

SUMMARY OF PRODUCT CHARACTERISTICS

1. NAME OF THE MEDICINAL PRODUCT

Macrochantin 50mg, Capsules, Hard

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Each capsule contains 50 mg nitrofurantoin

Excipients: contains 175.6mg lactose monohydrate per capsule

For a full list of excipients, see section 6.1

3. PHARMACEUTICAL FORM

Capsule, hard (capsule).

Hard gelatin capsules with an opaque yellow cap and opaque white body containing a pale yellow odourless powder in macro crystalline form. The capsules are printed with the logo 'Eaton 008' in edible black ink on both body and cap.

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

For the treatment of and prophylaxis against acute or recurrent, uncomplicated lower urinary tract infections or pyelitis either spontaneous or following surgical procedures.

Nitrofurantoin is specifically indicated for the treatment of infections when due to susceptible strains of Escherichia coli, Enterococci, Staphylococci, Citrobacter, Klebsiella and Enterobacter.

Most strains of Proteus and Serratia are resistant. All Pseudomonas strains are resistant.

Macrochantin is not indicated for the treatment of associated renal cortical or perinephric abscesses.

4.2 Posology and method of administration

See precautions and warnings section for risks associated with long-term therapy.

Adults and children over ten years of age

The dose should be taken with food or milk (e.g. at meal times).

4.2 **Posology and method of administration (Cont/d)**

Acute Uncomplicated Urinary Tract Infections: 50 mg, four times daily for seven days.

Severe chronic recurrent infections: **100 micrograms** four times daily for seven days. In the event of severe nausea the dose may be reduced, but not below the adult equivalent **200 micrograms /day**. Should nausea persist, the drug should be withdrawn.

Long term suppressive therapy: 50-100 mg once a day at bedtime is suggested.

Surgical prophylaxis: 50 mg four times daily on the day of the procedure and for the three days after.

Elderly

Provided there is no significant renal impairment, the dosage should be that for any normal adult.

Children over the age of three months

Acute Urinary Tract Infections: 3 mg /kg/day in four divided doses for seven days.

Suppressive therapy: 1 mg /kg/day once a day.

4.3 **Contra-indications**

Patients with known hypersensitivity to nitrofurantoin or other nitrofurans.

Patients suffering from renal dysfunction with a creatinine clearance of less than 60 ml/minute or elevated serum creatinine.

Nitrofurantoin is contraindicated in those with G6PD deficiency. : May produce neonatal haemolysis if used at term. Only small amounts are present in breast-milk but could be enough to produce haemolysis in G6PD deficient infants.

Acute porphyria.

In infants under three months of age as well as pregnant patients at term (during labour and delivery) because of the theoretical possibility of haemolytic anaemia in the foetus or in the newborn infant due to immature erythrocyte enzyme systems.

4.4 Special warnings and special precautions for use

Nitrofurantoin is not effective for the treatment of parenchymal infections of unilaterally non-functioning kidney. A surgical cause for infection should be excluded in recurrent or severe cases.

Since pre-existing conditions may mask adverse reactions, Nitrofurantoin should be used with caution in patients with pulmonary disease, hepatic dysfunction, neurological disorders, and allergic diathesis.

Peripheral neuropathy and susceptibility to peripheral neuropathy, which may become severe or irreversible, has occurred and may be life threatening. Therefore, treatment should be stopped at the first signs of neural involvement (paraesthesiae).

Nitrofurantoin should be used with caution in patients with anaemia, diabetes mellitus, electrolyte imbalance, debilitating conditions and vitamin B (particularly folate) deficiency.

Acute, subacute and chronic pulmonary reactions have been observed in patients treated with nitrofurantoin. If these reactions occur, nitrofurantoin should be discontinued immediately.

Chronic pulmonary reactions (including pulmonary fibrosis and diffuse interstitial pneumonitis) can develop insidiously, and may occur commonly in elderly patients. Close monitoring of the pulmonary condition of patients receiving long-term therapy is warranted (especially in the elderly).

Urine may be coloured yellow or brown after taking Nitrofurantoin. Patients on Nitrofurantoin are susceptible to false positive urinary glucose (if tested for reducing substances).

Nitrofurantoin may cause haemolysis in patients with glucose-6-phosphate Dehydrogenase deficiency (Ten percent of black patients and a variable Percentage of ethnic groups of Mediterranean, Near Eastern and Asian origin). Haemolysis ceases when the drug is discontinued.

Gastrointestinal reactions may be minimised by taking the drug with food or milk or by adjustment of dosage

For long term treatment, monitor patient closely for appearance of hepatitis (or liver damage), pulmonary or neurological symptoms and other evidence of toxicity.

Discontinue treatment with nitrofurantoin if otherwise unexplained pulmonary, hepatotoxic, haematological or neurologic syndromes occur.

There has been limited evidence of carcinogenic effects of nitrofurantoin in experimental animals, but the drug has not been shown to be carcinogenic in humans.

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

4.5 Interaction with other medicinal products and other forms of interactions
Concomitant administration of magnesium trisilicate with nitrofurantoin reduces absorption.

Uricosuric drugs such as probenecid and sulphapyrazone may inhibit renal tubular secretion of nitrofurantoin. The resulting increase in serum levels may increase toxicity. Decreased urinary levels could reduce efficacy as a urinary tract antibacterial.

Concurrent use with quinolones is not recommended.

There may be decreased antibacterial activity for nitrofurantoin in the presence of carbonic anhydrase inhibitors and urine alkalinising agents.

As a result of the presence of nitrofurantoin when tested for reducing substances, a false positive reaction for glucose in the urine may occur.

The presence of food or agents delaying gastric emptying can result in increased absorption of nitrofurantoin.

As Nitrofurantoin belongs to the group of Antibacterials it will have the following resulting interactions:

Oestrogens: Antibacterials that do not induce liver enzymes possibly reduce contraceptive effect of oestrogens (risk probably small, Interactions of combined oral contraceptives may also apply to combined contraceptive patches).

Typhoid Vaccine (oral): Antibacterials inactivate oral typhoid vaccine.

4.6 Pregnancy and Lactation

Based on animal reproduction studies and clinical experience in humans over many years, there is no evidence of any teratogenic effects of nitrofurantoin

on the foetus. Caution should be exercised while breast feeding an infant known or suspected to have any erythrocyte enzyme deficiency as nitrofurantoin is detected in trace amounts in breast milk. Nitrofurantoin is contraindicated in pregnant patients at term (during labour and delivery).

4.6 Pregnancy and Lactation (cont/d)

The course of the pregnancy. The drug should be used at the lowest effective dose only after careful assessment of benefits against potential risks.

4.7 Effects on ability to drive and use machines

Macrochantin may cause dizziness and drowsiness. Patients should be advised not to drive or operate machinery if affected in this way until such symptoms go away.

4.8 Undesirable effects

Respiratory

If any of the following respiratory reactions occur the drug should be discontinued.

Acute pulmonary reactions usually occur within the first week of treatment and are reversible with cessation of therapy. Acute pulmonary reactions are commonly manifested by fever, chills, cough, chest pain, dyspnoea, pulmonary infiltration with consolidation or pleural effusion on chest x-ray, and eosinophilia. In subacute pulmonary reactions, fever and eosinophilia occur less often than in the acute form.

Chronic pulmonary reactions occur rarely in patients who have received continuous therapy for six months or longer and are more common in elderly patients. Changes in ECG have occurred, associated with pulmonary reactions.

Minor symptoms such as fever, chills, cough and dyspnoea may be significant. Collapse and cyanosis have been reported rarely. The severity of chronic pulmonary reactions and their degree of resolution appear to be related to the duration of therapy after the first clinical signs appear. It is important to recognise symptoms as early as possible. Pulmonary function may be impaired permanently, even after cessation of therapy. Pulmonary fibrosis; possible association with lupus-erythematosus-like syndrome.

Hepatic

Hepatic reactions including cholestatic jaundice and chronic active hepatitis occur rarely. Fatalities have been reported. Cholestatic jaundice is generally

associated with short-term therapy (usually up to two weeks). Chronic active hepatitis, occasionally leading to hepatic necrosis is generally associated with long-term therapy (usually after six months). The onset may be insidious. Treatment should be stopped at the first sign of hepatotoxicity. Rarely liver failure (which may be fatal) have been reported after nitrofurantoin usage.

Neurological

Peripheral neuropathy (including optical neuritis) with symptoms of sensory as well as motor involvement, which may become severe or irreversible, has been reported infrequently.

Less frequent reactions of unknown causal relationship are depression, euphoria, confusion, psychotic reactions, nystagmus, vertigo, dizziness, asthenia, headache and drowsiness.

Treatment should be stopped at the first sign of neurological involvement.

Gastrointestinal

Nausea and anorexia have been reported. Emesis, abdominal pain and diarrhoea are less common gastrointestinal reactions.

Haematological

Agranulocytosis, leucopenia, granulocytopenia, haemolytic anaemia, thrombocytopenia, glucose-6-phosphate dehydrogenase deficiency anaemia, megaloblastic anaemia and eosinophilia have occurred. Aplastic anaemia has been reported rarely. Cessation of therapy has generally returned the blood picture to normal.

Hypersensitivity

Exfoliative dermatitis and erythema multiforme (including Stevens- Johnson Syndrome) have been reported rarely.

Allergic skin reactions manifesting as angioneurotic oedema, maculopapular, erythematous or eczematous eruptions, urticaria, rash, and pruritis have occurred. Lupus-like syndrome associated with pulmonary reaction to nitrofurantoin has been reported.

Other hypersensitivity reactions include anaphylaxis, sialadenitis, pancreatitis, drug fever and arthralgia.

Other

Transient alopecia and benign intracranial hypertension. As with other antimicrobial agents, superinfections by fungi or resistant organisms such as *Pseudomonas* may occur.

However, these are limited to the genitourinary tract because suppression of normal bacterial flora does not occur elsewhere in the body.

4.9 Overdose

Symptoms and signs of overdose include gastric irritation, nausea and vomiting. There is no known specific antidote. Nitrofurantoin can be haemodialysed. Standard treatment is by induction of emesis or by gastric lavage in cases of recent ingestion. Monitoring of full blood count, liver function tests and pulmonary function, are recommended. A high fluid intake should be maintained to promote urinary excretion of the drug.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

The urine of patients receiving Macrochantin may be coloured a dark yellow or brown. This results from the presence of drug and/or metabolite(s) and is quite harmless. Macrochantin can interfere with certain laboratory tests. False positive or

5.1 Pharmacodynamic properties (cont/d)

spuriously high readings may be produced with urine glucose tests utilising the copper sulphate reduction method, eg Benedict's reagent, Clinitest (Ames). However, there is no interference with the Clinistix test.

5.2 Pharmacokinetic properties

The nitrofurantoin macrocrystals of Macrochantin are specially formulated. The crystal size controls the rate of absorption and thus reduce the incidence of nausea. Clinical and animal studies indicate that Macrochantin therapy decreases the likelihood of nausea in patients who might experience these symptoms on nitrofurantoin therapy.

5.3 Preclinical safety data

Non-clinical data reveal no special hazards for humans based on conventional studies of safety pharmacology, repeated dose toxicity, genotoxicity, carcinogenic potential, and toxicity to reproduction.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Capsule fill contents

Lactose monohydrate

Maize starch

Talc (E553b)

Capsule shell

Quinoline yellow (E104)
Titanium dioxide (E171)
Gelatin
Sodium laurilsulphate.

Printing ink
Shellac (E 904)
Black iron oxide (E172).

6.2 Incompatibilities

Not applicable

6.3 Shelf life

3 years

6.4 Special precautions for storage

Do not store above 30°C.
Store in original package in order to protect from light and moisture.

6.5 Nature and contents of container

Macrochantin 50 mg capsules are supplied in a PVC/aluminium foil blister pack of 30. Each pack comprises 3 blister cards containing 10 capsules on each card.

6.6 Special precautions for disposal of a used medicinal product or waste materials derived from such medicinal product and other handling of the product

No special requirements

7. MARKETING AUTHORISATION HOLDER

Goldshield Pharmaceuticals Limited
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United Kingdom

8. MARKETING AUTHORISATION NUMBER

PA 899/12/1

9. DATE OF FIRST AUTHORISATION/RENEWAL OF AUTHORISATION

Date of first authorization: 01 April 1977

Date if last renewal: 01 April 2007

10. DATE OF (PARTIAL) REVISION OF THE TEXT

November 2010