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RESEARCH ARTICLE

CAPMUL MCM BASED NANOEMULSION FOR INTRANASAL DELIVERY OF AN ANTIDEPRESSANT

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The rationale of this study acquaint with improvement of sertraline hydrochloride (STH) solubility, formulation of STH nanoemulsion (NE) for intranasal delivery to achieve rapid onset of action and to omit first pass effect with enhanced bioavailability. STH nanoemulsion (NE) system was formulated consisting of capmul MCM as oil phase, tween 80 as surfactant and propylene glycol as co-surfactant. The developed system was characterized for phase behaviour and solubilization capacity and water titration method was utilized for the preparation of STH nanoemulsions (SNEs). All formulations were evaluated for globule size, drug content, nasal ciliotoxicity, pH and viscosity. A high STH solubility of 94.28 mg/ml was observed with the NE system containing 20.0% capmul MCM, 33.3% surfactant/co-surfactant (Labrasol:Transcutol P at 2:1) and 46.7% water. *In vitro* diffusion studies for nasal absorption explanation were executed on goat nasal mucosa. *In vitro* nasal absorption through goat nasal mucosa was found to be 62.85±0.56%. These results suggested that intranasal delivery of STH may be beneficial over the available oral delivery for the treatment of depression.

Key words: Sertraline hydrochloride, First-pass effect, Solubilization, Intranasal, Depression.

INTRODUCTION

Recent investigations on nasal delivery recognize the nasal crater as a surrogate route for the drugs with deprived aqueous solubility, vulnerable to acidic or enzymatic devastation and hepatic metabolism. Nasal crater is a well-tolerated and non-invasive route with ease of administration. Nasal delivery provides self administration and dosage control when required which facilitate home treatment and a cost-effective substitute. Systemic delivery of drugs acting on central nervous system (CNS), such as antidepressants, is considerably complicated due to the discriminatory physiological barriers that selectively seize the CNS from the circulatory system. Brain drug levels following nasal administration are the results of double absorption pathway *i.e.* direct transfer through olfactory region and absorption into the systemic circulation then transport across the blood brain barrier (BBB) (Pardridge, 1999). Absorption of therapeutics via BBB is significantly affected by the properties like lipophilicity, molecular size and specificity of drug for a variety of ATP-dependent transport systems (Graff and Pollack, 2004; Pardridge, 1999). Blood and the cerebrospinal fluid are also discriminated by blood-CSF barrier, which is made up of a single uninterrupted layer of polarized epithelial cells with rigid junctions that line the choroid plexus. This barrier has a wider range of enzymes with 1000 times lower surface area but less restrictive than BBB (Graff and Pollack, 2004; Loscher and Potschka, 2005). The