

Azithromycin-Induced Bradycardia in an 80-Year-Old Male Patient with Chronic Obstructive Pulmonary Disease and Cor Pulmonale: A Case Report

Waqar Ali¹, Shahzad Zafar², Hameed Ur Rehman³, Sifat Ullah⁴, Fatma Hussain⁵, Yasir Ali⁶, Kamran Ahmad^{7*}

¹Geriatric Fellow, Rusell Hall Hospital, United Kingdom

²Senior House Officer, Tallaght University Hospital, Dublin, Ireland

³Senior House Officer, Rusell Hall Hospital, United Kingdom

⁴Senior House Officer, Mayo University Hospital, Ireland

⁵MBBS, Khyber Medical College, Peshawar, Pakistan

⁶Senior House Officer, Saint Luke General Hospital, Kilkenny, Ireland

⁷Resident Physician, Hayatabad Medical Complex, Peshawar, Pakistan

Citation: Waqar Ali, Shahzad Zafar, Hameed Ur Rehman, Sifat Ullah, Fatma Hussain, Yasir Ali, et al. *Azithromycin-Induced Bradycardia in an 80-Year-Old Male Patient with Chronic Obstructive Pulmonary Disease and Cor Pulmonale: A Case Report*. *Int Clin Med Case Rep Jour*. 2024;3(6):1-5.

Received Date: 30 June, 2024; **Accepted Date:** 03 July, 2024; **Published Date:** 09 July, 2024

***Corresponding author:** Kamran Ahmad, Resident Physician, Hayatabad Medical Complex, Peshawar, Pakistan

Copyright: © Kamran Ahmad, Open Access 2024. This article, published in *Int Clin Med Case Rep Jour* (ICMCRJ) (Attribution 4.0 International), as described by <http://creativecommons.org/licenses/by/4.0/>.

ABSTRACT

This case report focuses on an 80-year-old man with a history of chronic obstructive pulmonary disease (COPD) who experienced bradycardia after receiving azithromycin treatment for an acute exacerbation of COPD. Despite having no prior history of bradycardia or arrhythmia, the patient developed symptoms such as sweating, dizziness, and confusion about 30 minutes after receiving azithromycin. An electrocardiogram revealed bradycardia with a heart rate of 40 beats per minute. Immediate medical intervention was necessary, including increased oxygen support and administration of medications to manage hypotension. This case highlights the importance of recognizing and monitoring for cardiac complications, such as bradycardia, in patients receiving azithromycin therapy, especially those with COPD. The abstract aims to provide a clear understanding of the clinical scenario and its implications for healthcare providers, emphasizing the need for vigilance when prescribing azithromycin to patients with underlying cardiac conditions.

Keywords: Azithromycin; Bradycardia; Azithromycin

INTRODUCTION

Azithromycin is a broad spectrum antibiotics belonging to the macrolide class, commonly used to treat variety of bacterial infections. It is indicated in respiratory tract infections, sexually transmitted infection, Gastrointestinal infections and other infectious etiologies.^[1,2]

It is widely regarded as a medication with a higher level of safety. However, like any medication, it's not without its drawbacks. While most people tolerate it well, some may experience adverse effects, ranging from minor gastrointestinal discomfort, headache, dizziness to more serious issues such as cardiac complications.^[3,4] Of

particular concern are the potential cardiac side effects, including the prolongation of the QT interval—a measure of the heart's electrical activity—and the risk of developing dangerous heart rhythms.^[5] The risk appear to be higher in Individuals with pre-existing cardiac conditions, electrolyte abnormalities, or those taking medications known to prolong the QT interval.

Though relatively rare, one such cardiac complication associated with azithromycin use is bradycardia, which refers to an unusually slow heart rate.^[4,6] While the incidence of bradycardia following azithromycin treatment is low, documented cases in medical literature highlight its significance as a potential adverse effect.

In our study, we have a case of 80-years- old male with last medical history of chronic obstructive pulmonary disease who develop bradyarrhythmia after 30 minutes of the administration of azithromycin. By this study we aim to shed light on this association by presenting a detailed case report which will raise awareness amongst physicians about the possibility of azithromycin induced bradycardia.

CASE PRESENTATION

An 80-year-old male, presented with a history of chronic obstructive pulmonary disease (COPD) for the past three years, attributed to his smoking habit of two decades. He had also successfully completed a nine-month course of anti-tuberculous therapy for tuberculosis five years ago.

Presenting Complaints:

He complained of shortness of breath, fever, and productive cough persisting for one month, consistent with an acute exacerbation of COPD. Physical examination revealed cachexia, bilateral pedal edema, and palmar erythema. His vital signs were mostly normal, except for an oxygen saturation level of 88%. Chest examination indicated bilateral coarse crepitations, while abdominal examination revealed distension with a positive fluid thrill. An ultrasound confirmed congested liver secondary to cor pulmonale, supported by a transudative ascitic tap and echocardiography findings.

Initial Investigations:

Initial electrocardiogram (ECG) results were unremarkable (**Figure1**). However, arterial blood gas analysis (ABG) showed a pH of 7.1, PCO₂ of 55, PO₂ of 35.9, and bicarbonate level of 16. All other laboratory parameters were within normal limits, except for a chest X-ray revealing signs of lower respiratory tract infection. Consequently, treatment for acute exacerbation of COPD was initiated.

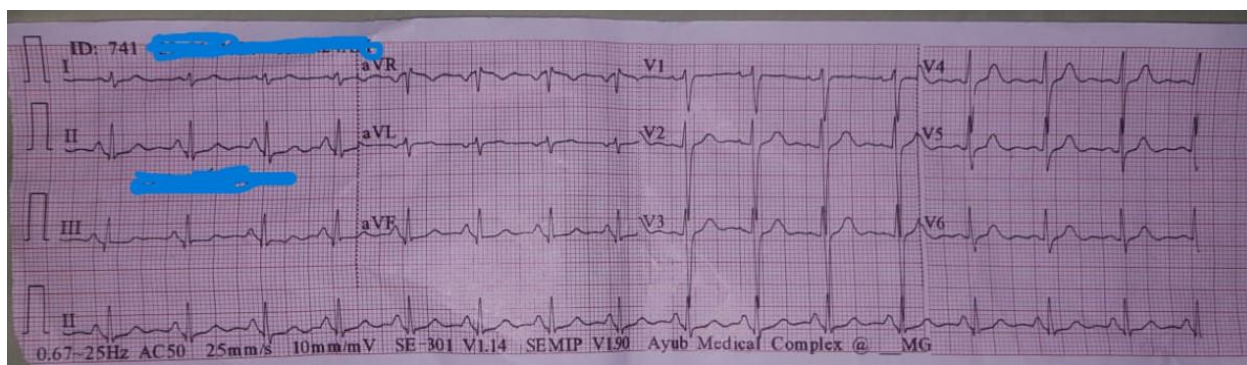


Figure 1: Showing Normal ECG (on admission)

Treatment Initiation:

He received nebulized ATEM/CLENIL, intravenous AZITHROMYCIN, LASIX (Furosemide), normal saline infusion, TANZO (Piperacillin/Tazobactam), and a single dose of Hydrocortisone 200mg stat.

Development of Bradycardia:

Approximately 30 minutes after the administration of azithromycin, the patient experienced diaphoresis, dizziness, and acute confusion. An ECG revealed bradyarrhythmia (**Figure 2**), with a heart rate of 40 BPM. Immediate measures were taken to maintain airway patency, and oxygen support was increased to 100% (15 liters via a non-rebreather mask). A cardiac monitor was promptly attached to monitor his rhythm, and blood pressure remained within the normal range.

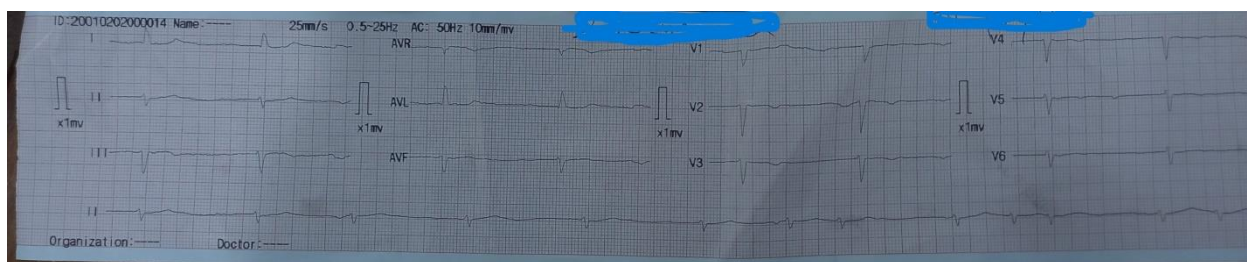


Figure2: Showing Bradyarrhythmia (after 30 minutes of azithromycin administration)

Hypotension Management:

Given the impending hypotension, atropine was administered. However, he did not respond positively to this intervention, necessitating escalation to dopamine and subsequently epinephrine infusion. Simultaneously, a call was placed to the intensive care unit (ICU) to inform them of the patient's condition, and he was promptly transferred. Because of consistent bradycardia, TPM was planned but the patient expired.

DISCUSSION

The presented case underscores the significance of azithromycin-induced bradycardia in a patient with COPD, devoid of any prior history of bradycardia or arrhythmia. Bradycardia, a potentially life-threatening condition, poses a serious medical concern due to its potential complications.

Existing literature predominantly reports azithromycin-related QTc interval prolongation, with limited instances documenting azithromycin-induced bradycardia in the absence of QTc interval abnormalities.^[1,3] The mechanism underlying azithromycin-induced bradycardia remains debated. Azithromycin metabolism primarily occurs through the CYP3A4 isoenzyme. Co-administration with medications inhibiting the CYP450 system increases the risk of cardiac adverse effects, including QTc prolongation, bradycardia, and AV block.^[8,9] Furthermore, dosage may influence the occurrence of macrolide-induced bradycardia, with higher doses predominantly associated with this adverse effect.^[10] Chronic obstructive pulmonary disease (COPD) significantly impacts patients, leading to exacerbations characterized by worsened respiratory symptoms. Effective management strategies, including the use of macrolide antibiotics like azithromycin, are crucial in mitigating exacerbation-related morbidity and mortality. Approximately 30 minutes after the administration of azithromycin, the patient experienced diaphoresis, dizziness, and acute confusion. Electrocardiogram (ECG) findings revealed bradycardia with a heart rate of 40 bpm, without

QT prolongation commonly observed in previous studies. This case contributes to the literature by highlighting azithromycin-induced bradycardia in a COPD patient, emphasizing the importance of recognizing and monitoring for cardiac complications in diverse patient populations receiving azithromycin therapy, particularly those with COPD.

CONCLUSION

This case highlights the importance of recognizing and understanding potential cardiac complications associated with azithromycin therapy, particularly in patients with underlying conditions like COPD. While azithromycin is generally considered safe, this report emphasizes the need for vigilance when prescribing it, especially in older patients with pre-existing cardiac conditions. The occurrence of bradycardia in this case, despite the absence of prior cardiac issues, emphasize the unpredictable nature of drug reactions. Healthcare providers should remain vigilant for such adverse effects, promptly recognizing and managing them to prevent serious complications. Additionally, further research is warranted to better understand the mechanisms underlying azithromycin-induced bradycardia and to refine guidelines for its safe use in clinical practice. Ultimately, this case serves as a reminder of the complexities involved in medication management and the importance of individualized patient care.

REFERENCES

1. Vibha Agrawal, Shobhana Chaudhari, Alexander Sy, Lolo Delatre. A case of hypotension and bradycardia precipitated by drug interaction of clarithromycin and calcium-channel blocker. 2015;63(9):1966-7.
2. Elyse Cornett, Matthew B Novitch, Alan D Kaye, Chris A Pann, Harish Siddaiah Bangalore, Gregory Allred. Macrolide and fluoroquinolone mediated cardiac arrhythmias: clinical considerations and comprehensive review. 2017;129:715–724.–1967.
3. Benn K, Salman S, Page-Sharp M, Davis TM, Buttery JP. Bradycardia and hypothermia complicating azithromycin treatment. Am J Case Rep. 2017;18:883–886.
4. Ninel Santos, Mário Oliveira, Ana Galrinho, José Alberto Oliveira, Lurdes Ferreira, Rui Ferreira. QT interval prolongation and extreme bradycardia after a single dose of azithromycin. Rev Port Cardiol. 2010;29(1):139-42.
5. McMullan BJ, Mostaghim M. Prescribing azithromycin. Aust Prescr. 2015;38:87–89.
6. Tilelli JA, Smith KM, Pettignano R. Life-threatening bradyarrhythmia after massive azithromycin overdose. Pharmacother. 2006;26:147–50.
7. Albert RK, Connett J, Bailey WC, Casaburi R, Cooper JA Jr, Criner GJ, et al. Azithromycin for prevention of exacerbations of COPD. N Engl J Med. 2011;365(8):689-98.
8. Erratum in: N Engl J Med. 2012 Apr 5;366(14):1356. PMID: 21864166; PMCID: PMC3220999.
9. Ryan M D Cook, Aileen S Garcia-Gayoso, Jennifer D Twilla. Concomitant use of nifedipine and clarithromycin leading to pulseless, bradycardic arrest. Am J Ther . 2019;26(4):e543-e546.
10. N Goldschmidt, T Azaz-Livshits, Gotsman, R Nir-Paz, A Ben-Yehuda, M Muszkat. Compound cardiac toxicity of oral erythromycin and verapamil. Ann Pharmacother. 2001;35(11):1396-9.
11. Mats F Nilsson, William S Webster. Effects of macrolide antibiotics on rat embryonic heart function in vitro. Birth Defects Res B Dev Reprod Toxicol. 2014;101(2):189-98.