

QTc and Medications

QT Prolonging Medications				
Antimicrobials	Antidepressants	Antipsychotics	Anticonvulsants	Other Drugs
Atazanavir	Amitriptyline	Chlorpromazine	Felbamate	Moexipril
Azithromycin	Citalopram	Clozapine	Fosphenytoin	Nilotinib
Bactrim	Clomipramine	Haldol	Phenytoin	Octreotide
Ciprofloxacin	Desipramine	Mesoridazine		Oxytocin
Chloroquine	Doxepin	Paliperidone	Other Drugs	Probucol
Clarithromycin	Escitalopram	Pimozide	Alfuzosin	Ranolazine
Erythromycin	Fluoxetine	Quetiapine	Astemizole	Sunitinib
Fluconazole	Nortriptyline	Risperidone	Amantadine	Tacrolimus
Foscarnet	Paroxetine	Sertindole	Bepidil	Tamoxifen
Gatifloxacin	Protriptyline	Thioridazine	Cisapride	Terfenadine
Gemfloxacin	Sertraline	Ziprasidone	Diphenhydramine	Tizanidine
Halofantrine	Trazodone	Antiarrhythmics	Eribulin	Vandetanib
Imipramine	Trimipramine	Amiodarone	Famotidine	Vardenafil
Itraconazole	Venlafaxine	Disopyramide	Fingolimod	
Ketoconazole	Antiemetics	Dofetilide	Galantamine	
Levofloxacin	Dolasetron	Dronedarone	Indapamide	
Moxifloxacin	Domperidone	Flecainide	Lapatinib	
Ofloxacin	Droperidol	Ibutilide	Levomethadyl	
Pentamidine	Granisetron	Nicardipine	Lithium	
Ritonavir	Odansetron	Procainamide	Methodone	
Sparfloxacin		Quinidine		
Telithromycin		Sotalol		
Voriconazole				

Measurement of QTc (Bazett formula):



$$QT_c = \frac{QT}{\sqrt{RR}}$$

- **Best leads:** II and V1 (as T waves are well-defined in these leads).
- **If patient has sinus arrhythmia:**
 - o Use the QT interval immediately after the shortest RR interval.
 - o Measurement may NOT be reliable.

Upper limits of normal:

- < 15 Y/O: 450 msec in boys and 460 msec in girls.
- > 15 Y/O: 440 msec in boys and 450 msec in girls.

Useful rule of thumb: Normal QT is less than half the preceding RR interval.

What are the red flags on the ECG with prolonged QTc?

Extremely long QTc interval (> 0.6 second), bradycardia (sinus, 2nd degree AV block), T wave alternans, PVCs, documented ventricular arrhythmia.

It is safe to practice the following with QTc-prolonging medications in children:

- Baseline ECG, and to avoid the medication in children with prolonged QTc.
- Repeat ECG in 3-7 days after starting the medication in children with other risk factors:
 - o Low K, Mg or Ca.
 - o Disorders of heart rate or rhythm (mainly bradycardia).
 - o Structural heart abnormalities.
 - o Co-use of other medications prolonging QTc.
 - o Dose > recommended range.
- To D/C the medication in case significant prolongation noted (> 60 msec increase or QTc > 440 msec).

References:

1. Domperidone-Associated QT Interval Prolongation in Non-oncologic Pediatric Patients: A Review of the Literature. Amy D Morris, et al. Can J Hosp Pharm. May-Jun 2016;69(3):224-30. doi: 10.4212/cjhp.v69i3.1560.
2. Tisdale, J. E. (2016). Drug-Induced QT Interval Prolongation in Children: Are the Kids Alright? The Canadian Journal of Hospital Pharmacy, 69(3), 183-184.