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Research Article

Comparative Antimicrobial Activity of Aspirin, Paracetamol, Flunixin Meglumine, Tolfenamic Acid, Diclofenac Sodium and Pheniramine Maleate

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Abstract

The study was conducted to evaluate the antimicrobial activity of aspirin, paracetamol, flunixin meglumine, tolfenamic acid, diclofenac sodium and pheniramine maleate on 499 strains of microbes of 117 species belonging to 26 genera of Gram-negative (G-ve), nine genera of Gram-positive (G+ve) bacteria and four strains of two *Candida* species. A total of 92.79%, 44.09%, 54.91% and 30.26% bacterial strains were sensitive to 2.56 mg/mL aspirin, 3.2 mg/mL flunixin, 2.56 mg/mL diclofenac and 1.28 mg/mL meloxicam, respectively. For paracetamol and pheniramine maleate only one strain of *Aerococcus* species was sensitive at ≤ 3.2 mg/mL concentration of these drugs and none of the strains was susceptible to tolfenamic acid even at 10.28 mg/mL. The analysis indicated that G+ve bacteria had significantly lower susceptibility to aspirin (OR = 0.30; CI_{99} = 0.12 - 0.78) but higher susceptibility to flunixin (OR = 7.22; CI_{99} = 4.12-12.50) and diclofenac (OR = 1.91; CI_{99} = 1.15 - 3.15) than G-ve bacteria. There was no significant difference in meloxicam susceptibility of G+ve and G-ve bacteria. The study concluded that NSAIDs and pheniramine maleate may not be used as antimicrobials in therapeutically achievable systemic concentrations of the drugs within biological safety limits of plasma concentration. However, the scope of use of NSAIDs still exists in form of non-antibiotic topical antimicrobial preparations.

Keywords: NSAIDs; Antihistaminics; Antibacterials; Antibiotics; Drug-repurposing; Alternative-antimicrobials

Introduction

Antibiotics are common in treatment against deadly bacterial and mycotic infections among man and animals. However, choices of antibiotics are getting narrower due to fast emergence of antimicrobial resistance (AMR). By 2030, approximately 24 million people would be affected by AMR and as a consequence of extreme poverty especially in low-income countries; millions will lose the life [1]. Resistance to frequently used antibiotic drugs among bacterial strains is right now a worldwide problem, in the meantime, the number of strains that have developed resistance to multiple antibiotics has risen at an increasing rate and has spread globally to most nations irrespective of antibiotic uses in therapeutics [2-4]. Due to the increase in resistance and delay in the development of newer antibiotics, the efficient treatment of bacterial diseases is affected [5,6]. Currently, research has been aimed at the investigation of non-steroidal anti-inflammatory drugs and other molecules for their antibacterial action [3].

"Drug repurposing" (or drug re-profiling), is a new idea in which the non-antibacterial drugs such as NSAIDs and others are