

Students' Material
Diabetes Case Conference

Ambulatory Component of the Internal Medicine Clerkship
Yale University School of Medicine

Prepared by

Walter N. Kernan, M.D.
Silvio E. Inzucchi, M.D.

Version 03/05/09

1. GOALS AND OBJECTIVE FOR STUDENTS

1.1 Major

1. Describe appropriate strategies for the initial management of new-onset type 2 diabetes.
2. State the indications and protocols for home glucose monitoring.
3. Describe consideration for selecting initial and add-on glucose-lowering therapy.
4. Demonstrate practices for helping patients attain goals for glycemic control.
5. List the major causes of morbidity and mortality among diabetic patients.
6. Describe interventions to prevent atherosclerosis in patients with diabetes.
7. Identify how social, economic, and other personal characteristics of patients influence management of diabetes.
8. Establish how frequently to schedule return visits.

1.2 Minor

1. Describe the definitions, diagnostic procedures, and diagnostic criteria for diabetes mellitus.
2. Describe the metabolic basis of dietary and exercise recommendations for patients with diabetes.
3. Recognize important differences among available glucose-lowering agents and how to select the appropriate agent for an individual patient.
4. Define microalbuminuria and describe its clinical significance.
5. List special health maintenance procedures and schedules for patients with diabetes.
6. Identify insulin preparations and administration protocols.

2. INSTRUCTIONS FOR STUDENTS

2.1 Read the Following Two Papers (if you have not read them recently).

These papers will help you manage the patient described in this case conference. The papers are:

1. American Diabetes Association. Standards of medical care for patients with diabetes mellitus. *Diabetes Care* 2009; 32: S13-S61.
NOTE: It is a long paper. You only need to read sections I, II, and VI (others optional).
2. Nathan DM, Buse JB, Davidson MB, Ferrannini E, Holman RR, Sherwin R, Zinman B. Management of hyperglycemia in type 2 diabetes: a consensus algorithm for the initiation and adjustment of therapy. *Diabetes Care* 2009;32:193-203

2.2 Read only Part I of the case material.

PLEASE DO NOT GLANCE BEYOND PART ONE OF THE CASE PRESENTATION. The conference is designed to present information in serial fashion, mimicking real practice. Each subsequent part to the case gives answers to questions from the previous part. If you can refrain from looking ahead, you will find that the classroom exercise will be more fun and meaningful as you and your colleagues try to solve patient-related problems for the first time.

2.3 Come to class and help the patient manage his diabetes.

This conference should unfold as a conversation between you and the faculty facilitator, in which you are challenged to think about managing a patient with diabetes over several years of his disease.

3. CASE DESCRIPTION: PART ONE

Luther Chance is a 54 year-old man who is seen because of high blood glucose (256 mg/dl) detected when he attended a free screening clinic at a local mall. On questioning, he has noted intermittent polyuria, polydipsia, fatigue, and blurred vision for about 4 months. His blood sugar was “borderline” about 5 years ago. Both of his parents had type 2 diabetes. His father and a brother have coronary artery disease. He saw a nutritionist several years ago for instruction in a low fat, low calorie diet, but failed to alter his eating habits or loose weight. He is very reluctant to attempt further changes in his diet, saying he cannot tolerate further restrictions. He feels well.

PMH: Hypertension

Medications: Hydrochlorothiazide 25 mg daily, KCL 20 Meq daily

Social History: He is married and works as an insurance salesman. He does not smoke. He drinks 2 alcohol beverages a night about 2 nights a week.

PE: General: He appears heavy, but well.

Vitals: BP 148/88, HR 66, WT 234, HT 5'9"
BMI 34 kg/m²

Other: Fundus normal. Thyroid not enlarged.
No neuropathy.

DATA (fasting):

Total Cholesterol	259 mg/dl	LDL	156 mg/dl
HDL	29 mg/dl	TG	368 mg/dl
FBS	198 mg/dl	HbA1c	8.8%
BUN	18	Cr	1.2 mg/dl

Main Discussion Questions:

1. What are the current (American Diabetes Association) intermediate (physiologic, metabolic) goals for optimal therapy for diabetes? (The ultimate goal is prevention of microvascular and macrovascular complications. Intermediate goals involve means to obtain these ultimate goals.)
2. What intermediate goals are appropriate for this patient? How do you select these goals?
3. Would the goals be different for Mr. Chance if he were 90 years old? If he lived alone? If he had advanced prostate cancer?
4. What would you do to help Mr. Chance reach his goals? (What do you need to do this visit?)

ATTENTION STUDENTS:

Please do not read beyond this page until you are in class and the instructor tells you to do so. The conference is likely to be more fun and useful if you pause here.

4. CASE DESCRIPTION: PART TWO

Mr. Chance returns to see you in 6 weeks. He has enrolled in diabetes education classes and has consulted a nutritionist. He was placed on a weight-reducing 2200 kcal diet. He and his wife have begun a walking program. He is very pleased to report that he has lost 6 pounds and that he no longer has polyuria, nocturia, or blurry vision. As you instructed, he began home glucose monitoring with the following results recorded in his log:

DAY	FASTING GLUCOSE	AC DINNER GLUCOSE
Monday	174	144
Tuesday	150	180
Wednesday	184	178
Thursday	121	189
Friday		210
Saturday	198	198
Sunday	170	
Average	166	183

Meds: metformin 500mg PO BID, HCTZ 25 mg PO daily, KCL 20 meq PO daily, aspirin 325 mg QD.

PE: General: he appears well.
Vitals: BP 146/92, 144/90, 144/92, pulse 72, weight 228 lb.
The remainder of the examination is normal.

Questions for students:

1. What would you do next?

5. CASE DESCRIPTION: PART THREE

Mr. Chance is returning 8 weeks later for review of his diabetes. At the last visit, his metformin was increased to 850 mg PO BID and lisinopril 10 mg PO QD was added. Four weeks later, his blood sugars dropped to an average value of 150 mg/dl in the morning and 170 mg/dl in the evening. Metformin was increased to 850 mg PO twice daily. He currently feels well.

MEDS: metformin 850 mg PO BID, HCTZ 25 mg PO QD, KCL 20 meq PO daily, lisinopril 10 mg PO QD; aspirin 325 mg QD

PE: Vitals: BP 136/86, 140/78, 138/80
HR 66, WT 228
Other: Normal

DATA: Total Cholesterol 210 mg/dl LDL 125 mg/dl
HDL 39 mg/dl TG 230 mg/dl
FBS 112 mg/dl HbA1c 7.5%
BUN 14 mg/dl Cr 1.1 mg/dl
AST 24 IU/L ALT 33 IU/L
Alk Phos 100 IU/L TB 1.02 IU/L
DB .2 IU/L

DAY	FASTING GLUCOSE	AC DINNER GLUCOSE
Monday	140	161
Tuesday	152	172
Wednesday	150	
Thursday	142	163
Friday	105	152
Saturday		155
Sunday	185	169
Average	146	162

Questions:

1. What would you do now?
2. When should he be seen in follow-up?

6. CASE PRESENTATION: PART FOUR

Over the next two years, Mr. Chance is seen regularly to maintain his HbA1c between 6.7 and 7.3%. In recent months, however, it has begun to rise. His fasting sugars are now in the 180-220 range. He returns to the office now for evaluation of this deterioration in glycemic control. He has recently gained weight related to dietary indiscretion and lack of exercise. He generally feels OK, but worries about his rising glucose levels.

Meds: Metformin 850 mg PO BID
Glimepiride 4 mg PO QD
Atorvastatin 20 mg PO QD
Lisinopril 20 mg PO QD
Aspirin 81 mg PO QD
HCTZ 25 mg PO QD
KCL 20 meq PO QD

PE: General: Appears well, obese
Vitals: BP 132/80, pulse 72, weight 242 (BMI 35.7)
Fundus: Normal
Neuro: No impaired sensation in feet

DATA:	Total Cholesterol	190 mg/dl	LDL	102 mg/dl
	HDL	37 mg/dl	TG	254 mg/dl
	FBS	162 mg/dl	HbA1c	8.8%
	BUN	16 mg/dl	Cr	1.2 mg/dl

Questions:

1. What is the most appropriate next step to get his blood sugar under control?
2. What additional testing is needed to screen for diabetic complications?
3. When should he be seen for follow-up? How will this be affected by your choice of agent.
4. What else would you do to reduce his risk for vascular disease?

7.0 REFERENCES¹⁻⁵:

1. Nathan DM, Buse JB, Davidson MB, Ferrannini E, Holman RR, Sherwin R, Zinman B. Medical management of hyperglycemia in type 2 diabetes: a consensus algorithm for the initiation and adjustment of therapy. *Diabetes Care*. 2009;32:193-203.
2. American Diabetes Association. Standards of Medical Care in Diabetes - 2009. *Diabetes Care*. 2009;32 (Supplement 1):S13-S61.
3. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL, Jones DW, Materson BJ, Oparil S, Wright JT, Rocella EJ. The Seventh Report of the Joint National Committee on Prevention, Detection, and Treatment of High Blood Pressure: the JNC 7 report. *JAMA*. 2003;289:2560-2572.
4. Colhoun HM, Betteridge DJ, Durrington PN, Hitman GA, Neil HAW, Livingstone SJ, Thomason MJ, Charlton-Menys V, Fuller JH, investigators obotC. Primary prevention of cardiovascular disease with atorvastatin in type 2 diabetes in the Collaborative Atorvastatin Diabetes Study (CARDS): multicentre randomized placebo-controlled trial. *Lancet*. 2004;364:685-696.
5. The Heart Protection Study Collaboration Group. MRC/BHF Heart Protection Study of cholesterol-lowering with simvastatin in 5963 people with diabetes: a randomized placebo-controlled trial. *Lancet*. 2003;361:2005-20016.