Case Report

A Clinical Case study of a patient with Syndrome Z in Diacare, Diabetes Car e and Hormone Clinic, Ahmedabad

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ABSTRACT

Objectives: Obesity is an increasing health concern in India in recent times, mainly due to sedentary lifestyle and irregular dietary pattern which leads to metabolic syndrome.

Materials and Methods: In our Diacare, Diabetes Care and Hormone Clinic, study of a 30 years, Female with Body mass index (BMI) of $34.3 kg/m^2$ and waist hip ratio (WHR) of 1.01 was done.

Results: The patient was diagnosed with Syndrome Z and was followed up for one year with lifestyle modifications in dietary and regular physical exercise. Metformin and glucagon- like peptide-1 receptor agonist (GLP-1RA) was prescribed for 24weeks and 12 weeks respectively. By the end of one year gradual improvement in her BMI, WHR, and reversal of diabetes was achieved.

Conclusion: It has been concluded from this case study that diabesity, which is a growing epidemic (obesity and type 2 diabetes) can be treated with proper dietary modifications, regular exercise and therapy. Reversal of diabetes can be achieved. Obesity is one of the main concern for many high risk diseases in our country and should be focused upon and treated as one of the major illnesses.

1. Introduction

A 30 year old female married since 6 years working at a corporate office, consulted to diabetes care and hormone clinic for obesity in December 2018.

At the time of consultation, a detailed history was taken.

Her birth weight was 3.4 kgs. She was delivered full term via C-section, breast feed for 9 months and weaning was started from sixth month.

Her weight during childhood was normal but since puberty it started increasing gradually.

She gives history of dysmenorrhea with heavy menstrual flow 5/28 days cycle.

She has history of abrupt awakening accompanied by gasping and loud snoring during sleep with difficulty in concentrating during the day at work. For which consulted physician and was diagnosed with OSA (obstructive sleep apnea) since 1year and has been advised to use CPAP at night.

No history of morning swelling of face or swelling at back of neck, no history of any hyperpigmentation of skin, no history of bluish-purple stretch mark over abdomen, thigh or axilla,

No history of any fracture, no history suggestive of any proximal muscle weakness.

No history of any medication or surgery in the past.

No history of any addictions.

No known of allergic to any food or medications.

She has a family history of father having type2DM

Anthropometry was measured and needful laboratory investigations such as RBS, HbA1c, insulin resistance , lipid profile,SGPT,SGOT, vitamin B12, vitamin D3 and thyroid functions with Fibroscan were ordered.

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Table 1:

	140/90mmHg
	Resting heart rate: 62 beats per minute
Height	175cm
Weight	105kg
BMI	34.3kg/m2 - <18.5kg/m2 underweight
	18.5-22.9kg/m2 Normal
	23.0-24.9kg/m2 overweight
	>25kg/m2 obese
Waist	132cm. - <80cms for women
Hip	130cm
Waist/hip ratio	1.01 - Low: 0.80 or lower
	Moderate: 0.81-0.85
	High: 0.86 or higher

1.1. On examination

1.2. On clinical examination

Acanthosis nigricans was present. No other significant findings in general examination.

No clinically significant findings were present in respiratoy, cardiovascular, alimentary, genitor-urinal or central nervous system examination.

Diet recall reveals that she was consuming high carbohydrate, low fibre, eggetarian and unhealthy diet, which mainly consisted of French toast, poha, upma, cheese sandwiches, paratha, fried chips, etc with 4-5 cups of milk coffee with sugar. Weekly cravings for sweets which included milk shakes, canned soda's, pastries and candies. Daily she also has mid-evening snacking in the office with her colleagues such as burgers, potato fries, nachos with cheese dips or a street side vada pau and panipuri. Also sometimes due to work load she gives the history of binge eating.

Due to her busy schedule maintaining to balance her professional and family life, she didn't get time to balance her health with healthy diet and any form of physical activity.

With the hustle of securing future, the couple was busy with their respective jobs. But now as they say they are stable enough so she and her husband are planning to conceive for a child in near future. So, they decided to first have a healthy lifestyle and weight reduction for they know a healthy mother leads to a birth of healthy child and a better future. This is when they decided to consult us for weight reduction.

On receiving the ordered reports, which were suggestive of, RBS: 142mg/dl

1.3. Nafld Fibrosis Score

Fibroscan suggestive of grade 1 fatty liver.

As per the laboratory reports, her anthropometry & past history she was newly detected type2 DM, borderline hypertension, having high levels of insulin resistance, borderline cholesterol levels in k/c/o OSA & morbid obesity soo diagnosed to have syndrome Z.

Our strategies are individualised to all patients and to these patient it included strict diet, physical activity, behavioral therapy and pharmacological therapy for 24weeks with the aim to achieve target of weight reduction of 25% from the actual weight , improved insulin resistance and Reversal to type2 DM with improvement in OSA.

1.4. Dietary Intervention

The diet prescribed was modified such that her daily micro and macro-nutrient needs were met with low carbohydrate and high fibre.

Diet involves 1200 kcal daily, 50% carbohydrate,25% protein and 25% fat with 35gms fibre daily.

The dietary modifications prescribed to her are as follow.

For breakfast she was asked to avoid cereal grains.The recommended breakfast was a mix of 50% of raw foods in the form of sprouts such as Bengal gram sprouts (chola), Green Gram Sprouts (mung), Bean sprouts, Alfalfa sprouts, Sunflower sprouts, or Radish Sprouts which she can soak overnight and sauté it with very little oil or have it boiled with spices to taste and 50% cooked food made from pulses/legumes.

For Lunch and dinner consisted of one multi grain atta chapati (25% jowar, 25% besan, 25% soyabean and 25% wheat) in each meal with a large bowl proportion of cereal, pulse, cooked vegetable and raw vegetable salad. She was asked to replace local white rice with brown/unpolished/semi-polished rice and also have one glass of diluted buttermilk.

For mid-evening snacking she was asked to carry either 2 tablespoon mix seeds like sunflower, pumpkin, watermelon, sesame, flaxseed and 2 soaked almonds or walnuts with her at office.

She was advised to use only 3-4 teaspoon i.e. (15-20gm) of cooking oil per day was recommended.

Any other dietary changes required as per individual needs was made accordingly during diet counseling on call

Table 2:

HbA1c: 7.2%	<5.8% non diabetic range 5.8-6.5% target control, 6.5-7.5% good control(individual), 7.5-8% needs changes/titration, Above 8.0% poor control.
HOMA-IR: 4.92	Normal insulin resistance <3 Moderate insulin resistance 3-5 Severe insulin resistance >5
TSH	1. 32ulu/ml. Normal: 0.3-4.5
FT3	1.99pg/ml. Normal 1.71-3.71
FT4	1.30ng/ml. Normal 0.89-1.76
SGPT	37U/L. Normal Up to 49
SGOT	29U/L. Normal up to 46
Vitamin B12	378pg/ml Normal 200-1100
Vitamin D3	51.3ng/ml. - Deficiency <10.0, Insufficiency 10-30, Sufficiency 30-100, Toxicity >100.
Lipid profile	
Serum cholesterol: 220mg/dl.	Desirable level/low risk: <200mg/dl Borderline level/moderate risk: 200-239mg/dl Elevated level/high risk: >240mg/dl
Serum triglyceride: 289mg/dl	Normal: <200mg/dl Borderline high: 200-400mg/dl High: 400-1000mg/dl
Serum HDL: 27.5mg/dl	Desirable level/low risk: >60mg/dl Borderline level/moderate risk: 35-60mg/dl Elevated level/high risk: <35mg/dl
Serum LDL: 86.1mg/dl	Desirable level/low risk: <130mg/dl Borderline level/moderate risk: 130-159mg/dl Elevated level/high risk: >160mg/dl
Serum VLDL	17.1mg/dl. - Normal Up to 34mg/dl
LDL/HDL ratio	3.1 - Desirable level/low risk: 0.5-3.0 Borderline level/moderate risk: 3.0-6.0 Elevated level/high risk: >6.0
Total cholesterol/HDL	4.5. - Low risk: 3.3-4.4 Average risk: 4.4-7.1 Moderate risk: 7.1-11.0 High risk: >11.0
Total Lipids	592mg/dl - Normal 400-700mg/dl

or one to one.

1.5. Exercise

We started with initial basic stretching program and walking with increasing intensity.

For stretching: she was asked to do suryananamaskar with holding.

She was asked to brisk walk minimum 8,000-12,000 steps daily.

Muscle strengthening exercises: squats and lunges for legs and bench presses for upper body on alternate day was advised with repetition of 3sets of 15 counts each.

Follow up was taken each week in meeting sessions.

1.6. Behavioural therapy

She was asked to have a positive mindset and attitude towards the treatment.

Guided meditation or soul mind body meditation daily for 30-45 minutes..This was directed towards the release of stress at an emotional level; improve awareness and healing from within. Patient educated for identifying hunger pattern and practise hunger scale for each meal to promote conscious eating which will help her to cope up with binge eating during stressful situations Motivational video sessions for positive energy were encouraged.

2. Pharmacological therapy

2.1. Metformin

Metformin is an effective drug to reduce weight in an insulin resistant overweight and obese patients. It will also help to manage her glucose levels. She was given Metformin (500mg) daily once inititaly and uptitrated every week to 2gm per day. After total of 24weeks Metformin was stopped.

2.2. Injection Dulaglutide.

Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) have shown an improvement in the glucose levels with a good benefit in the weight reduction in the patients with type 2 diabetes. But the results in the loss of weight in patients have shown variations individually. According to the latest ADA/EASD joint guideline, along with metformin, GLP-1 RAs can be placed as a possible second-line drug in the treatment in type 2 diabetic patients.

GLP-1 RA Initial dose: 0 75 mg subcutaneously once a week for 6 weeks then increased to 1.5 mg subcutaneously once a week for additional glycemic control later for other 6weeks. After 12weeks patient was off the GLP-1RA.

2.3. Daily Blood Glucose Levels

Monitoring of glucose levels daily was done with Calibrated glucometer and updated over the mobile application. She was asked to measure blood glucose at least daily at different time (fasting, post breakfast, prelaunch, post lunch, predinner and bed time) on a rotation basis. No episode of hypoglycaemia was recorded.

3. Results

3.1. progress chart

With the above mentioned multicentric strategies,

Initial visits were patient was asked to follow up personally every week for 12weeks for diet counselling, for diet changes as per her needs and dietary requirements, for motivation to stick her to exercise, also for her daily sugar record readings.

4. Discussion

Obstructive sleep apnea (OSA) along with metabolic syndrome is called Syndrome Z. There is very little information available to us in the community and its factors that are related to it.

Sustained weight loss among obese patients having type 2 diabetes along with poor glycemic control and higher lipids level help in achieving meaningful reductions in blood glucose, A1C, and triglycerides. Significant amount of weight loss with proper lifestyle changes gives greater benefits in context to blood pressure, levels of triglycerides and HbA1c[1].

There are series of evidence available which says insulin resistance is the most important predictor for future type 2 diabetes. Also insulin resistance helps the clinicians to decide on the therapeutic target once patient is having poor glycemic control.[2]

As mentioned earlier the combination of metabolic syndrome and obstructive sleep apnea (OSA) together is known as Syndrome Z[3] The risk of developing heart disease and stroke increases in metabolic syndrome as it is a clusters of multiple conditions such as high blood pressure, high blood sugars, presence of excess fat mainly around the waist as an apple shape and high cholesterol levels[4]. Prevelance of metabolic syndrome amongst Asians is between 21%-41% based on the population studied.[5][6]. Presence of just one of the mentioned conditions doesn't stamp as metabolic syndrome but can increase the chance of developing risk of serious disease. The higher the amount of body fat around the waist and trunk leads to higher risk. The mechanism and proper pathways for the occurrence of Syndrome Z is still not clearly elucidated and has been partially explained. Most of the people found to have Syndrome Z have a history of sedentary lifestyle and also some degree of insulin resistance. In some cases stress can also be the contributing factor. The most important risk factors to such patients are diet especially consumption of sweetened beverages and high carbohydrate meals along with very little or no physical activity. There are many researches that has shown that the consumption of western diet in normal routine as a habit which may not be biochemically suited to humans can lead to risk factors in development of metabolic syndrome. The primary goal of managing patients with the metabolic syndrome in the literature focuses on the reducing the risk factors. There are different treatment modalities in the treatment of metabolic syndrome that includes lifestyle modifications and drug therapy. The lifestyle modifications mainly focus on dietary changes, having any form of physical activity in routine life and cessation of smoking. These has shown a promising outcomes in overall patients. Weight reduction is the main priority and mainly the abdominal obesity is to be targeted.

In these patient we focused on four main things in order to achieve the target goal.

At the time of first consultation, she presented with BMI 34.3kg/m^2, Waist/hip ratio: 1.01, no physical activity, high carbohydrate and unhealthy diet consumption with diagnosis of obstructive sleep apnea (OSA). Also diagnosed as type 2 diabetes and Dyslipidaemia. In our case over the period of one year she was put on 1200kcal/day low carbohydrate and high fibre diet with incremental intense physical activity programme and inner transformations. Diabetic medications played a supportive role in helping to achieve our target Metformin and Dulaglutide were

Table 3:

At the end of 12 weeks her weight was 89kgs, waist:126cm, hip	124cm
Then she was called for follow up every 2weeks for other 12weeks and her weight was 81kgs, waist	110cm
hip	114cm. She was also off CPAP
	At the end of 24weeks she is off the medications, her OSA was improved, her HbA1c is 5.3%.
	After 24weeks the lifestyle modifications were continued and patient was followed up every month. By end of 12month her anthropometry and laboratory reports were
Weight	79kg
BMI	25.8kg/m2
Waist	108cm
Hip	110cm
Waist/hip ratio	0.9
RBS	108mg/dl
HbA1c	5.2%
HOMA-IR	3.8
Lipid profile	
Serum cholesterol	201mg/dl
Serum triglyceride	149mg/dl
Serum HDL	84mg/dl
Serum LDL	90mg/dl
Serum VLDL	20.1mg/dl
LDL/HDL ratio	2.8
Total cholesterol/HDL	2.39
Total Lipids	556mg/dl

prescribed for 24weeks and 12weeks respectively which showed an improving result to achieve glycemic control, improved satiety and weight loss. By end of 24weeks patient was off the medications and reversal of diabetic was achieved with continuation of lifestyle modifications and inner transformations. Our approach is mainly to guide a healthy dietary pattern and physical activity to the patient soo that she achieves a within target range for weight and hence improves insulin resistance and lower the risk of developing type 2 diabetes and its related complications.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. American Diabetes Association Diabetes Care; 2016.
2. Shahar E, Whitney CW, Redline S, Lee ET, Newman AB, Nieto J, et al. Sleep-disordered breathing and cardiovascular disease: cross-sectional results of the Sleep Heart Health Study. *Am J Respir Crit Care Med*. 2001;163:19–25.
3. Peker Y, Hedner J, Norum J, Kraiczi H, Carlson J. Increased Incidence of Cardiovascular Disease in Middle-aged Men with Obstructive Sleep Apnea. *American Journal of Respiratory and Critical Care Medicine*. 2002;166(2):159–165. Available from: https://dx.doi.org/10.1164/rccm.2105124. doi:10.1164/rccm.2105124.
4. Sharma SK, Kumpawat S, Banga A, Goel A. Prevalence and Risk Factors of Obstructive Sleep Apnea Syndrome in a Population of Delhi, India. *Chest*. 2006;130(1):149–156. Available from: https://dx.doi.org/10.1378/chest.130.1.149. doi:10.1378/chest.130.1.149.
5. Ip M, Lam B, Lauder IJ, Tsang KW, Chung KF, Mok YW. Acommunity study of sleep disordered breathing in middle aged Chinese men in Hong Kong. *Chest*. 2001;119:62–71.
6. Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults- The Evidence Report. National instiues of health. *Obes res*. 1998;6.

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