aminophylline  (am-in-off-ih-lin)

- Use:Bronchodilator
Pharmacologic: xanthines

Contraindications/Precautions
Contraindicated in: Hypersensitivity to aminophylline or theophylline.

Use Cautiously in: Cardiac arrhythmias; Heart failure, liver disease, or hyperthyroidism (dose, required); Peptic ulcer disease; Seizure disorder; OB: Lactation: Discontinue.

Adverse Reactions/Side Effects
CN: nausea, vomiting, anorexia, vomiting, paresthesia.
Other: GI: nausea, vomiting, anorexia, vomiting, Nephrolithiasis.

Interactions
Drug-Drug: Additives (IV and CS) side effects w/ adrenergics (sympathomimetics).
Alcohol: Decreases therapeutic effects of lithium and phenytoin. NSAIDs, barbiturates, carbamazepine, phenytoin, estrogens and rifampin may increase theophylline metabolism and may reduce therapeutic effect. Cimetidine, erythromycin, calcium channel blockers, clonidine, estrogens, hormonal contraceptives, metoclopramide, cimetidine, estrogen, xamoterol, nonsteroidal anti-inflammatory drugs, quinidine, some fluoroquinolones, and large doses of disulfiram may lead to toxicity.
Drug-Natural Products: St. John's wort may reduce the therapeutic effect of aminophylline.

Route/Dosage
Dose should be determined by theophylline serum level monitoring. Loading dose should be decreased or eliminated if theophylline preparation has been used in preceding 24 hr. Aminophylline is 80% theophylline (100 mg aminophylline = 80 mg theophylline).

IV (Adults): Loading dose—6 mg/kg (4.7 mg/kg of theophylline) given over 20–30 min, followed by 0.5 mg/kg/hr (0.36 mg/kg/hr of theophylline) via continuous infusion (non-smokers, adults), an infusion rate of 0.6 mg/kg/hr (0.42 mg/kg/hr of theophylline) should be used for adults who smoke.

IV (Geriatric Patients and Adult Patients with Cor Pulmonale): Loading dose—4 mg/kg (3.04 mg/kg of theophylline) given over 20–30 min, followed by 0.5 mg/kg/hr (0.36 mg/kg/hr of theophylline) via continuous infusion.

Pharmacokinetics
Absorption: Aminophylline is converted to theophylline after administration. Distribution: Widely distributed as theophylline; crosses the placenta; breast milk concentrations are 70% of plasma levels; not distributed into adipose tissue.
Metabolism and Excretion: Aminophylline is converted to theophylline; theophylline is metabolized by the liver (90%) to caffeine, which may accumulate in neonates, premature infants, and patients with liver disease. Metabolites are renally excreted; 10% excreted unchanged by the kidneys.

Half-life: Theophylline—Premature infants: 20–30 hr; Term infants: 11–25 hr; Adults: 9–10 hr (range 6–20 hr in patients 60 yr, patients with HF or liver disease; 4–8 hr in patients receiving 24 hr. Aminophylline is 80% theophylline (100 mg aminophylline = 80 mg theophylline).

TIME/ACTION PROFILE (bronchodilation)

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- Use: Bronchodilator
Pharmacologic: xanthines

Indications
Long-term control of reversible airway obstruction caused by asthma or COPD. Inhibits phosphodiesterase, producing increased tissue concentrations of cyclic adenosine monophosphate (cAMP). Increased levels of cAMP result in: Bronchodilation, CNS stimulation, Positive inotropic and chronotropic effects, Diuresis, Gastric acid secretion. Aminophylline is a salt of theophylline and releases free theophylline after administration. Pharmacokinetics
Absorption: Aminophylline releases theophylline after administration. Distribution: Widely distributed as theophylline; crosses the placenta; breast milk concentrations are 70% of plasma levels; not distributed into adipose tissue.

Pregnancy Category C

Pharmacology:
Bronchodilation.

Unlabeled Use:
Respiratory and myocardial stimulant in premature infant apnea (apnea of prematurity).

Contraindications/Precautions
Contraindicated in: Hypersensitivity to aminophylline or theophylline.

Use Cautiously in: Cardiac arrhythmias; Heart failure, liver disease, or hyperthyroidism (dose, required); Peptic ulcer disease; Seizure disorder; OB: Lactation: Discontinue.

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CN: nausea, vomiting, anorexia, vomiting, paresthesia.
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Drug-Drug: Additives (IV and CS) side effects w/ adrenergics (sympathomimetics).
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Half-life: Theophylline—Premature infants: 20–30 hr; Term infants: 11–25 hr; Adults: 9–10 hr (range 6–20 hr in patients 60 yr, patients with HF or liver disease; 4–8 hr in patients receiving 24 hr. Aminophylline is 80% theophylline (100 mg aminophylline = 80 mg theophylline).

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**V (Adults with HF or Liver Failure):** Loading dose—6 mg/kg (4.7 mg/kg/hr of theophylline) given over 20–30 min, followed by 0.5 mg/kg/hr (0.39 mg/kg/hr of theophylline) via continuous infusion.

**V (Children 12–16 yr):** Loading dose—6 mg/kg (4.7 mg/kg of theophylline) given over 20–30 min, followed by 1–1.2 mg/kg/hr (0.8–0.96 mg/kg/hr of theophylline) via continuous infusion.

**V (Children 9–12 yr):** Loading dose—6 mg/kg (4.7 mg/kg of theophylline) given over 20–30 min, followed by 0.9 mg/kg/hr (0.72 mg/kg/hr of theophylline) via continuous infusion.

**V (Children 6–11 yr):** Loading dose—6 mg/kg (4.7 mg/kg of theophylline) given over 20–30 min, followed by 0.6–0.7 mg/kg/hr (0.48–0.56 mg/kg/hr of theophylline) via continuous infusion.

**V (Children 3–5 yr):** Loading dose—6 mg/kg (4.7 mg/kg of theophylline) given over 20–30 min, followed by 0.5 mg/kg/hr (0.4 mg/kg/hr of theophylline) via continuous infusion.

**V (Children 1–2 yr):** Loading dose—6 mg/kg (4.7 mg/kg of theophylline) given over 20–30 min, followed by 0.4 mg/kg/hr (0.32 mg/kg/hr of theophylline) via continuous infusion.

**V (Children 6 mo–1 yr):** Loading dose—6 mg/kg (4.7 mg/kg of theophylline) given over 20–30 min, followed by 0.3 mg/kg/hr (0.24 mg/kg/hr of theophylline) via continuous infusion.

**V (Children 6 wk–6 mo):** Loading dose—6 mg/kg (4.7 mg/kg of theophylline) given over 20–30 min, followed by 0.25 mg/kg/hr (0.2 mg/kg/hr of theophylline) via continuous infusion.
CONTINUED

aminophylline

- **Rate:** See Route and Dosage section for rates.
- **Y-Site Compatibility:** acetaminophen, alcohol, allopurinol, amifostine, amikacin, amphotericin B lipid complex, amphotericin B liposome, anidulafungin, argatroban, atropine, aztreonam, benzodiazepines, bleomycin, bumetanide, busulfan, calcium chloride, calcium gluconate, carboplatin, carmustine, cefazolin, cefepime, cefoperazone, ceftazidime, ceftriaxone, cefuroxime, chloramphenicol, clindamycin, clomiphene, cytarabine, cytosine arabinoside, daunorubicin, desferrioxamine, dexamethasone, dicyclomine, digoxin, dobutamine, dopamine, doxorubicin, drotaverine, drotaverine fumarate, dexamethasone, fentanyl, filgrastim, fludarabine, fluorouracil, folic acid, foscarnet, furosemide, gemcitabine, gentamicin, ganciclovir, granisetron, heparin, hetastarch, hydrocortisone, hydromorphone, ifosfamide, indomethacin, insulin, irinotecan, ketorolac, labetalol, leucovorin, levodopa, levothyroxine, lincomycin, lorazepam, magnesium sulfate, midazolam, minocycline, mycophenolate, noradrenaline, ondansetron, papaverine, penicillin G, pentamidine, pentazocine, phenytoin, prilocaine, promethazine, quinupristin/dalfopristin, ranitidine, ranolazine, rauwolfia, recombinant human growth hormone, remifentanil, rituximab, rocuronium, sargramostim, sodium acetate, sodium bicarbonate, streptokinase, teniposide, theophylline, thiotepa, ticarcillin/clavulanate, tigecycline, tirofiban, tobramycin, tolazoline, trastuzumab, trimetaphan, vasopressin, vecuronium, vincristine, vitamin B complex, vitamin K1, verapamil, voriconazole, zolendronic acid.
- **Y-Site Incompatibility:** acetaminophen, alcohol, allopurinol, amifostine, amikacin, amphotericin B lipid complex, amphotericin B liposome, anidulafungin, argatroban, atropine, aztreonam, benzodiazepines, bleomycin, bumetanide, busulfan, calcium chloride, calcium gluconate, carboplatin, carmustine, cefazolin, cefepime, cefoperazone, ceftazidime, ceftriaxone, cefuroxime, chloramphenicol, clindamycin, clomiphene, cytarabine, cytosine arabinoside, daunorubicin, desferrioxamine, dexamethasone, dicyclomine, digoxin, dobutamine, dopamine, doxorubicin, drotaverine, drotaverine fumarate, dexamethasone, fentanyl, filgrastim, fludarabine, fluorouracil, folic acid, foscarnet, furosemide, gemcitabine, gentamicin, ganciclovir, granisetron, heparin, hetastarch, hydrocortisone, hydromorphone, ifosfamide, indomethacin, insulin, irinotecan, ketorolac, labetalol, leucovorin, levodopa, levothyroxine, lincomycin, lorazepam, magnesium sulfate, midazolam, minocycline, mycophenolate, noradrenaline, ondansetron, papaverine, penicillin G, pentamidine, pentazocine, phenytoin, prilocaine, promethazine, quinupristin/dalfopristin, ranitidine, ranolazine, rauwolfia, recombinant human growth hormone, remifentanil, rituximab, rocuronium, sargramostim, sodium acetate, sodium bicarbonate, streptokinase, teniposide, theophylline, thiotepa, ticarcillin/clavulanate, tigecycline, tirofiban, tobramycin, tolazoline, trastuzumab, trimetaphan, vasopressin, vecuronium, vincristine, vitamin B complex, vitamin K1, verapamil, voriconazole, zolendronic acid.
- **Additive Incompatibility:** admixing is not recommended because of dose titration and incompatibilities.

**Patient/Family Teaching**
- Encourage the patient to drink adequate liquids (2000 mL/day minimum) to decrease the viscosity of the airway secretions.
- Advise the patient to avoid OTC cough, cold, or breathing preparations without consulting health care professional. These medications may increase side effects and cause arrhythmias.
- Advise the patient not to smoke. A change in smoking habits may necessitate a change in dose.
- Advise the patient to minimize intake of sodium-containing foods or beverages (soda, coffee, chocolate) and local or oral decongestants and decongestants.

**Evaluation/Desired Outcomes**
- Increased ease in breathing.
- Clearing of lung fields on auscultation.
- Respiratory and myocardial stimulation in apnea of infancy.

Why was this drug prescribed for your patient?