Ephedrine sulfate
(eh-FED-rin)

CLASSIFICATION(S):
Sympathomimetic, direct- and indi-
rect-acting

PREGNANCY CATEGORY: C
OTC: Capsules: Ephedrine Sulfate.
Rx: Injection: Ephedrine Sulfate.

SEE ALSO SYMPATHOMIMETIC
DRUGS, CHAPTER 2.

USES
PO: Temporary relief of shortness of
breath, tightness of chest, and wheez-
ing due to bronchial asthma or bronchospasm.

Parenteral: (1) Allergic disorders, in-
cluding bronchial asthma. (2) Pressor
agent, especially during spinal anesthe-
sia when hypotension occurs frequent-
ly. (3) Stokes-Adams syndrome with
complete heart block. (4) Myasthenia
gravis. (5) CNS stimulant in narcolepsy.

Investigational: Depression (to en-
hance physical and mental energy).

ACTION/KINETICS
Action
Releases norepinephrine from synaptic
storage sites. Has direct effects on al-
pha, beta-1, and beta-2 receptors, caus-
ing increased BP due to arteriolar con-
striction and cardiac stimulation, bron-
chodilation, relaxation of GI tract smooth
muscle, nasal decongestion, mydriasis, and
increased tone of the bladder trigone and vesicle sphincter. It
may also increase skeletal muscle
strength, especially in myasthenia
clients. Significant CNS effects include
stimulation of the cerebral cortex and subcortical centers. Hepatic glycogeno-
lysis is increased, but not as much as
with epinephrine. More stable and
longer-lasting than epinephrine.

Pharmacokinetics
Rapidly and completely absorbed fol-
lowing parenteral use. Onset, IM:
10–20 min; PO: 15–60 min; SC: >20
min. Duration, IM, SC: 30–60 min; PO:
3–5 hr. t1/2, elimination: About 3 hr
when urine is at a pH of 5 and about 6
hr when urinary pH is 6.3. Excreted
mostly unchanged through the urine
(rate dependent on urinary pH in-
creased in acid urine).

ADDITIONAL CONTRAINDICATIONS
Angle closure glaucoma, anesthesia
with cyclopropane or halothane, thyro-
toxicosis, diabetes, obstetrics where
maternal BP is greater than 130/80.
Lactation.

SPECIAL CONCERNS
• Geriatric clients may be at higher risk
to develop prostatic hypertrophy.
• May cause hypertension resulting in
intracranial hemorrhage or anginal
pain in clients with coronary insuffi-
ciency or ischemic heart disease.
• Use with special caution in those
with heart disease, angina pectoris,
diabetes, hyperthyroidism, prostatic
hypertrophy, hypertension, and in
those taking digitalis.
• Use with MAO inhibitors is absolutely
contraindicated due to the possibili-
ty of hypertensive crisis.

SIDE EFFECTS
Most Common
Palpitations, tachycardia, PVCs, diz-
izziness/vertigo, nervousness, headache,
insomnia, N&V, sweating, anorexia.

See Sympathomimetics, Chapter 2, for a
complete list of possible side effects.

CNS: Nervousness, shakiness, confusion,
delirium, insomnia, vertigo, headache,
hallucinations. Anxiety and nervousness
following prolonged use. GI: N&V, an-
orexia. CV: PreCORDIAL PAIN, tachycardia,
palpitations, cardiac arrhythmias, exces-
sive doses may cause hypertension
sufficient to result in cerebral hemor-
rhage. GU: Difficult and painful urina-
tion, urinary retention in males with
prostatism, decrease in urine formation.

Miscellaneous: Pallor, sweating, respi-
atory difficulty, hypersensitivity reac-
tions. Abuse: Prolonged abuse can
cause an anxiety state, including symp-
toms of paranoid schizophrenia, tachy-
cardia, poor nutrition and hygiene, di-
lated pupils, cold sweat, and fever.

ADDITIONAL DRUG INTERACTIONS
Alpha-adrenergic blockers / Antagonism
of vasoconstricting and hypertensive ef-
fects of ephedrine
Dexmethylasone / ↓ Dexamethasone
effect
Digitalis / Possible cardiac arrhythmias
R/T sensitization of the myocardium
**Diuretics** / Diuretics ▼ response to sympathomimetics

**Furazolidone** / ▲ Pressor effect → possible hypertensive crisis and intracranial hemorrhage

**Guanethidine** / ▼ Guanethidine effect by displacement from its action site

**Halothane** / Serious arrhythmias R/T sensitization of myocardium to sympathomimetics by halothane

**MAO Inhibitors** / ▲ Pressor effect → possible hypertensive crisis and intracranial hemorrhage; do not give ephedrine during or within 14 days following administration of MAO inhibitors

**Methyldopa** / Effect of ephedrine ↓ in methyldopa-treated clients

**Oxycotic drugs** / Severe persistent hypertension

**OD** OVERDOSE MANAGEMENT

Symptoms: Acute poisoning: **Convulsions**, N&V, chills, cyanosis, irritability, nervousness, fever, suicidal behavior, tachycardia, dilated pupils, blurred vision, opisthotonos, spasms, pulmonary edema, gasping respirations, coma, respiratory failure, hypertension followed by hypotension accompanied by anuria. Treatment: Artificial respiration if breathing is shallow or cyanosis is present. Maintain BP but do not give vasopressors. For hypertension, can use phen tolamine mesylate diluted in saline IV or 100 mg PO. Control convulsions by diazepam. Cool applications and dexamethasone, 1 mg/kg, given slowly IV, may control pyrexia.

**HOW SUPPLIED**

Capsules: 25 mg; Injection: 50 mg/mL

**DOSAGE**

- **CAPSULES**
  - Bronchial asthma.
  - Adults and children over 12 years of age: 12.5–25 mg q 4 hr, not to exceed 150 mg in 24 hr. **Children, less than 12 years:** Consult a provider.
  - **IM; SC; SLOW IV**
    - Allergic disorders, including bronchial asthma.
    - **Adults:** 25–50 mg SC or IM; or, 5–25 mg by slow IV repeated q 5–10 min, if needed. **Children, usual:** 0.5 mg/kg (16.7–25 mg/m²) SC, IM q 4–6 hr.
    - **Vasopressor.**
    - **Adults:** 25–50 mg (IM or SC) or 5–25 mg (by slow IV push) repeated at 5- to 10-min intervals, if necessary. Absorption following IM is more rapid than following SC use. **Pediatric (IM):** 16.7 mg/m² q 4–6 hr.

**NURSING CONSIDERATIONS**

**ADMINISTRATION/STORAGE**

1. Tolerance may develop; temporary cessation of therapy restores original drug response.

2. May administer 10 mg IV undiluted over at least 1 min.

3. Use only clear solutions; discard any unused solution. Protect against exposure to light; drug is subject to oxidation.

**ASSESSMENT**

1. Note reasons for therapy; symptom characteristics.

2. Assess mental status, pulmonary function; monitor ECG and VS. If administered for hypotension, monitor BP until stabilized.

3. Monitor carefully with asthma, heart disease, and pregnancy.

4. If used for prolonged periods, assess for drug resistance. Rest without medication for 3–4 days, then resume to regain response.

**CLIENT/FAMILY TEACHING**

1. Method of administration depends on condition being treated. Report if SOB unrelieved by medication and accompanied by chest pain, dizziness, or palpitations; any elevated or irregular pulse.

2. Review proper method for nasal instillation. Nasal burning/stinging may occur with nasal drops or spray. Do not share nasal spray container with others.

3. Use topical decongestants only in acute states and not for more than 3 to 5 days.

4. Avoid activities that require mental alertness until drug effects realized. Do not take within 2 hr of bedtime; may cause insomnia.

5. With males, report difficulty or pain with voiding; may see drug-induced urinary retention.

6. Report any depression, lack of interest in personal appearance, complaints of insomnia, anorexia or decreased effectiveness. Tolerance may occur within 1–2 months.

7. Avoid OTC drugs and alcohol.

**Bold Italic** = life threatening side effect

■ = black box warning

♦ = Available in Canada
8. Keep all F/U to assess response, adverse SE.

OUTCOMES/EVALUATE
- Relief of SOB, chest tightness and wheezing with asthma
- ↓ Nasal congestion/mucus
- ↑ BP
- Control of narcolepsy