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New complexes of inhaled Furosemide and Cyclodextrin: Assessment of the bronchodilator effect

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Objectives: The objective of this study is to investigate the efficacy of nebulized Furosemide in children administered singly or combined with β-Cyclodextrins on asthma exacerbations.

Methods: A blind randomized controlled experiment involving five groups of children with moderate attack of asthma. Twenty children were enrolled in each group, group 1 received nebulized Salbutamol, group 2 received nebulized Furosemide, group 3 received both Salbutamol and Furosemide, group 4 received a mixture of Furosemide/β-CD in a (1:0.5) molar ratio and group 5 received a mixture of Furosemide/β-CD in a (1:1) molar ratio. Pulmonary function parameters, peak flow rates, respiratory rate, oxygen saturation and clinical scores were obtained before and after treatment.

Results: The study showed improvement in the primary outcome FEVl after drug administration in all five groups of patients. FEVl% improvement was noticed more effectively in group 3 children treated with a combination of Furosemide and Salbutamol 22.0±1.9 ($p<0.001$). Other pulmonary function parameter such as FVC achieved a maximum increase of 21.6±1.6 ($p<0.001$) and 20.9±1.8 ($p<0.001$) in group 3 and 4 respectively.

Conclusion: Complex of both Furosemide and Cyclodextrins led to a significant increase in peak flow rate and significantly improved of FEV1, FVC, respiratory rate, SaO2 and clinical scores as compared to other groups. The complex effect was nearly equal to Furosemide and Salbutamol combination. These results support the fact that Cyclodextrins are promising approach for improving efficacy of poorly water-soluble drugs administered by inhalation.

Biography

Ramadan I. Al-Shdefat is an Assistant Professor of Pharmaceutics, College of Pharmacy, Prince Sattam Bin Abdulaziz University, KSA. He is the director of the Research Centre, College of Pharmacy, from 2011 until date. Al-Shdefat received his B.Sc. degree in Pharmacy from Jordan University of Science and Technology, Jordan (1997) and his PhD in Pharmaceutics from The State University of Medicine and Pharmacy, Republic of Moldova(2002). He has good experience in development of Novel drug delivery Systems and their *in vitro* and *in vivo* analytical and bio-analytical evaluations. He has very good knowledge of scientific and ethical aspects of pre-clinical and clinical research and observed a number of bioequivalence studies. He has done significant original work and published many research articles in national and international journals.

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