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Case Report

METABOLIC SYNDROME: A CASE REPORT

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A 53 year-old female, presented with heaviness in chest since one-week of duration. She was having on and off history of generalized weakness, fatigability, increased frequency of urination. She had no past history of hypertension or diabetes, she attained menopause 1 year back. Her lifestyle is very sedentary. Physical examination: obese woman. Height 165 cm, weight 82 kg, BMI of 32 kg/m². Pulse rate: 98/min; regular, normal volume, no radio-radial, nor radio-femoral delay. Blood pressure: 160/110 mmHg in right and left upper limb. She was having black velvety hyperpigmentation of the skin especially on the neck possibly acanthosis nigricans, apart from this patch, rest of the systemic examination is normal. Her random blood sugar was 210 mg/dL as measured by Glucometer. Patient was diagnosed as metabolic syndrome. Patient was counselled and explained she is having diabetes mellitus, hypertension, and she has all the signs of metabolic syndrome. Patient was started on life style modification, diet modification, Pharmacotherapy, lipidemic drugs.

Keywords: Metabolic syndrome, Obesity Hyperlipidemia, Hypertension Diabetes mellitus

INTRODUCTION

A 53 year-old female, presented with heaviness in chest since one-week of duration. Chest pain was gripping in nature, localized to retrosternal region, was not associated with sweating, palpitation, anxiety. There was no increase in pain following physical activity. The pain was non radiating, no h/o of any injury or trauma. She was having on and off history of generalized weakness, fatigability, increased frequency of urination. She was never diagnosed as hypertensive or diabetic in the past. She attained menopause at the age

of 52 years. Family history: mother is a known diabetes mellitus and hypertension, she is on OHA since 5 years, and for hypertension is taking Telmisartan 40 mg once a day. She used to smoke but quitted since 10 years. Her lifestyle is very sedentary.

Examination: No signs of pallor, icterus, cyanosis, lymphadenopathy, koilonychia

Physical examination: obese woman

Height 165 cm, weight 82 kg, BMI of 32 kg/m², waist circumference: 36, hip Circumference: 38 inches, waist hip ratio: 0.94.

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Pulse rate: 98/min; regular, normal volume, no radio radial, no radio femoral delay.

Blood pressure: 160/110 mmHg in right and left upper limb. She was having black velvety hyperpigmentation of the skin especially on the neck possibly acanthosis nigricans, apart from this patch, rest of the systemic examination is normal. Her random blood sugar was 210 mg/dL as measured by Glucometer. She was advised to under all the investigation and review.

INVESTIGATIONS

- Fasting blood sugar: 150 mg/dL, Plbs: 280
- Lipid profile: Triglyceride:241, TC: 320, LDL-C: 235, HDL-C:38
- Liver function test showed mildly raised AST and ALT,
- Renal function test normal, HbA1C was 8.46%.
- Thyroid function tests normal.
- Serum cortisol: normal
- Serum oestradiol: normal
- DHEAS, testosterone, progesterone: normal.
- FSH 57.1 mU/L, LH 27.9 mU/L(menopausal range)
- Urine picture: protein present, glucose positive, no leukocyte, macroalbuminuria,
- Electrocardiogram: mild LVH with stain pattern, echocardiography : normal
- Chest radiograph normal
- Pap smear results normal.

DIAGNOSIS

- Type 2 Diabetes Mellitus
- Hypertensive

- Hyperlipedemia
- Metabolic syndrome

Treatment:

Non-pharmacological Measures:

1. Diet
2. Reduction of weight
3. Exercise
4. Salt intake should be reduced
5. Behavioral modification

Medication: She was initiated on

- Metformin 500 mg morning and evening one tablet a day,
- Atorvastatin 10 mg at night,
- Telmisartan 40 mg once a day.
- She was referred to a dietician for dietary advice.

Over next two weeks the patient was reviewed her fasting blood sugar 135 mg/dl, Plbs: 240 mg/dL blood pressure was normal. Her medication dose of metformin was increased to 850 mg morning and evening.

Patient was reviewed after a month she had reduced 6 kg of weight with the diet modification with pharmacotherapy. She was on low carbohydrate diet, low fat and high fiber. The random blood sugar was 108 mg/dL, pulse 90/min, BP: 120/70 mmHg. On review the investigation results are as follows; FBS 117 mg/dL, HbA1C 6.69%, TC 230, LDL-C 124, HDL-C 36, Tg 274 and the liver enzymes remained the same.

Atorvastatin dose was stepped upto 20 mg and patient was also started on omega 3 fatty acids in view of persistent increase in triglyceride

levels despite diet modification. Ophthalmologist opinion was taken for evaluation of early diabetic retinopathy. Patient was explained how to take the foot care and regarding the proper footwear.

DISCUSSION

Metabolic syndrome is burning topic presently, majority of adults are affected by metabolic syndrome, it constitutes nearly 25% of cases, and increasing trend is seen in patients with central obesity. Various criteria have been given by IDF, WHO, other diabetic societies all over the world.

IDF

The IDF definition of the metabolic syndrome (2006) is:

Central obesity (waist circumference with ethnicity-specific values) and any of the two following:

1. Raised triglycerides: >150 mg/dL, or specific treatment for this lipid abnormality
2. Reduced HDL cholesterol: <40 mg/dL in males, < 50 mg/dL in females, or specific treatment for this lipid abnormality
3. Raised blood pressure (BP): systolic BP > 130 or diastolic BP >85 mm Hg, or treatment of previously diagnosed hypertension
4. Raised FPG >100 mg/dL (5.6 mmol/L), or previously diagnosed type 2 diabetes

If FPG is >5.6 mmol/L or 100 mg/dL, an OGTT is advised, but is not necessary to define presence of the syndrome.

WHO

The WHO (1999) criteria require the

1. Presence of any one of these, (i) diabetes mellitus, (ii) impaired glucose tolerance, (iii)

impaired fasting glucose or insulin resistance, and two of the following criteria defined below:

- Blood pressure: $\geq 140/90$ mmHg
- Dyslipidemia: triglycerides (TG): ≥ 1.695 mmol/L and high-density lipoprotein cholesterol (HDL-C) ≤ 0.9 mmol/L (male), ≤ 1.0 mmol/L (female)
- Central obesity: in male waist: hip ratio > 0.90; in female waist: hip ratio > 0.85, or body mass index > 30 kg/m²
- Microalbuminuria: urinary albumin excretion ratio ≥ 20 μ g/min or albumin: creatinine ratio ≥ 30 mg/g

EGIR

The European group for the study of insulin Resistance (1999) requires insulin resistance defined as the top 25% of the fasting insulin values among non diabetic individuals AND two or more of the following:

1. Central obesity: waist circumference ≥ 94 cm or 37 inches (male), ≥ 80 cm or 31.5 inches (female)
2. Dyslipidemia: TG ≥ 2.0 mmol/L and/or HDL-C < 1.0 mmol/L or treated for dyslipidemia
3. Hypertension: blood pressure $\geq 140/90$ mmHg or antihypertensive medication
4. Fasting plasma glucose ≥ 6.1 mmol/L

NCEP

The US National Cholesterol Education Program Adult Treatment Panel III (2001) requires at least three of the following:

1. Central obesity: waist circumference ≥ 102 cm or 40 inches (male), ≥ 88 cm or 35 inches (female)

2. Dyslipidemia: TG \geq 1.7 mmol/L (150 mg/dl)
3. Dyslipidemia: HDL-C < 40 mg/dL (male), < 50 mg/dL (female)
4. Blood pressure \geq 130/85 mmHg (or treated for hypertension)
5. Fasting plasma glucose \geq 6.1 mmol/L (110 mg/dl)

American Heart Association/Updated NCEP

1. Elevated waist circumference:

Men—greater than 40 inches (102 cm)

Women—greater than 35 inches (88 cm)

2. Elevated triglycerides: Equal to or greater than 150 mg/dL (1.7 mmol/L)

3. Reduced HDL (good) cholesterol:

Men—Less than 40 mg/dL (1.03 mmol/L)

Women—Less than 50 mg/dL (1.29 mmol/L)

4. Elevated blood pressure: Equal to or more than 130/85 mm Hg or medication use for hypertension

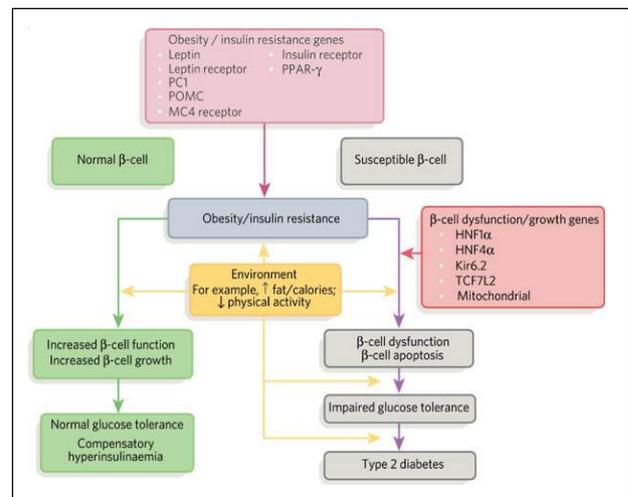
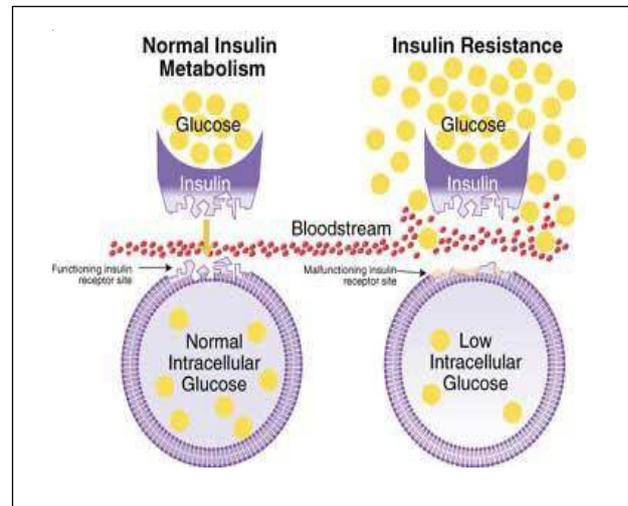
5. Elevated fasting glucose: Equal to or greater than 100 mg/dL (5.6 mmol/L) or use of medication for hyperglycemia.

Early detection and treatment of chronic problems and associated complication is important in metabolic syndrome. The management involvement is for various problems like hyperglycemia, hypertension, deranged lipid levels, obesity.

INSULIN RESISTANCE

The common underlying cause for the metabolic

syndrome is insulin resistance. In patient with insulin resistance the insulin levels are more and leads to impairment in glycemic levels and worsening the diabetes.



WEIGHT LOSS

Patient is advice to make a goal to reduce the weight by 8 to 10% in duration of 1 year. This can help in achieving in proper diet, physical activity, and exercise. Physical exercise can cause the loss of body fat and mobilization of visceral and abdominal adipose tissue which increases the sensitivity of insulin and also decrease in the

Cholesterol levels which is atherogenic. DASH diet should be encouraged (vegetables, fruits, whole grains, fish, monounsaturated fats, polyunsaturated fats).

HYPERTENSION

Recommended goal of blood pressure in diabetes mellitus patient is less than 130/80 mmHg. Drug of choice is ACE inhibitors; it is proved to prevent microvascular, and macrovascular complications as well as the progression of albuminuria.

GLYCAEMIC CONTROL

Patient with metabolic syndrome required good glycemic control. The goal for HbA1C level is less than 7%.

- UKPDS had demonstrated a 25% reduction in the risk of microvascular complications in type 2 diabetic patients who had achieved intensive glycaemic control.
- The Da Qing IGT and Diabetes study has shown that diet and exercise had decrease the incidence of diabetes mellitus in patient with IGT over a 6-year period.
- The Diabetes Prevention Program has shown:
 1. Lifestyle modification was more effective rather than therapeutic intervention,
 2. In patient with IGT incidence of diabetes mellitus is decreased by 58% in patient with lifestyle modification than patient on metformin which was 31%.

DYSLIPIDEMIA

In patient with diabetes mellitus Lipid lowering reduces the morbidity and mortality. Statins are used as a treatment modality for dyslipidemia in diabetics.

ROLE OF ASPIRIN

Aspirin is recommended in patient with coronary events as it decreases the risk by 10%. It decreases the raised plasminogen activator inhibitor and fibrinogen which is seen in patients with metabolic syndrome.

MANAGEMENT OF MICROALBUMINURIA

Microalbuminuria is an individual risk factor for cardiovascular events; it results by dysfunction of endothelium and oxidative stress in metabolic syndrome. In patient with diabetic with microalbuminuria drugs of choice is ACE inhibitors.

INSULIN SENSITIZERS

Thiazolidinediones

- Hyperglycemia is controlled by (i) glucose uptake in adipose tissue and muscles is improved; (ii) glucose production is reduced
- Reduces triglycerides
- Microalbumuria is reduced
- Improves blood pressure control
- Increases HDL

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