JOURNAL OF BIOMEDICAL RESEARCH & ENVIRONMENTAL SCIENCES
ISSN: 2766-2276
SUBJECT AREA(S): GYNECOLOGY
DOI: 10.37871

CASE REPORT

Bilateral Cavernous Sinus Thrombosis (CST) During the Early Pregnancy

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Abstract

Cavernous Sinus Thrombosis (CST) is a rare but serious condition with long term morbidity and mortality. Pregnancy and nausea vomiting during pregnancy are well known risk factors. Early identification and prompt interventions will minimize the complications of CST. This is a case of CST which presented in first trimester of the pregnancy.

Introduction

Cerebral Venous Sinuses (CVS) are channels filled with venous blood between the endosteal and meningeal layers of the dura matter of the brain. Emissary veins from scalp, face, paranasal sinuses and ears drains into these CVS. Main CVS of brain are superior sagittal, inferior sagittal, transverse, straight, sigmoid and cavernous sinus. Cerebral Venous Sinus Thrombosis (CVST) contributes to 0.5 to 1% of all strokes [1,2]. CST represents less than 10% of all CVST [3]. Table 1 shows the list of risk factors for CVST [4].

Mortality rate in literature for the CVST ranges from 20 to 50% [5]. This is a case of CST presented during the first trimester with a back-ground history of Nausea Vomiting in Pregnancy (NVP).

Case

29-year old previously healthy lady and mother of one child who was in the ninth week of her second pregnancy, presented with progressively worsening generalized head ache for one-week duration. Head ache was a persisting one throughout the day. She had NVP for the last two weeks. Other than the head ache, she complained of blurred vision, diplopia and difficulty in closing eyes. Her upper limb and lower limb functions were not affected. She didn't have any numbness or paresthesia. She denied any past history of estrogen containing pills and denied any personal or family history of thrombophilia or connective tissue disorders.

She was an averagely built lady with a BMI of 22 kg/m^2. She was afebrile

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DOI: 10.37871/jbres1891

Submitted: 14 March 2024

Accepted: 26 March 2024

Published: 28 March 2024

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OPEN ACCESS

Keywords

- Cavernous sinus
- Thrombosis
- Early pregnancy
- Cerebral venous sinus

MEDICINE GROUP

GYNECOLOGY

VOLUME: 5 ISSUE: 3 - MARCH, 2024

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How to cite this article: Walawe Nayaka S. Bilateral Cavernous Sinus Thrombosis (CST) During the Early Pregnancy. J Biomed Res Environ Sci. 2024 Mar 28; 5(3): 267-270. doi: 10.37871/jbres1891, Article ID: JBRES1891, Available at: https://www.jelsciences.com/articles/jbres1891.pdf

Table 1: list of risk factors for CVST.
1. Female gender (three times higher risk compare to males)
2. Local (ear, mastoid, face, orbits, meninges) or systemic (sepsis) infections
3. Pregnancy (specially third trimester and puerperium)
4. Iatrogenic (head and neck surgeries, jugular vein catheters, etc.
5. Drugs with prothrombotic effect (oral contraceptive pills, hormone replacement therapy, tamoxifen, steroids)
6. Dehydration (due to vomiting, diarrhea)
7. Congenital or acquired thrombophilia
8. Malignancies
9. Thyroid disorders.

at the time of examination. Neurological examination revealed sixth, seventh and twelfth nerve palsy in left side with mild papilledema. Bilateral upper limbs and lower limbs examination were normal. There was no any sensory loss. Immediate multi-disciplinary team meeting was arranged and possibility of CST was raised. Urgent Magnetic Resonance Imaging (MRI) with Venogram (MRV) was arranged which confirmed the diagnosis of bilateral CST (left > right). Her infection screening was negative. Her other investigations were normal including platelet count, liver and renal functions and coagulation profile. Her C-reactive protein level and the erythrocyte sedimentation rate was with in the normal range.

She was immediately started on twice daily therapeutic dose of Enoxaparin under the care of Hematologist. Once her symptoms started to resolve she was discharged with single daily dose of Enoxaparin with the plan of continuing it until the end of post-partum period. Thrombophilia screening was planned at the end of the pregnancy. Decision was taken to decide on lifelong oral anti-coagulant at the end of post-partum period.

Discussion

Even though very rare, CST may lead to significant morbidity and mortality if the diagnosis and treatments delayed. Causes of CST may be aseptic or infectious. The common possible infection sites are face, odontogenic, mastoid, upper respiratory tract, meninges and ear. Odontogenic causes contribute up to 10% of these infections. *Streptococcus milleri* is a well-known organism which cause local infections which lead to CST [6]. Infection may directly spread to the cavernous sinus or spread through the veins. In this patient her clinical and biochemical infection screening was negative. Most probable predisposing factors in this patient are female gender, pregnancy and possible dehydration due to NVP. But excluding an infection in this kind of patient is a crucial part of the management due to physiological immunosuppression during pregnancy and infection is one of the main causes for the CST. So, starting an empirical broad-spectrum antibiotic until infection screening over is justifiable.

When considering the symptomatology, commonest presentation of CVST is headache, one of the usual symptoms often neglected by the patients. So, headache during pregnancy should be considered something very serious when presented with 'red flag signs [7]. Table 2 shows those signs which are need to exclude during patient management [8]. Headache is the most commonly seen prodromal symptoms in patients with hypertensive disorders in pregnancy before the seizures [9]. But in this case that can be excluded as she was in early pregnancy and she was normotensive throughout the course. Most prominent associated feature of this patient is multiple unilateral cranial nerve palsies which lead to diplopia, tongue deviation and facial weakness. In some reported cases, the most predominant symptom was diplopia and blurring of vision compare to the headache. There were patients who presented with associated upper limbs and lower limbs weakness and numbness.

Investigations can be discussed in two arms. They are neuro-imaging to confirm the diagnosis and investigations to exclude the infections. The best neuro-imaging modality in this patient would be MRI compare to the imaging modalities which use ionizing radiation as she was in the early pregnancy [10]. But it

Table 2: Red flag signs of a patient with headache.

	Red flag signs in a patient with headache
1	Thunderclap headache (ex- subarachnoid hemorrhage)
2	Focal neurological signs
3	Non-focal neurological signs like cognitive disturbances (CVST)
4	Changes in headache frequency, characteristics and associated symptoms
5	Headache changes with the posture
6	Early morning headache relieved by vomiting
7	Abnormal neurological examination findings
8	Headache precipitated by physical exertion or Valsalva manoeuvre
9	Jaw claudication or visual disturbance (ex-giant cell arteritis)
10	Fever
11	Neck stiffness
12	New onset headache in a patient with past history of HIV or malignancy

is advised to avoid MRI during first trimester because of possible hazards due to hyperthermia and acoustic noise. But risk benefit balancing justified the use of MRI in this case. Gadolinium based contrast mediums appear to be safe during pregnancy [11]. But in this patient, it was avoided as she was in first trimester. Elemental iodine-based contrast medium should be avoided during pregnancy unless the benefits out weight the risks. Neonatal thyroid functions should be checked in case if it was used [11]. MRI can detect all stages of thrombus formation. In the early stages, on T1-weighted images thrombus is isointense and on T2-weighted images is hypointense; later, thrombus becomes hyperintense on T1- and T2-weighted images [6].

Management may vary depending on the cause. If there is any infective cause, surgical interventions may play a major role. But in aseptic CST main mode of treatment is low molecular weight heparin (Enoxaparin) due to its safety profile in pregnancy, not crossing the placenta, ability of self-administration by the patient in case if she needs prolong therapy. In this patient, Enoxaparin therapy was planned until the end of post-partum. She may need life long anti-coagulation depending on the results of thrombophilia screening. Place of using steroids is controversial [12]. Steroids will reduce the inflammation and edema around the orbits and cranial nerves. But it may cause immunosuppressive effect and prothrombotic effect.

CST is not a contra-indication for future pregnancy, but she needs cover the antenatal and post-partum period with Enoxaparin under the care of Hematologist as there is a risk of recurrence [7]. Best contraceptive methods for her will be non-hormonal methods like Intra-Uterine Contraceptive Device (copper IUCD). But if she needs life long warfarin therapy, this will increase the menstrual blood loss. In such case, Levonorgestrel releasing intrauterine device will be beneficial. Pre conceptional counselling done by an experienced person before the next pregnancy will be very important. Aggressive management of NVP in next pregnancy also helps to minimize the risk of recurrence.

Conclusion

CST is a rare but serious condition which needs immediate diagnosis, treatment and continuous follow up to reduce the associated high morbidity and mortality. MRI and Enoxaparin therapy play a major role in diagnosis and management. Proper counseling and follow up will help to reduce the risk of recurrences.

Declarations

Acknowledgements: Not applicable.

Competing interest: None.

Sponsorship: None.

Funding source: None.

Ethical approval: As this is a case report which do not contain any patient identification details, ethical approval is not required.

Informed consent: Informed written consent was obtained from the patient

Author contribution: The author confirms sole responsibility for study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

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