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CLINICAL AND RADIOLOGICAL SPECTRUM OF SMALL RING ENHANCING LESIONS ON CT SCAN HEAD IN JAMMU REGION

Neurology

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ABSTRACT

Background: Single small enhancing computed tomography lesions may occur in several infections and neoplastic diseases of central nervous system and are most common radiological abnormality seen in patients with focal seizure in India. Aim of this study was to access the clinical and radiological spectrum of small ring enhancing lesions on CT scan head in patients of Jammu Region.

Material and Methods: A total of 100 patients with small ring enhancing CT lesion /lesions presented to neurology and neurosurgery OPD of a tertiary health care center of Jammu region were prospectively enrolled in this study. Detail history, general physical examination, detail neurological examination and investigations like CBC, ESR, Mantoux test, cysticercus serology were done for all patients. Among the patients of neurocysticercosis (NCC) who had single lesion were labelled as group 1 and who had multiple lesions were labelled as group II. Patients having single lesion were divided into two sub groups 1a and 1b. Patients in group 1a and group II were subjected to Albendazole therapy and anti convulsants, whereas group 1b patients receive only anti convulsant therapy. All these patients were kept under follow up on OPD basis and assessed by CT head after 03 months.

Results: Out of 100 patients enrolled, 58 were male and 48 female. Age of patients ranges from 03 to 65 years with mean age of 28.8years. Most common presentation was focal seizure in 50% patients followed by generalized seizure in 35%. On CT scan most common diagnosis of neurocysticercosis was made in 80% patients, tuberculoma in 10%, glioma in 5%, pyogenic abscess in 4%, and AV malformation in 1% patients. Coalescing lesion in 5% and non-coalescing lesions in 95%, solitary lesions in 56% and multiple in 44%. Lesions with thin wall were seen on CT in 82%, thick wall in 13%, irregular wall in 5% and calcification in 2% patients. Overall improvement was seen in 10 patients in group 1a, 9 patients in group 1b and 12 (33.33%) patients in group II. The difference in group 1a and group 1b was not statistically significant, chi square = 0.09 (P=0.76%)

Conclusions: Most common small ring enhancing lesion on CT scan was neurocysticercosis in 80% patients followed by tuberculoma in 10%, glioma in 5%, pyogenic abscess in 4%, and AV malformation 1% patient in this study. Overall improvement was seen in 10 patients in group 1a, 9 patients in group 1b and 12 (33.33%) patients in group II. The difference in group 1a and group 1b was not statistically significant, chi square= 0.09 (P=0.76%)

KEYWORDS

Small ring enhancing lesion, Neurocysticercosis, Seizure, Albendazole.

INTRODUCTION

Single small enhancing computed tomography lesions may occur in several infections and neoplastic diseases of central nervous system and are most common radiological abnormality seen in patients with focal seizure in India and many other developing countries. Histopathological studies in India revealed that neurocysticercosis (NCC) is most common cause of these lesions provided they fulfill a rigid set of clinical and radiological criteria,[1,2] the second most common cause of these lesions is tuberculoma.[2].

MATERIAL AND METHODS

This is a prospective analysis of data collected over a period of 03 years of 100 patients with small ring enhancing CT lesion presented to neurology and neurosurgery OPD of a tertiary health care center of Jammu region. Detail history, general physical examination, detail neurological examination and investigations like CBC, ESR, Mantoux test, cysticercus serology were done for all patients. The socioeconomic status of family was calculated according to a modified Kuppuswamy scale. MRI brain was done as and when required for establishing diagnosis. Complete clinical assessment was done on initial and subsequent visits and Contrast enhanced CT head was done for all patients during follow up after 03 months. Patients were treated depending on diagnosis and patients were followed up for treatment response by CT scan head. All CT scans were assessed by a radiologist who was blinded to treatment regimen assigned to patients and their clinical outcome. The site, size of lesion and presence of edema was recorded in the initial and follow up CT scans. Complete resolution was defined as disappearance of lesion on contrast enhanced CT scan, partial resolution was defined as 50% reduction in size of lesion. Calcification was defined as the presence of a residual calcified speck without edema. The calcific change of the lesion was also grouped under radiological response/improvement. Among the patients of neurocysticercosis (NCC) who had single lesion were labelled as group 1 and who had multiple lesions were labelled as group II. Patients having single lesion were divided into two sub groups 1a and 1b. Patients in group 1a and group II were subjected to Albendazole therapy and anti convulsants, whereas group 1b patients receive only anti convulsant therapy. All these patients were kept under follow up on OPD basis and assessed by CT head after 03 months.

Chi square test was performed for discrete variables and p-value of <0.05 was considered as significant. The statistical analysis was carried out by SPSS 19.0 version.

RESULTS

Out of 100 patients enrolled in this study 58 were male and 48 female. Age of patients range from 03 to 65 years with mean age of 28.8years. Most common presentation was focal seizure in 50% patients, generalized seizure in 35%, headache and vomiting in 5% patients, focal weakness 4%, visual and behavior problems in 4%, and incontinence and fever in 1% each. Among the study group 59% patients belong to lower middle class, 35% middle class and 6% among rich class. On CT scan head most common diagnosis of neurocysticercosis was made in 80% patients, tuberculoma in 10%,

glioma in 5%, pyogenic abscess in 4%, and AV malformation 1% patients. CT scan findings revealed scolex in 17% patients, perilesional edema in 87%, and hydrocephalus in 6 patients. Coalescing lesion in 5% and non-coalescing lesions in 95%, solitary lesions in 56% and multiple in 44%. Thin walled lesions were seen on CT scan in 82%, thick wall in 13%, irregular wall in 5% and calcification in 2% patients.

In this study 20 patients with ring enhancing lesions which were diagnosed as a case of tuberculoma, glioma, pyogenic abscess and AV Malformation were treated as per cause and followed as per disease follow up protocol. Among the patients of NCC 44 had single lesion (group 1) and 36 had multiple lesions (group II). CT findings of patients after 03 months in both the groups are shown in Table 1.

Table 1: CT scan head findings after 03 months follow up.

S. No.	Follow up findings on CT Scan head	Group 1a N=22	Group 1b N=22	Group I N=44	Group II N=36
1	No change	11(50%)	13(59.09%)	24 (54.54 %)	23(63.88 %)
2	Size decrease	4(18.18 %)	4(18.18 %)	8(18.18 %)	9(25.50 %)
3	Disappeared	5(22.72 %)	4(18.18 %)	9(20.45 %)	3(8.33%)
4	Calcification	1(4.54%)	1(4.54 %)	2(4.54 %)	0
5	Size increased	1(4.54 %)	0	1(2.27 %)	1(2.77%)
	Total	22	22	44	36

Overall improvement was seen in 10 patients in group 1a, 9 patients in group 1b and 12 (33.33%) patients in group II.

The difference in outcome in group 1a and group 1b was not found to statistically significant, chi square= 0.09 (P=0.76%)

DISCUSSION

Neurocysticercosis (NCC) is the most common parasitic disease affecting the brain and is also the common identifiable cause of new onset seizures in several regions of the world including India. NCC was found to be the cause of active epilepsy in at least one third of the patients[3]. The most common form of the disease in India was the solitary cysticercus granuloma (SCG) first identified in 1989 which was seen in up to 60 per cent of patients with NCC[4,5]. NCC caused by the larval form of the cestode Taenia solium, is associated with lack of sanitation, poor hygiene and free roaming pigs. Local transmission of the disease is, however, only possible in the presence of an adult Taenia carrier in the gut. The mainstay of diagnosis of NCC is neuroimaging using contrast enhanced computerized tomography (CECT head) or magnetic resonance imaging (MRI brain). Both these imaging techniques are expensive, relatively inaccessible to several people in endemic regions and require the use of contrast agents which might have side effects. CT scan is preferred for identifying parenchymal calcifications while MRI is the preferred modality for parenchymal lesions which are in the temporal lobe and frontal lobe close to the skull base, intraventricular cysts and subarachnoid cysts. For patients with SCG, a well performed thin slice CECT scan is as good as an MRI in the detection of the granuloma [6]. In our study of 100 patients we found 44 patients with solitary NCC and 36 with multiple NCC and male to female ratio was comparable with other studies [3, 7]. The most common manifestation of NCC was in the form of focal seizure 56.25% followed by generalized seizure 33.75%, Sotelo J et al[8] also reported focal seizure as a commonest presentation in a single small enhancing computed tomography lesion (SSECTL).

In this study 80% of small enhancing lesions on CECT head were NCC and all these patients have regular outline and no midline shift on CT which is comparable to study conducted by Wadia et al[9], among 10 patients of tuberculoma, 6 had a significant midline shift with perilesional edema.

In this study we divided solitary NCC patients into two groups, in one group albendazole was given and in other group no albendazole given, but in both groups none of the patient showed increased in size. All patients with multiple NCC received albendazole along with anticonvulsants and only one patient showed increase in size. Rajshekhar et al[10] postulated two mechanism for enlargement of cysticercous granuloma. One was simply an increasing amount of inflammatory reaction giving rise to an increase in size of ring enhancing lesion as well as surrounding edema. The second mechanism postulated involved two cysticerus cysts located in proximity to each other, the degeneration of one following the other very closely. Albendazole therapy was believed to be a cause of such enlarging CT lesions, as albendazole administration would accelerate involution of cysticercosis granuloma, thereby leading to increasing inflammation around granuloma[11]. Albendazole therapy was hardly of any benefit in solitary NCC lesions whereas in multiple NCC cases albendazole therapy can be used [11].

In our study the percentage of improvement seen in solitary NCC was 43.1% over a period of 03months but 50- 75% resolution was observed by many others after 3-6 months [12-13]

CONCLUSION:

Most common small ring enhancing lesion on CT scan head was neurocysticercosis in 80% patients followed by tuberculoma in 10%, glioma in 5%, pyogenic abscess in 4%, and AV malformation 1% patient in this study. Overall improvement was seen in 10 patients in group 1a, 9 patients in group 1b and 12 (33.33%) patients in group II. The difference in group 1a and group 1b was not found to statistically significant, chi square= 0.09 (P=0.76%)

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