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Original Research Article

Cerebral venous sinus thrombosis a study to assess clinical profile among female patients in a tertiary care hospital

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ABSTRACT

Background: The Incidence of Cerebral Venous Thrombosis (CVT) is around 3-4 cases among one million population affecting children and young adults. In India the puerperal CVT is 10-12 times more common than western countries. Even though there is apparent "rarity" of the condition but advances in knowledge and available investigation in terms of imaging (CT scan/MRI) diagnosis can be done early for appropriate treatment and decreasing the morbidity and mortality.
Methods: A prospective study was conducted at Karnataka Institute of Medical Sciences, Hubli, Karnataka from December 2014 to November 2015. A total of 36 patients were included in the study.
Results: Mean age of females in the study was 27.06±9.033years. 75% had seizures, 47.2% had headache, 19.4% had focal neurological deficit, 13.9% had altered sensorium, 8.3% had cranial nerve deficits 5.6% had speech deficits. 72.22% of patients and were in peripartum period and 27.8% were non-pregnant. 72.2% had superior sagittal sinus involvement, 47.2% had transverse sinus, 47.2% had sigmoid sinus, and 13.9% had internal jugular vein and 5.6% straight sinus. 47.2% had single sinus involvement, and 52.8% had multiple sinus involvement. 94.4% patients were managed conservatively and 5.6% were managed by neurosurgical intervention. 94.4% patients survived and 5.6% had mortality.
Conclusions: Cerebral venous sinus thrombosis is most common in young females during peripartum period. Early diagnosis, treatment and if necessary neurosurgical intervention has good outcome.

Keywords: Cerebral venous thrombosis, Puerperal, Sinus, Thrombosis

INTRODUCTION

The thrombosis of cortical veins and the draining venous sinuses either alone or in combination of both is known as cerebral veno sinus thrombosis. The Incidence of Cerebral Venus Thrombosis (CVT) is around 3-4 cases among one million population affecting children and young adults most commonly. In India the puerperal CVT is 10-12 times more common than western countries.[1] The wide spectrum of clinical features in cerebral venous thrombosis, the varied and changing etiological factors and the apparent "rarity" of the condition had made advances in knowledge slow and uneven. Periods of relative neglect has been interspersed with burst of enthusiastic discussion. The earliest reference to cerebral venous sinus thrombosis was that of Ribes in 1824.[2]

The true incidence of CVT is unknown. Ehlers and Courville found only 16 superior sagittal sinus thrombosis in a series of 12,500 autopsies (0.12%).[3] However, with the more recent reports of large clinical

series, the true incidence of CVT is probably considerably higher than that derived from autopsy series. Exact figures however remain elusive. People of all age groups may be affected by CVT but there is preponderance in young women because of specific causes like use of oral contraceptives, pregnancy and puerperium.[4] Puerperal CVT has been reported to account for up to 15-20% of "young stroke". It is the commonest cause of stroke in young women in India. 50% of strokes in Indian women are related to pregnancy and puerperium and 95.5% of these are due to CVT. In western countries, the incidence of CVT related to pregnancy and puerperium ranges from 1 in 1666-10,000 pregnancies. Risk factors like hyper homocysteinemia, OCP use, alcoholism, procoagulant state are increasingly recognized in addition to the conventional risk factors like postpartum state.[5]

Several medical, surgical and gynaeco-obstetric ailments as well as several regional causes like infective, trauma, tumors etc. have been implicated in the causation and predisposition to CVT.[6] The objective was to assess the etiology and clinical profile of cerebral venous sinus thrombosis among female patients admitted in a tertiary care hospital of Karnataka, India.

METHODS

A prospective study was conducted at Karnataka institute of medical sciences, Hubli from December 2014 to November 2015.

A total number of 36 patients were included in the study during the study period. The inclusion criteria were female patients aged above 13 years and have been diagnosed clinically and radiologically as cerebral venous sinus thrombosis were included in the study and the exclusion criteria were the patients with ischemic/hemorrhagic stroke, transient ischemic attack, extradural hemorrhage, subdural hemorrhage, aneurysmal bleed and subarachnoid hemorrhage are excluded.

In the investigations, all patients were evaluated thoroughly by clinical examination by neurological assessment of the study subjects along with laboratory and radiological methods.

Laboratory investigation

- Hb%, TC, DC, ESR, Platelet count,
- BT, CT, PT, INR, APTT,
- CSF analysis (as and when needed),
- Blood urea, serum creatinine and electrolytes,
- Urine routine,
- ECG,
- 2D ECHO,
- Chest x ray,
- RBS, Lipid profiles,
- LFT.

Radiological investigations

- CT Scan of the brain and MRI of the brain with MR venography as and when required was done on the study subjects with consent.

Data was analyzed using SPSS 22 version software. Categorical variables were summarized as proportions. The difference between categorical variables was analyzed using chi-square test. P value <0.05 was considered as statistically significant.

RESULTS

A total of 36 female subjects were included in the study. Mean age of females in the study was 27.06±9.033years. Majority of subjects were in the age group 21 to 30years (58.3%). In this study 69.4% of females were Hindus and 30.6% were Muslims. In this study 16.7% was vegetarian and 83.3% were having mixed diet. None of the females were consuming alcohol and tobacco (Table 1).

Table 1: Socio demographic profile of female subjects.

Socio demographic profile		Frequency (n=36)	%
Age	<20 years	7	19.4%
	21 to 30 years	21	58.3%
	31 to 40 years	5	13.9%
	41 to 50 years	2	5.6%
	51 to 60 years	1	2.8%
Religion	Hindu	25	69.4%
	Muslim	11	30.6%
Diet	Vegetarian	6	16.7
	Mixed	30	83.3
Parity	Non-pregnant	10	27.8%
	Para-1	13	36.1%
	Para-2	8	22.2%
	Para-3	5	13.9%

In the study 75% had seizures, 47.2% had headache, 19.4% had focal neurological deficit, 13.9% had altered sensorium, 8.3% had cranial nerve deficits 5.6% had speech deficits.

Of these 47.2% of patients with headache, 70.6% had sub-acute onset, 17.6% had acute onset, and 11.8% had chronic onset. In the study 2.8% had HTN and DM individually, 5.6% had history of DVT.

The incidence of cerebral venous sinus thrombosis among pregnant women were 72.22% and were in peripartum period and non-pregnant was 27.8%. Among those in pregnancy 36.1% were para 1, 22.2% were para 2 and 13.9% were para 3. In the study 94.4% had pallor, 41.7% had dehydration and 11.1% had papilledema.

Out of 36 females with cerebral venous sinus thrombosis the frequency of involvement of superior sagittal sinus

was seen in 26 (72.2%) patients, transverse sinus in 17 (47.2%) patients, sigmoid sinus in 17 (47.2%) patients, internal jugular vein in 5 (13.9%) patients and straight sinus in 2 (5.6%) patients (Table 2).

Table 2: Clinical features of the study participants.

Clinical features		Present		Absent	
		Count	%	Count	%
Symptoms	Seizures	27	75.0%	9	25.0%
	Headache	17	47.2%	19	52.8%
	Focal neurological deficit	7	19.4%	29	80.6%
	Altered sensorium	5	13.9%	31	86.1%
	Cranial nerve deficits	3	8.3%	33	91.7%
	Speech deficits	2	5.6%	34	94.4%
Risk factors	HTN	1	2.8%	35	97.2%
	DM	1	2.8%	35	97.2%
	History of DVT	2	5.6%	34	94.4%
Signs at presentation	Pallor	34	94.4%	2	5.6%
	Dehydration	15	41.7%	21	58.3%
	Papilledema	4	11.1%	32	88.9%

Table 3: Hematological parameters, imaging and outcome of the study participants.

		Frequency (n=36)	Percentage
Anemia	<12	33	91.7%
	>12	3	8.3%
PCV	<48%	35	97.2%
	>48%	1	2.8%
MCV	Microcytic (<80fl)	13	36.1%
	Normocytic (80-100fl)	20	55.6%
	Macrocytic (>100fl)	3	8.3%
Peripheral smear	Normochromic normocytic	16	44.4%
	Dimorphic anemia	5	13.9%
	Macrocytic blood picture	7	19.4%
	Normocytic hypochromic	3	8.3%
	Microcytic hypochromic	5	13.9%
Homocysteine levels	Normal	4	11.1%
	Elevated	6	16.7%
	Not measured	26	72.2%
Sinuses involved	Superior sagittal sinus	26	72.2%
	Transverse sinus	17	47.2%
	Sigmoid sinus	17	47.2%
	Internal jugular vein	5	13.9%
	Straight sinus	2	5.6%
No of sinus involved	One	17	47.2%
	Two	9	25.0%
	Three	8	22.2%
	Four	2	5.6%
Management	Conservative	34	94.4%
	Neurosurgical	2	5.6%
Outcome	Survived	34	94.4%
	Death	2	5.6%

In the study 47.2% had one sinus involvement, 25% had two sinuses, 22.2% had three sinuses and 5.6% had four sinuses involved. Out of 36 females with cerebral venous sinus thrombosis 33 (91.7%) patients had anemia. Total

13 (36.1%) patients had MCV<80fL, 20 (55.6%) patients had MCV between 80 to 100fL and 3 (8.3%) patients had MCV>100fL. About 35 (97.2%) patients had normal packed cell volume and 1 (2.8%) patients had polycythemia. Out of 36 females with cerebral venous sinus thrombosis 16 (44.4%) patients had normocytic normochromic anemia, 5 (13.9%) patients had dimorphic anemia, 7 (19.4%) patients had macrocytic blood picture, 3 (8.3%) patients had normocytic hypochromic anemia and 5 (13.9%) patients had microcytic hypochromic anemia in peripheral smear examination.

In the study 11.1% of females had normal and 16.7% had elevated homocysteine levels. In the study 94.4% were managed conservatively and 5.6% were managed by neuro surgical method. In the study 94.4% survived and 5.6% had mortality (Table 3 and Figure 1).

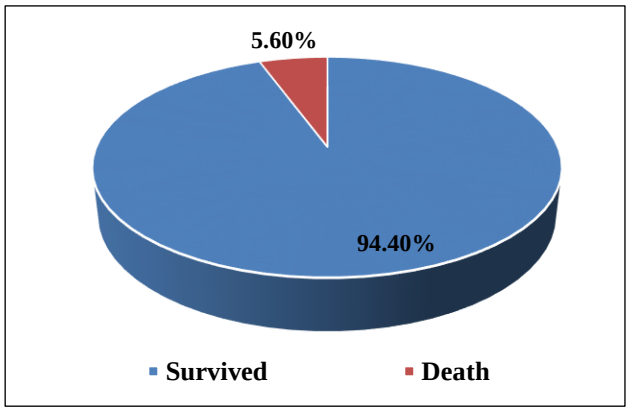

Figure 1: Outcome of the patients.

DISCUSSION

The incidence of the cerebral venous sinus thrombosis was among younger age group between 21-40 years which is in concordance with the study done by Mangshetty B et al and Vishwanath K et al.[7,8] The mean age of the females in our study was 27 years which is almost similar to the study findings of Souirti Z et al, Simone et al and Basavaraj et al. The study findings of Sidhom Y and Yii YL were much higher when compared to our study results.[7,9-12]

Seizure was common clinical presentation in our study and was higher in our study compared to results of Souirti Z et al, Nagarajan E et al, and Patil VC et al.[9,13,14] Headache was seen in 47% of the female patients in our study and was less common presentation compared to the study findings of Souirti Z et al, Appenzeller S et al and Rajoor UG et al. The other clinical presentation like seizure, pallor and anemia seen in our study was also seen in other studies.[7,9,10,11,15]

The few of the risk factors like hypertension, DM seen in our study was like other studies but the incidence of the risk factors in other studies and our study varied due to difference in study population and regional differences.

Increased incidence of CVT among peripartum was seen in our study which is due to increased level of dehydration seen among the women in peripartum period which is due to the cultural practice of decreased water intake of mother to make the mother milk thick can precipitate CVT during peripartum period.[5]

Superior sagittal sinus was the most common sinus involvement in our study which is in concordance with the studies done by Sidhom Y et al and Vishwanath K et al, whereas Paulo Christo showed transverse sinus as the most common involved sinus.[1,8,11,16]

Outcome of patients with cerebral venous sinus thrombosis in various studies were Sidhom Y et al complete recovery 78%, partial recovery 5%, dependent 10%, Souirti Z et al survived 93.34%, death 6.66%, Wasay M et al survived 87%, death 13%, Nagarajan E et al survived 100%, death 0%, Mangshetty B et al survived 90%, death 10%, Vishwanath K et al survived 76.66%, death 23.33%, Rajoor UG et al survived 96%, death 4%, Patil VC et al survived 84%, death 16%.

In present study the outcome in patients with cerebral venous sinus thrombosis was survived 94.4%, death 5.6% which is in concordance with studies done by Sidhom Y et al, Souirti Z et al, Rajoor UG et al and discordance in terms of mortality with studies done by Wasay M et al, Nagarajan E et al, Mangshetty B et al, Vishwanath K et al and Patil VC et al.[7-9,11,13-17] The prognosis of patients with CVT was better in all the above studies and in our study. Because of early diagnosis with the available imaging studies (CT scan/MRI brain with MR venogram) and usage of low molecular weight heparin and predictable response to the treatment.

CONCLUSION

Cerebral venous sinus thrombosis is most common in young females during peripartum period. Most common mode of presentation was seizures followed by headache, focal neurologic deficits, altered sensorium, cranial nerve deficits and speech deficits in decreasing order. Cerebral venous sinus thrombosis was more common following first pregnancy when compared to subsequent pregnancies. Anemia and dehydration may be precipating factor for cerebral Venous Sinus Thrombosis in peripartum period. Superior sagittal sinus is the most common sinus involved in cerebral venous thrombosis followed by transverse sinus, sigmoid sinus, internal jugular vein, straight sinus, deep venous system and cortical veins in decreasing order of frequency. Emergency neurosurgical intervention in the form of decompressive craniotomy has good outcome in such cases.

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