



MRI IMAGE CHANGES IN PREGNANCY RELATED NEUROLOGICAL MANIFESTATIONS

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ABSTRACT

Introduction: Neurological illness occurring during Pregnancy and puerperium may sometimes lead to serious adverse effects if prompt interevent is not undertaken. The study intended to describe the imaging characteristics of various neurological disorders in the pregnancy and puerperium

Aim: To evaluate and characterize the various neurological conditions of the central nervous system and pituitary gland that occurs during pregnancy and postpartum period with the help of 1.5 tesla magnetic resonance imaging (MRI).

Place and Duration of Study: The study was conducted in the with collaboration in the Department of Neurology and Radiology, in KAPV government medical college, Trichy from October 2021 to February 2022

Materials and Methods: Hospital based prospective study of patients presenting with neurological manifestations pregnant and postpartum period were included in this study. Patients imaged in 1.5T MRI. The images obtained were subjected for radiological interpretation.

Results: Most common neurological manifestation in our study was Headache, followed by Postpartum eclampsia, Ante partum eclampsia, Altered sensorium, Blurring of vision, Giddiness, Weakness, behavioral disturbances. mri imaging showed cerebral venous thrombosis (CVT), posterior reversible encephalopathy syndrome (PRES), ischemic stroke, hemorrhagic stroke, Grannuloma.

Conclusion: Neurological illness occurring during pregnancy and postpartum need to be diagnosed early and early intervention to prevent complications. MRI Brain is non invasive, non hazardous imaging technique which helps in interperation of brain and associated vascular changes in neurological manifestation

KEYWORDS :

INTRODUCTION:

During pregnancy and postpartum various physiologic and anatomical changes occur due to adopt physiologic Stress. Changes seen in various system including nervous system, result in various neurological disorders. These changes due to the exacerbation of preexisting medical condition such as multiple sclerosis or a seizure disorder; the initial manifestation of a primary central nervous system(acute ischemic stroke); or a neurologic problem unique to pregnancy and the postpartum period, such as eclampsia, postpartum cerebral angiopathy, Sheehan syndrome, and lymphocytic adenohypophysitis. As symptoms and signs are non-specific and it can be difficult to diagnose based on clinical grounds alone, in addition of imaging facilitates a prompt diagnosis and initiation of therapy and is very important for preventing complications and/or irreversible damage to the mother and fetus. In view of safety of mother and baby MRI(Magnetic Resonance Imaging) has better diagnostic accuracy, less radiation related hazards and enables excellent soft-tissue differentiation.

MATERIAL AND METHODS:

The study was a hospital based prospective study, with collaboration in the Department of Neurology and Radiology, in KAPV government medical college, Trichy from October 2021 to February 2022. Sample size in the study was 100. T1W, T2W axial, coronal and sagittal images, FLAIR, DWI and Gradient sequence images were obtained in all patients. MR angiogram, venogram and contrast enhanced MRI was obtained in specific conditions.

Inclusion Criteria:

Women in pregnancy & postpartum period Presenting with

- Headache,
- altered sensorium,
- new onset seizure,
- giddiness,
- weakness,
- behavioral disturbance,
- blurring of vision or primary lactation failure.

Exclusion Criteria:

- Women with pre-existing neurological diseases before pregnancy
- H/ORTA
- Patients with pacemakers, aneurysmal clips, cochlear implants and metallic implants or metallic foreign bodies.

RESULTS:

In our study most common neurological presentation was headache(Table 1) followed by postpartum eclampsia, antepartum eclampsia, altered sensorium, blurry vision, giddiness, weakness. In Table 2 MRI imaging in patients presented with headache, out of 35, 24 patients normal MRI, 4 patients had PRES(Fig 5), 4 had CVT(Fig1), 1 had infarct, 1 had hemorrhage, 11 had grannuloma (Fig4). In table 3 imaging in postpartum neurological illness out of 24 patients 12 had normal MRI, 7 had PRES, 2 had hemorrhage, 1 had CVT(Fig 2), 1 had infarct, 1 had cerebral edema.

Table 1 clinical presentation

S.no	Clinical diagnosis	Number
1	Headache	35
2	Postpartum eclampsia)	24
3	Antepartum eclampsia	23
4	Altered sensorium	4

5	Blurring of vision	4
6	Giddiness	3
7	Weakness	2
8	Behavioral disturbance,	2
9	Bells palsy	2
11	Intrapartum eclampsia	1

Table 2 MRI imaging features in patients with headache

NORMAL	24
PRES	4
CVT	4
INFARCT	1
HEMORRHAGE	1
Grannuloma	1

Table 3 MRI imaging features in patients with post partum eclampsia

NORMAL	12
PRES	7
HEMORRHAGE	2
CVT	1
INFARCT	1
CEREBRAL EDEMA	1

In table 3 showed imaging in patients with postpartum eclampsia, out of 24 patients, 12 have Normal MRI, 7 had PRES, 2 had hemorrhage, 1 had CVT, 1 had infarct, 1 had cerebral edema

Table 4 MRI imaging features in patients with antepartum eclampsia

Normal	14
PRES	5
CVT	2
Intracranial hemorrhage	1
Hydrocephalus	1

In table 4 showed imaging in patients with antepartum eclampsia, out of 23 patients, 14 had normal MRI, 5 had features of PRES, 2 had CVT, 1 had hemorrhage, 1 had hydrocephalus.

Table 5 MRI imaging features in patients with altered sensorium

Hemorrhage	1
Wernicke encephalopathy	1
PRES	1
Hydrocephalus	1

In table 5 showmin MRI changes in patients presented with altered sensorium, 1 had hemorrhage (Fig 3), 1 had Wernicke encephalopathy, 1 had PRES, 1 had hydrocephalus.

Table 6 MRI imaging features in patients with weakness

INFARCT	1
CVT	1

In table 6 showing MRI changes in patients with weakness out patients, 1 had infarct, 1 had CVT.

Table 7 MRI imaging features in patients with blurry vision

NORMAL	3
PRES	1

In table 7 showed imaging in 4 patients with blurry vision as presenting complaint, 3 had normal MRI, 1 had PRES.

Table 8 MRI imaging features in patients with giddiness

NORMAL	3
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In table 8 showed of 3 patients presented with giddiness had normal MRI.

Table 9 MRI imaging features in patients with behavioral disturbance

NORMAL	1
CVT	1

In table 9 showed patients with behavioural disturbance 1 had normal MRI, 1 had CVT

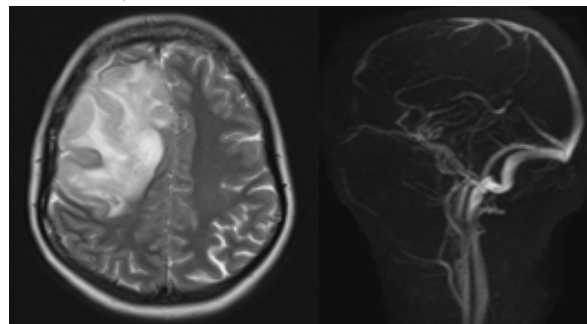


Fig 1 27yr female post lscs day 5 presented with headache on MRI T2 Weighted sequence showed hemorrhagic infarct on right fronto parietal cortex with mass effect. MRV showed non visualization anterior 2/3 of superior sagittal sinus

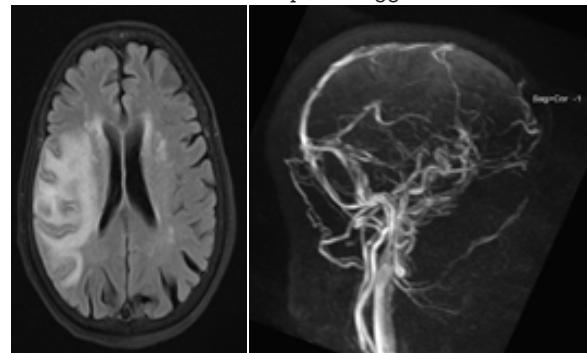


Fig 2 25yr female post lscs day 3 presented with generalized tonic clonic seizure on MRI FLAIR sequence showed hemorrhagic infarct on right temporal cortex. MRV showed non visualization anterior 2/3 of superior sagittal sinus

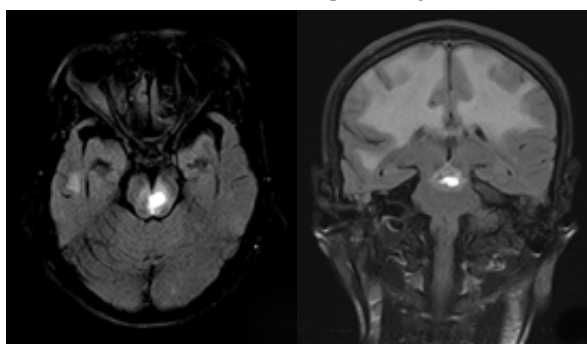


Fig 3 28yrs female post natal day 2 presented with altered sensorium MRI FLAIR Axial and coronal section showed acute pontine bleed with minimal surrounding edema

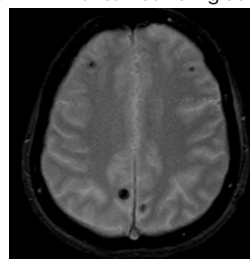


Fig 4 24yrs primi presented with headache in 5 month of pregnancy MRI Gradient sequence showed multiple calcified granuloma

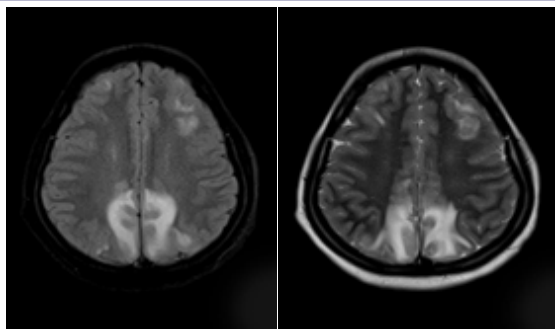


Fig 5 26yrs female post natal day 6 presented with headache MRI T2 & FLAIR showed hyperintensity on bilateral parieto occipital cortex

DISCUSSION

Neurologic conditions are related to the physiologic modifications in pregnancy, such as: Eclampsia, Reversible cerebral vasoconstriction syndrome. Other neurological manifestations occur more frequently in pregnancy and postpartum women, particularly: Cerebral infarction, Pituitary apoplexy.

In our study, the most common presenting complaint of patients in both pregnancy and peripartum phase is headache, next common presentation was postpartum eclampsia followed by antepartum eclampsia. History of seizures for the first time in peripartum period present in one patient. Peripartum seizures contribute significant problems to both maternal morbidity and mortality including their unborn children.

Headache is one of the most common symptoms seen in pregnant women. Most common cause is primary headache like tension-related or migraine headaches, secondary cause like IHH. Occurrence rates are estimated at 5% in the pregnant population. 1 approximately 8% of women experience increased frequency or intensity of Migraine headache during pregnancy.^{2,3,4} Physiologic hormonal change during pregnancy may cause headache.

Pre-eclampsia and Eclampsia:

Preeclampsia is defined as (systolic blood pressure >140mmHg OR diastolic blood pressure >90mmHg) and Protein excretion in urine (>0.3g protein in a 24-hour urine collection) at >20 weeks GA in a woman who was known to be normotensive prior to pregnancy. Preeclamptics with new onset seizure are considered eclampsia.^{5,6} Eclampsia is a serious complication that occurs commonly during the third trimester pregnancy, during labor, or after delivery—typically within the first 48 hours. pathogenesis is may be due to placenta-derived toxin contributes to widespread vascular derangements, the disruption of autoregulation, and the breakdown of the blood-brain barrier, also Increased sensitivity to vasoactive agents induced vasospasm. Clinical presentation of patients with preeclampsia includes headache, altered mental status, cortical blindness, and seizures

Posterior Reversible Encephalopathy Syndrome

Clinical presentation include either headache, seizure, encephalopathy and visual disturbance. cerebral vasogenic edema due to rapid increase in mean arterial blood pressure leads to impair cerebral auto regulation and, in turn, lead to cerebral hyperperfusion and blood-brain barrier dysfunction. Typical imaging study findings include vasogenic edema with or without ischemic changes in the posterior brain circulation.⁹ Delayed diagnosis can lead to poor prognostic indicators.¹⁰ 14 Fisher et al., described younger maternal age as a risk for developing PRES in eclampsia patients.

Cerebral Venous and Sinus Thrombosis

Need prompt diagnosis and initiation of therapy.

Clinical presentation is nonspecific includes headache, seizure, encephalopathy, and focal neurologic deficit. CVT can occur any time during pregnancy or puerperium. Most pregnancy-related CVT occurs in the third trimester.^{7,8} The cause of cerebral venous thrombosis during pregnancy are multifactorial and include abnormal venous drainage, dehydration Risk factors for the development of CVT include the hypercoagulable state of pregnancy, infection including sinusitis, head trauma, hypertensive conditions, and most recently, dural punctures after spinal analgesia^{7,8}. MRI/MRV is the imaging modality of choice.^{11,12} Non-contrast MRV is commonly used to evaluate for CVT; CT venography or MRV required to detect acute thrombus (up to 5 days old).¹³

Bells Palsy

The pregnant population is affected about 2 to 4 times more than the nonpregnant population with an incidence of 38 to 45/100,000 deliveries.¹⁵ Most commonly seen during the third trimester or postpartum period¹⁶. It is believed to be caused by increased peripheral edema that leads to compression of the facial nerve, immunosuppression that predisposes the person to viral infection or reactivation; or changes in estrogen, progesterone, and cortisol levels The diagnosis mainly based on clinical examination findings. MR imaging rule out the presence of a mass.

Wernicke encephalopathy is an acute severe neuro psychiatric syndrome secondary to thiamine deficiency.

The majority of pregnant patients with Wernicke encephalopathy present with nonspecific symptoms such as dizziness, headache, fatigue, and depressive or visual problems, nystagmus and ophthalmoplegia, mental status changes, and unsteadiness of stance and gait. Causes include hyperemesis gravidarum, anorexia nervosa, prolonged vomiting associated with chemotherapy, gastrointestinal disease, haemodialysis, and HG¹⁷. Need early diagnosis and treatment to prevent Korsakoff syndrome. The prevalence of WE in a nonalcoholic varies from 0.04% to 0.13%¹⁸

Stroke:

Incidence of stroke in non-pregnant women aged 15–44 years has been reported to be 10.7 per 1 lakh women-years.¹⁹ In pregnancy incidence rates of 4.3–210 strokes per lakh deliveries.²⁰⁻²²

Most cerebral infarctions are due to arterial occlusion^{23,24} Ischaemic and haemorrhagic strokes have been reported in roughly equal proportions,^{25,26} although Jaigobin and Silver⁶ found a much higher incidence of ischaemic stroke

CONCLUSION:

Neurological illness occurring during pregnancy and postpartum diagnosed mainly on clinical and supported by using non invasive, non hazardous imaging like MRI Brain helps in early and diagnosis and early intervention to prevent complication.

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