INSULIN (mixtures)

Insulin lispro protamine suspension/insulin lispro injection mixtures, rDNA origin
Humalog Mix 75/25, Humalog Mix 50/50

Insulin aspart protamine suspension/insulin aspart injection mixtures, rDNA origin
NovoLog Mix 70/30

NPH/regular insulin mixtures
Humulin N70/30, NovoLIN 70/30

Classification
Therapeutic: antidiabetics, hormones
Pharmacologic: pancreatics

Genetic Implication: CAPI TALS indicate life-threatening, underline indicate most frequent. Strikethrough Discontinued.

1 High Alert

INSULIN (mixtures) (in su-lin)

Control of hyperglycemia in patients with type 1 or type 2 diabetes mellitus.

Action
Lower blood glucose by: stimulating glucose uptake in skeletal muscle and fat, inhibiting hepatic glucose production. Other actions: inhibition of lipolysis and proteolysis, enhanced protein synthesis.

Therapeutic Effects: Control of hyperglycemia in diabetic patients.

Pharmacokinetics
Absorption: Well absorbed from subcutaneous administration sites. Absorption rate is determined by type of insulin, injection site, volume of injectate, and other factors.
Distribution: Widely distributed.

- Cardiac drug name
- Generic Implication
- OPTX indicates life-threatening; underline indicates most frequent
- Discontinued

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subcut</td>
<td>15–30 min</td>
<td>2.8 hr</td>
<td>24 hr</td>
</tr>
<tr>
<td>Subcut</td>
<td>15 min</td>
<td>1–4 hr</td>
<td>18–24 hr</td>
</tr>
<tr>
<td>Subcutaneous</td>
<td>30 min</td>
<td>2–12 hr</td>
<td>2–24 hr</td>
</tr>
</tbody>
</table>

Contraindications/Precautions
Contraindicated in: Hyposglycemia; Allergy or hypersensitivity to a particular type of insulin, preservatives, or other additives.

Use Cautiously in: Stress and infection (may temporarily increase insulin requirements); Renal/hepatic impairment (may increase insulin requirements); Concomitant use with pioglitazone or rosiglitazone (risk of fluid retention and worsening HF); OB: Pregnancy may temporarily increase insulin requirements; Pedi: Safety of Humalog not established.

Adverse Reactions/Side Effects
Endo: HYPOGLYCEMIA. Local: erythema, lipodystrophy, pruritis, swelling. Misc: allergic reactions including ANAPHYLAXIS.

Interactions
Drug-Drug: Beta blockers, clonidine, and reserpine may mask some of the signs and symptoms of hypoglycemia. Corticosteroids, thyroid supplements, estrogens, isoniazid, niacin, phenothiazines, and rifampin may increase insulin requirements. Alcohol, ACE inhibitors, HMG inhibitors, listeroids, oral hypoglycemic agents, and salicylates may increase insulin requirements. Concomitant use with pioglitazone or rosiglitazone may increase risk of fluid retention and worsening HF.
Drug/ Natural Products: Glucosamine may worsen blood glucose control. Fenugreek, chromium, and coenzyme Q-10 may produce additive hypoglycemic effects.

Route/Dosage
Dosage depends on blood glucose, response, and many other factors. \(0.5–1 \text{ unit/kg/day.}\) Adolescents during rapid growth—\(0.8–1.2 \text{ unit/kg/day.}\)

NURSING IMPLICATIONS

Assessment
- Access for symptoms of hypoglycemia (anxiety; restlessness; tingling in hands, feet, lips, or tongue; chills; cold sweats; confusion; drowsiness; excessive hunger; headache; irritability; nightmares or trouble sleeping; nausea; nervousness; palpitations; tachycardia; tremor; weakness; unsteady gait) and hyperglycemia (confusion, drowsiness; flushed, dry skin; fruity-like breath odor; rapid, deep breathing, polyuria; loss of appetite; nausea; vomiting; unusual thirst) periodically during therapy.
- Monitor body weight periodically. Changes in weight may necessitate changes in insulin dose.
- Lab Test Considerations: May cause serum inorganic phosphate, magnesium, and potassium levels.
- Monitor blood glucose every 6 hr during therapy, more frequently in ketoacidosis and times of stress. Hemoglobin A1C may also be monitored every 3–6 mo to determine effectiveness.
- Toxicity and Overdose: Overdose is manifested by symptoms of hypoglycemia. Mild hypoglycemia may be treated by ingestion of oral glucose. Severe hypoglycemia is a life-threatening emergency; treatment consists of IV glucose, glucagon, or epinephrine.

Potential Nursing Diagnoses
- Noncompliance (Patient/Family Teaching)

Implementation
- High Alert: Insulin-related medication errors have resulted in patient harm and death. Clearly ambiguous orders, do not accept orders using the abbreviation “a” for units. (can be misread as a zero or the numeral 0, has resulted in tenfold overdose).
- Insulins are available in different types and strengths. Check type, dose, and expiration date with another licensed nurse. Do not interchange insulins without consulting health care professional.
- Do not confuse Humalog with Humulin. Do not confuse Novolin with NovoLog.
- Use only insulin syringes to draw up dose. The unit markings on the insulin syringe must match the needle’s shrinkage.
- Store insulins in refrigerator. May also be kept at room temperature for up to 28 days. Do not use if cloudy, discolored, or unusually viscous.
- Use only insulin syringes to draw up dose. The unit markings on the insulin syringe must match the needle’s shrinkage.
- Subcut: Brain injection sites.
- Admit to ward abdomen/ mid-wall, thigh, or upper arm subcutaneously.

Patient/Family Teaching
- Instruct patient on proper technique for administration. Include type of insulin, equipment (syringe, cartridge pens, alcohol swabs), storage, and place to discard syringes. Discuss the importance of not changing brands of insulin or syringes, selection and rotation of injection sites, and compliance with therapeutic regimen.
- Caution patient that insulin pens should not be shared with others, even if clean needles are used.
- Instruct patient that this medication controls hyperglycemia but does not cure diabetes. Therapy is long term.
- Instruct patient in proper testing of serum glucose and ketones. These tests should be closely monitored during periods of stress or illness and health care professional notified of significant changes.
- Emphasize the importance of compliance with nutritional guidelines and regular exercise as directed by health care professional.
- Advise patient to notify health care professional of all Rx or OTC medications, vitamins, or herbal products being taken and to consult with health care professional before taking any other medication or alcohol.
- Advise patient to notify health care professional of medication regimen prior to treatment or surgery.
- Advise patient in need of health care professional for nausea, vomiting, or fever develops, if unable to eat regular diet, if blood glucose levels are not controlled.
INSULIN (mixtures)

- Instruct patient on signs and symptoms of hypoglycemia and hyperglycemia and what to do if they occur.
- Advise patient to notify health care professional if pregnancy is planned or suspected or if breast feeding or planning to breast feed.
- Patients with diabetes mellitus should carry a source of sugar (candy, glucose gel) and identification describing their disease and treatment regimen at all times.
- Emphasize the importance of regular follow-up, especially during first few weeks of therapy.

**Evaluation/Desired Outcomes**

- Control of blood glucose levels in diabetic patients without the appearance of hypoglycemic or hyperglycemic episodes.

**Why was this drug prescribed for your patient?**