ampicillin (amp-i-sil-in)

Classification
Therapeutic: anti-infectives
Pharmacologic: aminopenicillins

Pregnancy Category B

Indications

Action
Binds to bacterial cell wall, resulting in cell death. Therapeutic Effects: Bactericidal action; spectrum is broader than penicillin.

Spectrum:
Active against: Strep- tococci, nonpenicillinase-producing staphylococci, Salmonella, Pneumococcus, Enterococcus, Hemophilus influenzae, Escherichia coli, Enterobacter, Hafnia, Proteus mirabilis, Neisseria meningitidis, Staphylococcus, Streptococcus, E. coli, Klebsiella, Proteus mirabilis, Neisseria meningitidis, A. aerogenes, Bacteroides, Salmonella.

Pharmacokinetics
Absorption: Moderately absorbed from the duodenum (30–50%).
Distribution: Diffuses readily into body tissues and fluids. CSF penetration is poor in the presence of inflamed meninges. Crosses the placenta; enters breast milk in small amounts.
Metabolism and Excretion: Variably metabolized by the liver (12–50%). Renal excretion is variable (25–60% after oral dosing; 50–85% after IM administration).
Half-life: Neonates: 1.7–4 hr; Children and Adults: 1–1.5 hr (in renal impairment).

TIME/ACTION PROFILE (blood levels)

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
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</thead>
<tbody>
<tr>
<td>PO</td>
<td>0</td>
<td>1–2</td>
<td>4–6 hr</td>
</tr>
<tr>
<td>IM</td>
<td>rapid</td>
<td>1 hr</td>
<td>4–6 hr</td>
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Contraindications/Precautions
Contraindicated in: Hypersensitivity to penicillins. Use Cautionally in: Severe renal insufficiency (risk of toxicity, decreased efficacy, should be required if Clr < 30 ml/min); infections caused by enterococci, true staphylococci, or pseudomonas. Pregnancy: May be used during pregnancy. Lactation: Distributed into breast milk. Can cause rash, diarrhea, and amenorrhea in the infant.

Adverse Reactions/Side Effects

Interactions
Drug-Drug: Probenecid (renal excretion and blood levels of ampicillin—therapy may be combined for this purpose. Large doses may increase the risk of bleeding with warfarin. Risk of with concurrent allopurinol therapy. May decrease the effectiveness of oral hormonal contraceptives.

Route/Dosage
Respiratory and Soft-Tissue Infections
PO (Adults and Children ≥20 kg): 250–500 mg q 6 hr.
PO (Children ≤20 kg): 5–10 mg/kg/day in divided doses q 6–8 hr (not to exceed 2–3 g/day).
IM, IV (Adults and Children ≥40 kg): 500 mg to 3 g q 6 hr (not to exceed 14 g/day).
IM, IV (Children <40 kg): 100–200 mg/kg/day in divided doses q 6–8 hr (not to exceed 12 g/day).
Bacterial Meningitis Caused by H. influenzae, Streptococcus pneumoniae, Group B streptococcus or Staphylococcus: IM, IV (Adults): 500 mg to 1 g q 6 hr (not to exceed 14 g/day).
IM, IV (Children ≥3 mos): 10–20 mg/kg/day in divided doses q 6–8 hr (not to exceed 12 g/day).
IM, IV (Neonates ≥7 days): 200 mg/kg/day divided q 6 hr.
IM, IV (Neonates <7 days): 500 mg/kg/day divided q 6 hr.
GI/GU Infections Other Than N. gonorrhoeae

PO (Adults and Children >20 kg): 250–500 mg q 6 hr (larger doses for more severe infections).

PO (Children ≤20 kg): 50–100 mg/kg/day in divided doses q 6 hr.

Injection

IM (Adults): 500 mg/kg q 8 hr

IM (Children ≤60 kg): 300–500 mg/kg/day in divided doses q 6–8 hr.

Urethritis Caused by N. gonorrhoeae

IM, IV (Adults and Children ≤40 kg): 500 mg, repeated 8–12 hr later; additional doses may be necessary for more complicated infections (prostatitis, epididymitis).

Prevention of Bacterial Endocarditis

IM, IV (Adults and Children ≤40 kg): 500 mg, repeated 8–12 hr later; additional doses may be necessary for more complicated infections (prostatitis, epididymitis).

PO (Adults): 3 g with 1 g probenecid.

Injection

IM, IV (Adults and Children ≤40 kg): 500 mg q 6 hr.

IM, IV (Children ≤40 kg): 100–200 mg/kg/day in divided doses q 6–8 hr.

Renal Impairment

(Adults and Children): CCr ≤10 mL/min—q dosing interval to q 12 hr.

NURSING IMPLICATIONS

Assessment

● Assess patient for infection (rash, diarrhea, abdominal pain, fever, heparin, yellow urine, and WBC) at beginning of and throughout therapy.

● Obtain specimens for culture and sensitivity before 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 immediately if these occur. Keep epinephrine, an antiemetic, and resuscitation equipment close by in the event of an anaphylactic reaction.

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Potential Nursing Diagnoses

Risk for infection (Indications) (Side Effects)

Noncompliance (Patient/Family Teaching)

Implementation

● Reserve IM or IV route for moderately severe or severe infections or patients unable to take oral medication. Change to PO as soon as possible.

● PO: Administer around the clock on an empty stomach at least 1 hr before or 2 hr after meals with a full glass of water. Capsules may be opened and mixed with water. Solution is stable up to 14 days if refrigerated. Combination with probenecid should be used immediately after reconstitution.

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**Y-Site Compatibility:**
- acyclovir, alemtuzumab, alprostadil, amifostine, anidulafungin, argatroban, bivalirudin, bleomycin, carboplatin, carmustine, cisplatin, cyclophosphamide, daunorubicin, doxorubicin, docetaxel, dexamethasone, dexrazoxane, doxapram, doxorubicin liposome, eptifibatide, etoposide, etoposide phosphate, filgrastim, fludarabine, fluorouracil, foscarnet, gemcitabine, granisetron, heparin, hydrocortisone, hydroxyzine, idarubicin, idarubicin hydrochloride, ifosfamide, imipenem, irinotecan, levofloxacin, linezolid, mechlorethamine, melphalan, mesna, mitoxantrone, mycophenolate, nafcillin, neloxetin, norepinephrine, ondansetron, pantoprazole, pemetrexed, perphenazine, potassium acetate, propofol, remifentanil, rituximab, rocuronium, sodium bicarbonate, tannic acid, teicoplanin, thiotepa, tigecycline, tirofiban, trastuzumab, vecuronium, vincristine, vitamin B complex with C, voriconazole, zoledronic acid.

**Y-Site Incompatibility:**
- aminoglycosides and penicillins must be administered concurrently, administer in separate sites at least 1 hr apart; amphotericin B, amphotericin B colloidal, amphotericin B lipid complex, aminophylline, amphotericin B colloidal, amphotericin B lipid complex, anidulafungin, argatroban, bivalirudin, bleomycin, carboplatin, carmustine, cisplatin, cyclophosphamide, daunorubicin, doxorubicin, docetaxel, dexamethasone, dexrazoxane, doxapram, doxorubicin liposome, eptifibatide, etoposide, etoposide phosphate, filgrastim, fludarabine, fluorouracil, foscarnet, gemcitabine, granisetron, heparin, hydrocortisone, hydroxyzine, idarubicin, idarubicin hydrochloride, ifosfamide, imipenem, irinotecan, levofloxacin, linezolid, meclorethamine, melphalan, mesna, mitoxantrone, mycophenolate, nafcillin, neloxetin, norepinephrine, ondansetron, pantoprazole, pemetrexed, perphenazine, potassium acetate, propofol, remifentanil, rituximab, rocuronium, sodium acetate, sodium bicarbonate, tannic acid, teicoplanin, thiotepa, tigecycline, tirofiban, trastuzumab, vecuronium, vincristine, vitamin B complex with C, voriconazole, zoledronic acid.

**Patient/Family Teaching**
- Instruct patient to take medication around the clock and to finish the drug completely as directed, even if feeling better. Advise patients that sharing of this medication can be dangerous.
- Advise patient to report the signs of superinfection (furry overgrowth on the tongue, vaginal itching or discharge, loose or foul-smelling stools) and allergy.
- Caution patient to notify health care professional if fever and diarrhea occur, especially if stools contain 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 notify health care professional if one of the following occurs: rash, difficulty breathing, swelling of the ankles or feet, severe or unusual bleeding, bleeding gums, black or tarry stools, black vomit, unusual bruising or bleeding, weakness, muscle aches, chills, fevers, unusual fatigue, jaundice, dark urine, yellow skin.
- Advise patients taking oral contraceptives to use an alternate or additional non-hormonal method of contraception while taking ampicillin and until next menstrual period.
- Advise female patients to notify health care professional if breast feeding.

**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.
- Endocarditis prophylaxis.