International Journal of Science and Research Archive
eISSN: 2582-8185
Cross Ref DOI: 10.30574/ijsra
Journal homepage: https://ijsra.net/

(RESEARCH ARTICLE)

Check for updates

Identifying risk factors for cerebral venous thrombosis in an intensive care unit: Interest in early anticoagulant treatment

Ait Mouheb Tahar [1,*], Amine Zakaria [1], Ait Mokhtar Lynda [1], Ahmed Benyahia Iheb [1] and Labaci Fatima [2]

[1] *Department of anesthesia and resuscitation, Faculty of medicine Algiers, Algeria.*
[2] *Lamine Debaghine Hospital, Bab El Oued, Algeria.*

International Journal of Science and Research Archive, 2024, 11(01), 1506–1510

Publication history: Received on 01 January 2024, revised on 09 Februay 2024, accepted on 12 February 2024

Article DOI: https://doi.org/10.30574/ijsra.2024.11.1.0281

Abstract

Thrombosis of the dural venous sinus or cerebral veins (CVT) of particular anatomical location of venous thrombosis with a complete or partial occlusion. Treatment of CVT with Heparin followed by VKA is recommended by current guidelines.

Material and methods: We conducted a descriptive cohort study, of CVT recorded at the University Hospital Centre Lamine Debaghine Bab El Oued (Algeria) from April 2020 to December 2023.

Results: We reported 16 cases of cerebral venous thrombosis (CVT) that were admitted to the intensive care ward from April 2020 to December 2023. It represents 7.4% of neurologic deficiency consultation in the emergency department in the studied period. The mean age of our population is 37.38. we found a preponderance in the female population. The aim of our study is to highlight the importance of early anticoagulation.

Discussion: We found that early administration of anticoagulant therapy within the first 24 hours reduced mortality and outcomes in the study population. Our results were consistent with most studies reported in the literature.

Conclusion: the introduction of the precocial anticoagulation impacts the mortality and outcomes in CVT however, more studies on the exact timing of introduction are required to define the right timing.

Keywords: Cerebral venous sinus thrombosis; Heparin; Venous thrombosis; Cerebral venous sinus thrombosis

1. Introduction

Thrombosis of the dural venous sinus or cerebral veins (CVT) of particular anatomical location of venous thrombosis (1). There is a complete or partial occlusion that can affect one or more main sinuses. Involvement of the feeding cortical veins can lead to heterogeneous manifestations (headaches, altered consciousness, behavioral abnormalities, convulsions, speech difficulties and focal or gen eralized neurological deficits) (2).

It represents a particular type of stroke, less frequent and different from arterial strokes. In contrast to arterial stroke, CVT, is less common, (1,3) affects younger patients with a female predominance, (4), rarely presents as a stroke syndrome, (5), and cover various clinical syndromes, (6). Diagnosis is often difficult and delayed (7), its occurrence can be linked to several risk factors.

* Corresponding author: Ait Mouheb Tahar

The incidence of CVT is estimated at 5 per 1 million (8.9). TVCs are mainly of interest to young women (74.5% of cases, average age: 37 years) (10). Treatment of CVT with Heparin followed by VKA is recommended by current guidelines and should be started as soon as the diagnosis of CVT is clearly confirmed (11). Mortality can be increased by the occurrence of complications such as strokes, brain hernias, infections (12,13). Since the appearance of an early anticoagulant recommended by the American Heart Association-American Stroke Association, this mortality has significantly decreased and most cases have become mild. (14). However, the ideal time to introduce low molecular weight heparin remains difficult to define. The aim of our study is to highlight the importance of early anticoagulation.

2. Materials and methods

We conducted a descriptive and analytic cohort study, of CVT recorded at the University Hospital Centre Lamine Debaghine Bab El Oued (Algeria) from April 2020 to December 2023. We analyzed the gender, age, medical history, topography, as well as the length of stay of the patients. Likewise, we also reported the onset of anticoagulation, rather we switched or not to another anticoagulant, the patients that were sanctioned by intubation, and the mortality and morbidity

3. Results

We reported 16 cases of cerebral venous thrombosis (CVT) that were admitted to the intensive care ward from April 2020 to December 2023. It represents 7.4% of neurologic deficiency consultation in the emergency department in the studied period .77.8% of our cases are female and 11.1% are male (sex-ratio=0.14). The mean age of our population is 37.38, the youngest case was a 17-year-old and the oldest case reported was a 56-year-old. 25% of the cases were between 17–24-year-old, 18.8% were aged between 24- 32-year-old, 12.5% aged between 32–39-year-old, 12.5% aged between 39–46-year-old and 31.2% aged from 46- to 56-year-old.

As for medical history, 16.7% had high blood pressure, 11.1% had diabetes, 16.7% had anemia,12.3% had euthyroidism, 11.1% were admitted in postpartum .33.3% were under oral contraception.11.11% consume drugs.

For the topography, 66.7% had CVT in the superior sagittal sinus, 55.6% had CVT in the left transversal sinus,38.9% had a CVT in the right transversal sinus,27% presented it in the straight sinus, 16.7% had a CVT in the central gray nucleus, 22.2% presented a CVT in the jugular vein, and 22.2% in the lateral sinus. In terms of the length of hospitalization, 16.7% stayed less than 7 days, 33.3% stayed 7-14days, 33.3% stayed 14–21 days and 16.7 % stayed more than 21 days. 27.8% started anticoagulation with low molecular weight heparin, 55.6% started it on day 2, 5.5% on day 3 and 11.1% the anticoagulation started after the third day .68.8% switched to vitamin K antagonist (VKA) before the 4th day of anticoagulation. As for the length of anticoagulation treatment 50% took it for 14-21days, and the rest maintain it for a whole month We noticed that patient that started the heparin in the first 24h didn't show any squellea and didn't have outcomes .in the other hand the patient that started at the 3rd day manifested complications sequelae and death.61.1% complicated with an ischemic stroke, 5.6% complicated with brain herniation, 33.3% were complicated with infection and 5.6% were sanctioned by intubation. 11.11% died, 27.8% kept squellea.

4. Discussion

As found in our study, many studies reported a preponderance of females in two third of the cases (15.17). In our study our population age was between 17-56 with a preponderance of youngsters. More than 50% were aged between 17–39-year-old, and the mean age was 37.38-year-old. A study conducted in the Netherlands found an overall incidence of 1.32/100000/year and of 2.78/100000/year for women between the ages of 31 and 50 (18). A systematic review including of 8829 CVT patients, from 74 case series with more than 40 subjects, found an average age of 32.9 years (17).

The most common sites of CVT in our study were the superior sagittal sinus followed in decreasing order by the left transversal sinus, the right transversal sinus, straight sinus the jugular vein, lateral sinus and gray nucleus. The most common occlusion sites are the transverse sinuses (44-73%), the superior sagittal sinus (39-62%), sigmoid sinus (40-47%), deep venous system (10.9%) and cortical veins (3.7–17.1%) (18).

As for medical history, 33.3% were under contraceptives and 11.1% postpartum. In the literature, female gender-specific risk factors, especially pregnancy and puerperal and oral contraceptives, are potential risk factors for CVT (8). we also reported 16.7% of anemia and 11.11% toxicomania and dysthyroidism which are also recognized as risk factor in actual literature (19.20) (Tab 1)

In our study, we noticed that patient that started the heparin in the first 24 h didn't show any squellea and didn't have outcomes .in the other hand, the patient that started on the 3rd day manifested complications sequelae and death. The existing treatment guidelines provided by the American Heart Association-American Stroke Association (AHA-ASA) and European Stroke Organization (ESO) recommended initial systemic heparinization using either unfractionated or LMWH, followed by long-term oral anticoagulation with warfarin (21). However, the actual recommendations didn't state the best moment to introduce an anticoagulant (22).

In terms of outcomes, we found essentially strokes, brain herniation and infection were predominant. Those complications were described by many authors (13).

Table1 Risk factors for cerebral venous thrombosis (20)

Gender-specific risk factors	Oral contraceptives Puerperium Pregnancy Hormonal replacement therapy
Systemic conditions	Iron deficiency anemia Malignancy Myeloproliferative diseases Dehydration Inflammatory bowel disease Systemic lupus erythematosus Behçet's disease Thyroid disease Neurosarcoidosis
Genetic/acquired prothrombotic condition (thrombophilia)	Antiphospholipid antibody syndrome MTHFR gene mutation/hyperhomocysteinaemia Factor V Leiden mutation Prothrombin gene mutation Protein S/C deficiency Antithrombin deficiency Nephrotic syndrome Polycythaemia/thrombocythaemia
Mechanical factors	Surgery/neurosurgery Lumbar puncture Head trauma
Drugs	Cytotoxic Lithium Vitamin Intravenous immunoglobulin Ecstasy
Vascular abnormalities	Dural arteriovenous fistulae Arteriovenous malformations Other venous abnormalities
Infections	Ears, sinuses, mouth, face, neck Central nervous system

5. Conclusion

the introduction of the precocial anticoagulation impacts the mortality and outcomes in CVT however, more studies on the exact timing of introduction are required to define the right timing.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Ageno W, Beyer-Westendorf J, Garcia D, Lazo-Langner A, McBane R, Paciaroni M. Guidance for the management of venous thrombosis in unusual sites. J Thromb Thrombolysis. 2016; 41(2016):129–43.

[2] Capecchi M, Abbattista M, Martinelli I. Cerebral venous sinus thrombosis. J Thromb Haemost. 2018; 16(10):1918e31. https://doi.org/10.1111/jth.14210

[3] Ferro JM, Canhão P, Aguiar de Sousa D. Cerebral venous throm- bosis. Presse Med. 2016; 45(12 Pt 2):e429–50. https://doi.org/10. 1016/j.lpm.2016.10.007.

[4] Silvis SM, de Sousa DA, Ferro JM, Coutinho JM. Cerebral venous thrombosis. Nat Rev Neurol. 2017; 13(9):555–65. https://doi.org/ 10.1038/nrneurol.2017.104.

[5] Coutinho JM, Zuurbier SM, Aramideh M, Stam J. The incidence of cerebral venous thrombosis: a cross-sectional study. Stroke. 2012; 43(12):3375–7. https://doi.org/10.1161/STROKEAHA.112. 671453.

[6] Devasagayam S, Wyatt B, Leyden J, Kleinig T. Cerebral venous sinus thrombosis incidence is higher than previously thought: a retrospective population-based study. Stroke. 2016; 47(9):2180–2. https://doi.org/10.1161/STROKEAHA.116.013617.

[7] Coutinho JM, Zuurbier SM, Stam J. Declining mortality in cerebral venous thrombosis: a systematic review. Stroke. 2014; 45(2014): 1338–41.

[8] Zuurbier SM, Middeldorp S, Stam J, Coutinho JM. Sex differences in cerebral venous thrombosis: a systematic analysis of a shift over time. Int J Stroke. 2016; 11(2):164–70. https://doi.org/10.1177/ 1747493015620708.

[9] Bousser MG, Ferro JM. Cerebral venous thrombosis: an update. Lancet Neurol 2007; 6:162-70.

[10] Bousser MG, Chiras J, Bories J, Castaigne P. Cerebral venous thrombosis--a review of 38 cases. Stroke 1985; 16:199-213.

[11] Ferro JM, Canhao P, Stam J, Bousser MG, Barinagarrementeria F. Prognosis of cerebral vein and dural sinus thrombosis: results of the International Study on Cerebral Vein and Dural Sinus Thrombosis (ISCVT). Stroke 2004; 35:664-70.

[12] Ulivi L, Squitieri M,Cohen H, et al. Pract Neurol2020; 20:356–367

[13] Ferro, J.M., Aguiar de Sousa, D. Cerebral Venous Thrombosis: An Update. Curr Neurol Neurosci Rep 19, 74 (2019). https://doi.org/10.1007/s11910-019-0988-x

[14] Ferro JM, Bousser MG, Canhão P, et al.: European Stroke Organization guideline for the diagnosis and treatment of cerebral venous thrombosis - Endorsed by the European Academy of Neurology. Eur Stroke J.2017, 2:195-221. 10.1177/2396987317719364

[15] Coutinho JM, Zuurbier SM, Stam J. Declining mortality in cerebral venous thrombosis: a systematic review. Stroke 2014; 45:1338–41

[16] Devasagayam S, Wyatt B, Leyden J, Kleinig T. Cerebral venous sinus thrombosis incidence is higher than previously thought: a retrospective population-based study. Stroke. 2016; 47(9): 21802.https://doi.org/10.1161/STROKEAHA.116.013617.

[17] Coutinho JM, Zuurbier SM, Stam J. Declining mortality in cerebral venous thrombosis: a systematic review. Stroke. 2014;45(2014):1338–41

[18] Idiculla PS, Gurala D, Palanisamy M, Vijayakumar R, Dhandapani S, Nagarajan E. Cerebral venous thrombosis: a comprehensive review. Eur Neurol. 2020 Oct; 83(4):369-79. https://doi.org/10.1159/000509802

[19] Green M, Styles T, Russell T, et al.: Non-genetic and genetic risk factors for adult cerebral venous thrombosis. Thromb Res. 2018, 169:15-22. 10.1016/j.thromres.2018.07.005

[20] Ferro JM, Canhao P, Stam J, et al. Prognosis of cerebral vein and dural sinus thrombosis: results of the International Study on Cerebral Vein and Dural Sinus Thrombosis (ISCVT). Stroke 2004; 35:664–70.

[21] Fatema K, Rahman MM, Banu LAM: Superior ophthalmic vein thrombosis with cerebral venous sinus thrombosis: A rare entity in a child. J Enam Medical Coll. 2019, 9:127-32. 10.3329/jemc. v9i2.41415

[22] Canhao P, Ferro JM, Lindgren AG, et al. Causes and predictors of death in cerebral venous thrombosis. Stroke 2005; 36:1720–5