

“CAN YOU SEE A HEARTBEAT?”. A RARE CASE OF UNEXPECTED CARDIAC ARREST.

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Background

- Spinal anaesthesia is regularly performed by anaesthetists. It has become an integral part of obstetric procedures, particularly caesarean sections.
- Various complications of spinal anaesthesia have been described including hypotension, nausea and vomiting¹.
- Cardiac arrests during this procedure and in pregnancy is uncommon. It has a reported incidence of 1:20,000 pregnancies².
- Almost 25% of cardiac arrests in pregnancy were found to be due to an anaesthetic cause¹.

Case

- Ms. KG, a 38-year-old, G3P1⁺¹, was admitted for elective c-section at 38⁺⁴weeks gestation.
- Indication: 1 x previous emergency c-section.
- Past Med Hx: Hypothyroidism. BMI was 29. Antenatal visits were unremarkable.
- Preoperative checks including vital signs were normal.
- Spinal anaesthesia was given. During skin incision patient developed apneic breathing and became hypotensive. Brady-asystole was noted on the monitor and patient lost consciousness. Cardiac arrest was called. The emergency response team were sounded for. CPR was commenced immediately. Atropine 0.5mg was given. After 1 minute of CPR there was return of spontaneous circulation.
- Category 1 emergency c-section was called and liveborn infant was delivered within one minute.
- Apgar score and cord pHs were normal at delivery. Surgery was completed with no other complications. Estimated blood loss was 910mls.
- Maternal consciousness returned. Appropriate speech and power in upper limbs were noted. High spinal was ruled out as a cause. The patient spent 24hours in CCU on heart monitoring before being transferred to the maternity unit.
- The patient was monitored closely on the maternity ward. There were no complications post-operatively. Baby was monitored in SCBU for 24 hours given the events at delivery but was returned to her mother with no concerns.

Investigations

- 12 lead ECG showed normal sinus rhythm, no signs of myocardial damage.
- 24-hour Holter monitor: No arrhythmias, no ectopics, no further bradycardia.
- AP Chest X-ray: No abnormalities detected.
- FBC, U+E, TFTs: Normal
- Transthoracic echocardiogram (TTE): No abnormalities detected.

Cardiac disease was ruled out by the medical team and the assumed diagnosis was profound vasovagal in context of spinal anesthetic. Although the causes of this event remain unclear, Bezold Jarisch Reflex can explain the cardiac arrest after a spinal block³

Differential Diagnosis

Cardiac Disease	Embolism
<ul style="list-style-type: none">• Normal 24hr Holter• Normal 12-lead ECG• Normal TTE• No previous cardiac history	<ul style="list-style-type: none">• Normal TTE• Normal AP chest x-ray
Haemorrhage	Sepsis
<ul style="list-style-type: none">• During skin incision• Minimal blood loss during incision• Normal Haemoglobin pre- and post-operatively• No coagulopathy	<ul style="list-style-type: none">• No pyrexia• No site of infection• Normal serum infection markers
Anaesthetic Complication	Bezold Jarisch Reflex
<ul style="list-style-type: none">• Spinal block sited correctly• No loss of airway• No aspiration• Normal neurological exam	<ul style="list-style-type: none">• Bradycardia• Hypotension• No other medical cause found



Image 2: Brady-asystole seen by the arrows. This image was captured on the monitor during the Caesarean Section.

Pathogenesis: Bezold Jarisch Reflex (BJR)

BJR originates from inhibitory mechanoreceptors in the left ventricle (predominantly the inferoposterior wall)³. Stimulation of these inhibitory cardiac receptors is by stretch (poorly filled ventricle) or chemical substances or drugs (anaesthetics)³. This increases renin and vasopressin release and parasympathetic activity and inhibits sympathetic activity. These effects promote reflex bradycardia, vasodilation and hypotension (Bezold-Jarisch reflex)³.

The BJR has been implicated as a potential cause of profound bradycardia and circulatory collapse after spinal anaesthesia and as a complication of interscalene brachial plexus block³.

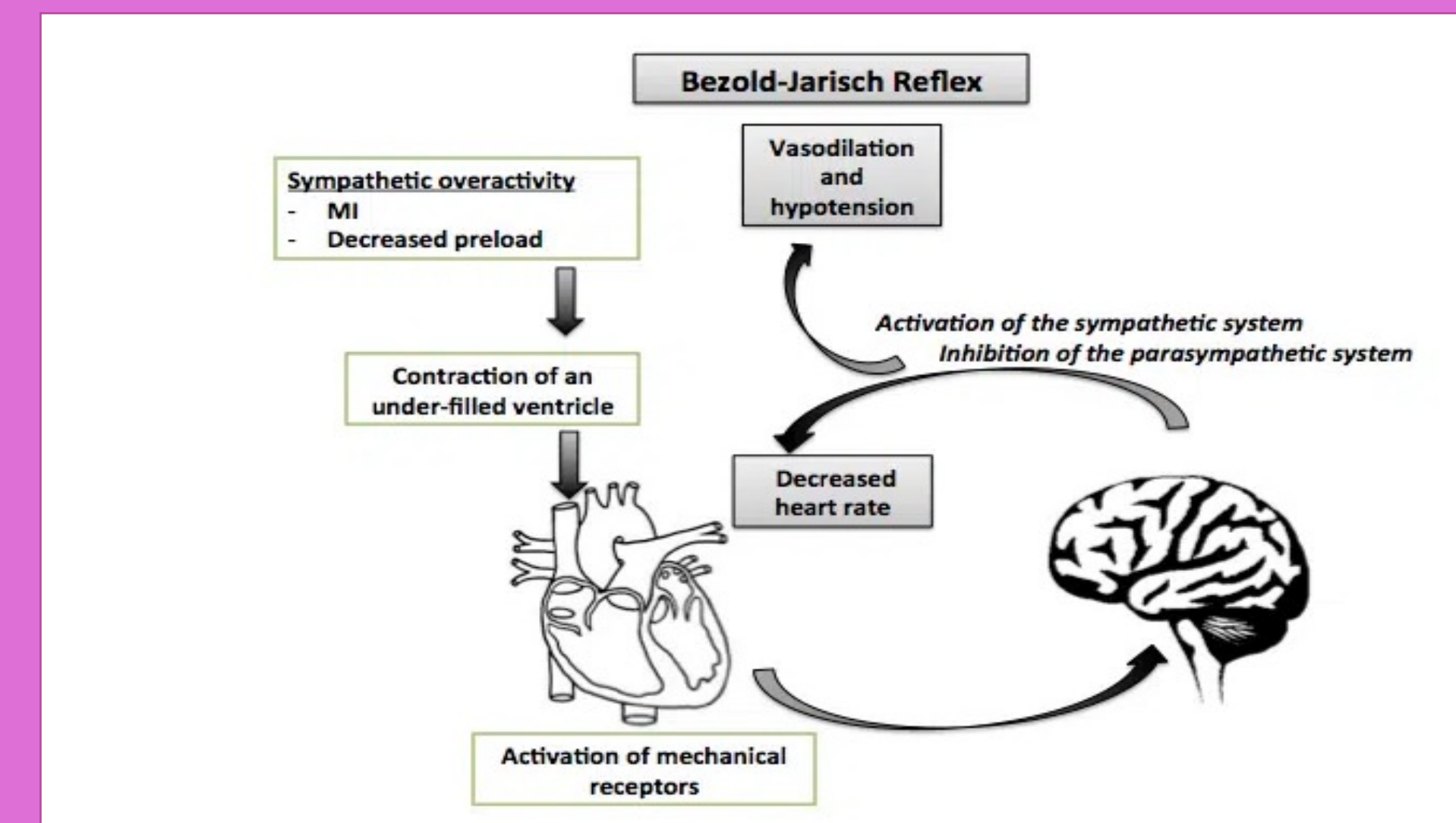


Image 1: Physiology of Bezold Jarisch Reflex⁴

Management and Outcome

The patient had an uneventful post-operative recovery course. She and her baby were both discharged home well on day 4 post-caesarean section. They were seen back in the post-natal clinic 6-weeks later. They were debriefed on the events and all questions were answered.

Learning Points

- Cardiac arrest during pregnancy is a rare and life-threatening event.
- To be familiar with the potential risks of the procedure (elective caesarean section with spinal block).
- This case illustrates the importance of early recognition, good teamwork, and immediate response. Simulation training can be implemented to ensure emergency preparedness to improve systems of care and to encourage collaborative communication, a vital component of successful multidisciplinary medical teams.
- The importance of debriefing after obstetric emergencies. Debriefing for the staff present during the event as well as for the patient and their family.

References:

1. Beckett VA, Knight M, Sharpe P. The CAPS Study: incidence, management and outcomes of cardiac arrest in pregnancy in the UK: a prospective, descriptive study. BJOG 2017;124:1374–1381.
2. Chiara Comito, Lorenzo Bechi, Caterina Serena, Vanni Checcucci, Emanuele Mori, Massimo Micaglio, Federico Mecacci & Felice Petraglia. Cardiac arrest in the delivery room after spinal anesthesia for cesarean section: a case report and review of literature, The Journal of Maternal-Fetal & Neonatal Medicine 2020; 33:8, 1456-1458.
3. Campagna JA, Carter C. Clinical relevance of the Bezold-Jarisch reflex. Anesthesiology. 2003; 98(5): 1250-60
4. Cadogan M, (2021) *Bezold-Jarisch reflex*. Available at: https://litfl.com/wp-content/uploads/2021/06/Bezold-Jarisch_reflex.png. (Accessed 21st May 2022).

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