World Journal of Pharmaceutical and Life Sciences

www.wjpls.org

Impact Factor: 8.21 Coden USA: WJPLA7

TORSADOGENIC RISK ASSOCIATED WITH PROKINETIC MEDICATION: A CASE REPORT OF QT PROLONGATION

Mr. Vetriselvan V.[1], Dr. M. K. Sundar Sri[2], Dr. M. Kalaiarasan*[3]

[1]Pharm D - Doctor of Pharmacy Inter, Department of Pharmacy Practice, School of Pharmaceutical Sciences, Vels Institute of Science Technology and Advanced Studies, Chennai, India. Vetriselvan02.10.2001@gmail.com
[2]Assistant Professor, Department of Pharmacy Practice, School of Pharmaceutical Sciences, Vels Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai - 600117, India. sundarsri.sps@vistas.ac.in
[3]Assistant Professor, Department of Phamracy Practice, School of pharmaceutical sciences, Vels Institute of Science Technology and Advanced Studies, Chennai, India. kalaiarasan.murugaiyan@gmail.com

***Corresponding Author: Dr. M. Kalaiarasan**

Assistant Professor, Department of Phamracy Practice, School of pharmaceutical sciences, Vels Institute of Science Technology and Advanced Studies, Chennai, India.

DOI: https://doi.org/10.5281/zenodo.21279293

How to cite this Article: Mr. Vetriselvan V.[1], Dr. M. K. Sundar Sri[2], Dr. M. Kalaiarasan*[3] (2026). Torsadogenic Risk Associated With Prokinetic Medication: A Case Report Of Qt Prolongation. World Journal of Pharmaceutical and Life Science, 12(7), 199-204.

Article Received on 05/05/2026 **Article Revised on 25/05/2026** **Article Published on 01/07/2026**

ABSTRACT

Background: Drug-induced QT interval prolongation is a clinically significant adverse drug reaction that can predispose patients to Torsades de Pointes, a potentially fatal ventricular arrhythmia. Prokinetic agents, although widely used for gastrointestinal motility disorders, have been implicated in cardiac repolarization abnormalities. **Case Presentation:** We report a case of a 58-year-old female with type 2 diabetes mellitus and hypertension who developed palpitations, dizziness, and near-syncope following initiation of domperidone for diabetic gastroparesis. Electrocardiography revealed marked QTc prolongation of 528 ms. Laboratory investigations, including serum electrolytes and cardiac biomarkers, were within normal limits, and echocardiography showed no structural heart disease. A diagnosis of domperidone-induced QT prolongation was made. The drug was immediately discontinued, and the patient was managed with cardiac monitoring and supportive care, including electrolyte optimization. Serial ECGs demonstrated progressive normalization of the QT interval over one week. **Conclusion**: Domperidone can cause significant QT prolongation leading to torsadogenic risk. Early detection, prompt drug withdrawal, ECG monitoring, and supportive care are essential to prevent life-threatening ventricular arrhythmias and complications.

KEYWORDS: QT prolongation, domperidone, Torsades de Pointes, prokinetic drugs, adverse drug reaction.

INTRODUCTION

Drug induced prolongation of the QT interval is a clinically significant adverse reaction, characterized by delay of ventricular repolarization, and is predisposing factors to life-threatening arrhythmias including Torsades de Pointes (TdP). The Q-T interval measured on an electrocardiogram reflects the time taken for both depolarization and repolarization of the ventricles. Elongation of the Q-T interval increases the likelihood of polymorphic ventricular tachycardia and subsequent sudden cardiac death. Numerous drugs from all therapeutic classes have been implicated in causing QT prolongation and thus are of significant clinical interest and a concern to pharmacovigilance bodies. Prevention and timely identification of the risk are key particularly when many drugs are prescribed to high risk patients and those in hospitals.[1,2]

Prokinetic drugs are frequently used in the treatment of gastrointestinal motility disorders, including gastroparesis, functional dyspepsia, and gastroesophageal reflux disease. These agents work primarily by modulating dopaminergic and serotonergic receptors to increase gastrointestinal motility and gastric emptying. Domperidone, a peripherally acting dopamine D2 receptor antagonist, is frequently used, as it has an

effective therapeutic profile and fewer CNS side effects than metoclopramide. Nonetheless, domperidone has been linked to Cardiac adverse events such as QTc interval prolongation and ventricular arrhythmias.[3,4]

The electrophysiological mechanisms involved in drug-induced QT prolongation involve largely blockades of cardiac potassium channels. Particularly influential are the effects on the rapid delayed rectifier potassium current (IKr) which is a function of hERG channels. By blocking hERG channels the period of repolarization in the ventricle is extended, thereby increasing the duration of the action potential and producing the underlying environment for the genesis of early afterdepolarizations. Early afterdepolarizations, along with the other electrical phenomena mentioned above provide the necessary milieu for the development of Torsades de Pointes. The probability of developing the latter condition is increased significantly in patients who have inherent electrophysiologic abnormalities including but not limited to: electrolyte disturbances, heart disease, bradycardia, advanced age, female gender, and concurrent therapy with another QT-prolonging agent.[5,6]

Although its use is being recognised, domperidone is commonly prescribed, especially to diabetic patients with gastroparesis and for functional gastrointestinal disorders. In most of the patients with QT prolongation, it is either under reported or diagnosed after substantial deterioration in their condition. Therefore, routine ECG monitoring, review of drugs taken and clinical vigilance by healthcare professionals for torsadogenic potential of the drugs is essential. The objective of this case report is to demonstrate the possibility of domperidone-induced QT prolongation and its potential clinical consequences and to provide guidance for a safe prescribing practice and pharmacovigilance in daily practice.[7,8]

CASE PRESENTATION

Patient Demographics

A 58-year-old female presented to the emergency department of a tertiary care teaching hospital with complaints of palpitations, dizziness, and a near-syncopal episode. She weighed 68 kg, had a body mass index (BMI) of 27.1 kg/m², and was a known case of type 2 diabetes mellitus and hypertension. The patient was conscious, cooperative, and oriented to time, place, and person at the time of admission.

Chief Complaints

The patient presented with the following complaints:

- Intermittent palpitations for 2 days
- Dizziness for 2 days
- Generalized weakness for 2 days
- One episode of near-syncope on the day of admission

The symptoms were sudden in onset and occurred predominantly during routine daily activities. There was no history of complete loss of consciousness.

History of Present Illness

The patient was apparently well until one week before admission when she was diagnosed with diabetic gastroparesis based on symptoms of postprandial fullness, abdominal bloating, nausea, and early satiety. She was prescribed domperidone 10 mg orally three times daily before meals to improve gastric motility. Approximately five days after initiation of domperidone therapy, she began experiencing intermittent episodes of palpitations associated with dizziness and light-headedness. The frequency and intensity of these symptoms gradually increased over the following two days. On the day of presentation, she experienced an episode of near-syncope while walking, prompting her family members to bring her to the emergency department. She denied chest pain, dyspnea, fever, cough, recent infections, seizures, head injury, or previous episodes of syncope. There was no history suggestive of ischemic heart disease or heart failure.

Past Medical History

The patient had a history of:

- Type 2 Diabetes Mellitus for 12 years
- Essential Hypertension for 8 years

Medication History

The patient's regular medications included:

Medication	Dose	Frequency	Indication
Metformin	500 mg	Twice daily	Type 2 Diabetes Mellitus
Insulin Glargine	18 units	Once daily at bedtime	Type 2 Diabetes Mellitus
Amlodipine	5 mg	Once daily	Hypertension

Recently prescribed medication:

Medication	Dose	Frequency	Indication
Domperidone	10 mg	Three times daily before meals	Diabetic Gastroparesis

No recent use of antiarrhythmic drugs, macrolide antibiotics, fluoroquinolones, antipsychotics, antidepressants, or other medications known to prolong the QT interval was reported.

Family History

There was no family history of:

- Sudden cardiac death
- Congenital long QT syndrome
- Inherited cardiac arrhythmias

- Premature coronary artery disease

Both parents had a history of hypertension, but no hereditary cardiovascular disorders were identified.

Social History

The patient was married and lived with her family. She maintained an independent lifestyle and was able to perform activities of daily living without assistance.

She denied:

- Tobacco smoking
- Alcohol consumption
- Recreational drug use
- Use of herbal or alternative medicines

Dietary history revealed adherence to a diabetic diet with occasional dietary indiscretions.

Occupational History

The patient was a retired school teacher. She had worked in the education sector for more than 30 years before retirement. There was no occupational exposure to chemicals, toxins, heavy metals, radiation, or other environmental factors known to contribute to cardiac abnormalities.

Allergy History

The patient had no known history of:

- Drug allergies
- Food allergies
- Environmental allergies

She had previously tolerated all prescribed medications without any documented hypersensitivity reactions.

Physical Examination

General Examination

- Conscious and oriented
- Moderately built and nourished
- No pallor, icterus, cyanosis, clubbing, lymphadenopathy, or pedal edema

Vital Signs

Parameter	Value
Blood Pressure	128/76 mmHg
Pulse Rate	62 beats/minute
Respiratory Rate	18 breaths/minute
Temperature	98.4°F
Oxygen Saturation	98% on room air

Systemic Examination

Cardiovascular System

- S1 and S2 heard normally
- No murmurs, rubs, or gallops

Respiratory System

- Bilateral air entry equal
- No added sounds

Abdominal Examination

- Soft and non-tender
- No organomegaly

Neurological Examination

- No focal neurological deficits
- Cranial nerves intact
- Normal motor and sensory examination

Laboratory Investigations

Hematological Parameters

Parameter	Result	Reference Range
Hemoglobin	12.6 g/dL	12–16 g/dL
Total Leukocyte Count	7,800 cells/mm³	4,000–11,000 cells/mm³
Platelet Count	2.4×10^5/mm³	$1.5–4.5 \times 10^5$/mm³

Biochemical Parameters

Parameter	Result	Reference Range
Serum Sodium	139 mmol/L	135–145 mmol/L
Serum Potassium	4.1 mmol/L	3.5–5.0 mmol/L
Serum Magnesium	1.9 mg/dL	1.7–2.2 mg/dL
Serum Calcium	9.2 mg/dL	8.5–10.5 mg/dL
Blood Urea Nitrogen	18 mg/dL	7–20 mg/dL
Serum Creatinine	0.9 mg/dL	0.6–1.2 mg/dL
Random Blood Glucose	176 mg/dL	70–200 mg/dL

Cardiac Biomarkers

Parameter	Result
Troponin I	Negative
CK-MB	Within Normal Limits

Electrocardiographic Findings

Initial 12-lead electrocardiogram revealed:

- Sinus rhythm
- Heart rate: 64 beats/minute
- Marked QT interval prolongation
- Corrected QT interval (QTc): 528 ms
- No ST-segment elevation or depression
- No evidence of acute myocardial ischemia

Transthoracic Echocardiography

- Normal cardiac chamber dimensions
- Preserved left ventricular ejection fraction (60%)
- No valvular abnormalities
- No structural heart disease
- No regional wall motion abnormalities

Causality Assessment

The causality was assessed using the Naranjo Adverse Drug Reaction Probability Scale. The score was 7, which indicates the likelihood of an adverse drug reaction is "probable". A likely cause-effect relationship was supported by the timing between domperidone administration and the onset of QT prolongation, improvement after the drug was withdrawn and exclusion of alternative causes

DIAGNOSIS

Based on the patient's clinical presentation, medication history, electrocardiographic findings, and exclusion of alternative causes, a diagnosis of drug-induced QT interval prolongation secondary to domperidone therapy with increased risk of Torsades de Pointes (TdP) was established. The patient developed palpitations, dizziness, and near-syncope within one week of initiating domperidone treatment for diabetic gastroparesis. Electrocardiography demonstrated a markedly prolonged corrected QT (QTc) interval of 528 ms, significantly exceeding the normal upper limit for females (<470 ms). Laboratory investigations revealed normal serum potassium, magnesium, and calcium levels, excluding electrolyte abnormalities as a contributing factor. Cardiac biomarkers were negative, and echocardiography showed no evidence of structural heart disease or cardiac dysfunction. The temporal association between domperidone initiation and symptom onset, along with progressive normalization of the QTc interval following drug withdrawal, strongly supported the diagnosis. Causality assessment using the Naranjo Adverse Drug Reaction Probability Scale indicated a probable drug-related adverse event.

MANAGEMENT

Upon establishing that a patient's QTc interval was prolonged due to domperidone, the causative agent was removed immediately (Domperidone 10mg p.o. B.i.d.). The patient was admitted to a telemetry cardiac care unit where serial ECG's could be performed since a QTc interval>500msec places the patient at increased risk for developing Torsades de Pointes (TdP) and other ventricular arrhythmias.

Electrolyte optimization was performed in conjunction with usual management for an acquired QT prolongation, even though the electrolyte levels were in the normal range initially. Intravenous Magnesium Sulfate (2 grams over 15 minutes) was administered to the patient, followed by serum magnesium levels. In patients who have a significantly prolonged QT interval, magnesium replacement is indicated as it contributes to the stability of electrical activity in the heart and reduces the likelihood of developing TdP. The potassium level was maintained at the higher end of normal range (4.5-5.0 mmol/L) with the help of supplementation of Potassium Chloride (20-40 mEq/day orally prn) to reduce the arrhythmogenic potential.

Telemetric monitoring was continuous for the duration of the hospital stay. No episodes of ventricular tachycardia, ventricular fibrillation or TdP were seen. 12-lead ECGs were performed every 24 hours in order to monitor QT interval recovery. Anti-arrhythmics were not required as the patient was haemodynamically stable and remained non-arrhythmic throughout their admission.

Diabetic gastroparesis is now being managed by conservative treatment: changed diet to smaller more frequent meals, lower fat content, improved diabetes control. The diabetes is now managed with Metformin 500mgBD and Insulin Glargine 18 Units at bedtime. No additional prokinetic agents are being prescribed due to their likely cardiac conduction effects similar to domperidone.

After 72 hours of treatment and follow up the patient symptoms had completely resolved. Repeat ECG showed a shortening of the QTc from 528 ms to 472 ms and a further ECG one week later showed that the QTc was within normal limits at 438 ms. The patient was discharged and instructed to refrain from QT prolonging drugs in the future and have regular cardiac checks if any further potentially cardiotoxic drugs were started.

DISCUSSION

The present case highlights the clinically important association between prokinetic medications and drug-induced QT interval prolongation. In this case, patient developed palpitations, dizziness, and near-syncope shortly after initiation of domperidone therapy, with ECG demonstrating a QTc interval of 528 ms. The temporal relationship between drug exposure and symptom onset strongly suggested a medication-related adverse event. Similar findings have been reported by Johannes et al., who observed an increased risk of serious ventricular arrhythmias and sudden cardiac death among domperidone users, particularly in susceptible individuals. Likewise, Roden emphasized that drug-induced QT prolongation remains one of the most common reasons for drug restrictions and withdrawals because of its association with potentially fatal arrhythmias. These findings support the causal relationship observed in this patient.[9,10]

The mechanism underlying the adverse event in this case is consistent with the known pharmacological effect of domperidone on cardiac potassium channels. Domperidone can inhibit the rapid delayed rectifier potassium current (IKr), resulting in delayed ventricular repolarization and QT interval prolongation. In simple terms, the heart takes longer to reset electrically between

beats, creating an environment where dangerous rhythm disturbances can occur. Yap and Camm described this mechanism extensively and explained how prolonged ventricular repolarization predisposes patients to Torsades de Pointes. Similarly, Liu and Juurlink highlighted that many commonly prescribed medications can unexpectedly affect cardiac electrical activity and increase the risk of serious arrhythmias. The electrophysiological findings in this patient closely mirror these previously reported mechanisms.[11,12]

A notable feature of the present case was the occurrence of significant QT prolongation despite the absence of several commonly recognized risk factors such as electrolyte disturbances, structural heart disease, renal dysfunction, or concomitant use of other QT-prolonging medications. This finding emphasizes that adverse cardiac effects associated with domperidone may occur even in patients who appear to be at relatively low risk. The patient developed symptoms shortly after initiation of therapy, and comprehensive investigations failed to identify an alternative explanation. Khatib R et al. highlighted that drug-induced QT prolongation is often unpredictable and may result from individual variations in susceptibility, drug metabolism, and cardiac ion channel sensitivity. Similarly, Kannankeril et al. described acquired long QT syndrome as a multifactorial condition in which certain medications can independently trigger clinically significant repolarization abnormalities. The findings in this patient are consistent with these observations and reinforce the importance of ECG monitoring even in patients without obvious predisposing factors.[13,14]

The favorable clinical outcome observed in this case underscores the importance of early recognition and prompt management of drug-induced QT prolongation. Immediate discontinuation of domperidone, continuous cardiac monitoring, and maintenance of normal electrolyte levels resulted in complete resolution of symptoms and normalization of the QT interval within one week. Early intervention likely prevented progression to Torsades de Pointes, a potentially fatal ventricular arrhythmia. Drew et al. emphasized that timely identification of prolonged QT intervals and withdrawal of offending medications are among the most effective strategies for preventing serious arrhythmic complications in hospitalized patients. Likewise, Tisdale et al. demonstrated that careful risk assessment and monitoring can significantly reduce adverse outcomes associated with QT-prolonging drugs. The clinical course of this patient closely mirrors these recommendations and highlights the critical role of pharmacovigilance, ECG surveillance, and patient education in ensuring medication safety.[15,16]

CONCLUSION

This case underscores the clinically significant risk of QT interval prolongation associated with prokinetic agents such as domperidone. Although commonly prescribed for gastrointestinal motility disorders, these drugs can precipitate serious cardiac adverse effects, including Torsades de Pointes, particularly in susceptible individuals. The patient in this report developed marked QTc prolongation shortly after initiation of therapy, despite having no major predisposing conditions. Prompt recognition of symptoms, immediate discontinuation of the offending drug, and continuous cardiac monitoring resulted in complete recovery and normalization of the QT interval. This case emphasizes the importance of baseline and follow-up ECG monitoring, careful assessment of patient risk factors, and avoidance of QT-prolonging medications when possible. Increased awareness among clinicians and adherence to pharmacovigilance practices are essential to prevent potentially fatal drug-induced arrhythmias.

REFERENCES

1. Li M, Ramos LG. Drug-Induced QT Prolongation And Torsades de Pointes. P T., 2017 Jul; 42(7): 473-477.
2. Del Rosario ME, Weachter R, Flaker GC. Drug-induced QT prolongation and sudden death. Mo Med., 2010 Jan-Feb; 107(1): 53-8.
3. Quigley EM. Prokinetics in the Management of Functional Gastrointestinal Disorders. J Neurogastroenterol Motil., 2015 Jul 30; 21(3): 330-6
4. Quigley EM. Prokinetics in the Management of Functional Gastrointestinal Disorders. J Neurogastroenterol Motil., 2015 Jul 30; 21(3): 330-6.
5. Nachimuthu S, Assar MD, Schussler JM. Drug-induced QT interval prolongation: mechanisms and clinical management. Ther Adv Drug Saf., 2012 Oct; 3(5): 241-53.
6. Kallergis EM, Goudis CA, Simantirakis EN, Kochiadakis GE, Vardas PE. Mechanisms, risk factors, and management of acquired long QT syndrome: a comprehensive review. Scientific World Journal., 2012; 2012: 212178.
7. Ehrenpreis ED, Roginsky G, Alexoff A, Smith DG. Domperidone is Commonly Prescribed With QT-Interacting Drugs: Review of a Community-based Practice and a Postmarketing Adverse Drug Event Reporting Database. J Clin Gastroenterol., 2017 Jan; 51(1): 56-62.
8. Ehrenpreis ED, Roginsky G, Alexoff A, Smith DG. Domperidone is Commonly Prescribed With QT-Interacting Drugs: Review of a Community-based Practice and a Postmarketing Adverse Drug Event Reporting Database. J Clin Gastroenterol., 2017 Jan; 51(1): 56-62.
9. Johannes CB, Varas-Lorenzo C, McQuay LJ, Midkiff KD, Fife D. Risk of serious ventricular arrhythmia and sudden cardiac death in a cohort of users of domperidone: a nested case-control study. Pharmacoepidemiol Drug Saf., 2010 Sep; 19(9): 881-8.

10. Roden DM. Drug-induced prolongation of the QT interval. N Engl J Med., 2004 Mar 4; 350(10): 1013-22.
11. Yap YG, Camm AJ. Drug induced QT prolongation and torsades de pointes. Heart, 2003 Nov; 89(11): 1363-72
12. Liu BA, Juurlink DN. Drugs and the QT interval - caveat doctor. N Engl J Med., 2004 Sep 9; 351(11): 1053-6
13. Kannankeril P, Roden DM, Darbar D. Drug-induced long QT syndrome. Pharmacol Rev., 2010 Dec; 62(4): 760-81.
14. Khatib R, Sabir FRN, Omari C, Pepper C, Tayebjee MH. Managing drug-induced QT prolongation in clinical practice. Postgrad Med J., 2021 Jul; 97(1149): 452-458.
15. Drew BJ, Ackerman MJ, Funk M, Gibler WB, Kligfield P, Menon V, Philippides GJ, Roden DM, Zareba W; American Heart Association Acute Cardiac Care Committee of the Council on Clinical Cardiology, the Council on Cardiovascular Nursing, and the American College of Cardiology Foundation. Prevention of torsade de pointes in hospital settings: a scientific statement from the American Heart Association and the American College of Cardiology Foundation. Circulation, 2010 Mar 2; 121(8): 1047-60.
16. Tisdale JE, Jaynes HA, Kingery JR, Mourad NA, Trujillo TN, Overholser BR, Kovacs RJ. Development and validation of a risk score to predict QT interval prolongation in hospitalized patients. Circ Cardiovasc Qual Outcomes, 2013 Jul; 6(4): 479-87.