Pharmacokinetics of levalbuterol research paper sample

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Pharmacokinetics of Levalbuterol

Levalbuterol is the R-enentiomer, which is a β2 –adrenergic receptor that is short-acting and agonist salbutamol. It is branded with various names including Levolin or Axazest (Peterson, 2004). Levalbuterol is a bronchodilator thus used in the treatment of asthma. Therefore, it widens breathing passages and makes breathing easier. The drug is available as a solution that is usedby a nebulizer and as an MDI. (Indra, 2004) The drug has different effects on the patient, which are detrimental in nature, which include anxiety, muscle cramps, weakness and irregular heartbeat. Another unlikely serious side effect that might happen is chest pains or wheezing. The systemic bioavailability of nebulized racemic albuterol is 2. 3% to 7. 6% in patients with normal renal and hepatic function (Trevor, 2010). When administered through inhalation, it will be active within 15 minutes and reaches peak action in 1 to 1. 5 hours. The duration of action ranges from 3 to 4 hours. The volume of distribution averages 9. 1 L/kg in patients (Indra, 2004).

β2 –adrenergic receptors are activated within the smooth muscles airway leading to adenylate cyclase activation, which has a consequence of increment of cyclic AMP (adenosine monophosphate) intracellular concentration. This results in protein kinase A activation, which limits myosin phosphorylation and reduces the concentration of the intracellular ionic calcium that has the impact of muscle realization.

The drug is introduced into the body either orally, through inhalation, subcutaneous, intramuscular or intravenous routes. Absorption in the gastrointestinal tract occurs via passive processes that cannot distinguish between the enantiomers of a racemate. Additionally, there is not any evidence that it is absorbedby a carrier mediated process; thus stereo selectivity in absorption of antiasthma agents currently in clinical practice is not expected. Although absorption from the membranes appears nonstereoselective, these drugs may be subject to extensive stereoselective first-pass metabolism in the gastrointestinal tract and the liver (Peterson, 2004). This can lead to attainment of different amounts of active enantiomer entering the systemic circulation after oral compared to after parenteral routes of administration. Hence a given total drug concentration after oral administration would be expected to yield a less marked pharmacodynamics response than that of an equivalent concentration after IV administration (Indra, 2004).

The drug once in the body is catalyzed with enzymes. It is not retained for long in the blood stream. The half-life of this drug is 1. 6 hours and is primary excreted through the urine (Indra, 2004).

References:

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