

## A prospective study of demography, clinical presentation and risk factors of cerebral venous thrombosis in pregnant and postpartum women

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### Abstract

**Introduction:** Cerebral venous thrombosis (CVT) is reported in pregnant and postpartum women showing different characteristic because of specific physiology associated with pregnancy and puerperium.

**Aims and Objectives:** To study sociodemographic features and risk factors of CVT in pregnant and postpartum women.

**Materials and Methods:** A total 100 pregnant and postpartum women having CVT were studied at Kamla Raja Hospital and JA Group of Hospital at GR Medical College, Gwalior Madhya Pradesh for study period of 2016 to 2017. Detailed patient's history, risk factors, symptoms, booking and referral status, place and mode of delivery was recorded.

**Results:** CVT was most common in women with 2<sup>nd</sup> decade of life (84%), were 2<sup>nd</sup> gravida (39%), belonging to rural community (82%) and low socioeconomic status (85%). Maximum women came directly to the centre (58%), were unbooked (96%), presented in postpartum period (95%) and were delivered in hospital (86%). Maximum patients were delivered at various district hospitals (25.5%). Most common risk factor for CVT was anemia (56%) followed by hypertension (30%) and infection (17%) Most common clinical presentation was seizure (65%), headache (48%), paresis (26%) and nausea and vomiting (15%).

**Conclusion:** CVT is associated with varied symptoms in pregnancy and postpartum period. Young age, rural community, low socioeconomic class, caesarean delivery, anemia and preeclampsia were the prevailing risk factors.

**Keywords:** Pregnancy, Postpartum period, Anemia, Caesarean delivery, CVT.

### Introduction

Thrombus formation in the cerebral veins or sinuses leads to Cerebral venous thrombosis (CVT).<sup>1</sup> Incidence of CVT is high (450 per 100,000 deliveries) in developing countries compared to developed countries (11.6 per 100,000 deliveries).<sup>2,3</sup>

In the present era of antibiotics, aseptic thrombus is most commonly seen. Several previous reports have identified hypercoagulable state as the reason for the aseptic thrombotic activity during pregnancy.<sup>4,5</sup> Increase in clotting factors, decrease in protein C and S levels may also contribute in advancement of CVT.<sup>1</sup>

CVT has widely different presentation. Because of non-specific vague symptoms and mimicking ability to other conditions, diagnosis of CVT is difficult. Hence it becomes very important to identify relevant clinical findings early in order to start appropriate medical treatment. A delay in diagnosis and treatment can result in poor outcome.<sup>6,7</sup>

Hence present study was performed to study sociodemographic features and risk factors of CVT in pregnant and postpartum women.

### Materials and Methods

A total 100 patients with CVT (confirmed by computed tomography (CT), MRI/MRV) were studied at Kamla Raja Hospital and JA Group of Hospital at GR Medical College, Gwalior Madhya Pradesh for study period of 2016 to 2017.

Before starting the study a written informed consent was obtained from all the patients. Institutional Ethics committee approval was also obtained before starting the study.

Pregnant and postpartum (6 weeks) women with features of neurological deficit and raised intracranial pressure were included whereas patients of cerebral venous thrombosis due to arterial stroke, cardioembolus stroke, nephrotic syndrome, cancer, head injury, neurosurgical procedures and any trauma were excluded from the present study.

Detailed history including risk factors, symptoms, booking (having at least 3 antenatal visits) and referral status, place and mode of delivery was also recorded.

All the data analysis was performed using IBM SPSS ver.20 software. Data is expressed as percentage. Descriptive analysis was performed for the entire variable studied. Frequency distribution function was used to draw table. Microsoft excel 2010 was used to prepare the graphs.

### Results

Majority were in 2<sup>nd</sup> decade of their life (84%) followed by 12 and 4 patients who were >30 and <20 years of age. Maximum patients belonged to rural community (82%). Majority were from the low socioeconomic status (85%) followed by middle socioeconomic status (14%).

**Table 1: Distribution of patients according to different parameters**

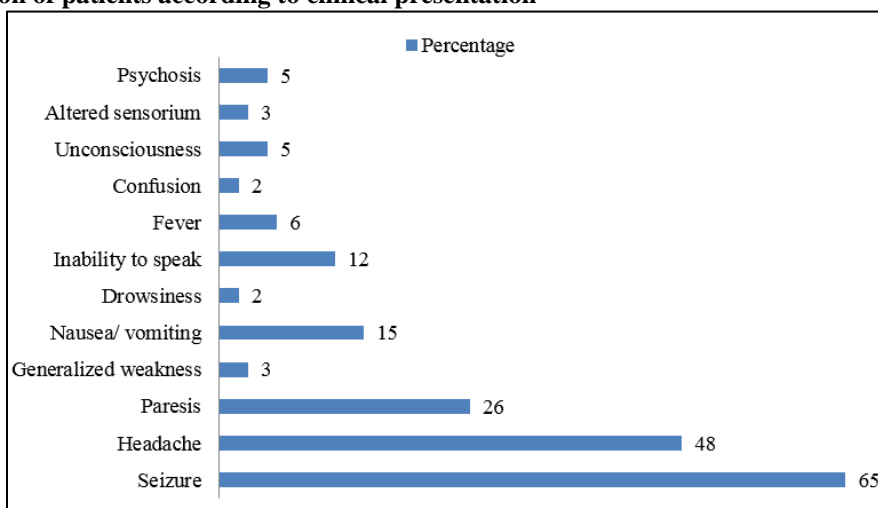
Parameters	Percentage of patients	
Gravidity	Primi	27
	2nd	39
	3rd or 4th	34
Mode of onset	Acute	5
	Subacute	92
	Chronic	3
Referral	Referred	42
	Direct	58
Booking status	Booked	4
	Un-booked	96
Period of presentation	Antepartum	5
	Postpartum	95
Mode of delivery	Hospital Vaginal	80
	Hospital LSCS	6
	Home delivery	14
Place of delivery (n=95)*	Subcentre	6.9
	PHC	10.4
	CHC	23.2
	DH	25.5
	Tertiary centre	9.3
	Private	18.6

Data is expressed as percentage, \*data is out of 95 patients delivered, PHC; primary health centre, CHC; community health centre, DH; district hospital

**Table 2: Distribution of patients according to risk factors involved**

Risk factors	Percentage of patients
Anemia	56
HTN	30
Infection	17
H/o OCP intake	7
Diabetes	3
Inflammatory condition	1
Substance abuse	4
Not known	8

Data is expressed as percentage, HTN; hypertension

**Graph 1: Distribution of patients according to clinical presentation**

## Discussion

Abercrombie in 1828 first described the CVT in postpartum women, since than various workers have worked on CVT to describe its risk factors and presentation in various studies.<sup>8</sup> CVT has emerged as one of the leading cause of stroke in young women.<sup>9,10</sup>

Previous report suggest higher risk of transient prothrombotic states among pregnant and postpartum women.<sup>11</sup> In present study women with CVT were young belonging to 2<sup>nd</sup> decade of their age. Saroja et al<sup>9</sup> evaluated CVT in pregnant and non-pregnant women and reported that patients with pregnancy related CVT were younger (24.55 ± 4.16 years) which in agreement with the present study where most of the women were in 2<sup>nd</sup> decade of their life. An Indian study from Mangalore, Karnataka involving 30 radiologically confirmed cases of CVT also reported that CVT was associated with young women (23.6 ± 3.90 years) which provide strength to present study findings.<sup>3</sup>

Similar to present study Premakumari et al<sup>3</sup> reported majority of the patients with CVT were from rural background (60%), low SES (66.7%) and were multipara (56.7%). In present study we found that CVT was more common in women who were un-booked. Contrary to present study Premakumari et al found that CVT was more common in booked (70%) cases.<sup>3</sup>

We found that district hospital and community health centre (23.2%) were the most common place of deliveries in agreement to that Premakumari et al also reported Health care setup (73.3%) as the most common place for deliveries.<sup>3</sup>

In our study, majority of women were seen in the group with normal deliveries. Reason for this may be due to the perineal and pelvic structure injury sustained during labour. Also, Valsalva manoeuvre increase the intra-abdominal and intra-thoracic pressure with labour. There is a need of more robust clinical studies to definite conclusion.

In present study most common clinical presentation was seizure, headache, paresis, nausea and vomiting. A Chinese study involving 43 pregnancy-associated CVT patients also reported headache (81.40%), Epileptic seizures (39.45%), Limb weakness (34.88%), and nausea/vomiting (30.23%) as the most common presenting symptom. (Liang ZW 2017) Saroja et al<sup>9</sup> reported that incidence of partial seizures was higher in pregnant women with CVT. Study from Mangalore also found that headache was more common followed by seizures, altered level of consciousness and visual disturbances.<sup>3</sup>

In present study anemia was present in most of the patients. Coutinho et al suggested anemia in patients with CVT could be due to the presence of iron deficiency anaemia in thrombocytosis.<sup>12</sup> Liang et al reported that infection (30.23%) was most common co-morbidity in pregnancy-associated CVT patients which is in agreement to present study where after anemia and hypertension, infection (17%) was the most common risk factors in pregnancy-associated CVT women.<sup>2</sup> In agreement to present study most common co-morbidity reported by Premakumari

et al<sup>3</sup> pregnancy induced hypertension (53.3%) but none of the patients had anemia as the risk factor.

Contrary to Premakumari et al<sup>3</sup> findings; we found anemia as the dominant risk factor for the CVT in pregnant and postpartum women. The possible reason for appearance of fever symptoms in present study may be due to the small sample size. In an observational study including 138 cases of CVT found additional symptoms including fever, paraesthesia, vertigo, limb pain, excessive salivation, motor aphasia and 6<sup>th</sup> cranial nerve involvement. These are linked to increased intracranial tension, haemorrhagic meningeal irritation and active thrombotic process.<sup>10</sup>

Present study had few limitations; small sample size was the one. A clinical trial with large sample size is required to strengthen the present study results. Also, the coagulation profile could not be assessed to rule out thrombophilia.

## Conclusion

CVT was presented with extremely varied signs and symptoms in pregnancy and postpartum period which represents a challenge for the diagnosis and management and easily mistaken for those due to eclampsia. Caesarean delivery, young age, anemia and preeclampsia are the dominant risk factors for pregnancy and postpartum associated CVT.

**Conflict of Interest:** None.

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