Case Report

Cerebral Vein Thrombosis due to Meningococcal Meningitis

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Abstract

Bacterial meningitis is a life-threatening condition and *Neisseria meningitidis* is a major cause. Cerebrovascular complications can occur. Cerebral venous and sinus thrombosis (CVST) is an uncommon type of these complications, especially in meningococcal meningitis. The initiation of anticoagulant in septic thrombosis is controversial. A 35-year-old man was admitted to a hospital with fever and confusion. The diagnosis of *N. meningitidis* meningitis was established. Antimicrobial regimen (ceftriaxone) was continued. On the 3rd day, the patient's consciousness was improved; however, according to the patient's headache on day 7, brain imaging was performed which revealed a cerebral thrombosis in transverse and sigmoid sinuses. Although initiation of anticoagulant is controversial in septic thrombosis, the anticoagulant treatment also was started. Control brain magnetic resonance venogram done revealed complete resolution of cerebral CVST after 2 weeks. CVST as a complication of meningococcal meningitis should be considered. Anticoagulant treatment may be considered in the management of septic cerebral thrombosis if there are no contraindications. The use of anticoagulant needs further studies.

Keywords: Bacterial meningitis, CVST, cerebral vein thrombosis, meningitis, meningococcal infection

Introduction

Bacterial meningitis is a disease with high mortality that requires immediate antimicrobial treatment.[1] *Neisseria meningitidis* is a Gram-negative diplococcal bacterium and is part of the normal microbiota of nasopharynx, which can cause invasive diseases, such as meningitis and bacteremia. Meningococcus is a major cause of meningitis worldwide. Humans are the only natural hosts.[2] Its common clinical manifestations are meningitis and meningococcemia.[3] Cerebral vein thrombosis as a neurological complication of meningitis is uncommon. In this paper, we report a case of cerebral venous and sinus thrombosis (CVST) as a complication of meningococcal meningitis which showed improvement after antibiotic and anticoagulant treatment.

Case Report

A 35-year-old man prison patient was referred to Alzahra Hospital, a tertiary center in Isfahan University of Medical Sciences, Isfahan, Iran, with loss of consciousness and fever in January 2018. No history of head trauma was declared. On examination, petechial skin rashes were noticeable. He was febrile, was confused, and had neck stiffness with no lateralizing signs or papilledema. The brain computed tomography scan was normal. According to meningismus signs, the lumbar puncture was performed, and considering clinical manifestation, an empirical antimicrobial regimen consists of ceftriaxone, vancomycin, and acyclovir in addition to corticosteroid being started. The cerebral spinal fluid (CSF) analysis revealed white blood cell = 200, polymorphonuclear = 75%, Glucose (Glu) = 32, and Protein (Pro) = 75, which was suggestive of bacterial meningitis. Other laboratory studies showed leukocytosis and high levels of serum erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) (78 mm/h and 55 mg/dL, respectively). International normalized ratio was 2.1. On the 3rd day, the patient's consciousness was improved and he was afebrile. The CSF and blood culture were positive for N. meningitidis. Hence, according to CSF analysis and its culture, the administration of vancomycin and acyclovir was stopped, and treatment with ceftriaxone was continued. After 1 week, the patient's complaint was headache, so brain magnetic resonance imaging

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and magnetic resonance venogram (MRV) were performed which revealed cerebral venous thrombosis in transverse and sigmoid sinuses [Figures 1-3], with no subdural collection or midline shift. A thrombophilic evaluation was performed and it was normal. The diagnosis of cerebral vein septic thrombosis as a complication of meningococcal meningitis was established. Anticoagulant therapy with heparin (5000 unit intravenous [IV] stat and then 1000 unit/h IV infusion) was started. Treatment with ceftriaxone was continued for 4 weeks. Control brain MRV was done which revealed complete resolution of CVST after 2 weeks.The patient's symptoms include headache that was also improved. The serum level of ESR and CRP diminished to 5 mm/h and 4 mg/dL, respectively.

Figure 1: Coronal view of magnetic resonance venogram demonstrating lack of flow in right sigmoid and transverse sinuses

Figure 2: Coronal T2-weighted magnetic resonance imaging demonstrating hypersignal clot in the right sigmoid sinus

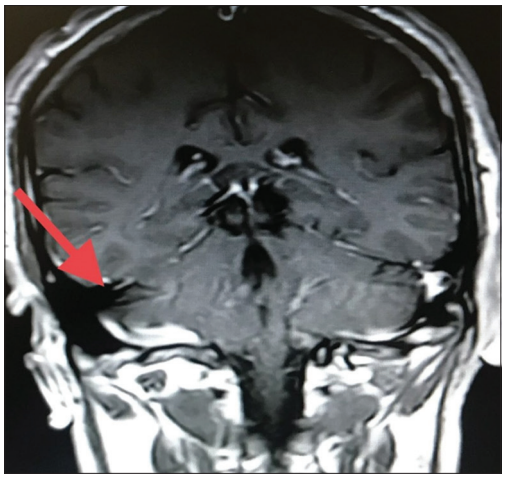

Figure 3: Coronal view of contrast-enhanced magnetic resonance imaging showing lack of filling in the right sigmoid sinus

Discussion

We report a patient presenting with meningococcal meningitis and CVST. Acute bacterial meningitis is a medical emergency with high mortality rate and neurological sequels.[1] Invasive meningococcal infection can present as meningitis, meningococcemia, or both. Petechial or purpuric rash is one of the important distinctive features.[3] In bacterial meningitis, cerebrovascular complications are common (10%–36%).[4] Since the introduction of antibiotics, septic cerebral and sinus thrombosis is an uncommon type of these cerebrovascular events.[5] Depending on the location of the thrombosis, the range of clinical symptoms associated with CVST varies. The most common symptoms are headache, seizures, and loss of consciousness.[6] Although CVST reported to occur in 9.2% in pneumococcal meningitis,[7] it is a rare complication of meningococcal infection.[8] As mentioned, few cases have also been reported. In the case reported by Chirakkara *et al*., a case of meningococcal meningitis with CVST was described and medical treatment with ceftriaxone was started. In the mentioned study, the authors stated that the use of anticoagulation in CVST secondary to meningococcal infection needs further studies to confirm its usefulness.[9] Further, in the case reported by Bozzola *et al*., a 8-month-old patient with multiple cerebral sinus thrombosis complicating meningococcal meningitis was reported. Thrombophilic evaluation revealed hyperhomocysteinemia and methylenetetrahydrofolate reductase variants (C677T and A1298C). Anticoagulant therapy was started.[10] Against this case, our patient had no thrombophilic abnormalities. Treatment of intracranial septic thrombophlebitis includes the administration of antibiotic according to the bacteria found in blood culture or CSF. The use of anticoagulant in this condition is controversial although, in septic cavernous sinus thrombosis, the initiation of anticoagulant is recommended.[11] We initiated anticoagulant therapy. The control brain MRV was done after 2 weeks which revealed complete resolution of thrombosis. At this time, the anticoagulant was stopped. The patient was clinically improved.

Conclusion

The main emphasis of this case describes CVST as a possible complication of meningococcal meningitis. Anticoagulant treatment may be considered in management of CVST

associated with meningococcal meningitis although it needs further studies.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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