



Clinical Profile of Patients with Cortical venous Thrombosis: A Hospital Based Study

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Abstract

Aims: Aim of our study was to evaluate the clinical profile of patients with cortical venous thrombosis.

Methods: A detail history, clinical examination and relevant investigations were performed to all cases. Laboratory investigations like complete blood count with peripheral smear, ESR, RBS, serum urea, serum creatinine, LFT, serum electrolytes, urine routine, ECG in all leads, CSF analysis (whenever necessary), prothrombin time, activated partial thromboplastin time, CT scan, MRI and MR venogram were performed to all patients with cerebral venous thrombosis.

Results: Data was analyzed with the help of MS- office software.

Conclusions: Young age female patients were more prone to cortical venous thrombosis. Headache, convulsion and altered sensorium, hemiparesis, pallor, papilloedema were common initial symptoms and sign. Transverse sinus, sigmoid sinus and superior sagittal sinus were commonly involved. Mortality rate was higher in patients with severe anaemia, haemorrhagic CVT and two or more than two sinus involvement of patients with cortical venous thrombosis.

Keywords: Cortical venous thrombosis, clinical profile, investigative profile, MR venogram.

Introduction

Cerebral venous sinus thrombosis (CVST) is an uncommon condition which over the past 5 to 10 years has been diagnosed more frequently due to greater awareness and the availability of better non-invasive diagnostic techniques. Because of the generally good prognosis and variable clinical signs, many cases remain clinically undetected.

CVST is slightly more common in women, particularly in the age group of 20 to 35, due to pregnancy, puerperium and oral contraceptive use.^[1]

In the late 1970's, hospital-based series from Northern India documented CVT in a frequency of 4.5/1000 obstetric admissions.^[2] Another population-based study from Southern India in the

late 1960's found that 25% of stroke patients were less than (<) 40 years of age and were primarily young women having a CVT that had occurred in the postpartum stage.^[3]

Incidence of CVT may be more in India compared to the western countries. This was probably due to the reporting of many large series of puerperal CVT from India in the 70's and 80's.^[4] But, due to the lack of any population-based study or nationwide multicentric hospital-based studies, the exact incidence of CVT in India is still not known. There have been a few epidemiological studies from the western countries trying to determine the incidence of CVT. In a nationwide hospital-based series in Portugal, an incidence of 0.22/100,000/year has been reported.^[5] A well-designed cross-sectional epidemiological study performed in the Netherlands had shown an incidence of 1.32/100,000/year.^[6]

MRI combined with MRV is reliable as the sole examination for the Condition of cerebral venous thrombosis.^[7,8] It can show the consequences of thrombosis such as cerebral oedema, infarction and haemorrhage as well as the anatomy of the disturbed venous circulation.

Intravenous heparin should be the first-line treatment, even in the presence of haemorrhagic infarction, provided there are no general contraindications to its use.^[9,10] If the patient deteriorates despite adequate heparinisation or presents moribund with coma, selective catheter-guided local thrombolysis may be an option,^[9,10] in spite of the increased haemorrhagic risk. This should be followed by 3–6 months of oral anticoagulation. Aim of our study was to evaluate the clinical and investigative profile of patients with cortical venous thrombosis.

Material and Methods

A total of 40 patients (19:males and 21:females) with age group 15 to >60 years of cortical venous thrombosis were selected in this study. Attendants/patients signed an informed consent approved by institutional ethical committee of Subharti Medical College and Hospital, Dehradun,

Uttarakhand, India was sought. Data was collected in the indoor and outpatients department, in department of Medicine, Subharti Medical College, Dehradun, Uttarakhand during a period from February 2016 to December 2016.

Inclusion Criteria: Patients age > 15 years and those with confirmed diagnosis (based on neuroimaging) of cerebral venous sinus thrombosis were included in this study.

Cases with hypertensive haemorrhage, atherothrombotic stroke and metabolic encephalopathies were excluded in this study.

Methods: Detail assessment was taken to all cases of cortical venous thrombosis. History, clinical examination and relevant investigation were performed. MR venogram was performed to confirm the patients of cerebral venous thrombosis.

Investigations: A relevant laboratory investigations were performed to all cases like complete blood count with peripheral smear, ESR, RBS, serum urea, serum creatinine, LFT, serum electrolytes, urine routine, ECG in all leads, CSF analysis(whenever necessary), prothrombin time, activated partial thromboplastin time, CT scan, MRI and MR venogram.

Statistical Analysis

Data was analyzed by using the simple statistical methods with the help of MS-Office software.

Observation

This study was conducted in department of Medicine, Subharti Medical College, Dehradun, Uttarakhand.

In this study, we were included a total of 40 cases of cortical venous thrombosis with age group of 15 to > 60 years. Majority of cases 15(37.5%) were in age group of 15-30 years. 10(25%) were in age group of 31-45 years. 8(20%) cases were in age group of >60 years. And 7(17.5%) cases were in age group of 46-60 years. 19(47.5%) males and 21(52.5%) females were included in this study.

Table 1. Showing the aetiology of patients with CVT out of 40 cases.

| Aetiology | Condition |
|-----------------------|------------|
| Puerperal | 11(47.82%) |
| Infective | 5(21.73%) |
| Traumatic | 5(21.73%) |
| Hyperhemocysteinaemic | 2(8.69%) |
| Total | 23(57.5%) |

In this study, out of 40 cases of CVT, 23 cases of aetiological factors were 11(47.82%) puerperal, 5(21.73%) infective, 5(21.73%) traumatic and 2(8.69%) hyperhemocysteinaemia. And rest cases 17(42.5%) were unknown aetiology.

Table 2. Showing the type of cortical venous thrombosis.

| Type of CVT | No. of patients | Percentage |
|---------------|-----------------|------------|
| Puerperal | 11 | 27.5% |
| Non-puerperal | 29 | 72.5% |
| Total | 40 | 100% |

In this study, 11 (27.5%) puerperal and 29(72.5%) non-puerperal cases of cortical venous thrombosis were found.

Table 3. showing the type of CVT in female patients

| Type of CVT in female | No. of patients | Percentage |
|-----------------------|-----------------|------------|
| Puerperal | 9 | 42.85% |
| Non puerperal | 12 | 57.14% |
| Total | 21 | 100% |

In this present study, out of 21 female cases of CVT, 9(42.85%) puerperal and 12(57.14%) non-puerperal were found.

Table 4. Showing the duration from delivery till onset of symptoms.

| Duration (Days) | No. of patients | Percentage |
|-----------------|-----------------|------------|
| 1-10 | 5 | 55.56% |
| 11-20 | 2 | 22.22% |
| 21-30 | 0 | 0% |
| >30 | 2 | 22.22% |

In this study. Out of 9 cases of puerperal, (55.56%) 5 majority of cases of CVT was duration till onset of symptoms after delivery 1 to 10 days.

Table 5. Mode of onset of symptoms of patients with CVT.

| Onset | No. of patients | Percentage |
|-----------|-----------------|------------|
| Acute | 18 | 45% |
| Sub acute | 20 | 50% |
| Chronic | 2 | 5% |
| Total | 40 | 100% |

Out of 40 cases of CVT, 20(50%) subacute, 18(45%) acute and 2(5%) chronic were seen.

Table 6. Showing the level of consciousness of patients with cortical venous thrombosis (CVT).

| Level of consciousness | No. of patients | Percentage |
|------------------------|-----------------|------------|
| Consciousness | 13 | 32.5% |
| Drowsy | 8 | 20% |
| Stuporous | 11 | 27.5% |
| Comatose | 8 | 20% |
| Total | 40 | 100% |

In this present study, out of 40 cases of CVT, level of consciousness was 13(32.5%) consciousness, 8 (20%) drowsy, 11(27.5%) stuporous and 8(20%) comatose.

Table 7. Showing the initial symptom of presentation of patients with CVT.

| Initial symptoms of presentation | No. of patients | Percentage |
|----------------------------------|-----------------|------------|
| Headache | 20 | 50% |
| Convulsions | 20 | 50% |
| Focal deficit | 12 | 30% |
| Altered sensorium | 21 | 52.5% |
| Vomiting | 11 | 27.5% |
| Fever | 9 | 22.5% |

Initial clinical symptoms of presentation of patients with CVT was 20(50%) headache, 20(50%) convulsion, 12(30%) focal deficit, 21(52.5%) altered sensorium, 11(27.5%) vomiting and 9(22.5%) fever followed to each other.

Table.8. Showing the clinical sign of presentation of patients with CVT.

| Sign | No. of patients | Percentage |
|---------------------------|-----------------|------------|
| Hemiparesis | 12 | 30% |
| Papilloedema | 10 | 25% |
| Pallor | 22 | 55% |
| Cranial nerve involvement | 5 | 12.5% |

Clinical sign of cases of CVT were 12(30%) hemiparesis, 10(25%) papilloedema, 22(55%) pallor and 5(12.5%) cranial nerve involvement followed to each other.

Table 9. Showing the investigations of patients with CVT

| Hb (gm %) | No. of patients alive | No. of patients dead | No. of cases |
|-----------|-----------------------|----------------------|--------------|
| <5 | 4(66.67%) | 2(33.33%) | 6 |
| 5-8 | 7(87.5%) | 1(12.5%) | 8 |
| 8-10 | 10(83.33%) | 2(16.67%) | 12 |
| >10 | 14(100%) | 0 | 14 |
| Total | 35(87.5%) | 5(12.5%) | 40 |

In this present study, were seen that cases who had Hb level less than 5 gm%, 4(66.67%) cases were alive and 2(33.33%) cases were dead. That was seen that mortality rate was higher with greater degree of severity of anaemia.

Table 10. Showing the sinus involvement of patients with CVT.

| Sinus involvement | No. of patients | Percentage |
|-------------------------|-----------------|------------|
| Superior sagittal sinus | 21 | 52.5% |
| Transverse sinus | 25 | 62.5% |
| Sigmoid sinus | 23 | 57.5% |
| Jugular sinus | 5 | 12.5% |
| Straight sinus | 7 | 17.5% |
| Internal cerebral vein | 13 | 32.5% |

In this present study, cases of CVT were sinus involvement associated to each other, 21(52.5%) superior sagittal sinus, 25(62.5%) transverse sinus, 23(57.5%) sigmoid sinus, 5(12.5%) jugular sinus, 7(17.5%) straight sinus and 13(32.5%) internal cerebral vein. Transverse sinus was more involved in cases of CVT.

Table 11 Showing the CSF analysis of patients with CVT.

| CSF | No. of patients | Percentage |
|--------------|-----------------|------------|
| Normal | 9 | 37.5% |
| Pleocytosis | 5 | 20.83% |
| Protein rise | 10 | 41.66% |

Out of 40 cases, CSF examination was done in 24 cases of CVT. 9(37.5%) cases were normal CSF findings, 5(20.83%) pleocytosis and 10(41.66%) protein rise.

Table 12. Showing the MRI findings of patients with CVT.

| MRI | No. of patients | Percentage |
|------------------|-----------------|------------|
| Haemorrhagic | 25 | 62.5% |
| Non haemorrhagic | 7 | 17.5% |

Out of 40 cases, MRI was performed in 32 cases of CVT. Haemorrhage was seen in 25(62.5%) cases.

Table 13. Showing the Mortality rate of patients with CVT.

| Status | No. of patients | Percentage |
|--------|-----------------|------------|
| Alive | 34 | 85% |
| Dead | 6 | 15% |

In this present study, we were found that majority of cases 34(85%) were alive.

Table.14. Showing the mortality in hemorrhagic infarct and non hemorrhagic infarct of patients with CVT.

| | HI | NHI |
|-----------|---------|-----------|
| Alive | 21(84%) | 5(71.42%) |
| Mortality | 4(16%) | 2(28.57%) |
| Total | 25 | 7 |

In this present study, out of 25 cases of haemorrhagic infarct, mortality rate was 4(16%) and in non haemorrhagic infarct, out 7 cases mortality rate was 2(28.57%).

Table 15 Showing the number of sinus involvement of patients with CVT.

| | Mortality | Percentage |
|------------------|-----------|------------|
| 1 | 1 | 16.67% |
| 2 or more than 2 | 5 | 83.33% |

In this present study, mortality was greater 5 (83.33%) of cases who had two and more than two sinus involvement.

Table 16. Treatment of patients with cortical venous thrombosis.

| Conditions | No. of patients | Recovered | Death |
|-------------------------------|-----------------|-----------|-------|
| Age >30 years | 25 | 21 | 4 |
| Duration < 10 days | 30 | 26 | 4 |
| Altered sensorium | 21 | 17 | 4 |
| Convulsions | 20 | 18 | 2 |
| Fever | 9 | 8 | 1 |
| Focal deficit | 12 | 10 | 2 |
| Puerperium | 9 | 9 | 0 |
| Haemorrhagic infarct | 25 | 22 | 3 |
| Non haemorrhagic infarct | 7 | 5 | 2 |
| SSS involvement | 20 | 17 | 3 |
| Single sinus involvement | 10 | 9 | 1 |
| Two or more sinus involvement | 27 | 23 | 4 |
| Tranverse sinus involvement | 25 | 21 | 4 |
| Sigmoid sinus involvement | 23 | 19 | 4 |

In this present study, after treatment of the patients, mortality rate was higher of patients with age > 30 years, duration < 10 days, altered sensorium, haemorrhagic infarct, SSS involvement, two or more sinus involvement, transverse sinus involvement and sigmoid sinus involvement.

Discussion

Cerebral venous-sinus thrombosis (CVST) is a potential life-threatening condition that requires rapid diagnosis and urgent treatment. Its epidemiology has changed over past few decades.^[11] Its increasing prevalence may be attributed to not only increased ease of diagnosis by modern imaging tools such as magnetic resonance imaging (MRI), but also to the increment of underlying causes including use of oral contraceptive pills (OCPs).^[11,12] Cerebral venous-sinus thrombosis seems relatively more frequent in South Asia and Middle East.^[11]

In this present study, we were included a total of 40 cases of cortical venous thrombosis with age group of 15 to > 60 years. Higher incidence 15 (37.5%) of cortical venous thrombosis was seen in young age group patients (15-30 years) patients. Females 21 (52.5%) were more affected with cerebral venous thrombosis than males 19 (47.5%). Similar finding was found by Hernando Raphael Alvis-Miranda. et al (2013).^[13] They were studied on patients with cerebral venous thrombosis and stated that cerebral sinus venous thrombosis (CSVT) is a rare phenomenon that seen with some frequency in young patients. Nahid Ashjzadeh, et al. (2011) were said that cerebral venous-sinus thrombosis is an uncommon form but important cause of stroke, especially in young-aged women.^[14]

In this present study, out of 40 cases of CVT, 23 cases (57.5%) of aetiological factors were 11 (47.82%) puerperal, 5 (21.73%) infective, 5 (21.73%) traumatic and 2 (8.69%) hyperhomocysteinaemia. And rest cases 17 (42.5%) were unknown aetiology. In this present study, out of 21 female cases of CVT, 9 (42.85%) puerperal.

Out of 9 cases of puerperal, 5 (55.56%) majority of cases were 1-10 days for onset of symptoms after delivery of child.

CSVT is characterized by a highly variable clinical spectra, difficult diagnosis, variable etiologies and prognosis. Of interest, in poor countries, there is an association with the puerperium, with no clear arguments, but probably related to factors such as inappropriate perinatal care, metabolic derangements, and infections associated to childbirth.^[15] The peripartum-associated CSVT has been established to be of 11.6 cases per 100 000 deliveries.^[16] There is sex predominance (hormonal?); 75% of all CSVT patients are women, with a 3:1 ratio compared to men.^[17] The IJV represent the main outflow pathway for the cerebral venous system.^[18] IJV abnormalities may change the hemodynamics of cerebral venous outflow, leading to insufficient venous drainage, and subsequently causing CSVT. In a study performed by Jia et al.,^[19] found that among 51 consecutive CSVT cases with unknown etiologies, 61% of the cases (31/51) had an IJV abnormality; furthermore, almost all the CSVT occurred on the same side as the IJV lesions, which strongly suggests a close association between IJV abnormalities and CSVT. However, a predisposing factor may not be identified in up to 20–35% of cases.^[20,21]

In present study, out of 40 cases of CVT, 20 (50%) subacute, 18 (45%) acute and 2 (5%) chronic were seen. A study conducted by Guenther G, et al.^[15] and they were concluded that in 30% of CSVT cases, it presents in an acute fashion and the symptoms appear in less than 48 h. In up to 50% of cases, it presents in a sub-acute fashion and the symptoms appear between 48 h and 30 days. The chronic form corresponds to 20% of cases, and the symptoms develop over a period greater than 30 days and up to 6 months.

In our study, level of consciousness was 13 (32.5%) consciousness, 8 (20%) drowsy, 11 (27.5%) stuporous and 8 (20%) comatose. Initial clinical symptoms of presentation of patients was

20(50%) headache, 20(50%) convulsion, 12(30%) focal deficit, 21(52.5%) altered sensorium, 11(27.5%) vomiting and 9(22.5%) fever followed to each other. Clinical sign of cases of CVT were 12(30%) hemiparesis, 10(25%) papilloedema, 22(55%) pallor and 5(12.5%) cranial nerve involvement followed to each other.

In this present study, 21(52.5%) superior sagittal sinus, 25(62.5%) transverse sinus, 23(57.5%) sigmoid sinus, 5(12.5%) jugular sinus, 7(17.5%) straight sinus and 13(32.5%) internal cerebral vein were involved in cases of cortical venous thrombosis. Involvement of sinuses was followed to other sinuses.

CVST presents with a wide spectrum of symptoms and signs. Headache is the presenting symptom in 70–90% of cases.^[20,21,22] Focal deficits such as hemiparesis and hemisensory disturbance, seizures, impairment of level of consciousness and papilloedema occur in one-third to three-quarters of cases.^[20,22] The onset may be acute, subacute or insidious, most patients presenting with symptoms which have evolved over days or weeks.^[20] There are several typical clinical constellations^[21,23]: 18–38% of cases present with a syndrome resembling benign intracranial hypertension with headache, papilloedema and visual disturbances; up to 75% of cases are characterised by a focal neurological deficit and headache; a third group of between 30% and 50% may present with seizures often followed by a Todd's paresis. Rare but classical clinical pictures are that of superior sagittal sinus thrombosis (4%) with bilateral or alternating deficits and/or seizures and cavernous sinus thrombosis (3%) with chemosis, proptosis and painful ophthalmoplegia.^[20] An even less frequent presentation is a rapidly progressive illness with deepening coma, headache, nausea and pyramidal signs, due to extensive involvement of the deep cerebral veins.^[24]

In this present study, we were seen that mortality rate 2(33.33%) was higher in degree of severity of anaemia. The other investigative procedures like leucocyte count, blood sugar, serum creatinine,

blood urea, liver function tests and serum electrolytes were not contributed to the diagnosis and were nonspecific.

In present study, out of 40 cases, CSF examinations was performed in 24 cases, majority of cases 10(42.66%) had rise of protein in CSF, pleocytosis 5(20.83%) and normal CSF findings 9(37.5%).

In this present study, MRI was performed in 32 cases of CVT. 25(62.5%) cases were haemorrhagic infarct and 7(17.5%) nonhaemorrhagic. Out of 25 cases of haemorrhagic infarct, mortality rate was 4(16%) and in out of 7 cases of non haemorrhagic infarct, mortality rate was 2(28.57%). All the 40 cases of cortical venous thrombosis were treated with anticoagulants. All patients were subjected to LMWH and then switched on to warfarin therapy maintaining the INR value 1.5 to 2 times normal. Patients were followed at 15 days interval and values of INR reviewed. Patients of hyperhomocysteinaemia were given folic acid and vitamin B12.

The different routes of administration reflect uncertainty of opinions among neurologists as to what type of heparin to be used. In the part, CVST had been associated with a dismal prognosis and high mortality rate, reaching 30-50%. The recent ISCVT study performed in the era of modern neuroimaging, LHW administration and endovascular intervention reported much lower mortality rates (8-14%) and significantly better outcome.

Out of 40 cases of cerebral venous thrombosis in our study, majority of cases 34(85%) were alive and mortality rate was 6(15%). Mortality rate was higher of patients with age >30 years, duration < 10 days, altered sensorium, haemorrhagic infarct, SSS involvement, two or more sinus involvement, transverse sinus involvement and sigmoid sinus involvement followed to each other.

According to Villringer A, et al.^[21] and de Bruijn SF, et al.^[25] between 57 and 86% of patients have complete functional recovery. Mortality rates was between 5.5% and 18%.^[21,25] Even though there appears to be no clear correlation between disease

severity and outcome,^[20] several factors are associated with a poorer prognosis. These are, most importantly,^[26] infancy and advanced age, rapid onset with coma and focal deficits, and thrombosis affecting largely the deep venous system. The underlying condition, particularly sepsis, malignancy, and paroxysmal nocturnal haemoglobinuria adversely affect outcome.^[26] Seizures rarely occur beyond the acute stages.^[27]

Conclusion

Our study concluded that the young age female patients were more prone to cortical venous thrombosis. Headache, convulsion and altered sensorium, hemiparesis, pallor, papilloedema were common initial symptoms and sign of patients with cortical venous thrombosis. Transverse sinus, sigmoid sinus and superior sagittal sinus were commonly involved. Mortality rate was higher in patients with severe anaemia, haemorrhagic CVT and two or more than two sinus involvement of patients with cortical venous thrombosis.

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