ORIGINAL RESEARCH PAPER

Radio-Diagnosis

"NEUROIMAGING IN TUBEROUS SCLEROSIS"

KEY WORDS: TS, MRI, CT.

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ABSTRACT

Tuberous sclerosis is a rare autosomal dominant neurocutaneous syndrome. The diagnosis is on the basis of diagnostic criteria applied to clinical findings classical triad of epilepsy, mental retardation, and adenoma sebaceum. Cardiac rhabdomyoma, renal angiomyolipoma, and neurologic involvement comprises of cortical or subependymal tubers and white matter abnormalities are the common radiologic findings, these will give strong evidence for suspecting tuberous sclerosis. accurate imaging differentiation of diagnosis and localization of tubers and is helpful for treatment.

INTRODUCTION

Tuberous sclerosis complex (TSC) is a multisystemic neurocutaneous genetic condition with autosomal dominant inheritance, characterized by hamartomas that affect multiple organs, including skin, central nervous system, heart, lungs, and kidney. it is also known as epiloia or pringle-Bourneville phacomatosis, [1,2].

Typically, Tuberous sclerosis (TS) demonstrates a triad of features called as Vogt triad it includes: mental retardation, epilepsy, and adenoma sebaceum.

Common manifestations include cortical tubers, subependymal nodules, white matter abnormalities, retinal abnormalities, cardiac rhabdomyoma, lymphangioleiomyomatosis, renal angiomyolipoma, and skin lesions [3].

In Tuberous sclerosis (TS) variety of intracranial manifestations of are there. four common CNS abnormalities are cortical tubers (95-100%), subependymal nodules (95-100%), subependymal giant cell astrocytoma, and white matter abnormalities (40%-90%). [4] These common CNS manifestations can be an adequate clue for suspecting Tuberous sclerosis (TS).

Other rare CNS manifestations include mild dilatation of lateral ventricles due to atrophy or dysgenesis, white matter cysts, cerebellar atrophy, dysgenesis of the corpus callosum, Chiari malformation, microcephaly, macrencephaly, neurofibromatosis, and chordoma.

Aims & Objectives of the Study

pictorial review describes common neuroimaging manifestations of tuberous sclerosis (TS).

Methodology

In our study there are 20 patients included who were referred to our radiology department GGH, Kurnool for evaluation of seizures. Patients were evaluated by MRI brain and Dynamic contrast enhanced MRI and CT brain.

Inclusion criteria:

1.patients clinically suspected of having clinical features of TS suspected to have subependymal nodules in Computed Tomography (CT) or Magnetization Resonance Imaging of Brain.

Exclusion criteria:

1. Patients with claustrophobia.
2. Patients with other contraindications –pacemaker implants, cochlear implants etc.

Imaging Techniques

The study was performed in Philips ingenia 1.5 tesla MRI machine with d-stream technology .and CT brain study performed on 16 slice CT [GE].

Study place:

GOVERNMENT GENERAL HOSPITAL KURNOOL MEDICAL COLLEGE.

Study period: Nov 2020 – Oct 2021.

Sequences used:

Conventional spin echo T1-Weighted (TR 1000, TE 14) axial MR images without off - resonance saturation pulse.

Conventional spin echo T1-Weighted (TR 1000, TE 14) nonaxial MR images with an off - resonance saturation pulse. Conventional spin echo T2-Weighted (TR 4800, TE 110) axial MR images without off - resonance saturation pulse.

Conventional spin echo FLAIR (TR 7500, TE 120) axial MR images without off - resonance saturation pulse.

RESULTS

In our study period, total of 20 people included, in this 55% (11) were male and 45% (9) were female participants.

SERIAL NO.	FINDING	NO.OF PATIENTS	PERCENTAGE %
1.	CORTICAL TUBERS	19	95
2.	SUBEPENDYMAL NODULES	18	90
3.	RADIAL WHITE MATTER BANDS	15	75
4.	GYRIFORM CALCIFICATION	2	10
5.	WHITE MATTER CYSTS	1	5
6.	SUBEPENDYMAL GIANT CELL ASTROCYTOMA	1	5

CONCLUSIONS

Recognition of radiologic features of CNS manifestations is essential for making the correct diagnosis and localization of tubers and is helpful for treatment.

MRI best in recognizing most of CNS manifestations. CT useful in recognizing the calcifications.

Summary

Our study aimed to show most common neuroimaging features in tuberous sclerosis. Total 20 patients were analyzed in which19 are with cortical tubers ,18 is with subependymal nodules,15 are radial white matter bands, and 1 is sub ependymal giant cell astrocytoma.

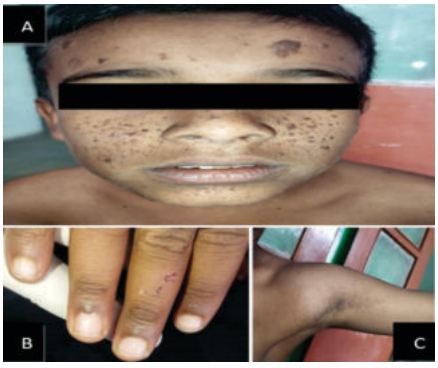

Fig1.clinical images showing Angio fibromas (A)over face, subungual fibromas (B), shagreen patches(C)

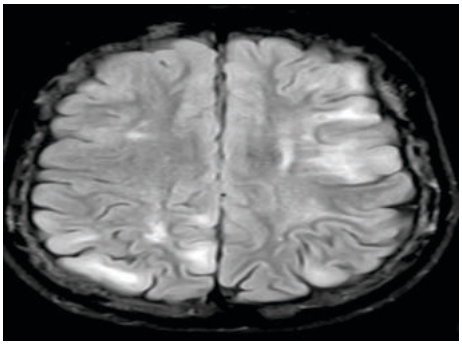

Fig2: MRI axial images of brain A) T2W image Showing multiple T2 hyper intense cortical tubers in subcortical white mater in a case of TS

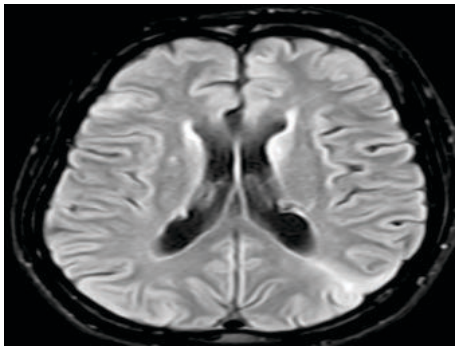

Fig3: MRI axial images of brain A) T2W image Showing Cortical tubers with subependymal nodules and radial white bands

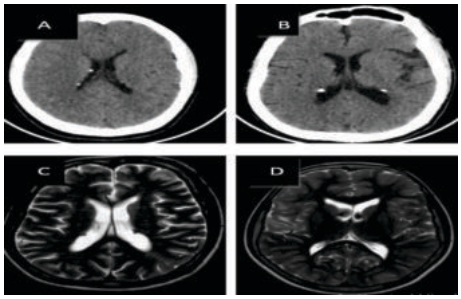

Fig 4: CT (A, B) and MRI T2W (C, D) axial images of brain showing subependymal nodules

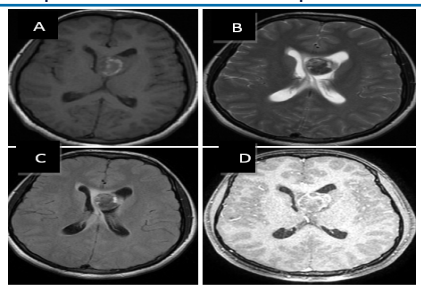

Fig5: MRI axial images of brain with contrast Showing T1(A) heterogeneously hypointense T2(B), flair(C) heterogeneously hyperintense mass with heterogeneous enhancement on T1 post contrast(D) at left foramen of Monro

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