**Nitrofurantoin**

**Classification**

Therapeutic: anti-infective

**Pregnancy Category** B

**Indications**

Prevention and treatment of urinary tract infections caused by susceptible organisms; not effective in systemic bacterial infections.

**Action**

Interferes with bacterial enzymes. **Therapeutic Effects:** Bactericidal or bacteriostatic action against susceptible organisms. **Spectrum:** Many gram-negative and some gram-positive organisms, specifically: *Citrobacter*, *Corynebacterium*, *Enterobacter*, *Escherichia coli*, *Klebsiella*, *Neisseria*, *Salmonella*, *Shigella*, *Serratia*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Enterococcus*.

**Pharmacokinetics**

**Absorption:** Readily absorbed after oral administration. Absorption is slower but more complete with macrocrystals (Macrodantin).

**Distribution:** Crosses placenta; enters breast milk.

**Protein Binding:** 40%.

**Metabolism and Excretion:** Partially metabolized by the liver; 30–50% excreted unchanged by the kidneys. **Half-life:** 20 min (q in renal impairment).

**CONTRAINDICATIONS/Precautions**

Contraindicated in: Hypersensitivity; Hypersensitivity to parabens (suspension); Oliguria, anuria, or significant renal impairment (CCr > 60 mL/min); History of cholestatic jaundice or hepatic impairment with previous use of nitrofurantoin; Pregnancy near term and infants (risk of hemolytic anemia). Use Cautiously in: Glucose–6–phosphate dehydrogenase (G6PD) deficiency (risk of hemolytic anemia, especially in Black and Mediterranean and Near-Eastern ethnic groups); Patients with diabetes or debilitated patients (neuropathy may be more common); GFR not established but has been used safely in pregnant women.

**Adverse Reactions/Side Effects**


**Interactions**

Drug–Drug: Probenecid prevents high urinary concentrations, may decrease effectiveness. Antacids may prevent high urinary concentrations. Risk of neurotoxicity with neurotoxic drugs (e.g., ampicillin). Risk of hepatotoxicity with hepatotoxic drugs (e.g., ampicillin). Risk of pneumonitis with drugs having pulmonary toxicity.

**Route/Dosage**

**PO (Adults):** Treatment of active infection— 50–100 mg q 6–8 hr or 100 mg q 12 hr as extended-release product. Chronic suppression—50–100 mg single evening dose.

**PO (Children <1 mo):** Treatment of active infection—q 6–8 hr; maximum dose: 400 mg/day (unlabeled). Children (1–14 yr): Treatment of active infection—5–7 mg/kg q 6–8 hr or 100 mg q 12 hr as extended-release product. Chronic suppression—5–10 mg/kg q 12 hr as extended-release product. (*) morning dose: 100 mg/day (unlabeled).

**NURSING IMPLICATIONS**

**Assessment**

- Assess for signs and symptoms of urinary tract infection (frequency, urgency, pain, and burning on urination; fever, cloudy or foul-smelling urine) before and periodically during therapy.
- Obtain specimens for culture and sensitivity before and during drug administration.
- Monitor bowel function. Diarrhea, abdominal cramping, fever, and bloody stools should be reported to health care professional promptly.

**Use Cautiously in:** Glucose–6–phosphate dehydrogenase (G6PD) deficiency (risk of hemolytic anemia, especially in Black and Mediterranean and Near-Eastern ethnic groups); Patients with diabetes or debilitated patients (neuropathy may be more common); GFR not established but has been used safely in pregnant women.

**NURSING IMPACT**

- Clinical drug name
- Genetic Implication
- CATEGORY indicates risk: 1 = highest risk, 2 = moderate risk, 3 = low risk
- **GENE:** indicates most frequent
- **STRKTHRU:** discontinued

**TIME/ACTION PROFILE (urine levels)**

<table>
<thead>
<tr>
<th>ROUGE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO</td>
<td>unknown</td>
<td>30 min</td>
<td>6–12 hr</td>
</tr>
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</table>
as a sign of pseudomembranous colitis. May begin up to several weeks following cessation of therapy.

Assess for signs and symptoms of pulmonary reactions periodically during therapy. Acute reactions (fever, chills, cough, chest pain, dyspnea, pulmonary infiltration with consolidation or pleural effusion on x-ray, eosinophilia) usually occur within first week of treatment and resolve when therapy is discontinued. Chronic reactions (malaise, dyspnea on exertion, cough, altered pulmonary function) may indicate pneumonitis or pulmonary fibrosis and are more common in patients taking intubation for 6 mos. or longer.

- Lab Test Considerations: Monitor CBC routinely with patients on prolonged therapy.
- Monitor liver function tests periodically during therapy. May cause q
  serum glucose, bilirubin, alkaline phosphatase, BUN, and creatinine. If hepatotoxicity occurs, discontinue therapy.
- Monitor renal function periodically during therapy.

Potential Nursing Diagnoses
Risk for infection (Indications)

Implementation
- PO: Administer with food or milk to minimize GI irritation, to delay and increase absorption, to increase peak concentration, and to prolong duration of therapeutic concentration in the urine.
- Do not crush tablets or open capsules.
- Administer liquid preparations with calibrated measuring device. Shake well before administration. Oral suspension may be mixed with water, milk, fruit juices, or infant formula. Rinse mouth with water after administration of oral suspension to avoid staining teeth.

Patient/Family Teaching
- Instruct patient to take medication around the clock, as directed. Take missed doses as soon as remembered and space next dose 2-4 hr apart. Do not skip or double up on missed doses.
- May cause dizziness or drowsiness. Caution patient to avoid driving or other activities requiring alertness until response to medication is known.
- Inform patient that medication may cause a rust-yellow to brown discoloration of urine, which is not significant.
- Advise patient to notify health care professional if fever, chills, cough, chest pain, dyspnea, skin rash, numbness or tingling of the fingers or toes, or intolerable GI upset occurs. Signs of superinfection (mild, low-grade fever, increased urinary frequency, urgency) should also be reported.
- Instruct patient to notify health care professional if fever and diarrhea develop, especially if stool contains blood, pus, or mucus. Advise patient not to treat diarrhea without consulting health care professional.
- Instruct patient to consult health care professional if no improvement is seen within 1-2 days after initiation of therapy.

Evaluation/Desired Outcomes
- Resolution of the signs and symptoms of infection. Therapy should be continued for a minimum of 7 days and for at least 3 days after the urine has become sterile.
- Decrease in the frequency of infections in chronic suppressive therapy.

Why was this drug prescribed for your patient?