In vitro antimicrobial effects of clarithromycin loaded PLGA nanoparticles against clinical strains of Helicobacter pylori

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Background and Aims: The aim of this research was to prepare and evaluate antimicrobial activity of clarithromycin loaded PLGA nanoparticles against clinical strains of Helicobacter pylori in order to improve patient compliance by improving its therapeutic effect and reducing its dose-related side effects.

Methods: The clarithromycin nanoparticles were prepared by the Quasi Emulsion Solvent Diffusion (QESD) method using Ploxiamer188® as a stabilizing agent and Poly lactic-co-Glycolic Acid (PLGA) as a biodegradable polymer. In vitro antibacterial activity of the formulations was performed against clinical strains of Helicobacter pylori by using agar dilution method and incubating cultures in gas-generating pack.

Results: Clarithromycin loaded PLGA nanoparticles in the size range between 189 and 280 nm; a relatively monodisperse distribution and spherical shape were achieved. The maximum percentage of drug entrapment for clarithromycin was 80%, whereas the maximum percentage for yield of the system was 90%. In vitro antibacterial activity of the formulations showed greater eradication effect of clarithromycin in the form of nanoparticle in comparison with the untreated clarithromycin.

Conclusions: The prepared clarithromycin nanoparticles are more potent against H. pylori with improved MICs and appropriate physicochemical properties that may be useful for other susceptible microorganisms and could be a suitable candidate for intravenous and oral preparations.

Keywords: Clarithromycin; Nanoparticle; Helicobacter pylori; Agar dilution