

NEW ZEALAND DATA SHEET



ISOTANE

Isotretinoin 5 mg, 10 mg and 20 mg capsules

Presentation

ISOTANE 5: Capsule with a yellow paste fill and a bicoloured reddish brown/cream opaque gelatin shell bearing the logo "15" in black ink, contains 5mg of isotretinoin.

ISOTANE 10: Capsule with a yellow paste fill and a reddish brown opaque gelatin shell bearing the logo "110" in black ink, contains 10mg of isotretinoin.

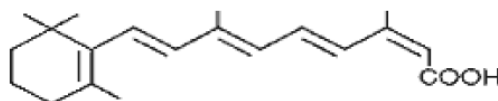
ISOTANE 20: Capsule with a yellow paste fill and a bicoloured reddish brown/cream opaque gelatin shell bearing the logo "120" in black ink, contains 20mg of isotretinoin.

Description

Isotretinoin is a retinoid with a specific antiseborrheic action for oral treatment of severe cystic acne and conglobate acne resistant to other forms of treatment.

Isotretinoin, the active ingredient of Isotane, is a synthetic stereoisomer of all-trans retinoic acid (tretinoin), an active substance that has proved effective in topical treatment of acne vulgaris. Isotretinoin is chemically identified as 13-cis retinoic acid: (2Z, 4E, 6E, 8E)-3,7-dimethyl-9-(2,6,6-trimethylcyclohexen-1-yl)nona-2,4,6,8-tetraenoic acid, molecular weight 300.42 and molecular formula is $C_{20}H_{28}O_2$.

The structural formula is:



The 5 mg, 10 mg and 20 mg capsules contain the following excipients: soyabean oil, hydrogenated vegetable oil and yellow beeswax. In addition the capsule shell contains gelatin, glycerol, lecithin, medium chain triglycerides, opacode black and iron oxide red. The 5 mg and 20 mg capsule shell also contains titanium dioxide and iron oxide yellow.

Isotane capsules are lactose, gluten and sugar free.

Pharmacology

Mechanism of Action

Administered orally, isotretinoin has a marked effect in severe forms of acne which have proved insufficiently responsive to previous treatment. The mechanism of action of isotretinoin has not yet been elucidated in detail, but it has been established that the improvement observed in the clinical picture of severe acne is associated with dose-related suppression of sebaceous gland activity and a histologically demonstrated reduction in the size of the sebaceous glands. Furthermore, a dermal anti-inflammatory effect of isotretinoin has been established.

Pharmacokinetics

Time-related blood concentrations can be predicted on the basis of linear pharmacokinetics.

Absorption

Peak plasma concentrations (C_{max}) of approximately 200-300 ng/ml have been achieved in healthy volunteers three to four hours (t_{max}) after administration of 40 mg isotretinoin. Taking isotretinoin with food increases bioavailability up to twofold relative to fasting conditions, probably as a result of easier absorption of this highly lipophilic medication. Furthermore, there is an overall decrease in fluctuations in systemic availability when isotretinoin is ingested with food.

Distribution

Isotretinoin is extensively bound to plasma proteins (99.9%) with the result that the free active fraction of the substance is less than 0.1% of the total over a wide range of therapeutic concentrations. Albumin appears to be the major binding protein.

The volume of distribution of isotretinoin is not known in humans since it is not available as an intravenous preparation.

Metabolism

Three major metabolites have been identified in plasma: 4-oxo-isotretinoin, tretinoin (all-trans retinoic acid), and 4-oxo-tretinoin. The major blood metabolite of isotretinoin is 4-oxo-isotretinoin, which is rapidly formed following oral administration achieving peak concentrations of 100 - 140 ng/ml at about two hours after administration of 40 mg isotretinoin. Other minor metabolites have been detected but are not completely identified, which also includes glucuronide conjugates.

Isotretinoin metabolites have shown biological activity in several in-vitro tests. Thus the observed clinical profile in patients could be the result of the pharmacological activity of isotretinoin and its metabolites.

Since isotretinoin and tretinoin (all-trans retinoic acid) are reversibly metabolised (= interconverted), the metabolism of tretinoin is linked with that of isotretinoin. It has been estimated that 20-30% of an isotretinoin dose is metabolised by isomerization.

Isotretinoin also isomerises *in vivo* via an alternative metabolic pathway to tretinoin (all-trans retinoic acid). Glucuronidation of the metabolites has not been conclusively demonstrated in humans but is strongly suggested by animal studies. Investigations in humans and dogs point to an enterohepatic recirculation of isotretinoin, which would contribute to the observed interindividual variability in plasma concentrations. *In vitro* metabolism studies have demonstrated that several CYP enzymes are involved in the metabolism of isotretinoin to 4-oxo-isotretinoin and tretinoin. No single isoform appears to have a predominant role. CYP2C8, CYP2C9, CYP2B6, and possibly CYP3A4 appear to have the greatest contributions in the metabolism of isotretinoin to 4-oxo-isotretinoin. CYP2C9, CYP2B6, and possibly CYP2C8, CYP3A4, CYP2A6, and CYP2E1 contribute to the metabolism of isotretinoin. CYP 26 is also known to metabolize retinoids.

Elimination

Isotretinoin appears to be eliminated almost exclusively by hepatic metabolism and biliary excretion. Following oral administration of isotretinoin, the elimination half-life of unchanged substance has ranged from 7 to 39 hours (mean approximately 20 hours) in both healthy volunteers and patients with cystic acne. The mean elimination half-life of the 4-oxo metabolite in patients with cystic acne is slightly longer (25 hours, range: 17-50 hours) than that of the parent substance. Isotretinoin is a physiological retinoid and endogenous retinoid concentrations are reached within approximately two weeks following the end of isotretinoin therapy.

Special Populations

Since isotretinoin is contraindicated in patient's hepatic impairment, there is no information on the pharmacokinetics of the substance in this population.

Patients with Renal Impairment

In patients with severe renal insufficiency treatment should be started at a lower dose (e.g. 10 mg/day) and afterwards individually adjusted according to tolerability.

Indications

Severe forms of nodulo-cystic acne which are resistant to therapy, particularly cystic acne and acne conglobata, especially when the lesions involve the trunk. Isotane should only be prescribed by physicians who are experienced in the use of systemic retinoids, preferably dermatologists, and understand the risk of teratogenicity if isotretinoin is used during pregnancy.

Contraindications

Pregnancy (Category X)

Isotretinoin is highly teratogenic. It is, therefore, contraindicated not only in women who are pregnant or who may become pregnant while undergoing treatment but also in all women of childbearing potential. There is an extremely high risk that a deformed infant will result if pregnancy occurs while taking oral isotretinoin in any amount even for short periods. Potentially all exposed foetuses can be affected.

Isotretinoin is contraindicated in women of childbearing potential unless the female patient meets all the following conditions:

- She must have severe disfiguring cystic acne resistant to standard therapies.
- She must be reliable in understanding and carrying out instructions.
- She must be informed by her doctor of the hazards of becoming pregnant during and 1 month after treatment with isotretinoin.
- She must be warned of the possibility of contraception failure.
- She must confirm that she has understood the warnings.
- She must be capable of complying with the mandatory effective contraceptive measures.
- She must use effective contraception without any interruption for 1 month before beginning isotretinoin therapy, during therapy and for 1 month following discontinuation of therapy. At least one and preferably two complementary forms of contraception including a barrier method should be used. Microdosed progesterone preparations (minipills) may be an inadequate method of contraceptive during isotretinoin therapy.
- She must have a negative result from a reliable pregnancy test within two weeks prior to beginning therapy. Monthly repetition of pregnancy testing is recommended.
- She must start isotretinoin therapy only on the 2nd or 3rd day of the next normal menstrual period.
- In the event of relapse treatments she must also use the same uninterrupted and effective contraceptive measures 1 month prior to, during, and for 1 month after isotretinoin therapy and the same reliable pregnancy evaluations should be followed.
- She must fully understand the precautions and confirm her understanding and her willingness to comply with reliable contraceptive measures as explained to her.

Even female patients who normally do not employ contraception because of a history of infertility (except in the case of hysterectomy) or who claim absence of sexual activity must

be advised to use effective contraceptive measures while taking isotretinoin, following the above guidelines.

Should pregnancy occur in spite of these precautions during treatment with isotretinoin or in the month following, there is a great risk of very severe malformation of the foetus (involving in particular the central nervous system, the heart and the large blood vessels). There is also an increased risk of spontaneous abortion. If pregnancy does occur, the doctor and patient should discuss the advisability of continuing the pregnancy.

Major human foetal abnormalities related to isotretinoin administration have been documented, including hydrocephalus, microcephalus, abnormalities of the external ear (micropinna, small or absent external auditory canals), microphthalmia, cardiovascular abnormalities, facial dysmorphism, thymus gland abnormalities, parathyroid gland abnormalities and cerebellar malformation.

Isotretinoin is also contraindicated in patients who are breast-feeding; hepatic and renal insufficiency; hypervitaminosis A; patients with excessively elevated blood lipid values; hypersensitivity to the medicine or any of the excipients.

Precautions

General

Prescribers should inform the individual patient of the risks associated with use of isotretinoin. Patients should understand the need for rigorous follow-up preferably on a monthly basis.

Isotretinoin should only be prescribed by doctors who are experienced in the use of systemic retinoids and understand the risk of teratogenicity associated with isotretinoin therapy (see Contraindications).

Hypersensitivity reactions may occur in susceptible individuals.

Liver function should be checked before and 1 month after the start of treatment, and subsequently at 3 month intervals.

Serum lipids (fasting value) should also be checked (before and one month after the start of therapy, and also at the end of the three-to-four-month treatment period). In high risk patients (with diabetes, obesity, alcoholism or lipid metabolism disorder) undergoing treatment with isotretinoin, more frequent checks may be necessary. Isotretinoin should not be used together with any medicine known to enhance liver metabolism or interfere with enterohepatic circulation.

The serum lipid values usually return to normal on reduction of the dose or discontinuation of treatment. The changes in serum lipids may also resolve in response to dietary measures.

In known or suspected diabetics, frequent determination of blood glucose levels is recommended. Although no causal relationship has been established, elevated fasting blood sugars have been reported, and new cases of diabetes have been diagnosed during isotretinoin therapy.

It is recommended that clinically significant serum triglyceride elevations be controlled, since levels in excess of 800 mg/dL are sometimes associated with acute pancreatitis, which is known to be potentially fatal (see Adverse Effects). Hence, isotretinoin should be discontinued if uncontrolled hypertriglyceridaemia or symptoms of pancreatitis occur.

Patients, particularly those with dry eyes, should be monitored for the development of keratitis.

Decreased night vision has occurred during isotretinoin therapy and in rare instances has persisted after discontinuation of therapy (see Adverse Effects). Because the onset in some patients was sudden, patients should be advised of this potential problem and warned to be cautious when driving or operating any vehicle at night. Visual problems should be carefully monitored.

Depression, psychosis and rarely, suicidal ideation, attempts and suicide have been reported in patients treated with isotretinoin (see Adverse Effects). Although a causal relationship has not been established particular care needs to be taken in patients with a history of depression and all patients should be monitored for signs of depression and referred for appropriate treatment if necessary. Although no mechanism of action for these events has been established, discontinuation of therapy may be insufficient and further evaluation by a psychiatrist may be necessary.

Rare cases of benign intracranial hypertension (pseudotumor cerebri) have been reported, some of which involved concomitant use of tetracyclines (see Interactions). Supplementary treatment with tetracyclines is, therefore, contraindicated.

Myalgia and arthralgia may occur and may be associated with reduced tolerance to vigorous exercise (see Adverse Effects). Isolated instances of raised serum CPK values have been reported in patients receiving isotretinoin, particularly those undertaking vigorous physical activity.

Hyperostosis has been seen in some patients suffering from keratinising dermatoses on treatment with higher doses (> 2 mg/kg) and long-term administration (> 1 year). Blood donation to women of childbearing age by patients being treated or recently treated (one to two weeks) with isotretinoin is contraindicated.

Aggressive dermabrasion should be avoided in patients on isotretinoin and for a period of 5-6 months after treatment because of the risk of hypertrophic scarring in atypical areas. Wax epilation should be avoided during therapy and at least for a period of 6 months thereafter due to the possibility of scarring or dermatitis.

Isotretinoin has been associated with inflammatory bowel disease (including regional ileitis) in patients without a prior history of intestinal disorders. Patients experiencing severe (haemorrhagic) diarrhoea should discontinue isotretinoin immediately.

Use in Pregnancy

Pregnancy (Category X)

Isotretinoin is highly teratogenic and must not be given to women who are pregnant. Isotretinoin crosses the placental barrier in amounts that lead to congenital deformities. There is an extremely high risk that a deformed infant will result if pregnancy occurs while taking isotretinoin in any amount even for short periods. Potentially all exposed foetuses can be affected.

Use in Lactation

As isotretinoin is highly lipophilic, the passage of isotretinoin into human milk is very likely. Because of the potential for adverse effects, the use of isotretinoin is contraindicated in nursing mothers.

Use in Children

Long term use in children under 13 years should be avoided because of a risk of premature epiphyseal closure.

Effects on Ability to Drive or Operate Machinery

Isotretinoin is presumed to be safe or unlikely to produce an effect on the ability to drive or use machinery.

Interactions

Concurrent therapy with isotretinoin and vitamin A must be avoided, as symptoms of hypervitaminosis A may be intensified. As tetracyclines can also cause an increase in intracranial pressure, their combination with isotretinoin is contraindicated. No further interactions between isotretinoin and other medicines (e.g. Oral contraceptives) have been observed to date.

Concurrent topical therapy

Concurrent administration of other keratolytic or exfoliative antiacne agents is not indicated, nor is concurrent radiation therapy with ultraviolet light indicated. Patients should avoid exposure to the sun. Adjuvant therapy with mild topical medicines may be given, as required.

Male patients

The available data suggest that the level of maternal exposure from the semen of patients receiving isotretinoin, is not of sufficient magnitude to be associated with the teratogenic effect of isotretinoin.

Male patients should be reminded that they must not share their medication with anyone, particularly not females.

Adverse Effects

Most of the adverse effects of isotretinoin are dose related. In the proper dosage, tolerability is generally acceptable in view of the severity of the disease. Every patient should be warned about the possible occurrence of adverse effects.

Hypervitaminosis A

The most frequently observed symptoms are those associated with hypervitaminosis A, i.e. dryness of the mucosa, which on the lips can be relieved by the application of a fatty ointment, dryness of the nasal mucosa which can lead to epistaxis, dryness of the pharyngeal mucosa and hoarseness and dryness of the vaginal and/or anal mucosa.

Eyes

Dryness of the eyes can cause conjunctivitis and reversible corneal opacities.

Conjunctivitis can be improved by a mild eye ointment. Intolerance to contact lenses may force the patient to wear glasses during treatment. Isolated cases of photophobia, dark adaptation disturbances (decreased night vision) and lenticular cataracts have been reported. Keratitis in association with isotretinoin treatment is a rare event and possibly related to the dry eye syndrome. Therefore patients, particularly those with dry eye syndrome, should be monitored for the development of keratitis.

Skin

Exanthema, pruritus, dermatitis facialis, sweating, pyogenic granuloma, paronychia, nail dystrophy and increased formation of granulation tissue may occur. Rare cases of persistent hair thinning have been reported. Reversible alopecia has been observed. Hirsutism, acne fulminans and hyperpigmentation (facial) have been reported rarely. Rarely, patients may experience photosensitivity reactions.

Bone

Bone changes and hyperostosis have occurred in children (including premature epiphyseal closure) and adults treated over long periods with high doses of isotretinoin generally for indications other than cystic acne. In one patient, spinal hyperostoses and calcification of the spinal ligaments with subsequent compression of the spinal cord were observed following long-term treatment over several years with another retinoid, etretinate. Isotretinoin is not intended for long-term therapeutic use, and the possibility of this adverse effect occurring if it is used improperly for long-term treatment should be borne in mind.

Minimal hyperostosis has been observed in cystic acne patients treated with a single course of isotretinoin. Due to the possible occurrence of these bone changes, a careful evaluation of the risk/benefit ratio should be carried out in every patient and isotretinoin administration should be restricted to severe cases.

Haematology

There have been cases of allergic vasculitis including Wegener's granulomatosis, decreases in white and red blood cell counts including anaemia and neutropenia, increases and decreases in platelet count, elevated sedimentation rate.

Respiratory System Disorders

Bronchospasm has been rarely reported; sometimes in patients with a pre-history of asthma.

Psychiatric and Central Nervous System Disorders

Behavioural disorders, depression (see Precautions), headache, increased intracranial pressure (pseudotumor cerebri) and seizures.

Laboratory Data

Transitory and reversible increases in transaminases as well as some cases of hepatitis related to isotretinoin have been observed. In many such cases the changes have been within the normal range and values have returned to baseline levels during treatment. In other cases, however, it has been necessary to reduce the dosage or discontinue treatment with isotretinoin.

Increases in serum triglyceride and cholesterol levels as well as a decrease of HDL have also been observed, particularly at high dosages and in predisposed patients (with a family history of lipid metabolism disorders, diabetes, obesity or alcoholism). These changes too are dose-related, and values return to normal on reduction of the dosage or withdrawal of the medicine.

Other effects

Isolated cases of benign intracranial hypertension and visual disturbances, and occasionally nausea and headache have been observed. Pancreatitis and haematuria/proteinuria occur rarely.

Impaired hearing in certain frequencies and local or systemic infections due to Gram-positive microorganisms (*Staphylococcus aureus*) have been reported.

Muscle and joint pain and, more rarely, overdosage, inflammatory bowel disease (e.g. Colitis, ileitis haemorrhage), and hyperuricaemia have been reported.

Lymphadenopathy has occasionally been noted.

Dosage and Administration

Patient response to isotretinoin is dose-related and varies from case to case. This necessitates adapting the dosage to individual needs according to severity of the clinical picture and side effects. With a dosage of between 0.1 and 1.0mg per kg daily over 12-16 weeks, it is generally possible to achieve a considerable improvement or complete healing. The daily dose is taken with meals, low doses once daily and higher amounts as a single dose or in several doses spread over the day.

Initial Treatment

As a rule, therapy is started with 0.5 mg/kg daily and maintained for 2 to 4 weeks until the patient's response is clear. Initially, the acne may be aggravated for a short period.

Follow-up Treatment (Maintenance Dose)

In patients who respond well to isotretinoin, treatment should be continued with a dosage of 0.5 mg/kg daily. With patients who show signs of intolerance during the initial therapy, the daily dosage should be reduced to 0.1-0.2 mg/kg. Where response to the initial dosage is slight, and in particularly severe cases, the daily dosage may be increased to 1.0 mg/kg provided the medicine is well tolerated. The maintenance dose is administered for a period of 12 weeks after which the first stage of therapy is generally terminated. After discontinuation of treatment, often a further improvement is observed which may last from a few weeks to several months and there should therefore be an interval of at least eight weeks before restarting treatment. In the event of recurrence of the acne, treatment should be resumed on the above lines, bearing in mind that recurrences may respond to a lower dosage.

A cumulative dose of 120 mg/kg per treatment has been documented to increase remission rates and prevent relapse. The therapy duration in individual patients therefore varies as a function of the daily dose. Complete remission of the acne is often achieved by a therapy course of 16-24 weeks. In patients who show severe intolerance to the recommended dose, treatment may be continued at a lower dose with the consequence of a longer therapy duration.

Concurrent Adjuvant Treatment

As a rule this is not indicated. It is advisable to discontinue antimicrobials before beginning treatment with isotretinoin. Concomitant radiation (ultraviolet) therapy and exposure to sunlight should also be avoided. Concomitant topical therapy of a mild nature may, however, be carried out.

Overdosage

Although the acute toxicity of isotretinoin is low, signs of hypervitaminosis A could appear in cases of accidental overdose. Such symptoms are reversible. Nevertheless, evacuation of the stomach may be indicated in the first few hours after overdose.

For further advice on management of overdose please contact the National Poisons Information Centre (0800 POISON or 0800 764 766).

Pharmaceutical Precautions

Store below 25°C.

Protect from light and moisture.

Medicine Classification

Prescription Medicine.

Package Quantities

Capsules 5mg: 100s (This strength is not currently marketed in New Zealand)

Capsules 10mg: 100s

Capsules 20mg: 100s

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21 January 2015