

CLINICAL PROFILE OF PATIENTS WITH CEREBRAL VENOUS SINUS THROMBOSIS IN A TERTIARY CARE HOSPITAL FROM EASTERN INDIA

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Abstract

Background: Cerebral venous sinus thrombosis (CVST) is a rare neurovascular syndrome in contrast to the more common arterial disease. Despite advances in the recognition of CVST in recent years, diagnosis and management can be difficult because of the diversity of underlying risk factors and the absence of a uniform treatment approach. **Materials and Methods:** All the patients (more than 14 years) who presented with radiological confirmation of CVST were included in the study. All clinical and epidemiological parameters were tabulated. The outcome was measured by follow-up. SPSS 24 version was used for the statistical analysis. **Result:** A total of 78 patients with Radiological confirmation of cerebral venous thrombosis were evaluated over a period of 3 years in this study. The average age of presentation is 31.8 ± 12.3 years. The average duration of symptoms prior to hospitalization was 13.6 days. Majority of patients presented to the hospital in apparently good sensorium. Headache was present in most of the patients. Most of the patients had holocranial headaches. **Conclusion:** The treatment of CVST must be aggressive as it can minimize morbidity and mortality compared with the arterial stroke.

INTRODUCTION

Cerebral venous sinus thrombosis (CVST) is Cerebral venous sinus thrombosis (CVST) is, characterized by formation of blood clots in the dural venous sinuses. It is one of the commonest causes of stroke in young people. Strokes in the young account for nearly 30% of all cases of stroke in India and cerebral venous thrombosis (CVST) accounts for 10-20% of these cases. Two-thirds of them develop the same in the postpartum period. Primary or idiopathic CVST is mainly caused by a hypercoagulable state commonly during puerperium or from dehydration. There has been a drastic reduction of infection as a causative agent for CVST in recent years. Puerperal CVST may account for approximately 15%-20% of stroke victims of younger age. CVST can be caused by several prothrombotic states and disorders of the clotting system as an inherited cause is Protein C resistance secondary to Factor V Leiden polymorphism, Protein C and S resistance, and antithrombin III deficiency.^[1,2,3] Other vasculitides such as Systemic lupus erythematosus (SLE) and polyarteritis nodosa (PAN) are also relevant in young adults.

Dehydration is still the most common cause of puerperal CVST in our country. CVST represents almost 0.5-3% of all types of strokes but, can be a fatal condition and with significant morbidity, especially when there are delay in diagnosis or interventions due to the variable presentation.^[4,5] CVST may occur at any time from infancy to old age and symptoms can be acute, sub-acute or chronic.^[6,7]

MATERIALS AND METHODS

In this study, a total of 78 patients with Radiological confirmation of cerebral venous thrombosis were evaluated over a period of 3 years. Patients were included in the study after obtaining informed written consent. They were explained regarding inclusion in the study, with their mother tongue. All study-related pieces of information were anonymized, kept confidential and used only for addressing the study objectives.

Inclusion Criteria

Patients with a diagnosis of CVST, confirmed by imaging of the brain with MRI/MRV scan of the brain.

Exclusion Criteria

Patients who were clinically diagnosed as having CVST, but had normal imaging of the brain (i.e. MRI/MRV scan of brain– normal) and patients below 14 years of age were excluded from the cohort.

Study Design

This study was performed as a hospital-based observational study with prospective follow-up in the department of neurology IMS & SUM Hospital, Bhubaneswar, a tertiary care Centre in eastern India. We included eligible participants through consecutive enumeration.

Case Selection

Patients who were admitted to the in patient department were enrolled in the study only if they had radiological confirmation of CVST by a radiologist. All the epidemiological data, as well as clinical manifestations, were enlisted in a previously structured format.

Patient Categorization & Comparison

The patients were categorized as per the duration of symptoms into acute (<48 hours), sub-acute (>48hours to 30 days), and chronic (> 30 days) for analysis & comparison. As per clinical manifestations, patients were grouped into 4 CVST syndromes for the purpose of comparison of various parameters.^[7]

- Patients with signs & symptoms of only headache, papilledema without any cranial nerve involvement, focal neurologic deficit or seizure were grouped into -the syndrome of raised intracranial pressure(ICP).
- Patients with signs & symptoms such as limb weakness, seizure, other focal neurologic deficit with or without headache & papilledema were grouped into syndrome of focal neurologic deficit with or without raised ICP.
- Patients with signs & symptoms of conjunctival redness, chemosis, progressive swelling of eyelid, ophthalmoparesis, headache,papilledemaetc. As predominant symptoms, were grouped into syndrome of cavernous sinus thrombosis.
- Patients presenting with signs & symptoms of generalized encephalopathic illness without a localizing signs or recognizable features of raised intracranial pressure, with a depressed level of consciousness being the most constant finding, (varying from drowsiness to deep coma) were grouped into syndrome of unspecific diffuse encephalopathy.

Statistical Analysis

The study data was managed in an MS Excel spreadsheet. Categorical data were expressed as

numbers and percentages. Continuous data were expressed as number, mean and standard deviation depending on the distribution. Statistical significance was tested at 5% using the SPSS version 24.0. Fisher's exact probability test was used for assessing the association of categorical factors with the dichotomous outcome ($mRS \leq 2$ and $mRS > 2$).

RESULTS

In this study, a total of 78 patients with Radiological confirmation of cerebral venous thrombosis were evaluated. M: F ratio was 1:1.1. Most patients were in the 3rd & 4th decades (63.5%) of life. The minimum age of presentation was 15 years & the maximum was 69 years in this study. The average age of presentation is (31.8 ± 12.3) years.

The subacute presentation was the commonest and was seen in (63.54%) of patients. The average duration of symptoms prior to hospitalization was 13.6 days (SD 11.9 days). Altered sensorium with Glasgow coma score (GCS) less than 13 was present in 28.2%. A poor (GCS) score of ≤ 8 , requiring ICU admission was present in 9.6% of patients & among them 3 (3.8%) patients presented in a comatose condition with a GCS of 3. Headache was present in 82.7 % (61/78) of patients. Most of the patients (53/78) had holocranial headaches. The total number of patients having a seizure during or prior to hospitalization was 25. It was (32.1%) of total CVST patients. Out of them, 19.2% had a generalized seizure. Excluding papilledema as a type of cranial nerve involvement, a total of 15 (19.2%) patients had cranial neuropathy. Sixth cranial nerve involvement was the most common type, with 8 patients out of a total of 78 having 6th cranial nerve palsy. The second most common cranial nerve involvement is the 7th cranial nerve. 2 patients had the combination of 7th,9th & 11th cranial nerve involvement with other brainstem & cerebellar signs. Out of a total of 78 CVST patients, 3 patients had monoparesis and 19 patients had hemiparesis at presentation, which is also the most common type of focal weakness in the present series. 3 out of 78 CVST patients presented in very poor condition with decerebrate posturing. Most CVST patients had multiple clinical manifestations. Out of 78 patients, 18 (23.1%) patients had vomiting, 17 (21.8%) patients had diminished visual acuity & 14 patients had dizziness as a major associated clinical symptom. 6 patients had dysphasia at presentation & 6 patients had a fever.

Major clinical features are given in Table 1: Most patients of CVST had multiple types of symptoms & signs, found on clinical examination. The patients with these different clinical manifestations were grouped into 4 CVST clinical syndromes [Table 2].

Table 1: Distribution of patients as per major clinical features

Clinical features	Number	Percentage (%)
Altered sensorium	22	28.2
Headache	61	82.7
Seizure	25	32.1
Focal weakness	22	28.2

Table 2: Distribution of patients according to clinical syndromes

Types of syndromes	Number	Percentage (%)
Syndrome of raised intracranial pressure	26	33.3
Syndrome of focal neurologic deficit with/without raised ICP.	48	61.5
Syndrome of cavernous sinus thrombosis	1	1.3
Syndrome of unspecific diffuse encephalopathy	3	3.8

On grouping, these patients into the clinical syndromes as described earlier, out of 78 patient, 26 (33.3%) patients could be classified into the syndrome of raised intracranial pressure & 48 (61.5%) patients into the syndrome of the focal neurologic deficit with/without raised ICP. Only 1 patient could be categorized into Syndrome of cavernous sinus thrombosis & 23 patients into Syndrome of unspecific diffuse encephalopathy.

DISCUSSION

In the present series, 51.9% of patients were female. It has been suggested that the incidence of CVST was higher in females. Most of the earlier case series viz. Nagaraja et al,^[8] (1987), Bansal et al,^[9] (1980) from India have reported a higher proportion of women suffering from CVST than men. More than half (63.5%) of the patients of CVST in the present series, were in the 3rd & 4th decade of their life. The mean age of the patients was 31.8 years (with SD 12.3 years) like earlier studies from India (Nagaraja et al, 1987).^[8] The mean age of patients in the large studies published from India ranged from 31.3 to 48.7 years. The mean age of the patients was also found to be 31.3 years in the recent series from Nizam's Institute Venous Stroke Registry [NIVSR], the largest hospital-based prospective study in India, involving 428 consecutive patients with CVST from South India, by Narayan et al, 2012.^[10,11]

In this series, most patients (63.4%) presented subacutely. Most of the patients with chronic or subacute presentation had a slowly progressive or uncommonly intermittent headache, vomiting & blurriness of vision indicating intracranial hypertension. The acute presentation was found in 21.2% of patients and they had a duration of symptoms than 48 hrs. Sudden onset of focal deficits simulating arterial strokes was present in 13.5% of patients & 6 patients presented acutely with seizure. This type of presentation of CVST was also observed earlier by Bousser et al,^[12] (1997) as per their series, the symptom onset in CVST was usually subacute (2 days to 1 month) in 50–80% of patients and acute (2 days or less) in 20–30% and many patients who presented in acute condition simulated arterial stroke. Chronic presentation (more than 2 months) was seen in 10–20% of

patients predominantly presenting as isolated intracranial hypertension.^[13]

Altered sensorium with GCS less than 13 was present in 28.2%. A poor GCS score of ≤ 8 , requiring ICU admission was present in 9.6% of patients & among them 3(3.8%) patients presented in a comatose condition with a GCS of 3. Most patients (68%) presented to the hospital in an apparently good sensorium with a GCS of ≥ 13 . In the NIVSR series, by Narayan et al, about 14.5% of patients were drowsy, 10.4% were unconscious and 75% were alert at presentation.^[11] This is like our study where most patients were in apparently good sensorium. Headache was present in 82.7% patients in the present series and was the most common symptom. Out of them, 67.9% of patients had a holocranial headache and of patients had a hemicranial headache. This is like the earlier observations as well as the recent ones like NIVSR Cohort, where 88.3% of patients had headaches as the presenting complaint of CVST.^[11] The presence of headache as the most common presentation was confirmed by other previous studies.^[11,14,15] Also in the ISCVT series, the largest international study on CVST, headache was present in nearly 90% of patients.^[14] Out of 78 patients 59.6% patients had papilledema at presentation. Fundus examination was normal in 40.4%. This finding is similar to various previous studies done by Bousser et al (1985),^[16] & Biousse et al (1999),^[17] where papilledema frequency varied from 45 to 86% among the CVST patients. 32.7% of patients had seizures during or prior to hospitalization. The presence of seizure as a predominant presentation was also a classical finding in NIVSR cohort, where 29.4% of patients presented with isolated seizures.^[11] Hemiparesis was the most common type of focal weakness, found in 25%. This is similar to the NIVSR series, by Narayan et al, (2012).^[11] Excluding papilledema as a type of cranial nerve involvement, 19.2% (15/78) of patients have cranial neuropathy. However cranial nerve involvement in CVST is not very common. Pai et al. reported cranial nerve palsies in 7.3% of patients in their hospital-based study.^[18] Cranial nerve palsies were also reported to be about 12% of all cases of cerebral venous thrombosis in various series.¹³ The present series depicts a mild increase in cranial neuropathy. It can be explained by a relatively small

number of sample size as well as geo spatial differentiations.

Most CVST patients had multiple clinical presentations. Out of 78 patients, 23.1 % (18/78) patient had vomiting 21.8% (17/78) patient had diminished visual acuity & 14(17.9%) patients had dizziness as a major associated clinical manifestation. 7.7% (6/78) patients had aphasia at presentation. 6 patients had fever & Swallowing difficulty was present in 4 patients. Neck pain was present in 4 patients. 1 patient also had periorbital pain and 1 patient complained retro auricular pain. Most CVST patients had multiple clinical presentations which were categorized into various clinical syndromes for comparison. On grouping, the patients into clinical syndromes (as per criteria described in materials & methods earlier), Out of 78 patients, 33.3% (26/78) patient could be classified into the syndrome of raised intracranial pressure. This is the most homogeneous group among the CVST clinical syndromes in the present series, in which, the majority patients had a progressive onset of symptoms and signs due to intracranial hypertension, presenting with headache, and papilloedema with /without vomiting. This type of clinical presentation mimicked "Benign intracranial hypertension" or "pseudo-tumour cerebri" syndromes to a great extent. As the majority of these patients (82.3%) had normal brain parenchyma on neuroimaging, It provides a strong message to all the neuro-physicians to rule out the possibility of CVST before putting a diagnosis of benign intracranial hypertension. This type of presentation was described in various studies. In the NIVSR cohort, the benign intracranial hypertension-like presentation was seen in 18.2% of patients.^[11]

About 61.5% of total patients were categorized into the syndrome of the focal neurologic deficit with/without raised ICP. It was the most common type of clinical syndrome in the present series, but also the clinical syndrome with the most heterogeneous presentation. About 43.7 % (21/48) patients of this syndrome had normal brain parenchyma on neuroimaging and 56.3% (27/48) of patients had some parenchymal involvement. Overall, hemiparesis with or without seizure was the most common presentation, found in 37.5% of patients in this clinical syndrome. Although it is an uncommon association similar condition was described by Straub et al, 2000.^[19] Among the patients of this syndrome with brain parenchyma involvement, hemiparesis with or without seizure was the commonest presentation followed by an isolated seizure.

Syndrome of cavernous sinus thrombosis found in 1.3% of all CVST syndromes. It was described in 2.4% of cases in the NIVSR cohort.^[11] This is like our series, but as only 1 patient had cavernous sinus syndrome in our series, it is difficult to assess its true frequency from this small series. About 3.8% (3/78) of the total patients in the series were categorized into syndrome of unspecific diffuse

encephalopathy. Patients of CVST presenting as a generalized encephalopathic illness without localizing signs is not a very rare presentation, but it was described in various series in varying proportions 6-29%.^[7,13]

CONCLUSION

Venous thrombosis is a disease in young people, especially females. It is one of the most common neuro-vascular syndromes. The presentation is subacute most of the time. Headache is the most common symptom. Most of the time it's associated with papilledema. All the CVST clinical spectrums can be divided into four syndromes. The syndrome with raised intracranial pressure was the commonest. The present study evaluates common risk factors and clinical presentations pertaining to our population. As it's a very devastating disease it should be diagnosed very early. Early diagnosis by MR Venogram with prompt anticoagulation can limit morbidity. Several catastrophic complications can be avoided by appropriate treatment. It's a small study in southeast Asia region, and we need more studies in future from our area to delineate the exact demographic parameters along with risk factors for early diagnosis and better treatment of CVT.

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