The Dilemma of Abnormal CT Scan in Epilepsy : An Experience of 56 Cases in Armed Forces

AK Roy, RM Dhamija, Ved Prakash, PC Sanchetee, S Venkatraman

Fifty six cases of epilepsy who had abnormal computed tomography (CT) findings at the initial ictal episode have been followed up for 2 years. There were 45 males and 11 females. Their age ranged between 7-52 years with a mean of 21 years. Seizures were generalized in 11 cases, focal motor/sensory in 36 and 19 cases had episodic headache/altered sensorium. CT scan findings corresponded with the focus in 22 of 36 focal seizure cases. In 8 cases of focal seizures, the lesion was ill defined and in 6 cases CT lesion did not correspond to the clinical focus. The CT scan lesions included disc ring or double-rings 3-12 mm in size and were cortical or subcortical. All cases had varying perifocal oedema in CT scan. All cases were treated with anti-convulsant medication. Biopsy was performed in 4 cases. In 3 cases antibiotics were given and in 4 cases who did not improve with anticonvulsant alone for 8-12 weeks antituberculous therapy was given. Two cases had cysticercosis. Serial CT scans done in all these cases revealed complete resolution of the lesion over a period of 8-48 weeks.

Keywords : Epilepsy, ring lesion, disc lesion.

Clinical manifestation of epilepsies in the man are multitudinous. Seizure disorders have been studied traditionally on their clinical presentation, epidemiological characteristics, pathological substrate and their therapeutic response. With availability of cranial CT scan (CCT), a new and non-invasive method is available. Gastaut(1976)[1], Mc Gahan[2] and Russo[3] described findngs of CT scan in seizure patients. Gastaut studied 1702 consecutive cases of epilepsy with CT scan and reported abnormality in 46% cases. Prensky (1975)[4] reported radionuclide scan in children. The CT scan abnormality reported from Western countries is of different kind. Rumack[5], Goulatia[6], and Sethi[7] reported transient CCT abnormality. Although well known, the CCT abnormality where first encountered raises many issues. A prospective study of 56 cases of epilepsy which presented with abnormal CCT findings has been undertaken at Neurological Centre, Army Hospital, Delhi.

Material and Methods

The period of study extends from December 1986 to December 1988. Seizure has been defined as transient period of neurologic dysfunction during which there is lateralized or generalized tonic-clonic movements with or without alteration in consciousness or a period of altered awareness associated with automatism and post ictal confusion. During the period of study, many cases of seizure disorder have been managed. In this study, however, cases with a proven diagnosis or those with normal CCT have been excluded. Each case was given detailed neurologic examination. Effort was made to investigate aetiologic/associated systemic disease. In all cases, analysis of urine, stool and blood was performed. X-ray chest, ECG, EEG and Mantoux test were performed in all cases. A plain CCT was performed and contrast enhancement was performed in selected cases. A repeat CCT was performed at 8-12 weeks interval and then once in 6 months till it became normal. Anticonvulsant treatment was given in all cases. Chemotherapeutic agents were given in 5 cases. In two cases, there was fever, leucocytosis and features of raised intracranial pressure. The CT appearance of the lesion was suggestive of an abscess. One of these cases was treated with ampicillin 100 mg/kg and chloromycetin 50 mg/kg for 4 weeks, another with sodium penicillin and chloromycetin for 4 weeks. Three cases did not respond to anticonvulsant therapy for 8 weeks. The clinical features and the CT scan raised the possibility of tuberculoma; these cases were treated with Rifampicin 10 mg/kg (R), INAH 5 mg/kg(H) Pyrazinamide 25 mg/kg (Z) and streptomycin 15 mg/kg (S) for 2 months (SHRZ) followed by three drugs (HRZ) for 18 months.

Results

Age and sex of the cases is shown in Table-I. It can be seen that the syndrome appears

at all ages but 88% cases occured in patients below 30 years of age. Motor and sensory seizures predominate the clinical presentation (Table-II). In nine out of 56 cases, headache was the presenting feature and episodic altered sensorium behaviour was the only presentation of seizure.

Table-I Age and Sex of Cases

Age Group (yrs)	Male	Female	Percent of Total
0-10	7	2	16.2
11-20	21	6	48.2
21-30	12	1	23.2
31-40	3	1	7.0
41-60	2	1	5.4
Total	45	11	100.0

Table-II Clinical Features : Pattern of Recovery

		Onset	4 weeks	24 Weeks
Seizure : Focal	Motor	26	5	2
	Sensory	10	5	1
	Generalized	11	7	0
Headache and altered sensorium		9	4	2
Lethargy, Malaise, Fever		7	0	0

CCT abnormality consisted of an area of low attenuation, a solid lesion (disc) or an area of low attenuation surrounded by high attenuation (ring). All areas of low attenuation disappeared by 24 weeks; only 2 out of 28 disc lesions had not disappeared by 24 weeks (Table-III), while ring

Table-III Resolution of CCT Lesion with Time

Type of lesion	At onset	8-12 week	24 week	36 week
Low attenuation	13	7	2	0
Disc	28	20	2	1
Ring	15	15	9	2

lesions persisted the longest. Table-IV describes the location of the lesions which are seen in all areas. EEG was done in all cases. It was abnormal in 26 cases, 17 cases had generalized paroxysmal and 9 had focal paroxysmal activity corresponding to the cortical lesion. All cases were treated with anticonvulsants. 48 (86%) required monotherapy and 8 (14%) required polytherapy with anticonvulsants.

Table-IV Location of CCT Lesion

Site of lesion	Low attenuation lesion	Disc lesion	Ring lesion
Frontal	4	8	3
Parietal	7	13	8
Temporal	2	4	3
Occiptal	0	3	1
Total	13	28	15

Representative Cases

Case No 1 : Satish, 12 years male was brought to hospital on 23.9.88 in an unconscious state. There was no history of fever, head trauma or history of drug ingestion. On admission, he did not respond to any command. General examination was non-contributory. Examination of cardiovascular system, chest and abdomen was normal. Right sided plantor reflex was abnormal. Routine analysis of urine, blood, serum electrolytes and biochemical parameters, CSF examination, X-ray chest and ECG were normal. He was noted to have right focal motor seizures in the ward. Seizures were controlled with Diazepam and Phenytoin sodium. CT scan showed a small enhancing ring lesion with a surrounding low attenuation in left parieto-temporal area. CT scan three months later revealed a small calcified lesion in the same area (Fig. 1). The child is doing well.

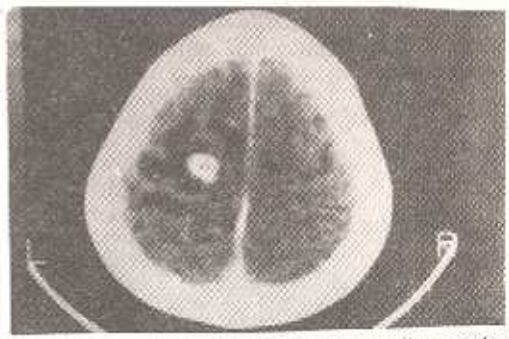

Fig. 1 Shows a ring lesion with surrounding oedema

Case No 2 : AKW, 52. years old female, developed left focal motor seizure in November 1987. There was ictal paresis for 7 days in the left sided limbs. A CT scan showed right parietal "granuloma". CT scan showed disappearance of lesion three months later. In January 1989, she developed right focal motor seizures with Todd's palsy over right sided limbs. CCT showed an area of low attenuation in left parietal area (Fig. 2).

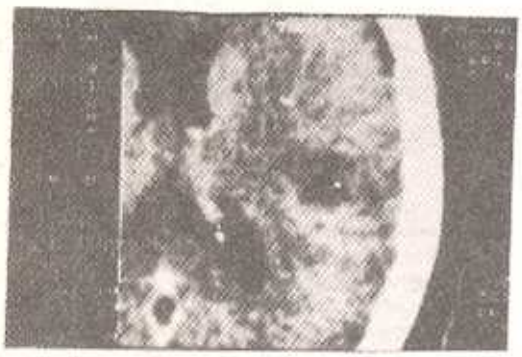

Fig. 2 Right Parietal low attenuating lesion which showed ring enhancement on contrast injection.

Case No 3 : A 17 years female developed paraesthesia over left upper limb, left side of face and neck. Touch over left side of face felt "different". A CT scan showed high attenuation area in right parietal area (Fig. 3).

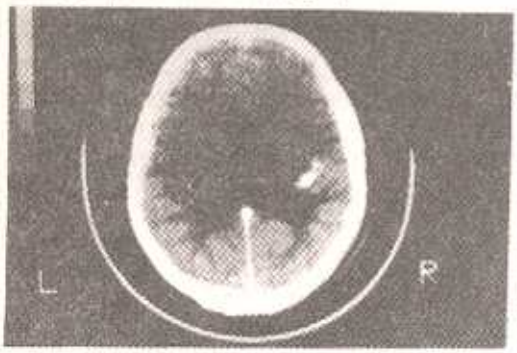

Fig. 3 Right Parietal high attenuating lesion.

Case No 4 : BKP, 27 years old male reported with right sensory motor seizures in November 1987. CCT showed a lesion in left parietal area. A repeat CT scan in March 88 was normal (Fig. 4).

Fig. 4 Ring lesion in Left Parietal area.

Case No 5 : PY, 11 years female developed seizures characterised by attacks of unconsciousness preceded by flashes of light in front of both eyes. A CT scan done in May and June 1988 showed a double ring in occipital area. Repeat CT scan in December 1988 was normal (Fig. 5).

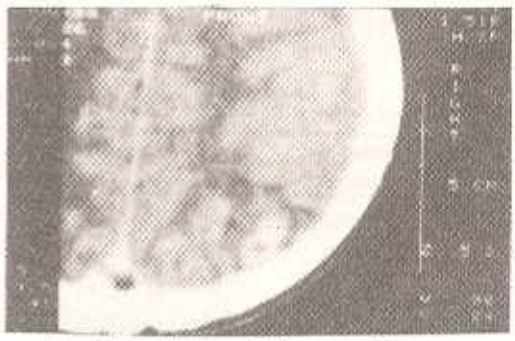

Fig. 5 Double ring in Right occipital area.

Discussion

The finding of a small (3-12 mm) disc, ring, double ring lesion or an area of low attenuation is a common finding in CCT performed in India[6,7,8] for cases of seizures. These type of cases are not encountered in Western Countries[1,2,6]. In a large series reported by Gastaut[1], CCT abnormalities consisted of tumours, infarcts, vascular malformation and Porencephaly. Disappearance of such lesions is, therefore, neither reported nor expected. Sethi[7] reported 13 cases where CT lesions disappeared in 8-12 weeks. In larger number of cases from the same centre, it is found that many cases do not respond to anticonvulsant treatment alone.

In two cases, fever and leucocytosis compelled the use of antibiotics. In three cases, antituberculous treatment was given when paraclinical evidence of associated extra-CNS tuberculosis was elicited. Bhargava and Tandon[9,10] report a 'specific' appearance of tuberculoma characterized by a conglomerate of small rings and discs surrounded by a variable degree of low attenuation characterized by finger like processes. However, solid discs and rings also have been reported to be tuberculous[11]. NMR helps in some cases by detecting "characteristic low intensity area". Biopsy of such lesions has shown them to be having cysticercosis, tuberculoma, abscess or focal encephalitis[8]. However, only occasional nonresponsive cases are biopsied and diagnosis remains unknown in vast majority of cases. It is

concluded that seizure disorders associated with abnormal CCT have excellent prognosis in that all cases recover in 2 years and only about 10% of these cases have probably an infective pathology and need antibiotic/ATT for treatment. As the literature is extremely inadequate, further studies are required to elucidate the aetiopathogensis of this syndrome.

REFERENCES

1. Gastaut H, Gastaut JL : Computerised transverse axial tomography in epilepsy. Epilepsia 1976 ; 17 : 325-336

2. Mc Gahan JP : The evaluation of Seizure disorder by computed tomography. J Neurosurg 1979 ; 50 : 328-332

3. Russo LS, Goldstein KH : The diagnostic assessment of single seizure : is cranial tomography necessary. Arch Neurol 1983; 40 : 744-47

4. Peansky AL, Swisher CN, Devivo DC : Positive brain scans in children with idiopathic focal epileptic seizures. Neurology (Minneapolis) 1973 ; 23 : 798-807

5. Rumack CM, Guggenbeim MA, Fasules JN, Burdick D : Transient positive interictal computed tomographic scan. J Pediat 1980; 97 : 263-264

6. Goulatia RK, Ahuja GK, Misra NK : Do seizures induce CT changes? Abstracts of 15th Epilepsy International Symposium. Washington DC 1983; 399

7. Sethi PK, Kumar BR, Madan VS, et al : Appearing and disappearing CT scan abnormalities and seizures. J Neurol Neurosurg Psychiat 1985; 48 : 866-869

8. Bhatia S, Tandon PN : Solitary microlesions in CT : A Clinical study and follow up. Neurology India 1988 ; 36: 139-150

9. Bhargava S, Tandon PN : Intracranial tuberculomas A CT study, Brit J Radiol, 1980 ; 53 : 935-945

10. Tandon PN, Bhargava S : CNS tuberculosis : lessons learnt from CT studies, Neurology India 1980 ; 28 : 207-212

11. Vengasarkar US, Pispaty RP, Parekh B, et al : Intracranial tuberculoma and the CT scan. J Neurosurg 1986; 64 : 568-574