

Arrhythmogenic Adverse Events Associated with Common Antimicrobial Medications: A Pharmacovigilance Study

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Abstract:

Introduction: Antimicrobial medications are generally safe and well-tolerated. Yet certain medications have been shown to have clinically relevant effects on the cardiac rhythm. Current evidence strongly correlates QT prolongation as the most common side effect, while other arrhythmogenic effects, such as bradycardia, atrial fibrillation, tachycardia, and atrioventricular block, are less recognizable within drug classes.

Methods: We conducted a pharmacovigilance study using the FDA Adverse Event Reporting System (FAERS) to assess arrhythmogenic adverse events associated with selected antimicrobial medications. The study included macrolides (azithromycin, clarithromycin, erythromycin), fluoroquinolones (levofloxacin, ciprofloxacin, moxifloxacin), antifungals (fluconazole, voriconazole, ketoconazole), and beta-lactams (amoxicillin-clavulanate, ceftriaxone, piperacillin-tazobactam). Reported adverse events of tachycardia, bradycardia, atrial fibrillation, QT prolongation, and AV block were evaluated. Disproportionality analyses were conducted using reporting odds ratios (RORs) with 95% confidence intervals.

Results: Analysis included 32,679,695 adverse event reports in FAERS. Macrolides demonstrated a strong association with QT prolongation (ROR 15.31, 95% CI 14.42–16.24), and a significant risk for bradycardia (ROR 2.75, 95% CI 2.49–3.05). For fluoroquinolones, the risk of QT prolongation was significantly high (ROR 12.62, 95% CI 12.00–13.28), similarly for bradycardia (ROR 1.63, 95% CI 1.47–1.80). Antifungals showed a strong association with QT prolongation (ROR 12.53, 95% CI 11.70–13.43), and bradycardia (ROR 2.22, 95% CI 1.97–2.50). Beta-lactams revealed significant signals for QT prolongation (ROR 11.44, 95% CI 10.34–12.65) and bradycardia (ROR 3.69, 95% CI 3.23–4.21).

Conclusions: Common antimicrobial classes portrayed significant pharmacovigilance signs for various arrhythmogenic adverse events, specifically QT prolongation and bradycardia. These findings support the need for cardiovascular assessment before prescribing them, especially in patients with predisposing factors or taking concurrent medications that can precipitate arrhythmogenic events.