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# Managing Blood Glucose with the Use of Oral Semaglutide and Life Style Modification Among Indian Patients

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#### Abstract

Increased number of Type II DM Patients with risk of other co morbidities for e.g. HTN, CAD, Stroke, CKD with prevalence of obesity has increased the overall comorbidities in multifold. Health benefits of weight loss are found to be effective in overall management of Diabetes. Meteoric rise in number of diabatic patients and increasing life threatening impact of this disease, the significance of studies on diabetes have increased. It becomes very crucial to explain the patient and their family members about the diet, required physical exercise and stress-free living for the management of this metabolic disorder. Senior Consultant Physician, Manglam Plus Medicity Hospital, Jaipur, India

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This case study will show the diabetes management and weight management with the help of oral Semaglutide, physical exercise and diet modification.

Keywords: Semaglutide; Diabetes; Weight management; Type II diabetes mellitus; Blood glucose.

#### Introduction

In today's world diabetes is in alarming position a health hazard and number of people living with diabetes has crossed 1 billion as per data of [1,2] (IDF international diabetes Federation Atlas 2021) [3]. Estimates suggest that number of people living with diabetes will increase from 5.37 million in 2021 to 6.43 million by 2030 and 7.83 million by 2045. Additional impaired glucose tolerance was present in 5.41 million people in 2021. Over 6.7 million people aged 20-79 were expected to die from diabetes -related cause in 2021 (IDF Atlas 2021).

Studies reflect that obesity and diabetes are highly related, [4,5] as obesity makes a person vulnerable to type two diabetes which not only increase the risk of diabetes but also increases overall health risk and CV complications and its management, [6] not only in adults but nowadays number of diabetes children has also been increased. In

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#### **Case report**

Indian female patient Α 56-year-old presented with raised blood sugar level (HbA<sub>1</sub>c: 10%) with body weight of 78kg in OPD for management of blood sugar and obesity. Patient had history of hypertension from 7yrs, Type II DM from 5yrs, HTN from 3yrs & Dyslipidemia (TG 285mg/dL) in last investigation done in OPD. Patient was a known case of Hypertension, Type IIDM with raised blood sugar levels also has no history of hospitalization or any other chronic medical illness. No family history of diabetes.

Patient had a sedentary lifestyle also victim's husband is retired Govt Servant and both the son are Grade 1st officer in Govt of Rajasthan. Patient does all household work with routine feasting and watching television is victim's hobby. Baseline Characteristics: BP 150/92, Pulse 89, Spo<sub>2</sub> 98%, Weight 78kg, height 4 feet, BMI 52.4kg/m<sup>2</sup> (Obese Class III). Temp 96.4, Glucose Fasting -147, Random 234, HBA<sub>1</sub>C -10.0, S. Createnine -1.24.USG whole Abdomen showed Grade I fatty liver disease. Thyroid functions were normal. Urine ACR is 256mg/g.

#### **Background treatment**

Combination therapy of Metformin 500+Glimepride 2mg twice a day along with Telmisartan 40mg once a day.

#### **Clinical problem**

Type II DM along with Obesity and Hypertension as co-morbidity with marginally raised Creatinine level suggestive of Diabetic nephropathy.

#### Management plan

Patient was properly counselled and explained about dietary modification regular physical exercise and benefits of weight management and blood sugar management to prevent from other CV Risks. Low calorie diet with a calorie deficit of 600cal per day. Half hour moderate intensity exercise in morning walks and after dinner [11]. Semaglutide 3mg with combination therapy of Metformin 1000 was initiated along with antihypertensive (Telmisartan 40mg) and statins. Patient tolerated the dose of Semaglutide and shifted dose to 7mg after one month. The dose of metformin was reduced to 500mg also patient's weight has dropped from 78kg to 65kg. Treatment continued for 2 more months and patient's weight dropped and came to 65kg with

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controlled cholesterol and blood pressure levels, also HBA<sub>1</sub>c has come to 6.3.

### First follow-up visit

First follow-up of the patient was after one month. Patient came in OPD with these mentioned vitals. SPO<sub>2</sub> was 97% Pulse 80, BP was 144/90, weight has been reduced 74kg. Patience, fasting blood glucose was 110mg/dl and random blood sugar was 150mg/dl. This patient lost 4kg within four weeks of the start of medication, blood glucose level BP level had also drop. Patient was very much motivated happy with the results. Patient was on calorie restricted diet. Patient had been doing a moderate intensity.

Exercise with hundred percent consistency, seven days a week one hour per day half hour in the morning and half hour in the evening regular exercise habit accustom the person to the training and no change in subjective appetite has been reported with a starting dose of semaglutide tied 3mg. The dose has been titrated. After 30 days of start of treatment.

Patient had minimal and tolerable Gastrointestinal side-effect like abdominal fullness in the first week of therapy which become accustomed to and their after had been tolerating, the doctor increased the dose of semaglutide to 7mg and gave detailed instruction about self-monitoring of blood Glucose and BP ahead. Also consulted patient regarding diet and exercise along with comprehensive lifestyle modification to reduce sedentary habits apart from regular exercise schedule.

## Second follow up

Second follow up after one month and patient came with vitals. BP was 140/86, Weight 70kg, Temp AF, the patient has lost around 8kg in eight weeks of intervention. BP medicine and still on the same doses. However, the patient was already tolerating semaglutide of 7mg per day very well, hence 14mg oral semaglutide once daily started however, the dose of metformin remains same. Since blood glucose was very well controlled for self-monitoring of blood Glucose records, hence metformin reduced to 500mg twice a day along with other medicine. Once again dietary and lifestyle interventions were the emphasized along with proper diabetes education.

## Third follow up visit

After 90 days of treatment, this was patient's third visit to the hospital had a vital parameter were BP 140/80, Pulse was 80, SPO<sub>2</sub> level was 98% and weight was 65kg. Victim's HBA<sub>1</sub>c has reduced to 6.3, serum creatinine 0.89 urine ACR decreased to 198mg/g after 3 months of diet modification. Personalized attention to individual patients includes dietary modification, Physical exercise, regular blood pressure monitoring and appropriate drug which can potentially induce complete remission of Type II DM.

## Methodology for study

The Patient was kept on regular blood sugar monitoring [12]. Also, doctors have planned blood sugar chart and advised patient to check blood sugar level once a day in different times e.g. Fasting, PP, Random, before dinner and after dinner. Doctor tried that the blood sugar level should remain under 180mg/dl after meals and fasting should not go above 100mg/dl. The chart was regularly monitored by the doctors so that the diet and Physical exercise should be planned accordingly. The patient should not feel dull and weak after calorie deficit diet. Patient regular walk to curtail weight. Initially the patient was advised to walk twice a day for 20 min then after 15 days patient got habitual for the walk. Further the doctor increased the distance and pace regularly, which showed a significant reduction in weight. As per pioneer study done the maximum weight loss shown was upto 10% or 5kg but in this case the weight reduction has been upto 16kg. The blood sugar chart has been attached for reference (Figure 1).

DAYS	1	2	3	4	5	6	7	8	9	10
BEFORE BREAKFAST (FASTING) ਨਗਟੀ ਪੈਟ										
BEFORE LUNCH (PP) ½ HOUR AFTER BREAKFAST लाश्त्वे के बाद										
4 P.M. (2 HOURS AFTER LUNCH) रणजे के बाद										
seFORE DINNER (%HOUR BEFORE DINNER) रात का ज्याजा ज्याजे से पेडले										
NFTER DINNER (XHOUR AFTER DINNER) रात का ज्याना ज्याने के आशा घंटे साद										
HYSICAL EXERCISE - MORNING WALK	<b>Dr. AMIT BHATNAGAR</b> MD. Physician PGDCD (USA), BLS/ACLS (Instructor) Consultant Phy:									Physic



#### Discussion

It is known that diabetes requires lifelong treatment because it is a chronic and progressive disease [13]. Weight loss in obese patient, living with diabetes and other co-Morbid diseases. Weight loss in patient living with diabetes lead to improved glycemic control [14]. Lifestyle, changes are not effective enough and a combined approach of lifestyle modification with anti-diabetic drugs which helps in losing weight gives better results [15]. Modest weight loss sustained for more than one year in patients with type two

diabetes with obesity is associated with improved glycemic control and reduced need of anti-diabetic medication. Real world intervention study done in recently diagnosed patient of type two diabetes with obesity and duration of diabetes less than six years. Targeted weight loss suggest that remission was induced in almost half of the participants to a non-diabetic state at 12 months and they were off anti-diabetic medication. Medication is a 12 month after start of intervention, the intervention consisted of initial 12-week period of food replacement with nutritionally, balanced and calorie deficit diet followed by regular exercise. It includes at least physical walk in the morning and in the evening hours, accompany with yoga and other exercises.

Further two years weight maintenance using diet and exercise to prevent weight gain was maintain in the intervention group, the median weight loss what is 10kg against 1kg in the control group mention group Head remission of their diabetes and 46% compared to 4% of the control group, off personalized medicine, pharmacological interventions which helps in weight loss and managing type II diabetes [16]. It should be used earlier and obese individuals with diabetes and drug such as Insulin glitazones, sulphonylureas which cause significant weight gain should be used later. According to recommendation from NICE (National Institute of health and care excellence, clinical guideline) Bariatric surgery is required when BMI is more than 40kg/m<sup>2</sup> or 35-40kg/m<sup>2</sup> in presence of significant disease like of sleep apnoea, diabetes, dyslipidaemia or hypertension, which are expected to improve with weight loss. However, prior to surgery all appropriate non-surgical measures must be tried. Patient should receive, personalized and diabetic medication along with lifestyle interventions to reduce body weight, targeting reduction of remission of diabetes, scientist defined partial remission of diabetes a change in blood glucose and HBA<sub>1</sub>C. PIONEER trial program from oral semaglutide has showed HbA<sub>1</sub>c reduction upto 1.5% and weight loss upto 5kg with oral semaglutide in comparison to other

comparators [17]. In patients with baseline HbA<sub>1</sub>c >9%, oral semaglutide showed HbA<sub>1</sub>c reduction upto 2.6%. Thus, oral semaglutide can be a one of the best options for the management. Of this kind of patient. Above mentioned, patient has a significant reduction in HBA<sub>1</sub>c from 10.0 to 6.3, Createnine decreased to 0.7mg% and urine ACR decreased to 198mg/g after 3 months of diet modification, Physical exercise and regular use of Oral Semaglutide with metformin. Hence, HbA<sub>1</sub>c in the patient is now 6.3%. Now the next planning would be where role of anti-diabetic medication has been started while continuing lifestyle changes for weight loss. It will be prudent to withdraw anti diabetic medication is completely by end of the six months of intervention and do a close follow-up to evaluate the duration of remission or diet diabetes in this patient.

### Conclusion

The study concludes that the use of oral semaglutide and Metformin with Regular Exercise, Calorie deficit diet and Yoga for stress reduction makes dramatic effect in reduction of weight and HBA<sub>1</sub>c and prevent from other co morbidities. Regular blood sugar monitoring was used as a key to show result after 2-3 months but frequently observation of blood sugar level can control the sugar in early stage and can help to plan diet accordingly. The sugar chart comprised of has 5 readings one is fasting one after breakfast a, one after lunch, one before dinner and one after dinner which was instrumental in controlling blood sugar levels.

#### References

- 1. Lam DW, LeRoith D. The Worldwide Diabetes Epidemic. Curr Opin Endocrinol Diabetes Obes. 2012;19(2):93-6. PubMed | CrossRef
- 2. Huizinga MM, Rothman RL. Addressing the Diabetes Pandemic: A Comprehensive Approach. Indian J Med Res. 2006;124(5):481. <u>PubMed</u>
- 3. International Diabetes Federation Atlas. 2022.
- 4. Profenno LA, Porsteinsson AP, Faraone SV. Meta-Analysis of Alzheimer's Disease Risk with Obesity, Diabetes, and Related Disorders. Biol Psychiatry. 2010;67(6):505-12. <u>PubMed | CrossRef</u>
- 5. Pereira SS, Alvarez-Leite JI. Low-Grade Inflammation, Obesity, and Diabetes. Curr Obes Rep. 2014;3(4):422-31. <u>PubMed | CrossRef</u>
- 6. Astrup A. Healthy Lifestyles in Europe: Prevention of Obesity and Type II Diabetes by Diet and Physical Activity. Pub Health Nutr. 2001;4(2b):499-515. <u>CrossRef</u>
- Marazziti D, Rutigliano G, Baroni S, Landi P, Dell'Osso L. Metabolic Syndrome and Major Depression. CNS Spectr. 2014;19(4):293-304. <u>PubMed | CrossRef</u>
- 8. Liu Y, Ozodiegwu ID, Yu Y, Hess R, Bie R. An Association of Health Behaviors with Depression and Metabolic Risks: Data from 2007 to 2014 US National Health and Nutrition Examination Survey. J Affect Disord. 2017;217:190-6. <u>PubMed | CrossRef</u>
- 9. Wondmkun YT. Obesity, Insulin Resistance, and Type 2 Diabetes: Associations and Therapeutic Implications. Diabetes Metab Syndr Obes. 2020;13:3611-16. <u>PubMed</u> | <u>CrossRef</u>
- 10. Kahn SE, Hull RL, Utzschneider KM. Mechanisms Linking Obesity to Insulin Resistance and Type 2 Diabetes. Nature. 2006;444(7121):840-6. <u>PubMed</u> | <u>CrossRef</u>
- Haigh L, Kirk C, El Gendy K, Gallacher J, Errington L, Mathers JC, et al. The Effectiveness and Acceptability of Mediterranean Diet and Calorie Restriction in Non-Alcoholic Fatty Liver Disease (NAFLD): A Systematic Review and Meta-Analysis. Clin Nutr. 2022;41(9):1913-31. <u>PubMed | CrossRef</u>
- 12. Gopichandran V, Lyndon S, Angel MK, Manayalil BP, Blessy KR, Alex RG, et al. Diabetes Self-Care Activities: A Community-Based Survey in Urban Southern India. Natl Med J India. 2012;25(1):14. <u>PubMed</u>
- 13. Mauro M, Taylor V, Wharton S, Sharma AM. Barriers to Obesity Treatment. Eur J Intern Med. 2008;19(3):173-80. <u>PubMed | CrossRef</u>
- 14. Lustman PJ, Clouse RE. Depression in Diabetic Patients: The Relationship Between Mood and Glycemic Control. J Diabetes Complications. 2005;19(2):113-22. <u>PubMed | CrossRef</u>
- 15. Golder S, Bach M, O'Connor K, Gross R, Hennessy S, Hernandez GG. Public Perspectives on Anti-Diabetic Drugs: Exploratory Analysis of Twitter Posts. JMIR Diabetes. 2021;6(1):e24681. <u>PubMed</u> | <u>CrossRef</u>
- 16. Lee M, Aronne LJ. Weight Management for Type 2 Diabetes Mellitus: Global Cardiovascular Risk Reduction. Am J Cardiol. 2007;99(4):68B-79B. <u>PubMed</u> | <u>CrossRef</u>
- 17. Hunt B, Hansen BB, Ericsson Å, Kallenbach K, Ali SN, Dang-Tan T, et al. Evaluation of the Cost Per Patient Achieving Treatment Targets with Oral Semaglutide: A Short-Term Cost-Effectiveness Analysis in the United States. Adv Ther. 2019;36(12):3483-93. <u>PubMed</u> | <u>CrossRef</u>