

Introduction

- Brugada syndrome (BrS) is a rare inherited ion channelopathy, where mutations to the sodium channel are the most commonly identified.¹
- Pathophysiology:

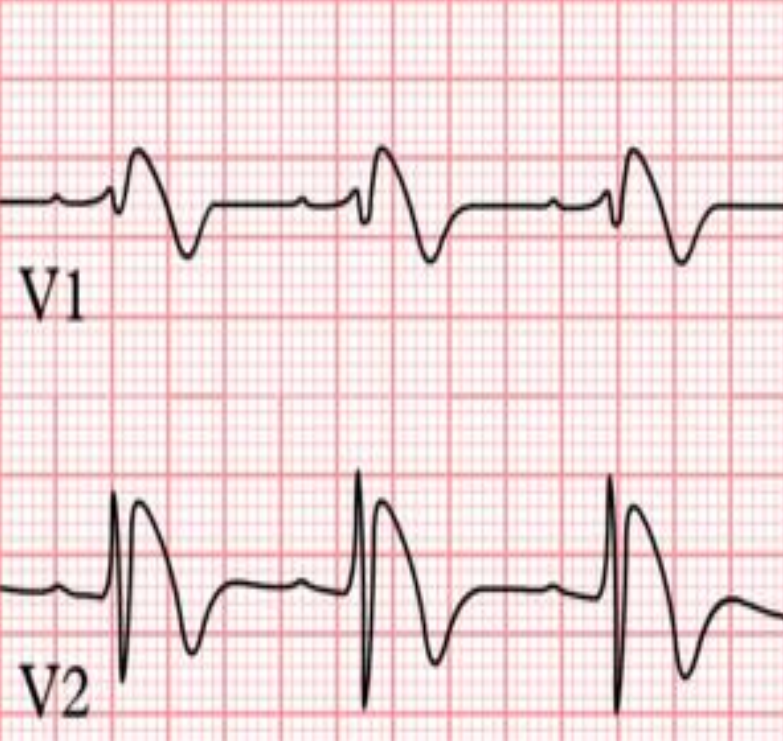
Abnormal sodium/ potassium/ calcium channel activity within the right ventricle

⚡

Abnormal repolarisation/ depolarisation

⚡

Ventricular re-entrant arrhythmias



- BrS is a recognised cause of maternal mortality, with 15 cases of sudden arrhythmic cardiac deaths with a morphologically normal heart in the UK between 2015-2017.²
- Local anaesthetics (LAs) may provoke arrhythmias in BrS patients, creating challenges for the peri-partum management of analgesia and anaesthesia.
- We present the case of a woman with known BrS who underwent three deliveries by caesarean section (CS) under general anaesthesia (GA) in our hospital.

Case Report

History

- A 36-year-old white British woman with a BMI of 27 kg/m² presented for her third planned caesarean section (CS).
- BrS was diagnosed aged 28 following an abnormal ECG performed during a febrile illness.
- She had no cardiac symptoms and no family history of sudden death. She was deemed low risk of ventricular arrhythmias and an implantable cardiac defibrillator (ICD) was not indicated.
- She was reviewed in the obstetric high risk anaesthetic clinic where the risks and benefits of regional anaesthesia (RA) versus general anaesthesia (GA) were explained. She opted to **proceed with GA for all three CS**.

Management and outcome

Pre-operative medication : Omeprazole only

Post-op:

- Monitored on obstetric high dependency unit for 24 hours

Intra-op:

- Induction: RSI with thiopentone and suxamethonium
- Maintenance: Sevoflurane
- Analgesia: Morphine and paracetamol IV, diclofenac PR, lidocaine SC (15ml of 1%)
- Uterotonic: Carbetocin 100 micrograms IV

Outcomes:

- Maternal: Estimated blood loss = 900ml, no peripartum arrhythmias and made an uncomplicated recovery
- Fetal: baby born in good condition

Discussion

- This case demonstrates the safe administration of GA to a pregnant woman with BrS.
- BrS in pregnancy poses specific challenges to the obstetric anaesthetist in view of recognised pharmacological and physiological arrhythmogenic triggers:

Pharmacological triggers ³	Physiological triggers ⁴
Local Anaesthetics: Bupivacaine > Lidocaine	Fever
Propofol infusions	Excess parasympathetic nervous system tone
Metoclopramide	Electrolyte abnormalities
Ergometrine	

- Neuraxial anaesthesia may be hazardous in BrS due to the LA used, the loss of sympathetic nervous system tone (which is protective in BrS), the increased risk of fever and the use of vasoactive drugs to treat spinal-induced hypotension.
- Regional anaesthesia (RA) including the epidural and intrathecal routes have been linked with the development of ECG changes, arrhythmias and cardiac arrest in non-obstetric patients.^{5,6}
- Conversely, there are case reports of pregnant BrS patients receiving RA for labour and operative delivery.⁷

- In contrast, there are few case reports of obstetric BrS patients undergoing GA. If selected, GA should be modified to mitigate the risk of arrhythmias:
 - Induction agents: Thiopentone or propofol (bolus only)
 - Maintenance: Volatile anaesthesia (avoid total intravenous anaesthesia)
 - Muscle relaxants: Rocuronium reversed with sugammadex (there is a theoretical risk of muscarinic-mediated bradycardia with suxamethonium)
 - Analgesia: Multi-modal analgesia. SC infiltration of 1% lidocaine with adrenaline may be considered owing to its improved safety profile in BrS and limited systemic absorption from the SC tissue
 - Uterotonics: 1st line: oxytocin or carbetocin. 2nd line: Carboprost (due to the lower risk of fever compared with misoprostol). Ergometrine is contra-indicated
- As BrS is rare, the true risk of a cardiac arrhythmia with RA is unknown. Whilst the case reports describing RA are reassuring, they do not constitute sufficient evidence to recommend RA over GA in this patient group. This ambiguity must be explained during the antenatal visit, and the multidisciplinary team should support patients in decisions regarding delivery mode including anaesthesia options.
- There is no national obstetric or anaesthetic guidance on this topic.
- We are producing a standard operating procedure for the management of pregnant patients with BrS for our regional maternal medicine network.

References

- Krahn AD, Behr ER, Hamilton R, Probst V, Laksman Z, Han HC. Brugada Syndrome. *Journal of the American College of Cardiology: Clinical Electrophysiology* 2022;**8**:386-405
- Knight M, Bunch K, Tuffnell D, *et al.* On behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2015-17. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2019
- Brugadadrugs.org: Safe use and the Brugada syndrome. Accessed 7th April 2025. <https://www.brugadadrugs.org/drug-lists/> 2025.

- Espinosa Á, Ripollés-Melchor J, Brugada R, *et al.* Brugada Syndrome: anesthetic considerations and management algorithm. *Minerva Anesthesiol* 2019;**85**:173-88.
- Kloesel B, Ackerman MJ, Sprung J, Narr BJ, Weingarten TN. Anesthetic management of patients with Brugada syndrome: a case series and literature review. *Can J Anesth* 2011;**58**:824-36.
- Aytuluk HG. Cardiac arrest during spinal anaesthesia in a patient with undiagnosed Brugada syndrome. *Eur J Anaesthesiol* 2018;**35**:710-717
- Gualtieri V, Obert C, Barbati F, Donvito V, Quaglia S. Anesthesiology Approach to Pregnant Women Affected by Brugada Syndrome: A Single-Center Case Series and Literature Review. *Journal of Obstetric Anaesthesia and Critical Care* **14** (1730178). Jul-Dec 2024. | DOI: 10.4103/JOACC.JOACC_80_23