

Clinical Profile of Acute Neurological Emergencies in Postpartum Mothers: A Hospital-based Descriptive Study

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ABSTRACT

Introduction: Neurological disorders in pregnancy pose a major diagnostic challenge as they are a significant contributor to mortality and morbidity in pregnancy. Neurological complications may manifest at any time during pregnancy or puerperium even after what seemed to be a normal pregnancy. A thorough understanding of the patterns of these diseases is essential for prediction and early identification.

Aim: To study the aetiology, clinical profile, morbidity and mortality patterns of acute neurological emergencies in postpartum women.

Materials and Methods: This hospital-based descriptive study was conducted in the Department of Obstetrics and Gynaecology at Government Vellore Medical College and Hospital, Vellore, Tamil Nadu, India between February 2021 and August 2022. A total of 76 postnatal mothers who met the inclusion criteria were selected using consecutive sampling. Details pertaining to personal, demographic, antenatal risk factors, labour/delivery and postnatal events were recorded using a pretested semi-structured questionnaire. The data were entered into Microsoft Excel and analysed using Statistical Package for the Social Sciences (SPSS) 21.0, with the data expressed as frequency and proportion.

Results: Among the 76 women included in the study, more than half were multiparous women 42 (55%) and the majority were young adults aged <25 years 48 (63.1%). The majority belonged to a low socioeconomic status (57, 75%), with headache 46 (60.5%) being the most common presenting complaint followed by seizures 45 (59%). The most common diagnosis observed was postpartum eclampsia 37 (48%). Around 34 (44.7%) of the women had associated anaemia, followed by hypertensive disorders of pregnancy including Gestational Hypertension (GHTN) and severe pre-eclampsia together 33 (42%). Long-term residual morbidity was observed only in five of the survivors, two with fine motor weakness, two with remote amnesia and one with speech defects mainly attributable to irreversible damage to motor nuclei and hypoxic ischaemic encephalopathy. Seven out of the 76 affected individuals succumbed to death during the hospital stay, all within seven days of admission.

Conclusion: Neurological disorders in the postpartum period are a major contributor to maternal mortality, with eclampsia topping the list as the most common cause of seizures in the postpartum period.

Keywords: Cortical vein thrombosis, Headache, Posterior reversible encephalopathy, Postpartum eclampsia, Seizures

INTRODUCTION

Acute neurological diseases requiring hospitalisation are relatively rare in young women of childbearing age. However, during pregnancy and the postpartum period, certain diseases increase in prevalence [1]. Due to the varied presentation and similarity with common non specific pregnancy-related symptoms such as headache, migraine, vomiting and lightheadedness, it poses a major diagnostic challenge.

A few conditions are quite unique to pregnancy, such as eclampsia and pregnancy-induced hypertension with neurological complications. Other neurological conditions that occur during pregnancy but are not specific to pregnancy include intracerebral haemorrhage, cerebral vasoconstriction syndromes, Posterior Reversible Encephalopathy Syndrome (PRES) and Cerebral Venous Thrombosis (CVT) [2].

In contrast to the non pregnant state, even minor neurological conditions such as headaches may require hospitalisation and a complete evaluation during pregnancy and the postpartum period to ensure appropriate treatment measures are taken at the earliest [3].

Despite being an important issue, there is a paucity of studies related to the clinical profile of acute neurological emergencies in postpartum mothers, especially from a South Indian setting, which led authors to undertake the present study [4,5]. The present study

aimed to study the aetiology, clinical profile, morbidity and mortality patterns of neurological disorders in postpartum women.

The present study would provide immense evidence regarding the various clinical presentations of these diseases, thereby helping in early diagnosis and the prompt initiation of active intervention so that residual neurological deficits can be prevented.

MATERIALS AND METHODS

The present hospital-based descriptive study was conducted in the Obstetric Emergency Unit of Government Vellore Medical College and Hospital, Vellore, Tamil Nadu, India between February 2021 and August 2022 following approval by the institutional ethics committee (Reg. No. ECR/1215/Inst/TN/2019). Informed consent was obtained from all eligible participants.

Inclusion criteria: All postpartum mothers who presented within the 42nd postnatal day with complaints of headache, altered sensorium, seizures, or focal neurological deficit were included in the study.

Exclusion criteria: Known epileptic patients, patients with a history of head injury or falls, space-occupying lesions in the brain and proven cases of other neurological disorders were excluded.

Study Procedure

During admission, each patient's clinical course was closely followed. A written and informed consent was taken from the

study subjects or attenders in case of patients with altered sensorium. Data were gathered by residents of the Obstetric and Gynaecology Department using a semi-structured questionnaire under the following sections: i) Sociodemographic details; ii) Clinical complaints and diagnosis.

STATISTICAL ANALYSIS

The collected data was consolidated in a Microsoft Excel spreadsheet on a password-protected computer. The data was further analysed using SPSS 21.0. The pattern of neurological ailments seen among postnatal women is expressed as frequency and proportion.

RESULTS

Among the 76 participants, 48 (63%) belonged to the age group of <25 years, with a mean age of 24.1±3.9 years. A total of 39 (51%) delivered through normal vaginal delivery. More than half 41 (54%) of the participants presented with neurological symptoms during the first seven days postpartum [Table/Fig-1] [6].

Characteristics	n (%)
Age group	
<25 years	48 (63.1)
25-30 years	20 (26.3)
>30 years	8 (10.5)
Education	
Illiterate/primary school	28 (36.8)
Middle/high school	36 (47.3)
Secondary school/graduate	10 (13.1)
Postgraduate/professional	2 (2.6)
Socioeconomic status (based on Modified Kuppuswamy scale) [6]	
Lower	57 (75.0)
Middle	15 (19.7)
Upper	4 (5.3)
Booking status	
Booked	72 (94.7)
Not booked	4 (5.3)
Parity	
Primi	34 (44.7)
Multiparous	42 (55.26)
Mode of delivery	
Normal vaginal delivery	39 (51.3)
LSCS	34 (44.7)
Assisted delivery	3 (3.9)
Gestational age at delivery	
Preterm (less than 37 weeks)	23 (30.2)
Term (37 to 42 weeks)	40 (52.6)
Post-term (>42 weeks)	13 (17.1)
Postnatal day	
<7 days	41 (53.9)
7-14 days	23 (30.3)
15-42 days	12 (15.7)

[Table/Fig-1]: Sociodemographic characteristics of the study participants (N=76) [6].
LSCS: Lower segment cesarean section

It was observed that 34 women had associated anaemia (44%), followed by hypertensive disorders of pregnancy including Gestational Hypertension (GHTN) and Severe preeclampsia 33 (42%) [Table/Fig-2].

With respect to the clinical presentation, the authors found that the most common clinical presentation was headache 46 (60.5%)

Co-morbidity	n (%)
Anaemia	34 (44.7)
Gestational diabetes mellitus	9 (11.8)
Gestational hypertension	11 (14.7)
Antepartum haemorrhage	7 (9.2)
Cardiac disease	5 (6.5)
Severe preeclampsia	22 (28.9)
Obesity (BMI >30)	19 (25)
Hypothyroid	5 (6.5)
Anaemia + hypertensive disorders	16 (21.0)

[Table/Fig-2]: Distribution of co-morbidities among the study participants (N=76).
BMI: Body mass index

followed by seizures 45 (59%) and altered sensorium 16 (21%) [Table/Fig-3].

Regarding the distribution of neurological diagnoses, the authors observed that among the most common was postpartum eclampsia 37 (48.6%) followed by Posterior Reversible Encephalopathy Syndrome (PRES) 16 (21%) and cortical venous thrombosis 11 (14.5%) [Table/Fig-4].

Symptoms	n (%)
Headache	
Yes	46 (60.5)
No	30 (39.5)
Altered sensorium	
Yes	16 (21.0)
No	60 (78.9)
Visual disturbances	
Yes	10 (13.1)
No	66 (86.9)
Speech disturbances	
Yes	4 (5.2)
No	72 (94.8)
Seizures	
Yes	45 (59.2)
No	31 (40.8)
GCS on admission	
3-8	7 (9.1)
9-12	29 (38.1)
13-15	40 (52.6)
Motor weakness	
Yes	5 (6.5)
No	71 (93.4)

[Table/Fig-3]: Presenting symptoms and signs of the study participants (N=76).
GCS: Glasgow coma scale

Diagnosis	n (%)
Meningitis	
Yes	3 (3.9)
No	73 (96.1)
Cerebral Venous Thrombosis (CVT)	
Yes	11 (14.5)
No	65 (85.5)
Metabolic encephalopathy	
Yes	2 (2.6)
No	74 (97.4)
Cerebrovascular accident	
Yes	4 (5.2)

No	72 (94.7)
Intracranial haemorrhage	
Yes	3 (3.9)
No	73 (96.1)
Posterior Reversible Encephalopathy Syndrome (PRES)	
Yes	16 (21.1)
No	60 (77.9)
Postpartum eclampsia	
Yes	37 (48.6)
No	39 (51.4)
Outcome	
Survived	69 (90.8)
Death (Mainly due to intracranial haemorrhage and massive infarct)	7 (9.2)

[Table/Fig-4]: Diagnosis of the study participants, N=76.

The distribution of treatment modalities among the study participants, where we observed that the majority recovered without any specific treatment are depicted in [Table/Fig-5]. Around 22 cases (28%) required ventilatory support, while surgery was needed for only 3 cases, which had increased intracranial tension with midline shift necessitating decompression craniotomy (3.9%). Thrombolysis was done in 11 cases.

Treatment	n (%)
Thrombolysis	11 (14.7)
Decompression surgery	3 (3.9)
Ventilatory support	22 (28.9)
Conservative management alone	40 (52.6)

[Table/Fig-5]: Distribution of treatment modalities among the study participants (N=76).

Long-term residual morbidity was seen only among five of the survivors, of which two had fine motor weakness and two had remote amnesia and one had speech defects mainly attributable to irreversible damage to motor nuclei and hypoxic ischaemic encephalopathy. They were followed-up for six months through phone and Outpatient Department (OPD) visits. Seven out of the 76 affected individuals succumbed to death during the hospital stay itself and all seven of them within seven days of admission [Table/Fig-6].

Residual morbidity/mortality	n (%)
Fine motor weakness	2 (2.6)
Speech deficit	1 (1.3)
Remote amnesia	2 (2.6)
Death	7 (9.2)

[Table/Fig-6]: Disease outcome among the study participants (N=76).

DISCUSSION

In the present study, more than half (63%) of the study participants belonged to the age group of less than 25 years, with a mean age of 24 years. Similar findings were reported by the study done by Solen Ros H et al., who also documented that 146 out of the 273 study participants were in the age group <30 years [7]. The most common mode of delivery was normal vaginal delivery. This was observed to be similar to findings from Vaswani PR et al., which showed overall normal vaginal delivery rates to be around 80% [8]. However, the mode of delivery does not seem to have an impact on the occurrence of neurological disorders. Kuklina EV et al., found that two out of three pregnancy-related hospitalisations were seen in young adults (25 to 34 years) that were complicated by stroke and were diagnosed during delivery or the early postpartum period [9]. The authors observed that 44% of the study participants had associated anaemia, followed

by severe preeclampsia and GHTN together accounting for 43%. A total of 25% of the study participants had obesity with a pre-pregnancy BMI >30. This finding was also found to be comparable to findings put forth by other studies by Kittner SJ et al., which shows that in the reproductive age group, women with cerebral infarction, 41% had associated pregnancy-induced hypertension [10]. Concerning the clinical presentation, the authors found that the most common clinical presentations were headache and seizures (61% and 59% respectively). In a study by James AH et al., neurological symptoms of importance, particularly migraine headache, the commonest medical condition associated with pregnancy-related stroke, supported by a high Odds Ratio (OR 16.9) [11]. The commonest diagnosis was post-partum eclampsia (48.6%), which was seen in almost half of the study participants. A similar proportion was observed in a study by Singh S and Behera A in which 158 out of 160 cases presented with convulsions attributed to eclampsia [12]. The next common diagnosis observed was PRES (21%), followed by CVT (14.5%), ICH (4%) and meningitis (4%). A study done by Posh SA et al., from Srinagar, India, among 25 pregnant women, estimated that out of the 25 cases, 10 (40.0%) had PRES, 6 (24%) were diagnosed with CVT, while 3 (12.0%) had embolic infarcts, 2 (8.0%) had status epilepticus and 2 (8.0%) had pituitary apoplexy [13].

Postpartum eclampsia was seen in 48% of the cases. The present study finding was significantly higher than a study from India by Singh S and Behera A who estimated the prevalence of postpartum eclampsia to be approximately 19% [12]. The difference in findings could be due to the fact that the Singh S and Behera A study estimated the prevalence among all pregnant women, whereas the present study focused on women who presented with neurological symptoms, explaining the increased prevalence in the present study [12].

The authors also observed that among the 76 individuals with acute neurological manifestations, 7 (9.2%) succumbed to death. This finding was similar to that reported by Hosley CM and McCullough LD, who estimated mortality rates among women with neurological symptoms during pregnancy to be between 5-12% [14].

The present study was conducted at a peripheral medical college in Tamil Nadu with limited resources. Hence, the study's outcomes may help doctors and other healthcare professionals in understanding the varied neurological presentations in postpartum mothers, which can sometimes be misleading and difficult to diagnose.

The present study will help in planning hospital-based management protocols that may not be disease-specific but rather symptom-specific, potentially aiding resource-poor settings in reducing maternal mortality and morbidity.

Limitation(s)

The limitations of the present study are attributed to its observational nature and the constraints in establishing causal relationships between the exposure and outcome. The findings are generalisable only to similar study settings, as the study was conducted in a single centre in South India. Additionally, the smaller sample size limited our ability to evaluate the effects of all independent variables on the outcome.

CONCLUSION(S)

Neurological disorders in the postpartum period are a major contributor to maternal mortality. Eclampsia tops the list as the most common cause of seizures in the postpartum period. Headache, even though it may seem benign, is the most common symptom preceding an episode of eclampsia and should never be neglected. This step is crucial in planning and designing evidence-based management protocols, which will have a definite impact on maternal health.

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