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ORIGINAL RESEARCH ARTICLE

Fluoroquinolones and Cardiovascular Risk: A Systematic Review, Meta-analysis and Network Meta-analysis

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Abstract

Introduction Several fluoroquinolone antibiotics have been associated with cardiac adverse effects, leading to the withdrawal of some of these agents from the market. Cardiac side effects such as QT prolongation and torsades de pointes (TdP) have also been observed with fluoroquinolones currently on the market. In order to evaluate the cardiac risk of fluoroquinolones as a class, and the comparative risk for each individual drug, we conducted a systematic review, meta-analysis, and network meta-analysis.

Methods MEDLINE, EMBASE and the Cochrane Library were searched, up to March 2018, for randomized controlled trials, cohort studies, and case–control studies that investigated the association between fluoroquinolone treatment and the risk of cardiovascular events and cardiovascular mortality. We followed the PRISMA 2009 guidelines for data selection and extraction. Outcomes were pooled using random effects models. Direct and indirect comparisons in network meta-analysis were performed using frequentist methods.

Results Thirteen studies were included in our analyses. Fluoroquinolone use was associated with a statistically significant 85% increase in the risk for arrhythmia (odds ratio [OR] 1.85; 95% confidence interval [CI] 1.22–2.81) and 71% increase in the risk for cardiovascular mortality (OR 1.71; 95% CI 1.39–2.09). Moxifloxacin ranked most likely to have the highest risk for arrhythmia (P-score 0.99) and for cardiovascular mortality (P-score 0.95) by network meta-analysis.

Conclusions Our findings show a significant association between fluoroquinolone use and an increased risk for arrhythmia and cardiovascular mortality. Moxifloxacin ranked with the highest probability for cardiovascular adverse events. Further study is required to determine how to reduce the risk for fluoroquinolone-associated cardiac toxicity.

Key Points

Fluoroquinolone use is associated with a statistically significant increase in the risk for arrhythmia and the risk for cardiovascular mortality.

This risk was especially pronounced with moxifloxacin.

1 Introduction

Fluoroquinolone antibiotics have a wide spectrum of antibacterial coverage and are commonly used for a variety of infections, including respiratory tract infections, urinary tract infections, skin and soft tissue infections [1]. Nevertheless, several fluoroquinolones have been removed from the market due to safety issues such as hepatic toxicity (e.g.,

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