WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 11, Issue 15, 67-72. Case Study ISSN 2277– 7105

QUETIAPINE RELATED QT INTERVAL PROLONGATION WITH GIANT T WAVE INVERSION CASE STUDY

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Article Received on
14 September 2022,
Revised on 04 Oct. 2022,
Accepted on 25 Oct. 2022
DOI: 10.20959/wjpr202215-26093

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ABSTRACT

QT interval is the period in which the ventricle contract and relax. It can be due to congenital or acquired causes. Quetiapine is an atypical anti-psychotic, and it is commonly used to treat some psychiatric symptoms and is reported to cause QT prolongation. However, in most reported cases, there is an association with a known risk factor of QT prolongation. Herein we report a case of quetiapine-related QT prolongation with the presence of possibly quetiapine-related giant t-wave inversion.

KEYWORDS: Quetiapine, QT Prolongation, T Wave Inversion.

INTRODUCTION

QT interval is the time taken for the ventricle to contract and relax. It usually takes 0.44 seconds, and it could be normally prolonged in females for up to 0.46 seconds.[1] This electrical activity illustrates the flow of ions in and out of cardiac cells. Any malfunctioning in these ion channels may lead to arrhythmia and electrocardiogram changes. This can be brought about by electrolyte imbalance and other risk factors. Multiple drugs can cause QT interval prolongation and should be used with caution. These drugs include antipsychotics, antiarrhythmics, antibiotics, and antidepressants.[2]

Quetiapine is one of the commonly used antipsychotics in elderlies to treat dementia and psychological symptoms[3], and one of the drugs reported to cause prolonged QT interval. However, a review of 12 case reports of quetiapine-related QT prolongation demonstrated that most reported cases are associated with other well-known risk factors driving prolonged QT. These risk factors include electrolyte imbalance, use of other well-known QT-prolonging antipsychotics, and quetiapine overdose.[4]

CASE REPORT

A 75 year old lady known to have dyslipidemia, hypertension, psychiatric illness, which she is using Quetiapine, vitamin D deficiency, osteoarthritis, status post bilateral total knee replacement, and no background of any cardiac disease. She was admitted under the care of orthopedics for left knee implant removal and cement spacer application.

She was referred to cardiology during admission as she developed sudden chest pain at rest. Physical examination revealed a conscious, alert, and oriented patient, not in distress. Vitally stable, chest, cardiovascular, abdomen, and lower limb examinations were unremarkable. Electrocardiogram was done for her and showed QT prolongation, with giant T wave inversion in the anterior leads (Fig.1). Previous Electrocardiogram (ECG) on her first day of admission was, normal (Fig.2). Cardiac enzymes, including Troponin I was negative. An Echocardiogram revealed a normal Ejection fraction. Her electrolytes were within normal range, and she was not in sepsis back then. The patient has a high-risk profile of developing coronary artery disease. Therefore, coronary artery angiography was done and showed normal coronaries. Pulmonary embolism was ruled out by Pulmonary computed tomography angiography (Fig3,4). Repeated ECG after a few days showed the same changes. After reviewing the patient's medications, we found that Quetiapine was recently resumed on her second day of admission as it was one of her home medications. She has been on Quetiapine for more than one year and was stopped by herself in the past six months before it's been resumed in this admission. The drug has been discontinued as it was the available explanation for the Electrocardiogram (ECG) changes. The patient was given a follow-up with the cardiology clinic.

DISCUSSION

QT prolongation is considered when the QT interval is more than 0.44 seconds in males and more than 0.46 in females. It can be due to congenital or acquired causes. Acquired causes include electrolyte imbalances like hypokalemia, hypocalcemia, and hypomagnesemia, and drugs, including anti-psychotics, antibiotics, antiarrhythmics, and anti-depressants.[5]

Even though first-generation antipsychotics carry a higher risk of developing Prolonged QT interval, Atypical (second-generation) anti-psychotics are thought to have a lower ability to elevate QT interval. Quetiapine is an atypical anti-psychotic, and it is commonly used to treat schizophrenia, acute manic attack, and major depression. As with any drug, quetiapine has

some side effects. These include dementia-related psychosis, neuroleptic malignant syndrome, orthostatic hypotension, and dizziness.[6]

Several conflicting studies have examined its capacity to lengthen the QTc interval. According to 12 published case reports of quetiapine-related QTc prolongation, 12 patients had at least one identifiable risk causing prolonged QT interval in addition to quetiapine.[7-11] According to published literature, hazardous consumption of quetiapine results in CNS depression that may require transient mechanical breathing and hypotension.[8] Prolonged QT interval may increase the risk of life-threatening polymorphic ventricular tachycardia.[9]

Our case represents QT interval prolongation after resuming Quetiapine therapeutic dose on her second day of hospital stay. The electrocardiogram showed normal sinus rhythm on her first day of admission before the procedure. The patient started to have chest pain on day seventeen of her admission. An ECG was ordered and showed a significantly prolonged QT interval along with giant T-wave inversion, which could represent ischemia-related T-wave changes. In reviewing the patient's medications, none are known to cause these ECG changes or record interaction with Quetiapine. After a comprehensive investigation and excluding all possible causes, we hypothesize that the ECG changes of QT interval prolongation were secondary to the effect of quetiapine. However, due to T-wave inversion, we can't exclude microvascular-related myocardial ischemia unmasked by the stress of surgery in the presence of a normal coronary angiogram. Therefore, we emphasize that patients using quetiapine undergo regular ECG with close monitoring.

CONCLUSION

QT interval prolongation can lead to life-threatening arrhythmias, with congenital and acquired causes of QT prolongation. Acquired causes should be avoided, and in the case of necessary medication, they should be used with caution and close monitoring.

Study limitations

Failure to attend cardiology follow-up after stopping quetiapine to re-assess ECG changes.

Consent

Written informed consent was obtained from the patient for publication.

Ethical approval

The study was approved by King Abdullah International Medical Research Center (KAIMRC).

Competing interest

The authors have declared that no competing interests exist.

Archive

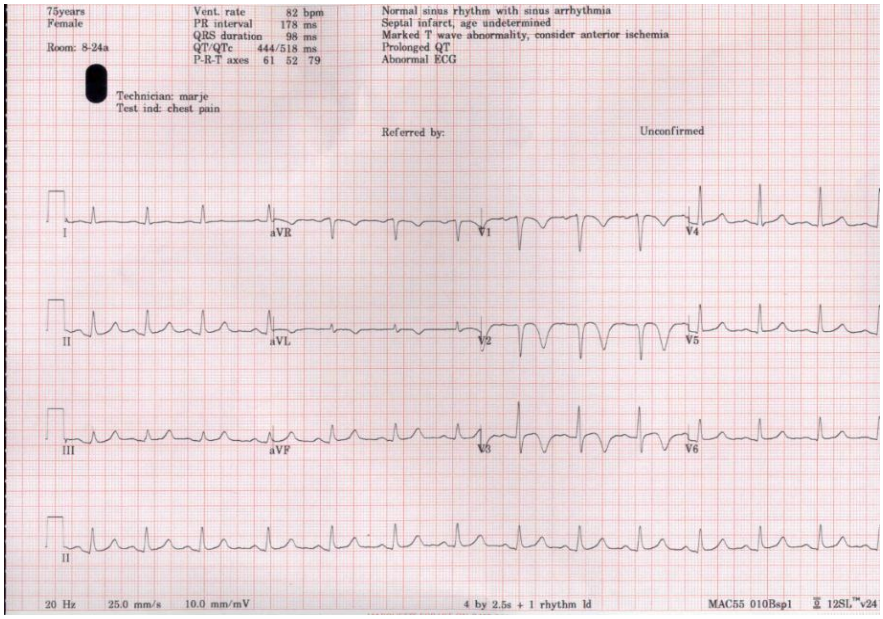

Fig.1

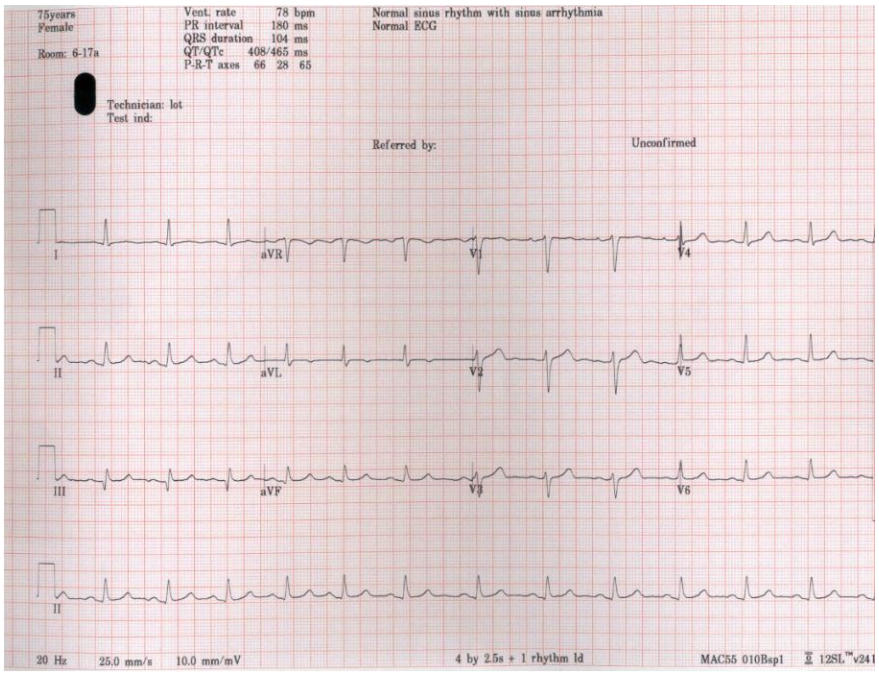

Fig.2

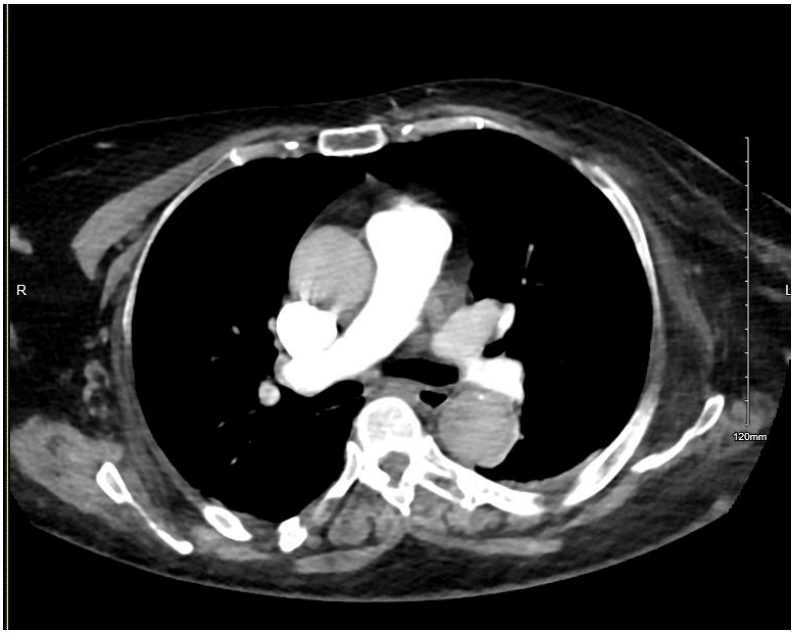

Fig.3.

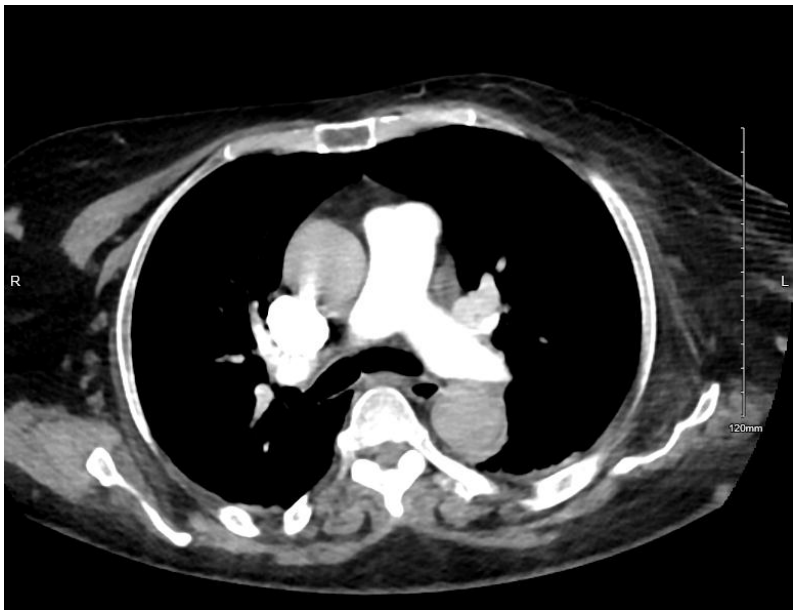

Fig.4

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