بیمار آقای ۵۸ ساله هفته گذشته آزمایش داده ند وجهت رویت آزمایشات به درمانگاه پزشک خانواده مراجعه کرده اند.

PMH سابقه ابتلا به فشار خون از ۵ سال قبل و دیابت از ۳ سال قبل می دهد.

Habitual H سیگار و الکل مصرف می کند

DH قرص لوزارتان ۲۵ میلی گرم ۲ بار در روز-قرص متفورمین ۵۰۰ میلی گرم ۳ بار در روز

FH برادر ایشان در سن ۳۵ سالگی CABG شده اند

PH/E

BP=160/95, RR=17, T=37 , PR=74, W=90, L=160 , WAIST=94 , BMI=35.15

H&N=NL ,JVP=NL,CONJUNCTIVA=NOT PALE,SCLERA=NOT ICTERIC,S1&S2 WITHOUT

 MURMUR,ABDOMEN=WITHOUT TENDERNESS or hepatomegaly,limb=nl without edema

LAB FINDING

CBC

HB=15 , MCV=88,PLT=400,000

BUN=33,CR=0/96,TG=350,CH=260,HDL=67,LDL=140,SGOT=22,SGPT33,ALP=220,

Metabolic syndrome

1.X syndrome
2.Insulin resistance syndrome
3.Obesity dyslipidemia syndrome

introduction

- Obesity, particularly abdominal obesity, is associated with resistance to the effects of insulin on peripheral glucose and fatty acid utilization, often leading to type 2 diabetes mellitus.

- Insulin resistance, the associated hyperinsulinemia and hyperglycemia, and adipocyte cytokines (adipokines) may also lead to vascular endothelial dysfunction, an abnormal lipid profile, hypertension, and vascular inflammation, all of which promote the development of atherosclerotic cardiovascular disease (CVD) .

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DEFINITION

Five criteria for diagnosis of metabolic syndrome. (3of 5)

- Abdominal obesity, waist circumference ≥102 cm in men and ≥88 cm in females

- Serum triglycerides ≥150 mg/dL or drug treatment

- Serum HDL cholesterol <40 mg/dL in males and <50 mg/dL in females or drug treatment

- Blood pressure ≥130/85 mmHg or drug treatment for elevated blood pressure

- Fasting plasma glucose (FPG) ≥100 mg/dL or drug treatment for elevated blood glucose

Definitions of the metabolic syndrome

Parameters	NCEP ATP3 2005*	IDF 2009	EGIR 1999	WHO 1999	AACE 2003
Required			Insulin resistance or fasting hyperinsulinemia (ie, in top 25% of the laboratory-specific reference range)	Insulin resistance in top 25%$^\Delta$; fasting glucose ≥ 6.1 mmol/L (110 mg/dL); 2-hour glucose ≥ 7.8 mmol/L (140 mg/dL)	High risk of insulin resistance$^\lozenge$ or BMI ≥ 25 kg/m^2 or waist ≥ 102 cm (men) or ≥ 88 cm (women)
Number of abnormalities	≥ 3 of:	≥ 3 of:	And ≥ 2 of:	And ≥ 2 of:	And ≥ 2 of:
Glucose	Fasting glucose ≥ 5.6 mmol/L (100 mg/dL) or drug treatment for elevated blood glucose	Fasting glucose ≥ 5.6 mmol/L (100 mg/dL) or diagnosed diabetes	Fasting glucose 6.1 to 6.9 mmol/L (110 to 125 mg/dL)		Fasting glucose ≥ 6.1 mmol/L (110 mg/dL); ≥ 2-hour glucose 7.8 mmol/L (140 mg/dL)
HDL cholesterol	<1.0 mmol/L (40 mg/dL) (men); <1.3 mmol/L (50 mg/dL) (women) or drug treatment for low HDL cholesterol§	<1.0 mmol/L (40 mg/dL) (men); <1.3 mmol/L (50 mg/dL) (women) or drug treatment for low HDL cholesterol	<1.0 mmol/L (40 mg/dL)	<0.9 mmol/L (35 mg/dL) (men); <1.0 mmol/L (40 mg/dL) (women)	<1.0 mmol/L (40 mg/dL) (men); <1.3 mmol/L (50 mg/dL) (women)
Triglycerides	≥ 1.7 mmol/L (150 mg/dL) or drug treatment for elevated triglycerides§	≥ 1.7 mmol/L (150 mg/dL) or drug treatment for high triglycerides	or ≥ 2.0 mmol/L (180 mg/dL) or drug treatment for dyslipidemia	or ≥ 1.7 mmol/L (150 mg/dL)	≥ 1.7 mmol/L (150 mg/dL)
Obesity	Waist ≥ 102 cm (men) or ≥ 88 cm (women)$^\yen$	Waist ≥ 94 cm (men) or ≥ 80 cm (women)	Waist ≥ 94 cm (men) or ≥ 80 cm (women)	Waist/hip ratio >0.9 (men) or >0.85 (women) or BMI ≥ 30 kg/m^2	
Hypertension	$\geq 130/85$ mmHg or drug treatment for hypertension	$\geq 130/85$ mmHg or drug treatment for hypertension	$\geq 140/90$ mmHg or drug treatment for hypertension	$\geq 140/90$ mmHg	$\geq 130/85$ mmHg

- **OTHER POTENTIAL MARKER**
- a proinflammatory, prothrombotic state that associated with elevated levels of:
- C-reactive protein (CRP)
- interleukin (IL)-6
- plasminogen activator inhibitor

- # **EPIDEMIOLOGY**

- The overall prevalence was 22 percent, with an age dependent increase (6.7, 43.5, and 42.0 percent for ages 20 to 29, 60 to 69, and >70 years, respectively)

- # **RISK FACTORS**

- Increased body weight is a major risk factor for metabolic syndrome

- 5 percent of those at normal weight

- 22 percent of those with overweight

- 60 percent of those with obesity

- Some normal-weight individuals are at increased risk of hypertension, CVD, and diabetes It is unknown if these individuals represent a distinct sub phenotype of metabolic syndrome (ie, "normal weight, metabolically obese")

- **Other risk factors**
- Age
- Race
- weight
- postmenopausal status
- smoking
- low household income
- high carbohydrate diet
- alcohol consumption
- physical inactivity
- Use of atypical antipsychotic medications (clozapin)

- **CLINICAL IMPLICATIONS**

- Important risk factor for subsequent development of type 2 diabetes and/or CVD

- Health care providers should assess individuals for metabolic risk at routine clinic visits

- The assessment should include measurement of blood pressure, waist circumference, fasting lipid profile, and fasting glucose.

- RR of developing diabetes ranged from 3.53 to 5.17

- RR of developing cvd ranged from 1.53 to 2.18

- **Metabolic syndrome has also been associated with several obesity-related disorders including:**

- Fatty liver disease with steatosis, fibrosis, and cirrhosis

- Hepatocellular carcinoma and intrahepatic cholangiocarcinoma.

- Chronic kidney disease (CKD)

- PCO

- Sleep-disordered breathing, including obstructive sleep apnea .

- Hyperuricemia and gout

- Several components of metabolic syndrome, including hyperlipidemia, hypertension, and diabetes, have been associated with an increased risk of cognitive decline and dementia.

THERAPY

- two major therapeutic goals:

- Treat underlying causes (overweight/obesity and physical inactivity) by intensifying weight management and increasing physical activity

- Treat cardiovascular risk factors if they persist despite lifestyle modification

- Aggressive lifestyle modification focused on weight reduction and increased physical activity

diet

- the Mediterranean diet (high in fruits, vegetables, nuts, whole grains, and olive oil) with a low-fat, prudent diet

- the Dietary Approaches to Stop Hypertension (DASH) diet (daily sodium intake limited to 2400 mg, and higher in dairy intake than the Mediterranean diet)

- A high-fiber diet (≥30 g/day) resulted in similar weight loss as compared with a more complex diet recommended by the AHA (fruits, vegetables, whole grain, high fiber, lean animal and vegetable proteins, reduction in sugar-sweetened beverages, moderate to no alcohol intake)

Exercise

- The standard exercise recommendation is a daily minimum of 30 minutes of moderate-intensity (such as brisk walking) physical activity. Increasing the level of physical activity appears to further enhance the beneficial effect .

Prevention of type 2 diabetes •

- Intensive lifestyle changes with the aim of reducing weight by 7 percent through a low-fat diet and exercise for 150 minutes per week.

- Treatment with metformin (850 mg twice daily) plus information on diet and exercise

- both intensive lifestyle intervention and metformin therapy reduced the risk of developing metabolic syndrome.

Oral hypoglycemic agents

- metformin and the thiazolidinediones (rosiglitazone and pioglitazone)

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- Recommendations are to treat IFG and IGT with weight loss of approximately 5 to 10 percent of the baseline weight; at least 30 minutes per day of moderately intense physical activity; and dietary therapy with a low intake of saturated fats, trans fats, cholesterol, and simple sugars, and increased intake of fruits, vegetables, and whole grains.

- **Lipid lowerin**

- serum low-density lipoprotein (LDL) cholesterol of less than 100 mg/dL for secondary prevention in patients with type 2 diabetes

Antihypertensive therapy

- angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARBs) used to treat hypertension in type 2 diabetes may also help to reduce insulin resistance.

Therapeutic goals for management of metabolic syndrome

	Goals
Lifestyle risk factors	
Abdominal obesity	Year 1: Reduce body weight 7 to 10 percent
	Continue weight loss thereafter with ultimate goal BMI $<25 \text{ kg/m}^2$
Physical inactivity	At least 30 min (and preferably ≥ 60 min) continuous or intermittent moderate inten exercise 5 times per week, but preferably daily
Atherogenic diet	Reduced intake saturate fat, trans fat, cholesterol
Metabolic risk factors	
Dyslipidemia	
Primary target elevated LDL cholesterol	High risk*: <100 mg/dL (2.6 mmol/$>$L); optional <70 mg/dL
	Moderate risk: <130 mg/dL (3.4 mmol/L)
	Lower risk: <160 mg/dL (4.9 mmol/L)
Secondary target elevated non-HDL cholesterol	High risk*: <130 mg/dL (3.4 mmol/L); optional <100 mg/dL (2.6 mmol/L) very high risk
	Moderate risk: <160 mg/dL (4.1 mmol/L)
	Lower risk: <190 mg/dL (4.9 mmol/L)
Tertiary target reduced HDL cholesterol	Raise to extent possible with weight reduction and exercise
Elevated blood pressure	Reduce to at least $<140/90$ ($<130/80$ if diabetic)
Elevated glucose	For IFG, encourage weight reduction and exercise
	For type 2 DM, target A1C <7 percent
Prothrombotic state	Low-dose aspirin for high-risk patients
Proinflammatory state	Lifestyle therapies; no specific interventions

Primordial Prevention

Primary Prevention

Secondary Prevention

Tertiary Prevention

Quaternary Prevention

Primordial Prevention

- ۱- اقدام در خصوص ترویج سبک زندگی سالم
- ۲- آموزش در خصوص تشکیل پرونده الکترونیک سلامت جهت تمامی آحاد جمعیت کشور و ارزش و اهمیت انجام مراقبتهای لازم در هر گروه سنی
- ۳- آموزش های لازم در سطح ملی برای آشنایی با علایم بیماری ریسک فاکتورها
- ۴-برگزاری جلسه با مسولان ذی ربط جهت تامین شرایط برگزاری ورزش های همگانی
- ۵-آموزش بانوان در مورد ارزش غذایی مواد مختلف مصرفی

۱- انجام مراقبتهای دوره ای در هرگروه سنی حسب مورد

۲- شناسایی افراد پر خطر و در معرض ریسک جهت توصیه های لازم بهداشتی در خصوص کنترل وزن انجام فعالیت بدنی و سبک زندگی سالم و ترک سیگار و الکل درمان بیماریهای همراهی که امکان و ریسک ایجاد موارد مثبت را میکند

۳- آموزش سبک زندگی سالم و افزایش فعالیت بدنی حداقل ۳۰ دقیقه در روز

Secondary Prevention

۱ـ بیماریابی بموقع در جمعیت در معرض ریسک و انجام اقدامات تستهای بیمار یابی و تشخیصی

۲- غربالگری کوموربیدتی های زمینه ای

Tertiary Prevention

- ۱- درمان بموقع و مقتضی براساس آخرین و جدیدترین مطالعات
- ۲- درمان کوموربیدیتی های همراه واقدامات پیشگیرانه جهت کنترل بیماری
- ۳-مراقبت و مونیتورینگ بموقع بیماران

Quaternary Prevention

- ۱ـ مونیتورینگ و فالواپ بموقع بیماران و ارایه خدمات درمانی مقتضی

- ۲ـ عدم انجام اقدامات پاراکلینیکی و دارویی که تاثیر خاصی بر پیش آگهی و عوارض بیماری ندارد