

SUMMARY OF PRODUCT CHARACTERISTICS

1. Name of the medicinal product

Atenolol/chlorthalidone 50mg/25mg tablets

Atenolol/chlorthalidone 100mg/25mg tablets

2. Qualitative and quantitative composition

Atenolol/chlorthalidone 50mg/25mg

Each tablet also contains 50mg of atenolol and 25mg of chlorthalidone.

Atenolol/chlorthalidone 100mg/25mg

Each tablet also contains 100mg of atenolol and 25mg of chlorthalidone.

For a full list of excipients, see section 6.1.

3. Pharmaceutical form

Tablet.

Atenolol/chlorthalidone 50mg/25mg

Light pink-coloured, round-shaped, biconvex, uncoated tablet debossed with '2', break line, '7' on one side and 'U' on the other side.

Atenolol/chlorthalidone 100mg/25mg

Light yellow-coloured, round-shaped, biconvex, uncoated tablet debossed with '26' on one side and 'U' on the other side.

4. Clinical particulars

4.1 Therapeutic indications

Atenolol/chlorthalidone is indicated for the treatment of hypertension, to lower blood pressure. Lowering blood pressure lowers the risk of fatal and nonfatal cardiovascular events, primarily strokes and myocardial infarctions. These benefits have been seen in controlled trials of antihypertensive drugs from a wide variety of pharmacologic classes including atenolol and chlorthalidone.

Control of high blood pressure should be part of comprehensive cardiovascular risk management, including, as appropriate, lipid control, diabetes management, antithrombotic therapy, smoking cessation, exercise, and limited sodium intake. Many patients will require more than 1 drug to achieve blood pressure goals. For specific advice on goals and management, see published guidelines, such as those of the National High Blood Pressure Education Program's Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC).

Numerous antihypertensive drugs, from a variety of pharmacologic classes and with different mechanisms of action, have been shown in randomized controlled trials to reduce cardiovascular morbidity and mortality, and it can be concluded that it is blood pressure reduction and not some other pharmacologic property of the drugs, that is largely responsible for those benefits. The largest and most consistent cardiovascular outcome benefit has been a

reduction in the risk of stroke, but reductions in myocardial infarction and cardiovascular mortality also have been seen regularly.

Elevated systolic or diastolic pressure causes increased cardiovascular risk, and the absolute risk increase per mmHg is greater at higher blood pressures so even modest reductions of severe hypertension can provide substantial benefits. Relative risk reduction from blood pressure reduction is similar across populations with varying absolute risk, so the absolute benefit is greater in patients who are at higher risk independent of their hypertension (for example, patients with diabetes or hyperlipidaemia) and such patients would be expected to benefit from more aggressive treatment to a lower blood pressure goal.

Some antihypertensive drugs have smaller blood pressure effects (as monotherapy) in black patients, and many antihypertensive drugs have additional approved indications and effects (e.g., on angina, heart failure or diabetic kidney disease). These considerations may guide the selection of therapy.

This fixed-dose combination drug is not indicated for initial therapy of hypertension. If the fixed dose combination represents the dose appropriate to the individual patient's needs, it may be more convenient than the separate components.

4.2 Posology and method of administration

Dosage must be individualised.

Chlorthalidone is usually given at a dose of 25 mg daily, the usual initial dose of atenolol is 50 mg daily. Therefore, the initial dose should be atenolol/chlorthalidone 50 mg/25 mg given once a day. If an optimal response is not achieved, the dosage should be increased to atenolol/chlorthalidone 100 mg/25 mg given once a day.

When necessary, another antihypertensive agent may be added gradually beginning with 50 percent of the usual recommended starting dose to avoid an excessive fall in blood pressure. Since atenolol is excreted via the kidneys, dosage should be adjusted in cases of severe impairment of renal function. No significant accumulation of atenolol occurs until creatinine clearance falls below 35 mL/min/1.73 m² (normal range is 100 to 150 mL/min/1.73 m²), therefore, the following maximum dosages are recommended for patients with renal impairment.

Creatinine Clearance (mL/min/1.73m ²)	Atenolol Elimination Half-Life (hours)	Maximum Dosage
15-35	16-27	50 mg daily
<15	>27	50 mg every other day

Method of administration

Oral.

4.3 Contraindications

Atenolol/chlorthalidone is contraindicated in patients with sinus bradycardia, heart blocks greater than first degree, cardiogenic shock, overt cardiac failure (see section 4.4), anuria and hypersensitivity to this product or sulfonamide-derived drugs.

4.4 Special warnings and precautions for use

Cardiac failure

Sympathetic stimulation is necessary for supporting circulatory function in congestive heart failure, and beta-blockade carries the potential hazard of further depressing myocardial contractility and precipitating more severe failure.

In patients without a history of cardiac failure, continued depression of the myocardium with beta-blocking agents over some time can in some cases lead to cardiac failure.

At the first sign or symptom of impending cardiac failure, patients should be treated appropriately according to currently recommended guidelines, and the response observed closely. If cardiac failure continues despite adequate treatment, atenolol/chlorthalidone should be withdrawn (see section 4.2).

Renal disease, hepatic disease and electrolyte disturbances

Since atenolol is excreted via the kidneys, atenolol/chlorthalidone should be used with caution in patients with impaired renal function.

In patients with renal disease, thiazides may precipitate azotaemia. Since cumulative effects may develop in the presence of impaired renal function, if progressive renal impairment becomes evident, atenolol/chlorthalidone should be discontinued.

In patients with impaired hepatic function or progressive liver disease, minor alterations in fluid and electrolyte balance may precipitate hepatic coma. Atenolol/chlorthalidone should be used with caution in these patients.

Ischemic heart disease

Following abrupt cessation of therapy with certain beta-blocking agents in patients with coronary artery disease, exacerbations of angina pectoris and, in some cases, myocardial infarction have been reported. Therefore, such patients should be cautioned against interruption of therapy without the physician's advice. Even in the absence of overt angina pectoris, when discontinuation of atenolol/chlorthalidone is planned, the patient should be carefully observed and should be advised to limit physical activity to a minimum. Atenolol/chlorthalidone should be reinstated if withdrawal symptoms occur. Because coronary artery disease is common and may be unrecognized, it may be prudent not to discontinue atenolol/chlorthalidone therapy abruptly even in patients treated only for hypertension.

Concomitant use of calcium channel blockers

Bradycardia and heart block can occur and the left ventricular end-diastolic pressure can rise when beta-blockers are administered with verapamil or diltiazem. Patients with pre-existing conduction abnormalities or left ventricular dysfunction are particularly susceptible (see Precautions).

Bronchospastic diseases

Patients with bronchospastic disease should, in general, not receive beta blockers. Because of its relative beta₁-selectivity, however, atenolol/chlorthalidone may be used with caution in patients with bronchospastic disease who do not respond to or cannot tolerate other antihypertensive treatments. Since beta₁-selectivity is not absolute, the lowest possible dose

of atenolol/chlorthalidone should be used and a beta2-stimulating agent (bronchodilator) should be made available. If dosage must be increased, dividing the dose should be considered to achieve lower peak blood levels.

Major surgery

Chronically administered beta-blocking therapy should not be routinely withdrawn prior to major surgery. However, the impaired ability of the heart to respond to reflex adrenergic stimuli may augment the risks of general anaesthesia and surgical procedures.

Metabolic and endocrine effects

Atenolol/chlorthalidone may be used with caution in diabetic patients. Beta-blockers may mask tachycardia occurring with hypoglycemia, but other manifestations such as dizziness and sweating may not be significantly affected. At recommended doses, atenolol does not potentiate insulin-induced hypoglycemia and unlike nonselective beta blockers, does not delay recovery of blood glucose to normal levels.

Insulin requirements in diabetic patients may be increased, decreased or unchanged; latent diabetes mellitus may become manifest during chlorthalidone administration.

Beta-adrenergic blockade may mask certain clinical signs (e.g., tachycardia) of hyperthyroidism. Abrupt withdrawal of beta-blockade might precipitate a thyroid storm; therefore, patients suspected of developing thyrotoxicosis from whom atenolol/chlorthalidone therapy is to be withdrawn should be monitored closely.

Because calcium excretion is decreased by thiazides, atenolol/chlorthalidone should be discontinued before carrying out tests for parathyroid function. Pathologic changes in the parathyroid glands, with hypercalcemia and hypophosphatemia, have been observed in a few patients on prolonged thiazide therapy, however, the common complications of hyperparathyroidism such as renal lithiasis, bone resorption and peptic ulceration have not been seen.

Hyperuricemia may occur, or acute gout may be precipitated in certain patients receiving thiazide therapy.

Untreated pheochromocytoma

Atenolol/chlorthalidone should not be given to patients with untreated pheochromocytoma.

Pregnancy and fetal injury

Atenolol can cause foetal harm when administered to a pregnant woman. Atenolol crosses the placental barrier and appears in cord blood. Administration of atenolol, starting in the second trimester of pregnancy, has been associated with the birth of infants that are small for gestational age. No studies have been performed on the use of atenolol in the first trimester and the possibility of fetal injury cannot be excluded. If this drug is used during pregnancy, or if the patient becomes pregnant while taking this drug, the patient should be apprised of the potential hazard to the foetus.

Neonates born to mothers who are receiving atenolol at parturition or breastfeeding may be at risk for hypoglycemia and bradycardia. Caution should be exercised when atenolol/chlorthalidone is administered during pregnancy or to a woman who is breastfeeding (see Precautions, Nursing Mothers).

Atenolol/chlorthalidone was studied for teratogenic potential in rats and rabbits. Doses of atenolol/chlorthalidone of 8/2, 80/20, and 240/60 mg/kg/day were administered orally to pregnant rats with no evidence of embryo/foetotoxicity observed. Two studies were conducted in rabbits. In the first study, pregnant rabbits were dosed with 8/2, 80/20, and 160/40 mg/kg/day of atenolol/chlorthalidone. No teratogenic effects were noted, but embryonic resorptions were observed at all dose levels (ranging from approximately 5 times to 100 times the maximum recommended human dose*). In the second rabbit study, doses of atenolol/chlorthalidone were 4/1, 8/2, and 20/5 mg/kg/day. No teratogenic or embryotoxic effects were demonstrated.

Atenolol

Atenolol has been shown to produce a dose-related increase in embryo/fetal resorption in rats at doses equal to or greater than 50 mg/kg/day or 25 or more times the maximum recommended human anti-hypertensive dose*. Although similar effects were not seen in rabbits, the compound was not evaluated in rabbits at doses above 25 mg/kg/day or 12.5 times the maximum recommended human antihypertensive dose*.

Chlorthalidone

Thiazides cross the placental barrier and appear in cord blood. The use of chlorthalidone and related drugs in pregnant women requires that the anticipated benefits of the drug be weighed against possible hazards to the foetus. These hazards include fetal or neonatal jaundice, thrombocytopenia and possibly other adverse reactions which have occurred in the adult.

*Based on the maximum dose of 100 mg/day in a 50 kg patient.

Precautions

General

Atenolol/chlorthalidone may aggravate peripheral arterial circulatory disorders.

Electrolyte and fluid balance status

Periodic determination of serum electrolytes to detect possible electrolyte imbalance should be performed at appropriate intervals.

Patients should be observed for clinical signs of fluid or electrolyte imbalance i.e., hyponatremia, hypochloremic alkalosis and hypokalaemia. Serum and urine electrolyte determinations are particularly important when the patient is vomiting excessively or receiving parenteral fluids. Warning signs or symptoms of fluid and electrolyte imbalance include dryness of the mouth, thirst, weakness, lethargy, drowsiness, restlessness, muscle pains or cramps, muscular fatigue, hypotension, oliguria, tachycardia and gastrointestinal disturbances such as nausea and vomiting.

Measurement of potassium levels is appropriate, especially in elderly patients, those receiving digitalis preparations for cardiac failure, patients whose dietary intake of potassium is abnormally low, or those suffering from gastrointestinal complaints.

Hypokalaemia may develop especially with brisk diuresis when severe cirrhosis is present, or during concomitant use of corticosteroids or ACTH.

Interference with adequate oral electrolyte intake will also contribute to hypokalaemia. Hypokalaemia can sensitize or exaggerate the response of the heart to the toxic effects of digitalis (e.g., increased ventricular irritability). Hypokalaemia may be avoided or treated by use of potassium supplements or foods with a high potassium content.

Any chloride deficit during thiazide therapy is generally mild and usually does not require specific treatment except under extraordinary circumstances (as in liver disease or renal disease). Dilutional hyponatremia may occur in oedematous patients in hot weather; appropriate therapy is water restriction rather than administration of salt except in rare instances when the hyponatremia is life-threatening. In actual salt depletion, appropriate replacement is the therapy of choice.

4.5 Interaction with other medicinal products and other forms of interaction

Atenolol/chlorthalidone may potentiate the action of other antihypertensive agents used concomitantly. Patients treated with atenolol/chlorthalidone plus a catecholamine depletor (e.g., reserpine) should be closely observed for evidence of hypotension and/or marked bradycardia which may produce vertigo, syncope or postural hypotension.

Calcium channel blockers may also have an additive effect when given with atenolol/chlorthalidone.

Disopyramide is a Type I antiarrhythmic drug with potent negative inotropic and chronotropic effects.

Disopyramide has been associated with severe bradycardia, asystole and heart failure when administered with beta-blockers.

Amiodarone is an antiarrhythmic agent with negative chronotropic properties that may be additive to those seen with beta-blockers.

Thiazides may decrease arterial responsiveness to norepinephrine. This diminution is not sufficient to preclude the therapeutic effectiveness of norepinephrine. Thiazides may increase the responsiveness to tubocurarine.

Concomitant use of prostaglandin synthase inhibiting drugs e.g., indomethacin, may decrease the hypotensive effects of beta blockers.

Lithium generally should not be given with diuretics because they reduce its renal clearance and add a high risk of lithium toxicity. Read prescribing information for lithium preparations before use of such preparations with atenolol/chlorthalidone.

Beta blockers may exacerbate the rebound hypertension which can follow the withdrawal of clonidine. If the two drugs are co-administered, the beta blocker should be withdrawn several days before the gradual withdrawal of clonidine. When replacing clonidine with beta-blocker therapy, the introduction of beta-blockers should be delayed for several days after clonidine administration has stopped.

While taking beta-blockers, patients with a history of anaphylactic reaction to a variety of allergens may have a more severe reaction on repeated challenge, either accidental,

diagnostic or therapeutic. Such patients may be unresponsive to the usual doses of epinephrine used to treat the allergic reaction.

Both digitalis glycosides and beta-blockers slow atrioventricular conduction and decrease heart rate.

Concomitant use can increase the risk of bradycardia.

Other precautions

In patients receiving thiazides, sensitivity reactions may occur with or without a history of allergy or bronchial asthma. The possible exacerbation or activation of systemic lupus erythematosus has been reported. The antihypertensive effects of thiazides may be enhanced in the post-sympathectomy patient.

4.6 Fertility, pregnancy and lactation

4.6.1 Nursing mothers

Atenolol is excreted in human breast milk at a ratio of 1.5 to 6.8 when compared to the concentration in plasma. Caution should be exercised when atenolol is administered to a nursing woman. Clinically significant bradycardia has been reported in breast-fed infants. Premature infants, or infants with impaired renal function, may be more likely to develop adverse effects. Neonates born to mothers who are receiving atenolol at parturition or breastfeeding may be at risk for hypoglycemia and bradycardia. Caution should be exercised when atenolol/chlorthalidone is administered during pregnancy or to a woman who is breastfeeding (see section 4.4, pregnancy and fetal injury.)

4.6.2 Paediatric use

Safety and effectiveness in pediatric patients have not been established.

4.6.3 Geriatric

Clinical studies of atenolol/chlorthalidone did not include sufficient numbers of subjects aged 65 and over to determine whether they respond differently from younger subjects. Other reported clinical experience has not identified differences in responses between the elderly and younger patients. In general, dose selection for an elderly patient should be cautious, usually starting at the low end of the dosing range, reflecting the greater frequency of decreased hepatic, renal, or cardiac function, and concomitant disease or other drug therapy. relevance of these data is unknown. In the animal fertility study with pregabalin in male rats, adverse reproductive and developmental effects were observed (see section 5.3., Nonclinical toxicology).

4.7 Effects on the ability to drive and use machines

No effects on the ability to drive and use machines have been observed.

4.8 Undesirable effects

Atenolol/chlorthalidone are usually well tolerated in properly selected patients. Most adverse effects have been mild and transient. The adverse effects observed for atenolol/chlorthalidone are essentially the same as those seen with the individual components.

Atenolol

The frequency estimates in the following table were derived from controlled studies in which adverse reactions were either volunteered by the patient (US studies) or elicited, e.g., by a checklist (foreign studies). The reported frequency of elicited adverse effects was higher for both atenolol and placebo-treated patients than when these reactions were volunteered.

Where the frequency of adverse effects for atenolol and placebo is similar, the causal relationship to atenolol is uncertain.

	Volunteered (US Studies)		Total – Volunteered and Elicited (Foreign + US Studies)	
	Atenolol (n = 164) %	Placebo (n = 206) %	Atenolol (n = 399) %	Placebo (n = 407) %
CARDIOVASCULAR				
Bradycardia	3	0	3	0
Cold Extremities	0	0.5	12	5
Postural Hypotension	2	1	4	5
Leg Pain	0	0.5	3	1
CENTRAL NERVOUS SYSTEM/ NEUROMUSCULAR				
Dizziness	4	1	13	6
Vertigo	2	0.5	2	0.2
Light-Headedness	1	0	3	0.7
Tiredness	0.6	0.5	26	13
Fatigue	3	1	6	5
Lethargy	1	0	3	0.7
Drowsiness	0.6	0	2	0.5
Depression	0.6	0.5	12	9
Dreaming	0	0	3	1
GASTROINTESTINAL				
Diarrhea	2	0	3	2
Nausea	4	1	3	1
RESPIRATORY(see WARNINGS)				
Wheeziness	0	0	3	3
Dyspnea	0.6	1	6	4

During post-marketing experience, the following have been reported in temporal relationship to the use of the drug: elevated liver enzymes and/or bilirubin, hallucinations, headache, impotence, Peyronie's disease, postural hypotension which may be associated with syncope, psoriasiform rash or exacerbation of psoriasis, psychoses, purpura, reversible alopecia, thrombocytopenia, visual disturbance, sick sinus syndrome, and dry mouth.

Atenolol/chlorthalidone like other beta blockers, has been associated with the development of antinuclear antibodies (ANA), lupus syndrome, and Raynaud's phenomenon.

Chlorthalidone

Cardiovascular: orthostatic hypotension.

Gastrointestinal: anorexia, gastric irritation, vomiting, cramping, constipation, jaundice (intrahepatic cholestatic jaundice) and pancreatitis.

CNS: vertigo, paraesthesia and xanthopsia.

Hematologic: leukopenia, agranulocytosis, thrombocytopenia and aplastic anaemia.

Hypersensitivity: purpura, photosensitivity, rash, urticaria, necrotizing angitis (vasculitis) (cutaneous vasculitis) and Lyell's syndrome (toxic epidermal necrolysis).

Miscellaneous: hyperglycemia, glycosuria, hyperuricemia, muscle spasm, weakness and restlessness.

Clinical trials of atenolol/chlorthalidone conducted in the United States (89 patients treated with atenolol/chlorthalidone) revealed no new or unexpected adverse effects.

Potential adverse effects

In addition, a variety of adverse effects not observed in clinical trials with atenolol but reported with other beta-adrenergic blocking agents should be considered potential adverse effects of atenolol.

Nervous System: Reversible mental depression progressing to catatonia; an acute reversible syndrome characterized by disorientation for time and place, short-term memory loss, emotional lability, slightly clouded sensorium and decreased performance on neuropsychometrics.

Cardiovascular: Intensification of AV block (see section 4.3).

Gastrointestinal: Mesenteric arterial thrombosis and ischemic colitis.

Hematologic: Agranulocytosis.

Allergic: Erythematous rash, fever combined with aching and sore throat, laryngospasm and respiratory distress.

Miscellaneous

There have been reports of skin rashes and/or dry eyes associated with the use of beta-adrenergic blocking drugs. The reported incidence is small, and, in most cases, the symptoms have cleared when treatment was withdrawn. Discontinuance of the drug should be considered if any such reaction is not otherwise explicable. Patients should be closely monitored following cessation of therapy (see section 4.2).

The oculomucocutaneous syndrome associated with the beta blocker practolol has not been reported with atenolol tablets. Furthermore, several patients who had previously demonstrated established practolol reactions were transferred to atenolol tablet therapy with subsequent resolution or quiescence of the reaction.

Clinical laboratory test findings

Clinically important changes in standard laboratory parameters were rarely associated with the administration of atenolol/chlorthalidone. The changes in laboratory parameters were not progressive and usually were not associated with clinical manifestations. The most common changes were increases in uric acid and decreases in serum potassium.

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 e-PV desktop applications

(https://drive.google.com/file/d/16hwTz0587ZWtSWadbBAMwQPOD_KSExZP/view) or search for e-PV Mobile applications on the Google Play or Apple App Store.

4.9 Overdose

No specific information is available about overdosage and atenolol/chlorthalidone in humans. Treatment should be symptomatic and supportive and directed to the removal of any unabsorbed drug by induced emesis, or administration of activated charcoal. Atenolol can be removed from the general circulation by hemodialysis. Further consideration should be given to dehydration, electrolyte imbalance and hypotension by established procedures.

Atenolol

Overdosage with atenolol has been reported with patients surviving acute doses as high as 5 g. One death was reported in a man who may have taken as much as 10 g acutely. The predominant symptoms reported following atenolol overdose are lethargy, disorder of respiratory drive, wheezing, sinus pause, and bradycardia. Additionally, common effects associated with overdosage of any beta-adrenergic blocking agent are congestive heart failure, hypotension, bronchospasm, and/or hypoglycemia.

Other treatment modalities should be employed at the physician's discretion and may include: Bradycardia: Atropine 1 mg to 2 mg intravenously. If there is no response to vagal blockade, give isoproterenol cautiously. In refractory cases, a transvenous cardiac pacemaker may be indicated. Glucagon in a 10 mg intravenous bolus has been reported to be useful. If required, this may be repeated or followed by an intravenous infusion of glucagon 1 mg/h to 10 mg/h depending on response.

Heart block (second or third degree): Isoproterenol or transvenous pacemaker.

Congestive heart failure: Digitalize the patient and administer a diuretic. Glucagon has been reported to be useful.

Hypotension: Vasopressors such as dopamine or norepinephrine (levarterenol). Monitor blood pressure continuously.

Bronchospasm: A beta2-stimulant such as isoproterenol or terbutaline and/or aminophylline.

Hypoglycemia: Intravenous glucose.

Electrolyte disturbance: Monitor electrolyte levels and renal function. Institute measures to maintain hydration and electrolytes.

Based on the severity of symptoms, management may require intensive support care and facilities for applying cardiac and respiratory support.

Chlorthalidone

Symptoms of chlorthalidone overdose include nausea, weakness, dizziness and disturbances of electrolyte balance.

5. Pharmacological properties

5.1 Pharmacodynamic properties

Pharmacological classification: 12.3.2 Antihypertensive medicines: Beta-blockers and diuretics.

In standard animal or human pharmacological tests, beta-adrenoreceptor blocking activity of atenolol has been demonstrated by: (1) reduction in resting and exercise heart rates and cardiac output, (2) reduction of systolic and diastolic blood pressure at rest and on exercise, (3) inhibition of isoproterenol induced tachycardia and (4) reduction in reflex orthostatic tachycardia.

A significant beta-blocking effect of atenolol, as measured by the reduction of exercise tachycardia, is apparent within one hour following oral administration of a single dose. This effect is maximal at about 2 to 4 hours and persists for at least 24 hours. The effect at 24 hours is dose-related and also bears a linear relationship to the logarithm of plasma atenolol concentration. However, as has been shown for all beta-blocking agents, the antihypertensive effect does not appear to be related to plasma level.

In normal subjects, the beta1-selectivity of atenolol has been shown by its reduced ability to reverse the beta2-mediated vasodilating effect of isoproterenol as compared to equivalent beta-blocking doses of propranolol. In asthmatic patients, a dose of atenolol producing a greater effect on resting heart rate than propranolol resulted in much less increase in airway resistance. In a placebo-controlled comparison of approximately equipotent oral doses of several beta blockers, atenolol produced a significantly smaller decrease of FEV1 than nonselective beta-blockers, such as propranolol and unlike those agents did not inhibit bronchodilation in response to isoproterenol.

Consistent with its negative chronotropic effect due to the beta-blockade of the SA node, atenolol increases sinus cycle length and sinus node recovery time. Conduction in the AV node is also prolonged. Atenolol is devoid of membrane stabilizing activity, and increasing the dose well beyond that producing beta blockade does not further depress myocardial contractility. Several studies have demonstrated a moderate (approximately 10%) increase in stroke volume at rest and exercise.

In controlled clinical trials, atenolol given as a single daily dose, was an effective antihypertensive agent providing 24-hour reduction of blood pressure. Atenolol has been studied in combination with thiazide-type diuretics and the blood pressure effects of the combination are approximately additive. Atenolol is also compatible with methyldopa, hydralazine and prazosin, the combination resulting in a larger fall in blood pressure than with the single agents. The dose range of atenolol is narrow and increasing the dose beyond 100 mg once daily is not associated with increased antihypertensive effect. The mechanisms of the antihypertensive effects of beta-blocking agents have not been established. Several mechanisms have been proposed including:

(1) competitive antagonism of catecholamines at peripheral (especially cardiac) adrenergic neuron sites, leading to decreased cardiac output, (2) a central effect leading to reduced sympathetic outflow to the periphery and (3) suppression of renin activity. The results from long-term studies have not shown any diminution of the antihypertensive efficacy of atenolol with prolonged use.

5.2 Pharmacokinetic properties

Atenolol

Absorption of an oral dose is rapid and consistent but incomplete. Approximately 50% of an oral dose is absorbed from the gastrointestinal tract, the remainder being excreted unchanged in the faeces. Peak blood levels are reached between 2 and 4 hours after ingestion. Unlike propranolol or metoprolol, nadolol, hydrophilic atenolol undergoes little or no metabolism by the liver, and the absorbed portion is eliminated primarily by renal excretion. Atenolol also differs from propranolol in that only a small amount (6-16%) is bound to proteins in the plasma. This kinetic profile results in relatively consistent plasma drug levels with about a four-fold interpatient variation. There is no information as to the pharmacokinetic effect of atenolol on chlorthalidone.

The elimination half-life of atenolol is approximately 6 to 7 hours and there is no alteration of the kinetic profile of the drug by chronic administration. Following doses of 50 mg or 100 mg, both beta-blocking and antihypertensive effects persist for at least 24 hours. When renal function is impaired, elimination of atenolol is closely related to the glomerular filtration rate; but significant accumulation does not occur until the creatinine clearance falls below 35 mL/min/1.73 m² (see section 4.2).

Atenolol geriatric pharmacology

In general, elderly patients present higher atenolol plasma levels with total clearance values about 50% lower than younger subjects. The half-life is markedly longer in the elderly compared to younger subjects. The reduction of atenolol clearance follows the general trend that the elimination of renally excreted drugs is decreased with increasing age.

Chlorthalidone

Chlorthalidone is a mono-sulfonamyl diuretic which differs chemically from thiazide diuretics in that a double-ring system is incorporated into its structure. It is an oral diuretic with prolonged action and low toxicity. The diuretic effect of the drug occurs within 2 hours of an oral dose. It produces diuresis with greatly increased excretion of sodium and chloride. At maximal therapeutic dosage, chlorthalidone is approximately equal in its diuretic effect to comparable maximal therapeutic doses of benzothiadiazine diuretics. The site of action appears to be the cortical diluting segment of the ascending limb of Henle's loop of the nephron.

5.3 Preclinical safety data

Two long-term (maximum dosing duration of 18 or 24 months) rat studies and one long-term (maximum dosing duration of 18 months) mouse study, each employing dose levels as high as 300 mg/kg/day or 150 times the maximum recommended human antihypertensive dose*, did not indicate a carcinogenic potential of atenolol. A third (24-month) rat study, employing doses of 500 and 1,500 mg /kg /day (250 and 750 times the maximum recommended human antihypertensive dose*) resulted in increased incidences of benign adrenal medullary tumours in males and females, mammary fibro adenomas in females, and anterior pituitary adenomas and thyroid parafollicular cell carcinomas in males. No evidence of a mutagenic potential of atenolol was uncovered in the dominant lethal test (mouse), *in vivo* cytogenetics test (Chinese hamster) or Ames test (*S. typhimurium*).

Fertility of male or female rats (evaluated at dose levels as high as 200 mg/kg/day or 100 times the maximum recommended human dose*) was unaffected by atenolol administration.

*Based on the maximum dose of 100 mg/day in a 50 kg patient.

Animal Toxicology

Six-month oral administration studies were conducted in rats and dogs using atenolol/chlorthalidone doses upto 12.5 mg/kg/day (atenolol/chlorthalidone 10/2.5 mg/kg/day -- approximately five times the maximum recommended human antihypertensive dose*). There were no functional or morphological abnormalities resulting from dosing either compound alone or together other than minor changes in heart rate, blood pressure and urine chemistry which were attributed to the known pharmacologic properties of atenolol and/or chlorthalidone.

Chronic studies of atenolol performed in animals have revealed the occurrence of vacuolation of epithelial cells of Brunner's glands in the duodenum of both male and female dogs at all tested dose levels (starting at 15 mg/kg/day or 7.5 times the maximum recommended human antihypertensive dose*) and increased incidence of atrial degeneration of hearts of male rats at 300 but not 150 mg atenolol/kg/day (150 and 75 times the maximum recommended human antihypertensive dose* respectively).

*Based on the maximum dose of 100 mg/day in a 50 kg patient.

6. Pharmaceutical particulars

6.1 List of excipients

Microcrystalline cellulose
Sodium starch glycolate
Magnesium stearate
Purified water
Povidone

Atenolol/chlorthalidone 50mg/25mg
Ferric oxide red

Atenolol/chlorthalidone 100mg/25mg
Ferric oxide yellow

6.2 Incompatibilities

Not applicable.

6.3 Shelf life

24 months.

6.4 Special precautions for storage

Store below 30°C.

6.5 Nature and contents of the container

Pack of 100's: The tablets are packed in a white, round, opaque, 60cc HDPE container with a 33 mm neck and polypropylene CR closure with a white, opaque, outer cap, translucent inner cap and liner.

Pack of 500s: The tablets are packed in a white, round, opaque, 200cc HDPE container with a 38 mm neck and a white, opaque, ribbed 38 mm PP Cap with an induction seal wad printed “sealed for your protection” in red.

6.6 Special precautions for disposal and other handling

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

7. APPLICANT

Unichem Laboratories Limited
Unichem Bhavan, Prabhat Estate
S.V. Road, Jogeshwari (west)
Mumbai – 400 102
India

8. MANUFACTURER

Unichem Laboratories Limited
C-31, C-32 and D-10, Industrial area, Meerut Road
Ghaziabad-2011003
India

9. REGISTRATION DETAILS

Atenolol/chlorthalidone 50mg/25mg

Zimbabwe registration number: 2023/12.3.2/6415

Zimbabwe category for distribution: Prescription Preparations Tenth Schedule (P.P.10)

Atenolol/chlorthalidone 100mg/25mg

Zimbabwe registration number: 2023/12.3.2/6416

Zimbabwe category for distribution: Prescription Preparations Tenth Schedule (P.P.10)

10. DATE OF REVISION OF TEXT

September 2023