Table 15f. Antiretroviral Therapy-Associated Adverse Effects and Management Recommendations—Insulin Resistance, Asymptomatic Hyperglycemia, Diabetes Mellitus  

(Last updated April 16, 2019; last reviewed April 16, 2019)

<table>
<thead>
<tr>
<th>Adverse Effects</th>
<th>Associated ARVs</th>
<th>Onset/Clinical Manifestations</th>
<th>Estimated Frequency</th>
<th>Risk Factors</th>
<th>Prevention/Monitoring</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin Resistance, Asymptomatic Hyperglycemia, DM*</td>
<td>ZDV, LPV/r, and possibly other PIs</td>
<td>Onset: • Weeks to months after beginning therapy</td>
<td>Children:</td>
<td>Risk Factors for Type 2 DM:</td>
<td>Prevention: • Lifestyle modification</td>
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<td></td>
<td></td>
<td>Presentation: • Asymptomatic fasting hyperglycemia (which sometimes occurs in the setting of lipodystrophy), metabolic syndrome, or growth delay</td>
<td></td>
<td>• Lipodystrophy</td>
<td>Monitoring: • Monitor for signs of DM, change in body habitus, and acanthosis nigricans.</td>
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<tr>
<td></td>
<td></td>
<td>• Symptomatic DM (rare)</td>
<td></td>
<td>• Metabolic syndrome</td>
<td>Obtain RPG Levels at: • Initiation of ARV therapy</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Family history of DM</td>
<td>• 3 months–6 months after therapy initiation</td>
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<td></td>
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<td></td>
<td></td>
<td>• High BMI (obesity)</td>
<td>• Once a year thereafter For RPG ≥140 mg/dL:</td>
<td></td>
</tr>
</tbody>
</table>

* Insulin resistance, asymptomatic hyperglycemia, and DM form a spectrum of increasing severity.

**Insulin Resistance:** Often defined as elevated insulin levels for the level of glucose observed.

*Impaired FPG:* Often defined as an FPG of 100–125 mg/dL.

*Impaired Glucose Tolerance:* Often defined as an elevated 2-hour PG of 140–199 mg/dL in a 75-g OGTT (or, if the patient weighs <43 kg, 1.75 g per kg of glucose up to a maximum of 75 g).

**Diabetes Mellitus:** Often defined as either an FPG ≥126 mg/dL, and RPG ≥200 mg/dL in a patient with hyperglycemia symptoms, an HgbA1c of ≥6.5%, or a 2-hour PG ≥200 mg/dL after an OGTT.

However, the Panel does not recommend performing routine measurements of insulin levels, HgbA1c, or glucose tolerance without consulting an endocrinologist. These guidelines are instead based on the readily available RPG and FPG levels.

**Key to Acronyms:** ABC = abacavir; ARV = antiretroviral; BMI = body mass index; dL = deciliter; DM = diabetes mellitus; FPG = fasting plasma glucose; HgbA1c = glycosylated hemoglobin; LPV/r = lopinavir/ritonavir; OGTT = oral glucose tolerance test; PG = plasma glucose; PI = protease inhibitor; RPG = random plasma glucose; TAF = tenofovir alafenamide; TDF = tenofovir disoproxil fumarate; ZDV = zidovudine
References


