

Sudden Intraoperative Headache: Management of a presumed case of reversible cerebral vasoconstriction syndrome for planned Caesarean section

J. Sandhu, ST6 Anaesthetics ¹; G.Kar, Consultant Anaesthetist ¹; P. Barclay, Consultant Anaesthetist ²

1. Kingston Hospital NHS Foundation Trust; 2. Chelsea and Westminster Hospital NHS Foundation Trust

KEY POINTS:

- Reversible cerebral vasoconstriction syndrome (RCVS) is an important differential diagnosis of sudden severe intraoperative headache in obstetric patients
- Management of the parturient with a history of RCVS requires a multidisciplinary approach
- The combination of elective Caesarean section, titrated neuraxial blockade, avoidance of triggers and use of prophylactic magnesium sulphate may reduce the rate of recurrence of RCVS.

Introduction

- We present a case of a 34 year old woman due to undergo an elective Caesarean section (CS) who was referred to our obstetric anaesthetic clinic due to a presumed case of RCVS during her previous CS. Written consent was obtained.
- RCVS is characterised by **sudden, brief, severe headaches** due to altered cerebral autoregulation leading to reversible cerebral vasospasm.
- Many triggers have been identified in RCVS, some of which are outlined in table 1. ¹
- Clinical diagnosis is widely accepted and the **RCVS2 score** may aid this (table 2). ¹
- Diagnosis is ideally confirmed by imaging or **angiography** (figure 1) but may be inconclusive
- There is significant **overlap between posterior reversible encephalopathy syndrome (PRES), pre-eclampsia and RCVS**. ^{2, 3}
- Whilst the majority of patients have no serious neurological sequelae, it can result in cerebral ischaemia and subarachnoid haemorrhage
- Up to 10% of patients experience **permanent disability** and one review suggests that this figure increases to 50% in the postpartum state. ⁴
- The case required careful multidisciplinary planning in order to prevent further episodes of RCVS.

Factor	Notes
Pregnancy and peripartum	Strong hormonal influence
Drugs	Vasoactive drugs, blood products, NSAIDs, recreational drugs e.g. cocaine, cannabis
Procedures	Carotid endovascular and neurosurgical procedures
Miscellaneous	Phaeochromocytoma, extreme grief, sexual intercourse, Valsalva manoeuvre

Table 1 – Triggers for RCVS

Variable		Points
Recurrent or single TCH	Present	5
	Absent	0
Carotid artery (intracranial)	Affected	-2
	Not affected	0
Vasoconstrictive trigger	Present	3
	Absent	0
Sex	Female	1
	Male	0
Subarachnoid hemorrhage	Present	1
	Absent	0
TOTAL		
Total score of ≤2 is negative, 3-4 equivocal, and ≥5 positive for diagnosis of reversible cerebral vasoconstriction syndrome.		
Abbreviation: TCH, thunderclap headache.		

Table 2 – RCVS score 2 (Teitcher and Biller : *Stroke Snapshot: Reversible Cerebral Vasoconstriction Syndrome - Practical Neurology*)

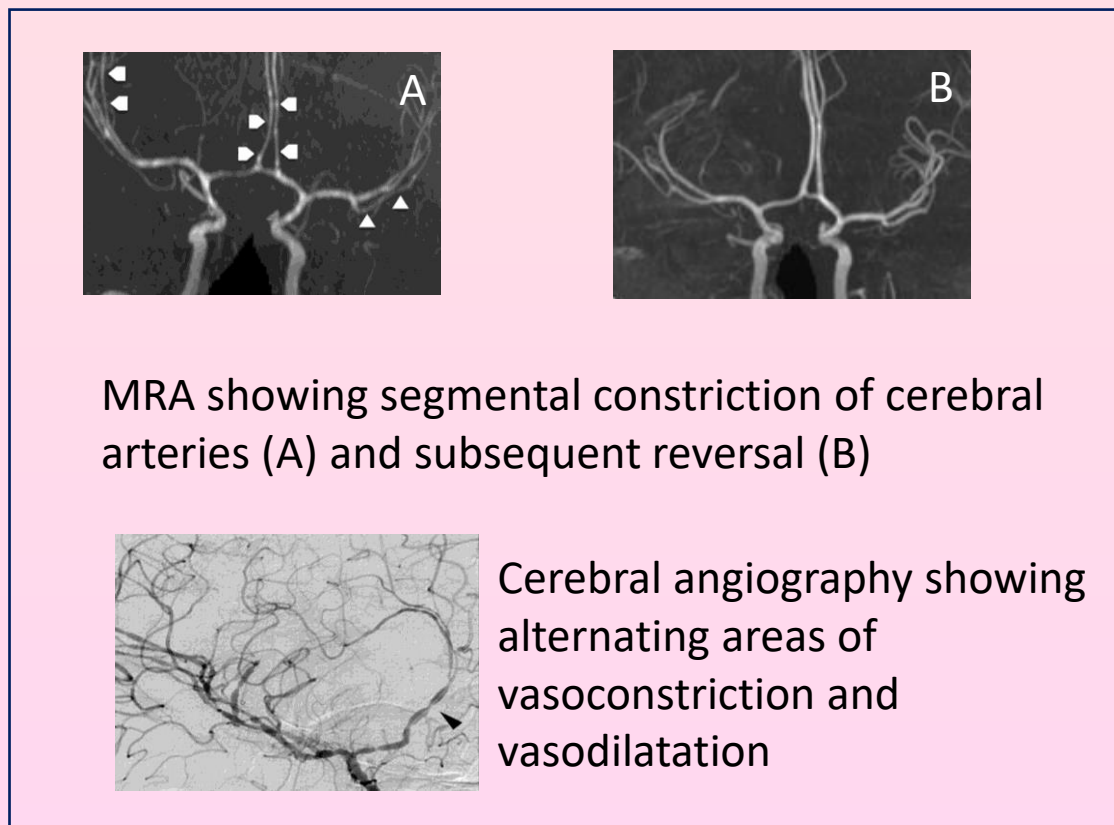


Figure 1 – taken from Marder et al (2012), Multimodal Imaging of Reversible Cerebral Vasoconstriction Syndrome: A Series of 6 Cases *American Journal of Neuroradiology* 33(71) 1403-1410

Discussion

- The multidisciplinary team’s plan was designed to prevent a recurrence of RCVS during labour and in the puerperium.
- Whilst the recurrence rate of RCVS is unknown, it is more likely with repeated exposure to triggers.
- Anaesthetic management was designed to avoid the need to administer known triggers of RCVS and included the use of prophylactic magnesium to prevent vasospasm.

Why an elective Caesarean section?

- Labour presents two issues – the sympathetic response to pain and the Valsalva manoeuvre.
- Whilst an epidural can obtund the sympathetic response to pain, Valsalva cannot be completely avoided in the second stage of labour.

Why magnesium?

- Magnesium causes vascular smooth muscle relaxation by antagonising the effects of calcium.
- It is used preventatively and therapeutically in pre-eclampsia and subarachnoid haemorrhage in order to prevent cerebral vasospasm and its sequelae.
- Magnesium sulphate is used as a treatment in RCVS ⁵
- Given that the overriding pathophysiology in pre-eclampsia and RCVS is impaired cerebral autoregulation and endothelial dysfunction, we propose that magnesium sulphate can be used to prevent recurrence of RCVS.
- There are no randomised controlled trials for the treatment of RCVS but nimodipine is often used as an initial treatment. It was considered for our patient but was unavailable in our hospital.

Why low dose CSE?

- The use of neuraxial blockade with incremental epidural top ups allowed attenuation of the stress response and sympathetic activity whilst limiting hypotension and avoiding the need for alpha agonists.
- The insertion of an epidural catheter also allowed for post-operative analgesia.

Summary

The combination of **avoidance of triggers** of RCVS and **prophylactic magnesium sulphate** successfully prevented a recurrence of features of RCVS in this patient. On review of the literature, we were unable to find any case reports where prophylactic magnesium had been administered to a parturient with a history of RCVS. It is unclear whether the lack of recurrence was solely due to avoidance of triggers of RCVS or if the magnesium had an independent effect. Further research is required to determine this.

Case Report

The parturient had experienced a sudden onset of severe headache during CS under spinal anaesthesia with concurrent intravenous fluids, phenylephrine, glycopyrrolate, ergometrine and antiemetics. The headache resolved with paracetamol but returned the next day requiring hospital readmission. There were no associated neurological features and examination was unremarkable. The headache resolved again with paracetamol. No imaging was performed at the time. A clinical diagnosis of RCVS was subsequently made by a neurologist.

- The shared decision for delivery was an elective Caesarean section.
- The anaesthetic plan for this CS included **regional anaesthesia, avoidance of RCVS triggers** and the use of **prophylactic magnesium sulphate**.

A preload was given before performing a combined spinal/epidural (CSE) with low dose spinal and slow incremental epidural supplementation.

Hypotension was treated with generous intravenous fluids, manual displacement of the uterus and anticholinergics.

A loading dose of 2g magnesium sulphate was given followed by a 1g/hour infusion for 20 hours.

The operation was uneventful and the patient was closely monitored postoperatively. The severe RCVS headache did not recur.

References

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