Dawn Phenomenon and Somogyi effect Comparison

Understanding and differentiating between the dawn phenomenon and the Somogyi effect become critical in the optimal management of diabetes. In this article, we shall compare these two phenomena by looking at their definitions, causes, epidemiology, diagnosis, and treatment.

Dawn phenomenon occurs when endogenous insulin secretion decreases or when the effect of the exogenous insulin administered to the patient the day before disappears, together with a physiological increase in insulin-antagonistic hormones.

The Somogyi effect is rebound hyperglycemia in the morning because of the counterregulatory hormone released after an episode of hypoglycemia in the middle of the night.

The dawn phenomenon is similar to the Somogyi effect, in that in both of the cases there is hyperglycemia in the morning, but the reasons for the hyperglycemia differ.

The major difference between the dawn phenomenon and the Somogyi effect is that the Somogyi effect is a response to low blood sugar during the night. Testing blood sugar levels at 3:00 a.m. and again in the morning can help distinguish them.

Low blood sugar at 3:00 a.m. indicates the Somogyi effect, while high or normal blood glucose levels at that time suggest that the dawn phenomenon is causing high morning blood sugar.

Comparison Between the Dawn Phenomenon and Somogyi effect

Dawn Phenomenon

The dawn phenomenon is recurring early morning hyperglycemia.

Caused by a decrease in insulin secretion between 3 am and 5 am and a decrease in insulin-antagonistic hormones.

It occurs in patients with type 1 diabetes mellitus and types 2 diabetes mellitus with no insulin therapy

Diagnosis is by measurement of plasma glucose concentration between 3 am and 5 am during the next several nights

The confirmative result is a normal or high plasma glucose level.

Its prevented by increasing physical activity, increasing amount of protein to carbohydrates in the last meal of the day, eat breakfast even though dawn phenomenon is presented, individual diet modification only if HBA1c is lower than 7%, antidiabetic oral agent only if HBA1c is lower than 7%, use an insulin pump, long-acting insulin analogue like glargine instead of NPH insulin

Somogyi effect

It occurs early in the morning due to treatment with an excessive amount of exogenous insulin.

Its caused by hypoglycemia due to excessive doses of insulin and the next early morning hyperglycemia due to an increase of insulin-antagonistic hormones.

It occurs in type 1 diabetic patients and types 2 diabetic patients who are on insulin therapy.

Diagnosis is by measurement of the plasma glucose concentration between 3 am and 5 am during the next several nights, GCMS. The confirmative result is a low plasma glucose level

Prevention is by modifying insulin dosage, use of long-acting analogues like glargine instead of NPH insulin. Use of insulin pump, more protein than carbohydrates in the last meal of the day, go to bed with a high plasma glucose level than usual.