

Albutamol[®] Plus

Syrup

Composition:

Each 5ml contains

Salbutamol 1mg

Etofylline 50mg

Bromhexine 4mg

Pharmacokinetic properties:

Salbutamol is readily absorbed from the gastrointestinal tract. When given by inhalation, 10 to 20% of the dose reaches the lower airways. The remainder is retained in the delivery system or is swallowed and absorbed from the gut. Salbutamol is subject to first-pass metabolism in the liver and possibly in the gut wall but does not appear to be metabolised in the lung; the main metabolite is the inactive sulfate conjugate. Salbutamol is rapidly excreted, mainly in the urine, as metabolites and unchanged drug; a smaller proportion is excreted in the faeces. The plasma half-life of salbutamol has been estimated to range from 4 to 6 hours.

Etofylline is well absorbed after oral administration. Rapidly and well absorbed after intravenous administration. Widely distributed in the body and 40% bound to the plasma proteins. Metabolized in the liver to its metabolites by demethylation and oxidation. 1-methyluric acid is its metabolite excreted through urine.

Bromhexine hydrochloride is rapidly absorbed from the gastrointestinal tract; peak plasma concentrations occur after about 1 hour. Bromhexine undergoes extensive first-pass metabolism in the liver: its oral bioavailability is stated to be only about 20%. It is widely distributed to body tissues. About 85 to 90% of a dose is excreted in the urine mainly as metabolites. Ambroxol is a metabolite of bromhexine. Bromhexine is highly bound to plasma proteins. It has a terminal elimination half-life of 13 to 40 hours. Bromhexine crosses the blood-brain barrier and small amounts cross the placenta

Mechanism of Action

Salbutamol is a beta(2)-adrenergic agonist and thus it stimulates beta(2)-adrenergic receptors. Binding of albuterol to beta(2)-receptors in the lungs results in relaxation of bronchial smooth muscles. It is believed that salbutamol increases cAMP production by activating adenylate cyclase, and the actions of salbutamol are mediated by cAMP. Increased intracellular cyclic AMP increases the activity of cAMP-dependent protein kinase A, which inhibits the phosphorylation of myosin and lowers intracellular calcium concentrations. A lowered intracellular calcium concentration leads to a smooth muscle relaxation and bronchodilation. In addition to bronchodilation, salbutamol inhibits



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the release of bronchoconstricting agents from mast cells, inhibits microvascular leakage, and enhances mucociliary clearance.

Etophylline is the ethyl salt of Theophylline. It inhibits phosphodiesterase enzyme which degrades cyclic nucleotides intracellularly and it results in the cyclic AMP accumulation in the cell. This causes bronchodilation.

Bromhexine is an oral mucolytic agent with a low level of associated toxicity. Bromhexine acts on the mucus at the formative stages in the glands, within the mucus-secreting cells. Bromhexine disrupts the structure of acid mucopolysaccharide fibres in mucoid sputum and produces a less viscous mucus, which is easier to expectorate.

Other pharmacodynamic properties:

Salbutamol, a moderately selective beta(2)-receptor agonist similar in structure to terbutaline, is widely used as a bronchodilator to manage asthma and other chronic obstructive airway diseases. The R-isomer, levalbuterol, is responsible for bronchodilation while the S-isomer increases bronchial reactivity. The R-enantiomer is sold in its pure form as Levalbuterol. The manufacturer of levalbuterol, Sepracor, has implied (although not directly claimed) that the presence of only the R-enantiomer produces fewer side-effects.

Etophylline releases calcium from sarcoplasmic reticulum, especially in cardiac muscles and results in increased cardiac muscle contraction. This drug also blocks adenosine receptors (adenosine acts as a local mediator in CNS & CVS and other organs- which contracts smooth muscles, especially in bronchi, blood vessels etc). This results in bronchodilation and vasodilatation.

Indication:

Salbutamol plus Syrup is indicated for the treatment of productive cough associated with bronchospasm in conditions such as bronchitis and bronchial asthma as well as all conditions associated with tenacious mucus, wheezing and chest congestion.

Contraindication:

Salbutamol Plus Syrup is contraindicated in patients with hypersensitivity to any ingredient of the formulation.

Drug Interaction:

- Hypokalemia with high doses of β_2 -agonists may result in increased susceptibility to digitalis-induced cardiac arrhythmias.
- Hypokalemia may be enhanced by concomitant administration of aminophylline or other xanthines, corticosteroids or by diuretic therapy.
- Other sympathomimetic bronchodilators or epinephrine should not be used concomitantly with salbutamol, since their combined effect on the cardiovascular system may be deleterious to the patient.



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- Salbutamol should be administered with caution in patients being treated with monoamine oxidase (MAO) inhibitors or tricyclic antidepressants, since the action of salbutamol on the vascular system may be potentiated.

Adverse effects:

- The adverse reactions to Salbutamol are similar in nature to those of other sympathomimetic agents and include nervousness and tremor.
- The frequency of these side effects appears to diminish with continued therapy.
- Other commonly reported reactions include increased heart rate, palpitations, dizziness, headache, drowsiness, vomiting, nausea, sweating and muscle cramps. These reactions are generally transient and usually do not require treatment.

Warnings and Precautions:

- While treating cough as a symptom, it is important to make every effort to determine and treat appropriately the underlying cause, such as a specific infection.
- Caution should be observed while prescribing Albutamol Plus Syrup to children with hypertension, cardiovascular disease, uncontrolled juvenile diabetes mellitus, hyperthyroidism, seizures or in patients who are unusually hypersensitive to sympathomimetic amines.

Use in special population:

1. **Pediatric:** Safe.
2. **Geriatric:** Safety and effectiveness of Albutamol Plus Syrup in geriatric patients have not been established.
3. **Liver impairment:** Use with caution.
4. **Renal failure:** Use with caution.
5. **Pregnancy and lactation:** Category C: Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks. Doctor consultation is recommended for breast feeding patients.

Dosage:

The usual recommended dose for children is 5-10ml thrice a day.

Presentation:

Albutamol Plus syrup is available in 100 ml bottle.

Storage and handling:

Store below 30°C in a dark place. Keep the bottle tightly closed.



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