Journal of Vessels and Circulation
Qom University of Medical Sciences
Spring 2022. Volume 3. Number 2

Case Series

# Frequency of Clinical and Imaging Findings of Cerebral Venous Thrombosis in Patients Referred to Booali Hospital of Qazvin: A Case Series

**Fatemeh Bahiraie[1], Monir Sadat Mirzadeh[2], Alireza Sharifi[3, 4], Mohammad Amin Habibi[5, 6], Maryam Sharifi[7], Saeed Karimi Matloub[3], Pooya Jafari[3], Mojde Bagheri[8], Mahdi Zarei[9*]**

*1. Student Research Committee, Qazvin University of Medical Sciences, Qazvin, Iran.*
*2. Department of Community Medicine, School of Medicine, Qazvin University of Medical Sciences, Qazvin, Iran.*
*3. Student Research Committee, Qom University of Medical Sciences, Qom, Iran.*
*4. Otorhinolaryngology Research Center, Tehran University of Medical Sciences, Tehran, Iran.*
*5. Gene, Cell & Tissue Research Institute, Tehran University of Medical Science, Tehran, Iran.*
*6. Clinical Research Development Center, Qom University of Medical Sciences, Qom, Iran.*
*7. Student Research Committee, Iran University of Medical Sciences, Tehran, Iran.*
*8. Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran.*
*9. Student Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran.*

Use your device to scan and read the article online

**Please cite this article as** Bahiraie F, Mirzadeh MS, Sharifi A, Habibi MA, Sharifi M, Karimi Matloub S, et al. Frequency of Clinical and Imaging Findings of Cerebral Venous Thrombosis in Patients Referred to Booali Hospital of Qazvin: A Case Series. Journal of Vessels and Circulation. 2022; 3(2):91-96. http://dx.doi.org/10.32598/JVC.3.2.110.1

http://dx.doi.org/10.32598/JVC.3.2.110.1



**Article info:**
**Received:** 19 Mar 2022
**Accepted:** 04 Sep 2022
**Publish:** 01 Apr 2022

**Keywords:**
Cerebral venous thrombosis, Frequency, Clinical, Symptoms, Imaging

## ABSTRACT

**Background and Aim:** Cerebral venous thrombosis (CVT) is a rare type of stroke and usually occurs in young people. The most common early clinical sign is a headache and the most common finding on clinical examination is bilateral papillary edema.

**Results:** Herewith, we have reported the frequency of clinical features, and imaging findings of cerebral venous thrombosis patients. A total of 17 patients with cerebral venous thrombosis with symptoms of stroke were evaluated, 64.7% of patients were female. The Mean±SD age of the patients was 40.41±12.08 years and the Mean±SD number of hospitalization days was 11.76±3.71 days. The most location of thrombosis and neurological symptoms were sigmoid headaches and blurred vision, respectively.

**Conclusion:** Based on our study, we found that the most common clinical manifestation of CVT is a headache. Papilledema and seizure are also very common, and the most common site of thrombosis in these patients is the sigmoid sinus.

*** Corresponding Author:**
*Mahdi Zarei*
***Address:*** *Student Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran.*
***Phone:*** *+98 (939) 0213177*
***E-mail:*** *mahdi.zarey75@gmail.com*

Journal of Vessels and Circulation
Qom University of Medical Sciences

## 1. Introduction

Cerebral venous thrombosis (CVT) is a rare type of stroke [1, 2] and usually occurs in young people [3]. CVT occurs due to thrombosis in cerebral arteries such as the Dural sinus and superficial and deep cerebral veins [4]. The prevalence of CVT is lower than stroke, with an estimated between 1-12 patients per million per year and 3%-5% of all subtypes of stroke [5-8]. CVT is more common in women, especially young women up to middle age, than men, so the prevalence in women is almost three times more than that of men.

In the International Study on CVT (ISCVT), the most extensive prospective cohort study in cerebral vein and sinus thrombosis, approximately 75% of patients were women [9], with an unbalanced prevalence ratio in women attributed to specific gender risk factors such as OCP, pregnancy, and hormone replacement therapy [2]. It is worth noting that mortality in CVT is lower than in arterial thrombosis. In recent decades, the mortality rate in CVT has dropped dramatically, and the mortality rate is now reported to be 2-38%. Possible causes for reduced mortality include improvements in treatment, changes in risk factors, and the detection of mild cases using advanced diagnostic facilities [10, 11]. The clinical course of CVT is unpredictable and highly variable. The most common early clinical sign is headache, which often accompanies other symptoms such as nausea, vomiting, blurred vision, seizures, and focal neurological symptoms if the cortical veins are involved. The most common finding on clinical examination is bilateral papillary edema. In addition, about a quarter of patients experience a transient loss of consciousness in the acute phase [12-14].

This case series aims to describe the imaging findings, and clinical features of 17 patients with CVT who referred to Bu-Ali Hospital in Qazvin, Iran, from 2017 to 2018.

## 2. Case Presentation

In this case series, we reviewed the profile of 17 patients with acute CVST who were referred to Booali hospital, Qazvin, Iran, from 2017 to 2018. This retro-

**Table 1.** Details of our studied patients.

| Number of Cases | Gender | Referral Month | Pregnancy | History of OCP | Number of Hospitalization | Past Medical History |
|---|---|---|---|---|---|---|
| Case 1 | Female | Not Ramadan | Yes | Yes | 10 | HTN-DM |
| Case 2 | Female | Not Ramadan | No | Yes | 7 | HTN-DM |
| Case 3 | Male | Ramadan | No | No | 11 | HTN |
| Case 4 | Male | Not Ramadan | No | No | 6 | HTN-DM |
| Case 5 | Female | Not Ramadan | Yes | Yes | 13 | DM |
| Case 6 | Female | Not Ramadan | No | Yes | 10 | HTN-DM |
| Case 7 | Female | Not Ramadan | No | Yes | 15 | HTN-DM |
| Case 8 | Female | Not Ramadan | No | Yes | 19 | HTN-DM |
| Case 9 | Female | Not Ramadan | No | Yes | 11 | HTN-DM |
| Case 10 | Male | Not Ramadan | No | No | 12 | HTN-DM |
| Case 11 | Female | Ramadan | No | Yes | 20 | Nothing |
| Case 12 | Male | Not Ramadan | No | No | 14 | HTN-DM |
| Case 13 | Male | Not Ramadan | No | No | 11 | HTN-DM |
| Case 14 | Male | Not Ramadan | No | No | 16 | HTN-DM |
| Case 15 | Female | Not Ramadan | No | Yes | 9 | HTN-DM |
| Case 16 | Female | Not Ramadan | No | Yes | 8 | HTN-DM |
| Case 17 | Female | Not Ramadan | No | Yes | 8 | HTN-DM |

spective observational study was approved by the ethics committee of Qazvin University of Medical Sciences. The informed consent was waived owing to the nature of our study design, but verbal and written informed consent was obtained from all individuals for publication, according to the declaration of Helsinki.

CVT patients were diagnosed and confirmed by a neurologist. Diagnosis of patients was based on clinical manifestations and the presence of thrombosis in the central veins and sinuses on CT scan, MRI, magnetic resonance venogram (MRV), and digital cerebral angiography (DSA) according to the diagnostic criteria. The following data were collected and enlisted for eligible patients: Demographic information, clinical signs and neurological signs, radiological images, length of hospital stay, underlying diseases, etiological factors, medications used, and patients' mense and pregnancy status. Neurological symptoms included diplopia, blurred vision, headache, seizures, decreased level of consciousness, and papillary edema. The etiological factors were gender and age. Underlying diseases included hypertension, diabetes, and stroke. Involved sinuses included deep sinus, sigmoid sinus, jugular sinus, and sagittal sinus.

The details of clinical data and demographic data are summarized in Table 1. The number of female patients was higher than male ones (64.7%). The youngest patient was 26 years old and the oldest one was 73 years old. The Mean±SD age of the patients was 40.41±12.08 years. Additionally, none of the patients complained of trauma, 88.2% (n=15) of patients had no pregnancy, only 11.8% (n=2) of patients were pregnant, and 64.7% (n=11) patients had a drug history of OCP.

Most patients (15/17) had been referred in months other than Ramadan when fasting was not observed. Also, the average number of hospitalization days was 11.76±3.71 days. What is more, the most common past medical histories were hypertension (HTN) and diabetes mellitus (DM) with identical numbers. The frequency of clinical findings and the location of thrombosis of

**Table 2**. Frequency of neurological symptoms and signs and location of thrombosis in patients with CVT.

| Number of CaseS | Neurological Symptoms and Signs | | | | | | | Location of Thrombosis | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seizure | Paralysis | Papill-edema | Blurred vision | Diplopia | Headache | Decreased LOC1 | Sagittal | Jugular | Sigmoid | Deep sinus |
| 1 | Yes | No | Yes | Yes | No | Yes | Yes | Yes | No | Yes | No |
| 2 | No | No | Yes | Yes | No | Yes | No | No | No | Yes | No |
| 3 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | Yes | No |
| 4 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | Yes | No |
| 5 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | Yes | No |
| 6 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | Yes | No |
| 7 | Yes | No | Yes | Yes | No | Yes | Yes | No | No | Yes | No |
| 8 | Yes | Yes | No | No | No | No | Yes | No | No | Yes | No |
| 9 | No | Yes | Yes | Yes | No | Yes | Yes | Yes | No | Yes | No |
| 10 | No | Yes | Yes | Yes | No | Yes | No | No | No | Yes | No |
| 11 | Yes | Yes | No | Yes | No | No | Yes | No | No | Yes | No |
| 12 | Yes | No | Yes | Yes | No | Yes | Yes | Yes | No | No | No |
| 13 | Yes | Yes | No | Yes | No | Yes | Yes | Yes | No | Yes | No |
| 14 | Yes | Yes | No | Yes | No | Yes | Yes | Yes | No | Yes | No |
| 15 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | Yes | No |
| 16 | Yes | Yes | No | Yes | No | Yes | Yes | Yes | No | No | No |
| 17 | No | Yes | No | No | No | Yes | Yes | No | No | Yes | No |
| Total of (Yes) answer | 13/17 | 13/17 | 11/17 | 15/17 | 0/17 | 15/17 | 15/17 | 11/17 | 0/17 | 15/17 | 0/17 |

LOC: Level of consciousness

Journal of Vessels and Circulation
Qom University of Medical Sciences

each patient are summarized in Table 2. Interestingly, 52.9% (n=9) of patients in the para-clinical evaluation showed evidence of cerebral ischemia.

## 3. Conclusion

Clinical manifestations of CVT include mild cases of headache only, headache and papilledema, or other signs of intracranial hypertension, focal deficits such as paresis or aphasia, to severe cases featuring status epilepticus, encephalopathy, or coma [15]. Confirmation of the diagnosis of CVT is using imaging that requires demonstration of thrombose in the cerebral vein or Dural sinus. Currently, CVT is being diagnosed with increased frequency due to easier access and higher awareness of magnetic resonance imaging [16].

In our study, the most common clinical manifestations were headache, loss of consciousness, and blurred vision, which were consistent with several studies [17, 18]. However, in a study in Pakistan, the prevalence of headaches was lower compared to these studies [19]. Diplopia has not been reported in any of the patients in our study, while in one study it had a prevalence of 13.5% of patients [20]. In our study, the seizure was the second most common clinical manifestation (76.5%), which is similar (62.2%) to the study of Bano et al. [20]. But in another study, it was less (39.3%) common [21]. Papilledema was relatively high (67.7%) in the patients of our study, which was similar (54.7%) to the results of Bano et al. [20]; but, in another study, papilledema was less (28.3%) common [21].

Pregnancy was not a common finding and just two patients were pregnant although, in ISCVT, 17% of the 465 women had CVT related to pregnancy or puerperium. More than half of the patients were taking oral contraceptives similar to other studies. Oral contraceptives have long been attributed to the development of CVT and have been reported in 54%-71% of CVT patients [22].

In our study, the sigmoid sinus was the most common site of thrombosis. In two other studies, the prevalence of thrombosis in the sigmoid sinus was much lower than in our study [21, 23]. The second most common site of thrombosis in our study was the sagittal sinus (64.7%), which was similar (62%) to the results of Idiculla et al. [24]; but, in the study of Patil et al. [23] the prevalence of thrombosis in the sagittal sinus was lower (46%). According to the results of the current study, jugular sinus thrombosis was not reported, while in the study of Sidhom et al. [21] and Idiculla et al. [24], jugular sinus thrombosis was reported in some patients. Deep sinus thrombosis was also not reported in our study while it was reported in another study as 28% [23].

In addition, we ordered anticoagulant therapy with low molecular weight heparin and heparin. In 13/17 patients we used antiepileptic therapy because they had both seizure and CVT. The period time of hospitalization is summarized in Table 1 for each patient, separately. Finally, all patients were discharged with a good general situation and we did not have any death.

The limitations of our study were the small sample size, the small number of people with CVT in Qazvin, the limitation in MRV explanation, and the lack of patient follow-up We also suggest that in future studies, imaging findings be interpreted by a radiologist rather than a neurologist and the studies be performed as multicentral with patients follow up.

## Ethical Considerations

### Compliance with ethical guidelines

This study has been approved by the Ethics Committee of Qazvin University of Medical Sciences (IR.QUMS.REC.1400.189).

### Funding

This research did not receive any grant from fundingagencies in the public, commercial, or non-profit sectors.

### Authors' contributions

Conceptualization: Fatemeh Bahiraie and Monir Sadat Mirzadeh; Drafting of the manuscript: Mahdi Zarei, Mohammad Amin Habibi, and Alireza Sharifi; Statistical analysis and interpretation of data: Fatemeh Bahiraie, Monir Sadat Mirzadeh, Saeed Karimi, and Pooya Jafari; Critical revision of the manuscript for important intellectual content: Alireza Sharifi and Mojde Bagheri.

### Conflict of interest

All authors declare no conflict of interest.

## References

[1] Bousser MG. Cerebral venous thrombosis. Stroke. 1999; 30(3):481-3. [DOI:10.1161/01.STR.30.3.481] [PMID]

[2] Stam J. Thrombosis of the cerebral veins and sinuses. N Engl J Med. 2005; 352(17):1791-8. [DOI:10.1056/NEJMra042354] [PMID]

[3] Bousser MG, Ferro JM. Cerebral venous thrombosis: An update. Lancet Neurol. 2007; 6(2):162-70. [DOI:10.1016/S1474-4422(07)70029-7] [PMID]

[4] Bushnell C, Saposnik G. Evaluation and management of cerebral venous thrombosis. Continuum. 2014; 20(2 cerebrovascular disease):335-51. [DOI:10.1212/01.CON.0000446105.67173.a8] [PMID]

[5] Ferro JM, Canhão P. Cerebral venous sinus thrombosis: Update on diagnosis and management. Curr Cardiol Rep. 2014; 16(9):523. [DOI:10.1007/s11886-014-0523-2] [PMID]

[6] Kernan WN, Ovbiagele B, Black HR, Bravata DM, Chimowitz MI, Ezekowitz MD, et al. Guidelines for the prevention of stroke in patients with stroke and transient ischemic attack: A guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke. 2014; 45(7):2160-236. [DOI:10.1161/STR.0000000000000024] [PMID]

[7] Ruiz-Sandoval JL, Chiquete E, Bañuelos-Becerra LJ, Torres-Anguiano C, González-Padilla C, Arauz A, et al. Cerebral venous thrombosis in a Mexican multicenter registry of acute cerebrovascular disease: The RENAMEVASC study. J Stroke Cerebrovasc Dis. 2012; 21(5):395-400. [DOI:10.1016/j.jstrokecerebrovasdis.2011.01.001] [PMID]

[8] Saposnik G, Barinagarrementeria F, Brown RD Jr., Bushnell CD, Cucchiara B, Cushman M, et al. Diagnosis and management of cerebral venous thrombosis: A statement for healthcare professionals from the American Heart Association/American Stroke Association. Stroke. 2011; 42(4):1158-92. [DOI:10.1161/STR.0b013e31820a8364] [PMID]

[9] Ferro JM, Canhão P, Stam J, Bousser MG, Barinagarrementeria F, ISCVT Investigators. Prognosis of cerebral vein and dural sinus thrombosis: Results of the international study on cerebral vein and dural sinus thrombosis (ISCVT). Stroke. 2004; 35(3):664-70. [DOI:10.1161/01.STR.0000117571.76197.26] [PMID]

[10] Ferro JM, Correia M, Pontes C, Baptista MV, Pita F. Cerebral vein and dural sinus thrombosis in Portugal: 1980-98. Cerebrovasc Dis. 2001; 11(3):177-82. [DOI:10.1159/000047635] [PMID]

[11] Lee DJ, Ahmadpour A, Binyamin T, Dahlin BC, Shahlaie K, Waldau B. Management and outcome of spontaneous cerebral venous sinus thrombosis in a 5-year consecutive single-institution cohort. J Neurointerv Surg. 2017; 9(1):34-8. [DOI:10.1136/neurintsurg-2015-012237] [PMID]

[12] Devasagayam S, Wyatt B, Leyden J, Kleinig T. Cerebral venous sinus thrombosis incidence is higher than previously thought. Stroke. 2016; 47(9):2180-2. [DOI:10.1161/STROKEAHA.116.013617] [PMID]

[13] Silvis SM, de Sousa DA, Ferro JM, Coutinho JM. Cerebral venous thrombosis. Nat Rev Neurol. 2017; 13(9):555-65. [DOI:10.1038/nrneurol.2017.104] [PMID]

[14] Duman T, Uluduz D, Midi I, Bektas H, Kablan Y, Goksel BK, et al. A multicenter study of 1144 patients with cerebral venous thrombosis: The VENOST study. J Stroke Cerebrovasc Dis. 2017; 26(8):1848-57. [DOI:10.1016/j.jstrokecerebrovasdis.2017.04.020] [PMID]

[15] Paybast S, Aghamiri SH. An update on diagnosis and treatment of cerebral venous thrombosis in adults: A narrative review. J Vessels Circ. 2020; 1(2):35-44. [DOI:10.29252/jvesselcirc.1.2.35]

[16] Aghamiri H, Paybast S, Lima BS, Mansoori B. New advances in acute ischemic stroke management. Int Clin Neurosci J. 2020; 7(2):55-60. [DOI:10.34172/icnj.2020.02]

[17] Anadure R, Wilson V, Sahu S, Singhal A, Kota S. A study of the clinical, radiological, and etiological profile of cerebral venous sinus thrombosis at a tertiary care center. Med J Armed Forces India. 2018; 74(4):326-32. [DOI:10.1016/j.mjafi.2017.11.004] [PMID] [PMCID]

[18] Gazioglu S, Eyuboglu I, Yildirim A, Aydin CO, Alioglu Z. Cerebral venous sinus thrombosis: Clinical features, long-term outcome and recanalization. J Clin Neurosci. 2017; 45:248-51. [DOI:10.1016/j.jocn.2017.07.028] [PMID]

[19] Mubarak F, Azeemuddin M, Anwar SSM, Nizamani WM, Beg M. In-hospital imaging prevalence, patterns of neurological involvement in cerebral venous sinus thrombosis: Analysis from Pakistan. J Adv Med Med Res. 2018; 4:1-9. [DOI:10.9734/JAMMR/2018/38540]

[20] Bano S, Farooq MU, Nazir S, Aslam A, Tariq A, Javed MA, et al. Structural imaging characteristic, clinical features and risk factors of cerebral venous sinus thrombosis: A prospective cross-sectional analysis from a tertiary care hospital in Pakistan. Diagnostics. 2021; 11(6):958. [DOI:10.3390/diagnostics11060958] [PMID] [PMCID]

[21] Sidhom Y, Mansour M, Messelmani M, Derbali H, Fekih-Mrissa N, Zaouali J, et al. Cerebral venous thrombosis: Clinical features, risk factors, and long-term outcome in a Tunisian cohort. J Stroke Cerebrovasc Dis. 2014; 23(6):1291-5. [DOI:10.1016/j.jstrokecerebrovasdis.2013.10.025] [PMID]

[22] Aguiar de Sousa D, Canhão P, Crassard I, Coutinho J, Arauz A, Conforto A, et al. Safety of pregnancy after cerebral venous thrombosis: Results of the ISCVT (International study on cerebral vein and dural sinus thrombosis)-2 PREGNANCY study. Stroke. 2017; 48(11):3130-3. [DOI:10.1161/STROKEAHA.117.018829] [PMID]

[23] Patil VC, Choraria K, Desai N, Agrawal S. Clinical profile and outcome of cerebral venous sinus thrombosis at the tertiary care center. J Neurosci Rural Pract. 2014; 5(03):218-24. [DOI:10.4103/0976-3147.133559] [PMID] [PMCID]

[24] Idiculla PS, Gurala D, Palanisamy M, Vijayakumar R, Dhandapani S, Nagarajan E. Cerebral venous thrombosis: Acomprehensive review. Eur Neurol. 2020; 83(4):369-79. [DOI:10.1159/000509802] [PMID]

This Page Intentionally Left Blank