-neoplastic cysts, demy Infectious and post-infectious complications made up the majority of intracranial pathology and accounted for 17% (34 cases). These complications included congenital CMV infection in 1% of cases, meningitis and post-meningitis in 6% of cases, neurocysticercosis in 4% of cases, cerebral abscess in 4% of cases, and neurocysticercosis and post-tuberculoma calcification in 2%. This study found that, because to CT's high sensitivity for calcification, it may be a more cost-effective alternative to MRI in suspected cases of NCC in a single seizure, particularly in endemic regions like portion of India. Neoplasm is the second most common group of lesions, making about 12% of all cases[17-20]. Meningioma and astrocytoma account for more than 50% of these instances, with 25% being secondary lesions. In 41.6% of cases, the neoplasm was accompanied by chronic seizures, and it was found that CT head imaging is a useful tool for identifying lesions that may be amenable to removal in chronic epileptic patients. With 8% of cases, cerebral vascular disease ranked third among the major causes. More than 50% of CVA lesions linked to seizure disorder are infarctions. In the current investigation, post-infarct seizures were more frequently seen when the temporal cortex was damaged. Congenital lesions were discovered in 7% of cases, including porencephalic cysts, schiezoencephaly, dandy Walker malformation, cysts of CSP and CV, cysts of CVI, and cysts of CSP and CV. In 4% of the patients, traumatic lesion and posttraumatic sequelae were discovered. The majority of patients had several traumatic lesions when they arrived. Arachnoid and colloid cysts, each detected in 2 patients, were among the 4 non-neoplastic cysts that were discovered. FHAR illness and ADEM were two of the four cases of the metabolic and demyelinating diseases discovered. In the current investigation, 6 cases of cerebral atrophy were discovered, including 2 cases of cerebral hemiatrophy and 4 cases of diffuse cerebral atrophy. Cerebral palsy and seizures were seen in 4 instances. On a CT scan, there was corpus callosum agenesis in 2 cases and cerebral atrophy in 2. These could be compared to earlier writing. Because the study's

selection population was drawn from developing nations, where infections are very common, the finding that static and developmental lesions are as common as infections was made.

CONCLUSION

When a patient has a seizure issue, a cranial CT scan is a helpful investigative technique. The type and location of the pathology in the brain of a patient with seizures can be used to characterise structural abnormalities on a CT scan. The CT scan lesion feature aids in precise seizure disorder diagnosis. When other modalities are unavailable in an emergency circumstance, a CT scan is frequently the first inquiry. Therefore, in a country like India with limited access to advanced scanning technology, CT scanning is a viable option.

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