



Bonus Monographs



Alprostadil (PGE₁) (al-PROSS-tah-dill)

CLASSIFICATION(S):

Prostaglandin

Rx: Caverject, Caverject Impulse, Edex, Muse, Prostin VR Pediatric

★**Rx:** Prostin VR

ACTION/KINETICS

Alprostadil is the naturally occurring acidic lipid prostaglandin E₁. It relaxes smooth muscle of the ductus arteriosus leading to increased pulmonary blood flow with increased blood oxygenation and lower body perfusion. Clients with low pO₂ values respond best. May also cause vasodilation, inhibit platelet aggregation, and stimulate both intestinal and uterine smooth muscle. When injected intracavernosally, alprostadil relaxes the trabecular cavernous smooth muscles and causes dilation of penile arteries. This results in increased arterial blood flow to the corpus cavernosa and thus swelling and elongation of the penis. **Onset, systemic:** 1.5–3 hr for acyanotic congenital heart disease and 15–30 min for cyanotic congenital heart disease. **Time to peak effect:** 3 hr for coarctation of the aorta and 1.5 hr for interruption of aortic arch. **Duration:** Closure of the ductus arteriosus usually begins 1–2 hr after infusion discontinued. Alprostadil is rapidly metabolized (80% in one pass) by oxidation in the lung, and metabolites are excreted by the kidney.

USES

(1) Diagnosis and treatment of erectile dysfunction (male impotence) due to neurologic, vascular, psychologic, or mixed causes. (2) Prostin VR Pediatric is used in newborns with congenital heart defects to maintain patency of the ductus arteriosus. *Investigational:* Diagnostic peripheral arteriography. Treat atherosclerosis, gangrene, and pain due to peripheral vascular disease.

CONTRAINDICATIONS

Respiratory distress syndrome. Conditions that predispose to priapism: sickle cell anemia or trait, multiple myeloma, leukemia. In clients with anatomic deformation of the penis or in those with penile implants. Use in women, children, newborns, or men for whom sexual activity is not advisable or is contraindicated. Use for sexual intercourse with a pregnant woman unless a condom is used. Hyaline membrane disease.

SIDE EFFECTS

Respiratory: *Apnea (in 10%–12% of neonates), especially in neonates less than 2 kg at birth;* bronchial wheezing, bradypnea, hypercapnia, respiratory depression. Also, in adults, respiratory infection, flu syndrome, sinusitis, rhinitis, nasal congestion, cough. **CNS:** Fever, *seizures*, hypothermia, jitteriness, lethargy, *cerebral bleeding*, stiffness, hyperextension of the neck, irritability. **CV:** Flushing, especially after intra-arterial dosage, bradycardia, hypotension, tachycardia, edema, *cardiac arrest, CHF, shock, arrhythmias*. **GI:** Diarrhea, hyperbilirubinemia, gastric regurgita-

2 ALPROSTADIL

tion. **Renal:** Hematuria, anuria. **Skeletal:** Cortical proliferation of long bones. **Hematologic:** *Disseminated intravascular coagulation*, thrombocytopenia, anemia, bleeding. **Miscellaneous:** *Sepsis, peritonitis*, hypoglycemia, hypokalemia or hyperkalemia. **Side effects when used for erectile dysfunction:** Penile pain, prolonged erection, penile fibrosis, hematoma at injection site, penile disorders, including numbness, yeast infection, irritation, sensitivity, phimosis, pruritus, erythema, venous leak, penile skin tear, strange feeling in penis, discoloration of penile head, itch at tip of penis. Painful erection, abnormal ejaculation, penile rash, penile edema, priapism, hematoma, ecchymosis, urethral pain, urethral burning, urethral bleeding or spotting, testicular pain.

LABORATORY TEST CONSIDERATIONS
 ↑ Bilirubin. ↓ Glucose, serum calcium. ↑ or ↓ Potassium.

OD OVERDOSE MANAGEMENT

Symptoms: *Apnea*, bradycardia, flushing, hypotension, pyrexia. **Treatment:** Reduce rate of infusion if symptoms of hypotension or pyrexia occur; discontinue infusion if symptoms of apnea or bradycardia occur.

DRUG INTERACTIONS

Cyclosporine / ↓ Cyclosporine blood levels

Heparin, Warfarin / ↑ Bleeding after intracavernosal injection

HOW SUPPLIED

Injection: 0.5 mg/mL; *Pellet:* 125 mcg, 250 mcg, 500 mcg, 1000 mcg; *Powder for Injection, lyophilized:* 5 mcg/mL, 10 mcg/mL, 20 mcg/mL, 40 mcg/mL; *Powder for Injection, Impulse:* 10 mcg/0.5 mL, 20 mcg/0.5 mL

DOSAGE**• CONTINUOUS IV INFUSION OR UMBILICAL ARTERY**

Maintain patency of ductus arteriosus.

Initial: 0.05–0.1 mcg/kg/min; **then,** after response achieved, decrease infusion rate to lowest dose that will maintain response (e.g., 0.1–0.05 to 0.025–0.01 mcg/kg/min). **NOTE:** If 0.1 mcg/kg/min is insufficient, dosage can be increased up to 0.4 mcg/kg/min.

• INTRACAVERNOSAL

Erectile dysfunction due to vascular, psychogenic, or mixed etiology.

Individualize the dose for each client by careful titration. **Initial:** 2.5 mcg. If there is a partial response, increase the dose by 2.5 mcg to 5 mcg and then in increments of 5–10 mcg, depending on the erectile response, until a dose is reached that results in an erection suitable for intercourse but not exceeding 1 hr in duration. If there is no response to the initial 2.5-mcg dose, the second dose may be increased to 7.5 mcg, followed by increments of 5 to 10 mcg. **Maximum dose:** 60 mcg. Do not give the drug more than 3 times/week with at least 24 hr between each dose.

Erectile dysfunction due to pure neurogenic etiology (spinal cord injury).

Initial: 1.25 mcg. The dose may be increased by 1.25 mcg to 2.5 mcg, followed by an increment of 2.5 mcg to a dose of 5 mcg. The dose may be increased in 5-mcg increments until a dose is reached that produces an erection suitable for intercourse and not exceeding 1 hr in duration.

NURSING CONSIDERATIONS**ADMINISTRATION/STORAGE**

1. For use in impotence, the diluent is mixed with alprostadil powder, and the solution is swirled gently. One mL of the reconstituted solution contains either 10 or 20 mcg of alprostadil. Use the solution immediately; do not store or freeze.

2. For treating impotence, alprostadil is injected into the corpus cavernosum using a small, thin needle (½ in, 27- to 30-gauge). Cleanse the injection site with an alcohol swab. The first injection should be administered in a physician's office.

3. Store ampules at 2–8°C (36–46°F).

IV 4. Administer infusions only in pediatric intensive care facilities. Use a Y set-up.

5. Dilute 500 mcg with either NaCl injection or dextrose injection in volumes appropriate for the infant's fluid intake and suitable for the type of infusion pump available.

ALPROSTADIL 3

6. Discard any unused solutions and prepare a fresh solution q 24 hr.

7. Infuse sterile solutions for the shortest time and at the lowest dose that will produce the desired effect.

ASSESSMENT

1. Document indications for therapy, onset of symptoms, and any associated predisposing factors.

2. Document VS and cardiac/respiratory function before administering.

3. Determine if the neonate has restricted pulmonary blood flow; have respirator readily available. During therapy for ductus arteriosus, monitor infants' arterial pressures, ABGs, EKG, VS, respirations and rectal temperature. Infusion should be immediately reduced if arterial pressure significantly drops or fever develops. Stop infusion if apnea or bradycardia occurs.

4. Note any evidence of bleeding tendencies or sickle cell anemia.

5. With sexual dysfunction, list all meds currently prescribed and those consumed. Note any altered psychosocial balance.

INTERVENTIONS

1. Monitor arterial pressure intermittently by umbilical artery catheter, auscultation, Dinemapp or with a Doppler transducer. Obtain written guidelines for arterial pressures; if pressure falls significantly, decrease flow rate and report.

2. Observe infant for apnea, bradycardia, pyrexia, flushing, and hypotension; symptoms of *overdose*. The following guidelines are appropriate.

- With apnea or bradycardia, stop infusion, change to the unmedicated solution, and start resuscitation.

- If infant develops pyrexia or hypotension, reduce flow rate until temperature and BP return to baseline.

- Flushing may indicate an incorrect intra-arterial catheter placement and requires repositioning.

3. If infant has restricted pulmonary

blood flow, monitor ABGs. A positive response to alprostadil is indicated by at least a 10 mm Hg increase in blood pO₂.

4. If systemic blood flow restricted, monitor BP and serum pH. If the infant has acidosis, a positive response to alprostadil would be indicated by an increased pH, an increase in BP, and a decreased PA to aortic pressure ratio.

5. Monitor neurological status and level of consciousness; stop drug and report seizures, hyperexcitability, or stiffness.

6. Treatment for impotence should be discontinued in clients who develop penile angulation, cavernosal fibrosis, or Peyronie's disease.

CLIENT/FAMILY TEACHING

1. Advise parents of infant's condition and why drug is indicated; review risks and benefits.

2. With erectile dysfunction, once initial injection response is evaluated, obtain instruction in the method for administration. Review written guidelines to ensure proper administration and dosing (use no more than 3 times/week with 24 hr between each use).

3. Report any foul discharge, pain, or local irritation and rash, nodules or hard lumps in penis, curvature of penis with erection, or problems voiding.

4. Report any unusual drug side effects. Seek immediate attention if an erection lasts longer than 6 hr and report for follow-up to detect signs of penile fibrosis.

OUTCOMES/EVALUATE

- With restricted pulmonary blood flow: Improved pulmonary blood flow with ↑ pO₂ (normal pO₂ neonates 60-70 mm Hg)

- With restricted systemic blood flow: ↓ pH with acidosis, ↑ systemic BP, ↑ urinary output; return of palpable pulses and ↓ pulmonary artery to aortic pressure ratio

- With ED: penile erection