

How to prevent QT-Prolongation medication incidents in the community

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When the heart muscles contract, there is a time delay required for electrical signals to reset before it is able to contract again. The QT interval represents the time delay for the ventricles of the heart. There are normal ranges between how long the time delay may last, but when the QT interval exceeds the upper normal limit, it is known to be prolonged. Drug therapy is the most common cause of prolonging the QT interval; and many of these drugs are amongst the top 100 medications prescribed in Canada. When QT prolongation occurs, there is a significant risk to develop an irregular heart rhythm known as torsades de pointes, which may result in sudden cardiac death.

ISMP Canada conducted this multi-incident analysis to examine medication incidents involving the potential for QT prolongation that are commonly encountered within the community setting. Incidents were retrieved from the ISMP Canada Community Pharmacy Incident Reporting (CPhIR) program from the period between April 2010 and June 2016. A total of 92 incidents met the inclusion criteria and were included in this multi-incident analysis. Three main themes were identified in this analysis.

Theme 1 – Prescriber Triggered Potential for QT Prolongation (Table 1)

Prescriber triggered potential refers to medication incidents that occurred at the prescribing step of the medication-use process. The list of drugs known to cause QT prolongation is vast and continually updating from emerging clinical evidence.

Combined with the limited use of computerized clinical decision support systems in medical clinics, the expectation to be aware of all QT-prolonging medications adds to the ever-growing burden and stress to the human brain power or memory of the prescribers. The prevalence of prescriber triggered medication incidents highlighted the niche for safety and quality improvement that can be enhanced by technology or computerization and readily accessible clinical resources or tools at the point-of-care during the initial stage of prescribing (Table 1).

Theme 2 – Potentially Inappropriate Pharmacist Interventions (Table 2)

Medication incidents grouped within this theme involved pharmacists' interventions that may have been inappropriate and may have led to potential, inadvertent patient harm. Unlike physicians, most pharmacists are familiar with the use of computerized clinical decision support systems to check for drug-drug interactions. However, drug interactions concerning QT prolongation may require additional assessments in order to evaluate the associated clinical significance. Sometimes, not every single drug interaction will require an intervention. Inappropriately doing so may lead to delayed treatments, inappropriate substitution to suboptimal therapies, or unnecessary expenditure of time and resources in the healthcare system. On the other hand, overriding some of these drug-drug interactions flagged by the clinical decision support systems due to alert fatigue may lead to significant patient harm. There-

fore, proper assessment of patient-oriented risk factors with respect to QT prolongation and drug therapy management are necessary before any intervention should be executed by the pharmacist.

Theme 3 – Patient Potentiated Risk for Harm (Table 3)

The final theme captured the medication incidents that were brought on by the patient. In such instances, the patient's actions or inactions, such as failure to communicate medication changes to healthcare providers in the circle of care of the patient, may have increased the likelihood of QT prolongation. When patients are consulting or seeking care from multiple prescribers (e.g. from the use of walk-in clinics or specialists clinics), they may fail to fully communicate all pertinent medical and medication in-

formation needed for the clinician to safely prescribe. Similarly, attending multiple pharmacies may limit pharmacists' access to a complete medication history of the patient.

This multi-incident analysis has identified common areas where QT prolongation incidents may occur in community pharmacy practice. Medication incidents may increase the risk of negative health consequences. All parties involved in the medication-use process have a role in mitigating these risks. Prescribers, pharmacists, and patients can collaborate to prevent these medication incidents from happening in the future. ■

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Table 1 – Prescriber Triggered Potential for QT Prolongation

Contributing Factors	Recommendations
Prescriber's unfamiliarity with QT prolonging agents	Ensure that computerized physician order entry systems have programming or clinical decision support functionality to detect drug-drug and drug-disease interactions and are updated regularly
Absence of computerized clinical decision support systems or systems with limited functionality for flagging drug-drug interactions with the risk of QT prolongation	Maintain complete medication records of all patients
Lack of communication among healthcare providers involved in episodic care (e.g. walk-in clinics) and transitions of care of patients	Communicate patient encounters to all healthcare providers involved the circle of care of patient

Table 2 – Potentially Inappropriate Pharmacist Interventions

Contributing Factors	Recommendations
Community pharmacy computer systems are not capable to fully evaluate the severity or clinical significance of drug-drug interactions with the risk of QT prolongation	Regularly evaluate and update alerts in the clinical decision support systems at the pharmacy
Alert fatigue or over-reliance on technology or clinical decision support systems for clinical interventions or recommendations	Avoid over-reliance on technology and make clinical decisions in conjunction with appropriate patient assessment and professional judgement
	Perform proper assessment of patient-oriented risk factors and communicate all findings to the patient's primary care physician and other healthcare providers in the circle of care of patient
	Educate patients and caregivers with respect to signs and symptoms of QT prolongation
	Monitor and provide regular follow-ups to patients who may be at risk of QT prolongation

Table 3 – Patient Potentiated Risk for Harm

Contributing Factors	Recommendations
Patients consulting multiple prescribers	Communicate all healthcare encounters and carry an up-to-date medication list to share with all healthcare providers in the circle of care of patient
Attending multiple pharmacies	