tobramycin (toe-bram-sin)
Betalok, Nobin, TOBI, TOBI Podhaler

**Classification**
Therapeutic: anti-infection
Pharmacologic: aminoglycoside

**Pregnancy Category D**

**Indications**
Treatment of serious gram-negative bacterial infections and infections caused by Pseudomonas aeruginosa. Another indication is management of cystic fibrosis patients with Pseudomonas aeruginosa.

**Action**
Inhibits bacterial growth by stopping protein synthesis in bacteria at level of 30S ribosome.

**Management of cystic fibrosis patients with Pseudomonas aeruginosa.**

**Adverse Reactions/Side Effects**

- **Hypersensitivity:** Hypersensitivity reactions.

- **Bactericidal action.**

**Contraindications/Precautions**

- Hypersensitivity to antibiotics of this class.

**Contraindicated in:** Hypersensitivity. Most penicillin products contain penicillins and should be avoided in patients with known intolerance. Cross-reactivity among aminoglycosides exists.

**Use Cautionally in:**
- Renal impairment (dose adjustments necessary; blood levels monitoring useful in preventing ototoxicity and nephrotoxicity). Hearing impairment; Gastrointestinal dysfunction, age-related renal impairment.
- Pedi: Neonates (risk of nonneurovascular blockade; difficulty in assessing auditory and vestibular function; immature renal function). Nonneurovascular diseases such as myopathies; otitis media; (dosage should be based on ideal body weight). ADR: May cause dermatologic reactions. Lactation: Lactation.

**Interactions**

- **Drug Interactions:**
  - Hypoglycemic agents. May cause hyperglycemia.
  - Inactivation by carbonic anhydrase inhibitors.
  - Metabolism and Excretion:
    - Use cautiously in: Renal impairment (dose adjustments necessary; blood levels monitoring useful in preventing ototoxicity and nephrotoxicity). Hearing impairment; Gastrointestinal dysfunction, age-related renal impairment.
    - Pedi: Neonates (risk of nonneurovascular blockade; difficulty in assessing auditory and vestibular function; immature renal function). Nonneurovascular diseases such as myopathies; otitis media; (dosage should be based on ideal body weight). ADR: May cause dermatologic reactions. Lactation: Lactation.

**Route/Dosage**

- **Inhalation only**
  - **Adults and Children age 6 yr:** Nebulizer solution—400 mg twice daily for 20 days, then off for 28 days, then repeat cycle. Powder for inhalation—Inhale contents of four 20-mg capsules once daily for 20 days, then off for 28 days, then repeat cycle.

**Pharmacokinetics**

- **Absorption:** Well absorbed after IM administration. IV administration results in higher peak levels.
- **Onset:** 0.5–2.5 hr; Adults: 2–4 hr.
- **Peak:** The distribution peak occurs 30 min after the end of a 1-hr infusion.
- **Duration:** IM rapid 30–90 min 6–24 hr
  
- **Half-life:**
  - Neonates: 2–11 hr; Infants: 3–5 hr; Children: 1–3 hr; Adolescents: 0.5–2.5 hr; Adults: 2–4 hr.
  - In renal impairment to 5–70 hr.
  - IM, IV (Children 1 mo–5 yr): 3–6 mg/kg/day divided q 8 hr, up to 13 mg/kg/day divided q 8 hr in cystic fibrosis.
  - IM, IV (Children 1–6 yr): 3.5 mg/kg/day divided q 8 hr.
  - IM, IV (Children 6–11 yr): 5–7.5 mg/kg/day divided q 8 hr, up to 13 mg/kg/day divided q 8 hr in cystic fibrosis.
  - IM, IV (Preterm Neonates): Premature—0–28 days—2.5 mg/kg/day divided q 8 hr; Postnatal age—28–37 days—2.5 mg/kg/day divided q 8 hr; Postnatal age—37–56 days—5 mg/kg/day divided q 8 hr.
  - IM, IV (Adults and Children age 6 yr): Toxicity with colonization of pseudomonas.

- **Excretion:**
  - 90% renal.
  - Small amounts enter breast milk. Poor penetration into CSF.
  - In treatment of enterococcal infections, synergy with a penicillin is required.

**Dosage Forms**

- **Tablets:** 0.5, 1, 1.5, 2 mg/kg/day divided q 8 hr, up to 3.5 mg/kg/day divided q 8 hr.
  - Inhala-

**Trade name(s):**
Bethkis, Nebcin, TOBI, TOBI Podhaler
Renal Impairment

IM, IV (Adults): 1 mg/kg initially, further dosing determined by blood level monitoring and assessment of renal function.

NURSING IMPLICATIONS

Assessment
- Assess patient for infection (vital signs, wound appearance, sputum, urine, stool, WBC) at beginning of and throughout therapy.
- Obtain specimens for culture and sensitivity before initiating therapy. First dose may be given before receiving results.
- Evaluate eighth cranial nerve function by audiometry before and throughout therapy. Hearing loss is usually in the high-frequency range. Prompt recognition and intervention are essential in preventing permanent damage. Also monitor for vestibular dysfunction (vomiting, ataxia, nystagmus, vertigo).
- Monitor intake and output and daily weight to assess hydration status and renal function.
- Monitor patient for signs of superinfection (fever, upper respiratory infection, vaginal itching or discharge, increasing malaise, diarrhea).
- Monitor bowel function. Diarrhea, abdominal cramping, fever, and bloody stools should be reported to health care professional promptly as a sign of pseudomembranous colitis. May begin up to several weeks following cessation of therapy.

Implementation
- Keep patient well hydrated (1500–2000 mL/day) during therapy.
- IM: Deep into a well-developed muscle. Alternate injection sites.

IV Administration
- pH: 3.0–6.5
- Intermittent Infusion: Dilute each dose of tobramycin in 50–100 mL of D10W, D5W/0.9% NaCl, 0.9% NaCl. Infuse slowly over 15–30 min. Peak levels may be obtained in proportionately smaller amounts. Stable for 24 hr at room temperature, 96 hr if refrigerated. Also available in commercially mixed parenteral injections. Rate: Infuse slowly over 30–60 min in both adult and pediatric patients.
- Y-Site Compatibility: acyclovir, aldebradine, albendazole, allopurinol, amifostine, amphotericin, amoxicillin, ampicillin, amphotericin, aminoglycosides, aminophylline, amikacin, aminoglycosides, amphotericin, amoxicillin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylline, amikacin, ampicillin, aminoglycosides, aminophylli
**Patient/Family Teaching**

- Instruct patient to notify health care professional immediately if rash, diaphoresis, abdominal cramping, fever, or bloody stools occur and not to treat with antidiarrheals without consulting health care professional.

- Instruct patient in correct technique for use of TOBI Podhaler. Wipe mouthpiece with clean, dry cloth after use; do not wash with water.

- Advise female patient to notify health care professional if pregnancy is planned or suspected or if breast feeding.

**Evaluation/Desired Outcomes**

- Resolution of the signs and symptoms of infection. If no response is seen within 3–5 days, new cultures should be taken.

- Why was this drug prescribed for your patient?