

© 2023 UpToDate, Inc. and/or its affiliates. All Rights Reserved.

Some reported causes and potentiators of the long QT syndrome

Congenital			
<ul style="list-style-type: none"> ▪ Jervell and Lange-Nielsen syndrome (including "channelopathies") ▪ Romano-Ward syndrome ▪ Idiopathic 			
Acquired			
<p>Metabolic disorders</p> <ul style="list-style-type: none"> ▪ Hypokalemia ▪ Hypomagnesemia ▪ Hypocalcemia ▪ Starvation ▪ Anorexia nervosa ▪ Liquid protein diets ▪ Hypothyroidism <p>Bradycarrhythmias</p> <ul style="list-style-type: none"> ▪ Sinus node dysfunction ▪ AV block: Second or third degree 	<p>Other factors</p> <ul style="list-style-type: none"> ▪ Myocardial ischemia or infarction, especially with prominent T-wave inversions ▪ Intracranial disease ▪ HIV infection ▪ Hypothermia ▪ Toxic exposure: Organophosphate insecticides 	<p>Androgen deprivation therapy</p> <ul style="list-style-type: none"> ▪ GnRH agonist/antagonist therapy ▪ Bilateral surgical orchiectomy <p>Diuretic therapy via electrolyte disorder particularly hypokalemia and hypomagnesemia</p> <p>Herbs</p> <ul style="list-style-type: none"> ▪ Cinchona (contains quinine), ibogaine (ibogaine), licorice extract in overdose via electrolyte disturbances 	
Medications*			
High risk			
<ul style="list-style-type: none"> ▪ Adagrasib ▪ Ajmaline[¶] ▪ Amiodarone^Δ ▪ Arsenic trioxide 	<ul style="list-style-type: none"> ▪ Cisapride (restricted availability) ▪ Delamanid[¶] 	<ul style="list-style-type: none"> ▪ Lenvatinib ▪ Levoketoconazole ▪ Methadone ▪ Mobocertinib 	<ul style="list-style-type: none"> ▪ Selpercat ▪ Sertindol ▪ Sotalol ▪ Terfenad

<ul style="list-style-type: none"> ▪ Astemizole[◇] ▪ Bedaquiline ▪ Bepridil[◇] ▪ Chlorpromazine 	<ul style="list-style-type: none"> ▪ Disopyramide^Δ ▪ Dofetilide ▪ Dronedarone ▪ Haloperidol (IV) ▪ Ibutilide ▪ Ivosidenib 	<ul style="list-style-type: none"> ▪ Papavirine (intracoronary) ▪ Procainamide ▪ Quinidine ▪ Quinine 	<ul style="list-style-type: none"> ▪ Vandetar ▪ Vernakalant ▪ Ziprasidon
Moderate risk			
<ul style="list-style-type: none"> ▪ Amisulpride[¶] (oral)[§] ▪ Azithromycin ▪ Capecitabine ▪ Carbetocin[¶] ▪ Certinib ▪ Chloroquine ▪ Citalopram ▪ Clarithromycin ▪ Clofazimine ▪ Clomipramine[¥] ▪ Clozapine ▪ Crizotinib ▪ Dabrafenib ▪ Dasatinib ▪ Deslurane ▪ Domperidone[¶] ▪ Doxepin[¥] ▪ Doxifluridine[¶] 	<ul style="list-style-type: none"> ▪ Droperidol ▪ Encorafenib ▪ Entrectinib ▪ Erythromycin ▪ Escitalopram ▪ Etelcalcetide ▪ Fexinidazole ▪ Flecainide ▪ Floxuridine ▪ Fluconazole ▪ Fluorouracil (systemic) ▪ Flupentixol[¶] ▪ Gabobenate dimeglumine ▪ Gemifloxacin[¶] ▪ Gilteritinib ▪ Halofantrine ▪ Haloperidol (oral) ▪ Imipramine[¥] 	<ul style="list-style-type: none"> ▪ Inotuzumab ozogamacin ▪ Isoflurane ▪ Levofloxacin (systemic) ▪ Lofexidine ▪ Meglumine antimoniate ▪ Midostaurin ▪ Moxifloxacin ▪ Nilotinib ▪ Olanzapine ▪ Ondansetrol (IV > oral) ▪ Osimertinib ▪ Oxytocin ▪ Pazopanib ▪ Pentamidine ▪ Pilsicainide[◇] ▪ Pimozide ▪ Piperazine ▪ Probucol[◇] 	<ul style="list-style-type: none"> ▪ Propafenone ▪ Propofol ▪ Quetiapine ▪ Ribociclik ▪ Risperidone ▪ Saquinavir ▪ Sevoflurane ▪ Sparfloxacin ▪ Sunitinib ▪ Tegafur[¶] ▪ Terbutaline ▪ Thioridazine ▪ Toremifene ▪ Vemurafenib ▪ Voriconazole
Low risk[‡]			
<ul style="list-style-type: none"> ▪ Albuterol ▪ Alfuzosin ▪ Amisulpride (IV)[§] ▪ Amitriptyline ▪ Anagrelide ▪ Apomorphine ▪ Arformoterol 	<ul style="list-style-type: none"> ▪ Fingolimod ▪ Fluoxetine ▪ Fluphenazine ▪ Formoterol ▪ Foscarnet ▪ Fostemsavir ▪ Gadofosveset 	<ul style="list-style-type: none"> ▪ Mequitazine ▪ Methotrimeprazine ▪ Metoclopramide (rare reports) ▪ Metronidazole (systemic) ▪ Mifepristone 	<ul style="list-style-type: none"> ▪ Ranolazine (due to bradycardia) ▪ Relugolix ▪ Rilpivirine ▪ Romidep ▪ Roxithrom

<ul style="list-style-type: none"> ▪ Artemether-lumefantrine ▪ Asenapine ▪ Atomoxetine ▪ Benperidol ▪ Bilastine[¶] ▪ Bosutinib ▪ Bromperidol ▪ Buprenorphine[†] ▪ Buserelin ▪ Ciprofloxacin (Systemic) ▪ Cocaine (Topical) ▪ Degarelix ▪ Desipramine ▪ Deutetrabenazine ▪ Dexmedetomidine^{**} ▪ Dolasetron ▪ Donepezil ▪ Efavirenz ▪ Eliglustat ▪ Eribulin ▪ Ezogabine 	<ul style="list-style-type: none"> ▪ Glasdegib ▪ Goserelin ▪ Granisetron ▪ Hydroxychloroquine (rare reports) ▪ Hydroxyzine ▪ Iloperidone ▪ Indacaterol ▪ Itraconazole ▪ Ketoconazole (systemic) ▪ Lacidipine ▪ Lapatinib ▪ Lefamulin ▪ Leuprolide ▪ Leuprolide-norethindrone ▪ Levalbuterol ▪ Levomethadone ▪ Lithium ▪ Loperamide^{¶¶} in overdose ▪ Lopinavir ▪ Macimorelin ▪ Mefloquine 	<ul style="list-style-type: none"> ▪ Mirtazapine ▪ Mizolastine ▪ Nelfinavir ▪ Norfloxacin ▪ Nortriptyline ▪ Ofloxacin (systemic) ▪ Olodaterol ▪ Osilodrostat ▪ Oxaliplatin ▪ Ozanimod^{ΔΔ} ▪ Pacritinib ▪ Paliperidone ▪ Panobinostat ▪ Pasireotide ▪ Pefloxacin ▪ Periciazine[¶] ▪ Pimavanserin ▪ Pipamperone ▪ Pitolisant ▪ Ponesimod ▪ Primaquine ▪ Promazine ▪ Radotinib 	<ul style="list-style-type: none"> ▪ Salmeterol ▪ Sertraline ▪ Siponimod ▪ Solifenacin ▪ Sorafenib ▪ Sulpiride ▪ Tacrolimus (systemic) ▪ Tamoxifen ▪ Telavancin ▪ Telithromycin ▪ Teneligliptin ▪ Tetrabenazine ▪ Trazodone ▪ Triclabendazole ▪ Triptorelin ▪ Tropisetron ▪ Vardenafil ▪ Vilanterol ▪ Vinflunin ▪ Voclosporin ▪ Vorinostat ▪ Zuclopietidine
--	---	--	---

This is not a complete list of all corrected QT interval (QTc)-prolonging drugs and does not include drugs with either a minor degree or isolated association(s) with QTc prolongation that appear to be safe in most patients but may need to be avoided in patients with congenital long QT syndrome depending upon clinical circumstances. A more complete list of such drugs is available at the [CredibleMeds](#) website. For clinical use and precautions related to medications and drug interactions, refer to the UpToDate topic review of acquired long QT syndrome discussion of medications and the [Lexicomp drug interactions tool](#).

AV: atrioventricular; IV: intravenous; QTc: rate-corrected QT interval on the electrocardiogram.

* Classifications provided by Lexicomp according to US Food & Drug Administration guidance: Clinical Evaluation of QT/QTc Interval Prolongation and Proarrhythmic

Potential for Non-Antiarrhythmic Drugs – Questions and Answers; Guidance for Industry US Food and Drug Administration, June 2017 (revision 2) available at: <https://www.fda.gov/downloads/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/UCM073161.pdf> with additional data from CredibleMeds QT drugs list^[1,2]. The use of other classification criteria may lead to some agents being classified differently by other sources.

¶ Not available in the United States.

Δ In contrast with other class III antiarrhythmic drugs, amiodarone is rarely associated with torsades de pointes; refer to accompanying text within UpToDate topic reviews of acquired long QT syndrome.

◇ Withdrawn from market in most countries due to adverse cardiovascular effects.

§ IV amisulpride antiemetic use is associated with less QTc prolongation than the higher doses administered orally as an antipsychotic.

¥ Other cyclic antidepressants may also prolong the QT interval; refer to UpToDate clinical topic on cyclic antidepressant pharmacology, side effects, and separate UpToDate topic on tricyclic antidepressant poisoning.

‡ The "low risk" category includes drugs with limited evidence of clinically significant QTc prolongation or TdP risk; many of these drugs have label warnings regarding possible QTc effects or recommendations to avoid use or increase ECG monitoring when combined with other QTc prolonging drugs.

† Rarely associated with significant QTc prolongation at usual doses for treatment of opioid use disorder, making buprenorphine a suitable alternative for patients with methadone-associated QTc prolongation. Refer to UpToDate clinical topic reviews.

** The United States FDA labeling for the sublingual preparation of dexmedetomidine warns against use in patients at elevated risk for QTc prolongation. Both intravenous (ie, sedative) and sublingual formulations of dexmedetomidine have a low risk of QTc prolongation and have **not** been implicated in TdP.

¶¶ Over-the-counter; available without a prescription.

ΔΔ Not associated with significant QTc prolongation in healthy persons. Refer to UpToDate clinical topic for potential adverse cardiovascular (CV) effects in patients with CV disease.

Data from:

1. Lexicomp Online. Copyright ©1978-2023 Lexicomp, Inc. All Rights Reserved.
2. CredibleMeds QT drugs list website sponsored by Science Foundation of the University of Arizona. Available at <http://crediblemeds.org/>.

Graphic 57431 Version 142.0