

For the use only of a Registered Medical Practitioner or a Hospital or a Laboratory

Solfin 5 (Solifenacin Succinate film coated Tablets 5 mg)

COMPOSITION

Each film coated tablet contains:
Solifenacin Succinate.....5 mg

DESCRIPTION

Light yellow coloured, round, biconvex, film coated tablets debossed with “L 22” on one side and plain on other side.

PHARMACOLOGICAL CLASSIFICATION

Cholinergic-receptor antagonist

PHARMACOLOGICAL ACTION:

Pharmacodynamic properties

Pharmacotherapeutic group: Urinary antispasmodics, ATC code: G04B D08.

Mechanism of action:

Solifenacin is a competitive, specific cholinergic-receptor antagonist.

The urinary bladder is innervated by parasympathetic cholinergic nerves. Acetylcholine contracts the detrusor smooth muscle through muscarinic receptors of which the M3 subtype is predominantly involved. *In vitro* and *in vivo* pharmacological studies indicate that solifenacin is a competitive inhibitor of the muscarinic M3 subtype receptor. In addition, solifenacin showed to be a specific antagonist for muscarinic receptors by displaying low or no affinity for various other receptors and ion channels tested.

Pharmacodynamic effects:

Treatment with Solifenacin succinate in doses of 5 mg and 10 mg daily was studied in several doubleblind, randomised, controlled clinical trials in men and women with overactive bladder.

As shown in the table below, both the 5 mg and 10 mg doses of Solifenacin succinate produced statistically significant improvements in the primary and secondary endpoints compared with placebo. Efficacy was observed within one week of starting treatment and stabilizes over a period of 12 weeks. A long-term open label study demonstrated that efficacy was maintained for at least 12 months. After 12 weeks of treatment, approximately 50% of patients suffering from incontinence before treatment were free of incontinence episodes, and in addition 35% of patients achieved a micturition frequency of less than 8 micturitions per day. Treatment of the symptoms of overactive bladder also results in a benefit on a number of Quality of Life measures, such as general health perception, incontinence impact, role limitations, physical limitations, social limitations, emotions, symptom severity, severity measures and sleep/energy.

Results (pooled data) of four controlled Phase 3 studies with a treatment duration of 12 Weeks

	Placebo	Solifenacin succinate 5mg o.d	Solifenacin succinate 10mg o.d	Tolterodine 2 mg b.i.d.
No. of micturitions/24 h				
Mean baseline	11.9	12.1	11.9	12.1
Mean reduction from baseline	1.4	2.3	2.7	1.9
% change from baseline	(12%)	(19%)	(23%)	(16%)
<i>n</i>	1138	552	1158	250
p-value*		<0.001	<0.001	<0.004
No. of urgency episodes/24 h				
Mean baseline	6.3	5.9	6.2	5.4
Mean reduction from baseline	2.0	2.9	3.4	2.1
% change from baseline	(32%)	(49%)	(55%)	(39%)
<i>n</i>	1124	548	1151	250
p-value*		<0.001	<0.001	0.031
No. of incontinence episodes/24 h				
Mean baseline	2.9	2.6	2.9	2.3
Mean reduction from baseline	1.1	1.5	1.8	1.1

% change from baseline	(38%)	(58%)	(62%)	(48%)
<i>n</i>	781	314	778	157
p-value*		<0.001	<0.001	0.009
No. of nocturia episodes/24 h				
Mean baseline	1.8	2.0	1.8	1.9
Mean reduction from baseline	0.4	0.6	0.6	0.5
% change from baseline	(22%)	(30%)	(33%)	(26%)
<i>n</i>	1005	494	1035	232
p-value*		0.025	<0.001	0.199
Volume voided/micturition				
Mean baseline	166 ml	146 ml	163 ml	147 ml
Mean increase from baseline	9 ml	32 ml	43 ml	24 ml
% change from baseline	(5%)	(21%)	(26%)	(16%)
<i>n</i>	1135	552	1156	250
p-value*		<0.001	<0.001	<0.001
No. of pads/24 h				
Mean baseline	3.0	2.8	2.7	2.7
Mean reduction from baseline	0.8	1.3	1.3	1.0
% change from baseline	(27%)	(46%)	(48%)	(37%)
<i>n</i>	238	236	242	250
p-value*		<0.001	<0.001	0.010

Note: In 4 of the pivotal studies, Solifenacin succinate 10mg and placebo were used. In 2 out of the 4 studies also Solfin 5 mg was used and one of the studies included tolterodine 2 mg bid.

Not all parameters and treatment groups were evaluated in each individual study. Therefore, the numbers of patients listed may deviate per parameter and treatment group.

*P-value for the pair-wise comparison to placebo

Clinical QT Interval Data

Two dedicated QT studies have been performed with solifenacin. The first study was an open label, multiple dose escalating study in 60 healthy subjects. In this study solifenacin was administered starting at a dose of 10 mg once daily for 2 weeks and proceeded in 10 mg increments for 2 weeks at each dose level. The highest tolerated dose was 40 mg. The results are presented in the table below. There was no significant change in QTc interval using the Bazett as well as the Friderica method for the 10 mg solifenacin compared to baseline. Depending on the method applied, some prolongation was seen for the 20 mg and 30 mg doses, which are higher than the recommended therapeutic dose. However, both methods suggest no prolongation for the 40 mg dose, which is four times the highest recommended therapeutic dose.

Treatment Least Squares Means of Change from Baseline QTc (Bazett and Friderica) ANCOVA Model

Dose (mg)	Bazett Method		Friderica Method	
	Estimate	95% Confidence Interval	Estimate	95% Confidence Interval
10	0.8	(-2.1, 3.6)	-0.6	(-3.3,2.0)
20	5.4	(2.6, 8.3)	2.5	(-0.2,5.2)
30	5.5	(2.5, 8.5)	1.3	(-1.5,4.2)
40	-0.1	(-3.4, 3.1)	-4.7	(-7.8,-2.0)

There were no QTc intervals > 500 msec; increases of >60 msec occurred in 1 subject (on 30 mg), while change <60 msec but >30 msec occurred in 34 subjects (11 changes on 10 mg, 20 changes on 20 mg, 27 changes on 30 mg, 9 changes on 40 mg).

The second study was a double blind, multiple dose, placebo and positive controlled (moxifloxacin 400 mg) study in 76 female volunteers aged 19 to 79 years. This second QT study was a dedicated thorough QT study with the subjects

randomized to one of two treatment groups after receiving placebo and moxifloxacin sequentially. One group (n=51) went on to complete 3 additional sequential periods of dosing with solifenacin 10, 20, and 30 mg, while the second group (n=25) in parallel completed a sequence of placebo and moxifloxacin. The 30 mg dose of solifenacin succinate (three times the highest recommended dose) was chosen for use in this study because this dose results in a solifenacin exposure that covers the exposure observed upon co-administration of 10 mg Solifenacin succinate with potent CYP3A4 inhibitors (e.g. ketoconazole, 400 mg). Due to the sequential dose escalating nature of the study, baseline ECG measurements were separated from the final QT assessment (of the 30 mg dose level) by 33 days. The median difference from baseline in heart rate associated with the 10 and 30 mg doses of solifenacin succinate compared to placebo was -2 and 0 beats/minute, respectively. Because a significant period effect on QTc was observed, the QTc effects were analyzed utilizing the parallel placebo control arm rather than the prespecified intra-patient analysis (Friderica method). Representative results for solifenacin are shown in the table below.

QTc changes in msec (90% Confidence Interval) from baseline at Tmax (relative to placebo)

Dose (mg)	Treatment	Result of Friderica method (using mean difference)
10 mg	Solifenacin 10 mg once daily for 14 days	2(-3,6)
30 mg	Solifenacin 30 mg once daily for 14 days	8(4,13)

Moxifloxacin was included as a positive control in this study and, given the length of the study, its effect on the QT interval was evaluated in 3 different sessions.

The placebo subtracted mean changes (90% Confidence Interval) in QTcF for moxifloxacin in the three sessions were 11 msec (7, 14), 12 msec (8,17) and 16 msec (12, 21), respectively.

There were no subjects with a mean QTc > 500 msec. Four subjects experienced increases in mean QTcF that were greater than 60 msec from the time-matched baseline. Three subjects received 30 mg solifenacin and the fourth received 400 mg moxifloxacin.

A change in QTc of < 60 msec but > 30 msec occurred in 29 subjects on 10 mg and in 31 subjects during 30 mg solifenacin treatment.

The QT interval prolonging effect appeared to be greater for the 30 mg compared to the 10 mg dose of solifenacin. Although the effect of the highest solifenacin dose (three times the maximum therapeutic dose) studied did not appear as large as that of the positive control moxifloxacin at its therapeutic dose, the confidence intervals overlapped. This study was not designed to draw direct statistical conclusions between the drugs or the dose levels.

Across the four controlled phase 3 studies, QTc interval prolongation was seen of approximately up to 5 msec, along with PR interval prolongation. There were 12

patients with a change in QTc from baseline of > 60 msec and 6 patients with QTc > 500 msec at any time point on solifenacin. There were no reports of VT or

VF or association between these QT changes and death, syncope, dizziness or ventricular arrhythmias.

Pharmacokinetics

Absorption

After intake of Solifenacin Tablets, maximum solifenacin plasma concentrations (C_{max}) are reached after 3 to 8 hours. The t_{max} is independent of the dose. The C_{max} and area under the curve (AUC) increase in proportion to the dose between 5 to 40 mg. Absolute bioavailability is approximately 90%. Food intake does not affect the C_{max} and AUC of solifenacin.

Distribution

The apparent volume of distribution of solifenacin following intravenous administration is about 600 L. Solifenacin is to a great extent (approximately 98%) bound to plasma proteins, primarily α1-acid glycoprotein.

Biotransformation

Solifenacin is extensively metabolised by the liver, primarily by cytochrome P450 3A4 (CYP3A4). However, alternative metabolic pathways exist, that can contribute to the metabolism of solifenacin. The systemic clearance of solifenacin is about 9.5 L/h and the terminal half-life of solifenacin is 45 - 68 hours. After oral dosing, one pharmacologically active (4R-hydroxy solifenacin) and three inactive metabolites (N-glucuronide, N-oxide and 4R-hydroxy-N-oxide of solifenacin) have been identified in plasma in addition to solifenacin.

Elimination

After a single administration of 10 mg [14C-labelled]- solifenacin, about 70% of the radioactivity was detected in urine and 23% in faeces over 26 days. In urine, approximately 11% of the radioactivity is recovered as unchanged active substance; about 18% as the N-oxide metabolite, 9% as the 4R-hydroxy- N-oxide metabolite and 8% as the 4R-hydroxy metabolite (active metabolite).

Linearity/non-linearity

Pharmacokinetics are linear in the therapeutic dose range.

Other special populations

Elderly

No dosage adjustment based on patient age is required. Studies in the elderly have shown that the exposure to solifenacin, expressed as the AUC, after administration of solifenacin succinate (5 mg and 10 mg once daily) was similar in healthy elderly subjects (aged 65 through 80 years) and healthy young subjects (aged less than 55 years). The mean rate of absorption expressed as t_{max} was slightly slower in the elderly and the terminal half-life was approximately 20% longer in elderly subjects. These modest differences were considered not clinically significant. The pharmacokinetics of solifenacin have not been established in children and adolescents.

Gender

The pharmacokinetics of solifenacin are not influenced by gender.

Race

The pharmacokinetics of solifenacin are not influenced by race.

Renal impairment

The AUC and C_{max} of solifenacin in mild and moderate renally impaired patients was not significantly different from that found in healthy volunteers. In patients with severe renal impairment (creatinine clearance ≤ 30 ml/min), exposure to solifenacin was significantly greater than in the controls, with increases in C_{max} of about 30%, AUC of more than 100% and $t_{1/2}$ of more than 60%. A statistically significant relationship was observed between creatinine clearance and solifenacin clearance.

Pharmacokinetics in patients undergoing haemodialysis have not been studied.

Hepatic impairment

In patients with moderate hepatic impairment (Child-Pugh score of 7 to 9) the C_{max} is not affected, AUC increased with 60% and $t_{1/2}$ doubled. Pharmacokinetics of solifenacin in patients with severe hepatic impairment have not been studied.

INDICATIONS AND USAGE

Symptomatic treatment of urge incontinence and/or increased urinary frequency and urgency as may occur in patients with overactive bladder syndrome.

DOSAGE

Posology

Adults, including the elderly

The recommended dose is 5 mg solifenacin succinate once daily. If needed, the dose may be increased to 10 mg solifenacin succinate once daily.

Paediatric population

The safety and efficacy of Solifenacin Tablets in children have not yet been established. Therefore, Solifenacin Tablets should not be used in children.

Patients with renal impairment

No dose adjustment is necessary for patients with mild to moderate renal impairment (creatinine clearance > 30 ml/min). Patients with severe renal impairment (creatinine clearance ≤ 30 ml/min) should be treated with caution and receive no more than 5 mg once daily.

Patients with hepatic impairment

No dose adjustment is necessary for patients with mild hepatic impairment. Patients with moderate hepatic impairment (Child-Pugh score of 7 to 9) should be treated with caution and receive no more than 5 mg once daily.

Potent inhibitors of cytochrome P450 3A4

The maximum dose of Solifenacin Tablets should be limited to 5 mg when treated simultaneously with ketoconazole or therapeutic doses of other potent CYP3A4 inhibitors e.g. ritonavir, nelfinavir, itraconazole.

Method of administration

Solifenacin Tablets should be taken orally and should be swallowed whole with liquids. It can be taken with or without food.

CONTRAINDICATIONS

- Solifenacin is contraindicated in patients with urinary retention, severe gastrointestinal condition (including toxic megacolon), myasthenia gravis or narrow-angle glaucoma and in patients at risk for these conditions.
- Patients hypersensitive to the active substance or to any of the excipients
- Patients undergoing haemodialysis.
- Patients with severe hepatic impairment.
- Patients with severe renal impairment or moderate hepatic impairment and who are on treatment with a potent CYP3A4 inhibitor, e.g. ketoconazole.

WARNING AND PRECAUTIONS

Other causes of frequent urination (heart failure or renal disease) should be assessed before treatment with Solifenacin Tablets. If urinary tract infection is present, an appropriate antibacterial therapy should be started.

Solifenacin Tablets should be used with caution in patients with:

- Clinically significant bladder outflow obstruction at risk of urinary retention.
- Gastrointestinal obstructive disorders.
- Risk of decreased gastrointestinal motility.
- Severe renal impairment (creatinine clearance ≤ 30 ml/min) and doses should not exceed 5 mg for these patients.
- Moderate hepatic impairment (Child-Pugh score of 7 to 9) and doses should not exceed 5 mg for these patients.
- Concomitant use of a potent CYP3A4 inhibitor, e.g. ketoconazole.
- Hiatus hernia/gastroesophageal reflux and/or who are concurrently taking medicinal products (such as bisphosphonates) that can cause or exacerbate oesophagitis.
- Autonomic neuropathy.

Safety and efficacy have not yet been established in patients with a neurogenic cause for detrusor overactivity.

Patients with rare hereditary problems of galactose intolerance, the Lapp lactase deficiency or glucose-galactose malabsorption should not take this medicinal product.

Angioedema with airway obstruction has been reported in some patients on solifenacin succinate. If angioedema occurs, solifenacin succinate should be discontinued and appropriate therapy and/or measures should be taken.

Anaphylactic reaction has been reported in some patients treated with solifenacin succinate. In patients who develop anaphylactic reactions, solifenacin succinate should be discontinued and appropriate therapy and/or measures should be taken.

The maximum effect of Solifenacin Tablets can be determined after 4 weeks at the earliest. QT prolongation and Torsade de Pointes have been observed in patients with risk factors. As with other drugs in this class, caution is advised in patients with known risk factors for QT-prolongation (i.e. history of QT prolongation, long QT syndrome, hypokalaemia, bradycardia, co-administration of drugs known to prolong the QT interval) and relevant pre-existing cardiac diseases (i.e. myocardial ischaemia, arrhythmia, congestive heart failure).

Appropriate investigations (e.g. ECG) should be considered in patients with risk factors for QTc prolongation.

DRUG INTERACTIONS

Pharmacological interactions

Concomitant medication with other medicinal products with anticholinergic properties may result in more pronounced therapeutic effects and undesirable effects. An interval of approximately one week should be allowed after stopping treatment with Solifenacin Tablets before commencing other anticholinergic therapy. The therapeutic effect of solifenacin may be reduced by concomitant administration of cholinergic receptor agonists.

Solifenacin can reduce the effect of medicinal products that stimulate the motility of the gastrointestinal tract, such as metoclopramide and cisapride.

Pharmacokinetic interactions

In vitro studies have demonstrated that at therapeutic concentrations, solifenacin does not inhibit CYP1A1/2, 2C9, 2C19, 2D6, or 3A4 derived from human liver microsomes. Therefore, solifenacin is unlikely to alter the clearance of drugs metabolised by these CYP enzymes.

Effect of other medicinal products on the pharmacokinetics of solifenacin

Solifenacin is metabolised by CYP3A4. Simultaneous administration of ketoconazole (200 mg/day), a potent CYP3A4 inhibitor, resulted in a two-fold increase of the AUC of solifenacin, while ketoconazole at a dose of 400 mg/day resulted in a three-fold increase of the AUC of solifenacin. Therefore, the maximum dose of Solifenacin Tablets should be restricted to 5 mg when used simultaneously with ketoconazole or therapeutic doses of other potent CYP3A4 inhibitors (e.g. ritonavir, nelfinavir, itraconazole). Simultaneous treatment of solifenacin and a potent CYP3A4 inhibitor is contraindicated in patients with severe renal impairment or moderate hepatic impairment.

The effects of enzyme induction on the pharmacokinetics of solifenacin and its metabolites have not been studied as well as the effect of higher affinity CYP3A4 substrates on solifenacin exposure. Since solifenacin is metabolised by CYP3A4,

pharmacokinetic interactions are possible with other CYP3A4 substrates with higher affinity (e.g. verapamil, diltiazem) and CYP3A4 inducers (e.g. rifampicin, phenytoin, and carbamazepine).

Effect of solifenacin on the pharmacokinetics of other medicinal products

Oral Contraceptives

Intake of Solifenacin Tablets showed no pharmacokinetic interaction of solifenacin on combined oral contraceptives (ethinylestradiol/ levonorgestrel).

Warfarin

Intake of Solifenacin Tablets did not alter the pharmacokinetics of *R*-warfarin or *S*-warfarin or their effect on prothrombin time.

Digoxin

Intake of Solifenacin Tablets showed no effect on the pharmacokinetics of digoxin.

Drugs which prolong the QT/QTc interval

There is no satisfactory information on the concurrent use of solifenacin succinate with drugs known to prolong the QT/QTc interval. In the absence of such information on these combinations the potential risk of pathological QT/QTc prolongation resulting in arrhythmias cannot be ruled out. Drugs known to prolong the QT/QTc interval include: erythromycin, quinidine, procainamide, disopyramide, sotalol, amiodarone, cisapride, fluconazole, amitriptyline, haloperidol, chlorpromazine, thioridazine, pimozone and droperidol.

PREGNANCY AND LACTATION:

Pregnancy

No clinical data are available from women who became pregnant while taking solifenacin. Animal studies do not indicate direct harmful effects on fertility, embryonal / foetal development or parturition. The potential risk for humans is unknown. Caution should be exercised when prescribing to pregnant women.

Breast-feeding

No data on the excretion of solifenacin in human milk are available. In mice, solifenacin and/or its metabolites was excreted in milk, and caused a dose dependent failure to thrive in neonatal mice. The use of Solifenacin Tablets should therefore be avoided during breast-feeding.

UNDESIRABLE EFFECTS

Summary of the safety profile

Due to the pharmacological effect of solifenacin, Solifenacin Tablets may cause anticholinergic undesirable effects of (in general) mild or moderate severity. The frequency of anticholinergic undesirable effects is dose related.

The most commonly reported adverse reaction with Solifenacin Tablets was dry mouth. It occurred in 11% of patients treated with 5 mg once daily, in 22% of patients treated with 10 mg once daily and in 4% of placebo-treated patients. The severity of dry mouth was generally mild and did only occasionally lead to discontinuation of treatment. In general, medicinal product compliance was very high (approximately 99%) and approximately 90% of the patients treated with Solifenacin Tablets completed the full study period of 12 weeks treatment.

Tabulated list of adverse reactions:

MedDRA system organ class	Very common > 1/10	Common ≥1/100, <1/10	Uncommon ≥1/1000, <1/100	Rare ≥1/10000, <1/1000	Very rare < 1/10,000,	Not known (cannot be estimated from the available data)
Infections and infestations			Urinary tract Infection Cystitis			
Immune system disorders						Anaphylactic reaction*
Metabolism and nutrition disorders						Decreased appetite* Hyperkalaemia*
Psychiatric disorders					Hallucinations* Confusional state*	Delirium*
Nervous system disorders			Somnolence Dysgeusia	Dizziness*, Headache*		
Eye disorders		Blurred vision	Dry eyes			Glaucoma*
Cardiac						Torsade de

disorders						Pointes* Electrocardiogram QT prolonged* Atrial fibrillation* Palpitations* Tachycardia*
Respiratory, thoracic and mediastinal disorders			Nasal dryness			Dysphonia*
Gastrointestinal disorders	Dry Mouth	Constipation Nausea Dyspepsia Abdominal pain	Gastroesophageal reflux diseases Dry throat	Colonic Obstruction Faecal impaction Vomiting*		Ileus* Abdominal discomfort*
Hepatobiliary disorders						Liver disorder* Liver function test abnormal*
Skin and subcutaneous tissue disorders			Dry skin	Pruritus*, Rash*	Erythema multiforme* Urticaria* Angioedema*	Exfoliative dermatitis*
Musculoskeletal and connective tissue disorders						Muscular weakness*
Renal and urinary disorders			Difficulty in micturition	Urinary Retention		Renal impairment*
General disorders and administration site conditions			Fatigue Peripheral oedema			

* observed post-marketing

OVERDOSAGE

Symptoms

Overdosage with solifenacin succinate can potentially result in severe anticholinergic effects. The highest dose of solifenacin succinate accidentally given to a single patient was 280 mg in a 5 hour period, resulting in mental status changes not requiring hospitalisation.

Treatment

In the event of overdose with solifenacin succinate, the patient should be treated with activated charcoal. Gastric lavage is useful if performed within 1 hour, but vomiting should not be induced.

As for other anticholinergics, symptoms can be treated as follows:

- Severe central anticholinergic effects such as hallucinations or pronounced excitation: treat with physostigmine or carbachol.
- Convulsions or pronounced excitation: treat with benzodiazepines.
- Respiratory insufficiency: treat with artificial respiration.
- Tachycardia: treat with beta-blockers.
- Urinary retention: treat with catheterisation.
- Mydriasis: treat with pilocarpine eye drops and/or place patient in a dark room.

As with other antimuscarinics, in case of overdosing, specific attention should be paid to patients with known risk for QTprolongation (i.e. hypokalaemia, bradycardia and concurrent administration of medicinal products known to prolong QT-interval) and relevant pre-existing cardiac diseases (i.e. myocardial ischaemia, arrhythmia, congestive heart failure).

Effects on ability to drive and use machines

Since solifenacin, like other anticholinergics may cause blurred vision, and, uncommonly, somnolence and fatigue, the ability to drive and use machines may be negatively affected.

STORAGE

Store below 30°C.

PRESENTATION:

Alu/Clear PVC Blister pack of 10 Tablets.
Available in pack size 3x10's

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