

Regurin 20mg Tablets

regurin
Trospium Chloride

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1. NAME OF THE MEDICINAL PRODUCT

Regurin 20mg Tablets.

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

The active ingredient is trospium chloride. Each coated tablet contains 20mg trospium chloride.
For excipients, see 6.1.

3. PHARMACEUTICAL FORM

Coated tablet.
Brownish-yellow, glossy coated, biconvex tablets.

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

Symptomatic treatment of urge incontinence and/or increased urinary frequency and urgency as may occur in patients with overactive bladder (e.g. idiopathic or neurologic detrusor overactivity).

4.2 Posology and method of administration

One coated tablet twice daily (equivalent to 40mg of trospium chloride per day).

In patients with severe renal impairment (creatinine clearance between 10 and 30 ml/min/1.73 m²) the recommended dosage is: One coated tablet per day or every second day (equivalent to 20mg of trospium chloride per day or every second day).

The coated tablet should be swallowed whole with a glass of water before meals on an empty stomach.

The need for continued treatment should be reassessed at regular intervals of 3-6 months.

Since no data are available, use in children under 12 years of age is contra-indicated.

4.3 Contraindications

Trospium chloride is contra-indicated in patients with urinary retention, severe gastro-intestinal condition (including toxic megacolon), myasthenia gravis, narrow-angle glaucoma and tachyarrhythmia.

Trospium chloride is also contra-indicated in patients who have demonstrated hypersensitivity to the active substance or to any of the excipients.

4.4 Special warnings and precautions for use

Trospium chloride should be used with caution by patients:

- with obstructive conditions of the gastro-intestinal tract such as pyloric stenosis
- with obstruction of the urinary flow with the risk of formation of urinary retention
- with autonomic neuropathy
- with hiatus hernia associated with reflux oesophagitis
- in whom fast heart rates are undesirable e.g. those with hyperthyroidism, coronary artery disease and congestive heart failure.

As there are no data in patients with severe hepatic impairment, treatment of these patients with trospium chloride is not recommended. In patients with mild to moderate liver impairment caution should be exercised.

Trospium chloride is mainly eliminated by renal excretion. Marked elevations in the plasma levels have been observed in patients with severe renal impairment. Therefore in this population but also in patients with mild to moderate renal impairment caution should be exercised (see 4.2).

Before commencing therapy organic causes of urinary frequency, urgency, and urge incontinence, such as heart diseases, diseases of the kidneys, polydipsia, or infections, or tumours of urinary organs should be excluded.

Regurin contains lactose monohydrate, sucrose and wheat starch. Patients with rare hereditary problems of galactose intolerance, the Lapp lactase deficiency or glucose-galactose malabsorption should not take this medicine.

Patients with rare hereditary problems of fructose intolerance or sucrase-isomaltase insufficiency should not take this medicine.

Patients with wheat allergy (different from coeliac disease) should not take this medicine. Apart from that, trospium chloride is suitable for people with coeliac disease.

4.5 Interaction with other medicinal products and other forms of interaction

Pharmacodynamic interactions:

The following potential pharmacodynamic interactions may occur: Potentiation of the effect of drugs with anticholinergic action (such as amantadine, tricyclic antidepressants), enhancement of the tachycardic action of β -sympathomimetics; decrease in efficacy of pro-kinetic agents (e.g. metoclopramide).

Since trospium chloride may influence gastro-intestinal motility and secretion, the possibility cannot be excluded that the absorption of other concurrently administered drugs may be altered.

Pharmacokinetic interactions:

An inhibition of the absorption of trospium chloride with drugs like guar, cholestyramine and colestipol cannot be excluded. Therefore the simultaneous administration of these drugs with trospium chloride is not recommended.

Metabolic interactions of trospium chloride have been investigated in vitro on cytochrome P450 enzymes involved in drug metabolism (P450 1A2, 2A6, 2C9, 2C19, 2D6, 2E1, 3A4). No influence on their metabolic activities were observed. Since trospium chloride is metabolised only to a low extent and since ester hydrolysis is the only relevant metabolic pathway, no metabolic interactions are expected.

4.6 Pregnancy and lactation

Animal studies do not indicate direct or indirect harmful effects with respect to pregnancy, embryonal/foetal development, parturition or postnatal development (see section 5.3). In rats, placental transfer and passage into the maternal milk of trospium chloride occurs.

For Regurin 20mg no clinical data on exposed pregnancies are available.

Caution should be exercised when prescribing to pregnant or breast-feeding women.

4.7 Effects on ability to drive and use machines

Principally, disorders of accommodation can lower the ability to actively participate in road traffic and to use machines.

However, examinations of parameters characterising the ability to participate in road traffic (visual orientation, general ability to react, reaction under stress, concentration and motor coordination) have not revealed any effects of trospium chloride.

4.8 Undesirable effects

Anticholinergic effects such as dry mouth, dyspepsia and constipation may occur during treatment with trospium chloride.

Very common (> 10%):

gastro-intestinal system: dry mouth

Common (> 1%):

gastro-intestinal system: dyspepsia, constipation, abdominal pain, nausea

Uncommon (< 1%):

gastro-intestinal system: flatulence

Rare (< 0.1%):

urinary system: micturition disorders (e.g. formation of residual urine)

cardiovascular system: tachycardia

vision disorders: disorders of accommodation (this applies in particular to patients who are hypermetropic and whose vision has not been adequately corrected)

gastro-intestinal system: diarrhoea

respiratory system: dyspnoea

skin: rash

body as a whole: asthenia, chest pain

Very rare (< 0.01%):

urinary system: urinary retention

cardiovascular system: tachyarrhythmia

musculoskeletal system: myalgia, arthralgia

skin: angio-oedema

liver and biliary system: mild to moderate increase in serum transaminase levels

body as a whole: anaphylaxis

central nervous system: headache, dizziness.

4.9 Overdose

After the administration of a maximum single dose of 360mg trospium chloride to healthy volunteers, dryness of the mouth, tachycardia and disorders of micturition were observed to an increased extent. No manifestations of severe overdosage or intoxication in humans have been reported to date. Increased anticholinergic symptoms are to be expected as signs of intoxication.

In the case of intoxication the following measures should be taken:

- gastric lavage and reduction of absorption (e.g. activated charcoal)
- local administration of pilocarpine to glaucoma patients
- catheterisation in patients with urinary retention
- treatment with a parasympathomimetic agent (e.g. neostigmine) in the case of severe symptoms
- administration of beta blockers in the case of insufficient response, pronounced tachycardia and/or circulatory instability (e.g. initially 1mg propranolol intravenously along with monitoring of ECG and blood pressure).

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Urinary Antispasmodic, ATC code G04BD15.

Trospium chloride is a quaternary derivative of nortropine and therefore belongs to the class of parasympatholytic or anticholinergic drugs, as it competes concentration-dependently with acetylcholine, the body's endogenous transmitter at postsynaptic, parasympathic binding sites.

Trospium chloride binds with high affinity to muscarinic receptors of the so called M1-, M2- and M3- subtypes and demonstrates negligible affinity to nicotinic receptors.

Consequently, the anticholinergic effect of trospium chloride exerts a relaxing action on smooth muscle tissue and organ functions mediated by muscarinic receptors. Both in preclinical as well as in clinical experiments, trospium chloride diminishes the contractile tone of smooth muscle in the gastro-intestinal and genito-urinary tract.

Furthermore, it can inhibit the secretion of bronchial mucus, saliva, sweat and the ocular accommodation. No effects on the central nervous system have so far been observed.

In two specific safety studies in healthy volunteers trospium chloride has been proven not to affect cardiac repolarisation, but has been shown to have a consistent and dose dependent heart rate accelerating effect.

A long term clinical trial with trospium chloride 20mg bid found an increase of QT> 60 ms in 1.5% (3/197) of included patients. The clinical relevance of these findings has not been established. Routine safety monitoring in two other placebo-controlled clinical trials of three months duration do not support such an influence of trospium chloride: In the first study an increase of QTcF>= 60 msec was seen in 4/258 (1.6%) in trospium-treated patients versus 9/256 (3.5%) in placebo-treated patients. Corresponding figures in the second trial were 8/326 (2.5%) in trospium-treated patients versus 8/325 (2.5%) in placebo-treated patients.

5.2 Pharmacokinetic properties

After oral administration of trospium chloride maximum plasma levels are reached at 4-6 hours. Following a single dose of 20mg the maximum plasma level is about 4ng/ml. Within the tested interval, 20 to 60mg as a single dose, the plasma levels are proportional to the administered dose. The absolute bioavailability of a single oral dose of 20mg of trospium chloride (1 coated tablet Regurin 20mg) is $9.6 \pm 4.5\%$ (mean value \pm standard deviation). At steady state the intraindividual variability is 16%, the interindividual variability is 36%.

Simultaneous intake of food, especially high fat diets, reduces the bioavailability of trospium chloride. After a high-fat meal mean C_{max} and AUC are reduced to 15-20% of the values in the fasted state.

Trospium chloride exhibits diurnal variability in exposure with a decrease of both C_{max} and AUC for evening relative to morning doses.

Most of the systemically available trospium chloride is excreted unchanged by the kidneys, though a small portion (10% of the renal excretion) appears in the urine as the spiroalcohol, a metabolite formed by ester hydrolysis. The terminal elimination half-life is in the range of 10-20 hours. No accumulation occurs. The plasma protein binding is 50-80%.

Pharmacokinetic data in elderly patients suggests no major differences. There are also no gender differences.

In a study in patients with severe renal impairment (creatinine clearance 8-32ml/min) mean AUC was 4-fold higher, C_{max} was 2-fold higher and the mean half-life was prolonged 2-fold compared with healthy subjects.

Pharmacokinetic results of a study with mildly and moderately hepatically impaired patients do not suggest a need for dose adjustment in patients with hepatic impairment, and are consistent with the limited role of hepatic metabolism in the elimination of trospium chloride.

5.3 Preclinical safety data

Preclinical data reveal no special hazard to humans based on conventional studies of safety pharmacology, repeated dose toxicity, genotoxicity, carcinogenicity, and toxicity to reproduction.

Placental transfer and passage of trosipium chloride into the maternal milk occurs in rats.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Tablet core:

Wheat starch

Microcrystalline cellulose

Lactose monohydrate

Povidone

Croscarmellose sodium

Stearic acid

Silica colloidal anhydrous

Talc

Tablet coat:

Sucrose

Carmellose sodium

Talc

Silica colloidal anhydrous

Calcium carbonate E170

Macrogol 8000

Titanium dioxide (E171)

Iron oxide hydrate yellow (E172)

Beeswax white

Carnauba wax

Note for diabetics: 1 coated tablet corresponds to 0.06g carbohydrate (equivalent to 0.005 bread units).

6.2 Incompatibilities

Not applicable.

6.3 Shelf life

5 years.

6.4 Special precautions for storage

This medicinal product does not require any special storage conditions.

6.5 Nature and contents of container

PVC foiled aluminium blister.

Packs sizes approved: 2, 20, 28, 30, 40, 50, 56, 60, 90, 100, 120, 150, 200, 500, 600, 1000, 1200, 2000.

Not all pack sizes may be marketed.

6.6 Special precautions for disposal and other handling

No special requirements.

7. MARKETING AUTHORISATION HOLDER

Madaus GmbH

51101 Cologne

Germany

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24 July 2007

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