



## A CLINICAL AND RADIOLOGICAL STUDY IN PATIENTS WITH CEREBRAL VENOUS SINUS THROMBOSIS

### Medicine

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### ABSTRACT

**Aim and objective:** To study the cases of cerebral venous thrombosis clinically and radiologically.

**Materials and methods:** This prospective observational study was carried out in the department of Neurology, at Bombay hospital Indore. 75 patients included in this study, who were admitted to Bombay Hospital, Indore between July 2010 to June 2013. Patients of all age groups and both sexes were included in this study.

**Result and Conclusion:** Total 75 patients were taken. M: F ratio was 1:1.4 and mean age was 36 yrs. Puerperium was the most common risk factor in pregnant females. Headache (86%) was the most common presenting symptom with vomiting (64%) cases. CT scan is an extremely useful imaging in the acute stage. MRI and MRV are more sensitive in diagnosing CVT than CT scan.

### KEYWORDS

Cerebral venous sinus thrombosis CVT, MRI, MRV, neuroimaging

### INTRODUCTION:

Cerebral venous thrombosis (CVT) (1) was initially considered a rare disorder, associated with an unfavourable outcome. The use of Digital Subtraction Angiography (DSA), Computed Tomography (CT) scan and, especially, Magnetic Resonance Imaging (MRI) and Magnetic Resonance Venography (MRV) have allowed an early diagnosis and have proved that the incidence of CVT is, in fact, higher, approximately 3-4 cases per million(2) people per year and that majority of patients have favourable outcome. At present, the most common causes in females are oral contraceptives, pregnancy or puerperium (5); therefore, 75% of patients are females. About 25 % cases are idiopathic(3). Venous strokes often have a haemorrhagic component, ranging from small petechiae to an actual intracerebral haemorrhage; the latter is associated with a worse clinical course. The clinical presentation of CVT is highly variable and includes patients with mild headache or focal neurological deficits and some with coma or seizures. The best radiological examination to confirm the suspicion of CVT is MRI / MRV of the brain (4), which can both demonstrate parenchymal lesions and directly show evidence of sinus occlusions. The available evidence suggests that anticoagulants are effective in reducing mortality and dependency in CVT patients; the possible role of systemic or localized thrombolysis is still to be established.

### MATERIALS AND METHODS:

Prospective observational study carried out on 75 patients from July 2010 to June 2013 at Department of Neurology at Bombay hospital, Indore.

### INCLUSION CRITERIA:

- Patients presenting with the history suggestive of cerebral venous thrombosis and confirmed by imaging of brain (CT or MRI / MRV brain).
- Patients of all age groups irrespective of sex.

### EXCLUSION CRITERIA:

- CT scan inconclusive of CVT
- Hypertensive hemorrhage
- Arterial stroke
- Space occupying lesions

### RESULTS:

Total 75 patients were included. The diagnosis of CVT was made based on clinical and radiological features. The patients were in the age group between 17 and 75 years, with the median age of 36 yrs.

**Table No. 1: Sex Distribution**

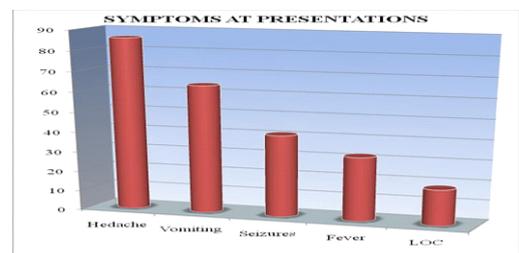
Sex	No. of patients	Percentage	Significance
Males	31	41.3	0.002 (S)
Females	44	58.6	

Our study included 31 males (41.3%) and 44 females (58.6 %) with M: F ratio of 1:1.4

**Table No. 2: Symptoms at presentation**

Symptoms	No. of patients	Percentage
Headache	65	86
Vomiting	48	64
Fever	24	32
Seizures	31	41
• Focal	4	5
• Generalised	24	32
• Focal + Generalised	3	4
Loss of consciousness (LOC)	14	18

**Graph No. 1: Symptoms at presentations**



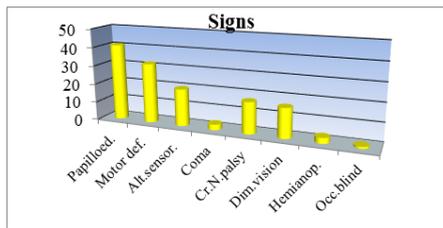
In this study, 86 % patients had headache, 64 % patients had vomiting and 32 % patients had fever. Seizure seen in 41% of the patients. 32% patients had generalised seizures where as 5% patients had focal seizures and 4 % patients had focal seizure with generalisation. 18% patients were brought in unconscious state.

**Table No. 3: Clinical Signs at presentation**

Signs	No. of patients	Percentage
Altered sensorium	15	20
Coma	2	3
Papilledema	31	41
6th nerve palsy	9	12
7th nerve palsy	4	5
Hemianopia	2	3
Occipital blindness	1	1
Diminished vision	12	16
Motor deficit	24	32
• Transient	2	3
• Persistent	22	29

Evidence of mastoiditis	2	3
Evidence of ear problem	2	3

**Graph No. 2: Clinical Signs at presentation**

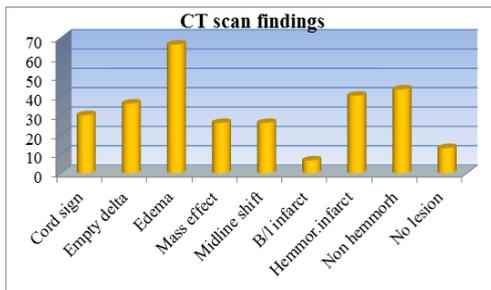


In this study, papilloedema was the most frequent sign in 41% patients. Motor deficit was present in 32% cases. Of these, 29% had persistent weakness and 3% had transient motor weakness (TIA). While 20% patients had altered sensorium (GCS <8) and 3% patients were in comatose state. Other signs: 6th nerve palsy in 12% patients, 7th nerve palsy in 5% patients, Hemianopia in 3% patients, Occipital blindness in 1% patients, Diminished vision in 16% cases. There was evidence of mastoiditis in 3% cases and otitis media in 3% cases.

**Table No. 4: CT scan findings**

Signs	No. of cases	Percentage
Cord sign	9	30
Empty delta sign	11	36
Edema	20	66.5
Mass effect	8	26
Midline shift	8	26
Bilateral infarct	2	6.6
Haemorrhagic infarction	12	40
Non-haemorrhagic infarction	13	43.3
No lesion on CT scan	4	13

**Graph No.3: CT scan findings**

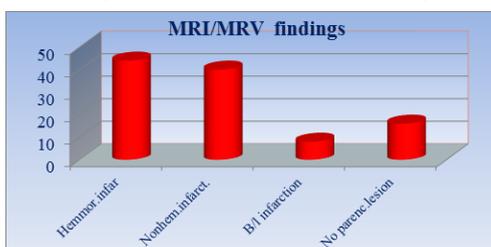


CT scan had been done in only 30 patients initially as MRV had been done initially in remaining. MRV brain also done in all these 30 patients after CT brain.

**Table No.5: MRI brain (MRV) findings**

MRI (MRV) findings	No. of cases	Percentage
Haemorrhagic infarction	33	44
Non-haemorrhagic infarction	30	40
Bilateral infarction	6	8
No parenchymal lesions	12	16

**Graph No. 4: MRI brain (MRV) findings**

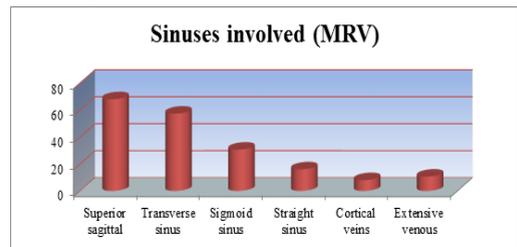


The most common MRI brain finding was haemorrhagic infarcts in 44% patients while 40% patients had non-haemorrhagic infarcts. Bilateral infarcts were noted in 8% patients while 16% demonstrated no parenchymal abnormality on MRV brain.

**Table No. 6: Sinus involvement on MRI/MRV**

Sinuses involved (MRI/MRV)	No. of cases	Percentage	Significance
Superior sagittal sinus	51	68	0.000 (HS)
Transverse sinus	43	57.3	
Sigmoid sinus	23	30.6	
Straight sinus	12	16	
Cortical veins	6	8	
Extensive venous sinus	8	10.6	

**Graph No. 5: Sinus involvement on MRI/MRV**



In this study, superior sagittal sinus 68% was the commonest sinus to be involved followed by transverse sinus 57.3% and sigmoid sinus 30.6%. Straight sinus was involved in 16% cases and cortical veins in 8% patients. So results were highly significant (p value <0.01). There was extensive venous sinuses involvement in 10.6% cases.

**DISCUSSION:**

- In this study, M: F was 1:1.4 and the mean age of patients was 36 years. Most of the female patients were in a younger age group due to pregnancy/ oral contraceptives use.
- Puerperium was the most common risk factor associated with CVT in pregnant females.
- Use of oral contraceptive drugs was related to CVT in 13.3% patients (n=10), indicating that it is an important etiological factor responsible for cerebral venous sinus thrombosis in young females.
- Increased incidence of CVT was observed in low socioeconomic groups.
- 30.6% patients were presented with only raised intracranial pressure (pseudo tumour cerebri), indicating that the diagnosis of CVT should be suspected in all such cases and the necessary investigations like MRI and MRV should be done to rule out CVT. A fewer (20%) of the patients had altered sensorium as compared to patients in other studies, probably because they were diagnosed and treated at an early stage.
- 2 patients with mastoiditis and 2 patients of otitis media diagnosed with CVT, suggesting that infection as the etiological factor responsible in those cases.
- Headache was the commonest symptom (86%) cases with vomiting (64%) cases. Seizures were present in 41% cases.
- Papilloedema was the most common presenting sign in 41% patients. Motor deficit was observed in 32% cases while altered sensorium present in 20% cases.
- CT scan is an extremely useful study in the acute stage and should be done on an emergency basis to confirm the diagnosis of CVT and to rule out any other pathology, which mimics CVT clinically. CT scan had been done in 30 patients only in our study. Out of which 43.3% patients were having non-haemorrhagic infarction, 40% patients with haemorrhagic infarction and 6.6% patients with bilateral infarction while 13% cases were having no parenchymal lesion on CT scan.
- MRI and MRV are more sensitive in diagnosing CVT than CT scan.

Though the parenchymal lesions were seen equally well on CT scan and MRI, MRI picked up more number of haemorrhagic lesions than CT scan (33 cases were found to haemorrhagic on MRI whereas only 12 cases were diagnosed as haemorrhagic on CT scan). On MRI/MRV study during the acute stage, superior sagittal sinus 68% was the most commonly involved sinus followed by transverse sinus 57.3% and sigmoid sinus 30.6%. While there were extensive venous sinus thrombosis in 10.6% cases.

#### **CONCLUSION:**

With the use of Computed Tomography (CT) scan, Magnetic Resonance Imaging (MRI) and Magnetic Resonance Venography (MRV) helps in early diagnosis of CVT. CT scan with and without contrast should be the first neuroimaging for CVT but MRI and MRV remains the modality of choice for the diagnosis and the follow up of CVT patients.

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