

Ambulatory glucose profile – case scenarios

Dr. Vijay Viswanathan¹, Dr. Leela Baid²

¹Head and Chief Diabetologist, M.V.Hospital for Diabetes.

²Consulting Diabetologist, M.V.Hospital for Diabetes.

Diabetes is a group of Metabolic Disorder that is characterized by hyperglycemia due to defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of different organs, especially the Eyes, Kidneys, Nerves, Heart, and Blood vessels. Treating diabetes need constant monitoring of blood sugars, which can be either done by Intermittent Capillary glucose monitoring (via Glucometer) or Continuous Glucose Profile, which is of two varieties – Real-time CGM(rtCGM) and Intermittently scanned CGM (is CGM)

In this article, we are going to discuss the Ambulatory Glucose Profile (AGP) by Intermittently scanned CGM or Flash glucose monitoring. AGP provides information unattainable by Intermittent Capillary Blood Glucose as it has the capacity to portray glycemic fluctuations all throughout day and night. It helps in improving HbA1c levels with reduced risk of Hypoglycemia

How it works

It comes with a sensor that has to be fixed on the arm, preferably on the backside. The glucose Sensor framework measures glucose in the Interstitial Fluid (ISF) by embedding a glucose detecting fiber into the subcutaneous tissue, which sits just beneath the dermis. We have to get the sensor activated by bringing the Reader near the sensor. Once it is activated, it takes readings every 15 mins, nearly 94 readings per day. Readings can be scanned through the Reader and downloaded as many times as needed for the next 14 days.

AGP Report

The standard AGP report shows the following data.

GLUCOSE STATISTIC AND TARGETS - This section displays metrics including average glucose, glucose variability, and Glucose Management Indicator (GMI), which can be thought of as predicted HbA1c (Figure – 1)

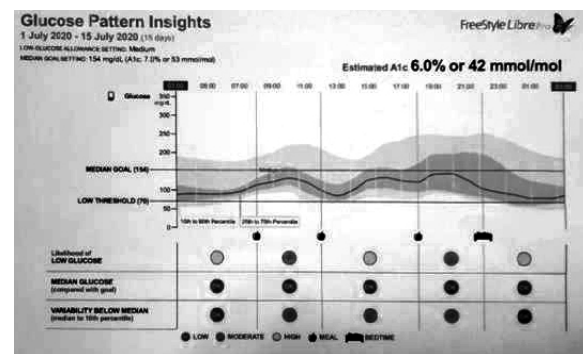


Figure - 1

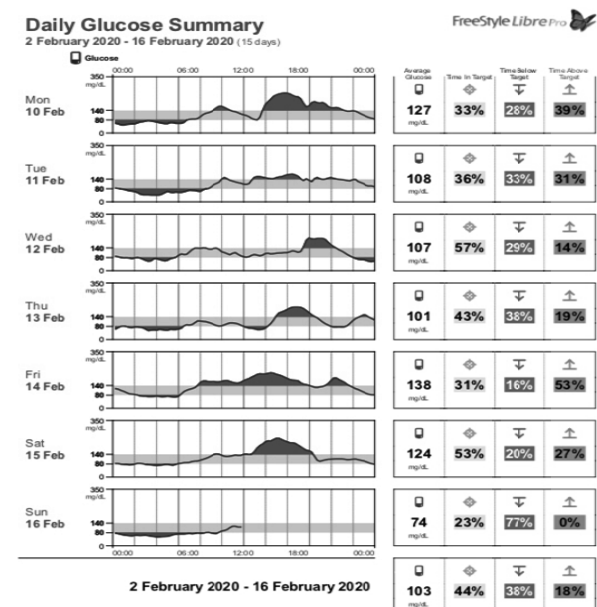


Figure - 2

Address for communication: M.V.Hospital for Diabetes and Prof. M.Viswanathan Diabetes Research Centre (WHO Collaborating Centre for Research, Education and Training in Diabetes) Royapuram, Chennai-13, India.

TIME IN RANGE – This color-coded bar helps us visualize the percentage of Time spent above and below the target Range. The general goal for people with diabetes is to have their glucose level stay within the Range of 70-180 mg/dl for atleast 70% of the day, spending less than 4% of the Time below 70 mg/dl, and nearly 24% can be above 180 mg/dl. (Figure 2)

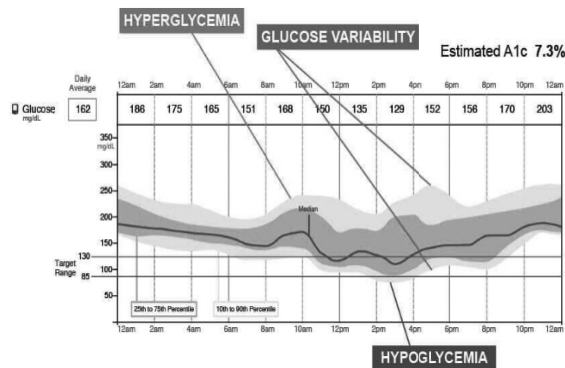


Figure - 3

AMBULATORY GLUCOSE PROFILE GRAPH - This combines all glucose readings over Time with median (50%) and other percentiles in a single graph. (Figure -3)

Case Discussion

- Age - 77 Years, Type 2 DM for Last 22 Years
- Known case of **Hypertension**, Hypo Thyroidism
- She was on Short-Acting Insulin 2 times and one time Pre Mixed Insulin along with Sulphonylurea, Metformin, and Voglibose twice a day and Teneligliptin 20 mg once a day
- HbA1c is 8.6 (Not coming down for some time)
- Her FBS ranges from 90 to 120 mg /dl
- Post-Prandial Blood Sugar ranges from 160 to 200 mg/dl
- We did Ambulatory Glucose Monitoring by Freestyle libre pro.

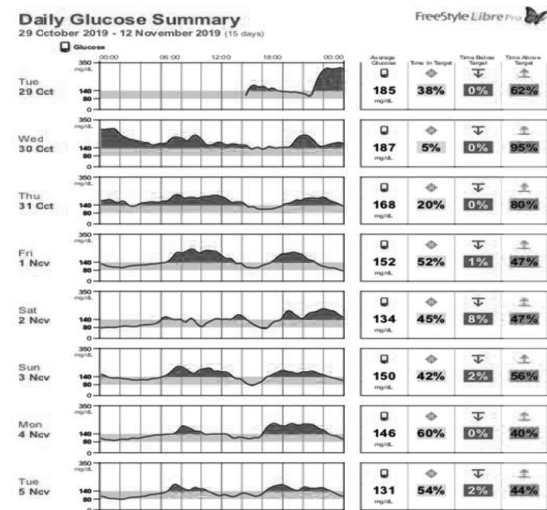


Figure - 4

The download after one week shows that that blood sugars usually goes up after breakfast and in the evening hours. (Figure- 4) She is not achieving her Target (Time in Range), which should be nearly 70%of the Time, and her blood sugar are above Range most of the Time, which is the reason for her not achieving HbA1c of 7%.We changed her insulin plan to Basal- Bolus, and then after another week, we got the final download. This Time her Time in Range showed an improvement, and she was achieving near 70%, and Time above Range was also reduced. After three months, her HbA1c was repeated and found to be 7.1 %. (Figure- 5)

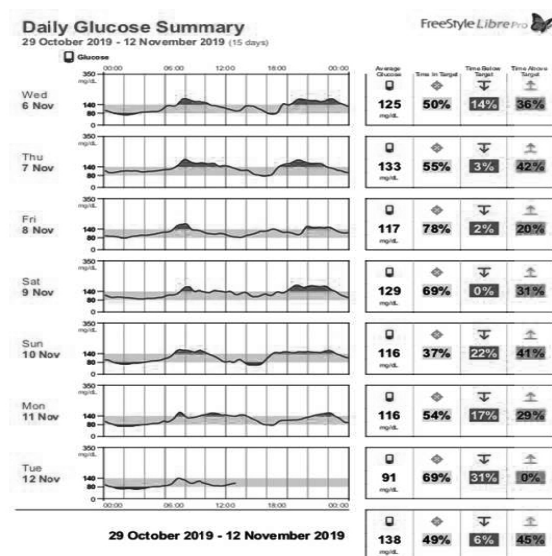


Figure - 5

Case 2

- Age -56 yrs
- K/c/o Type 2 Diabetes and Hypertension
- He was on Oral medication Sulphonylurea, Metformin and Vildagliptin twice daily
- His HbA1c is high for the last three visits, and he is very much reluctant to start Insulin as his Fasting blood sugars are quite normal.
- To convince him that his blood sugars are high, we did an Ambulatory glucose monitoring.

With the first-week download, we were able to show him that his blood sugars are high all throughout the day. (Figure – 6) Most of the Time, his blood sugars were Above Range, and only 20-30% of the Time, he was within the target range. We started him Premixed Insulin once a day before breakfast. After one week of starting the Insulin, we got the final download. This Time his Blood sugars improved a lot, and his Time in Range also improved. We made some more dose adjustment, and after three months, his HbA1c was 6.9 %. (Figure – 7)

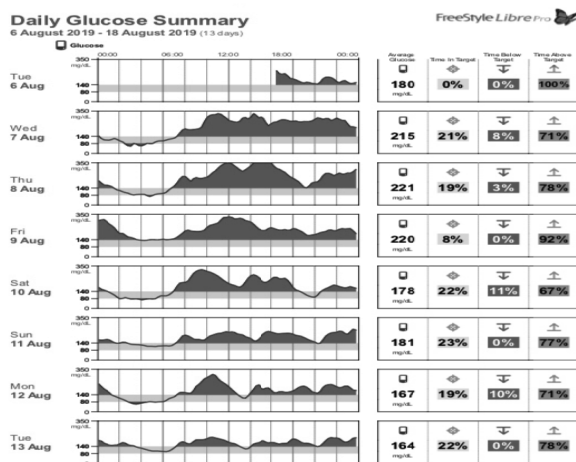


Figure- 6

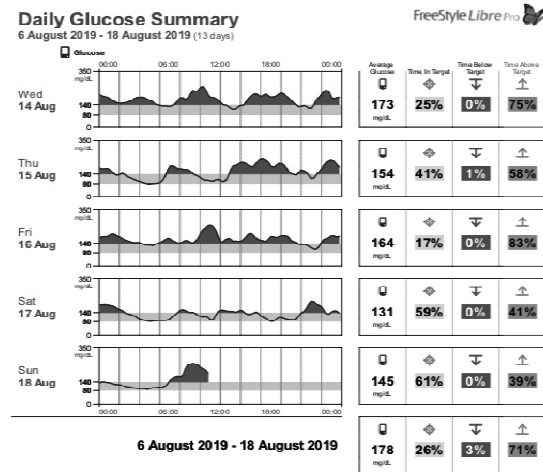


Figure- 7

References:

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