A fatal case of repeated ventricular fibrillation following torsade de pointes, due to multiple administrations of metoclopramide

Yusuke Watanabe[1], Itaru Nakamura[1], Yasuyuki Takebayashi[1], and Hidehiro Watanabe[1]

[1]Tokyo Medical University Hospital

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Abstract

Although metoclopramide has many adverse effects, Torsade de pointes (TdP) is rare. We describe a fatal case of repeated ventricular fibrillation following TdP, due to multiple administrations of metoclopramide. Multiple administrations of metoclopramide over a short time to a patient with risk factors of TdP should be reconsidered.

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Yusuke Watanabe[1], Itaru Nakamura*[1], Yasuyuki Takebayashi,[1] and Hidehiro Watanabe[1].

Department of Infection Prevention and Control, Tokyo Medical University Hospital, Tokyo, Japan

*Corresponding author

Itaru Nakamura, M.D., Ph.D.

Department of Infection Prevention and Control

Tokyo Medical University Hospital

6-7-1 Nishishinjuku, Shinjuku-ku, Tokyo 160-0023, Japan

Tel.: +81-3-3342-6111 (ext. 2525)

Fax: +81-3-5339-3817

E-mail: task300@tokyo-med.ac.jp

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Abstract

Although metoclopramide has many adverse effects, Torsade de pointes (TdP) is rare. We describe a fatal case of repeated ventricular fibrillation following TdP, due to multiple administrations of metoclopramide. Multiple administrations of metoclopramide over a short time to a patient with risk factors of TdP should be reconsidered.

Introduction

Metoclopramide is a dopamine 2-receptor antagonist with antiemetic activity that releases acetylcholine from postganglionic nerve endings and prevents apomorphine-induced vomiting[1]. Metoclopramide is an antiemetic agent for chemotherapy and post-operative nausea and vomiting[2,3]. Although metoclopramide

has many adverse effects(1), torsade de pointes (TdP) was not stated[4]. Some risk factors of TdP include advanced age, female, congestive heart failure and myocardial infarction, corrected QT (QTc) >500 ms, QT-prolonging drugs, impaired hepatic drug metabolism, hypokalemia, hypomagnesemia, hypocalcemia, diuretics causing hypokalemia and hypomagnesemia, and bradycardia[5]. Recently, a meta-analysis finding suggested metoclopramide increased cardiac event risk, including sudden cardiac death[6]. However, few case reports associate TdP with metoclopramide, and none report fatalities. We describe a fatal case of repeated ventricular fibrillation (VF) following TdP, due to multiple administrations of metoclopramide.

Case report

A 92-year-old woman was admitted for epigastric pain, nausea and diarrhea that persisted for a week. Her medical history consisted of a complete atrioventricular block on a pacemaker, atrial fibrillation, ischemic cardiac disease and chronic kidney disease. She had been taken enalapril, spironolactone, azosemide, carvedilol, apixaban, rabeprazole, rosuvastatin, nicorandil and zolpidem. On admission, her body temperature was 36.7 , blood pressure 109/75 mmHg, heart rate 58 BPM, and oxygen saturation 98% on room air. She had a slight percussion tenderness on the right hypochondriac region. The laboratory data showed leukocytes 20,600/μL, aspartate aminotransferase 27 U/L, alanine aminotransferase 41 U/L, creatinine 2.07 mg/dL, potassium concentration 4.0 mmoL/L, magnesium concentration 1.8 mg/dL, and C-reactive protein 25.9 mg/dL. Her electrocardiogram showed pacemaker potential and QTc interval of 453 ms (Figure A). Although her echocardiogram showed diffuse hypo-kinesis with an ejection fraction of 30%, there was no change compared to a week earlier. She received three drip infusions of metoclopramide 10 mg for nausea after admission. Nine hours after initial administration, ECG showed QTc prolongation of 551 m/s (Figure B). Twenty hours from initial administration, she suddenly lost consciousness with TdP (Figure C). Then, the laboratory data showed creatine kinase-MB 7 U/L, troponin T 0.088 ng/dL, potassium concentration 5.1 mmol/L, corrected calcium concentration 9.9 mg/dL, and magnesium concentration 1.8 mg/dL. The venous blood gas analysis showed pH 7.344, oxygen partial pressure 37.9 mmHg, carbon dioxide partial pressure 40.3 mmHg, bicarbonate level 21.5 mmol/L, lactate level 2.08 mmol/L. Contrast CT revealed liver abscess and portal vein thrombosis. Despite cardiopulmonary resuscitation with three defibrillations for every instance of VF following TdP and administration of adrenalin and amiodarone, VF returned, and she died. No antibiotics were administrated. *Escherichia coli* from her blood culture was positive on the fifth day from collection.

Discussion

Some reports suggested QT prolongation caused by metoclopramide[7-9]. A recent study stated that supratherapeutic doses of metoclopramide might lead to QT and action potential prolongation by inhibiting the human Ether-a-go-go-related gene and sodium channel, resulting in ventricular arrhythmias[8]. Moreover, 80% of metoclopramide is excreted in the urine, and impaired renal function prolongs the half-life[1]. Therefore, we hypothesized that QT prolongation due to metoclopramide was excessively expressed under multiple doses on impaired renal dysfunction.

To our knowledge, there are only three survived cases of torsade de pointes associated with metoclopramide. All cases experienced TdP caused by metoclopramide plus other risk factors. The first case was a 92-year-old woman taking two different QT-prolonging drugs[10]. The second case was an 86-year-old man administered metoclopramide four times daily with heart and renal failure[11]. The third case was a 50-year-old woman using three different QT-prolonging drugs[12]. Although our patient had been taking diuretics, her electrolytes were normal. None of the patient's other drugs interacted with metoclopramide, and she was not taking any QT-prolonging drugs known to cause TdP[4]. Therefore, three administrations of 10 mg metoclopramide in addition to advanced age, female, ischemic cardiac disease and chronic kidney disease might have contributed to repeated VF following TdP. Multiple administrations of metoclopramide over a short time to a patient with risk factors of TdP should be reconsidered.

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Ethical approval

Ethical approval was not required. Informed consent was obtained from the patient.

Conflicts of interest

The authors declare that they have no conflicts of interest to disclose.

Author contribution

YW, YT and IN were involved in the clinical management. YW wrote the manuscript. IN and HW was involved in the revision of the manuscript. All authors approved the final version for submission.

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