pioglitazone (pi-o-glit-a-zone)

**Synonyms:**

**Classification:** Therapeutic: antidiabetics (oral)
Pharmacologic: thiazolidinediones

**Pregnancy Category:** C

**Indications**

Type 2 diabetes mellitus (with diet and exercise); may be used with metformin, sulfonylureas, or insulin.

**Action**

Improves sensitivity to insulin by acting as an agonist at receptor sites involved in insulin responsiveness and subsequent glucose production and utilization. Requires insulin for activity.

**Therapeutic Effects:** Decreased insulin resistance, resulting in glycemic control without hypoglycemia.

**Pharmacokinetics**

**Absorption:** Well absorbed following oral administration.

**Distribution:** Unknown.

**Protein Binding:** 99% bound to plasma proteins. Active metabolites are also highly (99%) bound.

**Metabolism and Excretion:** Extensively metabolized by the liver (primarily by CYP2C8); at least two metabolites have pharmacologic activity. Minimal renal excretion of unchanged drug.

**Half-life:** Pioglitazone—3–7 hr; total pioglitazone (pioglitazone plus metabolites)—16–24 hr.

**TIME/ACTION PROFILE (effects on blood glucose)**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
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<tbody>
<tr>
<td>PO</td>
<td>30 min</td>
<td>2–4 hr</td>
<td>24 hr</td>
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**Contraindications/Precautions**

- Hypersensitivity; Type 1 diabetes; Diabetic ketoacidosis; Clinical evidence of active liver disease or ALT (2.5 times upper limit of normal);
- Active bladder cancer; OB, Lactation: Insulin should be used to control blood glucose levels; Pedi: Children
- Use Cautiously in: Edema; HF (avoid use in moderate to severe HF); Hepatic impairment; History of bladder cancer; Women (may ↑ distal upper and lower limb fractures); Women with childbearing potential (may restore ovulation and ↑ risk of pregnancy).

**Adverse Reactions/Side Effects**

- CV: CHF, edema.
- EENT: macular edema.
- GI: LIVER FAILURE, ↑ liver enzymes.
- GU: BLADDER CANCER (especially after ≥1 yr); Hemat: anemia.
- MS: RHABDOMYOLYSIS; frac- tures (arm, hand, foot) in female patients.
- Misc: fractures (arm, hand, foot) in female patients.

**Interactions**

**Drug-Drug:** May ↓ efficacy of hormonal contraceptives. Strong CYP2C8 inhibitors, including gemfibrozil, may ↓ levels. Ketoconazole may ↑ effects of pioglitazone. Concurrent use with insulin may ↑ risk of fluid retention and worsening HF.

**Drug-Natural Products:** Glucosamine may worsen blood glucose control. Chromium and coenzyme Q-10 may produce hypoglycemic effects.

**Route/Dosage**

**PO (Adults):** No heart failure—15–30 mg once daily; may be ↑ in increments of 15 mg/day to 45 mg/day if needed; NYHA class I-II heart failure—15 mg once daily; may be ↑ in increments of 15 mg/day to 45 mg/day if needed; Concurrent use of gemfibrozil—do not exceed 15 mg once daily.

**NURSING IMPLICATIONS**

**Assessment**

- Observe patient taking concurrent insulin for signs and symptoms of hypoglycemic reactions (sweating, hunger, weakness, dizziness, tremor, tachycardia, anxiety).
- Assess for signs and symptoms of heart failure (edema, dyspnea, rapid weight gain, unusual tiredness) after initiation and with dose increases.
- Lab Test Considerations: Monitor serum glucose and Hb A1C periodically during therapy to evaluate effectiveness.

**NURSING CONSIDERATIONS**

- Obtain blood glucose and Hb A1C periodically during therapy. May cause ↑ in homogentisic and homovanillic acid levels and in homogentisate and homovanillic acid levels.
Monitor serum AST, ALT, alkaline phosphatase, and total bilirubin levels before starting therapy and periodically thereafter or if jaundice or symptoms of hepatic dysfunction occur. Pioglitazone should not be started in patients with active liver disease or ALT levels ≥ 2.5 times the upper limit of normal. Patients with mildly elevated ALT should have more frequent monitoring. If ALT > 3 times the upper limit of normal, recheck ALT promptly. Discontinue pioglitazone if ALT remains > 3 times normal.

May cause transient increases in CPK levels.

Potential Nursing Diagnoses

- Imbalanced nutrition: more than body requirements (Indications)
- Noncompliance (Patient/Family Teaching)

Implementation

- Do not confuse Actos (pioglitazone) with Actonel (risedronate).

Patient/Family Teaching

- Insist on medication as directed. If dose for 1 day is missed, do not double dose the next day.
- Explain to patient that this medication controls hyperglycemia but does not cure diabetes. Therapy is long term.
- Review signs of hypoglycemia and hyperglycemia with patient. If hyperglycemia occurs, advise patient to take a glass of orange juice or 2–3 tsp of sugar, honey, or corn syrup dissolved in water and notify health care professional.
- Emphasize the importance of routine follow-up exams.

Evaluation/Desired Outcomes

- Control of blood glucose levels.

Why was this drug prescribed for your patient?