

Betahistine Hydrochloride

Serc®
24 mg Tablet
Anti-Vertigo

R_x

QUALITATIVE AND QUANTITATIVE COMPOSITION

Serc® 24 mg tablet contains 24 mg betahistine hydrochloride corresponding to 15.63 mg betahistine.

PHARMACEUTICAL FORM

Serc® tablet, 24 mg:

A round, biconvex, scored, white to almost white tablet with beveled edges. The diameter is 10 mm; the tablet weight is about 375 mg. The inscription is 289 on either side of the score on one tablet-side. The scoreline is only to facilitate breaking for ease of swallowing and not to divide into equal doses.

CLINICAL PARTICULARS

Therapeutic indications

Ménière's Syndrome as defined by the following triad of core symptoms:

- vertigo (with nausea/vomiting)
- hearing loss (hardness of hearing)
- tinnitus

Symptomatic treatment of vestibular vertigo.

Posology and method of administration

The dosage for adults is 48 mg divided over the day.

24 mg tablets
1 tablet
2 times/day

Method of administration:

Should be swallowed with water.

The dosage should be individually adapted according to the response. Improvement can sometimes only be observed after a couple of weeks of treatment. The best results are sometimes obtained after a few months. There are indications that treatment from the onset of the disease prevents the progression of the disease and/or the loss of hearing in later phases of the disease.

Pediatric population:

Serc® is not recommended for use in children below 18 years due to insufficient data on safety and efficacy.

Geriatric population:

Although there are limited data from clinical studies in this patient group, extensive post marketing experience suggests that no dose adjustment is necessary in this patient population.

Renal impairment:

There are no specific clinical trials available in this patient group, but according to post-marketing experience no dose adjustment appears to be necessary.

Hepatic impairment:

There are no specific clinical trials available in this patient group, but according to post-marketing experience no dose adjustment appears to be necessary.

Contraindications

Hypersensitivity to the active substance or to any of the excipients.
Phaeochromocytoma.

Special warnings and precautions for use

Patients with bronchial asthma and history of peptic ulcer need to be carefully monitored during the therapy.

Interaction with other medicinal products and other forms of interaction

No *in vivo* interaction studies have been performed. Based on *in vitro* data no *in vivo* inhibition on Cytochrome P450 enzymes is expected.

In vitro data indicate an inhibition of betahistine metabolism by drugs that inhibit monoamino-oxidase (MAO) including MAO subtype B (e.g. selegiline). Caution is recommended when using betahistine and MAO inhibitors (including MAO-B selective) concomitantly.

As betahistine is an analogue of histamine, interaction of betahistine with antihistamines may in theory affect the efficacy of one of these drugs.

Pregnancy and lactation

Pregnancy:

There are no adequate data from the use of betahistine in pregnant women.

Animal studies do not indicate direct or indirect harmful effects with respect to reproductive toxicity (see section **Preclinical safety data**). Betahistine should not be used during pregnancy unless clearly necessary.

Lactation:

It is not known whether betahistine is excreted in human milk. Betahistine is excreted in rat milk. Effects seen post-partum in animal studies were limited to very high doses (see section **Preclinical safety data**). The importance of the drug to the mother should be weighed against the benefits of nursing and the potential risks for the child.

Fertility

Animal studies did not show effects on fertility in rats.

Effects on ability to drive and use machines

Betahistine is indicated for Ménière's syndrome defined by the triad of core symptoms vertigo, hearing loss, tinnitus and for symptomatic treatment of vestibular vertigo. Both diseases can negatively affect the ability to drive and use machines.

In clinical studies specifically designed to investigate the ability to drive and use machines betahistine had no or negligible effects.

Undesirable effects

The following undesirable effects have been experienced with the below indicated frequencies in betahistine-treated patients in placebo-controlled clinical trials [very common (≥1/10); common (≥1/100 to <1/10); uncommon (≥1/1,000 to <1/100); rare (≥1/10,000 to <1/1,000); very rare (<1/10,000)].

Gastrointestinal disorders

Common: nausea and dyspepsia

Nervous system disorders

Common: headache

In addition to those events reported during clinical trials, the following undesirable effects have been reported spontaneously during post-marketing use and in scientific literature. A frequency cannot be estimated from the available data and is therefore classified as "not known".

Immune System disorders

Hypersensitivity reactions, e.g. anaphylaxis

Gastrointestinal disorders

Mild gastric complaints (e.g. vomiting, gastrointestinal pain, abdominal distension and bloating). These can normally be dealt with by taking the dose during meals or by lowering the dose.

Skin and subcutaneous tissue disorders

Cutaneous and subcutaneous hypersensitivity reactions, in particular angioneurotic edema, urticaria, rash, and pruritus.

Overdose

A few overdose cases have been reported. Some patients experienced mild to moderate symptoms with doses up to 640 mg (e.g. nausea, somnolence, abdominal pain).

More serious complications (e.g. convulsion, pulmonary or cardiac complications) were observed in cases of intentional overdose of betahistine especially in combination with other overdosed drugs. Treatment of overdose should include standard supportive measures.



PHARMACOLOGICAL PROPERTIES

Pharmacodynamic properties

Pharmacotherapeutic group: Anti-Vertigo preparations.
ATC-Code: N07CA01

The mechanism of action of betahistine is only partly understood. There are several plausible hypotheses that are supported by animal studies and human data:

- Bethahistine affects the histaminergic system:
Bethahistine acts both as a partial histamine H₁-receptor agonist and histamine H₃-receptor antagonist also in neuronal tissue, and has negligible H₂-receptor activity. Bethahistine increases histamine turnover and release by blocking presynaptic H₃-receptors and inducing H₃-receptor downregulation.
- Bethahistine may increase blood flow to the cochlear region as well as to the whole brain:
Pharmacological testing in animals has shown that the blood circulation in the striae vascularis of the inner ear improves, probably by means of a relaxation of the precapillary sphincters of the microcirculation of the inner ear. Bethahistine was also shown to increase cerebral blood flow in humans.
- Bethahistine facilitates vestibular compensation:
Bethahistine accelerates the vestibular recovery after unilateral neurectomy in animals, by promoting and facilitating central vestibular compensation; this effect characterized by an upregulation of histamine turnover and release, is mediated via the H₃ Receptor antagonism. In human subjects, recovery time after vestibular neurectomy was also reduced when treated with betahistine.
- Bethahistine alters neuronal firing in the vestibular nuclei:
Bethahistine was also found to have a dose dependent inhibiting effect on spike generation of neurons in lateral and medial vestibular nuclei.

The pharmacodynamic properties as demonstrated in animals may contribute to the therapeutic benefit of betahistine in the vestibular system.

The efficacy of betahistine was shown in studies in patients with vestibular vertigo and with Ménière's disease as was demonstrated by improvements in severity and frequency of vertigo attacks.

Pharmacokinetic properties

Absorption:

Orally administered betahistine is readily and almost completely absorbed from all parts of the gastrointestinal tract. After absorption, the drug is rapidly and almost completely metabolized into 2pyridylacetic acid. Plasma levels of betahistine are very low. Pharmacokinetic analyses are therefore based on 2 -PAA measurements in plasma and urine. Under fed conditions C_{max} is lower compared to fasted conditions. However, total absorption of betahistine is similar under both conditions, indicating that food intake only slows down the absorption of betahistine.

Distribution:

The percentage of betahistine that is bound by blood plasma proteins is less than 5 %.

Biotransformation:

After absorption, betahistine is rapidly and almost completely metabolized into 2-PAA (which has no pharmacological activity). After oral administration of betahistine the plasma (and urinary) concentration of 2-PAA reaches its maximum 1 hour after intake and declines with a half-life of about 3.5 hours.

Excretion:

2-PAA is readily excreted in the urine. In the dose range between 8 and 48 mg, about 85% of the original dose is recovered in the urine. Renal or fecal excretion of betahistine itself is of minor importance.

Linearity:

Recovery rates are constant over the oral dose range of 8 – 48 mg indicating that the pharmacokinetics of betahistine are linear, and suggesting that the involved metabolic pathway is not saturated.

Preclinical safety data

Chronic toxicity

Adverse effects in the nervous system were seen in dogs and baboons after intravenous doses at and above 120 mg/kg.

Studies on the chronic oral toxicity of betahistine hydrochloride were performed in rats over a period of 18 months and in dogs over 6 months. Doses of 500 mg/kg in rats and 25 mg/kg in dogs were tolerated without changes in the clinical chemical and hematological parameters. There were no histological findings related to treatment at these dosages. After increasing the dose to 300 mg/kg, the dogs showed vomiting. In an investigational study with betahistine in rats over 6 months at 39 mg/kg and above hyperemia in some tissues was reported in the literature. Data presented in the publication are limited. Therefore, the impact of this finding in this study is not clear.

Mutagenic and carcinogenic potential

Bethahistine does not have mutagenic potential.

Special carcinogenicity studies were not performed with betahistine hydrochloride. However, in the 18 months chronic toxicity studies in rats there was no indication of any tumors, neoplasms or hyperplasia in the histopathological examination. Therefore, betahistine hydrochloride up to a dose of 500 mg/kg did not show any evidence for carcinogenic potential in this limited 18 months study.

Reproduction toxicity

Bethahistine has no effects on fertility in male and female rats and is not teratogenic in rats and rabbits up to and including 1000 mg/kg for rats and 75 mg/kg in rabbits. In a pre- and postnatal development study in rats, lower pup weight, smaller litter size and lower viability in F1 pups and increased post implantation loss in F1 generation were seen at maternally toxic doses of 1000 mg. Lower average force for startle response test was observed in F1 pups of 300 and 1000 mg/kg dose groups. At 100 mg/kg, no effects on pre- and postnatal development were noted. The relevance of changes noticed at higher doses to humans is unknown.

PHARMACEUTICAL PARTICULARS

Incompatibilities

Not applicable

Shelf life

36 months

Special precautions for storage

Store at temperatures not exceeding 30°C.

Nature and contents of container

Blister Pack x 20's (Box of 100's)

Caution

Foods, Drugs, Devices and Cosmetics Act prohibits dispensing without prescription.

“For suspected adverse drug reaction, report to the FDA: www.fda.gov.ph”. Seek medical attention immediately at the first sign of any adverse drug reaction.

Registration Number

DRP-7104

Date of First Authorization

30 October 2003

Manufactured by:

MYLAN LABORATORIES SAS
Route de Belleville, Lieu-dit Maillard
01400 Chatillon sur Chalaronne, France

Imported by:

ABBOTT LABORATORIES
Venice Corporate Center, 8 Turin St.
McKinley Town Center, Taguig
Metro Manila, Philippines

SOLID 1000315910 v6.0

Date of Revision of Package Insert

9 March 2017



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