

Antidiabetic Drugs: Objectives

Chapter 26

- Compare Type 1 and Type 2 diabetes mellitus.
- Describe the effects of endogenous insulin on body tissues.
- Explain the differences among insulin preparations.
- Describe the mechanism of action, indications for use, major adverse effects of insulin and oral antidiabetic agents.
- Describe nursing interventions to promote effective treatment.

Insulin

- Secreted by beta cells in pancreas
- Transported to liver, muscle, and fat cells
- Binds with insulin receptors
- Increases cell permeability to glucose, amino acids etc.
- Stimulates anabolic effects
- Inhibits catabolic effects
- Lowers blood glucose levels

Key Terms

- Endogenous insulin
- Exogenous insulin
- Type 1 and Type 2 diabetes mellitus
- Hyperglycemia
- Hypoglycemia
- Polydipsia, polyuria, polyphagia
- Diabetic ketoacidosis (DKA)
- Hyperosmolar hyperglycemic nonketotic coma (HHNC)

Exogenous Insulin

- Lowers glucose levels by ↑ glucose uptake
- Only treatment for Type 1, pregnancy, children; Type 2 if uncontrolled, or at times of stress
- Pork and human preparations
- Short (R), intermediate (NPH), and long-acting (Ultralente) forms
- Insulin analogs: rapid (lispro), long-acting (glargine)
- U-100 contains 100 units/1mL

Insulin continued

- Only regular is given IV.
- SubQ, in units, using insulin syringe with needle. Insert 90° angle, rotate within sites.
- Store opened vial room temperature, extra vials in frig (not freezer).
- Mixing insulins p. 403.
- Adverse Effects: hypoglycemia, lipodystrophy
- Interactions: alcohol, nonspecific beta blockers (increase hypoglycemia), corticosteroids, thiazides (increase blood sugar levels)

Oral Antidiabetic Agents

- Sulfonylureas
 - Increase secretion of insulin from beta cells
- Alpha-glucosidase inhibitors
 - Delay absorption of complex carbohydrates
 - Reduces postprandial rise in BG
- Biguanide
 - Increase use of glucose by muscle and fat, decreases hepatic glucose production, decreases intestinal absorption of glucose

Oral Antidiabetic Agents cont.

- Glitazones
 - Insulin sensitizers decrease insulin resistance
 - Stimulate receptors on muscle, fat, and liver cells
- Meglitinides
 - Stimulate pancreatic secretion of insulin

Sulfonylureas

- Glipizide (Glucotrol), glyburide (Micronase)
- Related to sulfonamide antibacterials
- Use: Type 2 diabetes
- Adverse effects: hypoglycemia, skin reactions, GI upset, weight gain
- Contraindications: hypersensitivity, pregnancy, severe hepatic or renal impairment
- Interactions: alcohol, cimetidine, other antidiabetic agents

Alpha-glucosidase Inhibitors

- Acarbose (Precose), miglitol (Glyset)
- Use: Type 2 not controlled with diet and exercise
- May be used with insulin or another oral agent
- Adverse Effects: bloating, flatulence, diarrhea, cramps
- Contraindications: hypersensitivity, DKA, hepatic cirrhosis, severe renal impairment,

Biguanide

- Metformin (Glucophage)
- Use: Type 2 diabetes, alone or in combination with sulfonylurea or rosiglitazone
- Adverse Effects: anorexia, nausea, diarrhea, lactic acidosis (rarely)
- Contraindications: renal insufficiency, liver disease, severe infection, heart failure, hypoxia, pregnancy
- Interactions: alcohol, cimetidine

Glitazones

- Rosiglitazone (Avandia)
- Use: Type 2 diabetes alone or with insulin, metformin, or sulfonylurea
- Adverse Effects: fluid retention, edema, weight gain
- Contraindications: heart failure, liver disease
- Monitor: liver enzymes

Meglitinides

- Nateglinide (Starlix), repaglinide (Prandin)
- Use: Type 2 diabetes, alone or with metformin
- Newest class, same action as sulfonylureas
- Adverse Effects: URI, hypoglycemia
- Contraindications: hypersensitivity

Diabetic Ketoacidosis (DKA)

- Regular insulin by IV infusion with frequent blood sugar monitoring
- IV fluids to correct hyperosmolality and dehydration
- Potassium supplements to restore normal serum levels
- Sodium bicarbonate may be given for acidosis (pH <7.2)
- HHNC treatment is similar

Patient Teaching

- Diet, weight control, exercise
- Take antidiabetic medication as prescribed.
- Signs and symptoms of hypo- and hyperglycemia.
- Blood glucose testing.
- Prevention of complications.
- Management of sick days.
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Nursing Implications

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- Assessment: diet; activity; medications; method of glucose monitoring; skin - infections, lesions, lipodystrophy, ulcers, color and temperature of feet; CV history; renal function; frequency of eye exams
- Administer meds on time
- Monitor vital signs, blood glucose
- Observe for therapeutic effects, adverse effects
- Refer to diabetic educator, ADA
- Rx of hypoglycemia

Web Resources

- American Diabetes Association
 - <http://www.diabetes.org/home.jsp>
- National Institute of Diabetes & Digestive & Kidney Disorders
 - <http://www.niddk.nih.gov/health/diabetes/diabetes.htm>
- Diabetes Care; Clinical Practice Recommendations
 - <http://care.diabetesjournals.org/>
