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NEURORADIOLOGICAL MANIFESTATIONS IN POSTPARTUM PATIENTS- A RETROSPECTIVE ANALYSIS

Neurology

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ABSTRACT

Objective: To study the radiological profile of patients presenting with neurological manifestations in postpartum period.

Materials and method: This is a retrospective observational study done in postpartum patients with neurological symptoms admitted to obstetrics wards during the year 2016-17.About 40 patients presented with complaints of headache, seizures, altered sensorium, depression, focal neurological deficits were studied using CT/MRI.

Results: Total number of deliveries conducted in the hospital during the study period was nearly about 7300. The cases included are, posterior reversible encephalopathy syndrome (PRES), cerebral venous thrombosis (CVT), postpartum cerebral angiopathy (PCA) and arterial infarction. Total number of patients in whom imaging was positive in the study period was 30, which was 45% of symptomatic patients. Incidence rate of patients with positive findings was 410/100000 deliveries. Incidence of PRES cases during the study period was 14,CVT was 6,patients with abnormal white matter hyperintensities were 8, those with features suggestive of old infarct was two.

Conclusion: PRES and CVT are two most important causes of postpartum headache, seizures and other neurological manifestations. Proper clinical Judgement and timely utilization of appropriate radiological imaging modalities helps in pinning down the diagnosis and providing appropriate treatment.

KEYWORDS

neurological manifestations, MRI findings, postpartum, PRES, CVT.

INTRODUCTION:

Maternal health revolves around the provision of adequate care both in the antenatal and postnatal period. Acute neurological emergencies1 in the form of coma, neurological deficit, headache and seizures are common in postpartum period and are an important cause of admission to the critical care unit. Pathological conditions affecting the central nervous system during pregnancy and postpartum period are either specific to the reproductive process such as eclampsia /postpartum cerebral angiopathy or non-specific but occur more often in pregnant and postnatal women such as dural venous sinus thrombosis, cerebral infarction and pituitary apoplexy.2 Many of these neurological diseases can lead to devastating complications if not recognized early contributing to 20% of maternal death.3 Technological advancements in medical imaging have revolutionized in the early recognition of the above conditions and better prognosis. Our aim is to study the radiological profile of patients presenting with neurological manifestations in postpartum period.

MATERIALS AND METHOD:

This is an observational study done in postpartum patients with neurological symptoms admitted to obstetrics wards in Mahatma Gandhi memorial government hospital during the year of 2016-17.About 40 postpartum patients with various recent onset neurological symptoms like headache, seizures, altered sensorium, sensory motor deficit, depression or a combination of symptoms were studied. Patients with past history of neurological disorders were excluded.

The techniques used were CT/MRI imaging. Relevant clinical details were obtained. Initially all patients underwent spiral CT brain. If in further doubt MRI brain was performed. Intravenous contrast was administered in few cases for the confirmation of the diagnosis. Spiral CT brain was viewed as axial and reformatted images.MRI brain was performed with T1, T2& FLAIR sequences with additional sequences of gradient and diffusion weighted imaging. In case of cerebrovascular events MR venography and angiography using time of flight (TOF) sequences were performed. Contrast administration at the rate of 0.2ml/kg of iohexol followed by 10 ml saline push was used. Images were acquired in parenchymal phase as routine. Slice thickness was 1-2mm with scan delay of 300 seconds.

RESULTS:

Total number of deliveries conducted in the hospital during the study period was nearly about 7300. Total number of postpartum patients presented with neurological symptoms during that period was 40, their ages ranged between 20 to 33 years. Cases included are, posterior reversible encephalopathy syndrome (PRES), cerebral venous thrombosis (CVT), postpartum cerebral angiopathy (PCA) and arterial infarction. Total number of patients in whom imaging was positive in the study period was 30, which was 45% of symptomatic patients. Incidence rate of patients with positive findings was 410/100000 deliveries. Incidence of PRES cases during the study period was 14,CVT was 6,patients with abnormal white matter hyperintensities were 8,those with features suggestive of old infarct was two. Symptomatic patients with normal MRI was about 10 in number.

Table 1: Distribution of patients according to age

Age group (years)	Number of patients
<20	6
20-25	20
25-29	10
30 & above	4

Table 2: Results of imaging studies

Radiological finding	Number of patients
PRES	14
CVT	6
White matter hyper densities	8
Old infarct	2
Normal	10

The commonest radiological diagnosis was PRES, seen in 14 patients. In patients with PRES, seizure and headache was the main presenting complaints. MRI showed the lesions predominantly to be located in parietal and occipital regions with involvement of basal ganglia, brainstem and deep white matter. These were Hypointense on T1WI and hyperintense on T2WI.Changes were best seen on FLAIR images. Six patients had cerebral venous thrombosis (CVT). Headache was the main presenting complaint. MRI brain along with MRV was done in all

these patient showed haemorrhagic infarctions not following arterial territory ,involving deep gray matter i.e., thalamus.

DISCUSSION:

Neurological complications are classified into four major categories of ischemic Stroke , hemorrhage (subarachnoid hemorrhage, eclamptic encephalopathy, cerebral venous thrombosis), pituitary gland related disorders (pituitary apoplexy, pituitary adenoma, Sheehan's syndrome, lymphocytic adenohypophysitis) and other neoplastic disorders (primary intracranial tumors and intracranial metastasis).[2,3]

POST PARTUM NEUROLOGICAL MANIFESTATIONS

Cerebrovascular	Endocrine	Metabolic	Pre existing conditions
• Eclamptic encephalopathy • Hypertensive gangliocapsular haemorrhage. • Subarachanoid haemorrhage. • Postpartum cerebral angiopathy • Ischemic infarction • CVT	• Pituitary apoplexy • Sheehan syndrome • Lymphocytic hypophysitis.	• Hypernatremic osmotic demyelination	• Neurocysticercosis • Multiple sclerosis • Tumours • Vascular malformations

ECLAMPTIC ENCEPHALOPATHY:

PRES is one of the complications of preeclampsia, eclampsia, and pregnancy-induced severe hypertension. The constellations of symptoms are caused by reversible ischemia most commonly of the posterior cerebral vasculature affecting the watershed zones due to its sparse vasomotor sympathetic innervations.[4,5] The term PRES can be a misnomer as the syndrome can involve anterior circulation territories. Symptoms include headache, altered sensorium , blurring of vision, severe hypertension,and generalized seizures.Lesions are characterized by low signal intensity on T1-weighted images and high signal intensity on T2- weighted images in the posterior cortex and subcortical white matter. However the anterior cerebral hemispheres can also be involved in PRES.

There are usually four types of radiological presentation of PRES - Holohemispheric watershed pattern, superior frontal sulcus involvement pattern, predominant parieto occipital involvement, asymmetric presentation of primary pattern. Lesion typically shows no diffusion restriction. Diffusion-weighted imaging helps to differentiate between reversible vasogenic edema from cytotoxic edema of complete infarction.[6] Sometimes there is involvement of the basal ganglia and brainstem.[7]

Catheter angiography classically shows vasospasm in the medium and large cerebral arteries, notably the basilar artery[8].

cerebral ischemia (reported to occur in 10 to 25%), cerebral herniation (5-15%) and cerebral haemorrhage (5-15%). Though PRES resolves clinically after 3 to 8 days, MRI findings take a longer time to resolve. The ideal time for repeat MRI is 7 to 10 days.6 Treatment of eclampsia is supportive with priorities set out for controlling seizures and hypertension as well as maintaining a stable hemodynamic state[8]. Magnesium is the treatment of choice to prevent recurrent convulsions.[9,1]

CEREBRAL VENOUS SINUS THROMBOSIS:

The highest incidence of cerebral venous thrombosis is during first 2 weeks of puerperium accounts for 6% of maternal deaths which is precipitated by events such as dehydration due to post partum haemorrhage, inadequate fluid intake,poor obstetric practices.The clinical presentation varies from headache to coma, depending largely on the severity and extent of thrombosis as well as the mode of onset. Nonseptic CVT commonly occurs in the superior sagittal sinus, whereas septic CVT involves cavernous and lateral sinus.[10] Plain CT imaging studies depict enhanced attenuation of the cerebral venous sinuses in which thrombosis has occurred. Contrast-enhanced CT shows 'empty delta sign' which is a characteristic filling defect,but it might take 7–10 days for which to appear on CT following the appearance of symptoms. MRI has better accuracy and sensitivity showing simultaneous high signal intensity of the venous sinuses with all routine sequences(T1-weighted, T2-weighted, and FLAIR).10 High signal intensity on T1-weighted images with a corresponding filling defect after gadolinium enhancement may develop within the first week after clinical onset, whereas CT imaging may take 7-10 days to show significant changes. MR venography in addition to routine MR imaging, helps us CEREBRAL VENOUS SINUS THROMBOSIS:

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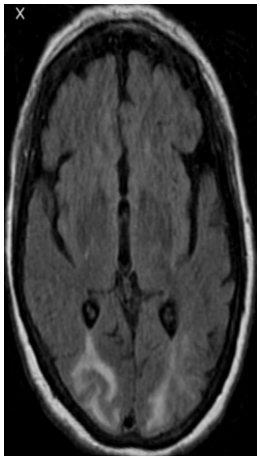

Figure shows MRI FLAIR sequence demonstrating high intensity signal involving bilateral occipital lobes consistent with PRES

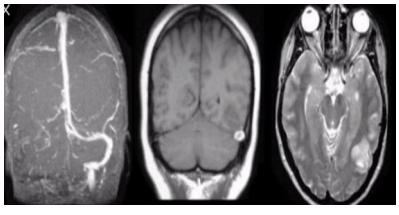

Figure : MRV shows the absence of left transverse and sigmoid sinuses(left),T1-weighted coronal MRI shows clot within the left transverse sinus(middle),T2 weighted axial MRI shows hyperintense signal in left posterior temporal lobe (right)

Catheter angiography has more significance in the treatment of CVT rather than diagnostic purpose. Anticoagulation is the recommended treatment. Early thrombolysis has better response even in the presence of hemorrhagic infarctions. Also symptomatic treatment of seizures, reduction of raised ICT and treatment of primary cause if any are important for better prognosis. [10]

Ischemic Stroke

Ischemic infarction occurs in puerperium due to an alteration in the levels of inhibitors of coagulant proteins. Probabilities of obstetric stroke to be of venous origin is higher in comparison to stroke due to other factors. Procoagulant states are more marked around term and worsens in the immediate postpartum period presumably related to the expulsion of the placenta and release of thromboplastic substances following placental separation.2 Normalisation of blood coagulation and fibrinolysis to the non-pregnant state occurs by around 3 weeks postpartum. Caesarean delivery has been shown to be associated with a 3–12 times heightened risk of stroke in peripartum and postpartum period. Early diagnosis and intervention by administration of thrombolytic agents such as human tissue plasminogen activator (rt-PA) is a lifesaving procedure and has favorable maternal outcome.2

POSTPARTUM CEREBRALANGIOPATHY:11

Postpartum cerebral angiopathy (PCA) is a unique and poorly understood cerebrovascular disease that occurs in normotensive postpartum women within 1-4 weeks of delivery. Two recognizable forms of PCA have been described

Idiopathic PCA (Call-Fleming postpartum angiopathy) is a reversible Non relapsing angiopathy that occurs in normotensive postpartum women who present with severe headache, seizures, and focal neurologic deficits

Iatrogenic PCA occurs anytime during the puerperium after administration of bromocriptine to suppress lactation, administration of ergot alkaloids to control postpartum hemorrhage, or use of sympathomimetics in cold medicines and nasal decongestants .Conventional MRI may be normal or sometimes show areas of cortical edema or parenchymal hemorrhage. The angiographic features are characterized by reversible multifocal stenoses and a beaded appearance of the medium- and small-caliber cerebral arteries in the anterior circulation,Which is in contrast to eclampsia affecting large and medium-sized arteries in the posterior circulation.Treatment options include steroids, calcium channel blockers such as nimodipine,hyperosmolar hypervoluemic saline infusions.

Pituitary apoplexy, pituitary adenoma, Sheehan's syndrome, lymphocytic adenohypophysitis , primary intracranial tumors and intracranial metastasis are other rare neurological manifestations in postpartum females.

Conclusion:

PRES and CVT are two most important causes of postpartum headache, seizures and other neurological manifestations as suggested by our study. Proper clinical judgement and timely utilization of appropriate radiological imaging modalities helps in pinning down the diagnosis and providing appropriate treatment as they are potentially reversible if intervened earlier.

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