

Introduction to Clinical Pharmacology

Chapter 40

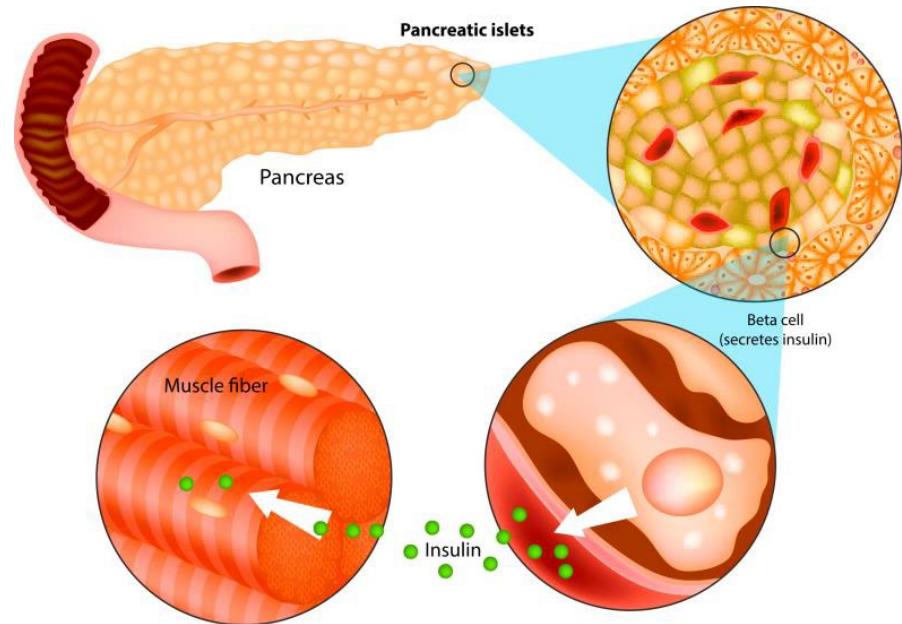
Antidiabetic Drugs

Learning Objectives

1. Describe the two types of diabetes mellitus.
2. Explain the types, uses, general drug actions, adverse reactions, contraindications, precautions, and interactions of the antidiabetic drugs.
3. Distinguish important preadministration and ongoing assessment activities the nurse should perform with the client taking an antidiabetic drug.
4. List nursing diagnoses particular to a client taking an antidiabetic drug.
5. Examine ways to promote an optimal response to therapy, how to manage common adverse reactions, and important points to keep in mind when educating clients about the use of antidiabetic drugs

Insulin

- ❖ Hormone manufactured by beta cells of pancreas that is required for the proper use of glucose and the proper metabolism of protein and fat
- ❖ Controls the storage and utilization of amino acids and fatty acids
- ❖ Lowers blood glucose levels by inhibiting glucose production by liver



Diabetes

- ❖ Diabetes mellitus is a chronic condition in which:
 - insufficient insulin is produced by the pancreatic beta cells (type 1)
 - or less insulin produced the body and cells become resistant to insulin (type 2)
- ❖ Gestational diabetes can occur in pregnant women; at higher risk for developing type 2 diabetes

Symptoms of Diabetes: the 3 Ps

- ❖ Polydipsia: Excessive thirst
- ❖ Polyphagia: Eating large amounts of food
- ❖ Polyuria: Increased urination

Risk Factors for Type 2 Diabetes

- ❖ Obesity
- ❖ Older age
- ❖ Family history of diabetes
- ❖ History of gestational diabetes
- ❖ Impaired glucose tolerance
- ❖ Minimal or no physical activity
- ❖ Race/ethnicity (African Americans, Hispanic/Latino Americans, Native Americans, and some Asian Americans)
- ❖ Many individuals with type 2 diabetes can be managed with diet, exercise, and oral antidiabetic drugs; others will require insulin

Insulin Products—Actions

- ❖ Activates a process that helps glucose molecules enter the cells of striated muscle and adipose tissue
- ❖ Promotes protein synthesis and helps the body store fat by preventing its breakdown for energy
- ❖ Properties of insulin: onset, peak, duration
- ❖ Controls type 1 diabetes mellitus, type 2 diabetes, severe diabetic ketoacidosis
- ❖ Treats hypokalemia in combination with glucose

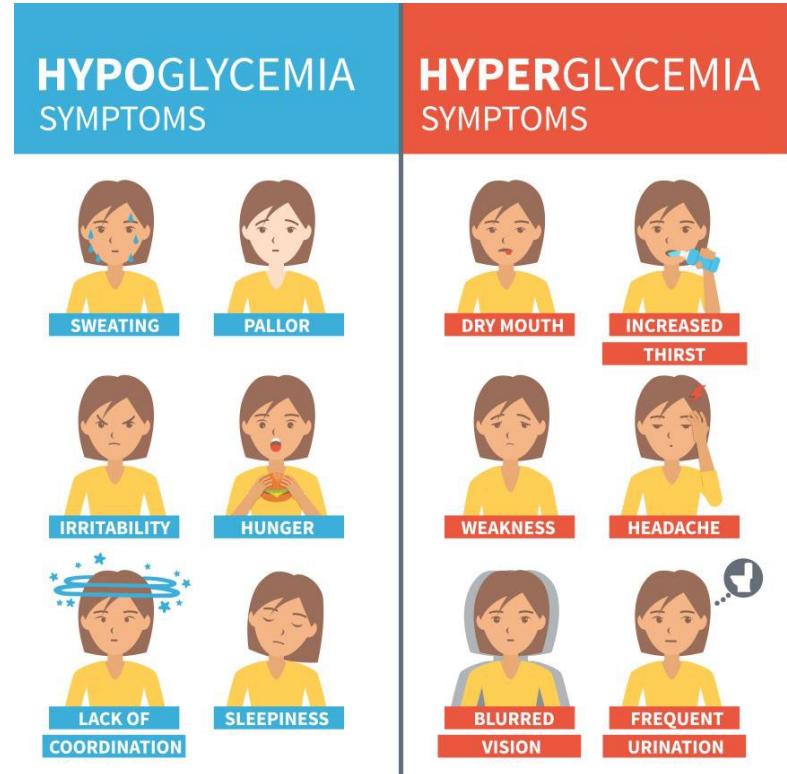


Insulin Products—Uses

- ❖ Insulin products are used to:
 - Replace the hormone, insulin in type 1 diabetes
 - Supplement insulin production in type 2 diabetes after other management methods have not been successful
 - Treat severe diabetic ketoacidosis or diabetic coma
 - Treat hypokalemia in combination with glucose

Insulin Products—Adverse Reactions

- ❖ Hyperglycemia—elevated blood glucose levels
- ❖ Hypoglycemia—decreased blood glucose levels



Insulin Products—Adverse Reactions—Contraindications and Precautions

- ❖ Contraindicated in clients:
 - With hypersensitivity or hypoglycemia
- ❖ Used cautiously in clients:
 - With renal and hepatic impairment
 - During pregnancy (pregnancy category B and C) and lactation



Insulin Products—Interactions

Interacting Drugs that Decrease the Effect of Insulin	Interacting Drugs that Increase the Effect of Insulin
Albuterol Antipsychotics Calcitonin Oral contraceptives Corticosteroids Diuretics Estrogens Lithium Morphine Phenothiazines Progestogens *etc. see box 40.1	ACE inhibitors Alcohol Beta-blocking drugs Oral antidiabetic drugs Calcium Clonidine Fluoxetine Lithium MAOIs Salicylates Sulfonamides *etc. see box 40.1

Oral Antidiabetic Drugs

- ❖ Used to treat clients with prediabetes or type 2 diabetes that is not controlled by diet and exercise alone
 - Not effective for treating type 1 diabetes
- ❖ Types of oral antidiabetic drugs:
 - Biguanides, glucagon-like peptide-1 agonists, sodium-glucose linked transporter-2 inhibitors (SGLT-2 inhibitors), dipeptidyl peptidase-4 inhibitors, thiazolidinediones, alpha (α)-glucosidase inhibitors, amylinomimetic, sulfonylureas, and meglitinides



Biguanides—Actions, Uses, and Adverse Reactions

- ❖ Action: sensitizes the liver to circulating insulin levels, reduces intestinal glucose absorption, and reduces hepatic glucose production
- ❖ Metformin is used as the first-choice drug for initial therapy of type 2 diabetes
- ❖ Adverse Reactions
 - Hypoglycemia (especially if taking in combination with insulin or other antidiabetic drugs)
 - Nausea, vomiting, diarrhea, increased flatulence

Biguanides—Contraindications and Precautions

❖ Contraindicated in clients:

- With poor kidney function
- Older than 80 years
- During pregnancy (pregnancy category B) and lactation

❖ Precautions:

- Temporarily discontinued for surgical procedures; restarted when client's oral intake returns to normal
- May lead to vitamin B₁₂ malabsorption



Biguanides—Interactions

Interacting Drug	Common Use	Effect of Interaction
Contrast medium	Radiologic studies	Increased risk of kidney failure and lactic acidosis
Glucocorticoids	Anti-inflammatory	Increased risk of lactic acidosis

Glucagon-like Peptide-1 Agonists—Actions and Uses

- ❖ Action: mimics the incretin hormone that increases insulin release and decreases glucagon levels in the circulation depending upon glucose levels; reduces insulin release when a person eats, reduces glucagon, and slows gastric emptying
- ❖ Used to treat type 2 diabetes and chronic weight management for clients with BMI over 27 who also have hypertension or dyslipidemia

Glucagon-like Peptide-1 Agonists—Adverse Reactions

❖ Common Adverse Reactions

- Diarrhea, nausea, vomiting, heartburn
- Headaches
- Local irritation of injection sites



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Glucagon-like Peptide-1 Agonists—Contraindications and Precautions

❖ Contraindicated in clients:

- With a family history of thyroid (medullary) or other endocrine cancers
- With type 1 diabetes

❖ Precautions:

- Albiglutide should be stopped 1 month prior to attempting pregnancy (pregnancy category C)
- Clients taking exenatide should be encouraged to sign up for monitoring programs



Glucagon-like Peptide-1 Agonists—Interactions

Interacting Drug	Common Use	Effect of Interaction
DPP-4 inhibitors	Treatment of type 2 diabetes	Increased additive glycemic effect when combined
Corticosteroids, danazol, luteinizing hormones, thiazide diuretics	Anti-inflammatory, treatment of endometriosis, fertility problems, and treatment of cardiac problems, respectively	Increased risk of elevated blood glucose level
Vitamin K	Supplement	Prolonged bleeding
Oral contraceptives	Prevent pregnancy	Decreased the effectiveness of the oral contraceptive

Sodium-Glucose Linked Transporter-2 Inhibitors—Actions and Uses

- ❖ Action: decreases glucose reabsorption in the kidney resulting in allowing more glucose to leave the body in the urine
- ❖ Used to treat type 2 diabetes
 - Drops HbA1c
 - Decreases weight
 - Decreases systolic blood pressure
 - Reduction in LDL

Sodium-Glucose Linked Transporter-2 Inhibitors— Adverse Reactions

❖ Common Adverse Reaction:

- Yeast infections in genital area
- Hypotension
- Hyperkalemia

❖ Rare Adverse Reaction:

- Necrotizing fasciitis



Sodium-Glucose Linked Transporter-2 Inhibitors—Contraindications and Precautions

- ❖ Contraindicated in clients:
 - With end-stage kidney disease or those on dialysis
- ❖ Precautions:
 - Canagliflozin and dapagliflozin increase diuresis, which can lead to dehydration
 - SGLT-2 inhibitors should be stopped prior to attempting pregnancy (pregnancy category C)



Sodium-Glucose Linked Transporter-2 Inhibitors—Interactions

Interacting Drug	Common Use	Effect of Interaction
ACE inhibitors	Treat hypertension	Increased risk of hyperkalemia
Angiotensin II receptor blockers	Treat hypertension	Increased risk of hyperkalemia
Potassium-sparing diuretics	Treat heart failure	Increased risk of hyperkalemia

Dipeptidyl Peptidase-4 Inhibitors—Actions, Uses, and Adverse Reactions

- ❖ Action: lower blood glucose level by enhancing the secretion of the incretin hormone produced by the body; reduces glucagon and lowers blood glucose levels
- ❖ Used to treat type 2 diabetes
- ❖ Adverse Reactions:
 - Headache
 - Upper respiratory tract symptoms/nasopharyngitis

Dipeptidyl Peptidase-4 Inhibitors—Contraindications and Precautions

❖ Contraindicated in clients:

- For the treatment of DKA
- With type 1 diabetes

❖ Precautions:

- Gliptin should be used cautiously in clients with chronic kidney disease or in older adults
- Pregnancy (pregnancy category B)
- Lactation



Thiazolidinediones—Actions, Uses, and Adverse Reactions

- ❖ Action: improve insulin sensitivity in muscle and fat cells; inhibit gluconeogenesis; reduces insulin resistance in the cell and lowers HbA1c
- ❖ Used to treat type 2 diabetes
- ❖ Adverse Reactions
 - Upper respiratory infections, sinusitis, pharyngitis
 - Headache, myalgia
 - Diarrhea
 - Back pain
 - Weight gain and hypoglycemia (combination therapy)

Thiazolidinediones—Contraindications and Precautions

❖ Contraindicated in clients:

- With symptomatic heart failure
- With type 1 diabetes
- Rosiglitazone should not be used in combination with insulin

❖ Precautions:

- Clients with edema, cardiovascular disease, or liver or kidney disease
- Pregnancy (pregnancy category C)



Thiazolidinediones—Interactions

Interacting Drug	Common Use	Effect of Interaction
Oral contraceptives	Birth control	Decreased effectiveness of oral contraceptives

Alpha-Glucosidase Inhibitors—Actions, Uses, and Adverse Reactions

- ❖ Action: prevent after-meal surge in blood sugar by delaying the digestion and absorption of carbohydrates in the intestine
- ❖ Used to treat type 2 diabetes
- ❖ Adverse Reactions
 - Bloating
 - Flatulence
 - Diarrhea

Alpha-Glucosidase Inhibitors—Contraindications and Precautions

❖ Contraindicated in clients with:

- preexisting GI problems (IBS or Crohn disease)
- DKA
- cirrhosis

❖ Precautions:

- Acarbose and miglitol are used cautiously in clients with renal impairment
- Pregnancy (pregnancy category B)
- Lactation



Alpha-Glucosidase Inhibitors—Interactions

Interacting Drug	Common Use	Effect of Interaction
Digestive enzymes	Assist with digestion	Reduce the effect of miglitol

Amylinomimetic—Actions, Uses, and Adverse Reactions

- ❖ Action: injectable drug that mimics the amylin hormone; delays gastric emptying, decreases glucagon release, decreases appetite
- ❖ Used with insulin at mealtimes to reduce blood glucose levels, HbA1c levels, and help reduce weight
- ❖ Adverse Reactions
 - Nausea, vomiting, decreased appetite, abdominal pain
 - Headache
 - Pain or irritation at injection site
 - Hypoglycemia

Amylinomimetic—Contraindications and Precautions

❖ Contraindicated in clients:

- Who have problems with stomach emptying
- Taking a drug that slows GI motility

❖ Precautions:

- Pregnancy (pregnancy category C)
- Lactation



Amylinomimetic–Interactions

Interacting Drug	Common Use	Effect of Interaction
Alpha-glucosidase inhibitor	Type 2 diabetes	Drug actions counteract each other

Sulfonylureas—Actions, Uses, and Adverse Reactions

- ❖ Action: lower blood glucose by stimulating the beta cells of the pancreas to release
- ❖ Used in type 2 diabetics who have functioning beta cells; second- and third-generation drugs (glimepiride, glipizide, and glyburide) are most commonly used
- ❖ Adverse Reactions
 - Hypoglycemia
 - Anorexia, nausea, vomiting, epigastric discomfort, heartburn, abdominal pain
 - Weight gain
 - Vague neurological symptoms (weakness and numbness of the extremities)

Sulfonylureas—Contraindications and Precautions

- ❖ First-generation sulfonylureas are contraindicated in clients:
 - With coronary artery disease
 - Liver or renal dysfunction
- ❖ Other sulfonylureas are used cautiously in clients with:
 - Impaired liver function
 - Renal impairment
 - Severe cardiovascular disease
 - Allergies to sulfonamides (risk for cross-sensitivity)



Sulfonylureas—Interactions

Interacting Drugs that Increase Hypoglycemic Effect	Interacting Drugs that Decrease the Hypoglycemic Effects
Anticoagulants Clofibrate Fluconazole Histamine H ₂ antagonists Methyldopa MAOIs NSAIDs Salicylates Sulfonamides Tricyclic antidepressants	Beta blockers Calcium channel blockers Cholestyramine Corticosteroids Estrogens Hydantoins Isoniazid Oral contraceptives Phenothiazines Rifampin Thiazide diuretics Thyroid agents

Pharmacology in Practice Exercise #1

- ❖ A nurse is asked to check the medical history of a client who is to be administered glimepiride. Which of the following allergies would alert the nurse to a possible reaction when taking this drug?
- a) Penicillin
 - b) Ragweed
 - c) Sulfa
 - d) Peanuts



Meglitinides—Actions, Uses, and Adverse Reactions

- ❖ Action: lower blood glucose levels by stimulating the release of insulin from the pancreas; more rapid acting and short acting than sulfonylureas
- ❖ Used in type 2 diabetics who have functioning beta cells
- ❖ Adverse Reactions
 - Upper respiratory infection, rhinitis, bronchitis
 - Headache, back pain
 - Hypoglycemia

Meglitinides—Contraindications and Precautions

❖ Use cautiously in clients:

- Who are debilitated, malnourished, or older
- Pregnancy (pregnancy category C)
- Lactation



Meglitinides—Interactions

Interacting Drug	Common Use	Effect of Interaction
Corticosteroids	Anti-inflammatory	Reduce the hypoglycemic effect of meglitinides
Carbamazepine	Anticonvulsant	Reduce the hypoglycemic effect of meglitinides
Rifampin	Antitubercular drug	Reduce the hypoglycemic effect of meglitinides

Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #1

❖ Preadministration Assessment

❖ Objective Data

- General client appearance, emphasis on skin
- Vital signs
- Weight, note weight gain or loss
- If previously receiving other antidiabetic drugs, type and dosage, dietary habits, and frequency and method of glucose testing
- Lab tests: HbA1c, glucose tolerance/fasting levels, lipid panel, and GFR for kidney function



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #2

- ❖ **Preadministration Assessment (continued)**
- ❖ **Subjective Data**
 - Current hyper-/hypoglycemia symptoms experienced by client
 - Dietary, activity history
 - Family history of diabetes or other chronic health conditions



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #3

❖ Ongoing Assessment

- Track blood sugars
- Evaluate client's knowledge about blood glucose testing and proper use of blood glucometer or continuous blood glucose monitoring device
- Assess HbA1c at 3-month intervals



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #4

❖ Nursing Diagnosis

- Acute Confusion related to hypoglycemia effects on mentation
- Hypovolemia/Dehydration related to fluid loss during DKA
- Anxiety related to uncertainty of diagnosis, testing own glucose levels, self-injection, dietary restrictions, other factors (specify)
- Altered Breathing Pattern related to hyperventilation in lactic acidosis with metformin use

Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #5

❖ Planning

- Expected client outcomes may include:
 - Optimal response to therapy
 - Support of client needs related to the management of adverse drug reactions
 - Reduction in anxiety and improved ability to cope with the diagnosis
 - Confidence in an understanding of the prescribed medication regimen

Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #6

❖ Implementation

- Promoting Optimal Response to Therapy
 - Antidiabetic therapy is individualized based on the effectiveness and tolerance of the drug(s) and the maximum recommended dose of the drug(s)



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #7

❖ Implementation

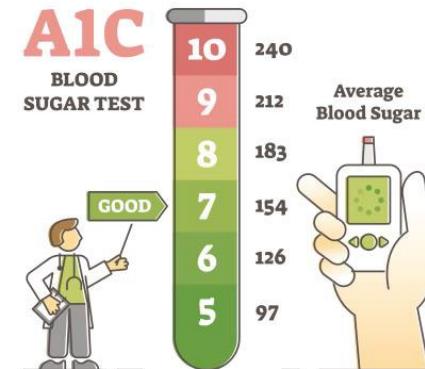
- Promoting Optimal Response to Therapy—*Blood Glucose Monitoring*
 - Blood glucose testing is often conducted before meals, after meals, and at bedtime
 - More frequent blood glucose monitoring is often conducted if the client is hospitalized
 - Less frequent blood glucose monitoring if often conducted if the client is stable



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #8

❖ Implementation

- Promoting Optimal Response to Therapy—*Blood Glucose Monitoring*
 - Urine testing can be done to identify kidney involvement or presence of ketones; use second daily void as specimen
 - Glycosylated hemoglobin (HbA1c) is used to monitor the client's average blood glucose level over a 3- to 4-month period



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #9

❖ Implementation

- Promoting Optimal Response to Therapy—*Insulin Product Administration*
 - Insulin dosing is individualized for each client by the primary healthcare provider and may need to be adjusted for illness or periods of stress
 - Never substitute one insulin for another
 - Some insulins can be mixed and some must be given alone; carefully read drug labels



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #10

❖ Implementation

- Promoting Optimal Response to Therapy—*Insulin Product Administration (continued)*
 - Insulin must be given subcutaneously
 - Aspiration for blood return does not need to be done when giving subcutaneously
 - Regular insulin is the only insulin given intravenously (IV)



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #11

❖ Implementation

- Promoting Optimal Response to Therapy—*Insulin Product Administration (continued)*
- Types of Insulin
 - Rapid- and short-acting insulins are given before meals (immediately before to up to 60 minutes before depending on the type of insulin)
 - Immediate- and Long-Acting Insulins
 - Many client's diabetes is well-managed on a single dose of intermediate-acting insulin given in the morning
 - If using a long-acting insulin, the dose is given at bedtime

Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #12

❖ Implementation

- Promoting Optimal Response to Therapy—*Insulin Product Administration (continued)*
- Mixing Insulins
 - Regular insulin and NPH can be mixed; clarify with the provider if they should be given together in one syringe or separately
 - If mixing, the short-acting (regular or lispro) or “clear” is drawn into the syringe first and then the long-acting or “cloudy”
 - Premixed insulins are available but cannot be individualized
 - Never mix glargine with any other insulin

Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #13

❖ Implementation

- Promoting Optimal Response to Therapy—*Insulin Product Administration (continued)*
- **Preparing Insulin for Administration**
 - Check the expiration date on the insulin vial
 - Select an appropriate syringe (in units) for the prescribed dose
 - Never substitute a tuberculin syringe for an insulin syringe
 - If the insulin is in a suspension (cloudy), roll or gently tilt the vial back and forth; do not shake

Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #14

❖ Implementation

- Promoting Optimal Response to Therapy—*Insulin Product Administration (continued)*
- Preparing Insulin for Administration (continued)
 - Carefully check the order before preparation and administration of the insulin(s)
 - All air bubbles must be eliminated from the syringe
 - Double check dose and the provider's order before administration with another nurse



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #15

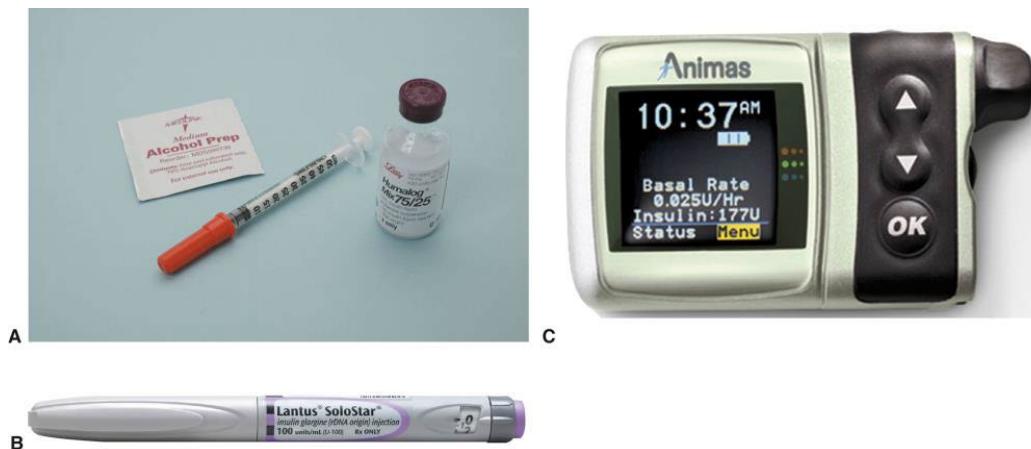
❖ Implementation

- Promoting Optimal Response to Therapy—*Insulin Product Administration (continued)*
- Rotating Injection Sites
 - Insulin can be administered in abdomen, arms, thighs, and buttocks (different rates of absorption from fastest to slowest)
 - Injections sites should be rotated within one area (e.g., abdomen) rather than rotating between areas
 - Insulin injection sites are rotated to prevent lipodystrophy
 - Ask client where last injection was given or check the chart; document the site of administration

Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #16

❖ Implementation

- Promoting Optimal Response to Therapy—*Insulin Product Administration (continued)*
- Methods of Administering Insulin
- Needle and syringe, insulin pen, or insulin pump



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #17

❖ Implementation

- Promoting Optimal Response to Therapy—*Insulin Product Administration (continued)*
- **Dosing**
- Insulin is given as a basal dose and then as bolus doses throughout the day to mimic normal insulin production
- Basal is intermediate- or long-acting and provides baseline glucose control throughout the day and night
- Bolus doses are rapid-acting and are taken before meals based on the client's blood glucose levels and/or how many carbohydrates the client plans to eat or to cover hyperglycemic episodes

Pharmacology in Practice Exercise #2

- ❖ A client with gestational diabetes is administered insulin with an insulin pump. Which of the insulin products will be used in the pump?
 - a) Lantus
 - b) Aspart
 - c) Regular
 - d) Glargine



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #18

❖ Implementation

- Promoting Optimal Response to Therapy—*Hypoglycemics*
 - Hypoglycemics can be administered orally or parenterally; given as single daily doses or divided doses
 - Solutions should never be mixed with insulin
 - The client is typically started on one drug and then a second is added if needed to establish glycemic control
 - Some combination drugs are available to decrease numbers of pills clients need to take
 - If client's blood glucose is not well-controlled, the provider may discontinue the oral hypoglycemic and switch the client to insulin

Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #19

❖ Implementation

- Promoting Optimal Response to Therapy—*Hypoglycemics (continued)*
 - Metformin: administer metformin two or three times a day with meals
 - SGLT-2: should be taken at the same time each day
 - Thiazolidinediones: given with or without meals; if dose missed at usual meal, take drug at the next meal; if the drug is taken, the meal must not be delayed

Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #20

❖ Implementation

- Promoting Optimal Response to Therapy—*Hypoglycemics (continued)*
 - α-Glucosidase inhibitors: given three times a day with the first bite of each meal; monitor response to drugs by periodic testing
 - Sulfonylureas: give glipizide 30 minutes before meal because food delays absorption; chlorpropamide, tolazamide, and tolbutamide are given with food to prevent GI upset; glyburide and glimepiride are administered with the first meal of the day
 - Meglitinides: give repaglinide or nateglinide immediately or up to 30 minutes before meals

Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #21

❖ Implementation

- Monitoring and Managing Client Needs
 - Acute Confusion
 - Monitor closely for signs of hypoglycemia
 - Check blood sugar, and if low, give rescue foods:
 - 4 oz of orange or cranberry juice
 - Hard candy or one or two tablespoons of honey
 - Commercial glucose products (gel or tablets)
 - Glucagon subcut., IM, or IV route
 - Glucose 10% or 50% IV
 - Notify primary healthcare provider if episodes of hypoglycemia occur
 - Document the hypoglycemic treatment

Pharmacology in Practice Exercise #3

- ❖ A client has been prescribed miglitol. The administration of miglitol causes hypoglycemia in the client. What is the nurse's priority intervention in this situation?
 - a) Discuss the disease and methods of control with the client
 - b) Administer insulin to the client
 - c) Administer the client glucose tablets rather than sugar candy
 - d) Obtain capillary blood specimens from the client



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #22

❖ Implementation

- Monitoring and Managing Client Needs
 - Hypovolemia/Dehydration
 - Monitor for signs of DKA
 - Notify healthcare provider if blood glucose levels are elevated or if ketones are present in urine
 - Administer IV fluids, low doses of regular insulin, and medications to correct acidosis and hypotension as ordered by the primary healthcare provider



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #23

❖ Implementation

- Monitoring and Managing Client Needs

- Anxiety

- Encourage client to talk about disorder, express concerns, ask questions
 - Use principles of adult learning to teach client the self-management skills needed for diabetes; start with small obtainable goals



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #24

❖ Implementation

- Monitoring and Managing Client Needs
 - Altered Breathing Pattern
 - Monitor client for symptoms of lactic acidosis, unexplained hyperventilation, myalgia, malaise, GI symptoms, unusual somnolence
 - Contact the primary healthcare provider if symptoms occur



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #25

❖ Implementation—Educating the Client and Family

- Explain the importance of taking the drug as directed and to take the drugs on an empty stomach
- Instruct the client to continue taking the drug even if symptoms get better



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #26

❖ Implementation—Educating the Client and Family

- Explain the importance of following the prescribed diet, physical exercise, and drug regimen
- Refer clients and family members to chronic illness support groups and workshops



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #27

- ❖ **Implementation—Educating the Client and Family**
- ❖ **Include in the teaching plan:**
 - Wear a medical ID bracelet
 - Follow prescribed diet and physical exercise plan
 - Follow the blood glucose or urine testing as directed by the provider
 - How to monitor for hypo- and hyperglycemia
 - Importance of personal hygiene/foot care
 - When to notify the healthcare provider
 - Considerations while travelling with insulin, needles, syringes; proper storage and disposal

Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #28

- ❖ **Implementation—Educating the Client and Family**
- ❖ Injectables teaching plan should include:
 - Type of insulin prescribed, dosing and calculation,
 - Storage of insulin
 - Types of needles and syringes used in administration and how to use them
 - Proper disposal of needles and syringes
 - How insulin dosing may need to change if client becomes stressed or ill (especially with vomiting or fever); contact provider if illness occurs

Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #29

- ❖ **Implementation—Educating the Client and Family**
- ❖ Oral hypoglycemics teaching plan should include:
 - Take the drug exactly as directed; same time at each day; never decrease or increase dose unless instructed to do so by provider
 - Oral antidiabetics cannot be substituted for insulin



Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #30

- ❖ **Implementation—Educating the Client and Family**
- ❖ Oral hypoglycemics teaching plan should include (continued):
 - Metformin: discontinue the drug and notify the provider if signs of lactic acidosis develop (teach signs of lactic acidosis)
 - SGLT2: report signs or symptoms of yeast infection or urinary tract infection to provider; do not begin self-treatment
 - Alogliptin: Report severe and persistent abdominal pain to the provider; may be pancreatitis

Nursing Process—Client Receiving Insulin and/or an Antidiabetic Drug #31

❖ Evaluation

- Was the therapeutic effect achieved and normal or near-normal blood glucose levels maintained?
- Were hypoglycemia and other adverse reactions: identified, reported, and managed?
 - Orientation and mentation remain intact
 - Adequate fluid volume is maintained
 - Anxiety is managed successfully
 - An adequate breathing pattern is maintained
- Did client and family express confidence and demonstrate understanding of drug regimen?

Turn and Talk—Case Study #1

- ❖ A client presents to the physician's office for a routine chronic illness visit. The client has type 2 diabetes, hypertension, and dyslipidemia. The current medication list includes glyburide/metformin (Glucovance) 5/500 mg two tablets twice a day, pioglitazone (Actos) 45 mg every day, simvastatin 20 mg at bedtime, and losartan/hydrochlorothiazide (Hyzaar) 100/25 mg every day. Home blood glucose readings have been 250 to 350 mg/dL 2 hours after meals and 130 to 160 mg/dL fasting.



Turn and Talk—Case Study #2

1. After examining the client's latest A1c, which was 10.5, and looking at the home blood glucose readings, the physician starts the client on insulin glargine (Lantus) 10 mg at bedtime subcutaneously. The physician asks the nurse to teach the client to properly inject the insulin. What should the nurse tell the client about injecting insulin and injection site rotation



Turn and Talk—Case Study #3

2. The nurse should also reinforce understanding of hypoglycemia reactions with the client because of the chance to experience a hypoglycemic episode while on insulin. What information should the nurse provide the client about hypoglycemia?
3. How should the nurse tell the client to treat a hypoglycemic episode?

