

## SUMMARY OF PRODUCT CHARACTERISTICS

**Amlosun 5/ Amlosun 10**  
(Amlodipine Besylate Tablets USP 5mg/ 10 mg)

### 1. NAME OF THE MEDICINAL PRODUCT

**Amlosun 5/10**

### 2. QUALITATIVE AND QUANTITATIVE COMPOSITION

#### **Amlosun 5**

Each uncoated tablet contains:

Amlodipine Besylate USP equivalent to Amlodipine.....5mg

#### **Amlosun 10**

Each uncoated tablet contains:

Amlodipine Besylate USP equivalent to Amlodipine.....10mg

### 3. PHARMACEUTICAL FORM

White coloured round shaped flat faced bevelled edged un-coated tablets having one side debossed with 'SUN' and other side breakline.

### 4. CLINICAL PARTICULARS <sup>1</sup>

#### **4.1 Therapeutic indications**

- Hypertension
- Chronic stable angina pectoris
- Vasospastic (Prinzmetal's) angina

#### **4.2 Posology and method of**

##### **administration Adults**

For both hypertension and angina, the usual initial dose is 5 mg **Amlosun** once daily which may be increased to a maximum dose of 10 mg depending on the individual patient's response.

In hypertensive patients, **Amlosun** has been used in combination with a thiazide diuretic, alpha blocker, beta blocker, or an angiotensin converting enzyme inhibitor. For angina, **Amlosun** may be used as monotherapy or

in combination with other antianginal medicinal products in patients with angina that is refractory to nitrates and/or to adequate doses of beta blockers.

No dose adjustment of **Amlosun** is required upon concomitant administration of thiazide diuretics, beta blockers, and angiotensin-converting enzyme inhibitors.

#### Special population

##### ***Elderly patients***

**Amlosun** used at similar doses in elderly or younger patients is equally well tolerated. Normal dosage regimens are recommended in the elderly, but increase of the dosage should take place with care (see **section 4.4 and 5.2**).

##### ***Patients with hepatic impairment***

Dosage recommendations have not been established in patients with mild to moderate hepatic impairment; therefore dose selection should be cautious and should start at the lower end of the dosing range (see **section 4.4 and 5.2**). The pharmacokinetics of amlodipine has not been reported in severe hepatic impairment. Amlodipine should be initiated at the lowest dose and titrated slowly in patients with severe hepatic impairment.

##### ***Patients with renal impairment***

Changes in amlodipine plasma concentrations are not correlated with degree of renal impairment, therefore the normal dosage is recommended. Amlodipine is not dialysable.

##### ***Paediatric population***

*Children and adolescents with hypertension from 6 years to 17 years of age.*  
The recommended antihypertensive oral dose in paediatric patients ages 6-17 years is 2.5 mg once daily as a starting dose, up-titrated to 5 mg once daily if blood pressure goal is not achieved after 4 weeks. Doses in excess of 5 mg daily have not been studied in paediatric patients.

##### *Children under 6 years old*

No reported information is available.

##### **Method of administration**

Tablet for oral administration.

### **4.3 Contraindications**

Amlodipine is contraindicated in patients with:

- Hypersensitivity to dihydropyridines derivatives, amlodipine or any of the excipients of the formulation listed in **section 6.1**.
- Severe hypotension.
- Shock (including cardiogenic shock).
- Obstruction of the outflow tract of the left ventricle (e.g., high grade aortic stenosis).
- Hemodynamically unstable heart failure after acute myocardial infarction.

### **4.4 Special warnings and precautions for use**

The safety and efficacy of amlodipine in hypertensive crisis has not been established.

#### *Patients with cardiac failure*

Patients with heart failure should be treated with caution. In a reported study in patients with severe heart failure (NYHA class III and IV), the reported incidence of pulmonary oedema was higher in the amlodipine treated group than in the placebo group. Calcium channel blockers, including amlodipine, should be used with caution in patients with congestive heart failure, as they may increase the risk of future cardiovascular events and mortality.

#### *Patients with hepatic impairment*

The half-life of amlodipine is prolonged and AUC values are higher in patients with impaired liver function; dosage recommendations have not been established. Amlodipine should therefore be initiated at the lower end of the dosing range and caution should be used, both on initial treatment and when increasing the dose. Slow dose titration and careful monitoring may be required in patients with severe hepatic impairment.

#### *Elderly patients*

In the elderly increase of the dosage should take place with care (see **section 4.2 and 5.2**).

#### *Patients with renal impairment*

Amlodipine may be used in such patients at normal doses. Changes in amlodipine plasma concentrations are not correlated with degree of renal impairment. Amlodipine is not dialysable.

### ***Excipient Warning***

**Amlsun** contains less than 1 mmol sodium (23mg) per tablet, that is to say essentially 'sodium -free'. This should be taken into consideration by patients on a controlled sodium diet.

## **4.5 Interaction with other medicinal products and other forms of interaction**

### **Effects of other medicinal products on amlodipine**

#### *CYP3A4 inhibitors*

Concomitant use of amlodipine with strong or moderate CYP3A4 inhibitors (protease inhibitors,azole antifungals, macrolides like erythromycin or clarithromycin, verapamil or diltiazem) may give rise to significant increase in amlodipine exposure resulting in an increased risk of hypotension. The clinical translation of these PK variations may be more pronounced in the elderly. Clinical monitoring and dose adjustment may thus be required.

#### *CYP3A4 inducers*

Upon co-administration of known inducers of the CYP3A4, the plasma concentration of amlodipine may vary. Therefore, blood pressure should be monitored and dose regulation considered both during and after concomitant medication particularly with strong CYP3A4 inducers (e.g. rifampicin, hypericum perforatum).

Administration of amlodipine with grapefruit or grapefruit juice is not recommended as bioavailability may be increased in some patients resulting in increased blood pressure lowering effects.

#### *Dantrolene (infusion)*

In animals, lethal ventricular fibrillation and cardiovascular collapse were reported in association with hyperkalemia after administration of verapamil and intravenous dantrolene. Due to risk of hyperkalemia, it is recommended that the co-administration of calcium channel blockers such as amlodipine be avoided in patients susceptible to malignant hyperthermia and in the management of malignant hyperthermia.

### **Effects of amlodipine on other medicinal products**

The blood pressure lowering effects of amlodipine adds to the blood pressure-lowering effects of other medicinal products with antihypertensive properties.

### *Tacrolimus*

There is a risk of increased tacrolimus blood levels when co-administered with amlodipine but the pharmacokinetic mechanism of this interaction is not fully understood. In order to avoid toxicity of tacrolimus, administration of amlodipine in a patient treated with tacrolimus requires monitoring of tacrolimus blood levels and dose adjustment of tacrolimus when appropriate.

### *Mechanistic Target of Rapamycin (mTOR) Inhibitors*

mTOR inhibitors such as sirolimus, temsirolimus, and everolimus are CYP3A substrates. Amlodipine is a weak CYP3A inhibitor. With concomitant use of mTOR inhibitors, amlodipine may increase exposure of mTOR inhibitors.

### *Cyclosporine*

No drug interaction studies have been reported with cyclosporine and amlodipine in healthy volunteers or other populations with the exception of renal transplant patients, where variable trough concentration increases (average 0% - 40%) of cyclosporine was reported. Consideration should be given for monitoring cyclosporine levels in renal transplant patients on amlodipine, and cyclosporine dose reductions should be made as necessary.

### *Simvastatin*

It has been reported that co-administration of multiple doses of 10 mg of amlodipine with 80 mg simvastatin resulted in a 77% increase in exposure to simvastatin compared to simvastatin alone. Limit the dose of simvastatin in patients on amlodipine to 20 mg daily.

In reported interaction studies, amlodipine did not affect the pharmacokinetics of atorvastatin, digoxin or warfarin.

## **4.6 Fertility, pregnancy and lactation**

### **Pregnancy**

The safety of amlodipine in human pregnancy has not been reported. In animal studies, reproductive toxicity was reported at high doses (see **section 5.3**). Use in pregnancy is only recommended when there is no safer alternative and when the disease itself carries greater risk for the mother and foetus.

### **Breast-feeding**

Amlodipine is excreted in human milk. It has been reported that the

proportion of the maternal dose received by the infant has been estimated with an interquartile range of 3- 7%, with a maximum of 15%. The effect of amlodipine on infants is unknown. A decision on whether to continue/discontinue breast-feeding or to continue/discontinue therapy with amlodipine should be made taking into account the benefit of breast-feeding to the child and the benefit of amlodipine therapy to the mother.

### **Fertility**

Reversible biochemical changes in the head of spermatozoa have been reported in some patients treated by calcium channel blockers. Reported information is insufficient regarding the potential effect of amlodipine on fertility. In a reported rat study, adverse effects were found on male fertility (see **section 5.3**).

### **4.7 Effects on ability to drive and use machines**

Amlodipine can have minor or moderate influence on the ability to drive and use machines. If patients taking amlodipine suffer from dizziness, headache, fatigue or nausea the ability to react may be impaired. Caution is recommended especially at the start of treatment.

### **4.8 Undesirable effects**

The most commonly reported adverse reactions during treatment are somnolence, dizziness, headache, palpitations, flushing, abdominal pain, nausea, ankle swelling, oedema and fatigue.

The following adverse reactions have been reported during treatment with amlodipine with the following frequencies: Very common ( $\geq 1/10$ ); common ( $\geq 1/100$  to  $< 1/10$ ); uncommon ( $\geq 1/1,000$  to  $< 1/100$ ); rare ( $\geq 1/10,000$  to  $< 1/1,000$ ); very rare ( $< 1/10,000$ ).

Within each frequency grouping, adverse reactions are presented in order of decreasing seriousness.

<b>System organ class</b>	<b>Frequency</b>	<b>Adverse reactions</b>
<b>Blood and lymphatic system disorders</b>	Very rare	Leukocytopenia, thrombocytopenia
<b>Immune system disorders</b>	Very rare	Allergic reactions
<b>Metabolism and nutrition disorders</b>	Very rare	Hyperglycaemia
<b>Psychiatric disorders</b>	Uncommon	Depression, mood changes (including anxiety),

		insomnia
	Rare	Confusion
<b>Nervous system disorders</b>	Common	Somnolence, dizziness, headache (especially at the beginning of the treatment)
	Uncommon	Tremor, dysgeusia, syncope, hypoaesthesia, paraesthesia
	Very rare	Hypertonia, peripheral neuropathy
	Not known	Extrapyramidal disorder
<b>Eye disorders</b>	Common	Visual disturbance (including diplopia)
<b>Ear and labyrinth disorders</b>	Uncommon	Tinnitus
<b>Cardiac disorders</b>	Common	Palpitations
	Uncommon	Arrhythmia (including bradycardia, ventricular tachycardia and atrial fibrillation)
	Very rare	Myocardial infarction
<b>Vascular disorders</b>	Common	Flushing
	Uncommon	Hypotension
	Very rare	Vasculitis
<b>Respiratory, thoracic and mediastinal disorders</b>	Common	Dyspnoea
	Uncommon	Cough, rhinitis
<b>Gastrointestinal disorders</b>	Common	Abdominal pain, nausea, dyspepsia, altered bowel habits (including diarrhoea and constipation)
	Uncommon	Vomiting, dry mouth
	Very rare	Pancreatitis, gastritis, gingival hyperplasia
<b>Hepatobiliary disorders</b>	Very rare	Hepatitis, jaundice, hepatic enzyme increased*
<b>Skin and subcutaneous tissue disorders</b>	Uncommon	Alopecia, purpura, skin discolouration, hyperhidrosis, pruritus, rash, exanthema, urticaria

	Very rare	Angioedema, erythema multiforme, exfoliative dermatitis, Stevens-Johnson syndrome, Quincke oedema, photosensitivity
	Not known	Toxic epidermal necrolysis
<b>Musculoskeletal and connective tissue disorders</b>	Common	Ankle swelling, muscle cramps
	Uncommon	Arthralgia, myalgia, back pain
<b>Renal and urinary disorders</b>	Uncommon	Micturition disorder, nocturia, increased urinary frequency
<b>Reproductive system and breast disorders</b>	Uncommon	Impotence, gynaecomastia
<b>General disorders and administration site conditions</b>	Very common	Oedema
	Common	Fatigue, asthenia
	Uncommon	Chest pain, pain, malaise
<b>Investigations</b>	Uncommon	Weight increased, weight decreased

\*mostly consistent with cholestasis

**Reporting of suspected adverse reactions:** Healthcare professionals are asked to report any suspected adverse reactions via pharmacy and poisons board, Pharmacovigilance Electronic Reporting System (PvERS) <https://pv.pharmacyboardkenya.org>

#### 4.9 Overdose

In humans experience with intentional overdose is limited.

##### *Symptoms*

Reported information suggest that gross overdosage could result in excessive peripheral vasodilatation and possibly reflex tachycardia. Marked and probably prolonged systemic hypotension up to and including shock with fatal outcome have been reported.

Non-cardiogenic pulmonary oedema has rarely been reported as a consequence of amlodipine overdose that may manifest with a delayed

onset (24-48 hours post-ingestion) and require ventilatory support. Early resuscitative measures (including fluid overload) to maintain perfusion and cardiac output may be precipitating factors.

#### *Treatment*

Clinically significant hypotension due to amlodipine overdosage calls for active cardiovascular support including frequent monitoring of cardiac and respiratory function, elevation of extremities and attention to circulating fluid volume and urine output.

A vasoconstrictor may be helpful in restoring vascular tone and blood pressure, provided that there is no contraindication to its use. Intravenous calcium gluconate may be beneficial in reversing the effects of calcium channel blockade.

Gastric lavage may be worthwhile in some cases. It has been reported that the use of charcoal up to 2 hours after administration of amlodipine 10 mg reduces the absorption rate of amlodipine.

Since amlodipine is highly protein-bound, dialysis is not likely to be of benefit.

## 5. **PHARMACOLOGICAL PROPERTIES** <sup>1</sup>

### 5.1 *Pharmacodynamic properties*

**Pharmacotherapeutic group:** Calcium channel blockers, selective calcium channel blockers with mainly vascular effects. **ATC Code:** C08CA01.

Amlodipine is a calcium ion influx inhibitor of the dihydropyridine group (slow channel blocker or calcium ion antagonist) and inhibits the transmembrane influx of calcium ions into cardiac and vascular smooth muscle.

The mechanism of the antihypertensive action of amlodipine is due to a direct relaxant effect on vascular smooth muscle. The precise mechanism by which amlodipine relieves angina has not been fully determined but amlodipine reduces total ischaemic burden by the following two actions:

- 1) Amlodipine dilates peripheral arterioles and thus, reduces the total peripheral resistance (afterload) against which the heart works. Since the heart rate remains stable, this unloading of the heart reduces myocardial

energy consumption and oxygen requirements.

- 2) The mechanism of action of amlodipine also probably involves dilatation of the main coronary arteries and coronary arterioles, both in normal and ischaemic regions. This dilatation increases myocardial oxygen delivery in patients with coronary artery spasm (Prinzmetal's or variant angina).

In patients with hypertension, once daily dosing provides clinically significant reductions of blood pressure in both the supine and standing positions throughout the 24-hour interval. Due to the slow onset of action, acute hypotension is not a feature of amlodipine administration.

In patients with angina, once daily administration of amlodipine increases total exercise time, time to angina onset, and time to 1 mm ST segment depression, and decreases both angina attack frequency and glyceryl trinitrate tablet consumption.

Amlodipine has not been reported to be associated with any adverse metabolic effects or changes in plasma lipids and is suitable for use in patients with asthma, diabetes, and gout.

## **5.2 Pharmacokinetic properties**

### *Absorption, distribution, plasma protein binding*

After oral administration of therapeutic doses, amlodipine is well absorbed with peak blood levels between 6-12 hours post dose. Absolute bioavailability has been reported to be between 64 and 80%. The volume of distribution is reported to be approximately 21 l/kg. *In vitro* studies have reported that approximately 97.5% of circulating amlodipine is bound to plasma proteins.

The bioavailability of amlodipine is not affected by food intake.

### *Biotransformation/elimination*

The terminal plasma elimination half-life reported is about 35-50 hours and is consistent with once daily dosing. Amlodipine is reported to be extensively metabolised by the liver to inactive metabolites with 10% of the parent compound and 60% of metabolites excreted in the urine.

### *Hepatic impairment*

Very limited reported information is available regarding amlodipine administration in patients with hepatic impairment. Patients with hepatic insufficiency have decreased clearance of amlodipine resulting in a longer half-life and an increase in AUC of approximately 40-60%.

### *Elderly population*

The time to reach peak plasma concentrations of amlodipine is reported to be similar in elderly and younger subjects. Amlodipine clearance tends to be decreased with resulting increases in AUC and elimination half-life in elderly patients. Increases in AUC and elimination half-life in patients with congestive heart failure were as expected for the patient age group studied.

### *Paediatric population*

A population PK study has been reported in hypertensive children aged from 1 to 17 years receiving amlodipine between 1.25 and 20 mg given either once or twice daily. In children 6 to 12 years and in adolescents 13-17 years of age the typical oral clearance (CL/F) was reported to be 22.5 and 27.4 L/hr respectively in males and 16.4 and 21.3 L/hr respectively in females. Large variability in exposure between individuals was reported. Data reported in children below 6 years is limited.

## **5.3 Preclinical safety data Reproductive toxicology**

Reproductive studies in rats and mice have reported delayed date of delivery, prolonged duration of labour and decreased pup survival at dosages approximately 50 times greater than the maximum recommended dosage for humans based on mg/kg.

### ***Impairment of fertility***

No effect was reported on the fertility of rats treated with amlodipine (males for 64 days and females 14 days prior to mating) at doses up to 10 mg/kg/day (8 times\* the maximum recommended human dose of 10 mg on a mg/m<sup>2</sup> basis). In another reported rat study in which male rats were treated with amlodipine besilate for 30 days at a dose comparable with the human dose based on mg/kg, decreased plasma follicle-stimulating hormone and testosterone were found as well as decreases in sperm density and in the number of mature spermatids and Sertoli cells.

### ***Carcinogenesis, mutagenesis***

Rats and mice treated with amlodipine in the diet for two years, at concentrations calculated to provide daily dosage levels of 0.5, 1.25, and 2.5 mg/kg/day reported no evidence of carcinogenicity. The highest dose (for mice, similar to, and for rats twice\* the maximum recommended clinical dose of 10 mg on a mg/m<sup>2</sup> basis) was close to the maximum tolerated dose for mice but not for rats.

Mutagenicity studies reported no drug related effects at either the gene or chromosome levels.

*\*Based on patient weight of 50 kg*

## **6. PHARMACEUTICAL PARTICULARS**

### **6.1 List of excipients:**

Microcrystalline cellulose, sodium starch glycolate, dibasic calcium phosphate, magnesium stearate, maize starch, colloidal silicone dioxide, talc, povidone and croscarmellose.

### **6.2 Incompatibilities**

Not Applicable

### **6.3 Shelf life**

Amlosun 5: 36 months

Amlosun 10: 24 months

### **6.4 Special precautions for storage**

Store upto 30°C, protected from light.

### **6.5 Nature and contents of container**

Amlosun 5 and Amlosun 10 is available in the strip of 10 tablets.

### **6.6 Special precautions for disposal and other handling**

No special requirements for disposal.

## **7. MARKETING AUTHORISATION HOLDER AND MANUFACTURING SITE ADDRESS**

Sun Pharmaceutical Industries Limited

## **8. MARKETING AUTHORISATION NUMBER**

Amlosun 5: 15947

Amlosun 10: 15948

## **9. DATE OF FIRST REGISTRATION/ RENEWAL OF THE REGISTRATION**

13-03-2021

## **10. DATE OF REVISION OF THE TEXT**

February 2024

## **REFERENCES**

1. Summary of Product Characteristics of ISTIN 5 & 10 mg Tablets, Upjohn UK Limited, UK, October 2023.

### ***Information compiled in February 2024***

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