Case Report

Rare case of postpartum intracranial hemorrhage with reversible cerebral vasospasm syndrome

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Abstract

Background

Reversible Cerebral Vasoconstriction Syndrome (RCVS), historically known as postpartum cerebral angiopathy, is a rare but critical cause of stroke in the puerperium. While most RCVS cases follow a benign course, hemorrhagic complications—including intracerebral hemorrhage (ICH) and cortical subarachnoid hemorrhage (cSAH)—occur in approximately 30–40% of postpartum patients. This case highlights the diagnostic challenge of differentiating RCVS from eclampsia and the necessity of early vascular imaging.

Key words: Large intraparenchymal lobar; Hyperacute hematomas; Eclampsia

Citation: Harish M.M. Rare Case of Postpartum Intracranial Hemorrhage with Re-versible Cerebral Vasospasm Syndrome. Kauverian Med J. 2026;3(3):85-99.

Academic Editor: Dr. Venkita S. Suresh

ISSN: 2584-1572 (Online)

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1. Case presentation

A 37-year-old P1L1 female admitted on 16/09/2025 with Co-Morbidities like k/c/o DM and Hypothyroidism on (treatment). Patient with outside LSCS on 09/09/2025 presented with the complain of headache since 1 day followed by seizure in the morning.

2. On Examination

On arrival to ER she had further episodes of GTCS along with accelerated hypertension. She was intubated for airway protection and low GCS. All routine investigations were sent.

- MRI seizure protocol was done – large intraparenchymal lobar acute and hyperacute hematomas in bilateral frontal lobe with minimal edema and mass effect. Bilateral frontal SAH
- MR venogram showed no evidence of any thrombosis.

3. MRI Brain (plain) on 16/9/25

Large intraparenchymal lobar acute and hyperacute hematomas in bilateral frontal lobes with minimal edema and mass effect. Bilateral frontal lobe convexal acute SAH. Venogram showed patent dural venous sinuses.

- Neurosurgical opinion was sought and initiated on antiseizure and antiedema methods
- Obs+ Gynae reference was done – magnesium sulphate with antihypertensives were given and shifted to MICU on mechanical ventilation
- Started on labetalol infusion with Tablet nimodipine through Ryles tube

In a postpartum woman with ICH + vasospasm, the most probable diagnoses are:

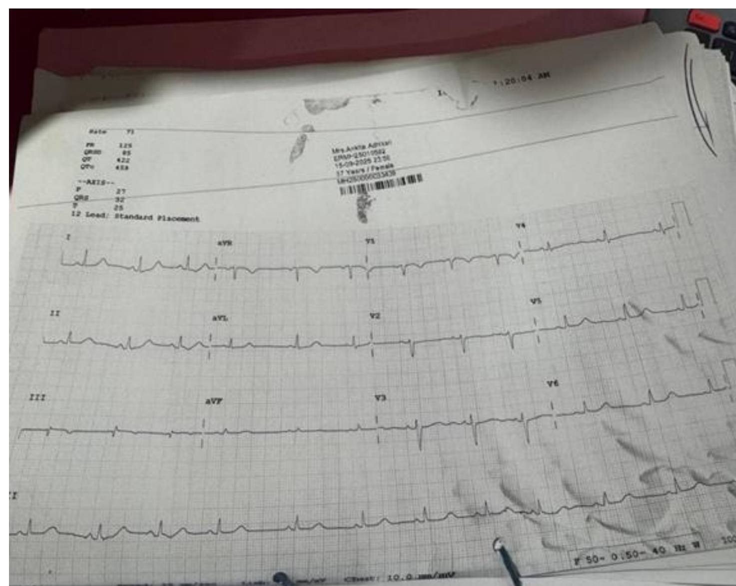
- RCVS (Reversible Cerebral Vasoconstriction Syndrome)
- PRES (Posterior Reversible Encephalopathy Syndrome)
- Eclampsia-related ICH
- CVST (Cerebral Venous Sinus Thrombosis)
- Must also rule out: aneurysmal SAH, vasculitis, drug-induced causes

Condition	Key features	Why considered	Clue for differentiation
Reversible Cerebral Vasoconstriction Syndrome (RCVS)	Thunderclap headache, seizures, focal deficits, vasospasm on angiography, self-limiting	Most common cause of postpartum vasospasm	No parenchymal lesion initially, vasospasm is **multifocal and segmental**, often triggered by labor, eclampsia, vasoactive drugs
Posterior Reversible Encephalopathy Syndrome (PRES)	Headache, altered sensorium, seizures, visual changes, often with HTN	Overlaps with RCVS, may coexist	MRI: **vasogenic edema in posterior regions**, usually no large ICH unless complicated
Eclampsia/Severe Preeclampsia	Seizures, HTN, proteinuria, altered sensorium, may have ICH	Pregnancy-specific; may cause PRES, RCVS or direct bleed	High BP, proteinuria, elevated LFTs, low platelets, **hypertensive bleed pattern**
Primary CNS Vasculitis (PACNS)	Progressive neuro symptoms, strokes, vasospasm, fever	Rare, may mimic RCVS	CSF lymphocytosis, **persistent vasculopathy**, biopsy may be needed

Aneurysmal SAH with vasospasm	Sudden headache, ICH, focal signs, vasospasm on day 3–7	Must rule out if ICH + vasospasm	CT angiogram: **aneurysm or SAH**, usually **basilar or anterior circulation aneurysms**
Cerebral Venous Sinus Thrombosis (CVST)	Headache, seizures, focal signs, ICH, altered GCS	Common in postpartum; can mimic ICH or PRES	**MRV** shows venous thrombosis; hemorrhagic infarcts often in atypical locations
Drug-induced vasospasm	Sympathomimetics, ergot derivatives, SSRIs	Postpartum vasospasm precipitated by medications	Drug history, resolves after withdrawal
Infectious vasculitis (e.g., TB, bacterialmeningitis)	Fever, altered sensorium, raised ICP, vasculitis	Rare postpartum but important mimic	CSF changes (elevated protein, low glucose), systemic infection signs

In ER

- GCS – 4/15(E1V1M2)
- ECG – WNL
- 2D echo – WNL (EF- 60%)
- Systemic Examination - WNL



Instrumentation Laboratory
PATIENT SAMPLE REPORT

Status: PENDING
16/09/2025 12:09:30
Sample Type:
Arterial
Sample No.: 18
Patient:
Name:
ANKITA
Sex: U
Instrument:
Model: GEM 3500
S/N: 22108278

Mode - VC
FiO2 - 40
PEEP - 8
RR - 16
VT - 400

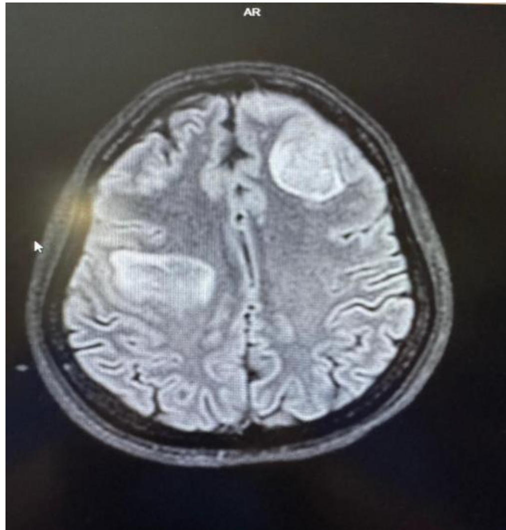
Measured (37.0C)

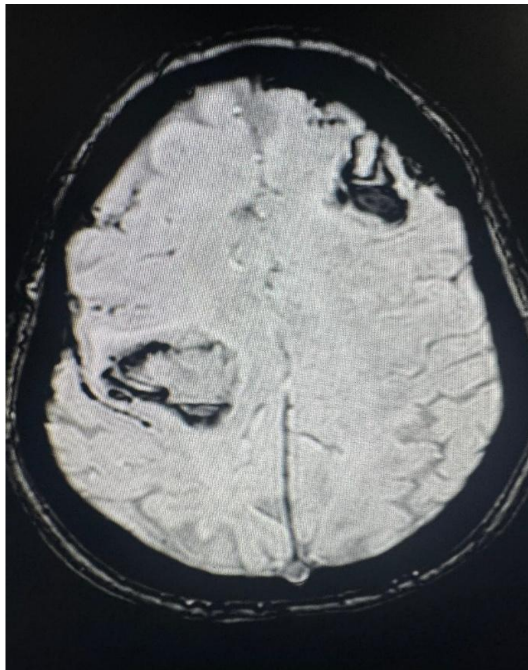
pH	7.50	
pCO2	30	mmHg
pO2	140	mmHg
Na+	140	mmol/L
K+	3.3	mmol/L
Ca++	1.11	mmol/L
Glu	133	mg/dL
Lac	1.1	mmol/L
Hct	38	%

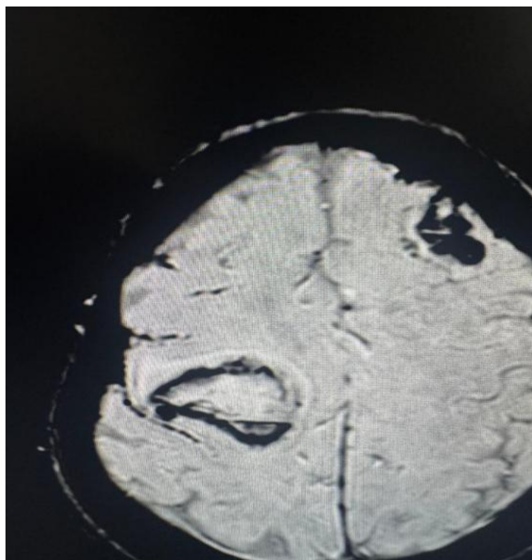
Derived Parameters

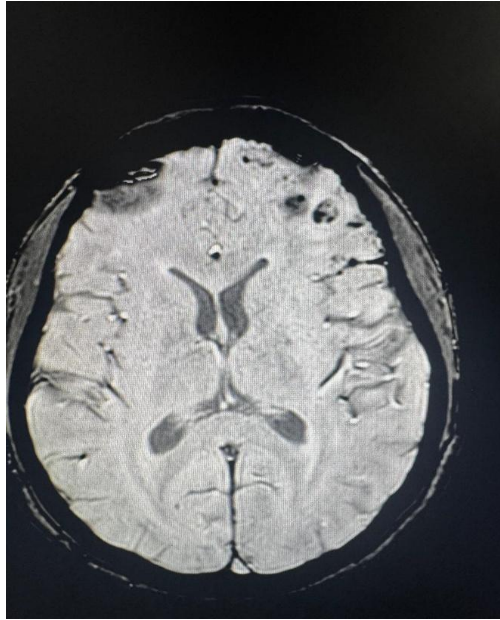
Ca++(7.4)	1.16	mmol/L
HCO3-	23.4	mmol/L
HCO3std	25.7	mmol/L
TCO2	24.3	mmol/L
BEecf	0.2	mmol/L
BE(B)	0.9	mmol/L
SO2c	99	%
THbc	11.8	g/dL

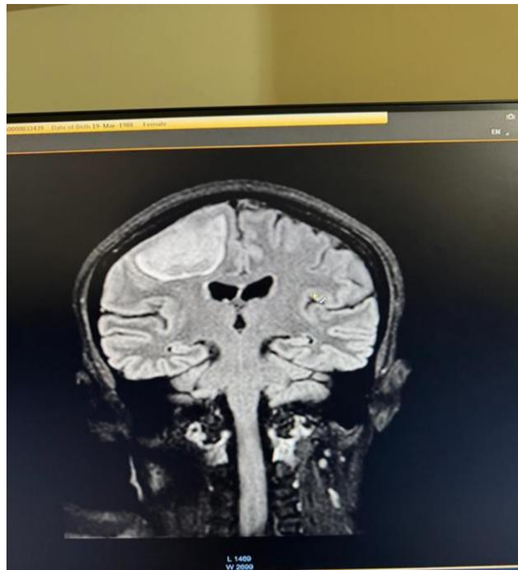
MRI brain on 16/9/25

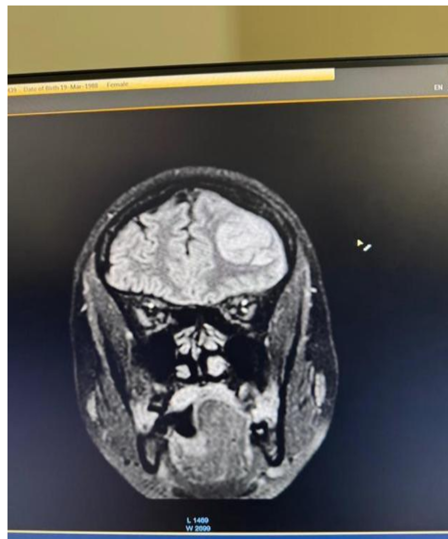


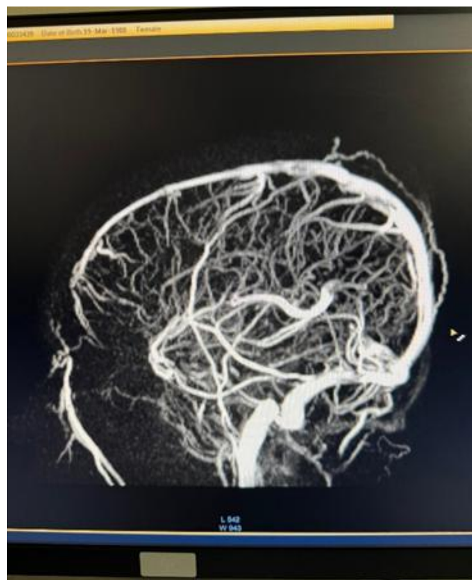


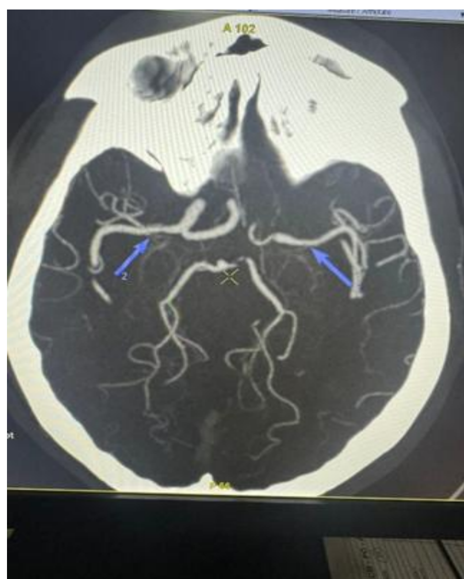








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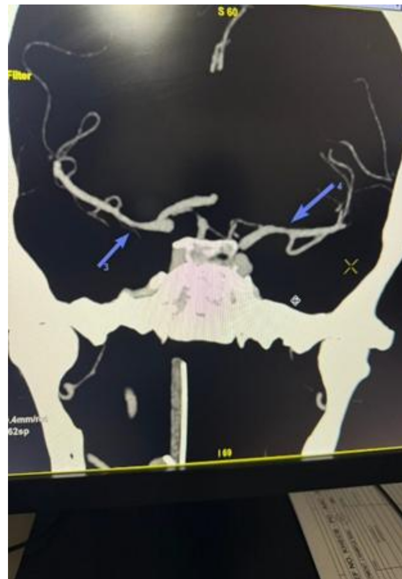

In MICU

- On mechanical ventilation and multiple antihypertensive infusions.
- Arterial and central venous cannula was taken for further monitoring and therapy

CT head with angiogram on 17/9/25

Vascular narrowing of the distal portion of M1 segment of the MCA on both sides? Vasospasm secondary to postpartum angiopathy/RCVS. No Aneurysm

- Neurology opinion was also sought the following day in which Reversible Cerebral Vasoconstriction Syndrome diagnosis was made
- EEG was suggested which showed diffuse slowing of the delta waves with no epileptic focus.

Next 3 days

- Patient was sedated+relaxed+mechanically ventilated.
- Repeat CT showed no new changes
- Persistent high urine output– around 250– 400ml per hour
- Strictly monitored her sodium – for Diabetes Insipidus
- GCS was E4VtM3 with left hemiplegia, power left side 0/5.
- Tracheostomy done on 19/9/2025
- New development of persistent fever but no increase in counts and cultures sterile.
- RT inserted and feeds initiated
- Urine output and hemodynamics maintained

Rx – antiseizure + antiedema + antihypertensives + Bromocriptine + Ceftriazone

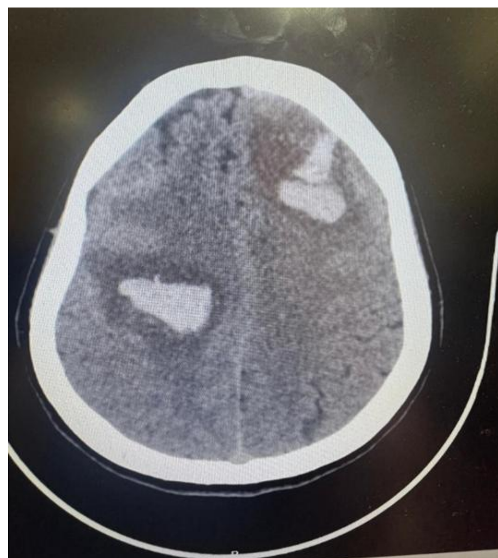

Fig (2): CT repeat on 18/9

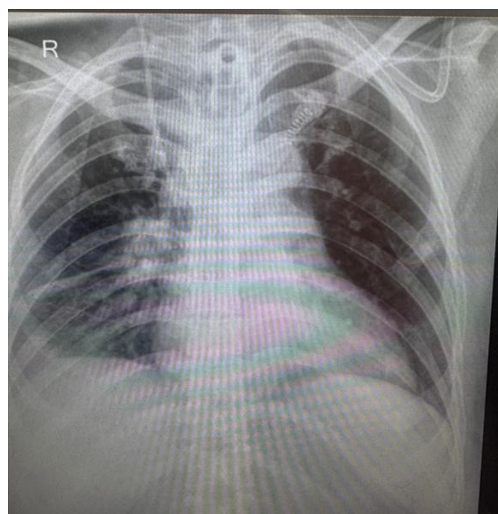

Fig (3): Post tracheostomy

From 20/09 to 25/09

- Weaning initiated as per protocol and patient taken on T-piece.
- Sugars, urine output and hemodynamics maintained
- Chest and limb physiotherapy with mobilization initiated with continued RT feeds.
- Repeat CT done which showed no new changes
- Fever spikes decreased so antibiotics deescalated.
- Patient shifted to ward on 25/09/25
- GCS improvement with power improvement seen

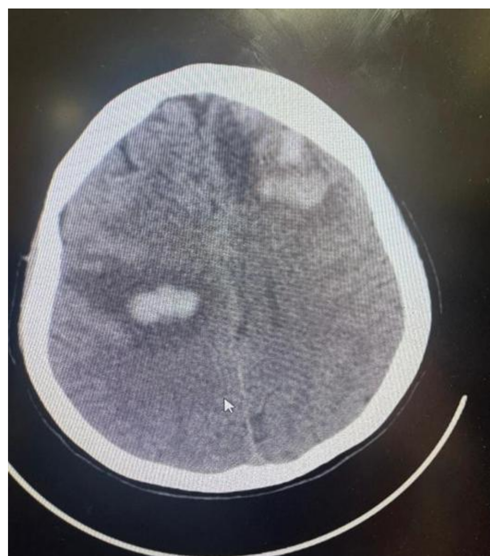

Fig (4): CT on 21/9 - resolving

From 26/09 to 1/10

- Aggressive Physiotherapy
- DVT prophylaxis was initiated as no bleed extension in Repeat CT
- 1 fever spike of 100 degrees was noted and so cultures were repeated.
- Urine C/s isolated E. coli and same was treated appropriately
- Foleys was changed and patient responded to therapy

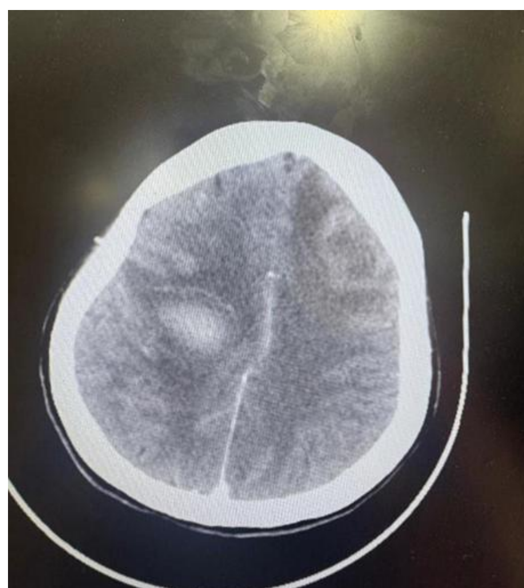

Fig (5): CT ON 29/9

From 1/10 to 13/10

- Aggressive chest and limb Physiotherapy was continued.

- Fever Spikes settled and so slowly antibiotics de-escalated.
- Weaning and Decannulation was planned and Patient was decannulated on 5/10/2025.
- Slowly oral liquids initiated and as per tolerance mashed food were tried.
- Ryles tube removed and then soft diet was initiated.
- Bladder and bowel sensations were checked and then Foleys was removed.
- Speech and swallow therapy was routinely done and slowly the speech disarticulation improved.
- Active mobilization of the patient was done twice daily.
- All investigations were settled with no spike of fever on 10/10/25.
- GCS was E4V5M6 with left sided localizing movements as well.
- Repeat CT angio -showed no deterioration, with vasospasm still persisting
- Patient was discharged by the whole team on 13/10/2025.

CT Angiography is planned in the Follow-up to look for the resolving Hematoma along with the resolution of the vasoconstriction symptoms of RCVS which can take months to recover.

	16/9/25	**17/9/25**	**18/9/25**	**19/9/25**	**22/9/25**	**25/9/25**	**30/9/25**	**6/10/25**	**7/10/25**	**11/10/25**
Hb	14.81		12.11		13.14		16.2	15.85		
TLC	8200		10610	9830	10770	12740	12050	8480		
Platelet	192.3		206.2		269.5		276.1	288.8		
Urea	29.9	21.4	19.2				55.6			
Creatinine	0.3	0.6	0.6				1.09			
Sodium	143	147	145	143	145		139	135	135	137
Potassium	3.8	3.4	3.7	3.8	3.9	4.5	4.5	4.1	4.4	4.4
Procalcitonin				0.16	0.16		1.03		0.13	

5. Radiological studies

MRI brain(plain) on 16/9/25: Large intraparenchymal lobar acute and hyperacute hematomas in bilateral frontal lobes with minimal edema and mass effect. Bilateral frontal lobe convexal acute SAH. Venogram showed patent dural venous sinuses.

CT head with angiogram on 17/9/25: Vascular narrowing of the distal portion of M1 segment of the MCA on both sides? Vasospasm secondary to postpartum angiopathy/RCVS. No Aneurysm

CT brain (plain) on 18/9/25: No obvious interval changes in interparenchymal lobar hematomas in the left anterior frontal and right posterior frontal lobes on comparison with previous MRI. No midline shift

Followup ct brain (plain) on 21/9/25: On comparison previous intraparenchymal hematomas showed resolution with mild reduction in surrounding hematoma.

Followup CT on 29/9/25: Bilateral frontal intraparenchymal hematomas resolution with complete resolution of the SAH. Minimal narrowing of the distal portion of M1 segment of the MCA on both sides persists.

6. Discussion

What is RCVS?

Reversible cerebral vasoconstriction syndrome (RCVS) is characterised by severe headaches, with or without other acute neurological symptoms, and diffuse segmental constriction of cerebral arteries that resolves spontaneously within 3 months. Calabrese and colleagues proposed name RCVS in 2007 and gave a set of diagnostic criteria. More common in women in reproductive age group. Though unknown incidence, condition is not rare!

"THUNDERCLAP HEADACHE"

A severe pain peaking within seconds is the first presentation and can lead to ischemic and hemorrhagic strokes as the most common complications.

- It is the main symptom and often remains the only symptom. Mimics Aneurysmal rupture pain but short lived.
- Association with focal deficits and seizure is common (20-40% cases).

Physical examination and Laboratory investigations generally remain normal except if it is posterior reversible encephalopathy syndrome.

Note

- In 2/3rd cases RCVS can occur within the first week postpartum.
- Diagnosis can only be confirmed when reversibility of vasoconstriction is assessed, 12 weeks from onset of symptom by which reversal should either be complete or atleast substantial but complete reversal can be slower in some patients

7. Neurological assessment

Brain scans of many patients with RCVS look healthy despite the presence of diff use vasoconstriction on concomitant cerebral angiograms.

Lesions include 3 types of stroke:

- Convexity Subarachnoid Hemorrhage
- Intracerebral hemorrhage
- Cerebral infarction and reversible cerebral edema

Convexity subarachnoid haemorrhages are nonaneurysmal, usually mild, unilateral or bilateral and are usually diagnosed within first week of the symptom onset.

Focal intracerebral hemorrhages are parenchymal, occur early in the course of RCVS and mostly associated with persistent focal deficit.

Cerebral Infarctions occur mainly in arterial watershed regions of the cerebral hemispheres, often between the posterior circulation and the carotid territories.

Reversible Brain Oedema is an early manifestation of RCVS and is usually diagnosed within a few days of clinical onset.

8. Cerebral angiography

- To diagnose RCVS, direct (transfemoral) or indirect (CT or magnetic resonance) cerebral angiography is needed to show segmental narrowing and dilatation (string of beads) of one or more arteries.
- The basilar artery, carotid siphonor external carotid artery can be affected.
- Maximum vasoconstriction of the branches of the middle cerebral arteries is reached generally after 10-14 days of the onset as per studies.

9. Pathological investigations

Biopsy of the brain or temporal artery is not recommended for diagnosis of RCVS, and should be done only in cases in which cerebral angiitis is strongly suspected.

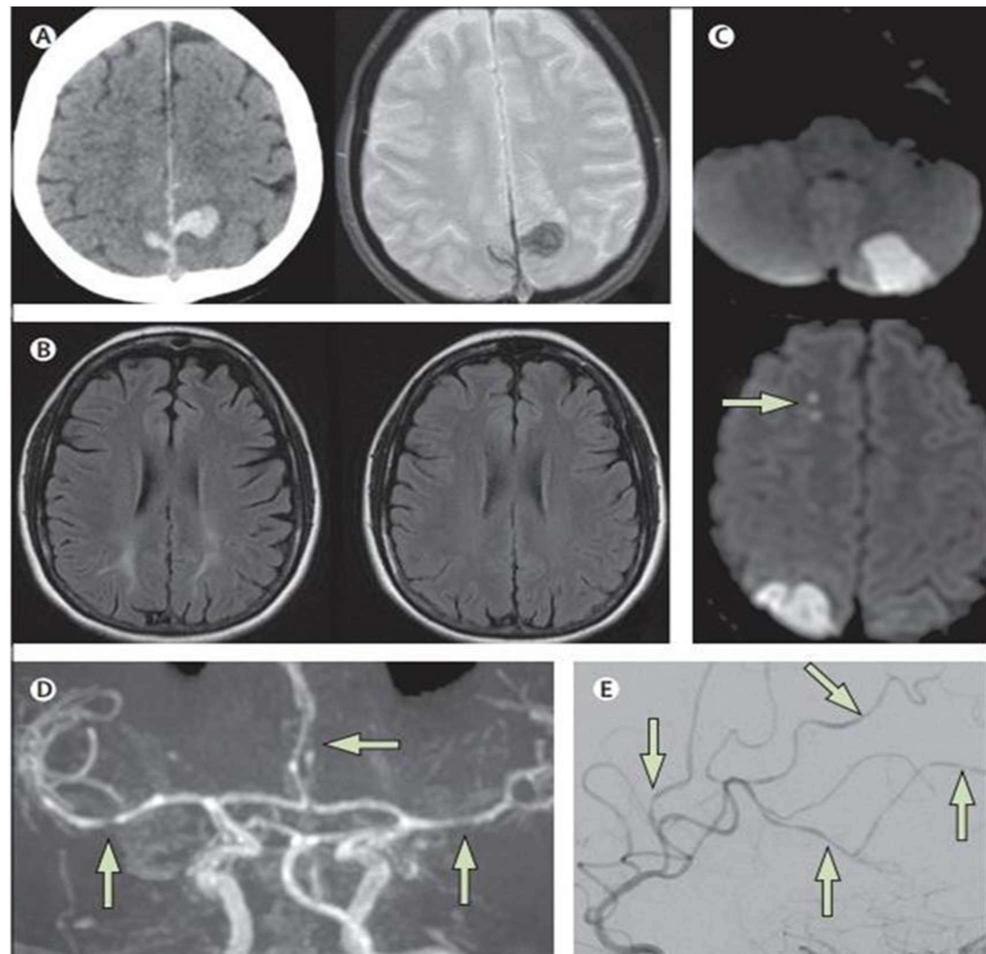

Fig (6): Lesions in patients with reversible cerebral vasoconstriction syndrome

Figure Legends

(A) CT (left) and T2*-weighted MRI (right) scans showing a bilateral occipital haematoma with interhemispheric subarachnoid haemorrhage in a 57-year-old woman who also had a left capsulothalamichaematoma (not shown).

(B) MRI (left) showing bilateral cortical-subcortical areas of high signal on fluid-attenuated inversion recovery sequences consistent with posterior reversible encephalopathy syndrome in a 36-year-old woman post-partum. Follow-up MRI (right) at 6 weeks was normal.

(C) Diffusion-weighted MRI showing a left cerebellar infarction (top), a right occipital infarction (bottom), and patchy small areas of restricted diffusion at the border zone between the right anterior and middle cerebral arteries (arrow) in a 33-year-old female cannabis smoker.

(D) Magnetic resonance angiogram showing segmental narrowings (arrows) of the middle and anterior cerebral arteries in the patient shown in (A).

(E) Transfemoral angiogram showing segmental narrowings of the branches of the anterior cerebral artery (arrows) in a 58-year-old woman with a left frontal haematoma and

subarachnoid haemorrhage in several sulci. A follow-up angiogram at 2 months was normal.

10. Treatment of Choice

- No Randomised clinical trials of treatment for RCVS have been done, but early recognition of the syndrome is important so that symptoms can be managed effectively.
- Patients with consistent clinical and brain imaging features, no evidence for another cause of symptoms, and normal initial cerebral angiograms should be viewed as having possible or probable RCVS.
- Treatment should include analgesics, antiepileptic drugs for seizures, monitoring of blood pressure, and admission to intensive-care units in severe cases.
- Avoid hypotension as it is dangerous in cerebral vasoconstriction. Nimodipine, verapamil and magnesium sulphate have been used to relieve arterial narrowing. No Mortality benefit with use of steroids
- In severe cases, intra-arterial administration of milrinone, nimodipine, and epoprostenol and balloon angioplasty have been used with variable and debatable success.

11. Prognosis

Most patients recover within few days.

- Prognosis depends on the associated with the Stroke.
- Intractable vasoconstriction could be more frequent in post-partum RCVS.
- Recurrence is possible but incidence unknown.