

Sagittal sinus thrombosis in pregnancy: A case report

ZAHEERA SAADIA¹, MISBAH ILYAS², JAYD SAUD ALTHWINY³, FAI ALAQEL³,
ALANOUD ABDULLAH ALSUFAYRI³ and LUJAIN HUSAIN ALMUTAIRI³

¹Department of Obstetrics and Gynecology, College of Medicine, Qassim University, Buraydah, Al-Qassim 52571, Saudi Arabia;

²Department of Obstetrics and Gynecology, Maternity and Children Hospital, Buraydah, Al-Qassim 52384, Saudi Arabia; ³College of Medicine, Qassim University, Buraydah, Al-Qassim 52571, Saudi Arabia

Received November 24, 2025; Accepted January 21, 2026

DOI: 10.3892/etm.2026.13095

Abstract. Cerebral venous sinus thrombosis (CVST) is a rare but serious cause of maternal morbidity. It most frequently occurs during late pregnancy and puerperium, and occurs due to pregnancy-induced hypercoagulability. The present report documents a 37-year-old multiparous woman diagnosed with acute superior sagittal sinus thrombosis involving multiple dural sinuses at 6 weeks gestation. The patient was managed with therapeutic low-molecular-weight heparin (enoxaparin 100 mg twice daily) under multidisciplinary supervision throughout pregnancy; at 33 weeks, recurrent headaches and vomiting occurred, but imaging showed no new thrombosis. Delivery by elective cesarean section at 38 weeks resulted in a healthy neonate. Postpartum anticoagulation was transitioned to apixaban for 3 months with complete neurological recovery. Early diagnosis, appropriate anticoagulation and multidisciplinary management are key to favorable maternal and fetal outcomes in CVST during pregnancy. The present case report contributes to the literature that sagittal sinus thrombosis can present in early pregnancy with symptoms, such as headache and vomiting, which overlap with the normal symptoms of pregnancy; therefore, a high index of suspicion should be kept in mind.

Introduction

Cerebral venous sinus thrombosis (CVST) is an uncommon but potentially life-threatening neurological condition that is caused by thrombosis of the dural venous sinuses or cortical veins (1). In pregnancy, it accounts for a rare but notable cause of maternal morbidity and mortality (2,3). The incidence ranges between 10 and 20 per 100,000 deliveries, based on population-based studies from developed countries, with the

highest risk during the third trimester and immediate postpartum periods (4,5)

Pregnancy induces prothrombotic changes, including elevated clotting factors VII, VIII, X and fibrinogen, coupled with reduced natural anticoagulants, such as protein S, and impaired fibrinolysis. Additional risk factors include obesity, dehydration, infection, hypertensive disorders and thrombophilia (2,6). Headache is the most common presenting symptom, which is frequently accompanied by visual disturbances, seizures or neurological deficits. MRI with MR venography is the preferred diagnostic method for this condition. Low-molecular-weight heparin (LMWH) is the treatment mainstay, since it is considered safe for patients who are pregnant as it cannot cross the placenta (1,4). Because of its presentation, including headaches, it may be misdiagnosed as migraine or preeclampsia. Therefore, it is important for clinicians to keep in mind the diagnosis of sagittal sinus thrombosis.

Case report

A 37-year-old female patient designated G2P1+0, with a previous normal delivery 4 years ago with no complications and a body mass index (BMI) of 42 kg/m², presented at 33 weeks of gestation in November 2023 at Maternity and Children Hospital (Buraydah, Saudi Arabia) with complaints of severe headache and intermittent vomiting. These symptoms had been occurring since the patient had been diagnosed with a case of acute sagittal sinus thrombosis earlier in the pregnancy at 6 weeks gestation at another facility, in June 2023, where the patient presented with severe persistent headache and vomiting for 3 days; the headache was unresponsive to analgesics.

At the time of diagnosis, the patient had no blurring of vision or epigastric pain. Vital signs and blood pressure were normal; there was no proteinuria, thus excluding the possibility of pregnancy-induced hypertension. Meningitis and hyperemesis were also unlikely because of the absence of fever, meningeal signs, severe vomiting and dehydration. There was no neurological deficits detected therefore the possibility of a stroke was remote; thus, the severe persistent headache prompted ophthalmologic examination by fundoscopy, which suggested papilledema (bilateral grade 4). MRI (Figs. 1-3) and MR venography (MRV; data not shown) showed thrombosis

Correspondence to: Professor Zaheera Saadia, Department of Obstetrics and Gynecology, College of Medicine, Qassim University, King Abdul Aziz Road, Buraydah, Al-Qassim 52571, Saudi Arabia
E-mail: zmhmod@qu.edu.sa

Key words: pregnancy, headache, sagittal sinus thrombosis, pregnancy-induced hypercoagulability

involving the superior sagittal sinus without ischemia or hemorrhage. The patient was prescribed enoxaparin (LMWH) 100 mg twice daily (subcutaneous administration) for thrombosis and acetazolamide 500 mg twice a day (subcutaneous administration) for the papilledema attributed to the dural sinus thrombosis.

Ophthalmology review in July 2023 showed bilateral grade 4 papilledema with preserved visual acuity. Intraocular pressure was normal, with no focal neurological deficits. Acetazolamide 500 mg twice daily was continued along with enoxaparin 100 mg twice a day subcutaneously.

At 19 weeks gestation, the patient reported mild productive cough and headache but no neurological deficits. Abdominal ultrasound confirmed the presence of a fetus corresponding to 19 weeks gestation with good cardiac activity; the patient received antibiotics (oral cefixime 500 mg once a day for 7 days) and continued enoxaparin, acetazolamide and supplements (combination tablet of 800 mg calcium and 1,000 IU vitamin D/day).

The patient was admitted again at 33 weeks to Maternity and Children Hospital with headaches; the general physical examination was unremarkable and the Glasgow coma scale was 15/15. Abdominal examination at 33 weeks revealed normal fundal height and no neurological abnormality was noted. On fundoscopy, there was grade 1 bilateral papilledema, especially in the left eye, where the intraocular pressure was normal digitally.

MRI (Figs. 4 and 5) and MRV analysis (data not shown) did not find anomalies therefore, carotid Doppler imaging was performed (data not shown), which showed the normal sonographic appearance of both internal jugular veins (IJVs), with no obvious sonographic evidence to suggest IJV thrombosis bilaterally; no focal carotid artery stenosis was noted. The laboratory investigations of the patient, including proteinuria, liver functions and renal functions, were all normal. The patient was managed conservatively (500 mg paracetamol tablet administered every 8 h for 1 day, and increased fluid intake), and the headache improved; therefore, the patient was discharged and prescribed enoxaparin 100 mg twice a day. The headache was not attributed to previous CVST, and may have been caused by stress or anxiety from the past experience of the patient. The patient was managed throughout the pregnancy period by the multidisciplinary team involving the obstetrician, internal medicine physician, ophthalmologist, neurologist and hematologist.

Elective cesarean section (CS) was performed on the patient at 38 weeks gestation in January 2024, due to breech presentation. The patient was discharged in a stable condition on day 4 after CS with a healthy baby and was prescribed apixaban (an anticoagulant) 5 mg twice daily (oral administration) by a hematologist for 3 months postpartum. The treatment with acetazolamide was stopped by the ophthalmologist before discharge from the hospital. The patient was advised to follow-up with the obstetrician, ophthalmologist, hematologist and neurologist in the outpatient department at 6 weeks postpartum, and then at 3 and 6 months. The patient was in good general condition at the last follow-up (June 2024) and has been inserted with an intrauterine contraceptive device for future birth spacing.

The patient had undergone complete neurological and ophthalmological recovery by June 2024; serial imaging



Figure 1. MRI T1-weighted mid sagittal section. The arrow shows high intensity in the superior sagittal sinus. Image was obtained in June 2023.

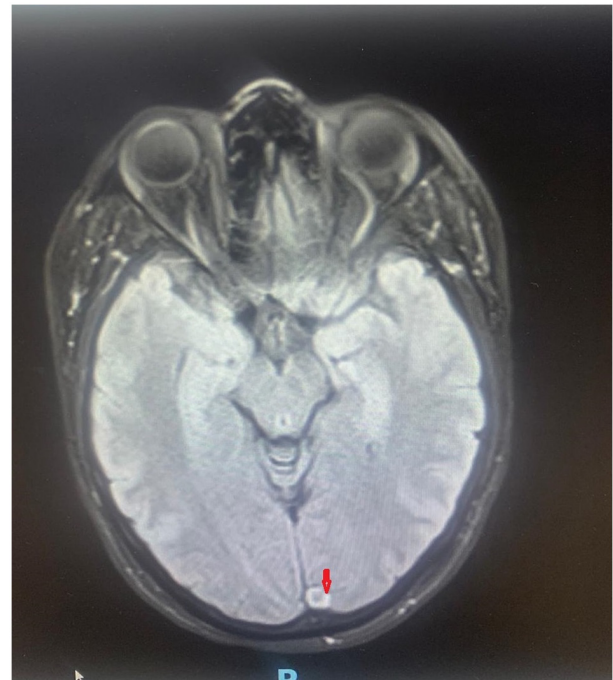


Figure 2. MRI FLAIR sequence axial section. The arrow shows loss of normal flow void. Image was obtained in June 2023.

confirmed complete CVST resolution (Fig. 6). Both mother and infant remained healthy, and the patient was advised to seek pre-conceptual counselling when planning any future pregnancies.

Discussion

The present case is unique in demonstrating that sagittal sinus thrombosis can present early in pregnancy with symptoms overlapping with the normal symptoms of pregnancy; therefore, a high index of suspicion should be kept in mind. Early identification, adequate anticoagulation and multidisciplinary care can result in good pregnancy outcomes. CVST diagnosis in pregnancy is challenging due to an overlap of symptoms with common pregnancy complaints,

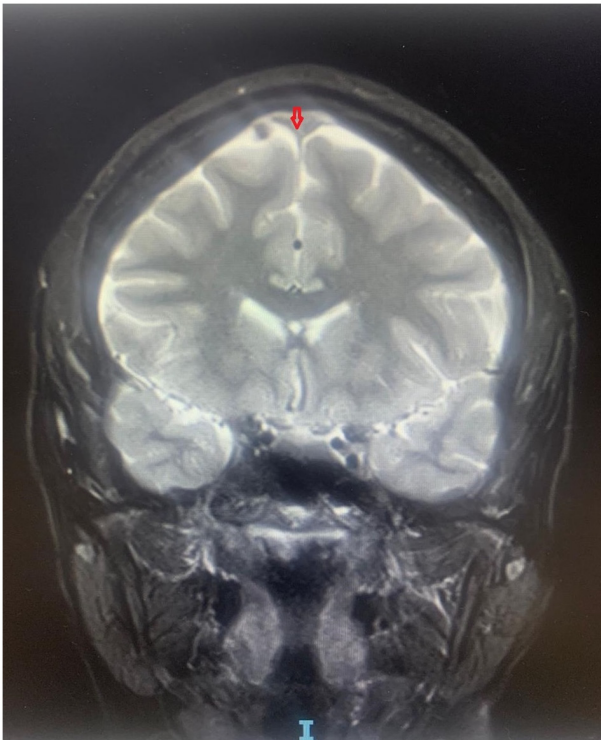


Figure 3. MRI T2-weighted coronal section. The arrow shows loss of flow void in the superior sagittal sinus. Image was obtained in June 2023.

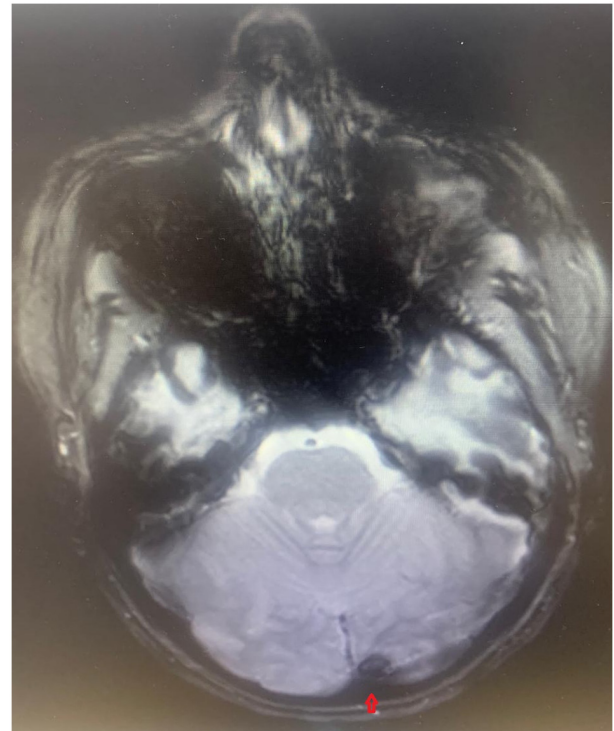


Figure 5. MRI T2-weighted axial section at the level of the pons. The arrow shows normal flow void of the terminal superior sagittal sinus and transverse sinuses. Image was obtained in November 2023.



Figure 4. MRI T1-weighted sagittal view of the brain. The arrow shows normal flow voids in the superior sagittal sinus. Image was obtained in November 2023.

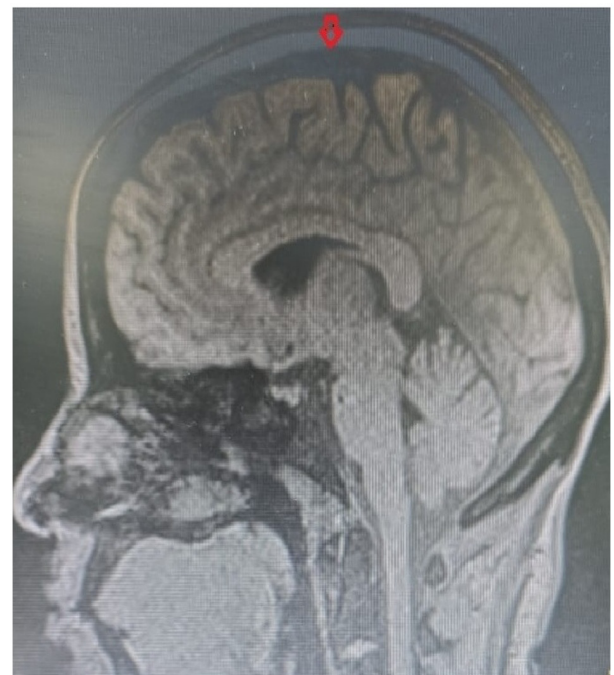


Figure 6. Follow-up image. MRI T1-weighted sagittal view of the brain. The arrow shows normal flow voids in the superior sagittal sinus. Image was obtained in June 2024.

such as headaches, nausea and vomiting (7). Typically, headaches are common in pregnancy, whereas progressive and persistent headaches may be a manifestation of a serious condition (8). Hypertensive disorders of pregnancy are one of the most common differential diagnoses, but they are associated with nausea, vomiting, blurring of vision and epigastric pain, along with proteinuria and high blood pressure (9). Other conditions such as intracranial hemorrhage and meningitis also present with headache, but are associated with neurological dysfunction (10,11). Hyperemesis is a common symptom of pregnancy that may be associated with neurological symptoms (12). Thus, the overlap of common

pregnancy symptoms makes it difficult to consider a serious pathology and can result in a delay in diagnosis. Sagittal sinus thrombosis is a serious condition that, along with all other possibilities, should be kept in mind when there is

persistent headache in the absence of neurological deficits, to be diagnosed with early neuroimaging (7,13).

In the present case, a persistent headache that did not respond to conventional therapy and the visual symptoms prompted physicians to perform an ophthalmologic examination and neuroimaging. It has been demonstrated that obesity and pregnancy-induced hypercoagulability can contribute to thrombosis (2,5); therefore, in the present case, it is likely that high BMI and the pregnancy-related hypercoagulable state contributed towards thrombosis. The common site of thrombosis during pregnancy is the iliofemoral region (6), where the diagnosis of CVST is difficult and only a high index of suspicion can direct physicians toward this possibility. MRV is the gold standard for imaging, and LMWH is the preferred treatment during pregnancy due to its proven safety and efficacy (14,15). Postpartum oral anticoagulation with apixaban complies with the current American Heart Association and European Stroke Organization guidelines (14,15). Multidisciplinary management and timely anticoagulation can further optimize outcomes (16). As far as recurrence is concerned, pregnancy is a thrombogenic state itself and in the absence of thrombophilia, risk assessment is difficult. Mehraein *et al* (17) followed 39 patients with a history of CVST of reproductive age, of which 22 became pregnant. Out of these 22 pregnancies, 19 births occurred, 1 pregnancy was terminated electively and 2 spontaneously miscarried; notably, none of the patients had a recurrence of cerebral or extracerebral thrombosis. Another previous study followed up 119 women of child-bearing age who had a history of CVST for 14 years. According to the data, 83% received antithrombotic prophylaxis during the first trimester or at least during puerperium, and 17% did not receive antithrombotic prophylaxis. In total, 51 term deliveries, 9 preterm births, 2 stillbirths and 2 miscarriages were observed (18); only 3 women had a recurrence of CVST, 2 of which received antithrombotic prophylaxis, thus highlighting the fact that obstetrical outcome may be good after a previous history of CVST, if managed by antithrombotic prophylaxis during pregnancy, and there is little risk of recurrence.

Zhou *et al* (19) reported on the case of a 29-year-old woman at 8 weeks gestation with severe headache, nausea and vomiting' the patient was treated for hyperemesis. When the patient developed acute left hemiplegia imaging confirmed superior sagittal sinus thrombosis. At this stage, anticoagulant treatment was ineffective and a thrombectomy was required to relieve the symptoms (19).

Another case report by Khan *et al* (20) reported on the case of a 25-year-old woman who developed left-sided hemiparesis on post-delivery day 4 following 3 days of headache and vomiting. Urgent contrast CT revealed sagittal sinus thrombosis with subarachnoid hemorrhage, which resulted in post-delivery headache and seizure; after the diagnosis of superior sagittal sinus thrombosis, the patient responded well to anticoagulation (20).

The onset in early pregnancy, the absence of thrombophilia and a previous normal course of pregnancy are unique features of the present case study. However, the factor of obesity (BMI 42 kg/m²) observed in the present case highlights the need for caution even during early pregnancy as a risk factor for thrombosis. Therefore, obesity should be considered as a risk factor for thrombosis. Early identification, adequate anticoagulation

and multidisciplinary care can result in improved pregnancy outcomes.

In summary, CVST is a rare condition where a blood clot forms in the dural venous sinuses, which are channels that drain blood from the brain (1,2,13). In the present case report, the patient was treated with enoxaparin and underwent MRI. Enoxaparin is an injectable anticoagulant (blood thinner) medication that can be used to prevent and treat dangerous blood clots, which belongs to the LMWH class of drugs. MRI is a medical imaging technique that uses strong magnetic fields and radio waves to create detailed pictures of the organs, tissues and bones without using radiation. The present case report provided a unique contribution to the present literature in terms of onset of sagittal sinus thrombosis in early pregnancy, with no previous risk factors except obesity. It highlights that headaches and vomiting in pregnancy should be taken seriously, and early imaging, timely management and multidisciplinary care can result in an improved outcome.

Acknowledgements

Not applicable.

Funding

The Researchers would like to thank the Deanship of Graduate Studies and Scientific Research at Qassim University for financial support.

Availability of data and materials

The data generated in the present study may be requested from the corresponding author.

Authors' contributions

ZS conceptualized the case report. MI and ZS were involved in the data curation. MI cared for the patient. JSA, FA, AAA and LHA were involved in conceptualization, image formatting, drafting, reviewing and editing the report. ZS and MI confirm the authenticity of all the raw data. All authors read and approved the final manuscript.

Ethics approval and consent to participate

Approval from the Ministry of Health, Regional Research Ethics Committee (Al-QAssim, Buraydah, Saudi Arabia) was obtained (approval no. 607-47-005880; 29/10/2025). This was for the use of data information from the patient's file and of the radiological images.

Patient consent for publication

Written informed consent was obtained from the patient for publishing the case report and radiological images with all identifiable information removed.

Competing interests

The authors declare that they have no competing interests.

References

1. Saposnik G, Barinagarrementeria F, Brown RD Tr, Bushnell CD, Cucchiara B, Cushman M, deVeber G, Ferro JM and Tsai FY: American heart association stroke council and the council on epidemiology and prevention: Diagnosis and management of cerebral venous thrombosis: A statement for healthcare professionals from the American heart association/American stroke association. *Stroke* 42: 1158-1192, 2011.
2. Algahtani H, Bazaid A, Shirah B and Bouges RN: Cerebral venous sinus thrombosis in pregnancy and puerperium: A comprehensive review. *Brain Circ* 8: 180-187, 2022.
3. Cantú C and Barinagarrementeria F: Cerebral venous thrombosis associated with pregnancy and puerperium. Review of 67 cases. *Stroke* 24: 1880-1884, 1993.
4. Coutinho JM: Cerebral venous thrombosis. *J Thromb Haemost* 13 (Suppl 1): S238-S244, 2015.
5. Silvis SM, de Sousa DA, Ferro JM and Coutinho JM: Cerebral venous thrombosis. *Nat Rev Neurol* 13: 555-565, 2017.
6. James AH: Pregnancy-associated thrombosis. *Hematology Am Soc Hematol Educ Program* 2009: 277-285, 2009.
7. Leach JL, Fortuna RB, Jones BV and Gaskill-Shipley MF: Imaging of cerebral venous thrombosis: Current techniques, spectrum of findings, and diagnostic pitfalls. *Radiographics* 26 (Suppl 1): S19-S43, 2006.
8. MacGregor EA: Headache in pregnancy. *Neurol Clin* 30: 835-866, 2012.
9. Gestational hypertension and preeclampsia. ACOG practice bulletin number 222. *Obstet Gynecol* 135: e237-e260, 2020.
10. Swartz RH, Cayley ML, Foley N, Ladhani NNN, Leffert L, Bushnell C, McClure JA and Lindsay MP: The incidence of pregnancy-related stroke: A systematic review and meta-analysis. *Int J Stroke* 12: 687-697, 2017.
11. Tunkel AR, Hasbun R, Bhimraj A, Byers K, Kaplan SL, Scheld WM, van de Beek D, Bleck TP, Garton HJL and Zunt JR: 2017 infectious diseases society of America's Clinical Practice Guidelines for Healthcare-Associated Ventriculitis and Meningitis. *Clin Infect Dis* 64: e34-e65, 2017.
12. Goodwin TM: Hyperemesis gravidarum. *Obstet Gynecol Clin North Am* 35: 401-417, 2008.
13. Ferro JM, Canhão P, Stam J, Bousser MG and Barinagarrementeria F; ISCVT Investigators: Prognosis of cerebral vein and dural sinus thrombosis: Results of the international study on cerebral vein and dural sinus thrombosis. *Stroke* 35: 664-670, 2004.
14. Saposnik G, Bushnell C, Coutinho JM, Field TS, Furie KL, Galadanci N, Kam W, Kirkham FC, McNair ND, Singhal AB, *et al*: Diagnosis and management of cerebral venous thrombosis: A scientific statement from the American heart association. *Stroke* 55: e77-e90, 2024.
15. Ferro JM, Bousser MG, Canhão P, Coutinho JM, Crassard I, Dentali F, di Minno M, Maino A, Martinelli I, Masuhr F, *et al*: European stroke organization guideline for the diagnosis and treatment of cerebral venous thrombosis - endorsed by the European academy of neurology. *Eur J Neurol* 24: 1203-1213, 2017.
16. Bates SM, Greer IA, Middeldorp S, Veenstra DL, Prabulos AM and Vandvik PO: VTE, thrombophilia, antithrombotic therapy, and pregnancy: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. *Chest* 141 (2 Suppl): e691S-e736S, 2012.
17. Mehraein S, Ortwein H, Busch M, Weih M, Einhäupl K and Masuhr F: Risk of recurrence of cerebral venous and sinus thrombosis during subsequent pregnancy and puerperium. *J Neurol Neurosurg Psychiatry* 74: 814-816, 2003.
18. Aguiar de Sousa D, Canhão P, Crassard I, Coutinho J, Arauz A, Conforto A, Béjot Y, Giroud M and Ferro JM; ISCVT-2-PREGNANCY Investigators: Safety of pregnancy after cerebral venous thrombosis: Results of the ISCVT (international study on cerebral vein and dural sinus thrombosis)-2 PREGNANCY study. *Stroke* 48: 3130-3133, 2017.
19. Zhou B, Huang SS, Huang C and Liu SY: Cerebral venous sinus thrombosis in pregnancy: A case report. *World J Clin Cases* 10: 309-315, 2022.
20. Khan YM, Al Yaqoubi HN and Fatema N: Complete superior sagittal sinus thrombosis along with subarachnoid hemorrhage during early postpartum period: A rare case report. *J Neurol Res* 7: 89-93, 2017.