Nanostructured lipid carriers as semisolid topical delivery formulations for diflucortolone valerate.

Seham Elkheshen,Hussein Ammar,AZZA AHMED MOHAMED MAHMOUD ,Fatma S. Abdel-Salam

Abstract

Context: Topical treatment of skin disease needs to be strategic to ensure high drug concentration in the skin with minimum systemic absorption.
Objective: The aim of this study was to produce semisolid nanostructured lipid carrier (NLC) formulations, for topical delivery of the corticosteroid drug, diflucortolone valerate (DFV), with minimum systemic absorption.
Method: NLC formulations were developed using a high shear homogenization combined with sonication, using PrecirolÈ ATO5 or TristearinÈ as the solid lipid, CapryolÊ or isopropyl myristate as the liquid lipid and PoloxamerÈ 407 as surfactant. The present study addresses the influence of different formulations composition as solid lipid, liquid lipid types and concentrations on the physicochemical properties and drug release profile from NLCs.
Results and discussion: DFV-loaded NLC formulations possessed average particle size ranging from 160.40 nm to 743.7 nm with narrow polydispersity index. The encapsulation efficiency was improved by adding the lipid-based surfactants (LabrasolÈ and LabrafilÈ M1944CS) to reach 68%. The drug release from the investigated NLC formulations showed a prolonged release up to 12 h. The dermatopharmacokinetic study revealed an improvement in drug deposition in the skin with the optimized DFV-loaded NLC formulation, in contrast to a commercial formulation.
Conclusion: NLC provides a promising nanocarrier system that work as reservoir for targeting topical delivery of DFV.

Journal of Liposome and Research 2017, January