

## Case Report of Cardiac Dysrhythmia Following Dental Prescription of Metronidazole

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### Abstract

Metronidazole is nitroimidazole antibiotic medication which has a specific activity against anaerobic bacteria and protozoa. In cardiology, the QT interval represents electrical depolarization and repolarization of the ventricles. A lengthened QT interval is a marker for the potential of ventricular tachyarrhythmia. Rare cases have been reported with QT prolongation in which metronidazole antibiotic had been used. The arrhythmogenic properties of metronidazole is not yet clear. This case reports a 10-year-old male child of 30 kg body weight with no history of any chronic illness or drug allergy came to the dental clinic with facial swelling, which was diagnosed as dental abscess. He was given oral metronidazole (500 mg 3 times/day for 5 days).

On the third day, he presented to the emergency department with palpitation, vomiting and then he collapsed. Cardiac Pulmonary Resuscitation (CPR) done and Electrocardiogram (ECG) showed prolonged QT corrected interval (QTc 480 ms). Laboratory test including serum potassium, magnesium and liver functional tests were within normal. Metronidazole was immediately stopped and subsequently the ECG returned to normal. In Conclusion, Metronidazole can potentiate QT prolongation. Further investigation should be carried out to assess its potential effect on QT interval and subsequent lethal arrhythmias. The maximum pediatric dose should be reviewed.

**Keywords:** Metronidazole; Antibiotic; Case report; Electrocardiogram; Cardiac pulmonary resuscitation; Dental; Anaerobic bacteria; Protozoa; Isoenzymes; Chronic illness

### Introduction

Metronidazole is a nitroimidazole antibiotic medication which has specific activity against anaerobic bacteria and protozoa. It is a potent inhibitor of CYP3A4 and CYP2C9 isoenzymes. In theory, it may cause QT prolongation and Torsades de Pointes (TdP) by inhibiting the metabolism of other QT prolongation agents [1-3], whereas the effect of metronidazole alone on QT interval is not well documented [4].

QT prolongation can be acquired due to inherited long QT syndromes or due to risk factors such as bradycardia or hypokalemia [5,6], in addition to drug-drug interactions which is considered the major cause of QT prolongation [7]. Recently, many cases have been reported with QT prolongation with/without TdP, in which metronidazole antibiotic had been used. Regardless of the medical history and the indication of metronidazole therapy either alone or in combination with other drugs, ECG reverted to normal within several hours of immediate drug withdrawal [8-11]. Likewise, a case had been reported in our clinic. Accordingly, the purpose of our case report is to illustrate the potentiality of the metronidazole in QT prolongation.

### Case Presentation

A 10-year-old male child of 30 kg body weight with no history of any chronic illness or drug allergy came to the dental clinic with facial swelling, which was diagnosed as dental abscess. He was given oral metronidazole (500 mg 3 times/day for 5 days). On the third day, he presented to the emergency department with palpitation, vomiting and then he collapsed. CPR was done and ECG showed prolonged QT corrected interval (QTc 480 ms) (Figure 1). Physical examination and laboratory tests including serum potassium and magnesium and liver functional test were within normal. Metronidazole was immediately stopped and subsequently the ECG returned to normal. Two weeks after, the ECG has been repeated and showed QTc of 390 ms.

### Discussion

Our case was the first case in our clinic to develop prolonged QT interval after using metronidazole. Metronidazole is one of the choices to treat acute dentoalveolar abscesses [12]. It is important to mention that the pediatric dose recommended for bacterial anaerobic infection is 7.5 mg/kg orally or IV every 6 hours, however the dose that used was the maximum pediatric dose (50 mg/kg/day orally in 3 divided doses) that usually used in treatment of amebiasis. Since our patient is not known to have any risk factors to prolong QT interval such as previous use of medication, or electrolyte imbalances, and he was confirmed that he has normal structural heart and function. He was diagnosed to have a drug induced long QT syndrome (congenital long QT

syndrome is a genetic disorder that has to be confirmed by genetic testing) similar to one of the cases that had been reported [9].

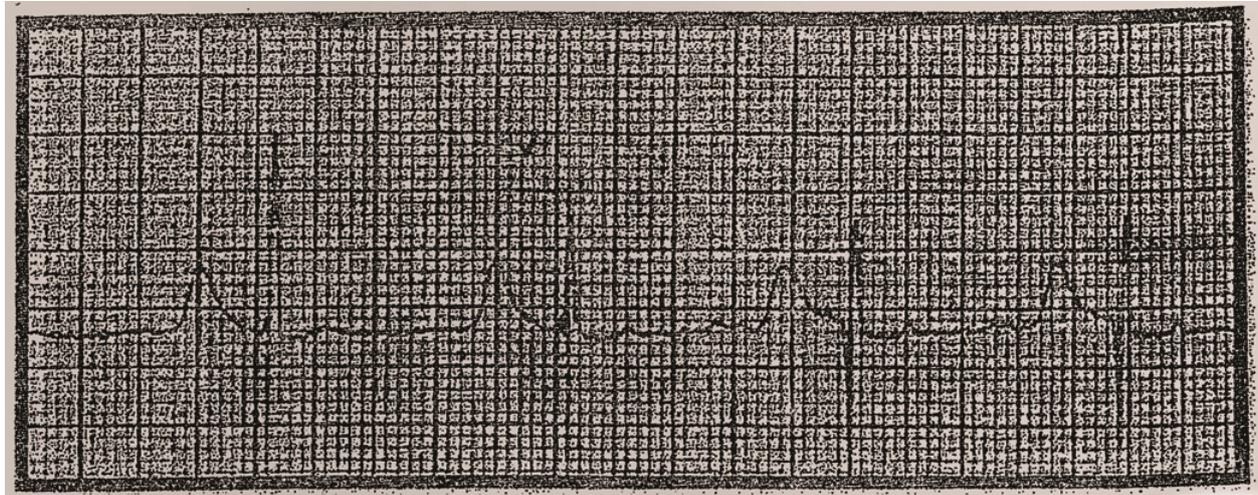


Figure 1: ECG showing prolonged QTc interval (480 ms).

Poluzzi [13] retrospectively studied 374 reports of TdP over a period of 5 years and found that two TdP cases had used metronidazole without co-medication, which in line with our case who was using metronidazole alone. Patients who are at high risk to develop QT prolongation and TdP, they are those patients exposed to drugs known to cause blocking of the potassium channels [14]. Therefore, metronidazole prescription should be avoided for patients at high risk for drug-induced TdP [15]. The arrhythmogenic properties of metronidazole is not yet clear, and further investigation should be carried out to assess its potential effect on QT interval and subsequent lethal arrhythmias. As a final point, the maximum pediatric dose of metronidazole should be investigated.

## Conclusion

Metronidazole is regarded to potentiate QT prolongation, and further investigations are needed.

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