1

**penicillin G** (pen-i-sill-in-gee)

Pfizerpen

**procaine penicillin G** (proe-kane pen-i-sill-in-gee)

Bicillin, P-Cillin

**benzathine penicillin G** (benz-a-theen pen-i-sill-in-gee)

Bicillin-L-A, Megacillin, Permapen

**Classification**

Therapeutic: anti-infectives

Pharmacologic: penicillins

**Pregnancy Category B**

**Indications**

Treatment of a wide variety of infections including: Pneumococcal pneumonia, Strep-
toccoccal pharyngitis, Syphilis, Gonorrhea strains. Treatment of enterococcal infec-
tions (requires the addition of an aminoglycoside). Prevention of rheumatic fever.

**Unlabeled Use:** Treatment of Lyme disease, prevention of recurrent
*Streptococcal pneumoniae* septicemia in
children with sickle-cell disease.

**Action**

Bind to bacterial cell wall, resulting in cell death. 

**Therapeutic Effects:** Bacteri-
cidal action against susceptible bacteria.

**Spectrum:** Active against: Most gram-pos-
itive organisms, including many streptococci (*Streptococcus pneumoniae*, group A
beta-hemolytic streptococci), staphylococci (non– penicillinase-producing strains)
and *Bacillus anthracis*, Some gram-negative organisms, such as *Neisseria menin-
gitidis* and *N. gonorrhoeae* (only penicillin susceptible strains), Some anaerobic
bacteria and spirochetes including *Borellia burgdorferi*.

**Pharmacokinetics**

Absorption: Variably absorbed from the GI tract. Procaine and benzathine peni-
cillin G—IM absorption is delayed and prolonged and results in sustained thera-
peutic blood levels.

**Distribution:** Widely distributed, although CNS penetration is poor in the presence of
normal (uninflamed) meninges. Crosses the placenta and enters breast milk.

**Half-Life:** 30–60 min.

**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>Penicillin G IM</td>
<td>rapid</td>
<td>0.25–0.5 hr</td>
<td>4–6 hr</td>
</tr>
<tr>
<td>Benzathine penicillin G IM</td>
<td>delayed</td>
<td>12–24 hr</td>
<td>1 wk</td>
</tr>
<tr>
<td>Procaine penicillin G IM</td>
<td>delayed</td>
<td>1–4 hr</td>
<td>12 hr</td>
</tr>
</tbody>
</table>

**Contraindications/Precautions**

Contraindicated in: Previous hypersensitivity to penicillins (cross-sensitivity ex-
sts with cephalosporins and other beta-lactam antibiotics); Hypersensitivity to pro-
caine or benzathine (procaine and benzathine preparations only); Some products
may contain tartrazine and should be avoided in patients with known hypersensitivity.

Use Cautiously in: Severe renal insufficiency (dosage reduction recommended); OB:
Although safety not established, has been used safely; Lactation: Safety not es-
tablished; Geri: Consider decreased body mass, age-related decrease in renal/he-
patic/cardiac function, intercurrent diseases and drug therapy.

**Adverse Reactions/Side Effects**

CNS: SEIZURES.

GI: diarrhea, epigastric distress, nausea, vomiting, pseudomem-
branous colitis.

GU: interstitial nephritis.

Derm: rash, urticaria.

Hemat: eosino-

philia, leukopenia.

Local: pain at IM site, phlebitis at IV site.

Misc: allergic reac-
tions including ANAPHYLAXIS and SERUM SICKNESS, superinfection.

**Interactions**

Drug-Drug: Penicillin may | effectiveness of oral contraceptive agents. Probenc-
icidal, | renal excretion and | 2 Blood levels of penicillin (therapy may be continued for
| this purpose). Neomycin may | absorption of penicillin. Concomitant use with meth-
| methotrexate | methotrexate elimination and | risk of serious toxicity.

**Gestation Implication. CAPI TALS indicate l ife-threatening, u nderlines indicate most frequent. Strikethrough**
Route/Dosage

Aqueous Penicillin G

IM, IV (Adults): Most infections—1–5 million units q 4–6 hr.

IM, IV (Children):<8333–16,667 units/kg q 4 hr; 12,550–25,000 units/kg q 6 hr; up to 50,000 units/kg/day in divided doses; some infections may require up to 75,000 units/kg/day.

IM (Infants <27 days): 30,000 units/kg/day in divided doses q 12 hr; (should not exceed 1.2 million units/day).

IV (Infants <27 days): 75,000 units/kg/day in divided doses every 8 hr; meningitis—200,000–300,000 units/kg/day in divided doses q 6 hr.

Benzathine Penicillin G

IM (Adults): Streptococcal infections/erysipelas—1.2 million units single dose.

Primary, secondary, and early latent syphilis—2.4 million units single dose.

Tertiary and late latent syphilis (not neurosyphilis)—2.4 million units once weekly for 3 wk.

Prevention of rheumatic fever—1.2 million units q 3–4 wk.

IM (Children <27 kg): Streptococcal infections/erysipelas—900,000–1.2 million units (single dose).

Primary, secondary, and early latent syphilis—up to 2.4 million units single dose. Late latent or latent syphilis of indeterminate duration—50,000 units/kg weekly for 3 wk. Prevention of rheumatic fever—1.2 million units q 3–4 wk.

IM (Children ≥27 kg): Streptococcal infections/erysipelas—300,000–600,000 units single dose. Early latent or latent syphilis of indeterminate duration—50,000 units/kg weekly for 3 wk. Prevention of rheumatic fever—1.2 million units q 3–4 wk.

Procaine Penicillin G

IM (Adults): Moderate or severe infections—600,000–1,200,000 units/day, single dose or 2 divided doses.

Neurosyphilis—2.4 million units/day with 500 mg probenecid PO 4 times daily for 10–14 days.

IM (Children): Congenital syphilis—50,000 units/kg/day for 10–14 days.

NURSING IMPLICATIONS

Assessment

* Assess for infection (site, age, appearance of wound, sputum, urine, and stool; WBCs) at beginning of and during therapy.
Penicillin G Potassium

Y-Site Compatibility: acyclovir, amiodarone, cyclophosphamide, dilantin, enalaprilat, furosemide, heparin, hydromorphone, labetalol, magnesium sulfate, meperidine, morphine, nicardipine, perphenazine, potassium chloride, tacrolimus, theophylline, verapamil, vitamin B complex with C.

Y-Site Incompatibility: Incompatible with aminoglycosides; do not admix.

Penicillin G Sodium

Y-Site Incompatibility: Incompatible with aminoglycosides; do not admix.

Additive Incompatibility: Incompatible with aminoglycosides; do not admix.

Patient/Family Teaching

- Instruct patient to take medication around the clock and to finish drug completely as directed, even if feeling better. Advise patient that sharing this medication may be dangerous.
- Advise patient to report signs of superinfection (black, furry overgrowth on tongue; vaginal itching or discharge; loose or foul-smelling stools) and allergy.
- 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.

Evaluation/Desired Outcomes

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

Why was this drug prescribed for your patient?