Leuprolide (loo-proe-ride)
Eligard, Lupron, Lupron Depot, Lupron Depot-Ped, Lupron Depot-3 Month, Lupron Depot-4 Month, Lupron Depot-6 Month

Classification
Therapeutic: antogonists
Pharmacologic: hormones, gonadotropin-releasing hormones

Pregnancy Category X

Indications
Advanced prostate cancer in patients who are unable to tolerate orchiectomy or estrogen therapy (may be used in combination with flutamide or bicalutamide). Central precocious puberty (CPP). Endometriosis. Uterine fibroids (with iron therapy).

Action
A synthetic analogue of luteinizing hormone–releasing hormone (LHRH). Initially causes a transient increase in testosterone; however, with continuous administration, testosterone levels are decreased. Reduces gonadotropins, testosterone, and estradiol.


Pharmacokinetics
Absorption: Rapidly and almost completely absorbed following subcut administration. More slowly absorbed following IM administration of depot form.
Distribution: Unknown.
Metabolism and Excretion: Unknown.
Half-life: 3 hr.

TIME/ACTION PROFILE (effect on hormone levels)
ROUTE ONSET† PEAK‡ DURATION§
Subcut within 1st week 2–4 wk 4–12 wk
IM within 1st week 2–4 wk 4–12 wk
IM-depot within 1st week 2–4 wk 4–12 wk
†Initial transient in testosterone and estradiol levels
‡Maximum decline in testosterone and estradiol levels
§Restoration of normal pituitary–gonadal function; in amenorrheic patients, normal menses usually returns 60–90 days after treatment is discontinued

Contraindications/Precautions
Contraindicated in: Intolerance to synthetic analogues of LHRH (GnRH); OB: Potential for fetal harm or spontaneous abortion; Lactation: Potentially serious adverse effects.

Use Cautiously in: Hypersensitivity to benzyl alcohol (results in induration and erythema at subcut site).

Adverse Reactions/Side Effects
CNS: STROKE, dizziness, headache, seizures, syncope; Depot, depression, disorders, personality disorder; Subcut, anxiety, blurred vision, memory disorder, mood swings, ringing in ears; IM, hearing disorder, dysthymia.
EENT: blurred vision; Subcut, hearing disorder.
Resp: hemoptysis; Depot, epistaxis, throat nodules; Subcut, cough, pleural rub, pulmonary fibrosis, pulmonary infiltrate.
CV: myocardial infarction, pulmonary emboli, angina, arrhythmias, QT interval prolongation, vasodilation, G6PD, anemia, diabetes, nausea, vomiting, Depot, increased appetite, gastritis, induration, hyperuricemia, pruritus,Gate, hyperpigmentation, rash, fever; Subcut, body odor, epistaxis.
GI: anorexia, diarrhea, dysphagia, nausea, vomiting; Depot, Hepatotoxicity, gingivitis, ulcer, esophageal rupture, skin cancer, skin lesions; Subcut, GI bleeding, hepatic dysfunction, peptic ulcer, rectal polyps, taste disorders.
GU: testicular size, dysuria, incontinence, testicular pain; Depot, cervix disorder; Subcut, bladder spasm, penile swelling, prostate pain, urinary obstruction.
Derm: Depot — hair growth, rash; Subcut, dry skin, hair loss, pigmentation, skin lesions.
Endo: Breast swelling, breast tenderness, hyperglycemia.
F and E: hypercalcemia, lower extremity edema.
Local: burning, itching, swelling at injection site.
Metals: Depot — hyperpigmentation.
Misc: IM — bone density.

Interactions
Drug-Drug: ↑ antineoplastic effects with antandrogens (megestrol, flutamide).

Route/Dosage
Prostate Cancer
Subcut (Adults): Lupron — 1 mg/day or Eligard — 7.5 mg once monthly; 22.5 mg every 3 mo, 45 mg every 6 mo.
IM (Adults): Lupron Depot — 7.5 mg once monthly or Lupron Depot-3 Month — 22.5 mg q 3 mo or Lupron Depot-4 Month — 30 mg q 4 mo or Lupron Depot-6 Month — 45 mg q 6 mo.

Contraindications/Precautions
Contraindicated in: Intolerance to synthetic analogues of LHRH (GnRH); OB: Potential for fetal harm or spontaneous abortion; Lactation: Potentially serious adverse effects.

Use Cautiously in: Hypersensitivity to benzyl alcohol (results in induration and erythema at subcut site).

Adverse Reactions/Side Effects
CNS: STROKE, dizziness, headache, seizures, syncope; Depot, depression, disorders, personality disorder; Subcut, anxiety, blurred vision, memory disorder, mood swings, ringing in ears; IM, hearing disorder, dysthymia.
EENT: blurred vision; Subcut, hearing disorder.
Resp: hemoptysis; Depot, epistaxis, throat nodules; Subcut, cough, pleural rub, pulmonary fibrosis, pulmonary infiltrate.
CV: myocardial infarction, pulmonary emboli, angina, arrhythmias, QT interval prolongation, vasodilation, G6PD, anemia, diabetes, nausea, vomiting; Depot, increased appetite, gastritis, induration, hyperuricemia, pruritus,Gate, hyperpigmentation, rash, fever; Subcut, body odor, epistaxis.
GI: anorexia, diarrhea, dysphagia, nausea, vomiting; Depot, Hepatotoxicity, gingivitis, ulcer, esophageal rupture, skin cancer, skin lesions; Subcut, GI bleeding, hepatic dysfunction, peptic ulcer, rectal polyps, taste disorders.
GU: testicular size, dysuria, incontinence, testicular pain; Depot, cervix disorder; Subcut, bladder spasm, penile swelling, prostate pain, urinary obstruction.
Derm: Depot — hair growth, rash; Subcut, dry skin, hair loss, pigmentation, skin lesions.
Endo: Breast swelling, breast tenderness, hyperglycemia.
F and E: hypercalcemia, lower extremity edema.
Local: burning, itching, swelling at injection site.
Metals: Depot — hyperpigmentation.
Misc: IM — bone density.

Interactions
Drug-Drug: ↑ antineoplastic effects with antandrogens (megestrol, flutamide).

Route/Dosage
Prostate Cancer
Subcut (Adults): Lupron — 1 mg/day or Eligard — 7.5 mg once monthly; 22.5 mg every 3 mo, 45 mg every 6 mo.
IM (Adults): Lupron Depot — 7.5 mg once monthly or Lupron Depot-3 Month — 22.5 mg q 3 mo or Lupron Depot-4 Month — 30 mg q 4 mo or Lupron Depot-6 Month — 45 mg q 6 mo.
Endometriosis

**IM (Adults):** Lupron Depot—3.75 mg once monthly for up to 6 mo or Lupron De- pot—11.25 mg once for up to 4 doses.

**Uterine Fibroids (with iron therapy)**

**IM (Adults):** Lupron Depot—3.75 mg once monthly for up to 3 mo or Lupron De- pot—11.25 mg single injection.

Central Precocious Puberty (CPP)

**Subcut (Children):** Lupron—50 mcg/kg/day, may q 10 mcg/kg/day as required.

**IM (Children):**
- **25 kg:** Lupron Depot-Ped—1 month—7.5 mg q 4 wk; may q 3.75 mg q 4 wk as required.
- **25 kg:** Lupron Depot-Ped—3 month—11.25 or 30 mg q 3 mo.

**NURSING IMPLICATIONS**

**Assessment**

- **Prostate Cancer:** Assess for an increase in bone pain, especially during the first few weeks of therapy. Monitor patients with vertebral metastases for increased back pain and decreased sensory/motor function.
- **Fibroids:** Assess for severity of symptoms (bloating, pelvic pain, pressure, excessive vaginal bleeding) periodically during therapy.
- **Endometriosis:** Assess for endometrial pain prior to and periodically during therapy.
- **CPP:** Prior to therapy, diagnosis of CPP should be confirmed by onset of secondary sex characteristics in girls—or boys—of a complete physical and endocri- nologic examination, including height, weight, hand and wrist x-rays; total sex steroid level (estradiol or testosterone); adrenal steroid level; beta human chorionic gonadotropin level; GnRH stimulation test, and computerized tomography of the head must be performed. These parameters are monitored after 1–2 mo and every 6–12 mo during therapy.
- **Bone:** Assess for signs of precocious puberty (menarche, breast development, testicular growth) periodically during therapy. Bone is increased until no progression of the disease is noted; other clinical or laboratory test parameters, then usually maintained throughout therapy. Discontinuation of therapy should be considered before age 11 in girls and age 12 in boys.
- **Lab Test Considerations:** Initially ↓ then ↓ Interleukin-1 alpha (IL-1a) and 6-hydroxydopamine (6-OHDA). This leads to calcium increases in bone 2–4 wk after initial increase in concentrations.
- **Monitor sex hormone, prostate-specific antigen (PSA) levels to evaluate response to therapy. Transient ↑ in levels may occur during the first few months of therapy for prostate cancer.
- **May cause:** BUN, serum calcium, urea nitrogen, creatinine, LDL, alkaline phosphatase, AST, total bilirubin, PSA. May also cause ↓ platelets and serum potassium.

**Monitor blood sugar and glycosylated hemoglobin periodically during therapy.**

**Potential Nursing Diagnoses**

**Sexual dysfunction (Side Effects)**

**Implementation**

- **Do not confuse Lupron Depot-3 Month with Lupron Depot-Ped.**
- **Northeastern acetate 5 mg daily may be used to prevent bone density loss from leuprolide.**
- **Subcut Eligard subcut formulation:** Bring to room temperature before mixing. Assemble the Eligard kit and reconstitute solution using syringes provided, as directed by manufacturer. Mix in syringes as directed by manufacturer, do not shake. Solution must reach room temperature before administration and must be administered within 30 min of mixing, or be discarded. Solution is light tan to tan in color. Inject into abdomen, upper buttocks, or anywhere that has adequate amounts of subcut tissue without excessive pigment, nodules, lesions, or hair. Vary site with each injection.

**Leuprolide depot is only for IM injection.**

**Lupron Depot formulation:** To prepare for injection screw white plunger into end stopper until stopper begins to turn. Hold syringe upright, then slowly push, over 6–8 sec, until the first stopper is at the blue line in the...
middle of the barrel. Keep syringe upright. Mix microspheres by shaking syringe until power forms a unified suspension. Tap syringe gently; do not use of powder does not form suspension. Keep syringe upright, remove cap and expel air. Inject at 90° angle in gluteal area, anterior thigh, or deltoid; rotate injection sites. Suspension settles very quickly; mix and administer immediately.

● Store at room temperature; stable for 24 hr following reconstitution

Patient/Family Teaching

● Advise patient that medication may cause hot flashes. Notify health care professional if these become bothersome.

● Leuprolide depot causes a temporary discontinuation of menstruation. Advise patient to notify health care professional if menstruation persists or if irregular bleeding occurs.

● Inform patient of the possibility of the development or worsening of depression and occurrence of memory disorders.

● Prostate Cancer: Instruct patient and family on subcut injection technique. Review patient insert provided with leuprolide patient-administration kit.

● Instruct patient to take medication exactly as directed. Take missed doses as soon as remembered unless not remembered until next day.

● Advise patient that bone pain may increase at initiation of therapy, but will resolve with time. Patient should discuss with health care professional use of analgesics to control pain.

● Instruct patient to notify health care professional promptly if difficulty urinating, weakness, or numbness occurs.

● Endometriosis: Advise patient to use a form of contraception other than oral contraceptives during therapy. Inform patient that amenorrhea is expected but does not guarantee contraception. Advise patient breast feeding should be avoided during therapy.

● Central Precocious Puberty: Instruct patient and family on the proper technique for subcut injection. Emphasize the importance of administering the medication at the same time each day. Rotate injection sites periodically.

● Instruct patient and parents that if injections are not given daily, pubertal process may be reactivated.

● Advise patient and parents that during the first 2 mo of therapy patient may experience a light menstrual flow or spotting. Health care professional should be notified if the continuous beyond 2nd mo.

● Instruct patient and parents to report health care professional immediately if hair growth occurs or unusual signs or symptoms occur.

Evaluation/Desired Outcomes

● Decrease in the spread of prostate cancer.

● Decrease in pain and pain in endometriosis.

● Resolution of the signs of CPP.

● Improvement in preoperative hematologic parameters in patients with anemia from uterine fibroids.

Why was this drug prescribed for your patient?