Testing Your Insulin Sensitivity Factor

An insulin sensitivity factor refers to the number of points 1 unit of rapid acting insulin lowers your blood glucose. The goal of your insulin sensitivity factor, ISF, is to bring your blood glucose level into target if it is elevated. If your ISF is set correctly, your blood glucose should decrease into target range 3-4 hours after the correction bolus is given. You determine your ISF by using the “1800 Rule.” To estimate your ISF you need to determine your average total daily insulin dose, TDD, and divide 1800 by your TDD.

Example: Brian uses Humalog insulin at a ratio of 1 unit per 15 grams of carbohydrate with each meal and snack. He also takes 36 units of Lantus insulin at bedtime. Below is the calculation of his estimated TDD.

Breakfast: 8 units Humalog +
Lunch: 5 units Humalog +
Snack: 3 units Humalog +
Dinner: 8 units Humalog +
Bedtime: 36 units Lantus
TDD: 60 units

1800 divided by 60 = 30

* 1 unit of Humalog decreases Brian’s blood glucose by approximately 30 mg/dL (points)

Example: Brian forgot to take his Humalog at lunch. It is now 3:00 p.m. and Brian’s blood glucose is 350 mg/dL.

Current blood glucose = 350 mg/dL
- (minus)
* Target blood glucose = 140 mg/dL
Gucose needs to drop 210 mg/dL (points)

210 (how far blood glucose needs to drop) divided by 30
= 7 units

* Brian needs to take 7 units of Humalog to decrease his blood glucose to approximately 140 mg/dL.
The following are important in order to test your ISF:

- Your blood glucose level needs to be above target (preferably above 180 mg/dL)
- You have not bloused or eaten within 3 hours
- You should plan to not eat for 3 ½ -4 hours after you give your correction bolus
- Your basal rates have been tested and set correctly

Once you start the test, check your blood glucose every hour for 4 hours. If your ISF is correct, your blood glucose should decrease to within 30 points of your target blood glucose 3 ½-4 hours after the correction bolus is given. The test should be repeated at least 2 times to confirm an accurate ISF.

**Example:** Your blood sugar is 312 mg/dL. Your ISF is 1:70.

Current blood glucose= 312 mg/dL
- (minus)
* Target blood glucose= 140 mg/dL
Glucose needs to drop 172 mg/dL

172 mg/dL divided by 70= 2.45 units (round up to 2.5 units)
* You need to take 2.5 units of rapid acting insulin (Humalog, Novolog, or Apidra) to decrease your blood glucose to approximately 140 mg/dL.

Take your bolus and start the test.
0 hour= 312 mg/dL
1 hour= 215 mg/dL
2 hours= 150 mg/dL
3 hours= 119 mg/dL
4 hours= 115 mg/dL

* Blood glucose is within 30 mg/dL of target blood glucose of 140 mg/dL. Repeat test 2 times to verify results.

- If your blood glucose is more than 30 points above your target, retest another time using a smaller number
  Example: your ISF was 1:50, try 1:45

- If your blood glucose is more than 30 points below your target, retest another time using a larger number
  Example: your ISF was 1:50, try 1:55
**Point to remember:**
You should only need to use correction boluses for occasional high blood glucose readings. If you find that you are correcting for elevated blood glucose readings everyday, you need to first look for patterns and then increase your basal rates or meal-time boluses accordingly.

**References:**

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