Case Report

Arrhythmias following spinal anesthesia for cesarean delivery - Is Wenckebach common?

Seema Kalra, Nitin Hayaran[1]

Department of Anaesthesiology and Critical Care, IGESI Hospital, Jhilmil, Delhi, [1]Smt. Sucheta Kriplani Hospital and LHMC, New Delhi, India

Abstract

Arrhythmias in pregnancy are common and may cause concern for the well-being of both mother and fetus. Generally, no previous history of heart disease is elicited and majority of the arrhythmias are benign. Bradycardia is commonly seen following subarachnoid block for cesarean section. However, the incidence of subsequent heart block is low. This case report highlights the occurrence of perioperative arrhythmias following sympathetic blockade in pregnant patients and their early detection by vigilant monitoring.

Key words: Cesarean, spinal, Wenckebach

Introduction

The increase in frequency of arrhythmias and in symptoms during pregnancy may be a result of the associated hemodynamic, hormonal, autonomic, and emotional changes.[1] We report a patient who developed bradycardia followed by atypical Wenckebach block, after subarachnoid block for cesarean section.

Case Report

A 150 cm, 58 kg, 28-year-old second gravida, with history of previous LSCS, presented with full term pregnancy with twins with transverse lie for LSCS. Routine preoperative clinical assessment was unremarkable and hematological and biochemical investigations were normal. Electrocardiography (ECG), non-invasive blood pressure, and pulse oximetry monitoring was started. The blood pressure was 128/84 mmHg and heart rate was 88 beats/min. Patient was preloaded with 500 ml of Ringer's lactate intravenous fluid. Subarachnoid block was given through the L3-4 intervertebral space with 10 mg 0.5% hyperbaric bupivacaine using 25-G Whitacre pencil point spinal needle.

The blood pressure was recorded as 117/80 mmHg and it remained stable. ECG showed sinus rhythm (92/min) with a normal PR interval. Five minutes after the spinal injection, when the level of analgesia was T5, ECG showed sinus bradycardia of 48/min and a prolonged PR interval followed by atypical Wenckebach atrio-ventricular (AV) block [Figures 1 and 2]. The blood pressure was 100/76 mmHg, oxygen saturation (SpO_2) was 100%. The patient had no complaints. The upper level of block remained at T5. After five minutes the rhythm reverted back to normal.

One healthy male and one female infant, with normal neurologic status, were delivered. Patient remained hemodynamically stable throughout surgery. The surgery lasted for 60 minutes. Approximately two hours after the initiation of the spinal anaesthetic, ECG again showed progressive prolongation of the P-R interval in an atypical Wenckebach type heart block

Figure 1: Bradycardia following spinal blockade

Figure 2: Atypical Wenckabach block

Address for correspondence: Dr. Seema Kalra,
Department of Anaesthesiology and Critical Care, 397, Jagriti Enclave, Vikas Marg Extension, Delhi - 110 092, India.
E-mail: kalraseema1965@gmail.com

Access this article online

Quick Response Code:

Website: www.joacp.org

DOI: 10.4103/0970-9185.86604

[Figures 3 and 4]. Vitals of the patient remained stable. Cardio-respiratory examination was normal. Patient was kept under observation for next 24 hours in postoperative ward. 12-lead ECG, 24 hr after the incident, was normal.

Echocardiograph showed normal sized cardiac chambers with no regional wall motion abnormality, global ejection fraction of 63%, no diastolic left ventricular dysfunction, and normal right ventricle systolic function. Valves were structurally normal and no other intra-cardiac defect, intra-cardiac mass or pericardial effusion was seen. The 24-hour Holter monitoring was normal. No further treatment was advised by the cardiologist.

Discussion

Direct physiological effects of hormones, changes in autonomic tone, hemodynamic alterations, and hypokalemia of pregnancy can potentially result in arrhythmias during pregnancy, labour, and delivery. Intraoperative arrhythmias could be due to parasympathetic over-activity following chemical sympathectomy resulting from subarachnoid block due to a reduction in venous return, and subsequent to a vasovagal attack.[2] Surgical maneuvers, like externalizing the uterus, also can result in increased vagal tone and cause arrhythmia.[2] Decreased threshold for cardiotoxicity with bupivacaine during pregnancy[3] due to the increased unbound bupivacaine present in the hypoproteinemia of pregnancy or to the selective cardiac depressant effects of progesterone combined with bupivacaine can also precipitate arrhythmia.

In patients undergoing cesarean section under subarachnoid block, Shen *et al.* found the incidence of second degree AV block to be 3.5%, and that of severe bradycardia (heart rate <50 beatsbullmin–1) to be 6.7%.[4] Mobitz I second-degree AV block (Wenckebach block) consists of progressive lengthening of conduction time in any cardiac tissue (most often the AV node or junction) with ultimate dropping of a beat. It usually occurs due to excess vagal tone and the site of the block is within the AV node.[4] It usually does not progress to complete AV block. It is observed in 1–2% of healthy young people, especially during sleep.

Mobitz II second-degree AV block, is generally caused by conduction block in the His bundle or lower in the conduction system. It is rare in healthy individuals. When Mobitz type II block is associated with a wide QRS complex, it is due to disease of the His-Purkinje system.[5] These patients have a greater mortality and definite measures such as pacemaker insertion are needed to stop progression of the AV block.[5]

Second-degree AV block whether Mobitz type II or atypical Wenckebach (pseudo Mobitz type II) is usually asymptomatic.

Figure 3: Bradycardia two hours following spinal blockade

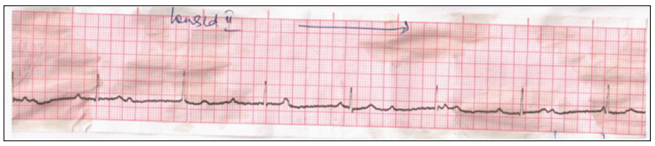

Figure 4: Atypical Wenckabach block seen postoperatively

However, some patients may complain of presyncope or syncope. The latter is observed in more advanced conduction disturbances such as Mobitz II AV block. A history of intake of medications that alter AV node function (digitalis, beta-blockers, calcium channel blockers) should be taken.[6] Levels of electrolytes should be assessed in the case of second-degree AV block whenever increased potassium levels are suspected. Our patient was not on any such medication. The patient was classified as atypical Wenckebach block, as she failed to meet one or more criteria for typical Wenckebach periodicity. Typical Wenckebach periodicity (Wenckebach and Winterberg) is considered to be present when: First PR interval of a cycle is the shortest; there is progressive lengthening of the PR interval with the increment between the first and second conducted beats being the largest; and there is progressive decrease in the RR intervals.[7]

A significant electrocardiographic difference between an atypical Wenckebach block (pseudo-Mobitz II arrangement) in the AV node and His-Purkinje system is the length of the PR interval in the opening beat of the Wenckebach cycle. In AV nodal block it usually remains significantly prolonged (0–26 to 0–38 s, with an average of 0–32 s).[7] Wenckebach block does not generally require treatment. Mobitz type II second-degree AV block and a wide QRS complex indicate diffuse conduction system disease and is an indication for pacing, even in the absence of symptoms as it may degenerate into third-degree heart block.[8]

Shen *et al.*[4] found that when patients had narrow QRS complexes with second degree AV block and it occurred transiently during spinal anesthesia, the prognosis was benign. Our patient had atypical Wenckebach block with narrow QRS complexes but it was transient and hence benign. The bradycardia was due to parasympathetic over activity, which initiated the second degree heart block. Our patient did not have any hypotension, as reported by others,[2] possibly because the patient was volume loaded. However, the arrhythmia recurred postoperatively when all surgical stimulation had been removed. This may have been due to a latent conduction disorder which was transient. However, there

was no indication for pacing as the patient was asymptomatic. Second-degree AV block associated with symptomatic bradycardia is an indication for pacing.[9] In asymptomatic patients with second-degree AV block, type I with a narrow QRS complex, cardiac pacing may be required if the level of block is infranodal as found on electrophysiological studies, because the progression to complete heart block is common.[10]

Sympathetic block is slower to regress than the sensory block,[11] and considerable sympathetic blockade can persist, when the patient is in the postoperative recovery. Vigilant monitoring must continue in the postoperative period. Atropine is contraindicated though it improves conduction in the AV node minimally it increases the sinus rate markedly. This can enhance the degree of block due to an increase in atrial rate.[12,13]

To conclude, bradycardia and heart block can occur following subarachnoid block for cesarean section. We successfully managed a patient who developed bradycardia followed by atypical Wenckebach block, after subarachnoid block for cesarean section.

References

1. Robins K, Lyons G. Supraventricular tachycardia in pregnancy. Br J Anesth 2004;92:140-3.
2. Shen CL, Hung YC, Chen PJ, Tsao CM, Ho YY. Mobitz type II AV block during spinal anesthesia. Anesthesiology 1999;90:1477-8.
3. Bern S, Weinberg G. Local anesthetic toxicity and lipid resuscitation in pregnancy. Curr Opin Anaesthesiol 2011;24:262-7.
4. Shen CL, Ho YY, Hung YC, Chen PL. Arrhythmias during spinal anesthesia for Cesarean section. Can J Anesth 2000;47:393-7.
5. Narula OS, Samet P. Wenckebach and Mobitz type II A-V block due to block within the His bundle and bundle branches. Circulation 1970;41:947-65.
6. Stoelting RK, Hines RL, Marschal KE, editors. Stoelting's Anesthesia and co-existing disease. 5th ed. Philadelphia: Saunders/Elsevier; 2008. p. 76.
7. El-Sherif N, Aranda J, Befeler B, Lazzara R. Atypical Wenckebach periodicity simulating Mobitz II AV block. Br Heart J 1978;40:1376-83.
8. Smith SC, Jacobs AK, Adams CD, Anderson JL, Buller CE, Creager MA. ACC/AHA/HRS 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities. J Am Coll Cardiol 2008;51:1-62
9. Estafanous FG, Barasch P, Reves JG. Cardiac Anaesthesia- Principles and clinical practice. 2nd ed. Philadelphia: Lippincott Williams and Wilkins; 2001. p. 620.
10. Hayes DL, Friedman PA. Cardiac pacing, defibrillation and resynchronisation. 2nd ed. Hoboken, NJ: Wiley Blackwell; 2008. P. 82.
11. Greene N, Brull S. Physiology of Spinal Anesthesia. 4th ed. Baltimore: Williams and Wilkins; 1992.
12. Zipes DP. Second-degree atrioventricular block. Circulation 1979;60:465-72.
13. Mangiardi LM, Bonamini R, Conte M, Gaita F, Orzan F, Presbitero PV, *et al*. Bedside evaluation of atrioventricular block with narrow QRS complexes: Usefulness of carotid sinus massage and atropine administration. Am J Cardiol 1982;49:1136-45.

How to cite this article: Kalra S, Hayaran N. Arrhythmias following spinal anesthesia for cesarean delivery - Is Wenckebach common?. J Anaesth Clin Pharmacol 2011;27:541-3.

Source of Support: Nil, **Conflict of Interest:** None declared.