Saskatchewan Drug Information Services
College of Pharmacy and Nutrition, U of S
T:(306)966-6340 F:(306)966-2286
www.druginfo.usask.ca

Volume 28, Issue No. 3 November 2011

Insulin Administration Misadventures

Missed Insulin Dose: *Once-a-day/Twice-a-day*, intermediate or long-acting insulin:

If the missed dose is recognized within 4 hours, then the full dose can still be taken as prescribed. However, if the dose is more than 4 hours late suggest testing the blood glucose concentration.[1] If the blood glucose concentration is higher than desired, additional doses of short- or rapid-acting insulin (e.g., up to 15% of the regular dose) can be used to achieve glycaemic control. Blood glucose should be tested 4 hours after any additional dose. If it turns out that blood glucose concentrations are still high, another dose of insulin (e.g., 5% of the regular dose) may be administered.[2] Keep in mind that having slightly high blood sugars in the short term is preferable to precipitating hypoglycaemia. Counsel patients to look out for any warning signs as these typically appear gradually. Symptoms of hyperglycemia include: increased urination; thirst; loss of appetite; feeling sick (nausea or vomiting); feeling drowsy or tired; flushed dry skin; a dry mouth; and a fruity (acetone) smelling breath.[2,3] Ensure patient is aware that if any of these signs are experienced, the blood glucose level should be tested (as well as the urine for ketones if possible) and that the patient should seek medical attention immediately.

Missed Insulin Dose: *Mealtime* dose of rapid-acting insulin:

If the patient has missed a mealtime dose and this is recognized within an hour of the meal, recommend the normal dose as prescribed. If within two hours, recommend 75 percent of the normal dose, and if three hours later, half of the normal dose. If a personalized correction scale is used, the patient can recheck blood glucose and use a correction factor instead as per his/her correction scale.[1]

Doubled Dose Mistakenly:

If a higher than intended dose of insulin is taken, advise patients to monitor blood sugars throughout the day and beware of signs and symptoms of hypoglycemia.[1] Insulin is considered to be a high alert medication and doses taken in a quantity greater than indicated must be managed carefully.[4] Ensure the patient has a source of dextrose on hand. If blood glucose falls below 4 mmol/L and/or symptoms of

hypoglycemia occur, the patient should take dextrose immediately and then proceed to the nearest hospital emergency department.[5] Symptoms of hypoglycemia include sweating, hunger, weakness, tremor, anxiety, palpitations and headache. Long-acting insulins are of particular concern because hypoglycemia may recur. If there is any uncertainty about appropriate management, refer the patient to Poison Control 1-866-454-1212.

Missed a Meal:

The management of skipped meals depends on the type of insulin the patient uses. Generally, meal time insulin is of the short acting variety. Therefore, when on a short acting insulin, it is better to miss the insulin as well as the food. If the meal is missed and the patient takes the short acting insulin there would be a risk of hypoglycemia.[6] If the patient takes intermediate or long acting insulin around meal time then it is advisable to monitor blood sugars and act accordingly. The occasional missed meal would not be harmful long term as long as the patient adheres to the scheduled routine thereafter.

General advice for dosing errors:

After a dosing error, increased monitoring should be encouraged.[1,2,6] Consider the duration of action and peak times of the respective insulin used in the respective patient's daily regimen. This information can be used as a guide to predict whether and when a potential high or low blood sugar can be expected. Ensure the patient understands the appropriate treatment for blood sugar highs or lows. Reinforcement of routine is also helpful – encourage the patient to practice consistency in self-management so desirable therapeutic outcomes can be achieved.

Forgot to shake/roll the insulin vial before injection:

Rolling insulin vials allows for mixing of the insulin suspension, which helps ensure that the concentration of the insulin is uniform. Incomplete mixing of the suspension may cause a slightly variable response to the dose; however, this should not be dramatic.[3] Blood glucose levels may be higher than normal until the next dose. If the patient forgets to shake the insulin before injection suggest monitoring blood glucose before bed, during the night if not feeling well, and in the morning and act accordingly.[7,8]

Encourage patients to always check the appearance of insulin prior to use. Regular insulin and insulins glargine/detemir should be clear and colorless; advise patient not to use if cloudy, thickened, coloured or contains solid particles. All other insulins have a cloudy appearance after gentle shaking; advise patients not to use if insulin stays at bottom of vial, clumps, or the bottle appears frosted.[3,9] Vials may be kept at room temperature for 30 days; unopened vials can be kept in refrigerator but should not be frozen.[3]

Prepared by Gurpreet Nijjar, Carmen Bell and Karen Jensen, SDIS Drug Information Consultants

References:

1. dLife: Handling Accidental or Missed Insulin Doses (CDE Advice) – last modified Spetember 26, 2001. Available at www.dlife.com/diabetes/information//inspiration_expert_advice/expert_columns/Theresa_Garnero/missed-insulin.html. Accessed Sep 2011.

2. AFHS Drug Information® 2011. Insulins monograph. Lexi-Comp Online with AHFS®. Accessed Sep 2011.
3. e-CPS [Internet]. Ottawa (ON): Canadian Pharmacists Association; c2011. Insulins. Available from: http://www.e-cps.ca. Also available in paper copy from the publisher. Accessed Sep 2011.
4. ISMP: High Alert Medications. Available at www.ismp.org/tools/highalertmedications.pdf. Accessed Sep 2011.
5. Lexi-Comp Online™ , Lexi-Tox: Insulins , Hudson, Ohio: Lexi-Comp, Inc.; January 29, 2011. Accessed Sep 2011.
6. University of Maryland Medical Center. Diabetes Diet: General Dietary Guidelines. Available at www.umm.edu/patiented/articles/what_general_guidelines_a_diabetes_diet_000042_2.htm). Accessed Sep 2011.
7. Insulin Management *DynaMed* [Internet]. Ipswich (MA): EBSCO Publishing. 1995 – . Available from http://www.ebscohost.com/*DynaMed*/ (registration and login required) Accessed Sep 2011.
8. McCulloch D. General Principles of Insulin Therapy in Diabetes Mellitus In: UpToDate, Basow, DS (Ed), UpToDate, Waltham, MA, 2011.
9. Comparisons of Insulins and Injectable Diabetes Medications. Canadian Pharmacist's Letter 2011; 27(5):270521.