"*Metabolic Syndrome*"

Endocrine Block, PBL; Case 3

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Color Guide:

- **Red:** <u>Relatively</u> important & <u>mentioned in case tutorials.</u>
- **Black:** Questions.
- **Blue:** Answers (<u>mentioned in case tutorials</u>).
- **Green:** Additional answers/notes.
- **Orange:** Explanation.

Learning Objectives

1- **Hormones involved in metabolism of carbohydrates and fats and their role in maintaining normal blood glucose.**

2- **Biochemical and physiological interactions between the different components of metabolic symptoms (such obesity, dyslipidaemia, high blood pressure and impaired blood glucose tolerance).**

3- **The mechanisms by which obesity causes insulin-resistance and the development of diabetes type 2.**

4- **Interpretation of the clinical manifestation and investigation results obtained from a patient with metabolic syndrome.**

5- **Differences between HDL and LDL.**

6- **Role of changing life style (including weight loss, low calorie diet and stopping smoking) in managing metabolic syndrome.**

Definition:
Metabolic syndrome is a cluster of conditions (increased blood pressure, a high blood sugar level, excess body fat around the waist and abnormal cholesterol levels) that occur together, increasing the risk of heart disease, stroke and diabetes.

Sings and Symptoms:
- Hypertension
- Hyperglycemia
- Hypertriglyceridemia
- Reduced high-density lipoprotein cholesterol (HDL-C)
- Abdominal obesity
- Chest pains or shortness of breath

Risk Factors:
- Obesity
- Sedentary lifestyle
- Aging
- Smoking

Diagnosis:
Metabolic syndrome occurs when a person has three or more of the following measurements:
- Abdominal obesity
- Triglyceride level of 150 (mg/dL) or greater
- HDL cholesterol of < 40 mg/dL in men, < 50 mg/dL in women
- Systolic blood pressure of 130 (mm Hg) or greater
- Diastolic blood pressure of 85 mm Hg or greater
- Fasting glucose of 100 mg/dL or greater
- Insulin resistance or glucose intolerance

Investigations:

Blood biochemistry:

High:	Low:
Fasting blood glucose	HDL
Total cholesterol	
Blood triglycerides	
LDL	

Treatment:

- Life style modification:
  Physical activities, Healthy diet, Stop smoking
- Reduce BMI to 23-25
- Enalapril (ACE inhibitor) for high blood pressure

Notes:

- BMI: is a measure for human body shape based on an individual's mass and height

- $BMI = \dfrac{mass(kg)}{(height(m))^2}$

- Fatty liver is enlarged and show
  1) increased echogenicity in ultrasound
  2) elevation in liver function test
- Hypertension may cause left ventricular hypertrophy

Questions

Q1- Name risk factors for metabolic syndrome

Obesity, Sedentary lifestyle, Aging, Smoking

Q2- What do you expect the fasting blood glucose level in metabolic syndrome patient?

100 mg/dL or greater

Q3- What do you expect the BP level in metabolic syndrome patient?

130/85 (mm Hg) or more

Q4- What is the first line of treatment to manage metabolic syndrome?

Life style modification

Q5- What is the effect and mechanism of Enalapril?

Lowers blood pressure, ACE inhibitor

Q6- What is the benefit of measuring BMI?

Measure human body shape based on an individual's mass and height

Q7- If your patient height 175 cm and his weight 100Kg, what is his BMI?

$100/(1.75^2) = 32.3$

Q8- Name one of hypertension complications

Left ventricular hypertrophy

Q9- What do you expect to see in the ultrasound of a fatty liver?

Increased echogenicity

Q10- Name 3 of the most common clinical finding in a metabolic syndrome patient

Hypertension, Hyperglycemia, Hypertriglyceridemia

Q11- What is the (good) cholesterol and (bad) cholesterol ?

High-density lipoprotein HDL is the good cholesterol

Low-density lipoprotein LDL is the bad cholesterol

Q12- What is the clinical significance of those 2 cholesterol ?

In metabolic syndrome HDL will decrease while LDL will increase