

Original research article**Single ring enhancing computed tomography lesions:
Clinical profile**

¹Dr. Megha B Amarapur, ²Dr. Manjunath Siddanna Biradar, ³Dr. Swati S Hiremath,
⁴Dr. Nandini Devru

¹Assistant Professor, Department of General Medicine, GIMS, Kalaburagi, Karnataka, India

²Senior Resident, Department of General Medicine, GIMS, Kalaburagi, Karnataka, India

³Senior Resident, Department of General Medicine, BIMS, Belagavi, Karnataka, India

⁴Associate Professor, Department of General Medicine, ESIC Medical College, Kalaburagi, Karnataka, India

Corresponding Author:

Dr. Nandini Devru

Abstract

A ring enhancing lesion is a common abnormality of central nervous system usually found in the Indian subcontinent. It is difficult without clinical history to differentiate between the various types of non-neoplastic lesions, non-neoplastic and neoplastic conditions only on CT brain. A detailed history, clinical and laboratory data of these patients at admission and then on daily basis will be recorded as per the Proforma. Details of the patient's history were taken in pretested Proforma at the time of admission and recorded. Various Examination was done like General, Systemic and neurological. In our study clinical symptoms are, number of cases with seizures 21(28.35%), headache 16 (21.62%), vomiting 6 (8.12%), weakness 8 (10.81), fever 5 (6.77%) and other symptoms are 18(24.33%). In this study location of lesion as per CT brain are, Frontal 9 (36%), Temporal 4 (16%), Parietal 7 (28%), Occipital 1 (4%) and others are 4 (16%).

Keywords: Single ring enhancing lesion, computed tomography lesions, clinical profile

Introduction

Single ring enhancing computed tomography lesions is commonly seen in clinical practice, since from discovered in the late 1970s due to invention of Computed Tomography (CT) of the brain. The advent of CT was made a great impact on medicine because it creates the detail anatomical image. This gives the precise location of slice, soft tissue, revealing bones, organs, brain and blood vessels. Contrasted image of the CT scan enhance the lesion and enables to evaluate the images better. It also helps in accurately localizing the site of lesion and types of lesion in a cost-effective manner as compared to Magnetic Resonance Imaging (MRI) ^[1].

A ring enhancing lesion is a common abnormality of central nervous system usually found in the Indian subcontinent. It is difficult without clinical history to differentiate between the various types of non-neoplastic lesions, non-neoplastic and neoplastic conditions only on CT brain. So, the CT brain findings like the size, shape, site, thickness and perilesional edema is correlated with the patient's clinical history and parameters like age to differentiate various causes of ring enhancing lesion of brain ^[2].

The causes of single ring enhancing lesion includes Neurocysticercosis (NCC), Tuberculoma, Metastasis, Abscess, Glioma, Toxoplasmosis, Medulloblastoma, Central Nervous System (CNS) lymphoma, fungal granuloma and small infarct. However, in the Indian subcontinent the common cause for single ring enhancing lesion on CT brain is neurocysticercosis and tuberculoma. The common presenting feature is epilepsy ^[3].

A pattern of ring enhancement on neuroimaging (CT) often prohibits a reliable diagnosis. Further due to the limited neurosurgical and neuropathological facilities often it is not possible to perform brain biopsies. Hence clinical correlation is essential to establish the etiological diagnoses of Single ring-enhancing lesions of the brain ^[4].

Methodology**Source of data**

The main source of data for the study is Patients attending Out Patient Department (OPD) and inpatients of Medicine department.

Methods of collection of data

A prospective study of patients satisfying the inclusion criteria attending OPD and inpatients of Medicine, Neurology, Neurosurgery departments were included in the study.

Inclusion Criteria

- All patients with Contrast Computed Tomography (CT) of brain showing single ring enhancing lesions.
- Cases of age more than or equal to 18 years, irrespective of sex

Exclusion Criteria

All patients who is having multiple lesions on the CT brain.

Patient having history of metallic implants insertion, cardiac pacemakers and metallic foreign body in situ.

Methodology

A detailed history, clinical and laboratory data of these patients at admission and then on daily basis will be recorded as per the Proforma. Details of the patient's history were taken in pretested Proforma at the time of admission and recorded. Various Examination was done like General, Systemic and neurological. At the time of enrollment several tests were undergone by patients such as routine hematological, biochemical, Human Immune Deficiency Virus (HIV), Venereal Disease Research Laboratory (VDRL), X-Ray of Chest, Urea, Blood sugar level, Electrolytes and Liver function tests. After consent by the respective patient CT brain with single enhancing lesion was considered for enrollment in the study.

Equipment and Technique used

The CT scan was performed CT Philips multi slice scanner.

Technique of examination

The CT examination was carried out by scanning the head in a series of axial slices at 10-12. To the reids base line in all the patients and sections were taken in parallel to the reids base line. During the scanning, 10-12 slices of 10 mm thick were taken and they are sufficient to visualize the intermediate slices. The plain as well as contrast enhanced scans were recorded in all the patients in order to study the CT finding. The study of CT finding includes such as size, number, and wall thickness, location of ring lesions, internal features and surrounding edema.

Statistical Analysis

Statistical analysis was carried out using Microsoft Excel version 2007. Data were described in terms of mean and standard deviation (\pm SD), frequencies (number of cases). The comparison between two groups of diseases that is infectious and non-infectious were compared in terms of clinical symptoms, neurological features, risk factors and site selection values using Student's t-test. The values are presented on the basis of the mean and Standard deviations (SD). A P value < 0.05 was considered statistically significant.

Results

Table 1: Age Wise Distribution of Various Single Ring Enhancing Lesions

Age (In Years)	Male	Female	No. of Cases	Percentage
18-30	7	2	9	36
31-40	4	1	5	20
41-50	2	3	5	20
51-60	2	1	3	12
>60	2	1	3	12

In our study, the number of cases between 18-30 years are 9(36%), 31-40 years are 5(20%), 41-50 years are 5 (20%), 51-60 years are 3(12%), > 60 years is 3 (12%).

Table 2: Clinical Symptoms Presented by a Patient with various single Ring Enhancing Lesions

Symptom	Male	Female	No. of Cases	Percentage
Seizures	14	07	21	28.35
Headache	10	06	16	21.62
Vomiting	01	05	6	8.12
Weakness	05	03	8	10.81
Fever	03	02	5	06.77
Others	11	07	18	24.33

In our study clinical symptoms are, number of cases with seizures 21(28.35%), headache 16 (21.62%), vomiting 6 (8.12%), weakness 8 (10.81), fever 5 (6.77%) and other symptoms are 18(24.33%).

Table 3: Location of lesion on CT brain

Location of Lesion	No. of Cases	Percentage
Frontal	9	36
Temporal	4	16
Parietal	7	28
Occipital	1	04
Others	4	16

In this study location of lesion as per CT brain are, Frontal 9 (36%), Temporal 4 (16%), Parietal 7 (28%), Occipital 1 (4%) and others are 4 (16%).

Discussion

25 patients were evaluated, whose age group ranged from 18 to 70 years. The highest incidence of Single Ring Enhancing Lesions were found in 18-30 years age group accounting for 36% (male=7 and female=2) of cases. The most commonly affected age group was young age group of 18-30 years in which 9 cases of single ring enhancing lesion were seen. This was followed by the age group of 31-40 years in which 20% (male=4 and female=1) of the cases, 20% (male=2 and female=3) of cases in the age group of 41-50 years of age, 12% (male=2 and female=1) of cases in the age group of 51-60 years and 12% (male=2 and female=1) cases in the age group of more than 60 years. Thus, the single ring enhancing lesions was found to be affecting the young age group more as compared to the older age group. As per the study, as age increased, the incidence of lesions was found to be decreased.

We have studied 25 cases of single ring enhancing lesions on CT brain, out of which males were 17 (68%) and the females were 8 (32%). From the study, it reveals that men were more affected than women and correlates with the study of Chaoshuang L *et al.* ^[5] who also found that males (78.8%) are more affected than females.

In the present study most common clinical presentation of single ring enhancing lesion was seizures 21 (84%). Vazquez ML *et al.* ^[6] noted that seizures as the only clinical presentation in 63% of the cases and overall in 84% of the cases. Headache was 16 (21.62%) of cases, vomiting 6(8.12%), fever 5(6.77%), and weakness 8(10.81%) were the other 18(24.33%) presenting complaints.

Among the 25 patients with single ring enhancing lesions noted frontal lobe was more commonly involved lobe. 9 (36%) were located on the Frontal position, 7 (28%) were located on the parietal position, 4 (16%) were on the temporal position, 1 (4%) was on the occipital position and 4 (16%) were on the others side that is both on the frontal as well as parietal region on CT brain.

Clinical v/s CT findings, so number of cases had no neurological defects corresponding to the site of lesion, hence all the patients presenting with seizure, headache even with no neurological deficits should undergo CECT brain and to diagnose a case of ring enhancing lesion, other parameters like history analysis and biochemical analysis like CSF should also be taken into consideration.

Conclusion

- CT is the most sensitive modality in the characterization of single ring enhancing lesions.
- Irregular type of single ring enhancement is the most common feature noted in most of the lesions.
- 18-30 years is the most common age group involved (36% of cases).
- Male preponderance was noted in this study (68%).

References

1. Padma Srivastava MV. Single small enhancing CT lesions with special reference to neurocysticercosis: How I treat, Ann Indian Acad. Neurology. 2015;18:286-289.
2. Kishor D, Mishra S. Short course of oral prednisolone on disappearance of lesion and seizure recurrence in patients of solitary cysticercal granuloma with single small enhancing CT lesion: an open labelled randomised prospective study, JAPI. 2007 June;55:419-424.
3. Rudresh K, Krishna MV, Kartik Jony, Sebastin. Clinical and etiological profile of ring enhancing lesion on CT brain, Indian academy of clinical medicine. 2008 April-June;9(02):100-102.
4. B Murali A, Baxi JB. Differential diagnosis of ring enhancing lesions in contrast enhanced CT and MRI with histopathological correlation: Indian study, 10-21.
5. Chaoshuang L, Zhixin Z, Xiaohong W, Zhanlian H, Zhiliang G. Clinical analysis of 52 cases of neurocysticercosis. Trop Doct. 2008;38(3):192-4.
6. Vazquez ML, Jung H, Sotelo J. Plasma levels of praziquantel decrease when dexamethasone is given simultaneously. Neurol. 1987;37(9):1561-2.