

TOPICAL TREATMENT OF ONYCHOMYCOSIS: CHALLENGES AND APPROACHES

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Introduction. Onychomycosis is a fungal nail infection and is thought to account for 40% of all nail disorder. One of the approaches for management of onychomycosis is topical treatment. However, topical treatment of nail disorders remains a challenge because of the difficulty encountered in achieving therapeutic concentrations of drugs at the site of infection.

Aim of the work was to justify use of keratolytic agents as penetration nail enhancers in topical treatment of onychomycosis.

Materials and methods. Pharmaceutical and medical data sources. Methods: search and systematization of information, logical analysis.

Results. The human nail forms a resistant barrier to the topical penetration of actives. To deliver the therapeutically sufficient quantity of antifungal drug to the fungus-infected sites of the nail, physical or chemical methods for penetration enhancement may need to be employed to overcome the nail barrier. Physically removing the entire diseased nail plate would be an effective way of eliminating the nail barrier, but it is painful and includes the risks of infection and abnormal nail growth. As opposed to the physical removal, chemical technique with using of keratolytic agents is almost always painless and provides partial removal of a diseased nail plate, or thinning of the diseased nail plate. Keratolytic agents enhance the drug permeation by breaking the physical and chemical bonds responsible for the stability of the nail keratin. The mechanism of nail penetration enhancers depends on the interaction with keratin bonds and may be quite different. Currently the following keratolytic enhancers have found their use in medicine: sulfhydryl compounds like acetylcysteine, salicylic and benzoic acids, thioglycolic and glycolic acids, urea etc.

Drug penetration through the nail plate is quite sensitive to the molecular weight of the penetrating compound and its solubility. The chemical composition of nail indicates that the aqueous pathway plays a dominant role in drug penetration into the nail. Consequently, an agent with lower molecular weight and strong hydrophilic characteristics will be the most effective.

Conclusion. The permeability of topically applied drugs through keratinized nail plate is highly poor and drug uptake into the nail apparatus is extremely low. Drug transport into/through the nail plate can be effectively assisted by the use of chemical enhancers like keratolytic agents. Effect of the keratolytic enhancers depends on the drug molecular mass and water solubility.