ISSN 1669-9106 MEDICINA (Buenos Aires) 2026: 86: 1320-1324

Case report

REVERSIBLE CEREBRAL VASOCONSTRICTION SYNDROME: A SEVERE NEUROLOGICAL COMPLICATION IN EARLY PUERPERIUM

MAURICIO A. BENETTI[1], FRANCISCO CAIZA-ZAMBRANO[1], FABIO GONZALEZ[1], LUIS A. MIQUELINI[2], SILVIA GARBUGINO[3], PABLO BONARDO[1]

[1]Departamento de Neurología, [2]Departamento de Neurorradiología, [3]Departamento de Neurocirugía Endovascular, Hospital Británico de Buenos Aires, Buenos Aires, Argentina

Postal address: Mauricio A. Benetti, Departamento de Neurología, Hospital Británico de Buenos Aires, Perdriel 74, 1280 Buenos Aires, Argentina
E-mail: mauriciobenetti@outlook.com
Received: 14-XII-2025
Accepted: 15-IV-2026

Abstract

Reversible cerebral vasoconstriction syndrome (RCVS) is an uncommon entity characterized by transient, segmental vasoconstriction of the cerebral arteries, which may be associated with sudden-onset headache and acute neurological complications. The puerperium represents a recognized risk period for its development.

We describe the case of a 29-year-old woman who, in the early puerperium, presented with sudden-onset orthostatic headache, followed by severe acute headache and impaired level of consciousness. Brain computed tomography revealed bilateral intraparenchymal hemorrhages. Angiographic studies demonstrated diffuse cerebral arterial vasospasm, with subsequent normalization of the cerebral vasculature on follow-up.

The clinical and radiological manifestations observed in this case are uncommon. This report highlights the importance of considering RCVS in the differential diagnosis of acute neurological complications in the puerperium and of its timely recognition to ensure appropriate management.

Key words: intracranial vasospasm, intracranial hemorrhage, stroke, headache disorders

Resumen

Síndrome de vasoconstricción cerebral reversible: una complicación neurológica grave en el puerperio temprano

El síndrome de vasoconstricción cerebral reversible (SVCR) es una entidad infrecuente, caracterizada por vasoconstricción segmentaria y transitoria de las arterias cerebrales, que puede asociarse a cefalea de inicio súbito y a complicaciones neurológicas agudas. El puerperio constituye un período de riesgo reconocido para su desarrollo.

Describimos el caso de una mujer de 29 años que, en el puerperio temprano, presentó cefalea ortostática de inicio súbito, seguida de cefalea aguda intensa y compromiso del nivel de conciencia. La tomografía computarizada de cerebro evidenció hemorragias intraparenquimatosas bilaterales. Los estudios angiográficos demostraron vasoespasmo arterial cerebral difuso, con posterior normalización de la vasculatura en el seguimiento.

Las manifestaciones clínicas y radiológicas observadas en este caso son poco frecuentes. Este reporte destaca la importancia de considerar el SVCR dentro

del diagnóstico diferencial de las complicaciones neurológicas agudas en el puerperio y de su reconocimiento oportuno para un adecuado manejo.

Palabras clave: vasoespasmo intracraneal, hemorragia intracerebral, accidente cerebrovascular, trastornos cefalálgicos

Reversible cerebral vasoconstriction syndrome (RCVS) is a rare condition characterized by the sudden onset of thunderclap headache, with or without neurological deficits, and diffuse segmental narrowing of the cerebral arteries, which typically resolves within three months[1]. It predominantly affects women, with a mean age of onset of 45 years, although its exact incidence remains unknown[2,3]. Various factors have been associated with the syndrome, including catecholamine-secreting tumors, rheumatological diseases, and certain vasoactive agents. The postpartum period is a recognized risk factor for the development of RCVS[4-7].

We report a case of RCVS with an uncommon clinical and radiological presentation during early puerperium.

Clinical case

A 29-year-old woman, G2P2A0, with no relevant medical history, had a full-term pregnancy without complications. She underwent an uncomplicated vaginal delivery under spinal anesthesia. The immediate puerperium was uneventful, and she was discharged on postpartum day (PPD) 1.

On PPD 4, she presented to the emergency department with a sudden-onset orthostatic headache. Neurological examination was unremarkable. Brain magnetic resonance imaging (MRI), including magnetic resonance angiography (MRA), revealed signs consistent with cerebrospinal fluid hypotension, with no evidence of arterial narrowing or vascular abnormalities at that time (Fig. 1A-B). A diagnosis of post-dural puncture headache was made, and intravenous (IV) caffeine was initiated in an attempt to achieve early symptomatic relief.

On PPD 6, she experienced the abrupt onset of a severe acute headache with thunderclap characteristics, followed by a sudden decline in consciousness, with a Glasgow Coma Scale (GCS) score of 8/15. She required orotracheal intubation for airway protection. Her blood pressure was 130/80 mmHg. Neurological examination was performed while the patient was intubated and sedated with fentanyl and propofol, revealing a Richmond Agitation-Sedation Scale (RASS) score of –4. Pupils were equal and hyporeactive, with preserved consensual light reflex. The corneal, oculocephalic, gag, and cough reflexes were intact. Painful stimuli elicited left-sided facio-brachio-crural hemiparesis. Plantar reflexes were flexor bilaterally.

A brain computed tomography (CT) scan of the head revealed a parenchymal hematoma in the right striatocapsular region with mass effect (Figure 1C-D). A decompressive craniectomy and hematoma evacuation were performed. On PPD 8, a follow-up CT scan demonstrated a new contralateral striatal hematoma (Figure 1E). Brain CT angiography (CTA) revealed diffuse arterial vasospasm (Figure 1F–G), which was subsequently confirmed by cerebral digital subtraction angiography (DSA) (Figure 1H–I). Treatment with nimodipine 40 mg every four hours was initiated.

One month later, she no longer required life support, although she remained with severe left hemiparesis and mixed aphasia. Three months later, cerebral CTA showed normalization of the arterial vascular structures.

Written informed consent for publication of this case and the accompanying images was obtained from the patient and her legal guardian.

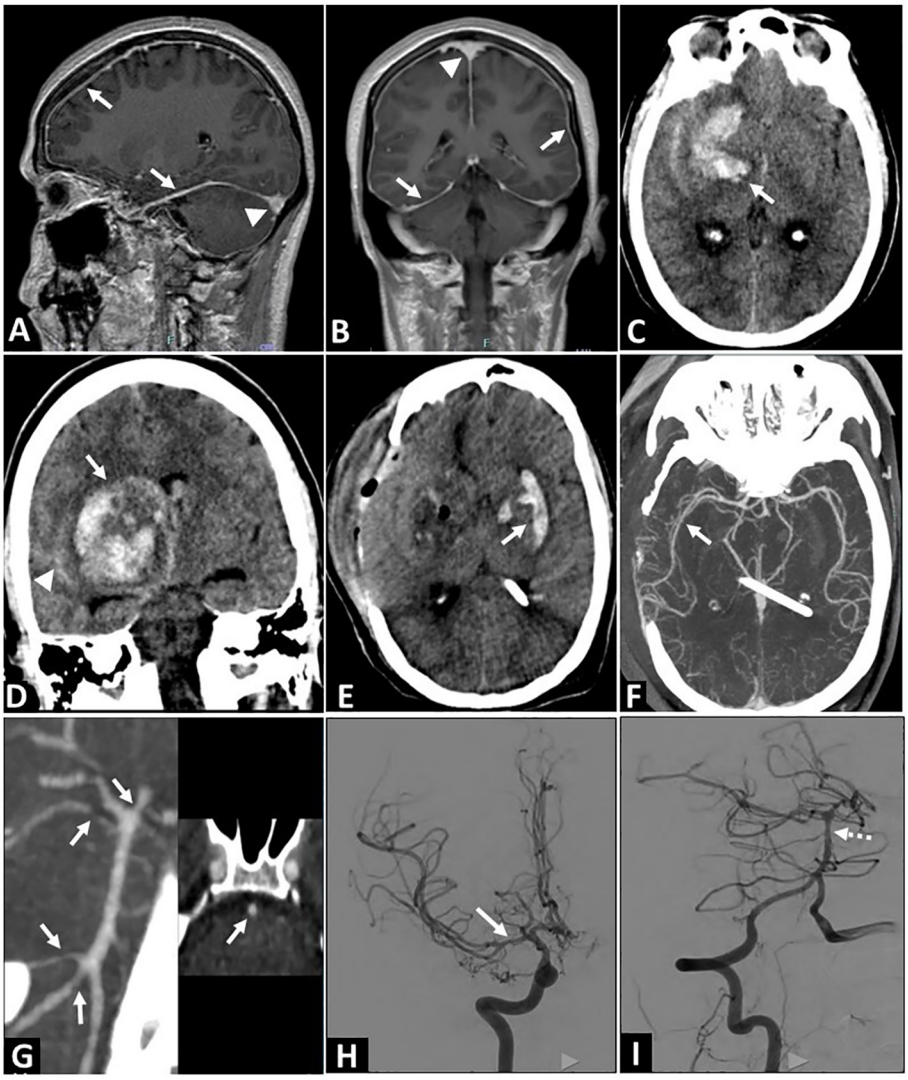
Discussion

Reversible cerebral vasoconstriction syndrome (RCVS) is a multifactorial condition with a poorly understood pathophysiology. Proposed mechanisms include immunological factors (T cells with proinflammatory cytokine production) and biochemical components (vasodilators and vasoconstrictors), leading to endothelial dysfunction and dysregulation of cerebral vascular tone[5].

In 50% of cases, a triggering factor is identified. The puerperium is a recognized risk factor for RCVS, associated with 7–9% of cases. The highest risk occurs during the first postpartum week, accounting for approximately two-thirds of cases. This risk is present even in women with uncomplicated pregnancies, as in our patient[5,8,9].

Certain drugs have also been associated with this vasomotor phenomenon (e.g., ergotamine, bromocriptine, caffeine)[10]. Although caffeine has demonstrated efficacy in the treatment of post-dural puncture headache, it has also been reported to exacerbate cerebral vasoconstriction due to its sympathomimetic effects, even at low

Figure 1 | Brain magnetic resonance imaging (MRI) and brain computed tomography (CT) images. T1-weighted MRI (A, B) shows diffuse pachymeningeal enhancement (arrows) and dural venous sinus engorgement (arrowheads), consistent with intracranial hypotension. Non-contrast brain CT (C-E) reveals bilateral striatal intraparenchymal hemorrhages (arrows). CT angiography and digital subtraction angiography (F-I) demonstrate multifocal segmental cerebral arterial vasospasm, with caliber reduction involving the M2-M3 branches of the right middle cerebral artery and the basilar artery (arrows; dashed arrow indicates basilar artery involvement).



doses[9,10]. This is particularly relevant in states of vascular instability, such as the puerperium, although proving a direct causal relationship remains challenging[9,10]. In our patient, intravenous caffeine was administered for the treatment of post–dural puncture headache before the diagnosis of RCVS was established.

Typically, RCVS presents with a thunderclap headache, usually bilateral and brief, a feature observed in our patient at the time of acute neurological deterioration. Focal, transient or persistent deficits such as visual disturbances, hemiparesis, aphasia and seizures may occur in up to 43% of cases[2-4,11].

The diagnosis of RCVS requires demonstration of segmental vasoconstriction of the cerebral arteries through angiographic methods, either direct (digital subtraction angiography) or indirect (CT or MR angiography)[3-5,12]. Additionally, these vascular changes must resolve within 12 weeks of symptom onset, as in our patient[3,5]. Several alternative diagnoses were systemati-

cally considered. Eclampsia was deemed unlikely due to the absence of arterial hypertension, proteinuria, or other systemic features suggestive of a hypertensive disorder of pregnancy. Posterior reversible encephalopathy syndrome (PRES) was excluded based on neuroimaging findings, which lacked the typical posterior vasogenic edema pattern. Cerebral venous thrombosis was ruled out by the absence of venous occlusion on initial magnetic resonance angiography. Primary central nervous system vasculitis was considered unlikely given the acute presentation, normal inflammatory markers, and subsequent complete angiographic reversibility[4,13].

Approximately 40% of patients with RCVS present with hemorrhagic or ischemic complications; hemorrhage (34%) is more common than ischemia (6%). Among hemorrhagic complications, SAH is the most frequent (30%), followed by parenchymal hemorrhage (PH) (12%). Bilateral PH is extremely rare (1%)[6]. Despite the high incidence of these complications, the risk of permanent neurological deficits remains low, ranging from 3% to 6%. Following resolution of the acute event, 97% of patients achieve long-term functional independence in daily activities. Permanent deficits are typically associated with severe complications, such as extensive intracerebral hemorrhages or large ischemic infarctions[14].

Management of RCVS includes identification and withdrawal of potential triggers, strict blood pressure control, and calcium channel blockers such as nimodipine[3,5]. However, evidence regarding its efficacy in altering the natural history of the condition remains inconclusive[13]. In refractory cases, intra-arterial vasodilators have been described, although their effectiveness is debatable and the associated risk of complications is high[3,13].

Recurrence of RCVS is uncommon (6%)[14]. In the puerperium, recurrence is also rare, although the risk is slightly increased in women with subsequent pregnancies, reaching up to 9% following another delivery[14].

Regarding future pregnancy planning, a history of RCVS does not contraindicate subsequent pregnancies. However, a thorough preconception assessment is essential to identify individual risk factors, implement preventive strategies such as the management of predisposing conditions and avoidance of known triggers, and ensure close monitoring throughout pregnancy and the postpartum period to minimize complications[15].

Our patient initially presented with orthostatic headache, followed by thunderclap headache and bilateral intraparenchymal hemorrhages. The combination of an initial presentation with orthostatic headache and the presence of bilateral intraparenchymal hemorrhages represents an uncommon manifestation of RCVS. No recurrences were observed during two years of follow-up.

RCVS is an uncommon condition with variable clinical presentations. In our patient, the initial presentation with orthostatic headache complicated the diagnostic process, whereas the subsequent onset of a severe acute thunderclap headache, together with the angiographic evidence of cerebral vasospasm, reinforced the clinical suspicion of RCVS. The postpartum period is a recognised risk factor for the development of RCVS. The use of vasoactive agents, such as caffeine—commonly administered for the treatment of post-dural puncture headache—may further increase this risk. It is crucial that clinicians managing obstetric patients are familiar with this condition and maintain a high index of suspicion. Early recognition and management of precipitating factors are essential to improving outcomes in these patients.

Conflicts of interest: None to declare

References

1. Ducros A. Reversible cerebral vasoconstriction syndrome. *Handb Clin Neurol* 2014; 121: 1725-41.
2. Calabrese LH, Dodick DW, Schwedt TJ, Singhal AB. Narrative review: reversible cerebral vasoconstriction syndromes. *Ann Intern Med* 2007; 146: 34-44.
3. Ducros A. Reversible cerebral vasoconstriction syndrome. *Lancet Neurol* 2012; 11: 906-17.

4. Lee DE, Krishnan A, Collins R. Reversible cerebral vasoconstriction syndrome in the postpartum period: a case report and review of the literature. *Int J Gynaecol Obstet* 2023; 162: 823-8.
5. Ducros A, Bousser MG. Reversible cerebral vasoconstriction syndrome. *Pract Neurol* 2009; 9: 256-67.
6. Ducros A, Fiedler U, Porcher R, Boukobza M, Stapf C, Bousser MG. Hemorrhagic manifestations of reversible cerebral vasoconstriction syndrome: frequency, features, and risk factors. *Stroke* 2010; 41: 2505-11.
7. Fugate JE, Wijdicks EF, Parisi JE, et al. Fulminant postpartum cerebral vasoconstriction syndrome. *Arch Neurol* 2012; 69: 111-7.
8. Anzola GP, Brighenti R, Cobelli M, et al. Reversible cerebral vasoconstriction syndrome in puerperium: a prospective study. *J Neurol Sci* 2017; 375: 130-6.
9. Barral E, Marcolin G, Surur A, Buonanotte FC. Síndrome de vasoconstricción cerebral reversible secundario a fármacos: reporte de caso. *Rev Chil Neuropsiquiatr* 2019; 57: 357-64.
10. Dodick DW, Brown RD Jr, Britton JW, Huston J 3rd. Nonaneurysmal thunderclap headache with diffuse, multifocal, segmental, and reversible vasospasm. *Cephalalgia* 1999; 19: 118-23.
11. Ducros A, Boukobza M, Porcher R, et al. The clinical and radiological spectrum of reversible cerebral vasoconstriction syndrome: a prospective series of 67 patients. *Brain* 2007; 130: 3091-101.
12. Singhal AB, Kimberly WT, Schaefer PW, Hedley-Whyte ET. Case records of the Massachusetts General Hospital. Case 8-2009. A 36-year-old woman with headache, hypertension, and seizure 2 weeks postpartum. *N Engl J Med* 2009; 360: 1126-37.
13. Mehdi A, Hajj-Ali RA. Reversible cerebral vasoconstriction syndrome: a comprehensive update. *Curr Pain Headache Rep* 2014; 18: 443.
14. Boitet R, de Gaalon S, Duflos C, et al. Long-term outcomes after reversible cerebral vasoconstriction syndrome. *Stroke* 2020; 51: 670-3.
15. Santos M, de Sousa DA. Cerebrovascular disease in pregnancy and postpartum. *Curr Opin Neurol* 2022; 35: 31-8.