



QTc Prolongation: Fluoroquinolones, Macrolides, and Azole Antifungals

Fluoroquinolones, macrolides, and azole antifungals are commonly prescribed antimicrobial agents, and they all can prolong the QTc interval. How long does each agent prolong the QTc interval? How should QTc prolongation be managed?

How much does each agent prolong the QTc interval?

The extent of QTc prolongation varies between agents among different studies and is summarized in Table 1.

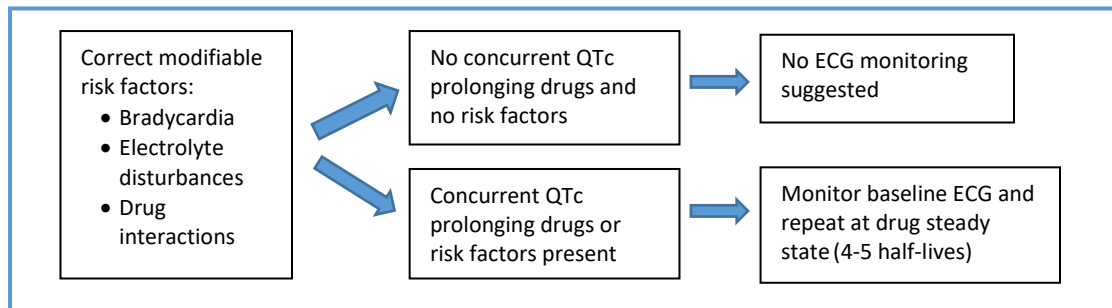
Table 1: Approximate QTc Prolongation and Half-life by Antimicrobial

Fluoroquinolones ^{1,2}	QTc Prolongation	Half-life	Macrolides ³⁻⁵	QTc Prolongation	Half-life	Azole Antifungals ^{6,7}	QTc Prolongation	Half-life
Ciprofloxacin	2-5 ms	5 h	Azithromycin	5-9 ms	72 h	Isavuconazole	-18 ms	130 h
Levofloxacin	3.5-15 ms	7 h	Clarithromycin	11 ms	5 h	Fluconazole	10 ms	30 h
Moxifloxacin	16-18 ms	12 h	Erythromycin	50 ms	2 h	Voriconazole	21 ms	6 h

How should QTc Prolongation Risk be Managed?

Risk management strategies can vary. Macrolides, fluoroquinolones and azole antifungals are generally considered low risk compared to other drugs such as anti-arrhythmic and antipsychotic medications. One proposed risk mitigation strategy is summarize in Figure 1.

Figure 1: Risk Management Strategy for QTc Prolonging Antibiotics⁸



How Long is Too Long?

A normal QTc is <450 ms in males and <460 ms in females and is considered prolonged if higher than these values.⁸ The risk of Torsade de Pointes increases ~5-7% for each 10 ms increase, but the greatest risk is seen when the QTc is >500 ms. QTc prolonging drugs should be avoided if possible when the baseline QTc is >500 ms or if there is significant concern for it to prolong the QTc to >500 ms.

Key Takeaways:

Fluoroquinolones, macrolides, and azole antifungals can prolong the QTc interval. One exception is isavuconazole which can shorten the QTc interval. The length of prolongation is highly variable between drugs. Commonly used antibiotics such as ciprofloxacin, azithromycin, and fluconazole have very limited impact on the QTc interval. Use of alternatives or increased monitoring may be needed when using QTc prolonging antimicrobials, especially moxifloxacin, erythromycin, and voriconazole.

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