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CT AND MRI IN DIAGNOSIS OF POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME (PRES) IN ECLAMPSIA PATIENTS

Radiodiagnosis

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ABSTRACT

OBJECTIVE: to know the diagnostic ability of CT and MRI in PRES in eclampsia patients. **MATERIAL AND METHODS:** it is a retrospective study conducted in department of radiology , government general hospital , Guntur for a period of 8 months from JAN 2020 to august 2020 for eclampsia patients undergoing CT and MRI brain. All the scans are performed with GE 16 slice CT scan machine and 1.5 tesla Philips MRI machine **RESULTS:** a total of 32 eclampsia patients with postpartum seizures undergone CT and MRI brain of which on NECT 12 (38%)patients shows no abnormality 25 patients shows hypodensity in cortical and subcortical locations of bilateral parietal , occipital and frontal lobes . MRI shows 31 (96%)patients with T2 and FLAIR hyperintensity in cortical and subcortical locations of bilateral parieto occipital, frontal, basal ganglion regions diagnostic of PRES. **CONCLUSION:** MRI is the diagnostic investigation of choice in PRES .NECT can be used as screening test in non availability of MRI.

KEYWORDS

PRES, Eclampsia, Seizures, Hyperintensities

INTRODUCTION

Posterior reversible encephalopathy syndrome (PRES), also known as acute hypertensive encephalopathy or reversible posterior leukoencephalopathy, is a neurotoxic state that occurs secondary to the inability of the posterior circulation to autoregulate in response to acute changes in blood pressure. Hyperperfusion with resultant disruption of the blood brain barrier results in vasogenic edema, usually without infarction, most commonly in the parieto-occipital regions.

It refers to a group of disorders that present clinically with headache, seizures, visual changes, altered mental status and occasionally focal neurologic signs in the background of high blood pressure. CT and MR images typically show symmetrically distributed areas of vasogenic edema, predominantly within the territories of the posterior circulation. Typically, the abnormalities affect the white matter, but the cerebral cortex has also been affected in a few cases . The term posterior reversible encephalopathy syndrome may be a misnomer as the syndrome can involve or extend beyond the posterior cerebrum

METHODOLOGY

Study design

it is a retrospective study conducted in department of radiology, government general hospital , Guntur for a period of 8 months from JAN 2020 to august 2020 for preeclampsia patients undergoing CT and MRI brain. All the scans are performed with GE 16 slice CT scan machine and 1.5 tesla Philips MRI machine

Objectives

To know the diagnostic ability of CT and MRI in Posterior reversible encephalopathy syndrome (PRES)

Patients and treatment

Inclusion criteria: all eclampsia patients undergoing CT and MRI
Exclusion criteria: unstable patients , All patients having cardiac pace makers, prosthetic heart valves or any metallic orthopaedic implants.

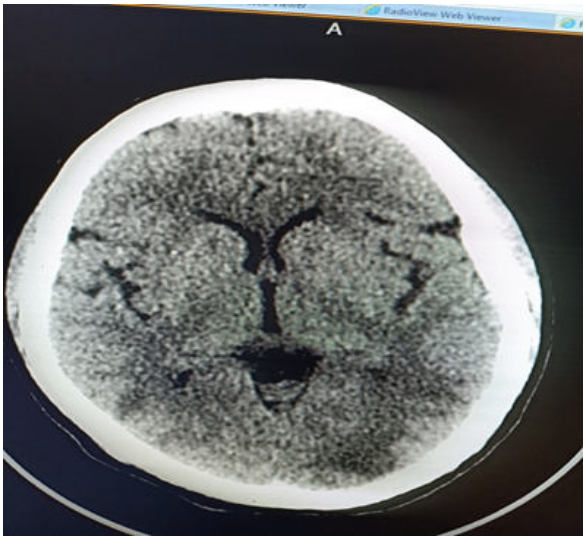
It is a retrospective study analyzing a report database and MR images of 32 patients with a clinical and radiological diagnosis of PRES, included from January 2020 to august 2020. The brain MRI images of these patients were reviewed. These patients had undergone an MRI study of the brain on the Philips Ingenia 1.5 T MRI scanner. The various regions involved were recorded. The signal intensity of the affected areas on T1, T2, FLAIR and DW sequences was recorded. The presence or absence of atypical features such as diffusion restriction and hemorrhage were also recorded. The data were analyzed and compared with the available literature.

CT scan is done useing GE 16 slice machine 5mm and 1.25 mm sections are taken.

RESULTS

The study population consists of 32 eclampsia patients undergoing CT and MRI .

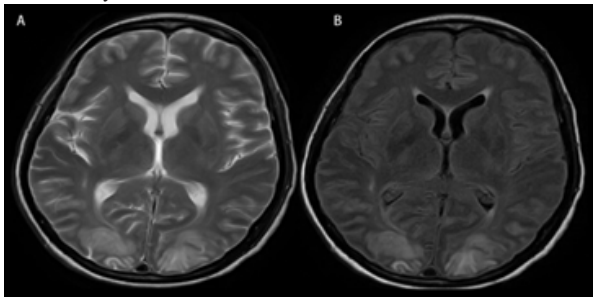
On CT scan it shows bilateral subcortical white matter hypodensities in parieto occipital lobes.



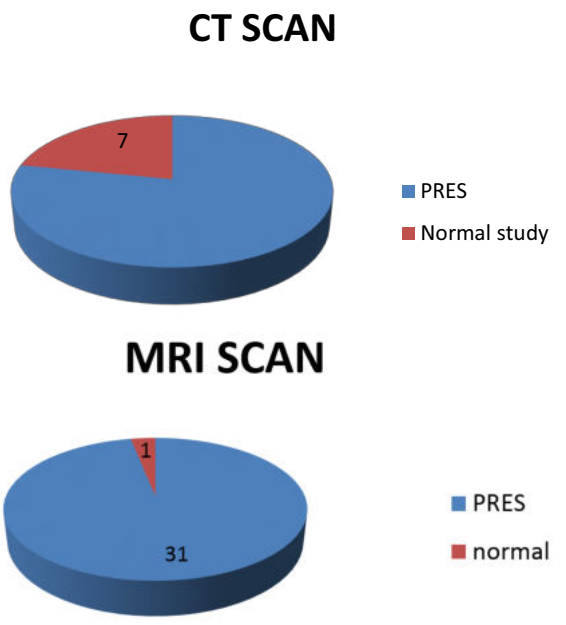
Sub cortical hypodensity noted in bilateral parietal lobes

Out of the 32 cases 25 cases show subcortical vasogenic oedema in bilateral parieto occipital and frontal region and 7 cases show normal study at the time of scan .

On MRI out of 32 cases 31 cases shows bilaterally symmetrical parieto-occipital white matter hyperintensities in all the cases , frontal and basal ganglion hyperintensities in few cases . one cases show normal study .



A) Axial T2-weighted and (B) Axial FLAIR-weighted image showing symmetrical areas of hyperintensity in both occipital lobes.



Out of the 32 cases no cases show diffusion restriction or haemorrhage.

Confirmed cases of PRES with an involvement of the typical and atypical regions of the brain

Region of involvement	No of patients	Percentage
Parieto occipital	31	100
Frontal lobe	6	20
Basal ganglia	3	10
Temporal lobe	0	0
cerebellum	0	0
thalamus	0	0

diagnostic ability of CT and MRI in PRES

	CT	MRI
PRES	25	31
Normal	7	1

DISCUSSION

Posterior reversible encephalopathy syndrome (PRES), is a neurotoxic syndrome occurring due to the susceptibility of the posterior circulation to variations in blood pressure. It is classically characterized by a symmetric parieto-occipital white matter edema. The imaging manifestations may vary and can include atypical locations and hemorrhage.

Clinical features of PRES range from headache, altered mental status, seizures and loss of vision to even loss of consciousness. The term describes potentially reversible imaging findings and symptomatology that is shared by a diverse group of diseases such as hypertension, glomerulonephritis, eclampsia, preeclampsia and drug intoxication

Various clinical settings can precipitate the syndrome. The mechanism is not well understood but is thought to be related to the altered integrity of the blood brain barrier. Two main theories have been proposed:

high blood pressure: leads to loss of self-regulation, hyperperfusion with endothelial damage and vasogenic edema

endothelial dysfunction: leads to vasoconstriction and hypoperfusion resulting in cerebral ischemia and subsequent vasogenic edema.

Patients may present with headaches, seizures, visual changes, altered mental status and occasionally focal neurologic signs.

The most commonly described abnormality in PRES consists of symmetrical cortical and subcortical hyperintense signals on T2 and FLAIR-weighted MR images in the parieto-occipital lobes of both hemispheres. These areas are frequently hypointense on corresponding T1-weighted MR images and have a decreased attenuation on CT scans. Similar areas of altered signal intensity can also be seen in other locations such as the frontal lobes, cerebellum, brainstem and basal ganglia [24]. The central variant of PRES with an isolated involvement of the basal ganglia and brainstem with no involvement of the subcortical white matter

100% of the cases had almost symmetrical lesions in both hemispheres. Atypical unilateral presentations of PRES has also been described in the literature but were not encountered in our study.

The incidence of intracranial hemorrhage in PRES is approximately 15% . The three distinct types of hemorrhage (minute hemorrhage, sulcal subarachnoid hemorrhage, and intraparenchymal hematoma) are identified in PRES with equal frequencies. The pathological mechanism is not well understood. It can be due to hypertension with hyperperfusion or due to vasculopathy with hypoperfusion.

DWI and apparent diffusion coefficient (ADC) have been found to be helpful in differentiating between atypical presentations of PRES and other conditions such as central pontine/extrapontine myelinolysis, non-hemorrhagic infarcts and hypoglycemic or hypoxic encephalopathy. Due to the vasogenic edema in PRES, ADC shows increased values with slightly increased signal intensity on DWI, whereas the other conditions mentioned above show reduced ADC values due to cytotoxic edema.

Differential diagnosis include infraction , herpes simplex infection, cerebral venous thrombosis , encephalitis , acute demyelination

Treatment consists of An adequate control of hypertension and removal of the offending agent is the treatment of choice. Most patients recover completely within 12–24 hours. In some patients, vasogenic edema may progress to cytotoxic edema with resultant infarction.

CONCLUSION

Posterior reversible encephalopathy syndrome presents with classical imaging manifestations of symmetrical parieto-occipital subcortical white matter hyperintensities in both brain hemispheres . Other locations such as the frontal lobes, basal ganglia, brainstem and cerebellum may also be involved. CT and MRI plays a Major role in diagnosis of PRES .according to our study MRI has a better diagnostic ability compare to CT, but CT can be used as a screening test as it is easily available and cheap compared to MRI. As our study period is for limited duration results may vary on long standing study .

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