

Pregnancy:**Teratogenic effects:**

Pregnancy Category B. Several reproduction studies have been performed in rabbits and rats at doses up to six times the human dose and have revealed no evidence of impaired fertility or harm to the fetus due to nitrofurantoin. In a single published study conducted in mice at 80 times the human dose (based on mg/kg administered to the dam), growth retardation and a low incidence of minor and common malformations were observed. However, at 25 times the human dose, fetal malformations were not observed; the relevance of these findings to humans is uncertain. There are, however, no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, this drug should be used during pregnancy only if clearly needed.

Non-teratogenic effects:

Nitrofurantoin has been shown in one published transplacental cardiogenicity study to induce lung papillary adenomas in the F1 generation mice at doses 19 times the human dose on a single level. The relationship of this finding to potential human cardiogenesis is presently unknown. Because of the uncertainty regarding the human implications of these animal data, this drug should be used during pregnancy only if clearly needed.

Labor and Delivery:

See **CONTRAINDICATIONS**.

Nursing Mothers:

Nitrofurantoin has been detected in human breast milk in trace amounts. Because of the potential for serious adverse reactions from nitrofurantoin in nursing infants under one month of age, a decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to the mother. (See **CONTRAINDICATIONS**.)

Pediatric Use:

Nitrofurantoin capsules (monohydrate/macrocrystals) are contraindicated in infants below the age of one month. (See **CONTRAINDICATIONS**.) Safety and effectiveness in pediatric patients below the age of twelve years have not been established.

Geriatric Use:

Clinical studies of nitrofurantoin capsules (monohydrate/macrocrystals) 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 response between the elderly and younger patients. Spontaneous reports suggest a higher proportion of pulmonary reactions, including fatalities, in elderly patients; these differences appear to be related to the higher proportion of elderly patients receiving long-term nitrofurantoin therapy. As in younger patients, chronic pulmonary reactions generally are observed in patients receiving therapy for six months or longer (see **WARNING 8**). Spontaneous reports also suggest an increased proportion of severe hepatic reactions, including fatalities, in elderly patients (see **WARNING 5**).

In general, the greater frequency of decreased hepatic, renal, or cardiac function, and of concomitant disease or other drug therapy in elderly patients should be considered when prescribing nitrofurantoin capsules (monohydrate/macrocrystals). This drug is known to be extensively excreted by the kidney, and the risk of toxic reactions to this drug may be greater in patients with impaired renal function. Anuria, oliguria, or significant impairment of renal function (creatinine clearance under 50 mL per minute or clinically significant elevated serum creatinine) are contraindications (see **CONTRAINDICATIONS**). Because elderly patients are more likely to have decreased renal function, it may be useful to monitor renal function.

ADVERSE REACTIONS

In clinical trials of nitrofurantoin, the most frequent clinical adverse events that were reported as possibly or probably drug-related were nausea (8%), headache (6%), and flatulence (7.5%). Additional clinical adverse events reported as possibly or probably drug-related occurred in less than 1% of patients studied and are listed below in alphabetical order of decreasing frequency.

Gastrointestinal: Diarrhea, dyspepsia, abdominal pain, constipation, emesis**Neurologic:** Dizziness, drowsiness, amblyopia**Respiratory:** Acute pulmonary hypersensitivity reaction (see **WARNING 8**)**Allergic:** Pruritus, urticaria**Dermatologic:** Alopexia**Miscellaneous:** Fever, chills, malaise

The following additional clinical adverse events have been reported with the use of nitrofurantoin:

Gastrointestinal: Stomatitis, pancreatitis. There have been sporadic reports of pseudomembranous colitis with the use of nitrofurantoin. The onset of pseudomembranous colitis symptoms may occur during or after antimicrobial treatment. (See **WARNING 5**.)

Neurologic: Peripheral neuropathy, which may become severe or irreversible, has occurred. Fatalities have been reported. Conditions such as renal impairment (creatinine clearance under 50 mL per minute or clinically significant elevated serum creatinine), anemia, diabetes mellitus, electrolyte imbalance, vitamin B deficiency, and debilitating diseases may increase the possibility of peripheral neuropathy. (See **WARNING 8**.)

Asthenia, vertigo, and nystagmus also have been reported with the use of nitrofurantoin.

Benign intracranial hypertension (pseudotumor cerebri), confusion, depression, optic neuritis, and psychotic reactions have been reported rarely. Sludging of fontanels, as a sign of benign intracranial hypertension in infants, have been reported rarely.

Respiratory:

CHRONIC, SUBACUTE, OR ACUTE PULMONARY HYPERSENSITIVITY REACTIONS MAY OCCUR WITH THE USE OF NITROFURANTOIN.

CHRONIC PULMONARY REACTIONS GENERALLY OCCUR IN PATIENTS WHO HAVE RECEIVED CONTINUOUS TREATMENT FOR SIX MONTHS OR LONGER. MALAISE, DYSPNOEA ON EXERCISE, COUGH, AND ALTERED PULMONARY FUNCTION ARE COMMON MANIFESTATIONS WHICH CAN OCCUR INSIDIOUSLY. RADIOLOGIC AND HISTOLOGIC FINDINGS OF

DIFFUSE INTERSTITIAL PNEUMONITIS OR FIBROSIS, OR BOTH, ARE ALSO COMMON MANIFESTATIONS OF THE CHRONIC PULMONARY REACTION. FEVER IS RARELY PROMINENT. 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, PULMONARY FUNCTION MAY BE IMPAIRED PERMANENTLY, EVEN AFTER CESSATION OF THERAPY. THE RISK IS GREATER WHEN CHRONIC PULMONARY REACTIONS ARE NOT RECOGNIZED EARLY.

In subacute pulmonary reactions, fever and eosinophilia occur less often than in the acute form. Upon cessation of therapy, recovery may require several months. If the symptoms are not recognized as being drug-related and nitrofurantoin therapy is not stopped, the symptoms may become more severe. Acute pulmonary reactions are generally manifested by fever, chills, cough, chest pain, dyspnea, pulmonary infiltration with consolidation or pleural effusion on x-ray, and eosinophilia. Acute reactions usually occur within the first week of treatment and are reversible with cessation of therapy. Resolution often is dramatic. (See **WARNING 8**.)

Changes in EKG (e.g., non-specific ST-T wave changes, bundle branch block) have been reported in association with pulmonary reactions. Cyanosis has been reported rarely.

Hepatic: Hepatic reactions, including hepatitis, cholestatic jaundice, chronic active hepatitis, and hepatic necrosis, occur rarely. (See **WARNING 5**.)

Allergic: Lupus-like syndrome associated with pulmonary reaction to nitrofurantoin has been reported. Also, angioedema, maculopapular, erythematous, or eczematous eruptions, anaphylaxis, asthmalic, myalgic, or ag fever, chills and vasculitis (sometimes associated with pulmonary reactions) have been reported. Hypersensitivity reactions represent the most frequent spontaneously reported adverse events in worldwide postmarketing experience with nitrofurantoin formulations.

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

Hematologic: Cyanosis secondary to methemoglobinemia has been reported rarely.

Miscellaneous: As with other antimicrobial agents, superinfections caused by resistant organisms, e.g., *Pseudomonas* species or *Candida* species, can occur.

In clinical trials of nitrofurantoin, the most frequent laboratory adverse events (1% to 5%), without regard to drug relationship, were as follows: eosinophilia, increased AST (SGOT), increased ALT (SGPT), decreased hemoglobin, increased serum phosphorus. The following laboratory adverse events also have been reported with the use of nitrofurantoin: glucose-6-phosphate dehydrogenase deficiency anemia (see **WARNING 5**), agranulocytosis, leukopenia, granulocytopenia, hemolytic anemia, thrombocytopenia, megaloblastic anemia. In most cases, these hematologic abnormalities resolved following cessation of therapy. Aplastic anemia has been reported rarely.

To request medical information or to report SUSPECTED ADVERSE REACTIONS, contact Inventa Healthcare Limited at 1-855-442-2994 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

OVERDOSAGE

Overdose incidents of acute overdosage of nitrofurantoin have not resulted in any specific symptoms other than vomiting. Induction of emesis is recommended. There is no specific antidote, but a high fluid intake should be maintained to promote urinary excretion of the drug. Nitrofurantoin is dialyzable.

DOSE AND ADMINISTRATION

Nitrofurantoin capsules (monohydrate/macrocrystals) should be taken with food.

Adults and Pediatric Patients Over 12 Years: One 100 mg capsule every 12 hours for 5 to 7 days.

HOW SUPPLIED

Nitrofurantoin capsules, USP (monohydrate/macrocrystals), 100 mg, are supplied as a light yellow to yellow powder blend and yellow colored tablet film in the hard gelatin capsule shell size "1" with black cap imprinted "100" and yellow colored body imprinted "100".

NDC 20746-762-01: bottle of 100

NDC 20746-762-56: case of 1000

Store at controlled room temperature (59° to 86° F or 15° to 30° C).

Rx Only**CLINICAL STUDIES**

Controlled clinical trials comparing nitrofurantoin 100 mg p.o. q12h and nitrofurantoin macrocrystals 50 mg p.o. q6h in the treatment of acute uncomplicated urinary tract infections demonstrated approximately 75% microbiologic eradication of uropathogens in each treatment group.

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Inventa Healthcare Limited

Plot No. F1-FV1-F757, Additional Ambemeth M.I.D.C.,

Ambemeth, (Sas) 421506,

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