

Summary of Product Characteristics

1 NAME OF THE MEDICINAL PRODUCT

Midodrine Hydrochloride 2.5 mg tablets

2 QUALITATIVE AND QUANTITATIVE COMPOSITION

Each tablet contains 2.5 mg of midodrine hydrochloride.

For a full list of excipients, see section 6.1.

3 PHARMACEUTICAL FORM

Tablet.

White to off white, round biconvex tablets, debossed with "MI" above the score line and "2.5" below the score line, and plain on other side. Diameter 6.3 mm and thickness 2.8 – 3.2 mm.

The score-line is only to facilitate breaking for ease of swallowing and not to divide into equal doses.

4 CLINICAL PARTICULARS

4.1 Therapeutic Indications

Midodrine Hydrochloride Tablets are indicated in adults for the treatment of severe orthostatic hypotension due to autonomic dysfunction when corrective factors have been ruled out and other forms of treatment are inadequate.

4.2 Posology and method of administration

Posology

The usual starting dose is 2.5 mg 2-3 times daily. The dose should be increased at weekly intervals in small increments until an optimal response is obtained. Most patients are controlled at or below 30 mg daily given in divided doses. The maximum daily dose is 30mg given in divided doses. Doses in excess of 30mg daily are not recommended. The supine and standing blood pressure should be monitored regularly during initial treatment (at least two times a week) and the use of midodrine should be stopped if supine hypertension increases excessively. Dosing of midodrine should occur during the daytime, when the patient needs to be upright. A dosing schedule of 3-4 hour intervals is suggested.

The last dose should be taken at least four hours before bedtime to reduce the risk of supine hypertension.

A careful evaluation of the response to treatment and of the overall balance of the expected benefits and risks needs to be undertaken before any dose increase and advice to continue therapy for long periods.

Midodrine Hydrochloride Tablets may be taken with food (see section 5.2).

Paediatric population

- The safety and efficacy of midodrine in children have not been established. No data are available.

Elderly population

- There is limited data on dosing in the elderly and there are no specific studies which have focused on a possible dose reduction in the elderly population. Cautious dose titration is recommended.
- The administration of midodrine should be stopped and the attending physician notified immediately if the blood pressure in either position increases above 180/100 or is considered clinically significant.

Patients with renal impairment

- There are no specific studies that have focused on a possible dose reduction in patients with renal impairment. Typically, midodrine is contraindicated in patients with acute renal impairment and severe renal impairment (see section 4.3).

Patients with hepatic impairment

- There are no specific studies in this patient population (see also section 4.4).

Method of administration

For oral use.

4.3 Contraindications

- Severe organic heart disease (e.g. bradycardia, heart attack, congestive heart failure, cardiac conduction disturbances or aortic aneurysm).
- Hypertension.
- Serious obliterative blood vessel disease, cerebrovascular occlusions and vessel spasms.
- Acute kidney disease.
- Severe renal impairment (creatinine clearance of less than 30 ml/min).
- Serious prostate disorder.
- Urinary retention.
- Proliferative diabetic retinopathy.
- Pheochromocytoma.
- Hyperthyroidism.
- Narrow angle glaucoma.
- Vasovagal hypotension
- Hypersensitivity to the active substance or to any of the excipients listed in section 6.1.

4.4 Special warnings and precautions for use

Severe orthostatic hypotension with supine hypertension

Regular monitoring of supine and standing blood pressure is necessary due to the risk of hypertension in the supine position, e.g. at night. Patients should be told to report symptoms of supine hypertension immediately such as chest pain, palpitations, shortness of breath, headache and blurred vision, and should be monitored for these side effects by the treating physician. Supine hypertension may often be controlled by an adjustment to the dose. If supine hypertension occurs, which is not overcome by reducing the dose, treatment with midodrine must be stopped.

The time of administration of the drug is important in this context. Avoid administration in the late evening. The last daily dose should be taken at least 4 hours before bedtime in order to prevent supine hypertension. The risk of supine hypertension occurring during the night can be reduced by elevating the head.

Severe disturbances of the autonomic nervous system

In patients suffering from a severe disturbance of the autonomic nervous system, administration of midodrine may lead to a further reduction of blood pressure when standing. If this occurs, further treatment with midodrine should be stopped.

Atherosclerotic disease

Caution must be observed in patients with atherosclerotic disease especially with symptoms of intestinal angina or claudication of the legs.

Prostate disorders

Caution is advised in patients with prostate disorders. Use of the drug may cause urinary retention.

Renal and hepatic function

This medicinal product is contraindicated in patients with acute renal impairment or severe renal impairment (see Section 4.3). Treatment with midodrine has not been studied in patients with hepatic impairment. It is therefore recommended to evaluate the renal and hepatic parameters before starting treatment with midodrine and on a regular basis.

Heart rate

Slowing of the heart rate may occur after midodrine administration, due to vagal reflex. Caution is advised when midodrine is used concomitantly with cardiac glycosides (such as digitalis preparations) and other agents that directly or indirectly reduce heart rate such as beta blockers, psychopharmacologic agents (Specifically tricyclic antidepressants, phenothiazines and atypical antipsychotics). Patients should be monitored for signs or symptoms suggesting bradycardia.

Patients taking midodrine should avoid concomitant use of other adreno-sympathomimetic drugs including over the counter remedies (see 4.5).

Great caution should be exercised in patients with mild to moderate renal insufficiency (creatinine clearance >30mL/min and <90mL/min).

Patients with persistent labile blood pressure after stabilisation on midodrine should discontinue treatment.

The use of midodrine in patients who are treated with mineralocorticoids / fludrocortisone acetate (which may increase intra-ocular pressure) should be avoided or monitored very closely (see section 4.5).
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4.5 Interaction with other medicinal products and other forms of interactions

Sympathomimetics and other vasopressor agents

Concomitant treatment with sympathomimetics and other vasoconstrictive substances such as reserpine, methyl dopa, guanethidine, tricyclic antidepressants, antihistamines, decongestants, thyroid hormones and MAO-inhibitors, including treatments that are available without prescription, should be avoided as a pronounced increase in blood pressure may occur.

Alpha-adrenergic antagonists

As with other specific α -adrenergic agonists, the effect of midodrine is blocked by α -adrenergic antagonists such as prazosin and phentolamine. The concomitant use of alpha- and beta-receptor blocking agents (which reduce the heart rate) and midodrine requires careful monitoring.

Heart rate reducing drugs

Monitoring is recommended if midodrine is combined with other drugs that directly or indirectly reduce the heart rate.

Glycosides

Simultaneous use of digitalis preparations is not recommended, as the heart rate reducing effect may be potentiated by midodrine and heart block may occur.

Corticosteroid preparations

Midodrine may potentiate or enhance the hypertensive effects of corticosteroid preparations. Patients being treated with midodrine in combination with mineralocorticoids or glucocorticoids (e.g. fludrocortisone) may be at increased risk of glaucoma/increased intraocular pressure, and should be carefully monitored

Potential pharmacokinetic interactions

Midodrine is an inhibitor of Cytochrome P450 CYP2D6 and may therefore affect the metabolism of other drugs metabolised by this isoenzyme (e.g. perphenazine, amiodarone, metoclopramide). This may lead to increased systemic exposure and increased effects of these drugs.

4.6 Fertility, pregnancy and lactationPregnancy

There are no data from the use of midodrine hydrochloride in pregnant women. Studies in animals have shown reproductive toxicity at maternally toxic doses.

Midodrine Hydrochloride Tablets are not recommended during pregnancy and in women of childbearing potential not using contraception.

Breastfeeding

It is unknown whether midodrine and its metabolites are excreted in human milk.

A risk to newborns/infants cannot be excluded. Midodrine Hydrochloride Tablets should not be used during breastfeeding.

Fertility

Animal studies are insufficient with respect to the assessment of fertility.

4.7 Effects on ability to drive and use machines

Midodrine Hydrochloride Tablets have negligible influence on the ability to drive and use machines.

However, patients who experience dizziness or light-headedness should refrain from driving or operating machinery.

4.8 Undesirable effectsSummary of the safety profile

The most frequent and very common adverse reactions related to midodrine therapy are piloerection, pruritus of the scalp and dysuria

Tabulated list of adverse reactions

Organ Class	Very Common (> 1/10)	Common (> 1/100, < 1/10)	Uncommon (> 1/1,000, < 1/100)	Rare (> 1/10,000, < 1/1,000)	Frequency not known (cannot be estimated from available data)
Psychiatric disorders			Sleep disorders Insomnia		Anxiety Confusional state
Nervous system disorders		Paraesthesia Paraesthesia of the scalp Headache	Restlessness Excitability Irritability	Dizziness or light headedness	
Cardiac disorders			Reflex bradycardia	Tachycardia Palpitations Arrhythmias Chest pain	
Vascular disorders		Supine hypertension (dose dependent effect)		Cerebrovascular accident	
Gastrointestinal disorders		Nausea Dyspepsia Stomatitis			Abdominal pain Vomiting Diarrhoea

Hepatobiliary disorders				Abnormal hepatic function Raised liver enzymes	
Skin and subcutaneous tissue disorders	Piloerection (goose bumps) Pruritus of the scalp	Pruritus Chills Flushing Rash			
Renal and Urinary disorders	Dysuria	Urinary retention	Urinary urgency		
Eye disorders				Visual disturbance	Increased tear production

Reporting of suspected adverse reactions

Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via the HPRA Pharmacovigilance Website: www.hpra.ie.

4.9 Overdose

The symptoms of overdose are the same as experienced with side effects. The following in particular may occur: hypertension, piloerection (goosebumps) and feeling cold, bradycardia (reflex bradycardia) and urinary retention.

Treatment: In addition to the main general "life support" measures, induced vomiting and the administration of an α -sympatholytic agent (e.g. nitroprusside, phentolamine, nitroglycerine) is recommended, based on the pharmacology of the drug.

Bradycardia and bradycardic conduction disturbances can be blocked by atropine.

The active metabolite desglymidodrine is dialysable.

5 PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Cardiac Therapy, Adrenergic and dopaminergic agents

ATC Code: C01C A17

Midodrine is the rapidly absorbed pro-drug of the pharmacologically active constituent desglymidodrine. Desglymidodrine is a sympathomimetic agent with a direct and selective effect on the peripheral α 1-adrenergic receptors. This α 1-stimulative effect induces vasoconstriction of the venous system (causing a reduction in venous pooling). The α 1-adrenergic effects of desglymidodrine are almost wholly attributable to the (-) enantiomer of desglymidodrine. After taking midodrine, which is a racemic mixture, (+) desglymidodrine is also present, though this contributes almost nothing to the desired effect.

Desglymidodrine increases the peripheral arterial resistance, resulting in an increase in arterial blood pressure.

Only limited data is available on the long-term effects of taking midodrine.

Stimulation of the α -adrenergic receptors of the bladder and the ureter increases the sphincter muscle tone.

Desglymidodrine has no β -adrenergic effects.

5.2 Pharmacokinetic properties

Absorption

After oral administration, midodrine is rapidly absorbed. Peak plasma concentrations are reached after approximately 30 minutes, and the plasma concentration of the active metabolite, desglymidodrine, peaks after approximately 1 hour.

AUC and C_{max} increase proportionally to the dose across a dosage range of 2.5 – 22.5 mg. Administration with food increases the AUC by approximately 25%, and the C_{max} decreases by approximately 30%. The pharmacokinetics of desglymidodrine are not affected.

Distribution

Neither midodrine nor desglymidodrine are bound to plasma proteins to any significant extent (less than 30%). Desglymidodrine diffuses poorly across the blood-brain barrier. Diffusion across the placenta has been reported. It is not known whether this drug is excreted in human milk.

Metabolism

Midodrine is partially hydrolysed before absorption (in the intestines), and partially after absorption (in plasma) by the separation of glycine, herewith generating the active metabolite, desglymidodrine. The elimination of desglymidodrine is primarily caused by an oxidating metabolism, followed by (partial) conjugation.

Excretion

Midodrine (8%), desglymidodrine (40%), and their degradation products (55%) are excreted in the urine by more than 90% within 24 hours in conjugated or non-conjugated forms. The plasma elimination half-life for midodrine is approximately 30 minutes, and is approximately 3 hours for desglymidodrine. Elimination of the active (-) enantiomer of desglymidodrine is slower than the elimination of the inactive (+) enantiomer.

5.3 Preclinical safety data

Safety Pharmacology studies and repeat-dose toxicity studies with animals did not show any indications of a safety risk for humans at therapeutic doses. Studies in the rat and rabbit show that at maternally toxic doses, midodrine is embryotoxic. There is no evidence of teratogenicity.

Midodrine is not genotoxic and after long term studies in rats (104 weeks) and mice (78 weeks), there was no evidence that midodrine was carcinogenic at dose of up to 10 mg/kg/day and up to 15 mg/kg/day, respectively, compared to a maximum patient daily dose of 30 mg (~0.5 mg/kg/day).

6 PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Microcrystalline cellulose
Maize starch
Colloidal anhydrous silica
Magnesium stearate

6.2 Incompatibilities

Not applicable.

6.3 Shelf life

30 months

6.4 Special precautions for storage

Store below 30°C.

6.5 Nature and contents of container

PVC/PVdC foiled aluminium blister.

Pack of 100 tablets.

6.6 Special precautions for disposal and other handling

No special requirements.

Any unused medicinal product or waste material should be disposed of in accordance with local requirements.

7 MARKETING AUTHORISATION HOLDER

Milstein C.V.
Patroonsweg 20 E
3892 DB Zeewolde
Netherlands

8 MARKETING AUTHORISATION NUMBER

PA23215/001/001

9 DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

Date of First Authorisation: 11th February 2022

10 DATE OF REVISION OF THE TEXT