Diabetes Medications: Oral Medications

Medication Types

1. Biguanides
2. Sulfonylureas
3. Thiazolidinediones (TZDs)
4. Alpha-Glucosidase Inhibitors
5. D-Phenylalanine Meglitinides
6. SGLT-2 inhibitors
7. DPP-4 inhibitors
8. Combination Oral Medications

1. Biguanides
   This works by lowering blood glucose by reducing the amount of glucose produced by the liver and helping the body respond better to the insulin made in the pancreas. Metformin can be used with diet and exercise or with other agents, diet, and exercise.

   Types of Biguanides:
   - Metformin (Glucophage) 500mg/1000mg
   - Metformin (Glucophage XR) 500mg/1000mg
   - Fortamet (extended release) 500mg/1000mg
   - Riomet (oral solution) 500mg/5ml

   Side Effects:
   - Cramping
   - Gas
   - Diarrhea
   - Taking the pill before meals may decrease stomach upset
2. **Sulfonylureas**

Sulfonylureas stimulate the pancreas to produce insulin and cause the body to respond better to the insulin it does produce. Sulfonylureas can be used alone or in combination with other medications.

**Types of Sulfonylureas:**

- Glimepiride (Amaryl)
- Glipizide (Glucotrol, Glucotrol XL)
- Glyburide (Diabeta, Micronase)
- Glyburide, micronized (Glynase)
- Tolbutamide (Orinase) 1st generation
- Tolazamide (Tolinase) 1st generation
- Acetohexamide (Dymelor) 1st generation
- Chlorpropamide (Diabinese) 1st generation

**Side Effects:**

- Hypoglycemia
- Upset stomach
- Weight gain
- Skin rash

3. **Thiazolidinediones (TZDs)**

TZDs primarily reduce insulin resistance by improving target cell response (sensitivity) to insulin. They also can decrease glucose output from the liver and increase glucose disposal in the skeletal muscles.

**Types of TZDs:**

- Pioglitazone (Actos) 15-45 mg Actos may be taken with or without food
- Avandia—off the market

**Side Effects:**

- Jaundice
- Nausea and vomiting
- Stomach pain
- Dark urine
- Swelling
- These medicines are generally safe and do not cause hypoglycemia when used alone.
- These medicines can take 2-12 weeks to become effective.
- Use caution when taking if you have liver or heart disease
4. **Alpha-Glucosidase Inhibitors**

Alpha-glucosidase inhibitors block the enzymes that break down starches so that they are slowly absorbed. This blunts the increase in blood glucose that occurs after eating. To be effective, take them with the first bite of food at all meals.

**Types of Alpha-glucosidase inhibitors:**
- Acarbose (Precose) 75-300 mg 2-3 times per day with food
- Miglitol (Glyset) 75-300 mg 2-3 times per day with food

**Side Effects:**
- Bloating
- Gas
- Diarrhea
- The side effects generally disappear after 6 months

5. **D-Phenylalanine Meglitinides**

This type of drug causes the beta cells to release insulin. It is different than sulfonylurea in that it works quickly and its effects are glucose-dependent. For greatest effectiveness, take 15 minutes before each meal or snack.

**Types of D-Phenylalanine Meglitinides:**
- Repaglinide (Prandin)
- Nateglinide (Starlix)

**Side Effects:**
- Weight gain
- Hypoglycemia
6. **SGLT-2 Inhibitors**

Also known as sodium-glucose, cotransporter-2 inhibitors lower blood glucose and also reduce weight and blood pressure. They work by causing the kidneys to remove sugar from the body through the urine and are available as single agents or in combination with other diabetes medicines such as metformin. All may be taken with or without food. They do not cause weight gain in fact, they may cause a little weight loss.

**Types of SGLT-2 Inhibitors:**
- Invokanna (Canagliflozin) 100mg and 300mg
- Farxiga (Dapagliflozin) 5mg and 10mg
- Jardiance (Empagliflozin) 10mg and 25mg

**Side Effects of SGLT2:**
- Has been associated with female genital mycotic infections
- Yeast infections
- Urinary tract infections
- Increased urination
- Hyperkalemia
- Hypoglycemia, especially if combined with other oral diabetes medications and/or insulin.

*Note: SGLT2 has been associated with increased risk of DKA if consuming a very low carbohydrate or no carbohydrate diet.*

7. **DPP-4 inhibitors**

Also known as dipeptidyl peptidase 4 inhibitors inhibit the enzyme dipeptidyl peptidase 4 and regulate the levels of insulin the body produces after a meal. Dipeptidyl peptidase 4 inhibition results in increased activity of incretins, which inhibits glucagon release. This leads to increased insulin secretion, decreased gastric emptying and therefore decreased blood sugar levels. DPP-4’s can be taken with or without food. They don’t cause weight gain and have a low risk of hypoglycemia.

**Types of DPP-4 inhibitors:**
- Saxagliptin (Onglyza) 5mg
- Sitagliptin (Januvia) 50mg and 100mg
- Linagliptin (Tradjenta) 5mg
- Alogliptin (Nesina) 25mg

**Side Effects:**
- May cause upper respiratory tract infection
- Sore throat
- Headache
8. **Combination Oral Medications**

Combination medications include agents from two different medicines that are combined in one pill. Purpose of combination medications is to make it easier for the patient to follow multiple drug regimens. Advantages: taking one medication as opposed to two pills.

**Types of Combination Medications:**

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dosages</th>
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<tbody>
<tr>
<td>Glucovance (metformin/glyburide)</td>
<td>1.25 mg/250mg; 20 mg/2000mg</td>
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<tr>
<td>Metaglip (glipizide/metformin)</td>
<td>2.5mg/250mg; 20 mg/2000mg</td>
</tr>
<tr>
<td>Actos plus met (pioglitazone HCL/metformin)</td>
<td>15mg/500mg; 15mg/850mg</td>
</tr>
<tr>
<td>Duetact (pioglitazone and glimepiride)</td>
<td>30mg/2mg; 30g/4mg</td>
</tr>
<tr>
<td>Janumet (sitagliptin and metformin)</td>
<td>50mg/500mg; 50mg/1,000mg</td>
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<tr>
<td>Janumet XR (sitagliptin and metformin HCl extended release)</td>
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</tr>
<tr>
<td>Jentadueto (linagliptin and metformin)</td>
<td>2.5mg/500mg; 2.5mg/850mg;</td>
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<tr>
<td></td>
<td>2.5mg/1,000mg</td>
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<tr>
<td>Kombiglyze XR (saxagliptin and metformin XR)</td>
<td>5mg/500mg; 5mg/1,000;</td>
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<tr>
<td></td>
<td>2.5mg/1,000mg</td>
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<tr>
<td>Xigduo XR (dapagliflozin/metformin HCL extended release)</td>
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<tr>
<td>Invokamet (canagliflozin/metformin HCL)</td>
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