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**Original Research Article**

# A study of clinical & radiological outcomes of small single enhancing lesions in CT brain - in a tertiary care hospital

Author
**Dr Sourav Chattopadhyay**
PDT, Deptt. of Neurology, Geetanjali Medical College and Hospital, Hiranmagri Extension, Manwakhera NH- 8 Bypass, Near Eklingpura Chouraha, Udaipur 313002, Rajasthan, India

## Introduction

Small single enhancing lesion in CT (SSECT) scan as an entity came into existence in India in early 1980, with the advent of CT scan. Tandon et al[3] labeled them as intracranial tuberculomas. They identified two types of lesions based on the appearance of the lesion in the C T Scan brain. Small ring and disc lesions were called as immature tuberculomas and large lobulated lesions were called as mature tuberculomas. ATT was invariably started in these patients. Sethi et al[5] & Bansal et al[6] noted that these lesions disappeared spontaneously without treatment. Natarajan and Arjundas et al[37] at the Institute of Neurology, Chennai also noted spontaneous disappearance of these lesions without specific treatment. The exact cause of these lesions could not be deciphered because apart from tuberculoma, cysticercus granuloma, pyogenic abscess, metastases, fungal granuloma, and glioma had been reported to cause similar appearance in CT scan brain as more centers acquired C.T. Scan facility. Hence the exact aetiology of these lesions became a subject of speculation. A significant breakthrough came in 1987 at Vellore 8 when stereo tactic biopsy was done on 15 patients with SSECT. Most of the lesions were identified as cysticercus and none were of tuberculous etiology. Bhargava and Tandon in 1988 and Wadia, Makhalle in 19863,4, found evidence of tuberculous lesions in histopathology. However they failed in defining the size of the lesion. Rajshekhar et al[8] then defined a small single lesion based on CT appearance as “A solitary, contrast-enhancing lesion of less than 20-mm diameter lesion without severe cerebral edema (no midline shift)”.this definition is often equated to cysticercous granuloma but there is every possibility that these lesions could be a tuberculoma.

## Review of Literature

Amongst single contrast enhancing lesions on CT Scan Brain, those less than 20 mm were classified as small and termed “single small enhancing computed tomography lesion” (or SSECT). The criteria for SSECT included patients who had acute symptomatic focal seizures with or without secondary generalization, minimal or no neurological deficit, no evidence of raised intracranial tension and no evidence of

systemic disease4, 7, 9, 10 . A Thailand based study evaluated 1,000 patients with various seizure disorders, of whom approximately 10% had seizure and a solitary lesion. Roughly 80% of patients had lesions more than 20 mm and were excluded. On follow-up of these excluded patients (> 20 mm), only 1 had spontaneous resolution while the rest had persistent lesion on CT scan. Of the remaining 20% included in the study, 90% had complete resolution by 6 months. Of the two patients with persistent lesions, one underwent excision biopsy which revealed eosinophilic granuloma. The other patient refused biopsy, anti-tubercular treatment was prescribed and lesion disappeared in 4 months. This study concluded that a small lesion of less than 20 mm in size is a cysticercous granuloma, because the lesions were classified based on Rajshekhar's clinico radiological definition for Cysticercus granuloma.

**Aims and Objectives**

1) To study the natural course of SSECT without giving cysticidal or anti tuberculous treatment and give only symptomatic treatment as needed.
2) To observe the seizure outcome in patients with SSECT, duration of persistence or subsidence of symptoms and to find out the duration of symptomatic treatment needed.
3) To follow the patients with SSECT radiologically at 3months,6 months and 1 year to assess the size, morphology, occurrence of calcification and resolution characteristics in CT brain. Identifying the aetiology was not part of this study as tissue study by biopsy is the only conclusive test for a definitive diagnosis.

**Materials and Methods**

The study was done at Geetanjali Medical College and Hospital, Rajasthan. This study was observational in nature designed to analyze patients in age group more than 12 years of age and who presented with seizures and CT brain showing SSECT. The sample size was 26 and the study period was from June2023 to June 2024, including the follow up.

**Inclusion criteria**

1. All patients who have SSECT lesions in the brain, detected by CT scan.
2. The patients should not have other neurological problems.

**Exclusion criteria**

1. Patients who have neurological roblems other than due to the small single enhancing lesion of the brain.
2. More than 2 lesions on CT brain.
3. Patients age less than 12 years and pregnant women.

**Method of the Study**

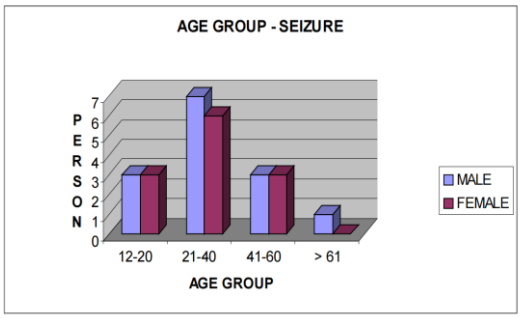
The clinical diagnosis on the seizure type, whether partial or generalized was made. A detailed history was taken and recorded. Significant past medical history if any were noted. A thorough clinical examination was performed at the time of admission and relevant findings were recorded. Laboratory work up, which included blood sugar, urea, serum creatinine, electrolytes and liver function tests (if indicated), were done atthe time of enrollment into the study .Patients with CT brain showing single enhancing lesion were enrolled in the study after taking consent. Consent was taken after explaining the therapeutically aspects.

They were followed for 1 year with respect to seizure control and CT evolution of the lesion. All patients were treated with antiepileptic drugs(AED). Steroids at 1mg per kg body weight were added to patients who had lesions with oedema. It was tapered over a period of 15 days given. Follow up CT scans with contrast was done at the end of 3 rd month, 6th month and 1 year if required. The lesions were followed in terms of regression, persistence, enlargement, resolution and calcification.

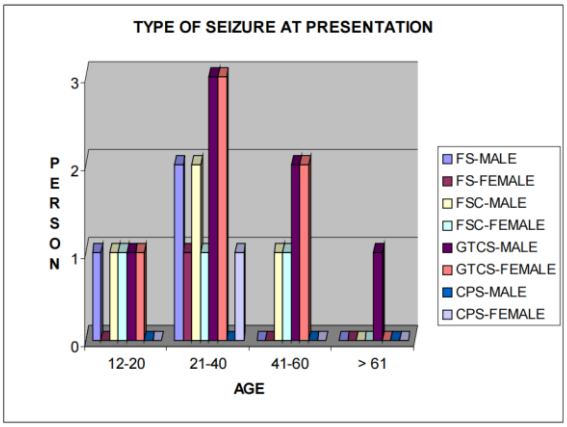
**Results**

Seizure Type - Age Distribution

Total Number of Patients – 25

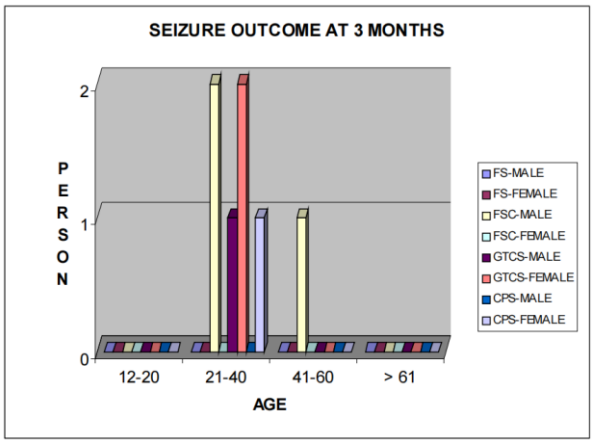



Type of seizure at the time of presentation



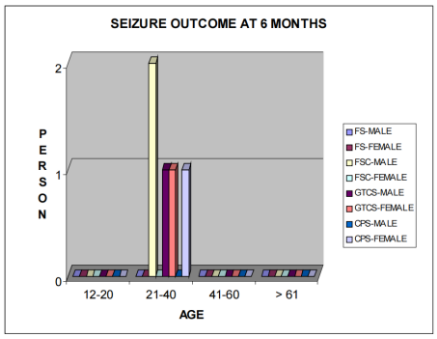

FS : Focal Seizure
FSC : Focal Seizure with Secondary Generalisation
GTCS : Generalised Tonic Clonic Seziure
CPS : Complex Partial Seizure

Seizure outcome at three months



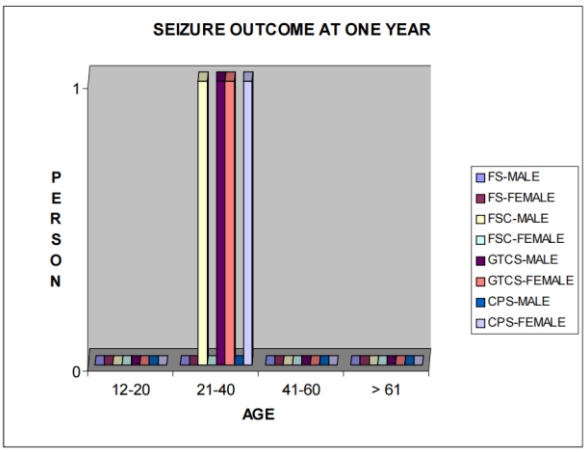

FS : Focal Seizure
FSC : Focal Seizure with Secondary Generalisation
GTCS : Generalised Tonic Clonic Seziure
CPS :Complex Partial Seizure

Seizure outcome at six months




FS : Focal Seizure
FSC : Focal Seizure with Secondary Generalisation
GTCS : Generalised Tonic Clonic Seziure
CPS : Complex Partial Seizure

Seizure outcome at 1 year

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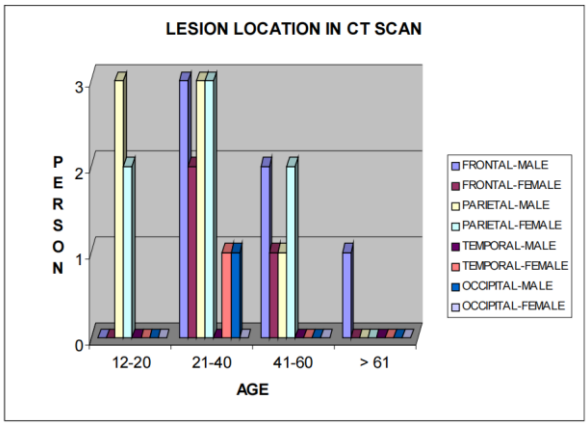
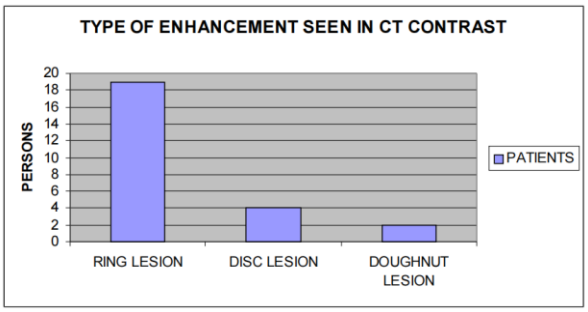
Lesion location in CT scan – plain and contrast






Course of the lesion in ct scan over a period of one year

| | COMPLETE RESOLUTION | INCREASE IN SIZE | DECREASE IN SIZE | CALCIFICATION | LESIONS |
|---|---|---|---|---|---|
| AT 3 MONTHS | 12 | 2 | 8 | 3 | 1 (excluded from study) |
| AT 6 MONTHS | 4 | 0 | 2 | 4 | |
| AT ONE YEAR | 1 | 0 | 0 | 1 | |

Complete resolution without calcification - 17
Resolution with calcification- 8

**Discussion**

The study included 25 patients of different age and sex. Sex ratio was almost even (men-14–56% women 11 –44%). The youngest patient was 13, and the oldest was 65 years old.

The analysis of the age groups showed that the incidence of SSECT is more common among the younger age group. As the age advances the incidence decreases. This data is concordant with other studies [1 2 4 6] .

**Conclusions**

1) By three months most of the SSECT resolve without calcification and by 1 year all lesions resolve either by resolution or calcification.
2) Enlargement of a lesion may not be always paradoxical and it can be a natural course in the evolution of the lesion.
3) SSECT present as generalized tonic clonic convulsions or focal seizure with secondary generalization.
4) Seizure caused by SSECT are well controlled and most of them don't have seizures beyond 3 months.
5) Patients who have seizures are usually secondary to calcified lesions.
6) Specific treatment in terms of anticysticidal or ATT is unnecessary as all lesions have better seizure control and radiological resolution when followed for 1 year.
7) Steroids might be useful in patients who have lesion with significant oedema.
8) Headache is a feature of calcified lesion.
9) The commonest location of SSECT in brain is parietal cortex.

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