

Clinical Profile of Postpartum Cerebral Venous Thrombosis and its Management in a Tertiary Hospital Salem, Tamilnadu, India

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Abstract: Cerebral venous thrombosis (CVT) is an infrequent condition affecting pregnant females, resulting from clot formation in one of the many outflow tracts of the brain. It is a rare but potentially fatal complication of pregnancy and postpartum period. The incidence of venous thromboembolism during pregnancy and puerperium has been estimated to be 5.5 -6 times higher than general female population of child bearing age. In this study we observe the clinical profile of postpartum cerebral venous thrombosis and its management. **Aim:** To observe the demographic profile, predisposing factors, spectrum of clinical manifestation and also the neuroimaging, management and prognosis of Cerebro Vascular Thrombosis, which occur during puerperium. **Materials and Methods:** This prospective analytical study was conducted on 75 radiologically confirmed cases of cerebral venous thrombosis admitted in Obstetrics and Gynaecology department of Govt. Mohan Kumaramangalam medical college hospital during the period from February 2018 to July 2019. Detailed history, clinical examination, laboratory and radiological investigations were carried out in all the cases. **Results:** Among the 75 patients of CVT studied the age of patients vary from 21 -30 yrs. Most of the cases presented in second week of delivery. The most common presenting symptom is headache and seizures. MRI brain with MRV is the diagnostic investigation of choice for CVT. The mortality rate was 9.33%. **Conclusion:** Timely recognition and treatment of CVT in postpartum period result in better prognosis. An MRI combined with MRV may be the best choice for the investigation of CVT in the postpartum period.

Keywords: Cerebral venous thrombosis, neurological disorder, stroke

1. Introduction

Cerebral venous /sinus Thrombosis (CVT) has been recognized since the early 19th century¹ but still remains a diagnostic and therapeutic challenge. Cerebral vein and sinus thrombosis is rare compared to arterial stroke often occurs in young individuals² CVT may occur at any time from infancy to old age most reported cases were women in association with puerperium.³ Onset of symptoms may be acute, sub acute or chronic⁴ Cerebral venous infarction is the most serious consequence of cerebral venous thrombosis, venous infarctions are often multifocal bilateral affecting both grey matter and sub cortical white matter.

Patient of CVT usually presents with headache, seizure, papilledema, altered sensorium and focal deficits due to thrombosis of intracranial veins and sinuses resulting in haemorrhagic infarctions and raised intracranial tension². The above features are present in various combinations ranging from syndrome of raised intracranial pressure without localization to deep altered sensorium and dense hemi paresis. CVT forms a distinct subgroup of cerebrovascular disease in India and is a leading cause of mortality in women of reproductive age group³. In India, most of the cases are seen in post partum period in women.

Pangayara reported from India that CVT accounted for half

of young stroke and 40% for stroke in women. After introduction of heparin in treatment of CVT mortality has come down significantly and most of the recent studies^{6,7} reporting mortality < 20% compared to earlier studies reporting mortality between 30-50%. However outcome of CVT is highly unpredictable and it is not unusual to see dramatic recovery in deeply comatose patient and sudden worsening in conscious patients due to extension of thrombosis. With the advent of imaging modalities like CT scan and recently Magnetic Resonance Imaging (MRI) and Magnetic resonance venography (MRV), the diagnosis of CVT has improved significantly. CT scan commonly shows haemorrhagic infarctions with or without "cord", or "empty delta" sign⁷. MRI and MRV, when used in doubtful situations can clarify the diagnosis by showing thrombosed sinus of cortical vein.

Raised ICT have been noted to have sinus thrombosis giving rise to syndrome of raised intracranial pressure without localization. Pathologically involvement of superior sagittal sinus of varying extent with or without the involvement of transverse and sigmoid sinuses with thrombosis of cortical veins had been reported commonly^{2,3}. Haemorrhagic infarctions with mass effect and diffused cerebral edema with herniation is also frequently seen. Involvement of deep venous system is less common than superficial venous system but by no means rare. Due to

multifactorial causation of this condition, it will be interesting to know whether different pathophysiological mechanisms are operating in different clinical settings. Long term outcome of CVT in this part of the state is not well described, so this study was undertaken to identify the etiological spectrum of CVT and its outcome.

Aim

To observe the demographic profile, predisposing factors, spectrum of clinical manifestation and also the neuroimaging, management and prognosis of Cerebrovascular Thrombosis, which occur during puerperium.

2. Materials and Methods

This prospective and retrospective analytical study was conducted on 75 radiologically confirmed cases of cerebral venous thrombosis admitted in Obstetrics and Gynaecology department of Govt. Mohan Kumaramangalam Medical College hospital during the period from February 2018 to July 2019.

Inclusion criteria

- Postnatal mothers with confirmed clinical and radiological diagnosis of cerebral venous thrombosis within 6 weeks of delivery

Exclusion criteria

- Patients whose clinical presentation could be explained by any other neurological disease.
- Women without radiological evidence of CVT.
- Women who delivered 6 weeks ago.
- Women who do not want to part of study.

All patients admitted during the study period are subjected to analysis based on a preformed proforma. Age of the mother, socio economic status, parity, presence of predisposing factors, mode of delivery, time of presentation, mode of delivery, treatment given, hospital course, outcome were noted. Detailed analysis of the collected data was done at the end to find predisposing factors and the spectrum of postpartum CVT. Assessment of consciousness level, Glasgow coma scale score at the time of admission were also recorded in all patients. Neuroimaging in the form of CT brain and MRI brain with MRA and MRV was done in all patients. Details like presence of cerebral edema, haemorrhagic infarct, no haemorrhagic infarct, presence of direct signs like cord sign, dense delta sign etc., occurrence of focal or diffuse subarachnoid haemorrhage in CT brain were recorded. In MRI with MRV, type and number of sinuses involved, involvement of cortical veins, internal jugular vein extension, and laterality of the sinuses involved were noted.

Investigations like complete blood count, erythrocyte sedimentation rate (ESR), blood urea, blood sugar, serum creatinine, serum electrolytes, lipid profile, X-ray chest, Electrocardiogram, Elisa for Human Immunodeficiency Virus (HIV), VDRL, coagulation profile including bleeding time, clotting time, prothrombin time, activated partial thromboplastin time were done in all patients. Females with haemoglobin level of <12 g/dl were considered to have anemia in our study. Specific investigations like

antinuclear antibody (ANA), antiphospholipid antibodies, tests for procoagulant states like protein C, protein S, antithrombin III (AT III) and serum homocysteine with an aim to detect the underlying etiology were done in certain patients as needed. Outcome at the end of the hospital stay was recorded in all patients. The modified Rankin score was used for outcome assessment.

3. Results

Statistical analysis was done using SPSS software. Statistical analysis used descriptive, univariate and multivariate methods. Continuous variables were presented as mean, median and \pm SD. Categorical variables were expressed as proportions and Fisher's test was used to study the association in proportions. We estimated the relative risk and the resulting 95% Confidence Interval to study associations. P value of equal to or less than 0.05 was considered statistically significant. The study was approved by the ethical committee of our hospital.

4. Results and Analysis

Our study was conducted Govt Mohan Kumaramangalam Medical College and Hospital, Salem during a period of 18 months and the results were studied.

The results of the study are documented below.

Table 1: Age Distribution

Age in years	No. of cases	Percentage
< 20	7	9.3
21 - 25	40	53.3
26 - 30	19	25.3
> 30	9	12.0
Total	75	100.0

Maximum occurrence of CVT was noted in the age group of 21-25 years contributing to 53.3%. Similarly the incidence of 25.3% was noted in 26-30 yr. The youngest age of stroke is 16 yr old girl with anemia and severe preeclampsia.

Table 2: Parity Distribution

Parity	No. of cases	Percentage
P1	45	60.0
P2	18	24.0
P3	9	12.0
P4	3	4.0
Total	75	100.0

P1 - Postnatal patients after first delivery (primi para) irrespective of the outcome of delivery.

P2 - Postnatal patients after second delivery irrespective of outcome of previous and present pregnancy

P3 - Postnatal patient after third delivery irrespective of outcome of pregnancies

P4 - Postnatal patient after fourth delivery irrespective of outcome of pregnancies

60% of patients were primipara showing the highest incidence, followed by P2 group with 24%.

Table 3: Time of Presentation

Duration	No.of case	Percentage
1 week	28	37.3
2 week	39	52.0
3 week	8	10.7
Total	75	100.0

52% of patients had CVT in the 2nd week of postpartum period, followed by 28% of postnatal women in the first week of postpartum.

Table 4: Co-Morbidity

CO Morbidity	No.of cases	Percentage
Anemia	48	64.0
Dehydration	26	34.67
GDM/DM	5	6.67
Hypertensive Disorders	36	48
Obesity	12	16
Multiple Pregnancy	6	8.0
Blood Transfusion	32	42.67
LSCS	39	52

Table 5: Symptomatology

Symptoms	No.of cases	Percentage
Altered Sensorium	52	69.33
Visual Disturbance	34	45.33
Neurological Deficit	41	54.67
Convulsions	63	84
Headache	65	86.67
Vomiting	29	38.67
Fever	17	22.67
Neck Stiffness	13	17.30

Table 6: Radiological Findings

Radiological Findings	No.of cases	Percentage
Vasogenic edema	15	20
Haemorrhagic infarct	18	24.0
Venous infarct	44	58.6
Mass effect	14	18.67
Empty delta sign	9	12
Total	75	100.0

Table 7: Outcome

Outcome	No.of cases	Percentage
Death	7	9.3
Residual Defect	8	10.7
No Residual Defect	60	80.0
Total	75	100.0

5. Discussion

The event of Cerebro Vascular accident in puerperal period is challenging both in diagnosis as well as in management too. They are at increased risk of thrombo embolic disease since pregnancy and puerperium are hypercoagulable state¹¹. Nearly 50% of young stroke in women is related to pregnancy and puerperium¹²

Cerebral Venous thrombosis leads the cause for stroke in pregnancy and puerperium as first which has its maximum incidence in puerperium. In India Bansal et al reported puerperal CVT as 4.5/1000 obstetric admission⁸. With immunological and haematological abnormalities, infections, pre eclampsia, dehydration over already existing hypercoagulable state, chance of CerebroVascular

Thrombosis increases. Once unbooked and home delivery were the contributing factor which was reduced in recent days due to Our National Health programmes.

The mortality rate was 5-30% which varies with time of detection and treatment initiated⁹ As early as possible neuroimaging should be done either as CT or MRI. This study was done to find the risk factors, clinical presentation, outcome and management cerebral CVT in puerperal period.

We had 75 patients, all diagnosed to have Cerebral venous thrombosis in a period Feb2018 to July 2019. Due to limited resource we did not do all investigation. Investigated to the maximum, analysed the following observation was penned.

Highest incidence of CVT was seen in 21-25years contributing to 53.3% of total cases. This is similar to Lanska et al, a study by him mentioned 15-25year is most vulnerable to obstetric stroke (10).25.3% of cases belonged to 26-30year group. Youngest age patients was 16year old, a case of anemia with severe pre eclampsia. Among 75 mothers the maximum incidence was noted in primipara which is 60.0%, followed by second gravida contributing to 24%.

In this study 52% of CVT occurred in 2nd week of postpartum. Prakash BC and Bansal C reported that postpartum CVT usually occurred 7-10days after delivery(8)

CVT is a multifactorial disorder proving that when two or more risk factors exists, the chance of CVT is high. In our study we found Anemia (64%), LSCS(52%), Hypertensive disorders (48%), Blood transfusion (42.2%), Dehydration (34.67%) are the most important predisposing factor for CVT. Brown et al showed women with pre eclampsia were 60% more likely to have ischemic stroke than women without it(14)

Independent risk factors for CVT are postpartum period, caesarean delivery, anemia, maternal hypertension(13) As the people around salem have custom of restricted water intake in postpartum period by superstitious belief, it increases the risk of CVT while presenting with other co-morbidities like anemia, pre-eclampsia , immunological abnormalities, fever.

Headache was the most commonest symptom preceding this neurological event. In our study 86.67% of patients are preceded by headache which is similar to study by Kumar et al with 66%, Nagaraj et al showing 71%. Convulsions, altered sensorium are the other two common symptoms with 84%, 69.3%. This is to conclude that patients severe, constant headache in postpartum period should be evaluated even if there in no neurological deficit.

84% of patients had seizure which is either focal or generalized seizures which is similar to study by Kumar S et al. Early appearance of seizure might be hallmark of bad prognosis. 53.3% had GTCS and 30.7% had focal seizures.

In our study 22.67% of patients had fever at the onset of CVT. Fever and infection may predispose to CVT as the fever develops in patients in those with deep cerebral veins as their pons is involved⁷¹. One patient of brainstem infarct had persistent hyperpyrexia. Among 75 patients studied 45.33% had visual disturbance like blurring of vision, diplopia, floaters or transient loss. Some cases of diplopia is due to raised ICT compressing 6th cranial nerve¹⁵. PRES causes transient loss of vision.

In our study 64% of patients were anemic. Most of them are severely anemic, almost all of them had Iron sucrose infusion postoperatively. These patients are more prevalent to pre eclampsia, infection explaining its increased incidence.

Radiological investigation was done in all patients. Study by Srinivasan K showed 50 cases of CVT among 10,000 deliveries. Developing countries have increased prevalence, 10 times more than in developed countries. 58.67% had venous infarct, 24% had haemorrhagic infarct, 8% had empty delta sign and mass effect was observed in 5.33% of patients.

All patients of suspected CVT was received in Intensive care unit or High dependency unit and a multi disciplinary treatment was initiated involving Obstetrician, Neurophysician, Neurosurgeon, Radiologist and Physiotherapist. Unfractionated Heparin loading dose 80u/kg iv followed by 18u/kg/hr titrated according to APTT value was given for patients with CVT. Anticonvulsants, anti hypertensives and anti edema measures was given in appropriate manner. Coagulation profile was done periodically. Decompressive Craniotomy was done in 3 patients and 2 recovered well.

Patients on ventilator or bed ridden are monitored carefully with measures to prevent aspiration, bed sores, exposure keratitis and infections. The risk factors are corrected accordingly like anaemia with blood transfusion, dehydrated patients with Intravenous fluids. After the acute phase patients are stepped down, shifted to ward and their anti coagulation was maintained with T. Warfarin.

80% of patients recovered well with no neurological deficit. 10.7% of patients had neurological deficit like hemiparesis. Patients with cerebral venous thrombosis have good outcome. The mortality rate was 9.33%.

6. Conclusion

Timely recognition and treatment of CVT in postpartum period result in better prognosis. An MRI combined with MRV may be the best choice for the investigation of CVT in the postpartum period. The mortality rate was 9.3%.

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