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Original Research Article

Spectrum of neurological disorders during pregnancy and postpartum period from a tertiary hospital

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ABSTRACT

Background: Pregnancy and puerperium are states of hypercoagulability. This predisposes women in these phases to increased risk of cerebrovascular diseases. These neurological complications are important causes of maternal and foetal morbidity and mortality. These must be recognized and managed to decrease their burden on maternal and child health.
Methods: The aim of this study was to consider the occurrence of neurological complications in pregnancy and puerperium and to analyse the clinical and radiological spectrum of them. This was a prospective study carried out with 1200 patients from January 2014 to August 2015.
Results: Of the 1200 women, 87(7.25%) were diagnosed to have neurological complications. Overall mortality was 11.4%. Eclampsia (63.2%), Cerebral Venous sinus Thrombosis (CVT) (18.3%) and Posterior Reversible Encephalopathy Syndrome (PRES) in (8%) accounted for the majority of cases (Table 1). Eclampsia carried a significant mortality rate of 12.7% whereas CVT and PRES had favourable outcomes. Imaging of CVT revealed involvement of deep venous system in 12% and haemorrhagic infarcts in 69%.
Conclusions: The commonest neurological complications seen in this cohort were eclampsia, cerebral venous thrombosis and posterior reversible encephalopathy syndrome. Hence a physician needs to bear in mind the common neurological complications that can occur during pregnancy and puerperium to avert poor pregnancy outcomes for both mother and child.

Keywords: Cerebral venous sinus thrombosis, Eclampsia, Hypercoagulability, Posterior reversible encephalopathy syndrome, Pregnancy, Puerperium

INTRODUCTION

The spectrum of neurological diseases during pregnancy is varied. The hypercoagulable state of pregnancy and puerperium is an important factor contributing to the higher risk for cerebro-vascular disease, an important cause of maternal and fetal morbidity and mortality. These may range from hypertensive disorders of pregnancy which usually falls within the obstetric realm to cerebral venous sinus thrombosis which is usually managed by neurologists. Many of these conditions present with headache and separating a benign headache from a secondary cause assumes vital importance during pregnancy. Physicians also face certain constraints regarding medications and diagnostic evaluations in pregnant women, thus increasing the risk. As neurological problems contribute to nearly 20% of maternal deaths, it is important for physicians to have an in-depth knowledge of this spectrum of diseases.[1] The aim of this study was to analyze the clinical and radiological spectrum of neurological complications in pregnancy and puerperium in a tertiary care center.

METHODS

This was a prospective descriptive study carried out in a cohort of 1200 consecutive patients admitted in the obstetrics wing of a tertiary care hospital in Bangalore, India from January 2014 to August 2015.

Ethical approval was taken for the study and informed consent was obtained from all patients. Patients who presented with acute and sub-acute neurological complications during pregnancy and puerperium were grouped together.

Inclusion criteria

- Patients of all age groups in the pregnant and postpartum phase admitted in the obstetrics wing of hospital from January 2014 and August 2015 were included in the study.

Exclusion criteria

- Patients not in the pregnant or postpartum phase were excluded from the study.

From the patients in the pregnant and postpartum period, only those with neurological complications were considered for the final analysis. Those with uneventful pregnancies and non-neurological complications were excluded from the final analysis.

Clinical history, risk factors, symptoms, signs, imaging and outcome parameters of this group were analyzed. Hematological and biochemical investigations like complete hemogram, prothrombin time, renal and liver function tests, urine analysis were done in all patients. In cases of CVT, tests for hypercoagulability were done when indicated. Imaging of the brain by CT/ MRI with CT/ MR angiogram/ venogram was done depending on the clinical scenario. All neuroimaging was reported by a qualified radiologist.

Data collection was done in a master chart and statistical analysis was done using Microsoft Office Excel 2007.

RESULTS

A total number of 1200 of patients in the pregnant and postpartum period were included in the study. Out of this, 87(7.25%) of the patients presented with neurological complications. The frequency of anemia and hypertension was 56.3% and 51.7% respectively. Overall mortality was 11.4% (Table 1).

The commonest neurological complications noted were eclampsia (63.2%), CVT (18.3%) and PRES (8%). CNS tuberculosis (4.5%) and neurocysticercosis (2.2%) were also seen in the cohort. A single case each of cerebral infarction, intracerebral hemorrhage, osmotic demyelination, chorea gravidarum and frontal astrocytoma was also seen in this cohort (Table 2).

Table 1: Baseline data.

Total number of obstetric cases	1200
Number of cases with neurological complications	87(7.25%)
Mean age of cohort in years	25(16-36)
Number of primigravida	50(57.4%)
Number of patients with anemia	49(56.3%)
Number of patients with hypertension	45(51.7%)
Number of deaths	10(11.4%)

Table 2: Frequency of neurological complications.

Total number of cases with neurological complications	87
Eclampsia	55(63.2%)
Cerebral venous thrombosis (CVT)	16(18.3%)
Posterior reversible encephalopathy syndrome (PRES)	7(8%)
CNS tuberculosis	4(4.5%)
Neurocysticercosis	2(2.2%)
Cerebral infarction	1(1.1%)
Intracerebral hemorrhage	1(1.1%)
Osmotic demyelination	1(1.1%)
Chorea gravidarum	1(1.1%)
Frontal astrocytoma	1(1.1%)

Seizures, headache and focal neurological deficits in varying proportions are the presenting features in eclampsia, CVT and PRES. Antepartum occurrence is more frequent (72.7%) in eclampsia. In patients with eclampsia, 18% had a history of pregnancy induced hypertension and 3.6% had gestational diabetes mellitus. Anemia was seen in 61% of patients with CVT, 56% of patients with PRES and in 21% of patients with anemia. Eclampsia still carried a significant mortality rate of 12.7% whereas CVT and PRES were associated with a favorable outcome (Table 3).

Imaging was not done in patients whose clinical manifestations were consistent with eclampsia. This accounts for the fact that 63.3% of the cohort did not undergo imaging. Relevant neuroimaging was done in all cases where CVT or PRES were suspected (Table 4).

In cases of CVT, superior sagittal sinus (SSS) (98%) and transverse sinus (44%) were the commonest sinuses involved. Deep venous system involvement was seen in 12%. Hemorrhagic infarcts were seen in 69%.

In cases of PRES, parietooccipital involvement was very common (86-100%) on neuroimaging. Frontotemporal involvement was less common (28.7-42.8%). Involvement of white matter was always bilateral with asymmetry being seen in 28.7% (Table 5).

Table 3: Comparative clinical features of eclampsia, CVT and PRES.

	Eclampsia	CVT	PRES
Number of patients	55	16	7
Age range in years	18-32	19-35	16-36
Antepartum occurrence	72.7%	3(18.75%)	1(14.2%)
Number of primigravida	35(63.6%)	5(31.2%)	3(42.8%)
Number of patients with PIH	10(18%)		2(28.5%)
Number of patients with GDM	2(3.6%)		
Number of patients with anemia	12(21%)	10(61%)	4(56%)
Seizures	100%	50%	71%
Headache	40%	100%	57%
Focal neurological deficits	18%	69%	28%
Mortality rate	12.7%	0%	0%

Table 4: Proportion of the cohort which has undergone imaging.

Total number of cases	87
Total number of cases in which imaging was done	32(36.7%)

Table 5: Imaging features of the cohort.

CVT	PRES
Superficial venous system involvement - 100%	
• Superior sagittal sinus - 98%	
• Transverse sinus -44%	
• Occipital - 100%	
• Parietal - 86%	
• Frontal - 42.8%	
• Temporal - 28.7%	
Involvement of deep venous system - 12%	Bilateral involvement - 100%
Hemorrhagic infarcts - 69%	Asymmetric involvement - 28.7%

DISCUSSION

This study is one of the largest series identifying neurological complications in pregnancy and puerperium. There is a wide range of neurological conditions affecting pregnant and post-partum women. This may be due to certain physiological changes during pregnancy and puerperium in the form of hypercoagulability.

A case series by Prabhu et al, revealed 26 cases of cerebrovascular complications out of 39211 deliveries amounting to an incidence of 66 per 100000 deliveries.[2] The mean age at presentation was 22 years with 69% being primigravida. Hypertensive disorders of pregnancy were seen in 73% of cases. The other neurological conditions seen in this cohort were intracerebral hemorrhage (15.3%), cerebral infarction (19.2%) and CVT (61.5%). This is comparable with the results from this cohort.

Eclampsia

Douglas and Redman reported that headache was the presenting symptom in 15%, visual changes in 5.8% and right upper quadrant or epigastric pain in 5.8%.[3] Chames et al, reports that 78.6% had headache, 33.7% had visual symptoms and 13.5% had epigastric pain.[4] Case fatality rates of 7.8-8.06% have been reported. Such high incidences could be explained by referral of complicated cases to tertiary centers as is true in this case.

Cerebral venous sinus thrombosis

The incidence in developing countries is high at 4.5 per 1000 obstetric cases. Puerperal CVST may account for approximately 15-20% of stroke victims of younger age.[5]

In a similar study by Prabhu et al, 17 cases were diagnosed with CVT. It was reported that CVTs were mostly clustered around the first week after delivery.[2]

In the study by Carlos et al, 73.1% presented with headache, 10.3% with seizures and 10.5% with focal signs.[6]

Superior Sagittal Sinus (SSS) involvement was seen in 89.5%, transverse sinus involvement in 34.3% and deep venous system involvement was seen in 25.3%.

In the study by Chaudhary et al, all patients had headache, 70% had associated vomiting and 50% had seizures.[7] In a study by Patil et al, all 9 patients with obstetric CVT recovered.[5]

Favorable outcome in CVT may be ascribed to less frequent involvement of the deep venous system (12%) and early use of anticoagulation.

Posterior reversible encephalopathy syndrome

Hinchey et al, in their study of 15 patients observed that the commonest presenting symptoms were seizures (73%), visual abnormalities (67%), impaired consciousness (67%), headaches (53%) and vomiting in 53%.[8] Bartynski et al, reported that seizures were seen in 71% and impaired consciousness, headaches, visual abnormalities and vomiting were seen in 26%.[9] Similar findings were observed in studies by McKinney et al, Lee et al, and Burnett et al.[10-12] In the study by Hinchey et al, all had bilateral involvement with asymmetrical lesions seen in 67%. Occipital involvement was noted in 93%, parietal in 87%, temporal in 60% and frontal in 47%. Brainstem involvement was seen in 13% and cerebellar and basal ganglia involvement in 7%.[8] Bartynski et al, in

his study found parietal and occipital involvement in 98%, frontal (68%), inferior temporal lobes (40%), cerebellum (30%), basal ganglia (14%), brainstem 13%, deep white matter 18% and splenium in 10%.[9] McKinney et al, showed that involvement was parieto-occipital in 98.7%, temporal 68.4%, thalamus 30.3%, cerebellum 34.2%, brainstem 18.4%, and basal ganglia 11.8%. Enhancement was seen in 37.7%, restricted diffusion in 17.3%, hemorrhage in 17.1% and a unilateral variant in 2.6%.[10] Lee et al, and Burnett et al, also showed similar observations.[11,12] Observations of good prognosis were made in studies by Wagner et al.[13]

CONCLUSION

The commonest conditions seen in this cohort were eclampsia, cerebral venous thrombosis and posterior reversible encephalopathy syndrome. Hence a physician needs to bear in mind the common neurological complications that can occur during pregnancy and puerperium to avert poor pregnancy outcomes for both the mother and the child.

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