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Case Report

Posterior reversible encephalopathy syndrome associated with reversible cerebral vasoconstriction syndrome in a patient presenting with postpartum eclampsia: A case report

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ABSTRACT

Posterior reversible encephalopathy syndrome (PRES) and reversible cerebral vasoconstriction (RCVS) are rare neurological disorders with complex physiopathology which is not yet fully understood. We present here the case of a 31-year-old woman with a bi-amniotic bi-chorial pregnancy who developed immediate postpartum eclampsia after vaginal delivery, associated with RCVS and PRES. Although postpartum is a well-known precipitating factors for these diseases, to our knowledge, there are only few similar cases reported with the association of these syndromes.

Repeated MRI scans were instrumental in the final diagnosis of RCVS associated with PRES, allowing us to give the patient the appropriate treatment. These two syndromes have similar symptoms but may have different treatments, thus highlighting the importance of a correct diagnosis.

Introduction

Posterior reversible encephalopathy syndrome (PRES) defines a group of rare neurological conditions with clinical manifestations varying from headaches, vomiting, disorientation to seizures and vision loss [1,2]. Even though the physio-pathology of PRES is not yet clearly established, there are multiple causes and precipitating factors to PRES like exhaustion, chemotherapy, severe infection but three main factors are well known: malignant hypertension, immunosuppressive drugs and especially pre-eclampsia and eclampsia [3,4]. Thus, in cases of women presenting with pre-eclampsia and thunderclap headache with or without other associated neurological symptoms or seizures, the final diagnosis of PRES is based on radiology – MRI- findings showing typically sub cortical vasogenic edema in the bilateral parietal and occipital lobes [5–7].

Reversible cerebral vasoconstriction syndrome (RCVS) is a rare neurological disorder presenting as acute-onset recurring typically thunderclap headaches caused by reversible prolonged vasoconstriction I n the cerebral arteries typically in females between 20 and 50 years old [8–11]. Until today the pathophysiology of this condition is not fully understood, so RCVS has been known by many names in the past decades such as Call-Fleming syndrome, benign angiopathy in the central nervous system, migrainous vasospasms and postpartum angiopathy. They were all sharing the same reversible clinical presentation and imaging findings and were therefore more recently defined as RCVS [10]. Although the pathophysiology of RCVS is unclear, there are two main precipitating conditions namely postpartum and vasoactive drugs and sometimes idiopathic cases [8–11].

Both posterior reversible encephalopathy syndrome (PRES) and reversible cerebral vasoconstriction syndrome (RCVS) may cause headache during postpartum and the association between PRES and RCVS may be due to some common factors which are present in the pathophysiology of both syndromes such as endothelial dysfunction [13].

We report here a rare case of a woman presenting with both PRES and RCVS in postpartum. To our knowledge only two cases have been reported with both PRES and RCVS in postpartum but neither was associated with eclampsia [13,14], making this the first

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reported case of PRES and RCVS secondary to post-partum eclampsia.

Case presentation

The patient was a 31 years old nulliparous woman with an uneventful bi-amniotic bi-chorial twin pregnancy. The patient had a history of hypothyroidism treated by 75 mg of levothyroxine per day and no history of hypertension or neurological illness. The patient presented at 38 weeks of amenorrhea at the emergency room with generalized pruritus. No proteinuria was present, deep tendon reflex and blood pressure was normal. Blood tests showed: Hb 12.7 g/dl, platelets 153000/mm3, ASAT 60 UI/L, ALAT 128 I/L haptoglobin 0.27 g/L. Labor was induced due to suspicion of cholestasis and she gave birth under epidural anesthesia to two healthy twins. Blood pressure and other vital signs were normal throughout labor.

Four hours after delivery the patient complained of acute-onset intense headaches, abdominal and thoracic pain, with blood pressure at 175/90 mmHg a few minutes after the onset of the headaches. Other vital signs were normal, the neurological exam and electrocardiogram were normal. An emergency brain MRI was performed. At the end of the MRI the patient started having seizures. Since eclampsia was suspected intravenous treatment with magnesium sulfate and clonazepam was administrated. The patient responded well to treatment, the seizure stopping after a few seconds. Emergency blood tests suggested HELLP syndrome: Hb 11.6 g/dl, ASAT 230 UI/L, ALAT 324 I/L, platelets 69 000/mm3, haptoglobin 0.03 g/L, proteinuria: 0.56 g/24 h, thus confirming the diagnosis of pre-eclampsia.

The MRI showed multiple bilateral symmetrical area of gadolium enhancement in the sulci of the brainstem, cerebellum and brain suggesting PRES and a focal subarachnoidal hemorrhage in the left frontal lobe (Fig. 1).

The patient was stable in the intensive care unit under treatment with intravenous magnesium sulfate. No nicardipine treatment was needed. During the following three days, the patient remained in the intesive care unit for surveillance and treatment with a favorable evolution showing no more seizures, an improvement in the blood test results ASAT 101 UI/L, ALAT 223 I/L, platelets 82000/mm3 and a stabilization of the blood pressure at normal values without treatment.

On the fourth day the patient was moved to the obstetrics ward with normal blood pressure without treatment but presenting persistent headaches which required opioid analgesia. Faced with the persisting thunderclap headaches with an otherwise normal neurological exam, at day five post-partum, a second MRI showed the persistence of the left frontal sub-arachnoid hemorrhage and an new symmetric sub-arachnoid hemorrhage in the right frontal lobe judged consistent with PRES. Two days later blood tests showed significant improvement ASAT 35 UI/L, ALAT 116 I/L platelets 220 000/mm3, blood pressure was normal, but the patient presented recurring thunderclap headaches despite opioid analgesia with developing cervicalgia and with an otherwise normal neurological exam. The patient was examined by a neurologist and a RCVS was suspected due to thunderclap headache and distal focal sub-arachnoid hemorrhage. An MRI-angiography was performed for the first time which showed a stability of the sub-arachnoid hemorrhage with the presence of an irregular aspect of the cerebral arteries suggesting a RVCS (Fig. 2).

Following the diagnosis of RVCS, oral treatment by nimodipine was started. The patient responded very well to treatment, showing an immediate improvement with a favorable regression of headaches after 24 h of treatment. The patient was discharged at day eight in postpartum with an undergoing course of treatment of nimodipine for another three weeks. Follow-up visits with the neurologist and obstetrician were scheduled and the patient was informed about the recurrence risk.

Written informed consent was obtained from the patient in this case report and we have permission to use the accompanying images

Discussion

Headache in the postpartum period can affect about 39% of patients [14] Most of the time it can be benign or associated with a dural punction secondary to epidural anesthesia, but in some cases, especially in patients presenting with high blood pressure, it can be due to eclampsia and its complications [8].

Even though the etiology of PRES is still unclear and remains to be established, lately the hypertension/hyper perfusion theory seems to be more and more accepted. This theory suggests that when severe high blood pressure overcomes the body's vascular auto-regulation capacity it causes the passive dilatation of small arteries, endothelial damage and excessive perfusion, all of which leads eventually to vasogenic oedema in the brain, to the rupture of hemato-encephalic barrier and cerebral hemorrhage [1–4]. Although recent MRI imaging and angiography increasingly support this theory, the complete pathophysiology of PRES is still unclear and a topic for further studies.

Post-partum is a well known precipitating factor of PRES, making PRES a diagnosis to be systematically searched for in women with pre-eclampsia and neurological symptoms [1–7] The treatment for PRES associated with pre-eclampsia is magnesium sulphate and lowering high blood pressure if needed as soon as the diagnosis of PRES is made. Eclampsia is defined by the occurrence

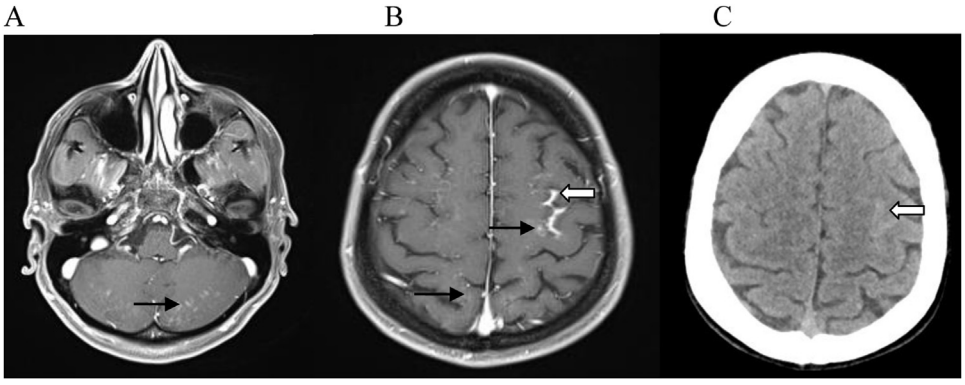

Fig. 1. MRI (A,B) 3D T1Weighted imaging after contrast media injection and non enhanced CT (C) : blood brain barrier rupture with cerebellar and brain parenchyma contrast enhancement (black arrow). Sub-arachnoid hemorrhage (white arrow).

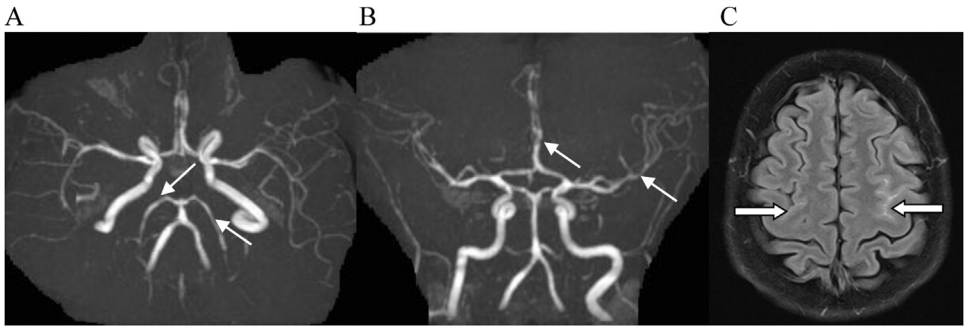

Fig. 2. 3D Time of Flight Magnetic Resonance Angiography (A,B): multiple focal stenosis of posterior, anterior and middle cerebral arteries, bilaterally (thin arrows). FLAIR sequence (C): Sub-arachnoïd hemorrhage without other associated parenchyma lesion (large arrows).

of seizure in the context of pre-eclampsia but seizure is only one of the multiple symptoms of PRES such as headache, visual disturbance and encephalopathy. These symptoms even if absence of seizures are suggesting of PRES and must lead to a brain MRI. In most cases, if treatment is started early, we see a complete remission of symptoms without any neurological deficit [1,5].

The pathophysiology of pre-eclampsia is not yet fully understood but it is proven that the placenta is the main inducing-factor leading [1,5,6]. Due to defects in its formation and implantation it releases large amounts of inflammatory cytokines into the maternal circulation which cause a systemic immune response leading to endothelial damage and vasoconstriction. These increased amounts of inflammatory cytokines in the maternal circulation could be responsible for PRES and RCVS.

In this case the patient had a bi-amniotic bi-chorial twin pregnancy, making her, due to her increased placental mass, at a higher risk of vascular complications. The patient's delivery was induced due to a suspicion of cholestasis (altered ASAT, ALAT and generalized pruritus with normal blood pressure). In hindsight, the patient was probably staring to develop an atypical HELLP syndrome without hypertension or proteinuria.

Finally, in our case the patient presented an eclampsia and the brain imaging found strong elements for the diagnosis of PRES which included cerebral edema showed in high signal on the T2 image [1,12] Interestingly, the MR scan showed predominantly gadolinium enhancement rather than vasogenic oedema consistent with more blood-brain barrier rupture than oedema. The key point of our case was a distal sub-arachnoid hemorrhage wrongly interpreted as PRES mainly because of this unusual aspect of predominantly gadolinium enhancement.

When two days later the patient still had recurring thunderclap headaches resistant to opioid-level analgesics despite normal blood pressure, a second set of scans showed a new contra-lateral focal sub-arachnoid hemorrhage. A third set of scans was requested, more specifically the cerebral angiography MRI which showed typical images of multi-focal, segmental vasoconstriction in large and medium size vessels of the Willis polygon, findings evoking RCVS, Wich may better explain the distal sub-arachnoid hemorrhage [10–14].

RCVS is a rare syndrome causing recurring intense thunderclap headaches associated with nausea, photo-sensitivity and in rare cases transitory seizures and other neurological symptoms such as hemiplegia, permanent visual deficits, ataxia or aphasia due to ischemic lesions caused by hypo perfusion of the brain areas served by the constricted vessels or sometimes due to focal sub-arachnoid hemorrhage [9,10]. In most of the cases RCVS responds well to treatment with nimodipine without causing any permanent neurological deficit.

The final diagnosis was established based on the radiology findings, more specifically cerebral angiography highlighting typical images of multi-focal, segmental vasoconstriction in large and medium sized vessels. It is important to know that between 30 and 70 percent of the patients with RCVS have no abnormality on initial scans in the first week and 75 percent of these will eventually develop ischemic lesions, sub-arachnoid hemorrhage and reversible vasogenic edema as complications [9–11], thus underlying the importance of repeating cerebral angiography and MRI scans in patients with thunderclap recurring headaches, risk factors and initially normal scans.

In our case, multiple sets of scans were performed, and only on the scans made at day seven in post-partum, lesions suggestive of RCVS were searched for and visible. Segmental vasoconstriction in large and medium sized vessels in the Willis Polygon were observed (Fig. 2); the lesions were present at a considerable distance from the hemorrhage areas, thus invalidating the possibility that the vasoconstriction lesions are a consequence of the sub-arachnoid hemorrhage. The distal (and anterior) topography of the sub-arachnoid hemorrhage and the thunderclap headache are more consistant with RCVS than PRES.

The patient's progress was good with a complete regression of the headaches after 10 days of treatment with nimodipine, furthermore confirming that the diagnosis of RCVS was accurate. In the absence of correct treatment, RCVS can give persistent headaches for weeks, and in rare cases, seizures and neurological deficit [9,10].

Conclusion

In the case presented we were confronted with an association of two rare neurological syndromes, that both may occur in postpartum: PRES and RCVS associated with eclampsia. They both give acute headaches but have different treatments. The imaging findings which lead to the diagnosis of RCVS can initially be inconclusive or masked by those caused by PRES. As in our case, only the repeated MRI angiography scans were able to lead us to the correct diagnosis making appropriate treatment possible.

References

[1] Zhang Lihong, Wang Yacong, Shi Liang, Cao Jianhui, Li Zhenzhong, Wáng Yì-Xiáng J. Late postpartum eclampsia complicated with posterior reversible encephalopathy syndrome: a case report and a literature review. Quant Imaging Med Surg 2015;5(Dec. (6)):909–16, doi:http://dx.doi.org/10.3978/j.issn.2223-4292.2015.12.04.

[2] Lio CF, Lee YH, Chan HY, Yu CC, Peng NJ, Chan HP. Posterior reversible encephalopathy syndrome in a postpartum hemorrhagic woman without hypertension: a case report. Medicine (Baltimore) 2017;96(Apr. (16)):e6690, doi:http://dx.doi.org/10.1097/MD.0000000000006690.

[3] Hobson Esther V, Craven Ian, Catrin S. Blank posterior reversible encephalopathy syndrome: a truly treatable neurologic illness. Perit Dial Int 2012;32(Nov.–Dec. (6)):590–4, doi:http://dx.doi.org/10.3747/pdi.2012.00152.

[4] Sundin CS, Johnson ML. Posterior reversible encephalopathy syndrome. MCN Am J Matern Child Nurs 2018;43(Mar./Apr. (2)):77–82, doi:http://dx.doi.org/10.1097/NMC.0000000000000409.
[5] Verma AK, Garg RK, Pradeep Y, Malhotra HS, Rizvi I, Kumar N, et al. Posterior encephalopathy syndrome in women with eclampsia: predictors and outcome. Pregnancy Hypertens 2017;10(Oct):74–82, doi:http://dx.doi.org/10.1016/j.preghy.2017.06.004.
[6] Kauntia R, Valsalan R, Seshadri S, Pandit VR, Prabhu MM. Late postpartum preeclampsia with posterior reversible encephalopathy syndrome. Indian J Med Sci 2009;63(Nov. (11)):508–11, doi:http://dx.doi.org/10.4103/0019-5359.58880.
[7] Brewer J, Owens MY, Wallace K, Reeves AA, Morris R, Khan M, et al. Posterior reversible encephalopathy syndrome in 46 of 47 patients with eclampsia. Am J Obstet Gynecol 2013;208(Jun. (6)), doi:http://dx.doi.org/10.1016/j.ajog.2013.02.015 468.e1-6.
[8] Headache Classification Committee of the International Headache Society (IHS). The International classification of headache disorders, 3rd edition (beta version). Cephalalgia 2013;33(July (9)):629–808, doi:http://dx.doi.org/10.1177/0333102413485658.
[9] Lee SH, Yun SJ, Choi YH. Reversible cerebral vasoconstriction syndrome presenting as subarachnoid hemorrhage: a rare cause of postpartum seizure. Am J Emerg Med 2017;35(May (5))807, doi:http://dx.doi.org/10.1016/j.ajem.2016.12.021 e1-807.e3.
[10] Calabrese Leonard H, Dodick David W, Schwedt Todd J, Singhal Aneesh B. Narrative review: reversible cerebral vasoconstriction syndromes. Ann Intern Med 2007;146(1):34–44, doi:http://dx.doi.org/10.7326/0003-4819-146-1-200701020-00007.
[11] Ducros A, Boukobza M, Porcher R, Sarov M, Valade D, Bousser MG. The clinical and radiological spectrum of reversible cerebral vasoconstriction syndrome. A prospective series of 67 patients. Brain 2007;130(Dec. (Pt 12))3091–101 Epub 2007 Nov 19.
[12] Arrigan MT, Heran MKS, Shewchuk JR. Reversible cerebral vasoconstriction syndrome: an important and common cause of thunderclap and recurrent headaches. Clin Radiol 2018;73(May (5)):417–27, doi:http://dx.doi.org/10.1016/j.crad.2017.11.017.
[13] Feil K, Forbrig R, Thaler FS, Conrad J, Heck S, Dorn F, et al. Reversible cerebral vasoconstriction syndrome and posterior reversible encephalopathy syndrome associated with intracranial hypotension. Neurocrit Care 2017;26(Feb. (1)):103–8, doi:http://dx.doi.org/10.1007/s12028-016-0320-4.
[14] Ruiz López N, Cano Hernández B, Balbás Álvarez S. Posterior reversible encephalopathy syndrome and cerebrovascular constriction. Rev Esp Anestesiol Reanim 2016;63(Feb. (2)):116–21, doi:http://dx.doi.org/10.1016/j.redar.2015.04.008.