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Case Report

Cerebral Sinus Thrombosis with Coexisting Secondary Hypoparathyroidism: Case Report for Clinical Education

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ABSTRACT

Cerebral venous sinus thrombosis is a rare and infrequent condition in pregnant women. Hemorrhagic infarction can occur in early stages of cerebral venous thrombosis. This article reports a rare case of cerebral transverse sinus thrombosis presenting in pregnant women with unidentified secondary hypoparathyroidism, highlighting the difficulties in identifying this rare case from common diagnosis like preeclampsia. According to the differential diagnoses for this case, it can be a good exercise to strengthen clinical reasoning in students and medical teachers to improve the quality of clinical education.

Although Cerebral venous sinus thrombosis (CVST) is a rare disease, it can be very important and life-threatening for patients. This pathologic condition was mentioned in literature for the first time about 100 years ago [1]. CVST is a rare phenomenon during pregnancy period and its incidence was thought to be 0.2–0.5 per 100,000 person-years [2]. The main symptoms of this disease are seizure, headache and other kinds of neurologic deficit [3]. These symptoms transpire due to obstruction of cerebral venous sinuses which can result in development of intracranial hypertension [4]. Early diagnosis and treatment of cerebral venous thrombosis is very important [5]. Pregnancy is a known risk factor for development of cerebral venous thrombosis [6]. On the other hand, pregnancy may predispose a patient to parathyroid disorders. In an unusual state, pregnancy may have a patient with parathyroid disorder leading to cerebral venous thrombotic events. In some studies, there is association between cerebral thrombotic events and hyperparathyroidism, but the association between Cerebral venous thrombosis and Hyporparathyroidsm is very rare [7-8]. During the search invalid databases such as PubMed, Cochrane, Elsevier, Springer, Ebsco, Scopus, Google Scholar and Proquest this unique case seems to be not reported. We report a case of 42 years old pregnant woman with unidentified secondary Hyporparathyroidsm who developed CVST after Cesarean section.

Case Report

A 42-old-year G4P3L3 was brought to Zanjan Ayatollah Mousavi gynecology emergency with compliant of deterioration in level of consciousness. She

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was brought to our center by air ambulance from Amiralmomenin hospital which is located in Khodabandeh city in Zanjan province.

The main cause of patient transfer was muscular weakness, lethargy and fatigue sensation. Cesarean section was performed in Amiralmomenin hospital with a primary diagnosis of severe preeclampsia. One hour after discharge from recovery ward, she became lethargic with sensation, numbness in her right hand and leg.

Emergency brain CT-scan result which was performed in Amirlamomenin hospital was absolutely normal without any abnormal findings. Initial laboratory examination results was AST=21, ALT=11, ALP=79, Platelet Count=217000, Hb=10.

Finally, after arrival in Zanjan Mousavi hospital, intensive care and neurologic referrals were taken and further neurologic examinations conducted. After admission into the intensive care unit, the patient's level of consciousness gradually improved. On physical examination, which was performed upon admission, Blood pressure was 150/90 and heart rate was about 70/min. Whole abdominal ultrasonography revealed normal uterus with no pelvic collections with the exception of right-side polycystic kidney. Initial laboratory examination in Mousavi hospital showed a normal complete blood count, but very low serum calcium level [Table 1].

One day after admission, patient's heart rate decreased to 40/min and emergency cardiology consultation was requested, there was no significant findings in cardiologist's evaluations. According to the above mentioned clinical symptoms and normal brain CT-scan result, Thyroid and Parathyroid tests were performed, due to the raised levels of parathyroid hormone and ultrasonography result (polycystic kidney disease), the diagnosis of secondary hypoparathyroidism was confirmed [Table 2]. Because of ongoing headache, MRI and MRV was suggested by a neurologist. MRI and MRV results were compatible with transverse sinus's thrombosis so anticoagulation therapy with Enoxaparin was started and two days later the patient was discharged from intensive care unit with complete alertness [Figure 1].

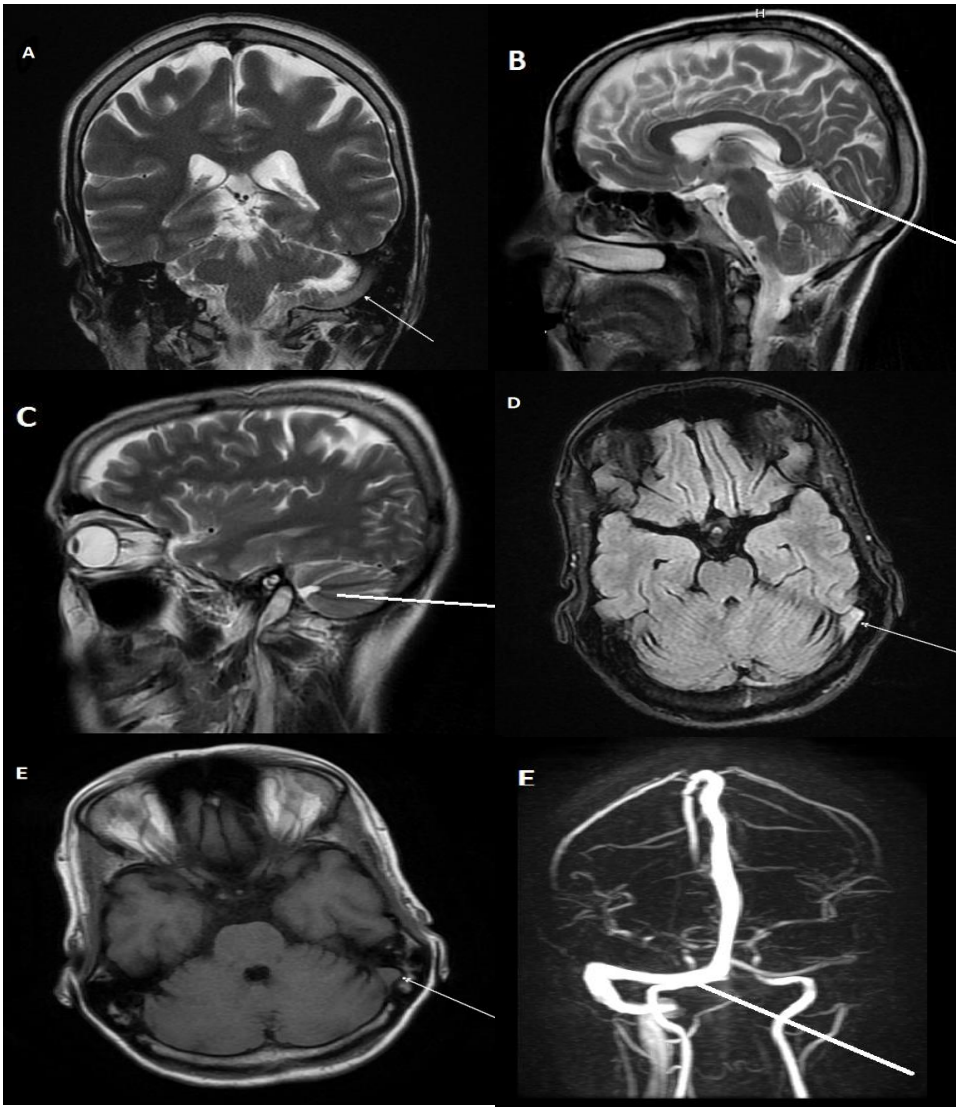
Table 1- Initial laboratory results in Zanjan Ayatollah Mousavi hospital

Laboratory	Results	Laboratory	Results
Na	137 meq/l	Procalcitonin	0/2 ng/ml
K	4/4 meq/l	AST	25 U/l
Bun	22 mg/dl	ALT	14U/l
Cr	1/5 mg/dl	ALP	303U/l
Ca	5/5 mg/dl	Alb	2/6
WBC	14000/microliter	LDH	784 U/L
Neut	89	INR	1
Hb	8/2 g/dl	PT	13
Platelet	206000/microliter	PTT	32
Relic count	0/5%	PTH	192 ml/dl

Table2- Summary table for pregnant woman presenting with cerebral sinus thrombosis with coexisting secondary hypoparathyroidism

Etiology	These symptoms transpire due to obstruction of cerebral venous sinuses, which can result in development of intracranial hypertension
Incidence	Overall- not much data for CVST coexisting secondary hypoparathyroidism because it is very rare. •. the CVST incidence was thought to be 0.2–0.5 per 100,000 person-years • Annual secondary hypoparathyroidism incidence was 0.9 per 100 000 persons
Gender Ratio	Females are more commonly affected than males with the ratio of 1/29:1
Age Predilection	It is commonly present in woman of 25-35 years of age and no kind of cause is identifiable in 25% of patients
Risk Factors	• Family History of CVT, pregnancy
Treatment	No specific management guidelines for cerebral sinus thrombosis with coexisting secondary hypoparathyroidism Primary diagnosis (MRI and MRV) • Standard Guideline Anti-coagulation (Heparin, warfarin, enoxaparin) • Family Counseling and Screening

Figure 1- 42-year-old female(pregnant) with cerebral sinus thrombosis with coexisting secondary hypoparathyroidism.



Findings: A: Coronal T2WI: Abnormal signal in left transverse and sigmoid sinuses.B: MRV MPR: left transverse and sigmoid sinuses are not seen. C: T2 FLAIR. D: T1WI

Discussion

CVST has a variety of clinical presentations ranging from severe headache to deep coma. The most common presentation includes headache, seizure and paresis [9]. Females are more commonly affected than males with the ratio of 1/29:1 [10]. It is commonly present in women of 25-35 years of age and no kind of cause is identifiable in 25% of patients [11]. Hypercoagulable states such as pregnancy, puparium, and contraceptives are among the main causes of disease [12]. Ct scan is an initial imaging tool to evaluate acute cerebral disorders and to show venous thrombosis, but it's results can be entirely normal [13]. The imaging modality of choice is MRI in combination with MRV or with CT venography (CTV) that, the differential diagnoses for cerebral sinus thrombosis with coexisting secondary hypoparathyroidism in CT-Scan, MRI and MRV was shown in (Table 3) [14].

Anticoagulant therapy is the most common treatment for CVST. Most patients have a good prognosis after anticoagulation. Low molecular weight heparin is the treatment of choice followed by warfarinasation [15]. Outcome can result from total recovery to death however prospective studies have reported independent survival rate of 80% [16]. However, the prognosis of CVST is completely different, and the consequence may range from improvement to death. In untreated cases of CVST mortality has been reported to range from 13.8-48%; full recovery occurs between 25% to 30% of patients [17]. The clinical evolution of CVST and its natural history

differ significantly from the various subtypes of arterial stroke, while its clinical presentation is characterized by a wide spectrum of symptoms and signs, depicted in an increasing body of previously published studies. The differential diagnoses are related to: 1- Meningitis, 2- Intracranial mass, 3- Cerebral hemorrhage, 4- Cerebral Infarction, 5- Migraine, 6- Lymphocytic hypophysitis. These items are listed and described in detail in (Table 4) [18].

Given the differential diagnoses made for this case, it can be an excellent practice for strengthening clinical reasoning in students and medical teachers. By understanding these differences, learning from a one-sided approach to understanding the differences, analyzing the information gathered and integrating the results of clinical examination, interpreting laboratory tests, and monitoring the patient. Using the integration of findings and appropriate ballistic reasoning can create a different perspective on clinical education.

Table3- Differential diagnoses table for cerebral sinus thrombosis with coexisting secondary hypoparathyroidism in CT-Scan, MRI and MRV.

Diagnoses	CT/ CTA	MRI	MRV
cerebral sinus thrombosis with coexisting secondary hypoparathyroidism	No changes	Coronal T2WI, T2 FLAIR, T2 FLAIR: Abnormal signal in left transverse and sigmoid sinuses	MRV MPR: left transverse and sigmoid sinuses are not seen

Table4- Differential diagnoses table for cerebral sinus thrombosis with other similar pathological conditions in the brain Includes symptoms, diagnosis (gold Standard, CT/MRI, other investigation findings.

Disease	Symptoms	Diagnosis		
		Gold Standard	CT/MRI	Other Investigation Findings
Meningitis	Headache, Neck stiffness, Fever, Photophobia, Phonophobia, Irritability, altered mental, status (in small children)	Lumbar puncture for CSF	CT scan of the head may be performed before LP to determine the risk of herniation.	clinical presentation in combination with CSF analysis. CSF analysis is the investigation of choice.
Intracranial mass	Headache, Nausea, Vomiting, Change in mental status, Seizures, Focal symptoms of brain damage	MRI	CT or MRI	Biopsy of the X-ray
Cerebral hemorrhage	Headache, vomiting, low LOC, Progression of focal neurological deficits over periods of hours	CT scan without contrast	CT scan without contrast, Gradient echo and T2 susceptibility-weighted MRI	PT/ INR and aPTT should be checked to rule out coagulopathy.
Cerebral Infarction	Based on area involved vary widely	Cerebral angiography	CT scan without contrast may show hypo-attenuation and swelling of involved area. MR diffusion-weighted imaging	Carotid doppler may be done. Cerebral angiography
Migraine	Headache, nausea, vomiting, photophobia, phonophobia, aura.	----	CT and MRI	clinical diagnosis
Lymphocytic hypophysitis	Mass lesion effect such as headache or visual field defects, Hypopituitarism	Pituitary biopsy	CT & MRI	pituitary biopsy

Conclusion

CVST is an uncommon disorder in pregnancy and puerperium, so a high index of suspicion needs to be present in order to diagnose it. MRI with MRV (magnetic resonance venography) scans can confirm the diagnosis. The main frame of treatment is heparinisation. In pregnant patients with any neurological deficit, MRI with MRV or CTV can confirm the diagnosis of CVST. Even in the Hypoparathyroidism condition, we should not ignore the CVST risk in pregnant patients. Given the differential diagnoses for this case, it can be an excellent guide to strengthen the clinical reasoning of students and medical teachers.

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Abbreviations

CT- Computed Tomography
DWI- Diffusion Weighted Images
MRI- Magnetic Resonance Imaging
MRV- Magnetic resonance venography
T1W- T1 Weighted (images)
PTH- Parathyroid hormone
PTT- Thromboplastin time
PT- Prothrombin time
INR- International normalized ratio
Hb- Haemoglobin
WBC- White blood cells
AST- Aspartate aminotransferase
ALT- Alanine aminotransferase
ALP- Alkaline phosphatase
Alb- Albumin
LDH- Lactate Dehydrogenase
LOC- Level of consciousness

References

[1] Aguiar de Sousa D, Canhão P, Ferro JM. Safety of Pregnancy After Cerebral Venous Thrombosis: A Systematic Review. Stroke. 2016; 47(3):713-8.
[2] Ferro JM, Canhão P. Cerebral venous sinus thrombosis: update on diagnosis and management. Curr Cardiol Rep. 2014; 16(9):523.
[3] Suri D, Ahluwalia J, Saxena AK, Sodhi KS, Singh P, Mittal BR, Das R, Rawat A, Singh S. Thromboembolic complications in childhood nephrotic syndrome: a clinical profile. Clin Exp Nephrol. 2014 Oct;18(5):803-13.
[4] Ehtisham A, Stern BJ. Cerebral venous thrombosis: a review. Neurologist. 2006; 12(1):32-8.
[5] Walecki J, Mruk B, Nawrocka-Laskus E, Piliszek A, Przelaskowski A, Sklinda K. Neuroimaging of Cerebral Venous Thrombosis (CVT) - Old Dilemma and the New Diagnostic Methods. Pol J Radiol. 2015; 80:368-73.
[6] Prabhu TRB. Cerebrovascular complications in pregnancy and puerperium. J Obstet Gynaecol India. 2013; 63(2): 108–111.
[7] Diaz-Soto G, Linglart A, Sénat MV, Kamenicky P, Chanson P. Primary hyperparathyroidism in pregnancy. Endocrine. 2013; 44(3):591-7.
[8] Herrera-Martínez AD, Bahamondes-Opazo R, Palomares-Ortega R, Muñoz-Jiménez C, Gálvez-Moreno MA, Quesada Gómez JM. Primary hyperparathyroidism in pregnancy: a two-case report and literature review. Case Rep Obstet Gynecol. 2015; 2015:171828.
[9] Luo Y, Tian X, Wang X. Diagnosis and Treatment of Cerebral Venous Thrombosis: A Review. Front Aging Neurosci. 2018; 10:2.
[10] Lim HY, Ng C, Donnan G, Nandurkar H, Ho P. Ten years of cerebral venous thrombosis: male gender and myeloproliferative neoplasm is associated with thrombotic recurrence in unprovoked events. J Thromb Thrombolysis. 2016; 42(3):423-31.
[11] Seneviratna A, Pallemulle R. Cerebral venous thrombosis in a post-partum patient. Sri Lankan Journal of Anaesthesiology. 2019; 27(1):97-9.
[12] Thorell SE, Parry-Jones AR, Punter M, Hurford R, Thachil J: Cerebral venous thrombosis—a primer for the haematologist. Blood Rev. 2015; 29(1):45-50.
[13] Buyck PJ, Zuurbier SM, Garcia-Esperon C, Barboza MA, Costa P, Escudero I, et al. Diagnostic accuracy of noncontrast CT imaging markers in cerebral venous thrombosis. Neurology. 2019; 92(8):e841-e851.
[14] Agrawal K, Burger K, Rothrock JF. Cerebral sinus thrombosis. Headache. 2016; 56(8):1380-9.
[15] Chai-Adisaksopha C, Iorio A, Crowther MA, de Miguel J, Salgado E, Zdraveska M, et al. Vitamin K Antagonists After 6 Months of Low-Molecular-Weight Heparin in Cancer Patients with Venous Thromboembolism. Am J Med. 2018; 131(4):430-437.
[16] Masuhr F, Mehraein S, Einhäupl K. Cerebral venous and sinus thrombosis. J Neurol. 2004; 251(1):11-23.
[17] Capecchi M, Abbattista M, Martinelli I: Cerebral venous sinus thrombosis. J Thromb Haemost. 2018 Oct;16(10):1918-1931.
[18] Maddaleni M.and Kalia A. Cerebral venous sinus thrombosis differential diagnosis. 2017; https://www.wikidoc.org/index.php/Cerebral_venous_sinus_thrombosis_differential_diagnosis