ERYTHROMYCIN

(eh-rith-roe-**mye**-sin)

erythromycin base
~~E-Mycin~~, Erybid, Eryc, Ery-Tab, Erythro-EC, PCE

erythromycin ethylsuccinate
E.E.S, EryPed, Erythro-ES, Pediazole

erythromycin lactobionate
Erythrocin

erythromycin stearate
Erythrocin, Erythro-S

erythromycin (topical)
Akne-Mycin, Erygel, Erysol

Classification
Therapeutic: anti-infectives
Pharmacologic: macrolides

Pregnancy Category B

Indications

IV, PO: Infections caused by susceptible organisms including: Upper and lower respiratory tract infections, Otitis media (with sulfonamides), Skin and skin structure infections, Pertussis, Diphtheria, Erythrasma, Intestinal amebiasis, Pelvic inflammatory disease, Nongonococcal urethritis, Syphilis, Legionnaires' disease, Rheumatic fever. Useful when penicillin is the most appropriate drug but cannot be used because of hypersensitivity, including: Streptococcal infections, Treatment of syphilis or gonorrhea. **Topical:** Treatment of acne.

Action

Suppresses protein synthesis at the level of the 50S bacterial ribosome. **Therapeutic Effects:** Bacteriostatic action against susceptible bacteria. **Spectrum:** Active against many gram-positive cocci, including: Streptococci, Staphylococci. Gram-positive bacilli, including: *Clostridium*, *Corynebacterium*. Several gram-negative pathogens, notably: *Neisseria*, *Legionella pneumophila*. *Mycoplasma* and *Chlamydia* are also usually susceptible.

Pharmacokinetics

Absorption: Variable absorption from the duodenum after oral administration (dependent on salt form). Absorption of enteric-coated products is delayed. Minimal absorption may follow topical or ophthalmic use.
Distribution: Widely distributed. Minimal CNS penetration. Crosses placenta; enters breast milk.
Protein Binding: 70–80%.
Metabolism and Excretion: Partially metabolized by the liver, excreted mainly unchanged in the bile; small amounts excreted unchanged in the urine.
Half-life: Neonates: 2.1 hr; Adults: 1.4–2 hr.

TIME/ACTION PROFILE (blood levels)

ROUTE	ONSET	PEAK	DURATION
PO	1 hr	1–4 hr	6–12 hr
IV	rapid	end of infusion	6–12 hr

Contraindications/Precautions

Contraindicated in: Hypersensitivity; Concurrent use of pimozide, ergotamine, dihydroergotamine, procainamide, quinidine, dofetilide, amiodarone, or sotalol; Long QT syndrome; Hypokalemia; Hypomagnesemia; Heart rate <50 bpm; Known alcohol intolerance (most topicals); Tartrazine sensitivity (some products contain tartrazine—FDC yellow dye #5); Products containing benzyl alcohol should be avoided in neonates.
Use Cautiously in: Liver/renal disease; ***OB:*** May be used in pregnancy to treat chlamydial infections or syphilis; Myasthenia gravis (may worsen symptoms); ***Geri:*** ↑ risk of ototoxicity if parenteral dose >4 g/day, ↑ risk of QTc interval prolongation.

Adverse Reactions/Side Effects

CNS: seizures (rare). **EENT:** ototoxicity. **CV:** TORSADE DE POINTES, VENTRICULAR ARRHYTHMIAS, QT interval prolongation. **GI:** PSEUDOMEMBRANOUS COLITIS, nausea, vomiting, abdominal pain, cramping, diarrhea, hepatitis, infantile hypertrophic pyloric stenosis, pancreatitis (rare). **GU:** interstitial nephritis. **Derm:** rash. **Local:** phlebitis at IV site. **Misc:** allergic reactions, superinfection.

Interactions

Drug-Drug: Concurrent use with pimozide may ↑ levels and the risk for serious arrhythmias (concurrent use contraindicated); similar effects may occur with **diltiazem**, **verapamil**, **ketoconazole**, **itraconazole**, **nefazodone**, and **protease inhibitors**; avoid concurrent use. **May ↑ levels of ergotamine** and **dihydroergotamine** and risk for acute ergot toxicity; concurrent use contraindicated. **Concurrent use with amiodarone**, **dofetilide**, or **sotalol** may ↑ risk of torsades de pointe; avoide concurrent use. May ↑ **verapamil** levels and the risk for hypotension, bradycardia, and lactic acidosis. ↑ blood levels and effects of **sildenafil**, **tadalafil** and **vardenafil** ; use lower doses. Concurrent **rifabutin** or **rifampin** may ↓ effect of erythromycin and ↑ risk of adverse GI reactions. ↑ levels and risk of toxicity from **alfentanil**, **alprazolam**, **bromocriptine**, **carbamazepine**, **cyclosporine**, **cilostazol diazepam disopyramide**, **ergot alkaloids**, **felodipine**, **methylprednisolone**, **midazolam**, **quinidine**, **rifabutin**, **tacrolimus**, **triazolam**, or **vinblastine**. May ↑ levels of **lovastatin**, and **simvastatin** and ↑ the risk of myopathy/rhabdomyolysis. May ↑ serum **digoxin** levels. **Theophylline** may ↓ blood levels. May ↑ **colchicine** levels and the risk for toxicity; use lower starting and maximum dose of colchicine. May ↑ **theophylline** levels and the risk for toxicity; ↓ theophylline dose. May ↑ **warfarin** levels and the risk for bleeding.

Route/Dosage

250 mg of erythromycin base or stearate = 400 mg of erythromycin ethylsuccinate.

Most Infections

PO (Adults): *Base, stearate*— 250 mg q 6 hr, *or* 333 mg q 8 hr, *or* 500 mg q 12 hr. *Ethylsuccinate*— 400 mg q 6 hr *or* 800 mg q 12 hr.
PO (Children >1 mo): *Base and ethylsuccinate*— 30–50 mg/kg/day divided q 6–8 hr (maximum 2 g/day as base or 3.2 g/day as ethylsuccinate). *Stearate*— 30–50 mg/kg/day divided q 6 hr (maximum 2 g/day).
PO (Neonates): *Ethylsuccinate*— 20–50 mg/kg/day divided q 6–12 hr.
IV (Adults): 250–500 mg (up to 1 g) q 6 hr.
IV (Children > 1 mo): 15–50 mg/kg/day divided q 6 hr, maximum 4 g/day.

Acne

Topical (Adults and Children >12 yr): 2% ointment, gel, solution, or pledgets twice daily.

NURSING IMPLICATIONS

Assessment

- Assess for infection (vital signs; appearance of wound, sputum, urine, and stool; WBC) at beginning of and during therapy.
- Obtain specimens for culture and sensitivity before initiating therapy. First dose may be given before receiving results.
- **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.**
- ***Lab Test Considerations:*** Monitor liver function tests periodically on patients receiving high-dose, long-term therapy.
- May cause ↑ serum bilirubin, AST, ALT, and alkaline phosphatase concentrations.
- May cause false ↑ of urinary catecholamines.

Potential Nursing Diagnoses

Risk for infection (Indications) (Side Effects)
Noncompliance (Patient/Family Teaching)

Implementation

- **PO:** Administer around the clock. *Erythromycin film-coated tablets (base and stearate)* are absorbed better on an empty stomach, at least 1 hr before or 2 hr after meals; may be taken with food if GI irritation occurs. *Enteric-coated erythromycin (base)* may be taken without regard to meals. *Erythromycin ethylsuccinate* is best absorbed when taken with meals. Take each dose with a full glass of water.
- Use calibrated measuring device for liquid preparations. Shake well before using.
- Chewable tablets should be crushed or chewed and not swallowed whole.
- Do not crush or chew delayed-release capsules or tablets; swallow whole. *Erythromycin base delayed-release capsules* may be opened and sprinkled on applesauce, jelly, or ice cream immediately before ingestion. Entire contents of the capsule should be taken.

IV Administration

- **IV:** Add 10 mL of sterile water for injection without preservatives to 250- or 500-mg vials and 20 mL to 1-g vial. Solution is stable for 7 days after reconstitution if refrigerated.

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ERYTHROMYCIN

- **Intermittent Infusion:** ***Diluent:*** Dilute in 0.9% NaCl or D5W. ***Concentration:*** 1–5 mg/mL. ***Rate:*** Administer slowly over 20–60 min to avoid phlebitis. Assess for pain along vein; slow rate if pain occurs; apply ice and notify health care professional if unable to relieve pain.
- **Continuous Infusion:** May also be administered as an infusion over 4 hr. ***Diluent:*** 0.9% NaCl, D5W, or LR. ***Concentration:*** 1 g/L.

Erythromycin Lactobionate

- **Y-Site Compatibility:** acyclovir, alemtuzumab, alfentanil, amikacin, aminocaproic acid, aminophylline, amiodarone, anidulafungin, atracurium, atropine, azathioprine, benztropine, bivalirudin, bleomycin, bumetanide, buprenorphine, butorphanol, calcium chloride, calcium gluconate, carboplatin, carmustine, caspofungin, cefotaxime, ceftriaxone, cefuroxime, chlorpromazine, cisplatin, cyanocobalamin, cyclophosphamide, cyclosporine, cytarabine, dactinomycin, daptomycin, dexmedetomidine, dexrazoxane, digoxin, diltiazem, diphenhydramine, dobutamine, docetaxel, dopamine, doxacurium, doxapram, doxorubicin, doxorubicin liposomal, enalaprilat, ephedrine, epinephrine, epirubicin, epoetin alfa, eptifibatide, ertapenem, esmolol, etoposide, etoposide phosphate, famotidine, fenoldopam, fentanyl, fluconazole, fludarabine, fluorouracil, folic acid, foscarnet, gemcitabine, gentamicin, glycopyrrolate, granisetron, hetastarch, hydrocortisone, hydromorphone, idarubicin, ifosfamide, imipenem/cilastatin, insulin, irinotecan, isoproterenol, labetalol, leucovorin, levofloxacin, lidocaine, lorazepam, mannitol, mechlorethamine, meperidine, methotrexate, methyldopate, methylprednisolone, metoclopramide, metoprolol, metronidazole, midazolam, milrinone, mitoxantrone, morphine, multivitamins, mycophenolate, nafcillin, nalbuphine, naloxone, nesiritide, nicardipine, nitroglycerin, norepinephrine, octreotide, ondansetron, oxacillin, oxaliplatin, oxytocin, paclitaxel, palonosetron, pamidronate, pancuronium, papaverine, pentamidine, pentazocine, perphenazine, phentolamine, phenylephrine, phytonadione, piperacillin/tazobactam, potassium acetate, procainamide, prochlorperazine, promethazine, propranolol, protamine, pyridoxine, ranitidine, sodium acetate, sodium bicarbonate, streptokinase, succinylcholine, sufentanil, tacrolimus, teniposide, theophylline, thiamine, thiotepa, tigecycline, tirofiban, tobramycin, tolazoline, vancomycin, vasopressin, vecuronium, verapamil, vinblastine, vincristine, vinorelbine, vitamin B complex with C, voriconazole, zidovudine, zoledronic acid.
- **Y-Site Incompatibility:** amphotericin B colloidal, amphotericin B lipid complex, amphotericin B liposome, ascorbic acid, aztreonam, cefazolin, cefepime, cefotetan, cefoxitin, chloramphenicol, dantrolene, dexamethasone, diazepam, diazoxide, doxycycline, furosemide, ganciclovir, indomethacin, ketorolac, metaraminol, nitroprusside, pemetrexed, penicillin G, pentobarbital, phenobarbital, phenytoin, ticarcillin/clavulanate, trimethoprim/sulfamethoxazole.
- **Topical:** Cleanse area before application. Wear gloves during application.

Patient/Family Teaching

- Instruct patient to take medication around the clock and to finish the drug completely as directed, even if feeling better. Take missed doses as soon as remembered, with remaining doses evenly spaced throughout day. Advise patient that sharing of this medication may be dangerous.
- May cause nausea, vomiting, diarrhea, or stomach cramps; notify health care professional if these effects persist or if severe abdominal pain, yellow discoloration of the skin or eyes, darkened urine, pale stools, or unusual tiredness develops. May cause infantile hypertrophic pyloric stenosis in infants; notify health care professional if vomiting and irritability occur.
- **Caution patient to notify health care professional if fever and diarrhea occur, especially if stool contains blood, pus, or mucus. Advise patient not to treat diarrhea without consulting health care professional. May occur up to several weeks after discontinuation of medication.**
- Advise patient to report signs of superinfection (black, furry overgrowth on the tongue; vaginal itching or discharge; loose or foul-smelling stools).
- Instruct patient to notify health care professional if symptoms do not improve.

Evaluation/Desired Outcomes

- Resolution of the signs and symptoms of infection. Length of time for complete resolution depends on the organism and site of infection.
- Improvement of acne lesions.

Why was this drug prescribed for your patient?