**levofloxacin** (le-voe-flox-a-sin)

**Levaquin**

Classification

Therapeutic: anti-infectives

Pharmacologic: fluoroquinolones

**Pregnancy Category C**

**Indications**

PO, IV: Treatment of the following bacterial infections: Urinary tract infections, including cystitis, pyelonephritis, and prostatitis. Respiratory tract infections, including acute sinusitis, acute exacerbations of chronic bronchitis, community-acquired pneumonia, and nosocomial pneumonia. Uncomplicated and complicated skin and skin structure infections. Post-exposure treatment of inhalational anthrax. Treatment and prophylaxis of plague.

**Action**

Inhibits bacterial DNA synthesis by inhibiting DNA gyrase enzyme. Therapeutic Effects: Death of susceptible bacteria.

**Spectrum:**

Active against gram-positive pathogens, including:

- *Staphylococcus aureus*
- *Staphylococcus epidermidis*
- *Staphylococcus saprophyticus*
- *Streptococcus pyogenes*
- *Streptococcus pneumoniae*
- *Enterococcus faecalis*
- *Bacillus anthracis*.

Gram-negative spectrum notable for activity against:

- *Escherichia coli*
- *Klebsiella pneumoniae*
- *Enterobacter cloacae*
- *Proteus mirabilis*
- *Pseudomonas aeruginosa*
- *Serratia marcescens*
- *Haemophilus influenzae*
- *Moraxella catarrhalis*.

Additional spectrum includes:

- *Chlamydophila pneumoniae*
- *Legionella pneumophila*
- *Mycoplasma pneumoniae*
- *Yersinia pestis*.

**Pharmacokinetics**

**Absorption:** Well absorbed (99%) after oral administration; IV administration results in complete bioavailability.

**Distribution:** Widely distributed. High tissue and urinary levels are achieved. Appears to cross the placenta.

**Protein Binding:** 24–38%.

**Metabolism and Excretion:** 87% excreted unchanged in urine. Small amounts metabolized. **Half-life:** 8 hr.

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

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO</td>
<td>rapid</td>
<td>1–2 hr</td>
<td>24 hr</td>
</tr>
<tr>
<td>IV</td>
<td>rapid</td>
<td>end of infusion</td>
<td>24 hr</td>
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</tbody>
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**Contraindications/Precautions**

Contraindicated in: Hypersensitivity (cross-reactivity within class may exist); QTc interval prolongation; Uncorrected hypokalemia or hypomagnesemia; Concurrent use of Class IA antiarrhythmics (disopyramide, quinidine, procainamide) or Class III antiarrhythmics (amiodarone, sotalol) (risk of QTc interval prolongation and torsade de pointes); History of myasthenia gravis (may worsen symptoms including muscle weakness and breathing problems); OB: Pregnancy; Lactation: Not recommended.

Use Cautiously in: Known or suspected CNS disorder; Renal impairment (dose recommended if CCr/50 mL/min); Cirrhosis; Concurrent use of corticosteroids (risk of tendonitis/tendon rupture); Kidney, heart, or lung transplant patients (risk of tendonitis/tendon rupture); Dialysis patients (risk of adverse reactions); Geri: Risk of adverse reactions; Pedi: Children ≤18 yr (except for inhalational anthrax (post-exposure) and anthrax) (risk of articular, arthritic, tendinopathy, and joint disturbances).

**Adverse Reactions/Side Effects**

**CNS:** ELEVATED INTRACRANIAL PRESSURE (including pseudotumor cerebri), SEIZURES, agitation, anxiety, confusion, depression, dizziness, hallucinations, headache, insomnia, nightmares, paranoia, tremor.

**CV:** TORSADE DE POINTES, QTc INTERVAL PROLONGATION.

**GI:** HEPATOTOXICITY, PSEUDOMEMBRANOUS COLITIS, nausea, abdominal pain, diarrhea, vomiting.

**GU:** vaginitis.

**Derm:** STEVENS-JOHNSON SYNDROME, photosensitivity, rash.

**Endo:** hyperglycemia, hypoglycemia.

**Local:** phlebitis at IV site.

**Neuro:** peripheral neuropathy.

**MS:** arthralgia, tendinitis, tendon rupture.

**Misc:** hypersensitivity reactions including eosinophilia.

**Interactions**

**Drug-Drug:** Concurrent use of amiodarone, disopyramide, procainamide, quinidine, dofetilide, or sotalol (risk of torsade de pointes in susceptible individuals; avoid concurrent use). *Serum theophylline levels may lead to toxicities.*

**Lactation:** Discontinued.
**Route/Dosage**

PO, IV (Adults): Inhalational anthrax (post-exposure)—500 mg daily for 60 days.

PO, IV (Children <50 kg): Inhalational anthrax (post-exposure)—8 mg/kg (max: 250 mg/dose) every 12 hr for 60 days; other infections—10 mg/kg/dose every 24 hr (max: 500 mg/dose).

Renal Impairment

PO, IV (Adults): Normal renal function dosing of 750 mg/day: CCr 20–49 mL/min—750 mg q 48 hr; CCr 10–19 mL/min—750 mg initially, then 500 mg q 48 hr.

NORMAL RENAL FUNCTION DOSING OF 500 MG/DAY: CCr 20–49 mL/min—500 mg initially then 250 mg q 24 hr; CCr 10–19 mL/min—500 mg initially then 250 mg q 48 hr.

NORMAL RENAL FUNCTION DOSING OF 250 MG/DAY: CCr 20–49 mL/min—250 mg q 48 hr.

**NURSING IMPLICATIONS**

**Assessment**

- Assess for infection (oral temperature; appearance of wound, sputum, urine, and stool; WBC; urinalysis; frequency and urgency of urination; cloudy or foul-smelling urine) at beginning of and during therapy.
- Obtain specimens for culture and sensitivity before initiating therapy. First dose may be given before receiving results.
- Observe patient for signs and symptoms of anaphylaxis (rash, pruritus, laryngeal edema, wheezing). Discontinue drug and notify physician or other health care professional immediately if these problems occur. Keep epinephrine, an antihistamine, and resuscitation equipment close by in case of an anaphylactic reaction.
- 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. May cause Stevens-Johnson syndrome. Discontinue therapy if severe or if accompanied with fever, general malaise, fatigue, muscle or joint aches, blisters, oral lesions, conjunctivitis, hepatitis and/or eosinophilia.
- Avoid for signs and symptoms of peripheral neuropathy (pain, burning, tingling, numbness, and/or weakness or other alterations of sensation including light touch, pain, temperature, position sense, and vibratory sensation) periodically during therapy. Symptoms may be reversible; discontinue levofloxacin if symptoms occur.
- Lab Test Considerations: May cause ↑ serum AST, ALT, LDH, bilirubin, and alkaline phosphatase.
- May also cause ↑ or ↓ serum glucose.
- Potential Nursing Diagnoses: Risk for infection (Patient/Family Teaching)

**Implementation**

- Do not confuse levofloxacin with levetiracetam.
- PO: May be administered without regard to meals. Products or foods containing calcium, magnesium, aluminum, iron, zinc should not be ingested for 4 hr before and 2 hr after administration.

**IV Administration**

- pH: 3.5–5.5
- Intermittent Infusion: Diluent: sterile water for injection, D5W, D5/0.2%, D5/0.45%, D5/0.9%. Concentration: 5 mg/mL. Also available in premixed bottles and flexible containers with D5W, which need no further dilution. Discard unused solution. Diluted solution is stable for 72 hr at room temperature and 14 days if refrigerated. Rate: Administer by infusion over at least 60 min for 250– mg or 500– mg doses and over 90 min for 750– mg dose. Avoid rapid bolus injection to prevent hypotension.
- Y-Site Compatibility: alemtuzumab, alfentanil, amifostine, amikacin, aminocaproic acid, aminophylline, ampicillin, ampicillin/sulbactam, anidulafungin, ar-

**PO Administration**

- May be administered without regard to meals. Products or foods containing calcium, magnesium, aluminum, iron, zinc should not be ingested for 4 hr before and 2 hr after administration.
levofloxacin
galactose, aspartate, arginine, bradykinin, bleomycin, bromocriptine, brompheniramine,
aproplamine, busulfan, butorphanol, caffeine citrate, calcium gluconate, carboplatin,
carmustine, carprofen, cephalosporins, colchicine, colistin, coluracetam, colinidene, colubrini,
colestipol, colestipol, colchicine, colon, hyperbaric oxygen, hydralazine, hydrocortisone,
hydrochlorothiazide, ibuprofen, ibuprofen, indomethacin, ketorolac,
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Evaluation/Desired Outcomes

- Resolution of the signs and symptoms of bacterial infection. Time for complete resolution depends on organism and site of infection.
- Avoidance of signs and symptoms of inhalational anthrax (postexposure treatment).
- Prevention and treatment of plague.

Why was this drug prescribed for your patient?