Metformin

Metformin is part of the Biguanide class of diabetic drugs. It is the first line medical treatment for diabetes mellitus type 2 and can also be used for PCOS. Its exact mechanism of action is not fully understood, but this medication leads to decreased gluconeogenesis and increased insulin sensitivity to lower blood sugar levels. Side effects of this drug include lactic acidosis, GI distress, weight loss, and vitamin B12 deficiency. Metformin should be avoided in patients with renal failure.



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Indications

Diabetes Mellitus Type 2
Dyed-bead Pancreas in a (2) Tutu
Metformin is the first line medical therapy for patients with type 2 diabetes mellitus (T2DM) because unlike other antidiabetic agents, it does not cause hypoglycemia.

Polycystic Ovary Syndrome (PCOS)
Peacock with PCOS
Metformin can be used in PCOS particularly in women with co-morbid insulin resistance, as evidenced by the presence of type 2 diabetes or lab measures of insulin resistance. It can also assist with weight loss.

Mechanism of Action

Decreased Gluconeogenesis
Down-arrow Glue-genie
Metformin has multiple mechanisms of action. Metformin decreases hepatic gluconeogenesis via inhibition of mitochondrial glycerophosphate dehydrogenase (mGPD), an enzyme which normally facilitates the conversion of glycerol to glucose.

Increased Insulin Sensitivity
Up-arrow Insect-syringe at Sensitive-tears
Metformin also increases insulin sensitivity, which is the primary affliction in patients with T2DM. Metformin helps increase peripheral glucose uptake, helping to lower the blood sugar.

Side Effects

Lactic Acidosis
Lake Acidic-lemon
Metformin can cause elevations in lactate levels due to its inhibition of gluconeogenesis and prevention of lactate being converted to glucose. Therefore a side effect can be lactic acidosis, seen especially in cases of overdose or concurrent renal failure.

GI Distress
GI with Flare-gun
Metformin use can cause GI distress. It is associated with diarrhea, nausea and vomiting.

Weight Loss
Baggy-pants
This drug promotes weight loss, which is actually a favorable side effect for most patients.

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B12 Deficiency

(12) Dozen Viking (B) Bees Broken

Another side effect of metformin is inhibition of vitamin B12 and/or folate absorption from the gastrointestinal tract.

Contraindication

GFR < 30 ml/min

Gopher < (30) Dirty

Due to the increased risk of lactic acidosis, metformin is contraindicated in patients with a GFR < 30 ml/min. Patients whose GFR is greater than 45ml/min are generally considered to be candidates for a full dose of metformin. Patients whose GFR is 30-45 should be closely monitored and prescribed metformin judiciously. For patients receiving intravenous contrast for radiologic studies, metformin may be stopped for a period of time since contrast increases the risk of acute kidney injury.

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