



Pregnancy and complete atrioventricular block: a case report

Bryam López, MD, Milagros Batallanos, MD

Introduction: Bradycardia in pregnancy due to complete atrioventricular block (CAVB) is a rare but serious occurrence that can be life-threatening to the mother and fetus. Patients with CAVB may be asymptomatic, but symptomatic cases require urgent and definitive management.

Case presentation: The case of a 20-year-old primigravida with previously undiagnosed CAVB who attended the obstetric emergency service in labor is presented. The route of delivery was vaginal without complications. The decision was made to implant a permanent dual-chamber pacemaker on the third day of the puerperium, and the patient did not present cardiovascular symptoms during outpatient follow-up.

Clinical discussion: CAVB is a rare but serious condition in pregnancy that can be congenital or acquired. While some cases are relatively benign, others can lead to decompensation and fetal complications. There is no consensus on the best delivery route, but vaginal delivery is generally safe unless contraindicated for obstetric reasons. Pacemaker implantation may be necessary in some cases and can be performed safely during pregnancy.

Conclusion: This case highlights the importance of cardiac evaluation in pregnant patients, especially those with a history of syncope. It also highlights the need for adequate and urgent management in symptomatic cases of CAVB in pregnancy and adequate evaluation to decide when to implant the pacemaker as a definitive measure.

Keywords: atrioventricular block, bradycardia, permanent pacemaker implantation, pregnancy

Introduction

Bradycardia in pregnancy due to complete atrioventricular block (CAVB) is a rare but serious occurrence^[1,2]. The incidence of CAVB is estimated to be 1 in 15 000 to 20 000 live births^[3], and it can be congenital or acquired. The acquired variety is rare during pregnancy, as it is mainly observed in individuals over 50 years of age^[4]. Cardiac output is generally maintained by increasing stroke volume, but some individuals require additional management when facing physiological challenges such as pregnancy, especially if they have a cardiac condition such as CAVB^[5]. Patients with CAVB may be asymptomatic, but symptomatic cases require urgent and definitive management. Definitive management requires the implantation of a pacemaker, but there has been controversy in the past regarding its necessity^[6]. This case report highlights the challenges we faced due to a lack of

HIGHLIGHTS

- Pregnancy with complete heart block is rare.
- Patients may be asymptomatic.
- A multidisciplinary team is required to manage these cases.
- Such patients can be managed conservatively or may require temporary or permanent pacemaker implantation.

experience and the solutions available using the available clinical evidence. This case report has been reported in accordance with the CARE criteria^[7].

Case presentation

A 20-year-old primigravida with 39 weeks of pregnancy attended the obstetrics emergency service in the latent phase of labor with no significant personal and family cardiovascular history. She reported having experienced four episodes of syncope in her life: one episode at 11 years of age and three episodes at 18 years of age not related to physical effort, evaluated by a neurologist who ruled out neurological involvement, for which no further studies were carried out, nor she received any treatment. She had no symptoms during the pregnancy.

On admission, the patient was in good general condition, oriented, showing bradycardia with a heart rate of 36 beats/min, uterine height according to gestational age, cephalic presentation, fetal movements present and adequate fetal heartbeats, cervix dilation of 3 cm. During cardiovascular auscultation, a bradycardic heart rate was detected, for which she was referred to a hospital with a greater capacity for resolution, as she was a

Department of Cardiology, National Hospital Edgardo Rebagliati Martins, Lima, Perú
Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article

*Corresponding author. Address: Avenida Edgardo Rebagliati 490, Jesús María, Lima 15072, Peru. Tel: +51 979 413 502. E-mail: blt138@hotmail.com (B. López).

Copyright © 2023 The Author(s). Published by Wolters Kluwer Health, Inc. This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

Annals of Medicine & Surgery (2023) 85:2093–2096

Received 4 March 2023; Accepted 18 March 2023

Published online 7 April 2023

<http://dx.doi.org/10.1097/MS9.0000000000000505>

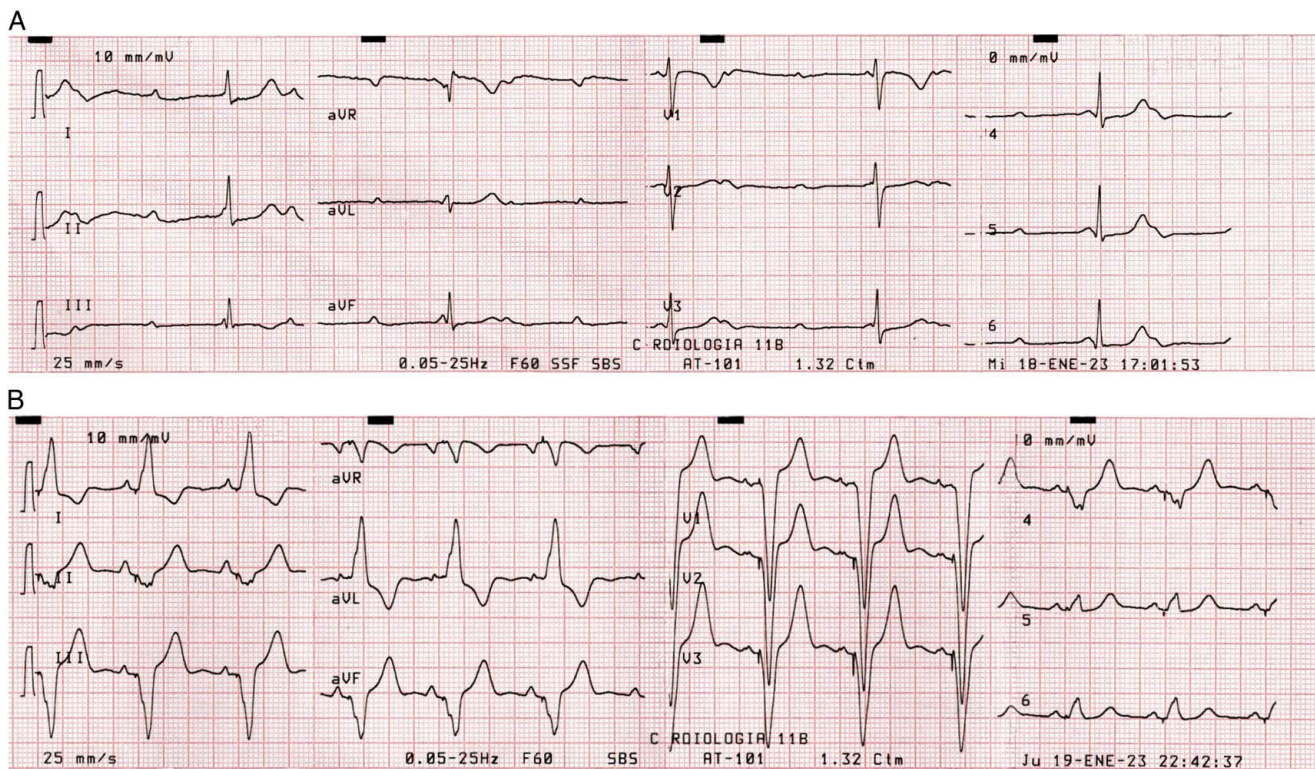


Figure 1. A. ECG: Atrioventricular block, heart rate 34 beats/minute, narrow QRS. B. Electrocardiography: pacemaker rhythm, 100% ventricular capture.

high-risk maternal patient. Initially, 1 mg of atropine was indicated if the heart rate decreased to less than 30 beats/min. The patient arrived at the obstetric emergency room of our institution, in the expulsive period of labor and with a variable heart rate between 25 and 32 beats/min, respiratory rate 22 /minute, blood pressure 120/70 mmHg. CAVB was documented on the electrocardiography, with a narrow QRS complex and a heart rate of 34 beats/minute (Fig. 1A). In the registry of prenatal check-ups, the pregnant woman's heart rate was not recorded, blood pressure was normal, and uterine growth was adequate for gestational age, negative serological tests, and hemoglobin of 13 g/dl.

As the patient arrived at our institution during the last stage of labor and maintained a heart rate greater than 30 beats/min without major risk factors on the electrocardiogram indicating an urgent need for pacemaker implantation, we decided to immediately implement monitoring and expectant management, and advised her to continue with labor. The delivery was vaginal, without complications. She was born a healthy baby weighing 2860 g, with an APGAR score of 9 and 9 at 1 min and 5 min, respectively, without cardiovascular disease. The patient underwent an echocardiogram with preserved left ventricular ejection fraction and no structural alterations (Fig. 2A). It was decided to implant the definitive dual-chamber pacemaker on the third day of the puerperium (Figs. 1B and 2B). In the outpatient follow-up, the patient did not present any cardiovascular symptoms.

Discussion

CAVB, a disorder of the cardiac conduction system in which atrioventricular conduction is completely absent, is a common

cause of permanent bradycardia^[4]. The finding of CAVB in pregnancy is rare; if present, it is usually congenital. About 30% of congenital CAVB cases remain undiscovered until adulthood and therefore may be first diagnosed during the gestational stage^[8]. It can be acquired from secondary causes, such as ischemic heart disease, drug toxicity, nodal ablation, electrolyte disorder, and due to previous cardiac surgeries. Other acquired causes are systemic diseases such as amyloidosis, sarcoidosis, and systemic lupus erythematosus, which can also cause CAVB^[2].

Congenital CAVB can occur as an isolated condition or in conjunction with other congenital heart disease. Isolated CAVB, without associated structural disease, is relatively benign, consistent with a normal pregnancy, and there may be an increase in heart rate with exercise, atropine, and orciprenaline since the block is in the AV node in these cases^[9-11].

However, in other cases of CAVB, the heart rate does not increase and can become decompensated, especially in the last stages of pregnancy and during the second stage of labor or in the immediate postpartum period. Valsalva stimulates the vagus nerve and may exacerbate bradycardia, produce asystole, or cardiac arrest^[4,8].

In 30% of patients with congenital heart block, the first symptoms occur during pregnancy, probably due to the hyperdynamic circulation of pregnancy^[1]. Regarding fetal complications, isolated cases of pregnancy with intrauterine growth retardation and preterm delivery have been reported^[12].

In the review of the literature, there is no consensus regarding the best route of delivery of such patients^[13]. There is no absolute contraindication regarding vaginal delivery since it depends on the patient's condition and her cardiopulmonary tolerance^[14].

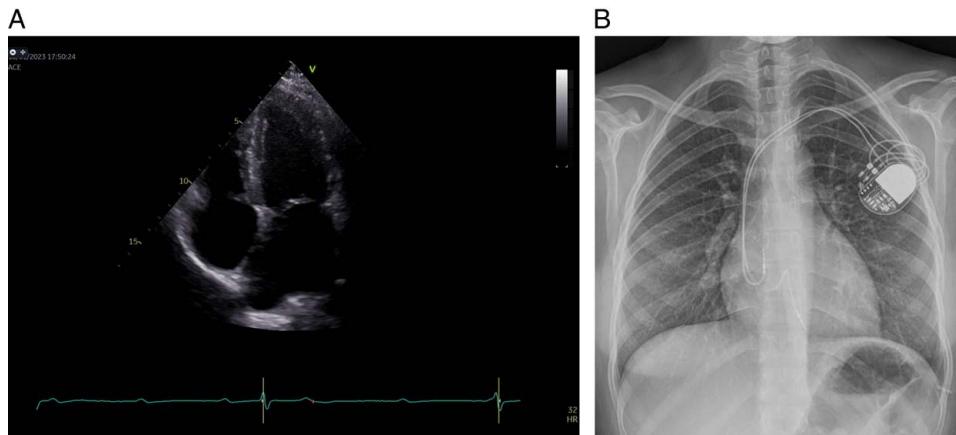


Figure 2. A. Normal echocardiography. B. Chest X-ray after permanent dual-chamber pacemaker implantation.

Vaginal delivery carries no additional risks in a pregnant with congenital complete heart block, unless contraindicated for obstetric reasons^[15]. Dilation of labor is recommended to shorten the active phase of labor and elective instrumental delivery is recommended to limit the duration of the active phase of the second stage, as these pregnant women are prone to developing syncopal attacks and seizures due to decreased heart rate associated with Valsalva^[6]. Cesarean section is recommended only when there is an obstetric indication^[16].

For women who have a stable junctional escape rhythm, implantation of a pacemaker may not be necessary or may be deferred until after delivery if there are no risk factors such as syncope, pauses greater than 3 times the duration of the ventricular escape rhythm cycle, wide QRS escape rhythm, prolonged QT interval, complex ventricular ectopy, mean daytime heart rate less than 50 bpm^[17]. Otherwise, patients should undergo pacemaker implantation during pregnancy.

Pacemaker implantation can be performed safely, especially if the fetus is more than 8 weeks pregnant^[8,11,17]. There are several reports of women undergoing permanent pacing during pregnancy without significant adverse effects; in some cases, transthoracic echocardiography was used to guide lead position and in others electroanatomical navigation minimizing the use of fluoroscopy^[17].

Conclusion

CAVB in pregnancy is a rare condition. This condition can be completely asymptomatic during pregnancy and be diagnosed only at the time of labor when the patient comes into contact with health facilities for the first time. Once diagnosed, a multidisciplinary approach involving obstetrician, cardiologist, and anesthesiologist should evaluate the case, to plan the management, to determine the best route of delivery and the timing of pacemaker implantation. The medical team must be prepared for any adverse event that may arise.

Ethical approval

No ethical approval necessary.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Sources of funding

There is no funding source for this study.

Conflicts of interest disclosure

I declare that there is no competing interest related to the study, authors, other individuals, or organizations.

Provenance and peer review

Not commissioned, externally peer reviewed.

Acknowledgments

None.

References

- [1] Sullivan T, Rogalska A, Vargas L. Atrioventricular block in pregnancy: 15.8 seconds of asystole. *Cureus*, 2020;12:e10720.
- [2] Irianti S, Tjandraprawira KD, Sumawan H, *et al.* Total atrioventricular block in pregnancy –Case report. *Annals of Medicine and Surgery* 2022;75:103441.
- [3] Nakashima A, Miyoshi T, Aoki-Kamiya C, *et al.* Predicting postpartum cardiac events in pregnant women with complete atrioventricular block. *J Cardiol* 2019;74:347–52.
- [4] Hidaka N, Chiba Y, Fukushima K, *et al.* Pregnant women with complete atrioventricular block: perinatal risks and review of management. *Pacing Clin Electrophysiol* 2011;34:1161–76.
- [5] Christensen A, Singh V, England A, *et al.* Management and complications of complete heart block in pregnancy. *Obstet Med* 2021. doi: 10.1177/1753495X211033489.
- [6] Suri V, Keepanasseril A, Aggarwal N, *et al.* Maternal complete heart block in pregnancy: analysis of four cases and review of management. *J Obstet Gynaecol Res* 2009;35:434–7.
- [7] Agha RA, Franchi T, Sohrab C, *et al.* The CARE 2020 guideline: updating consensus Surgical Case Report (CARE) guidelines. *Int J Surg* 2020;84: 226–30.
- [8] Swain S, Routray S, Behera S, *et al.* Pregnancy with complete heart block. *BMJ Case Rep CP* 2022;15:e244598.

- [9] Vijayaraman P, Ellenbogen KA. 14 - Atrioventricular Conduction System Disease. In: Ellenbogen KA, Wilkoff BL, Kay GN, Lau CP, Auricchio A, editors. *Clinical Cardiac Pacing, Defibrillation and Resynchronization Therapy* (Fifth Edition). Elsevier; 2017:399–453. doi:10.1016/B978-0-323-37804-8.00014-6
- [10] Baghel K, Mohsin Z, Singh S, *et al.* Pregnancy with complete heart block. *J Obstet Gynaecol India* 2016;66(suppl 2):623–5.
- [11] Thaman R, Curtis S, Faganello G, *et al.* Cardiac outcome of pregnancy in women with a pacemaker and women with untreated atrioventricular conduction block. *EP Europace* 2011;13:859–63.
- [12] Mandal S, Mandal D, Sarkar A, *et al.* Complete heart block and pregnancy outcome: an analysis from Eastern India. *SOJ Gynecol, Obstet Women's Health* 2015. doi:10.15226/2381-2915/1/1/00104
- [13] Dhiman N, Sarda N, Arora R. Management of complete heart block during pregnancy: heart block in pregnancy. *J Obstet Gynaecol Res* 2013;39:588–91.
- [14] Yafi DA, Noviani C, Saputri RE, *et al.* Complete heart block in pregnancy : a case report. *Indo J Cardiol* 2021;42.
- [15] Visseren FLJ, Mach F, Smulders YM, *et al.* 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice. *Eur Heart J* 2021;42:3227–337.
- [16] Aratake S, Yasuda A, Sawamura S. Cesarean section under spinal anesthesia in acquired complete atrioventricular block without a pacemaker: a case report. *Clin Case Rep* 2019;7:1663–6.
- [17] 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy | *European Heart Journal* | Oxford Academic. Accessed 17 February 2023. <https://academic.oup.com/eurheartj/article/42/35/3427/6358547>