TOBACCO AND ENDOCRINE PROBLEMS

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TOBACCO AND ENDOCRINE PROBLEMS

I. GOAL OF MODULE: Provide students with knowledge and skills about endocrine problems related to tobacco use.

II. TARGET AUDIENCE

a. Level of Student/Learner: 3rd Semester
b. Suggested Course or Subject: Department of General Medicine

III. LEARNING OBJECTIVES

- To understand the burden of smoking among diabetes patients
- To understand the association between smoking and diabetes, and the impact of smoking on diabetes
- To understand the importance of providing cessation counseling to diabetes patients
- To discuss the association between tobacco use, obesity, and dyslipidemia
- To advise smoking cessation for patients and populations with these CVD risk factors, i.e. diabetes, obesity, and dyslipidemia

IV. CURRICULUM STANDARDS ADDRESSED:

The General Medicine Department has the broad goal of teaching undergraduate medical students the knowedge, skills, and behavioural attributes to function effectively as a first contact physician. It has a total of 180 hours, of which 14 hours are for endocrine diseases. Time from this slot can be used for this module.

- The student will be able to diagnose common clinical disorders, outline various modes of management, propose and interpret diagnostic and investigative procedures, and provide first level management of acute emergencies.

Skills:

- The student will develop clinical skills for various common medical disorders and emergencies, perform simple routine investigations, assist in common bed-side investigative procedures, and be able to refer a patient to secondary or tertiary level health care.

V. MINI-LECTURES

MINI LECTURE 1: TOBACCO AND DIABETES

CORE SLIDES

1. Global Burden of Diabetes
2. Diabetes in India
3. Diabetes in Indonesia
4. Smoking and Diabetes Incidence
5. Smoking and Diabetes: Pathophysiology
6. Metabolic Effect of Nicotine
7. Smoking and Diabetes Complications
8. Why Cessation in Diabetes?
9. What Should Doctors Do?

OPTIONAL SLIDES

1. Smoking and Diabetes: Association
2. Smoking and Diabetes: Mortality
3. Smoking and Diabetes: Cost
4. Smoking am Diabetic Retinopathy
5. Smoking and Diabetic Nephropathy
6. Smoking and Diabetic Neuropathy
7. Smoking and Cardiovascular Diseases among Diabetes Patients
8. Smoking and Stroke among Diabetes Patients
9. Tobacco Use among Diabetes Patients in Kerala, India
10. Perceptions of Tobacco Use in Kerala, India
11. Smoking among Diabetes Patients Indonesia: Results from QTI
12. Perceptions of Tobacco Use among Diabetes Patients in Indonesia

MINI LECTURE 2: TOBACCO AND OTHER METABOLIC DISORDERS

CORE SLIDES

1. Smoking and Metabolic Disorders
2. Smoking and Insulin Resistance
3. Body Fat Distribution in Smoking
4. Smoking and Changes in Lipid Profile
5. Smoking and HDL
6. Centripetal Adiposity
7. Smoking and Obesity: Mortality
8. Smoking Cessation and Weight Gain
9. What Should Doctors Do?

OPTIONAL SLIDES

1. Smoking, Weight Gain, and Women
2. Lipid Profile Changes: Pathways

3. Role of Plasma FFAs
4. Smoking and LDL Oxidation
5. Smoking and Free Radicals

VI. CASE DISCUSSION / CLINICAL SCENARIO AND SKILLS CHECKLIST

CASE SCENARIO—asking patient about tobacco use

Overview

In this module, students are asked to practice integrated communication during case discussion under supervision of instructors in order to develop their smoking cessation skills. Students will be trained to routinely ask about patients' smoking status in every case. After obtaining patients' current smoking status, students will then practice how to assess patients' readiness to quit, advise and assist patients to quit smoking, and also arrange follow ups to monitor patients' smoking cessation progress. Therefore students will also learn how to deliver efficient encouragement and provide proper explanation about the harm of tobacco on health and to help patients on their smoking cessation attempts.

Introduction

Tobacco has direct and indirect effects on diabetes incidence, disease progression, and also on both incidence and severity of complications. Smoking also has an unfavorable impact on lipid profile and body fat distribution. All this has a bearing on continued use of tobacco as well as on cessation efforts, which should be discussed as part of this case.

Learning Objectives

Upon the completion of this skills laboratory practice, students are expected to be able to:

- Routinely ask all patients about their smoking status
- Assess patients' readiness to quit
- Advise patients with diabetes, obesity, or hyperlipidemia to quit smoking
- Assist the patients to quit
- Arrange follow ups on patients' smoking cessation progress
- Explain the harm of tobacco on the endocrine system

Asking the patient's smoking history

Research studies show that if doctors have a reminder to ask about smoking, e.g. smoking status is part of the vital signs, doctors are three times more likely to advise patients to quit. Simple advice from a physician has been shown to increase abstinence rates significantly (by 30%) compared to no advice.

There are several important factors that should be considered when we are asking the patients'smoking history, i.e. 1) asking the smoking status of all patients (including women and teenagers); 2) if the patient does not smoke, they should be asked if they have ever smoked (because even after quitting, a smoker can start again); 3) questions should be delivered in a non-critical manner; 4) evaluate the patients' smoking history as to how many cigarettes they smoke daily, do they use any other forms of tobacco; and 5) make a note on the patients' smoking status in the medical record. Women and children should not be excluded and they should also be asked about passive smoking.

Case Scenario

A 58 year old man, a known diabetes patient for the past 10 years on regular medication, has come with a history of numbness and tingling in both feet and hands. He has a past history of angina for which he is on medication. He has been a smoker since he was 15 years old and smokes about one pack of cigarettes everyday. He quit smoking when he was diagnosed with angina five years ago but subsequently restarted once the symptoms subsided.

On examination the patient was found to be obese and on investigation his fasting blood sugar—180 mg/dl, total cholesterol—210mg/dl, triglycerides—252 mg/dl and HDL—20 mg/dl.

Vital Signs
Blood Pressure: 130/90 mm Hg
Pulse: 72 / min
Body Weight: 82 kg
Temperature: 97.3 F

Smoking Status
Smoking status of patient: Smoker Ex-Smokers Never Smoke (Circle one)
Smoking status of spouse: Smoker Ex-Smokers Never Smoke (Circle one)

Checklist for Case Scenario

S.No.	Aspects	Please tick if student has covered this aspect
	Ask	
1.	• Ask patient whether he/she smokes or not	
2.	• If the patient doesn't smoke, ask whether he/she ever smoked before	
3.	• If the patient smokes, ask how many cigarettes he/she takes per day	
	Assess	
4.	• Assess patient's readiness to quit.	
	Advise	
5.	• Advise patient to quit smoking	
6.	• Personalize advice by using the tobacco user's health status/disease	

	Assist	
7.	• Assist the patients to quit by giving him/her pamphlets, brochures	
	Arrange for Follow-up	
8.	• Arrange to follow up on tobacco use	

Points for Discussion

- Smoking has been shown to interfere with glycemic control by increasing central adiposity and insulin resistance.
- Since diabetics are already at high risk for cardiovascular events, both smoking and chewing increase this risk.
- Smoking interferes with circulation and accelerates both micro and macro vascular complications like nephropathy, retinopathy, and neuropathy.
- The physician of every diabetes patient should discuss the specifics of how tobacco use adversely affects diabetes as our research shows that patients are more interested in learning about how their specific diseases are impacted by tobacco use rather than just general information about the harms of tobacco use.

FACT SHEET

The fact sheets are to be used by the tutor to supplement the discussion about the scenario. This fact sheet will address background information on tobacco that could be relevant to the scenario.

Tobacco and Diabetes

1. One of the most important findings from studies relating tobacco and diabetes was that only a very few informants thought that tobacco use was related to diabetes and those who did so thought that only very high levels of tobacco use (exceeding 25 cigarettes a day) might pose a risk to diabetes.[1]
2. Cigarette smoking, both active and passive, is an independent modifiable risk factor for the development of impaired fasting glucose (IFG),[2] type 2 diabetes mellitus (T2DM), and diabetes complications.[3] The risk was greater for heavy smokers and lower for former smokers compared with active smokers, consistent with a dose-response phenomenon.[2]
3. Cigarette smoke may have a direct toxic effect on the endothelial lining of blood vessels, which may lead to increased insulin resistance, and smoking is also associated with chronic inflammation, which is shown to be predictive of T2DM. Smoking may also mediate disturbed glucose metabolism by promoting or inducing alteration in fat distribution.[2]
4. The effect of smoking on CVD among diabetes patients is dose-dependent. The combined CVD risk of both smoking and diabetes is nearly 14 times higher than the risk of either smoking or diabetes alone.[4]
5. Smoking was associated with subclinical atherosclerosis in persons with diabetes and smoking interacts with duration of diabetes to accentuate atherosclerosis.[5]
6. Smoking cessation is proven effective to reduce the incidence and complications of diabetes.[6]
7. Smoking cessation helps to prevent and control diabetic complications. It improves metabolic and glycemic control and reduces the risk of CVD, peripheral artery disease, proteinuria and renal failure, neuropathy, and also retinopathy in some sub-groups.[7]
8. Smoking cessation decreases the cost for diabetic hospitalization, as the major cost incurred for diabetes is in the management of diabetic complications, rather than the treatment of diabetes itself.[8]

Tobacco and Other Metabolic Disorders

1. Although smokers weighed significantly less than nonsmokers, the waist-to-hip ratio (a measure of central adiposity), was significantly higher in smokers than in nonsmokers. Despite decreased relative adiposity in smokers, centripetal adiposity is increased.[9]
2. Cigarette smokers (both active and passive) were found to have significantly increased serum levels of TC, LDL, VLDL, and TG, and significantly decreased serum levels of HDL and apolipoprotein-Al (apo-A1).[10,11,12]
3. A dose-response relationship has been demonstrated between the number of smoked cigarettes and the concentration of blood lipids with men and women smoking 25 or more

cigarettes/day, having significantly elevated VLDL and TG levels and significantly lower HDL levels as compared to non-smokers and ex-smokers.[13]

4. Cigarette smoking is associated with an elevated ratio of total cholesterol (TC) to high-density lipoprotein cholesterol (HDL). The TC/HDL ratio is a powerful predictor of the risk of atherosclerotic cardiovascular disease.[14]
5. Smoking increases centripetal accumulation of body fat indirectly through increased androgenicity, which may lead to increased accumulation of adipose tissue in the abdomen rather than in the femoral-gluteal area.[9]
6. Effects of smoking and drinking on waist-to-hip ratio were found to be independent and additive.[15]
7. The association of smoking with waist-to-hip ratio was found to be stronger in women than men.[15]
8. Catecholamines released during smoking enhance lipolysis and raise plasma free fatty acid (FFA) concentrations.[13]
9. Smoking is also an independent determinant of low paraoxonase activity in patients with acute coronary events.[13]
10. Smoking cessation was found to reduce the susceptibility of LDL to oxidation.[13]
11. Weight gain and increased appetite were cited as important reasons for relapse following attempts to quit smoking among Swedish women.[16]

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MINI LECTURE 2 [Tobacco and Other Metabolic Disorders]

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2. INSTRUCTOR KEY RESOURCES/REFERENCES

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4. INSTRUCTOR WEB-SITE RESOURCES

http://www.eatlas.idf.org/

5. SAMPLE EXAMINATION QUESTIONS

Short Answers

1. How does smoking lead to diabetes? Describe a few mechanisms/pathways.
2. Why is smoking cessation important in diabetic patients?
3. Describe the pattern of body fat distribution in smokers.
4. Describe the changes that occur in the lipid profile of smokers.

Multiple Choice Questions (Answers in blue font)

1. Which one of the following is **not** true regarding active or passive smoking and diabetes?

    a. Increased incidence of impaired fasting glucose
    b. Increased incidence of juvenile (type 1) diabetes
    c. Increased incidence of Type 2 diabetes mellitus
    d. Increased incidence of complications of type 1 and 2 diabetes
    e. Increased severity of complications of type 1 and 2 diabetes

2. Which is **true** regarding body fat distribution in smokers compared to non- or ex-snokers?

    a. Decreased waist to hip ratio
    b. Decreased centripetal adiposity
    c. Increased body weight
    d. Increased adiposity in abdomen rather than femoral-gluteal region
    e. Increased adiposity in femoral-gluteal region rather than abdomen

3. The effects of smoking on incidence of NIDDM are _____?

    a. Chronic and irreversible
    b. Not modifiable
    c. Acute, reversible, and modifiable
    d. None of the above
    e. All of the above

4. Which is **not true** regarding changes in lipid profile and its pathways in smokers?

    a. Decreased mean levels of HDL2 sub-fraction
    b. Increased mean levels of TC, LDL, VLDL and TG
    c. Decreased serum apolipoprotein A1
    d. Decreased TC/HDL ratio
    e. LCAT activity inhibited

5. Which is **not true** regarding mechanisms of centripetal adiposity in smokers?

    a. Increased adrenal androgens in females only
    b. Testicular androgens minimize effect of adrenal androgens in males
    c. Increased serum estradiol levels
    d. Increased adrenal androgens in males and females
    e. Increased cortisol levels in post-menopausal women smokers

6. Which of the following is **not true** regarding weight gain due to smoking cessation?

    a. Clear evidence of short-run weight gain
    b. Results in upper body fat distribution
    c. No evidence of steady weight gain
    d. Has no adverse health effect
    e. One of the reasons for smoking relapse in women