



# The Spectrum of Cerebral Venous Thrombosis Presenting at a Tertiary Care Centre: A Case Series

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## ABSTRACT

**Introduction:** One of the rare sites for having venous thromboembolism is dural venous sinuses. An estimated incidence of CVT is around 3 to 5 per million. **Aims & Objectives:** A case series was conducted to determine the spectrum of clinical presentation, etiology and course of the disease. **Place and duration of study:** It was a 9 months study conducted in Shaikh Zayed Medical Complex Lahore, Pakistan. **Material & Methods:** A case series was done on 10 patients with cerebral venous thrombosis who presented to the medical ward of Shaikh Zayed Medical Complex Lahore, Pakistan. **Results:** The study revealed headache (70%) as the most common presentation followed by altered state of consciousness (40%) and seizures (30%). Most common etiology was infectious 7/10 cases, post-partum period accounted for 2/10 while one case had hyperhomocysteinemia as a cause. Two of our patients had concomitant use of oral contraceptive pills. **Conclusion:** Our case series showed headache as the most common presentation and infectious etiology as the most frequent reason for cerebral venous thrombosis.

**Key words:** Cerebral venous thrombosis

## INTRODUCTION

Cerebral venous thrombosis is a condition which involves cerebral venous sinuses and cerebral veins with thrombotic event. It has the potential of being life threatening, therefore needs swift diagnosis and treatment.<sup>2</sup> The incidence has been reported more in South Asian and Middle Eastern population in comparison to the Western regions.<sup>3</sup>

CVT affects about 3-4 people per million per year and represents 0.5 % of all stroke.<sup>1</sup> The incidence of CVT was based on autopsy series previously.<sup>4</sup> Mortality rate of 20-50% was seen in autopsy series, with an incidence of around 0.1 to 0.2 cases per 100. Recent studies give an estimate of the incidence of CVT among adults of about 1.2-1.3 per 100,000.<sup>4</sup>

Review of CVT cases from Asian countries is suggestive of differences in risk factors profile and outcome in these patients as compared to European studies. A study conducted on 182 patients of CVT in USA reported hypercoagulable state to be the most common cause of CVT.<sup>5</sup> A study from Pakistan reported systemic and central nervous system infections (18%), postpartum state (17%), hyperhomocysteinemia (9%), genetic thrombophilia

(5%), and oral contraceptive pill use (3%) as various causes of CVT.<sup>6</sup>

It presents with wide range of clinical symptoms and signs, as varying combination of headache, seizures, aphasia, behavioral abnormality, altered sensorium and focal neurological deficits.<sup>10</sup> Variable presentations of CVT has led to diagnostic dilemma. The purpose of the study is to highlight the importance of headache being a manifestation of cerebral venous thrombosis. Moreover as CVT is a potentially life threatening condition, it requires a high index of suspicion especially in acute settings. The study determines the triggering etiology of cerebral venous thrombosis so that clinicians are well equipped to not only solve the diagnostic challenge but also treat the associated underlying cause responsible for it.

## CASE SERIES

We conducted a case series on 10 patients who presented to Shaikh Zayed Medical Complex, Lahore from July 2016 to March 2017. Diagnosis of CVT was established based on the clinical presentation and later confirmed by Magnetic Resonance Imaging & Magnetic Resonance Venogram. Based on clinical presentation, CSF

analysis and autoimmune workup was done. The surviving patients as well as next to kin of deceased were approached and informed that their clinical data will be used for publication. Patients were told that their information will be kept anonymous. Ethical clearance was granted by IRB Shaikh Zayed no 1513.

10 cases of CVT who presented at Shaikh Zayed hospital within the specified period of time were studied in detail for their age, gender, clinical presentation, involved sinuses, MRI findings, etiology and treatment given. Median age was 28.5 (mean,  $31.7 \pm 11.03$ ). Case series included 7 females and 3 males with mean age of females  $34.71 \pm 11.81$  and mean age of males  $24.66 \pm 3.09$ . The most common presenting complaint was headache (7 out of 10). Other common symptoms included altered state of consciousness (4/10) and seizures (3/10)

Table-1 shows the symptoms with which the patient presented. The table also depicts the thrombosed sinuses and MRI findings.

Table-2 summarizes the underlying etiologies responsible for CVT in the case series. Seven cases

had infectious etiology of CVT, most common infectious cause was Tuberculous Meningitis (3/10) while one case was diagnosed with viral encephalitis and two were empirically treated for meningo-encephalitis as patient (Case 5) had refused lumbar puncture whereas another patient (Case 8) had contraindication to lumbar puncture due to disseminated intravascular coagulation.

Two of our female cases presented with CVT in post-partum period while two females were on oral contraceptive pills as a contributing factor, however they had infection as an underlying cause of CVT.

Only one case had hypercoagulable state i.e. hyperhomocysteinemia. And only one patient (Case 5) had severe dehydration, although he also had evidence of meningeal enhancement on MRI scan suggesting meningitis and consequently was empirically treated on lines of infection as he had refused lumbar puncture.

Six of our patients had complete recovery. One patient (Case 2) developed paraparesis with partial recovery. Case no 10 had motor dysphasia with headache. Case number 6 died during hospital stay and case number 7 was lost to follow up.

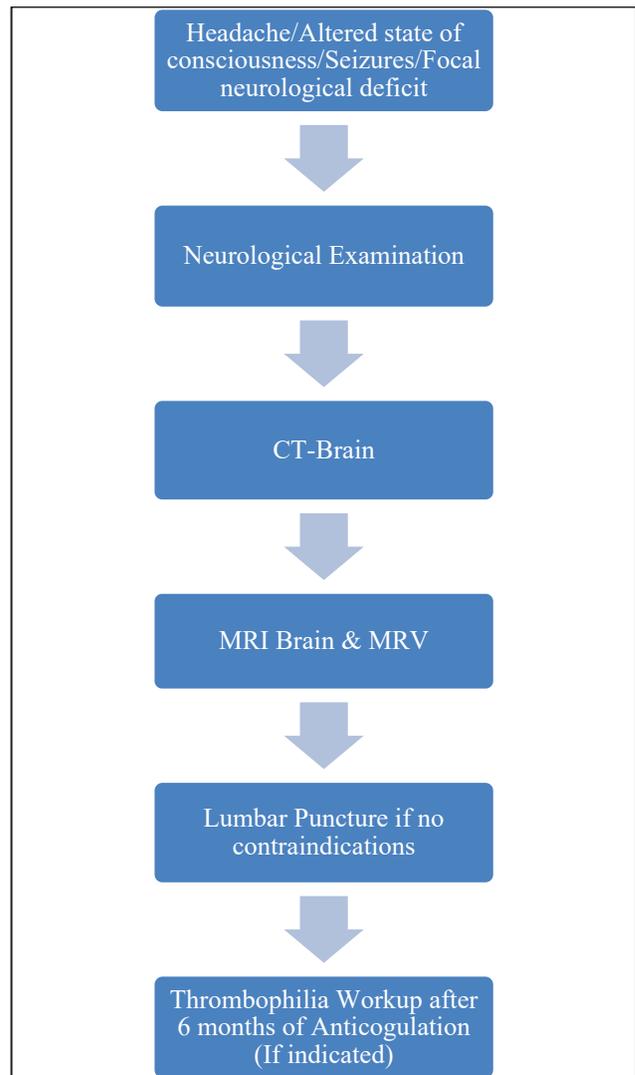
Case	Age	Sex	Clinical Presentation	Involved Sinus(MRV)	MRI-Brain Findings
1	29	M	Headache	Inferior sagittal sinus, left transverse sinus & confluence of sinuses thrombosis	Not done
2	23	M	Altered state of consciousness and right sided hemiparesis	Superior sagittal sinus thrombosis with para-sagittal collaterals	Bilateral altered signals in medial temporal lobes bright on T2WI % FLAIR images causing effacement of sulci and gyri with similar features present in perisylvian fissure areas suggestive of Herpes Encephalitis
3	60	F	Headache and fever	Partial thrombosis in transverse and sigmoid sinuses	Three ring enhancing lesions in right occipital with surrounding edema and ventriculitis suggestive of tuberculomas/pyogenic abscess
4	28	F	Headache and altered state of consciousness	Complete thrombosis of right transverse, sigmoid and straight sinuses is noted with thrombus extending into right internal jugular vein	Two areas of signal alteration in right parietal (demonstrating ring enhancement) and posterior temporal lobes (showing nodular enhancement) respectively with T2 internal hypointense areas suggestive of developing tuberculous abscesses with associated meningeal thickening and enhancement in right tentorium and venous infarcts
5	22	M	Severe throbbing headache	Superior sagittal sinus, sigmoid & transverse sinus thrombosis	Meningeal enhancement
6	26	F	Generalized tonic clonic seizures	Draining vein thrombosis	There are bilateral altered basal ganglia signal, bright on T2 and FLAIR and low on T2 likely representing complication related to previous exposure to TB such as draining vein thrombosis
7	26	F	Fever, headache, vomiting and altered state of consciousness Horizontal nystagmus	Right sided transverse and sigmoid sinuses thrombosis	Not done

8	29	F	Fever, headache, vomiting and tonic-clonic seizures	Anterior segment of superior sagittal sinus and draining cortical veins & left transverse sinus thrombosis	Hemorrhagic infarctions and surrounding edema in bilateral frontal and left parietal lobes
9	30	F	Tonic clonic seizures, Right sided hemiparesis Global aphasia	Superior sagittal sinus and its draining cortical veins, left sided transverse and sigmoid sinus up to jugular bulb thrombosis	Bilateral frontal lobe hemorrhagic infarcts. Extensive perilesional edema particularly around larger left sided lesion with mass effect causing subfalcine herniation about 3 mm across mid line and partial effacement of left lateral ventricle
10	44	F	Headache, Altered state of consciousness	Right & Left Transverse sinus, Vein of labbe	Chronic left mastoiditis resulting in cerebritis

**Table-1:** Clinical presentation of cases with MRI findings

Case	Etiology	Treatment
1	Hyperhomocysteinemia	LMWH & Warfarin
2	Viral Encephalitis	LMWH and Warfarin Acyclovir
3	Tuberculous Meningitis & Nephrotic Syndrome	LMWH and Warfarin Ceftriaxone and Vancomycin Anti-Tuberculous therapy Dexamethasone
4	Tuberculous Meningitis & Oral Contraceptive Pills	LMWH and Warfarin Meropenem, Vancomycin and Metronidazole Anti-tuberculous therapy
5	Meningo-encephalitis (Refused Lumbar puncture) & Dehydration due to Gastroenteritis	LMWH and Warfarin Ceftriaxone & Vancomycin Acyclovir
6	Tuberculous Meningitis	LMWH Meropenem, Vancomycin, Dexamethasone, Sodium valproate & Anti-tuberculous therapy
7	Post-partum	LMWH and Warfarin
8	Meningo-encephalitis	Ceftriaxone, Acyclovir, Metronidazole, Sodium valproate and Levetirecam
9	Post-Partum	LMWH and Warfarin
10	Chronic Mastoiditis leading to cerebritis & Oral contraceptive pills	LMWH and Warfarin Meropenem, Vancomycin and Metronidazole

**Table-2:** Cases on the basis of their etiology and given treatment



**Chart-1:** Approach to CVT

## DISCUSSION

CVT has myriads of presentations with most common presenting symptom being headache. Our study demonstrated headache as the most common presenting feature; present in 7 of our patients which was consistent with the western cohorts.<sup>7</sup> Wassay et al<sup>5</sup> reported headache to be present in 71% of cases while Ferro et al<sup>8</sup> found headache to be the presenting symptom in 88.8% of cases. Similar studies from India found headache to be the presenting symptom in 61.9% and 88.3% cases respectively.<sup>9,10</sup> A case series from Italy reported headache in 92% of its participants.<sup>15</sup> Another multicentre case series from Pakistan and Middle East found headache in 81% of its participants.<sup>6</sup>

Our study displayed infectious etiology as the most common predisposing factor for the development of CVT with Tuberculous meningitis. It is in contrast to other studies which shows hypercoagulable state as the most common predisposing factor followed by pregnancy and malignancy (Wassay M. et al<sup>5</sup>). Another case series showed important predisposing factors as systemic and central nervous system infection (18%), postpartum state (17%), hyperhomocystinemia (9%), genetic thrombophilia (5%), and oral contraceptive pill use (3%) from Pakistan and Middle East.<sup>6</sup> Ferro et al<sup>8</sup> in a cohort of 624 patients showed infection to be the etiological cause in only 12.3% of patients while Pia et al<sup>9</sup> demonstrated infection to be found in 22.7% in a prospective case series of 612 patients. This is in contrast to our findings which displayed infection as a cause in 70% of patients. Tuberculosis meningitis was the most common etiology in our case series but a larger study is required to draw meaningful conclusion.

Our study showed Oral contraceptive pills to be present as predisposing cause in 2 patients only. Moreover these patients had other predisposing etiologies. Whereas, Ferro et al<sup>8</sup> found oral contraceptive pills and puerperium as causative factor in 54.3% and 20.1% of its cohort of 624 patients respectively. This may be due to the less use of OCP's in our population. Cohorts from Western and Indian studies showed genetic thrombophilia to be the causative factor of CVT in 10-25% of cases while only one of our cases had hyperhomocysteinemia which is in contrast to the international studies.<sup>5,8,9,10</sup> Only one patient had high homocysteine levels as a triggering cause while a multicentre case series from Pakistan and Middle East had 9 out of 109 patients in whom the triggering cause was hyperhomocysteinemia.<sup>6</sup>

## CONCLUSION

The study depicted headache the most common presenting feature suggesting physicians have to be more meticulous and need to have a high index of suspicion while seeing patients with headache. Infectious etiology as the most common predisposing factor suggests that neuroimaging followed by lumbar puncture should be performed in every case to rule out infection.

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