

Neurological Disorders in Puerperium: A Tertiary Care Experience

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Abstract

Background: Puerperium is the period of adjustment after child-birth during which the mothers reproductive system returns to its normal prepregnant state. It generally lasts six to eight weeks and end with the first ovulation and the return of normal menstruation. A variety of neurological disorders may be encountered during puerperium. The primary neurological disorders studied in relation to puerperum include stroke, epilepsy, benign intracranial hypertension, continuous demyelinating diseases of central and peripheral nervous system and peripheral neuropathy.

Materials and Methods: A prospective observational study wherein the clinical profile of patients presenting with neurological disorders during puerperium was studied. Patients with pre-existing neurological disorders and eclampsia were excluded from the study. Detailed history, examination and relevant investigation like CT head, MRI brain, EEG etc. were done and statistical analysis using Microsoft Excel spreadsheet was done.

Results: Out of 36550 hospital deliveries in 2 years, 74 patients had postpartum neurological complications giving an incidence 337 per lac deliveries. Majority of patients

were in their 3rd and 4th decade of life. Majority of patients had PRES and almost equal percentage 15% patients had GBS and ischemic stroke and 12.2% had cerebral venous thrombosis. Majority of our patients had generalized tonic clonic seizures. Majority (44.6%) of our patients (60.8%) had undergone caesarean section while 29 (39.2%) had normal vaginal delivery.

Conclusion: Posterior reversible encephalopathy syndrome PRES and ischemic stroke (PRESS) emerge as the predominant neurological disorders during puerperium with a substantial contribution by peripheral neuropathy, cerebrovascular disease and CNS infections. Appropriate management, preferably under the joint care of neurologists, obstetricians and neurosurgeons is required to optimize the maternal and foetal outcome.

Keywords: Post reversible encephalopathy syndrome (PRES), generalized tonic clonic seizures (GTCS), cerebral sinus thrombosis, stroke.

Introduction

Puerperium is the period of adjustment after childbirth during which the mother's reproductive system returns to its normal prepregnant state. It generally lasts six to eight

weeks and ends with the first ovulation and the return of normal menstruation.

Puerperal changes begin almost immediately after delivery, triggered by a sharp drop in the levels of estrogen and progesterone produced by the placenta during pregnancy. The uterus shrinks back to its normal size and resumes its prebirth position by the sixth week. During this process, called involution, the excess muscle mass of the pregnant uterus is reduced, and the lining of the uterus (endometrium) is reestablished, usually by the third week. While the uterus returns to its normal condition, the breasts begin lactation. Colostrum, a high-protein form of milk, is produced by the second day after the birth and is gradually converted to normal breast milk, which has less protein and more fat, by the middle of the second week.

A postpartum period or postnatal period is the period beginning immediately after the birth of a child and extending for about six weeks. Less frequently used are the terms puerperium or puerperal period.

The World Health Organization (WHO) describes the postnatal period as the most critical and yet the most neglected phase in the lives of mothers and babies; most deaths occur during the postnatal period. It is the time after birth, a time in which the mother's body, including hormone levels and uterus size, returns to a non-pregnant state. Lochia is postpartum vaginal discharge, containing blood, mucus, and uterine tissue.¹

A neurological disorder is any disorder of nervous system of the body. Structural, biochemical or electrical abnormalities in the brain, spinal cord or other nerves can result in a range of symptoms. Examples of symptoms include headache, vomiting, seizures, altered levels of consciousness, paralysis, muscle weakness, poor coordination, loss of sensation and confusion.²

A variety of neurological disorders may be encountered during puerperium. The primary neurological disorders studied in relation to puerperium include stroke, epilepsy, benign intracranial hypertension, CNS tumors, demyelinating diseases of central and peripheral nervous system and peripheral neuropathy. Neurological disorders may present incidental to pregnancy and puerperium. Patient may also present with secondary neurological disorders such as metabolic encephalopathies.³

Various Neurological Disorders In Puerperium

Stroke: Strokes, both ischemic and hemorrhagic, are a major contributor to morbidity and mortality during pregnancy and the puerperium.

The overall incidence of ischemic stroke during pregnancy is low (3.5-5 per 100 000 pregnancies in the developed world), with the majority of these events occurring late in pregnancy and particularly in the postpartum period. Ischemic stroke can be caused by venous thromboemboli or cardioembolic. Hypercoagulable states can cause both arterial and venous thrombosis. Paradoxical emboli related to presence of patent foramen ovale and peripartum cardiomyopathy can cause cardioembolic stroke. The diagnosis of stroke is considered in patients who present with acute onset of focal neurological changes in absence of alternative etiology. Additionally patient present with headache and altered consciousness. Initial study with non-contrast head computerized tomography (CT) facilitates the diagnosis of stroke.

The incidence of hemorrhagic stroke is similar to ischemic stroke but ICH has higher maternal mortality rate and is estimated to account for 5 to 12 percent of overall mortality rate. Hemorrhage is primarily associated with preeclampsia eclampsia, arteriovenous malformations

(AVM) and cerebral aneurysm rupture. Initial imaging of choice is non-contrast computerized tomography^{4,5}.

Cerebral Venous Thrombosis: Cerebral venous and sinus thrombosis (CVT) is a subtype of stroke which may result in ischemic and / or hemorrhagic complications. It is imperative that the neurohospitalist recognizes that pregnancy and the immediate postpartum period are associated with a significant increase in risk of cerebral venous thrombosis.⁶ However, the overall risk of developing a CVT remains low in developed countries (11.6 per 100 000 pregnancies).⁷ Mortality related to CVT is estimated at 9% and is primarily due to intracerebral hemorrhage. The development of cerebral venous thrombosis has been related to number of factors including hypercoagulable states, inflammatory disorders and infection. Other genetic causes of hypercoaguability including antiphospholipid syndrome, prothrombin gene mutation and factor V leiden/MHTFR deficiency are associated with CVT. Hypertension, caesarean section, infection, obesity, hyperemesis dehydration, prolonged bed rest may also further increase the risk of developing thrombosis. They present with headache, seizures and rarely with hemiplegia and aphasia. Magnetic resonance imaging of brain is best initial study to work up potential CVT.⁸ The incidence has dropped from 3.2% a century ago to less than 0.25% likely due to the shortened second stage of labor.^{10,11}

Aims And Objectives

To assess clinical profile of patients with neurological disorders during puerperium.

Material And Methods

After obtaining the ethical clearance from the Institutional Ethical Committee the present study was conducted in the Postgraduate Department of Medicine, Government Medical College, Srinagar over a period of 2 years.

Inclusion Criteria

1. Patients developing primary neurological disorders during course of puerperium.
2. Metabolic causes of coma and convulsion

Exclusion Criteria

- Patients with pre-existing neurological disorders.
- Eclampsia

Each patient was subjected to detailed history and relevant clinical examination with emphasis on elaborate neurological examination. Informed consent regarding participation into the study was taken from the patient. All the information regarding history and examination was recorded in case preformed proforma. All baseline investigations viz. CBC, ESR, Urine examination, LFT, KFT with Serum Electrolytes (Sodium, Potassium), Blood Sugar, PT, INR, ANA and USG abdomen, were done. Specific investigations like APLA profile, nerve conduction studies, electromyography, cerebrospinal fluid analysis, NCCT Head, magnetic resonance imaging, magnetic resonance angiography, magnetic resonance venography were performed wherever needed.

Statistical Analysis

The data obtained was entered in computer using Microsoft Excel Spreadsheet and thereafter analyzed using Statistical Package for Social Sciences (SPSS Ver. 22).

Results

The total number of deliveries conducted in this period were 36550 which includes 21930 lower segment caesarean section and 14620 normal vaginal deliveries, out of which 74 patients developed postpartum neurological complications giving an incidence 337 per 1,00,000 lac deliveries.

Table – 1: Age distribution of the studied population

Age (years)	Frequency	Percent
< 24	9	12.2
25 - 29	31	41.9
30 - 34	23	31.1
35 - 39	11	14.9
Total	74	100.0

Majority of our studied patients were in their 3rd and 4th decade of life while as there were only 9 patients < 24 years of age. Four (5.4%) of our patients were hypothyroids with one each (1.4%) with history of rheumatic heart disease and systemic lupus erythematosus. 68 (91.9%) of our patients were having no significant past history.

Table – 2: Diagnosis

Diagnosis	Frequency	Percent
Acute fatty liver of pregnancy	1	1.4
Gullian Barre syndrome	11	14.9
Atypical posterior reversible encephalopathy syndrome	3	4.1
bupivacaine induced seizures	1	1.4
Central pontine myelinolysis	1	1.4
Cerebral vein thrombosis	9	12.2
HELLP syndrome	1	1.4
Iatrogenic meningitis	8	10.8
Intracerebral	6	8.1

haemorrhage		
Ischemic stroke	11	15.1
Posterior reversible encephalopathy syndrome	22	29.7

Posterior reversible encephalopathy syndrome was seen in majority of our patients i.e. 22 (29.7%), 11 (15.1%) had ischemic stroke and, out of these 8 had MCA infarct and 2 had ACA infarct and 1 had PCA infarct. 11 (15.1%) had Gullian Barre syndrome, 9 (12.2%) had cerebral vein thrombosis, 8 (10.8%) had iatrogenic meningitis, 6 (8.1%) intracerebral haemorrhage, 3 (4.1%) had atypical posterior reversible encephalopathy syndrome. (PRES)

Table – 3: Clinical complaints

Complaints	Frequency	Percent
Altered sensorium	14	19.0
Areflexic paraplegia	11	14.9
Generalized tonic clonic seizures	33	44.6
Headache	2	2.7
Left hemiparesis	9	12.2
Right hemiparesis	5	6.8
Total	74	100.0

Majority of our patients 33 (44.6%) had generalized tonic clonic seizures, 14 (19%) had altered sensorium, 11 (14.9%) had areflexic paraplegia, 9 (12.2%) left hemiparesis, 5 (6.8%) right hemiparesis and 2 (2.7%) patients had headache as the presenting complaint. Pregnancy induced hypertension was seen in 61 (82.4%) of our studied patients. A total of 45 (60.8%) patients had undergone caesarean section while as 29 (39.2%) had normal vaginal delivery. Majority of our patients i.e. 27 (36.5%) were para 2, 22 (29.7%) were para 1 and 12 (16.2%) were para 3.

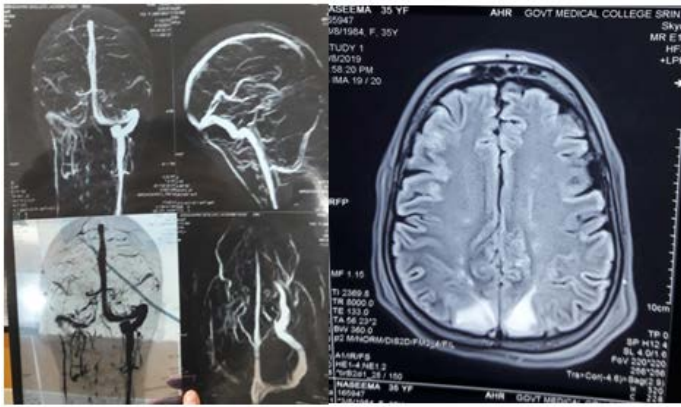


Figure 1 : MRIs showing sinus thrombosis and PRES.

DISCUSSION After obtaining the ethical clearance from the Institutional Ethical Committee the present study was conducted in the Postgraduate Department of Medicine, Government Medical College, Srinagar over a period of 2 years.

In our study majority of patients i.e. 31 (41.9%) were 25-29 years of age followed by 23 (31.1%) patients with age ranging from 30-34 years while as only 9 patients in our study were < 24 years of age. Similar results were found by Shanthirani B et al (2016)¹¹ in their study. They too had majority of patients in their 3rd and 4th decade of life. Shubha L et al (2017)¹² again found their enrolled patients in their 3rd and 4th decade of life.

We had 4 (5.4%) hypothyroids in our study population, rheumatic heart disease and systemic lupus erythematosus was seen in 1 (1.4%) patients each. 68 (91.9%) patients were normal in our study population. We could not find any literature suggesting medical disorders in pregnancy and puerperum.

In our study posterior reversible encephalopathy syndrome was seen in majority of patients i.e. 22 (29.7%). Shanthirani B et al (2016)¹¹ found PRES as the first major neurological complication in 5 (16.6%) of patients.

Eleven (15.1%) had ischemic stroke and 6 (8.1%) had haemorrhagic stroke in our study. Gupta S et al (2006)¹³

had 3 patients with ischemic stroke and 1 patient with haemorrhagic stroke. Simolke GA et al (1991)¹⁴ also found 9 cases of ischemic stroke and 6 cases of haemorrhagic stroke in their study which is comparable with the findings in our study. Sharshar T et al (2014)¹⁵ found that out of 31 cases of stroke, 15 were non-haemorrhagic and 16 were haemorrhagic which was again comparable to our study.

Eleven (15.1%) of our studied patients had Gullian Barre syndrome. Sarella LK et al (2014)¹⁶ in their study found 4 (7.27%) patients with peripheral neuropathy. Gupta S et al (2006)¹⁷ found peripheral neuropathy in 1 (1.3%) patient out of 76 studied patients. Shubha L et al (2017)¹³ had peripheral neuropathy in 5 (9.6%) out of 52 studied patients.

In our study, there were 9 (12.2%) patients diagnosed with cerebral vein thrombosis. Gupta et al (2006)¹⁷ had 5 patients with cerebral vein thrombosis and 4 patients with cerebrovascular accident which was comparable to our study. Simolke L et al (1991)¹⁴ in their study observed 12 (13.3%) patients with cerebrovascular accident and 2 (2.2%) with cerebral vein thrombosis. Witlan AG et al (1997)¹⁷ had cerebrovascular accident in 11 (13.9%) patients and cerebral vein thrombosis in 9 (11.3%) patients.

We found 8 (10.8%) patients diagnosed with meningitis all of which had iatrogenic meningitis. However, Gupta S et al (2006)¹³ had 12 patients with CNS infections out of which 7 cases were having tubercular meningitis, 4 were having acute pyogenic meningitis and 1 had viral encephalitis. Shubha L et al (2017)¹² found CNS infection in 2 (3.8%) patients out of 52 studied patients.

In our study there were 3 (4.1%) patients with atypical posterior reversible encephalopathy syndrome, we could not find any literature regarding the same.

In our study we found HELLP syndrome in 1 (1.4%) patient Shubha L et al (2017)¹² found HELLP syndrome in 2 (3.8%) of their patients out of the total of 52 studied patients.

Majority of our patients 33 (44.6%) had generalized tonic clonic seizures, 14 (19%) had altered sensorium, 11 (14.9%) had areflexic paraplegia, 9 (12.2%) left hemiparesis, 5 (6.8%) right hemiparesis and 2 (2.7%) patients had headache as the presenting complaint. Shanthirani B et al (2016)¹¹ studied 30 patients in which seizure was found in 23 (76.6%) patients, altered sensorium in 5 (16.6%) and hemiplegia in 2 (6.6%) patients.

Pregnancy induced hypertension was seen in 61 (82.4%) of our studied patients. Previous studies showed relation between hypertension and neurological complications. The hypertension included eclampsia, PIH, essential hypertension, but no such study revealed PIH individually in relation with neurological deficiencies.

A total of 45 (60.8%) patients had undergone caesarean section while as 29 (39.2%) had normal vaginal delivery. Lanska DJ et al (2000)¹⁸ had normal vaginal delivery in 165 (14.5%) who had cerebrovascular accident and CVT and 188 (60.9%) undergone caesarean section and developed cerebrovascular accident and CVT.

Majority of our patients i.e. 27 (36.5%) were para 2 followed by 22 (29.7%) para 1 and 12 (16.2%) para 3. Shanthirani B et al (2016)¹¹ studied 30 patients 19 were primigravida, 10 were multi gravida, there was 1 grand-multi.

Conclusion

To conclude, posterior reversible encephalopathy syndrome and ischemic stroke emerge as the predominant neurological disorders during puerperium with a substantial contribution by peripheral neuropathy

cerebrovascular diseases and CNS infections. A comparative analysis with previous Indian studies and international studies has been highlighted. Effects of these conditions and their treatments on pregnancy and the effects of pregnancy on the course of these disorders should be kept in mind when dealing with these conditions in pregnancy. Appropriate management, preferably under the joint care of neurologists, obstetricians and neurosurgeons, is required to optimize maternal and foetal outcomes.

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