Antidiabetic drugs

Two types of diabetes 1&2

**Type one:** usually referred as juvenile diabetes, pancreas dose not make insulin (beta cells)

**Type two:** can be insulin dependant or not, pancreas doesn’t make enough insulin/cells become insulin resistant thus do not lower glucose levels. Try diet alterations/lifestyle changes before medication or oral antidiabetic medications before using injected insulin

**S/Sx of diabetes:** Polydipsia, polyphagia, polyuria

**Onset, peak, duration**:
Onset: when insulin begins to act in the body
Peak: when insulin is working at its max potential
Duration: how long the insulin remains effective

**Uses**
Used to control type one and type two Diabetes
Controls type two when diet and exercise can’t
Treat severe diabetic ketoacidosis
Treats hypokalemia in conjunction with glucose

**Adverse reaction**
The major adverse reaction with any insulin is HYPOGLYCEMIA
Or hyperglycemia

**Do not give**:
If the patient is already hypoglycemic.

**Insulins can be long acting or short acting.**
Oral antidiabetic drugs "oral hypoglycemic" short acting

Mimic or interact with incretin hormones (newer agents)
Treats type 2 diabetes for patients that cant control it with diet and exercise alone
NOT effective for Type 1 diabetes
Can be used with insulin, may decreased the amount of insulin needed
May use two oral hypoglycemics

Sulfonylureas

Adverse reactions
Hypoglycemia, various neurologic symptoms, numbness in extremities

Contraindications;
DKA, severe infection, endocrine disease, there is a risk for cross sensitivity of sulfonylureas and sulfonamides, do not give if they are N.V.D or fasting check BS before giving

Non sulfonylureas

Adverse reactions:
GI upset

Contraindications
HF, Renal disease, acute or chronic metabolic acidosis including ketoacidosis
** metformin is temporarily discontinued for surgical procedures****

Meglitantides stimulate production of beta, give with meals 3x a day (shorter acting)

Biguanides: "metformin" usually start with these drugs works in the liver to decrease glucose production, metabolized in the kidneys, use caution when given with CT contrast, hold metformin before CT/Contrast(48 hours before and after) and monitor kidney function

Alphaglucodase inhibitors: usually given with another oral antidiabetic, delays the gastric absorption of carbs.

Thiazolidinediones: "glidizones" decrease insulin resistance in peripheral cells used in conjunction with metformin and/or sulfonylureas
Incretin mimetics: "Peptide" mimics insulin only one is sub q the rest are oral, xentide bietta mimicks incretin to act like insulin, stimulates beta, decrease glucagon via the liver.
Nursing actions
Insulin doesn’t always treat diabetes ,Use of corticosteroids cause blood sugar to increase thus needing insulin, continuous tube feedings cause increased blood sugars . Always obtain a blood glucose level before administration . Have they eaten? Are they NPO? HYPOGLYCEMIA usually occurs at peak of insulin . Give rapid insulin on a sliding scale . Educate patient on s/sx of hypoglycemia

**Insulins Rapid acting**

**Regular:** Humalin r, Novalin R  
**Uses:** IDDM onset: 30-60 min, peak: 2-4 HR, duration: 8-2 HR  
**Adverse Reactions:** Hypoglycemia  
**Nursing Actions:** check blood glucose levels and labs

**Lispro:** Humalog  
**Uses:** Onset: 5-10 min Peak: 30min-1.5HR Duration: 2-2.5 HR  
**Adverse Reactions:** same  
**Nursing Actions:** monitor blood sugar levels be aware of hypoglycemia

**Aspart:** Novalog  
**Uses:** Onset: 5-10min Peak: 1-3 HR Duration: 3-5 HR  
**Adverse Reactions:** same  
Nursing Actions:

**Insulins Intermediate Acting**

**NPH:** Humalin , Novolin  
**Uses:** onset: 1.5 Hr / Peak: 4-12/ Duration:24 hours  
**Adverse Reactions:** hypoglycemia  
**Nursing Actions:** check blood glucose levels

**Insulins Long Acting**

**Insulin glargine:** Lantus  
**Uses:** onset: 1Hr/ Peak: steady no peak / Duration:  
**Adverse reactions:** same  
**Nursing Actions:** same

**Insulin detemir:** levemir  
**Uses:** Onset: 2hr / Peak: 3-14 HR / Duration: 24 Hr
ANTIDIABETICS ORAL

Sulfonylurea's

Glimipride: amaryl
Uses: may be used with insulin, as an adjunct to diet and exercise, type 2 diabetes
Adverse Reactions: Hypoglycemia

Glipizide: Glucotrol/xl
Uses: type 2 diabetes adjunct to diet and exercise
Adverse Reactions: hypoglycemia

Glyburide: Dibeta
Uses: same
Adverse reactions: same

Sulfonylurea's and Meglitinides combo

Nateglidnide: starlix
Uses: Given with metformin for type 2 diabetes before meals
Adverse Reactions: upper respiratory tract infection, flue symptoms, back pain

Repaglinide: Prancing
Uses: same before meals
Adverse reactions: hypoglycemia

A-Glucoside inhibitors

Acarbose: Precise (3x day)
Uses: diabetes 2, in conjunction with sulfonylureas to enhance glycemic control
Adverse Reactions: flatulence and abdominal pain

Biguanides

Metformin: fortamet, Glucophage, Riomet
Uses: type 2 diabetes with a sulfonylurea or insulin to improve glycemic control
Adverse Reactions: hypoglycemia, asthenia

Thiazolidinediones

Pioglitazone: Actos
Uses: type 2 diabetes with a sulfonylurea or metformin or insulin to improve glycemic control
Adverse Reactions: myalgia, hypoglycemia
Rosglitazone: Avandia
Uses: type 2 diabetes with metformin for better glycemic control
Adverse reactions: same + infections

Incretin mimetic

Sitagliptin: januvia
Uses: Type 2 diabetes
Adverse reactions: same

Exenatide: Byetta given SUB Q
Uses: Type 2 diabetes
Adverse reactions: same

Glucose elevating agents

Glucagon: emergency kit
Uses: Hypoglycemia
Adverse reaction: general allergic reactions
**Nursing alerts**

When giving an A-Glucosidase inhibitor give the PT an form of glucose such as glucose tablets or dextrose because absorption of sugar blocked by these drugs.

Exposure to stress, fever, infections, surgery, or trauma may cause a loss of control of blood glucose, if this occurs loss of control with an oral antidiabetic could happen and the provider may prescribe insulin and stop the oral antidiabetic, insulin requirements may also change.

Have the patient keep logs of blood glucose levels.

Always check accuracy, too much insulin can result in sudden hypoglycemia.

Do not mix or dilute gargling with any other insulin due to loss of glucose control.

Insulin pens are patient specific for multi use and should never be shared.

Regular insulin is clear, intermediate and long acting insulins are cloudy and need agitated before use. Clear insulin should be drawn first then cloudy when mixing.

Diabetic DRUGS

**THREE BLOOD TESTS FOR DIABETES**

Play list

*Trick to remember insulin*

*Insulin drug and function*

*ACTOS*

*ANTIDIABETIC METFORMIN (GLUCOPHAGE)*

*WEIGHT LOSS WITH HIGH SUGAR*

*HYPERGLYCEMIC NURSING INTERVENTIONS*

*HYPOGLYCEMIA INTERVENTIONS*
Pituitary and Adrenocortical Hormones
( posterior pituitary)

Vasopressin and desmopressin regulate the reabsorption for H2O by the kidneys and is secreted when body fluids must be preserved (states of dehydration) usually activated by severe vomiting or diarrhea with little to no fluid intake. Also used to treat diabetes insipidus (failure of the pituitary to secrete ADH) also treats post op abdominal distention.

**Adverse reactions**
H2O intoxication, tremor, sweating, vertigo, nasal congestion, N.D, abdominal cramps

**Contraindications/precautions**
Used cautiously in Pts with a History of seizures, migraines, HF, vascular disease, asthma

**Posterior pituitary hormones given IM or subQ**

**Desmopressin:** DDAVP  
**Uses:** diabetes insipidus, hemophilia, nocturnal enuresis, deficient fluid volume  
**Adverse reactions:** H2O Intoxication

**Vasopressin:** ADH  
**Uses:** Same+ post op abdominal distention  
**Adverse reaction:** same

Monitor fluid volume and electrolytes carefully, these patients are usually in the ICU or have suffered severe head trauma causing damage to the pituitary gland.
**Growth hormones/hormone inhibitors**

"SOMATOTROPIC" HORMONE. Secreted by the anterior pituitary, regulates growth of the patient, must be given weekly SubQ before the closure of the bones epiphyseal plates, regulates the release of TSH and can cause hypothyroidism and joint pain

**Contraindication/precaution**

Epiphyseal or cranial lesions, sensitivity to benzoyl alcohol. Use caution when giving to patients with thyroid disease and diabetes

**Adverse reactions**

With injections: diarrhea and arthralgia
Long term: growth problems, bone and ear edema
Bradycardia, hypoglycemia and pain at the injection site

**Growth hormones/hormone inhibitors**

**Somatropin:**
**Uses:** growth failure
**Adverse Reactions:** Injection: diarrhea and arthralgia / Long Term: growth problems, bone and ear edema

**Octreotide:**
**Uses:** reduction of GH in acromegaly
**Adverse reactions:** bradycardia, hypoglycemia, injection site pain
**Adrenocorticotropic hormones**

Hormones secreted by the adrenal cortex, glucocorticoids and mineralcorticoids, corticotropin (ACTH) is an anterior pituitary hormone that stimulates the adrenal cortex to release cortisol.

**Adrenocorticotropic drugs**

**Adrenocorticotropic hormone**: ACTH (20 units IM)

**Uses**: diagnose adrenocorticotropic function, non suppurative thyroiditis, hypercalcemia (cancer), MS (acute exacerbation)

**Adverse reactions**: contraindicated in pts with adrenocorticotrophic insufficiency, allergy to pork, synthetic fungal infections, ocular herpes

**Cosyntropin**: cortysin

**Uses**: screening tool for adrenal insufficiency

**Glucocorticoids Actions**

- **REGULATE MULTIPLE BODY FUNCTIONS**
- Antiinflammatory response
- Regulates blood pressure: keep and eye on BP
- Metabolism of carbohydrates/fat
- Interferes with the immune response: delays organ rejection
- Protection during stress
- CNS response: psychosis, euphoria, excitability

**Glucocorticoid uses 43.1**

**Endocrine disorders**: thyroiditis, adrenal cortico insufficency, hypercalcemia (cancer)

**Rheumatic disorders**: ankylosing, bursitis, arthritis,

**Collagen disease**: lupus, rheumatic carditis, dermatomyosistus

**Dermatologic disorders**: SJS, psoriasis

**Allergic states**: asthma, bronchosmaspm

**Ophthalamic disease**: herpes zoster of the eye, iritis, optic neuritis

**Respiratory disease**: allergic rhinitis, pulmonary TB, aspiration pneumonia

**Hematologic disorders**: thrombocytopenia pupura, hematolytic anemia, all anemia

**Neoplastic diseases**: lymphoma, leukemia

**Edemetaus state**: induces diuresis

**Gl diseases**: ulcerative colitis, regional enteritis

**Nervous system disorders**: acute exacerbation of MS
GLUCOCORTICOIDS ADVERSE REACTIONS 43.2

**Fluid and electrolyte imbalance:** hypokalemia alkalosis

**Musculoskeletal disturbance:** loss of mass, tendon rupture, necrosis of femoral and homeral heads

**Cardiovascular disturbance:** thromboembolism, fat embolism, necrotizing Angitis, fatal arrhythmia

**GI disturbance:** pancreatitis, ulcerative esophagitis

**Dermatological disturbance:** impaired wound healing

**Neurologic disturbances:** convulsions, increased intracranial pressure, vertigo, headache

**Endocrine disturbances:** amenorrhea, menstrual irregularities, cushingoid symptoms, growth suppression in children

**Ophthalmic disturbances:** subcapsular cataracts, increased intraocular pressure, exophthalmos

**Metabolic disturbances:** negative nitrogen balance

**Other disturbances:** anaphylaxis, aggravates existing infections, decreased sperm motility
**Glucocorticoids (keep and eye on bp)**

**Budesonide:** Entocort  
**Uses:** see above plus crohns disease  
**Adverse reactions:** cardiac arrhythmia, hypertension, increased appetite and weight gain, impaired wound healing, thin fragile skin, insomnia, cushingoid state

**Cortisone:**  
**Uses:** see 43.1  
...: same

**Dexamethasone:**  
**Uses:** cerebral edema + 43.1  
**Adverse reactions:** same

**Methylprednisone:**  
**Uses:** see 43.1  
**Adverse reactions:** same

**Prednisone:** medrol  
**Uses:** 43.1  
**Adverse reactions:** 43.2

Never discontinue suddenly, dose must be reduced gradually, never omit a dose if a dose is missed contact the primary care provider immediately. Monitor older adults for exacerbation of existing conditions.

**Thyroid drugs**

Increase the metabolic rate of tissues thus increasing HR, RR, TEMP, CO, O2, and metabolism of fats and carbs.

**Uses**

Treat hypothyroidism caused by: thyroiditis, supplement after hyperthyroid treatment, goiter, thyroid nodules, depression, thyroid cancer. Levothyroxine is the drug of choice, it is inexpensive, only once a day dose, more uniform potency.

**Adverse reactions**

Drug is usually titrated, possible hyperthyroidism

**Contraindication**

Uncorrected adrenal cortical insufficiency, thyroxicosis, not for obesity or fertility. Use caution when giving to patients with cardiac disease and pregnancy and lactation

**Interactions**

Oral hypoglycemics/insulin: increase the risk of hypoglycemia
Oral anticoagulants: prolong bleeding

**Nursing actions**
Thyroid hormone replacement drugs should not be changed unless you talk to your doctor, they have different potencies.

**Thyroid stimulating drugs**

*Levothyroxine*: Levothroid

**Uses**: Hypothyroidism, TSH supression, thyrotoxicosis, diagnostic testing, goiter, thyroid cancer, thyroiditis

**Adverse reactions**: palpitation, tachycardia, titration due to possible OD causing hyperthyroidism

*Liotrix*: Thyrolar

**Uses**: Same

**Adverse reactions**: same

*Desicated thyroid*: Armour

**Uses**: same

**Adverse reactions**: Same

**Antithyroid drugs**

Inhibit the manufacture of thyroid hormone.

Radioactive iodine is used because the thyroid has an affinity for iodine

Antithyroid drugs may be used before surgery to get the patient to a normal thyroid state also reducing vascularity and decreasing bleeding

**Uses**
Hyperthyroidism, cancer of the thyroid ,

**Contraindications**
Breastfeeding (methimazole) pregnancy( isotope)
Allergy to iodine, can cause hypothyroidism in the fetus

**Adverse reactions**
Agranulocytosis, exfoliative dermatitis, granulocytopenia, hypoprothrominemia,
Antithyroid drugs

Methimazole: parole long term
Uses: hyperthyroidism
Adverse reactions: see above

Propylthiouracil
Uses: same
Adverse reactions: same

Iodine products

Sodium iodide: isotope
Uses: eradicate hyperthyroidism, some cancers, may be given orally with methimazole
Adverse reactions: bone marrow depression, itching rash and hives
Male and female hormone

Androgens/anabolic steroids

Androgens: testosterone causes reproductive maturation of the male sex organs and puberty transdermal testosterone is used as a replacement for when the body isn't producing it.

Adverse reactions: breast enlargement, testicular atrophy, inhibit testicular fx, impotence, baldness, in women Amenorrhea, and acusition of male sexual characteristics (virilization)

Anabolic steroids: synthetic androgens, management of anemia or renal insufficiency, control metastatic breast cancer in women, these can cause death in young males

Adverse reactions: virilization in women, acne, jaundice, testicular atrophy, cysts of the liver, and spleen, mental changed and increased risk for atherosclerosis

Uses: testosterone deficit, hypogonadism (little to no balls), delayed puberty, test deficit post puberty, for females: postmenopausal breast carcinoma, premenopausal hormone dépendant breast carcinoma

When given to a diabetic monitor glucose levels as they can cause hypoglycemia do not give to older adults with cardiac problems. These are contraindicated in pts with liver disease and prostate disorders

Female hormones

Estrogens

Used most commonly with progesterone for birth control. Or as ERT,

Adverse reactions: mental depression, chloasma, breakthrough bleeding, change in menstrual flow, dysmenorrhea, pms, yeast infections, cervical erosion, vaginitis pain at injection site, or abscess, redness and irritation with transdermal preparations, seeping of corneal curvature, venous thromboembolism

Progestin

Used in treatment of amenorrhea, endometriosis, oral contraceptive combo

Adverse reactions: breakthrough bleeding and spotting, breast tenderness, weigh loss/gain, acne, chloamsa, mental depression

Contraindications and precautions

Breast cancer, estrogen dependant neoplasms, genital bleeding and thromboembolytic disorders, pregnancy catagory x, use caution when on antibiotics
**Uterine drugs**

**Oxytocic drugs**

Used antepartum to induce contractions, stimulate the uterus, given when we need to stimulate labor for conditions like eclampsia and preeclampsia.

**Oxytocin**

Hormone released by the posterior pituitary, acts on uterine smooth muscle.

**Adverse reactions**

Fetal bradycardia, uterine rupture, uterine hypertonicity, cardiac arrhythmia, anaphylactic reaction, h20 intoxication may occur.

**Contraindication**

Cephalopelvic disproprtions, unfavorible fetal positions.

**Other uterine stimulants**

Increase the strength and duration of contractions, decrease uterine bleeding post partum, uterine Antony,

**Adverse reactions**

Elevated BP, temporary chest pain, h20 intoxication,

**Contraindications**

Ob emergancies, fetal distress, severe eclampsia and preeclampsia, placenta Previa

All patients receiving IV oxytocin must be under constant supervision attending HCP should be immediately available.

**Oxytocin**

Carbopost: hemabate given IM

**Uses**: post partum uterine hemorrhage

**Adverse reactions**: fetal bradycardia

**Oxytocin**: pitocin

**Uses**: antepartum to induce labor postpartum and stop bleeding

**Adverse reactions**: pelvic hematoma, postpartum bleeding, cardiac arrhythmia, anaphylactic reactions, fetal bradycardia

**Tocylitics**

Manage pre term labor

Contraindicated in preeclampsia increase CNS effects (magnesium)

**Indomethacin**: indocen

**Uses**: preterm labor

**Adverse reaction**: prolonged vaginal bleeding

**Magnesium**: 

**Uses**: same+ seizure control

**Adverse reactions**: itching burning flushing, depressed reflexes, and flaccid paralysis, diplopia