

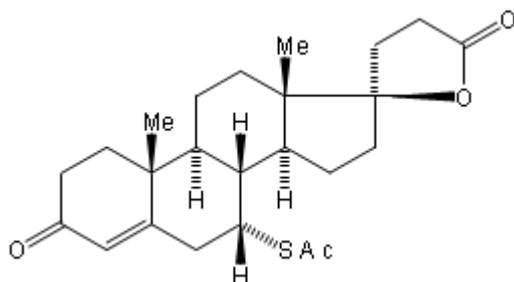
PRODUCT INFORMATION

NAME OF THE MEDICINE

Active ingredient: Spirolactone

Chemical name: 7 α -acetylthio-3-oxo-17 α -pregn-4-ene-21,17 β -carbolactone

Structural formula:



Molecular formula: C₂₄H₃₂O₄S Molecular weight: 416.6

CAS Registry no.: 52-01-7

DESCRIPTION

Each Spiractin 25 tablet contains 25 mg of spironolactone. Each Spiractin 100 tablet contains 100 mg of spironolactone. Spiractin 25 and Spiractin 100 tablets also contain lactose, microcrystalline cellulose, maize starch, polysorbate 80, povidone, sodium starch glycolate, purified talc, magnesium stearate, peppermint oil, quinoline yellow (CI 47005), erythrosine (CI 45430) and sunset yellow FCF (CI 15985).

PHARMACOLOGY

Pharmacodynamics

Spirolactone is a specific pharmacological antagonist of aldosterone, acting primarily through competitive binding of receptors at the aldosterone dependent sodium-potassium exchange site in the distal convoluted renal tubule. Spirolactone causes increased amounts of sodium and water to be excreted, while potassium is retained. It has both diuretic and antihypertensive activity. It may be given alone or in combination with other diuretic agents which act more proximally in the renal tubule.

Increased levels of the mineralocorticoid, aldosterone, are present in primary and secondary hyperaldosteronism. Oedematous states in which secondary aldosteronism is usually involved include congestive cardiac failure, hepatic cirrhosis, and the nephrotic syndrome. Spirolactone provides effective therapy for the oedema and ascites in those conditions by competing with aldosterone for receptor sites.

Spirolactone is effective in lowering the systolic and diastolic blood pressure in patients with primary hyperaldosteronism. It is also effective in most cases of essential hypertension despite the fact that aldosterone secretion may be within normal limits in benign essential hypertension.

Spirolactone inhibits the exchange of sodium for potassium in the distal renal tubule and helps to prevent potassium loss by antagonising the effect of aldosterone. It has not been demonstrated to elevate serum uric acid, to precipitate gout or to alter carbohydrate metabolism.

Spironolactone has moderate anti-androgenic activity in humans by inhibition of the interaction between dihydrotestosterone and the intracellular androgen receptor. It also inhibits several steps in ovarian steroidogenesis, resulting in lowered plasma levels of testosterone and some other weak androgenic steroids. Through this activity, spironolactone is effective in the treatment of female hirsutism.

Pharmacokinetics

Absorption

In humans, the bioavailability of spironolactone from orally administered tablets is greater than 90% when compared with an optimally absorbed solution (spironolactone in polyethylene glycol 400).

Food may increase the bioavailability of spironolactone; the clinical relevance of this effect is uncertain.

Metabolism

Spironolactone is rapidly and extensively metabolised.

Approximately 25 to 30% of the dose administered is converted to canrenone. Sulfur containing products are the predominant metabolites and together with spironolactone are thought to be primarily responsible for the therapeutic effects of the drug. Canrenone attains peak serum levels at 2 to 4 hours following single oral administration. Canrenone plasma concentrations decline in two distinct phases, being rapid in the first 12 hours and slower from 12 to 96 hours. The log-linear phase half-life of canrenone, following multiple doses of spironolactone, is between 13 and 24 hours. Both spironolactone and canrenone are more than 90% bound to plasma proteins.

Excretion

The metabolites of spironolactone are excreted primarily in urine, but also in bile.

INDICATIONS

Essential hypertension. Spironolactone, when used alone, is effective in lowering both systolic and diastolic blood pressure. Spironolactone improves the hypotensive action of thiazide diuretics, while at the same time reducing or preventing potassium loss due to the thiazide. Spironolactone enhances the effectiveness of other antihypertensive agents such as β -blockers, vasodilators, etc.

As adjunctive therapy in malignant hypertension.

In diuretic induced hypokalaemia when other measures are considered inappropriate or inadequate.

Prophylaxis of hypokalaemia in patients taking digitalis when other measures are considered inadequate or inappropriate.

Congestive cardiac failure. When used alone, spironolactone is effective in the management of oedema and sodium retention associated with congestive cardiac failure. Spironolactone may be used in combination with a thiazide or other conventional diuretics for achieving diuresis in patients whose oedema is resistant to a thiazide or other conventional diuretics. Unlike conventional diuretics, spironolactone does not produce hypokalaemia. When administered with a thiazide or other conventional diuretics, spironolactone offsets hypokalaemia induced by these diuretics. The prevention of potassium loss is particularly important in the treatment of digitalised patients, since digitalis intoxication may be precipitated if hypokalaemia is induced by conventional diuretic therapy.

Hepatic cirrhosis with ascites and oedema. When used alone, spironolactone is frequently adequate for the relief of ascites and oedema associated with hepatic cirrhosis. It provides a mild and even diuresis and prevents excessive potassium excretion caused by thiazide diuretics, thus avoiding possible precipitation of hepatic coma.

Nephrotic syndrome. Although glucocorticoids, whose anti-inflammatory activity appears to benefit the primary pathological process in the renal glomerulus, should probably be employed first, spironolactone either alone or in combination with a conventional diuretic is useful for inducing diuresis.

Diagnosis and treatment of Primary hyperaldosteronism. Spironolactone may be used to establish the diagnosis of primary hyperaldosteronism by therapeutic trial. Spironolactone may also be used for the short-term preoperative treatment of patients with primary hyperaldosteronism, long-term maintenance therapy for patients with discrete aldosterone producing adrenal adenomas who are judged to be poor operative risks (or who decline surgery), and long-term maintenance therapy for patients with bilateral micro- or macronodular adrenal hyperplasia (idiopathic hyperaldosteronism).

Hirsutism in females. Spironolactone is effective in the treatment of females with hirsutism, an androgen related increase in facial and body hair. A reduction in hair growth, hair shaft diameter and hair pigmentation is seen.

Use of Spiractin should be considered only after all other alternatives of non-drug therapy have been explored. For women of childbearing age, see **CONTRAINDICATIONS** and **PRECAUTIONS - Use in Pregnancy**.

CONTRAINDICATIONS

Acute renal insufficiency

Significant impairment of renal function,

Anuria

Addison's disease or other conditions as associated with hyperkalaemia (See **PRECAUTIONS**)

Hyperkalaemia,

Pregnancy (see **PRECAUTIONS**)

Hypersensitivity to spironolactone

Concomitant use of eplerenone.

PRECAUTIONS

Concomitant use of spironolactone with angiotensin converting enzyme (ACE) inhibitors, non-steroidal anti-inflammatory drugs, angiotensin II antagonists, aldosterone blockers, heparin, low molecular weight heparin, other drugs or conditions known to cause hyperkalaemia or potassium supplements, a diet rich in potassium, including salt substitutes containing potassium, or of other potassium sparing agents is not recommended as it may lead to severe hyperkalaemia.

Periodic estimation of serum electrolytes is desirable due to the possibility of hyperkalaemia, hyponatraemia and possible transient blood urea nitrogen (BUN) elevation, especially in the elderly and/or in patients with pre-existing impaired renal or hepatic function, in whom the risk/benefit ratio should always be weighed.

Hyperkalaemia may be fatal in patients with severe heart failure (New York Heart Association [NYHA] Class III-IV). Potassium and creatinine levels should be closely monitored one week after initiation or monthly for the first 3 months, then quarterly for a year, and then every 6 months when increasing the dose of spironolactone. Concomitant use of spironolactone and other potassium-sparing diuretics in patients with severe heart failure should be avoided. If serum potassium >3.5 mEq/L, oral potassium supplements should be avoided. Treatment with spironolactone should be discontinued or interrupted in patients with serum potassium >5 mEq/L or with serum creatinine >4 mg/dL.

Reversible hyperchloraemic metabolic acidosis, usually in association with hyperkalaemia, has been reported to occur in some patients with decompensated hepatic cirrhosis, even in the presence of normal renal function.

The safety of spironolactone for the treatment of hirsutism in women of childbearing age has not been established by specific long-term clinical trials. Epidemiological studies are also inadequate to establish the safety of long-term use in this population.

Effects on Fertility

In animal studies, spironolactone was devoid of teratogenic effects in mice and rabbits at oral doses up to 20mg/kg/day, and in rats at dietary doses up to 50 mg/kg/day. However, increased resorption rate was seen at 20 mg/kg/day in rabbits, and the incidence of stillbirths was increased in rats dosed at 50 mg/kg/day. Subcutaneous administration of spironolactone (approximately 50 to 100 mg/kg/day) to rats during late pregnancy caused endocrine dysfunction in both sexes of offspring 70 to 80 days after birth (hypoprolactinaemia and decreased ventral prostate and seminal vesical weights in males; increased luteinising hormone secretion and ovarian and uterine weights in females). Feminisation of the external genitalia of male foetuses was reported in another study in rats at oral doses of approximately 200 mg/kg/day. Subcutaneous administration of spironolactone to neonatal female mice caused histological changes in the cervicovaginal epithelium that were similar to those caused by diethylstilboestrol (a drug which causes vaginal neoplasia in adulthood following *in utero* exposure).

The risk of demasculinisation of the male foetus will only occur from about 6 weeks post conception onwards, hence if inadvertent spironolactone administration is stopped at an early stage, the risk to the male foetus is small.

Use in Pregnancy (Category B3)

Experimentally, passive transfer of potassium sparing diuretics across the human placenta has been demonstrated. Maternal treatment during pregnancy may result in electrolyte disturbances in the foetus.

Spironolactone should not be used in pregnancy (see **CONTRAINDICATIONS**). Women of childbearing potential should employ adequate contraception (ie. oral contraceptives or IUDs) during administration of spironolactone, and the drug should be stopped if pregnancy occurs or is suspected.

Use in Lactation

Canrenone, an active metabolite of spironolactone, appears in breast milk. An alternative method of infant feeding should be instituted if the use of the drug is deemed essential.

Carcinogenicity

Spironolactone has been shown to be tumorigenic in chronic toxicity studies performed in rats. It should be used only for approved indications. Unnecessary use of this drug should be avoided.

In chronic toxicity studies of spironolactone in rats, changes were observed in the endocrine organs and the liver. In one study using dietary doses of 50, 150 and 500 mg/kg/day there was a statistically significant dose-related increase in benign adenomas of thyroid follicular cells and testicular interstitial cells. In female rats there was a statistically significant increase in malignant mammary tumours at the middle dose only. In male rats, there was a dose-related increase in proliferative changes in the liver which included hyperplastic nodules and hepatocellular carcinomas at the middle and high doses.

In a two year oral carcinogenicity study in which rats were administered spironolactone 10, 30, 100 and 150 mg/kg/day, the range of proliferative effects observed was consistent with earlier studies. There were statistically significant increases at higher doses in hepatocellular adenomas and testicular interstitial cell tumours in males, and in thyroid follicular cell adenomas and carcinomas in both sexes. There was also a statistically significant increase in benign uterine endometrial polyps in females. There was an increase in hepatocellular carcinomas in males at 150 mg/kg but this was not statistically significant. There was no significant increase in the incidence of mammary tumours.

The significance of these findings with respect to clinical use is not known.

Spironolactone was not mutagenic in the Ames test using 5 strains of *Salmonella typhimurium* with or without metabolic activation.

A dose -related (above 20 mg/kg/day) incidence of myelocytic leukaemia was observed in rats fed daily doses of potassium canrenoate for a period of one year. Canrenone and canrenoic acid are the major metabolites of potassium canrenoate. Spironolactone is also metabolised to canrenone. In long-term (2 year) oral carcinogenicity studies of potassium canrenoate in the rat, myelocytic leukaemia, and hepatic, thyroid, testicular and mammary tumours were observed. Potassium canrenoate did not produce a mutagenic effect in tests using bacteria or yeast. It did produce a positive mutagenic effect in several *in vitro* tests in mammalian cells following metabolism activation. In an *in vivo* mammalian system, potassium canrenoate was not mutagenic. An increased incidence of leukaemia was not observed in chronic rat toxicity or carcinogenicity studies conducted with spironolactone at doses up to 500 mg/kg/day. The recommended human dose of spironolactone is 1.4 to 5.7 mg/kg/day.

Effects on Ability to Drive and Use Machines

Somnolence and dizziness have been reported to occur in some patients. Caution is advised when driving or operating machinery until the response to initial treatment has been determined.

Effects on Laboratory Tests

Spironolactone can interfere with assays for plasma digoxin concentrations.

INTERACTIONS WITH OTHER MEDICINES

Concomitant use of drugs known to cause hyperkalaemia with spironolactone may result in severe hyperkalaemia (see **PRECAUTIONS**).

Hyperkalaemia has been associated with the use of either indomethacin or angiotensin converting enzyme (ACE) inhibitors in combination with potassium sparing diuretics.

Spironolactone reduces the vascular responsiveness to noradrenaline. Therefore caution should be exercised in the management of patients subjected to regional or general anaesthesia while they are being treated with spironolactone.

Non-steroidal anti-inflammatory drugs (NSAIDs) such as aspirin, indomethacin, and mefenamic acid may attenuate the natriuretic efficacy of diuretics due to inhibition of intrarenal synthesis of prostaglandins and have been shown to attenuate the diuretic effect of spironolactone.

As carbenoxolone may cause sodium retention and thus decrease the effectiveness of spironolactone, concurrent use of the 2 agents should be avoided.

Spironolactone has been shown to increase the half-life of digoxin. This may result in increased serum digoxin levels and subsequent digitalis toxicity. It may be necessary to reduce the digoxin dose when spironolactone is administered, and the patient should be carefully monitored to avoid over- or under-digitalisation.

Spironolactone may have an additive effect when given concomitantly with other diuretics and antihypertensive agents. The dose of such drugs may need to be reduced when spironolactone is added to the treatment regimen.

Spironolactone enhances the metabolism of antipyrine.

Hyperkalaemic metabolic acidosis has been reported in patients given spironolactone concurrently with ammonium chloride or cholestyramine.

ADVERSE EFFECTS

Gynaecomastia may develop in association with the use of spironolactone, and physicians should be alert to its possible onset. The development of gynaecomastia appears to be related to both dosage level and duration of therapy and is normally reversible when spironolactone is discontinued. In rare instances some breast enlargement may persist.

Other adverse reactions that have been reported in association with spironolactone are: gastrointestinal symptoms, including cramping, diarrhoea, nausea, vomiting, gastric bleeding, ulceration and gastritis; drowsiness, lethargy, headache, maculopapular or erythematous cutaneous eruptions, urticaria; mental confusion, drug fever, ataxia, inability to achieve or maintain erection, irregular menses or amenorrhoea, post-menopausal bleeding, malaise, benign breast neoplasm, breast pain, leucopenia (including agranulocytosis), thrombocytopenia, abnormal hepatic function, electrolyte disturbances, hyperkalaemia, leg cramps, dizziness, changes in libido, Steven-Johnson syndrome (SJS), toxic epidermal necrolysis (TEN), drug rash with eosinophilia and systemic symptoms (DRESS), alopecia, hypertrichosis, pruritus, rash and acute renal failure.

Carcinoma of the breast has been reported in patients taking spironolactone, but a cause and effect relationship has not been established.

DOSAGE AND ADMINISTRATION

Adults

Essential hypertension

50 to 100 mg/day which may be given either in divided doses or as a single daily dose.

Dosage should be adjusted according to response but it should be noted that maximum effect of spironolactone therapy may not occur for up to 2 weeks after starting treatment.

Spironolactone may potentiate the action of diuretics or other antihypertensive drugs, and their dosage should first be reduced by at least 50% when Spiractin is added to the regimen, and then adjusted as necessary.

Oedematous disorders

The daily dose may be given either in divided doses or as a single daily dose.

Congestive cardiac failure. The initial dose is 100 mg/day. In difficult or severe cases the dosage may be gradually increased up to 200 mg/day. When oedema is controlled, the usual maintenance level is 25 to 200 mg/day.

Cirrhosis. If the urinary sodium/potassium ratio is greater than one, the recommended dose is 100 mg/day. If the ratio is less than one, the recommended dose is 200 to 400 mg/day. Maintenance dosage should be individually determined.

Nephrotic syndrome. Usually 100 to 200 mg/day. Spironolactone is not anti-inflammatory, has not been shown to affect the basic pathological process and its use is only advised when treatment of the underlying disease, restriction of fluid intake and sodium intake, and the use of other diuretics do not provide an adequate response.

Diagnosis and treatment of primary aldosteronism

Spironolactone may be employed as an initial diagnostic measure to provide presumptive evidence of primary hyperaldosteronism while patients are on normal diets.

Long test: Spironolactone is administered at a daily dosage of 400 mg for three to four weeks. Correction of hypokalaemia and of hypertension provides presumptive evidence for the diagnosis of primary hyperaldosteronism.

Short test: Spironolactone is administered at a daily dosage of 400 mg for four days. If serum potassium increases during administration but drops when spironolactone is discontinued, a presumptive diagnosis of primary hyperaldosteronism should be considered.

After the diagnosis of hyperaldosteronism has been established by more definitive testing procedures, Spiractin may be administered in doses of 100 to 400 mg daily in preparation for surgery. For patients who are considered unsuitable for surgery, spironolactone may be employed for long-term maintenance therapy at the lowest effective dosage determined for the individual patient.

Malignant hypertension

Spironolactone should be used as adjunctive therapy only, where there is an excessive secretion of aldosterone, hypokalaemia and metabolic alkalosis. The initial dosage is 100 mg/day increased as necessary in two weekly intervals to 400 mg/day. Initial therapy should include a combination of other antihypertensive drugs and spironolactone. Do not automatically reduce the dose of other treatments as is recommended for essential hypertension.

Hypokalaemia

Spironolactone may be useful in treating diuretic induced hypokalaemia when oral potassium supplements are considered inappropriate. In treating hypokalaemia, the lowest dose should be used and titrated upwards. A daily dose exceeding 100 mg is not recommended.

Female hirsutism

100 to 200 mg/day in divided doses is usual, however 50 mg daily has also been shown to be effective.

Clinical improvement is usually shown within 3 to 6 months and an initial course of treatment should continue for 12 months.

Spironolactone may be administered continuously or as a cyclical dosage for approximately three weeks out of every four. Dosing from day 5 to 21 of the menstrual cycle, with a drug free interval during menstruation, has been effective. Cyclical dosing may reduce menstrual irregularities in women with previously regular cycles.

Combined use with oestrogen-progestogen oral contraceptives may also be considered to provide both regular menstrual cycles and adequate contraception (see **PRECAUTIONS - Use in Pregnancy**).

Children and Adolescents

Oedematous disorders

The initial daily dosage should provide approximately 3.3 mg spironolactone/kg bodyweight. For small children, spironolactone tablets may be pulverised and administered as a suspension in cherry syrup. When refrigerated, such a suspension is stable for one month.

OVERDOSAGE

Symptoms

Overdosage may be manifested by nausea and vomiting, dizziness and (more rarely) by drowsiness, mental confusion, maculopapular or erythematous rash or diarrhoea. Electrolyte imbalances and dehydration may occur. Hyperkalaemia may be produced; symptoms include paraesthesia, weakness, flaccid paralysis and tetany. The earliest signs are characteristic electrocardiographic abnormalities including tall 'tent shaped' T waves, decreased amplitude of the P waves and widening of the QRS complex. Delayed onset of hyperkalaemia has been reported after acute ingestion of spironolactone (peak levels at 24 and 32 hours).

Treatment

Symptomatic and supportive measures should be employed. There is no specific antidote. Support respiratory and cardiac functions. Treat fluid depletion, electrolyte imbalances and hypotension by established procedures.

Severity of intoxication should be based on clinical findings and serial determination of serum potassium levels. Monitoring plasma levels of spironolactone is not clinically useful.

Hyperkalaemia can be treated promptly by the rapid intravenous administration of glucose (20 to 50%) and regular insulin, using 0.25 to 0.5 units of insulin per g of glucose. Potassium excreting diuretics and ion exchange resins may also be administered, and repeated as required.

Spiractin should be discontinued and potassium intake (including dietary potassium) restricted.

Contact the Poisons Information Centre on 131126 for advice on the management of an overdose.

PRESENTATION AND STORAGE CONDITIONS

Spiractin 25, 25 mg tablet: pale orange, peppermint flavoured, marked "SP" breakline "1" on one side, "α" on the reverse; available in blister packs* or bottles of 100's.

Spiractin 100, 100 mg tablet: pale orange, peppermint flavoured, marked "SP" breakline "2" on one side, "α" on the reverse; available in blister packs* or bottles of 100's.

* Not marketed in Australia.

Store below 30°C.

NAME AND ADDRESS OF SPONSOR

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ABN 93 002 359 739

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POISON SCHEDULE OF THE MEDICINE

S4 (Prescription Only Medicine)

DATE OF FIRST INCLUSION IN THE AUSTRALIAN REGISTER OF THERAPEUTIC GOODS (THE ARTG)

14/10/1993

DATE OF MOST RECENT AMENDMENT

10/04/2015

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