Module 7. Endocrine Disorders

EDUCATIONAL OBJECTIVES

Upon completion of this activity, participants will be better able to:

1. Discuss the epidemiology and pathophysiology of common endocrinologic disorders;
2. Explain the basic approach to treatment for common endocrinologic disorders;
3. Discuss appropriate monitoring parameters for medications discussed in this module; and
4. Demonstrate effective patient counseling skills for patients with an endocrinologic disorder discussed in this module.

Post-Test/Rationale

1. Which of the following patient factors is NOT a risk factor for type 2 DM?
   A. low HDL cholesterol
   B. alcohol use***
   C. physical inactivity
   D. history of ASCVD

   Correct Answer: B
   Risk factors for type 2 DM include: age ≥ 45 years; family history; race (Native American, African American, Latino, Asian American, Pacific Islander); impaired glucose tolerance or fasting glucose; overweight or obesity; physical inactivity; hypertension; low high-density lipoprotein (HDL) cholesterol or high triglycerides; history of atherosclerotic cardiovascular disease (ASCVD); women delivering a baby over 9 pounds; and women with polycystic ovary syndrome.

2. Which of the following factors should be considered when setting glycemic targets?
   A. cost of treatment
   B. race
   C. comorbidities***
   D. weight

   Correct Answer: C
   The American Diabetes Association has suggested the following targets: A1C ≤ 7%, pre-prandial glucose 80 to 130 mg/dL, and 2 hour post-prandial glucose < 180 mg/dL. However, they recommend that these goals can be altered based on several factors such as comorbidities, age, duration of diabetes, and hypoglycemic unawareness. The American Association of Clinical Endocrinologists/American College of Endocrinology suggest a slightly lower goal A1C (≤ 6.5%) but also recommend that higher targets may be necessary in patients at greater risk for hypoglycemia or in those with comorbidities.
3. True or False? Metformin should be avoided in all patients with heart failure.

   A. True
   B. False***

Correct Answer: B
Metformin may be used in patients with stable heart failure but should be withheld in acute heart failure. Acute hypoxia that develops during acute heart failure increases the risk of lactic acidosis.

4. Which of the following medications does not need dosage adjustment in patients with renal impairment?

   A. canagliflozin
   B. pioglitazone***
   C. repaglinide
   D. sitagliptin

Correct Answer: B
Many medications used in the treatment of diabetes require dosage adjustment in patients with renal impairment including the second generation sulfonylureas, repaglinide, the sodium-glucose co-transporter 2 inhibitors (e.g., canagliflozin), the dipeptidyl peptidase-4 inhibitors (e.g., sitagliptin). Pioglitazone does not require adjustment in patients with renal impairment.

5. A patient seen in the MTM clinic states that their primary goal for treating type 2 DM is to avoid hypoglycemia, the most current A1C is 8%. Which agent would be the best option to add to this patient's current metformin therapy?

   A. saxagliptin***
   B. glipizide
   C. insulin
   D. nateglinide

Correct Answer: A
There are a number of medication options for concomitant administration with metformin in patients who are unable to meet glycemic targets with metformin monotherapy; however, some of these medications may increase the risk of hypoglycemia. Insulin, sulfonylureas (e.g., glipizide), meglitinides (e.g., nateglinide), sodium-glucose co-transporter 2 inhibitors, and amylin mimetics all increase the risk of hypoglycemia. The dipeptidyl peptidase-4 inhibitors such as saxagliptin do not increase the risk of hypoglycemia.

6. A 33-year-old female with type 2 DM is referred to your MTM clinic. She has been taking metformin irregularly because it "makes me sick to my stomach." As a result, her A1C remains unchanged at 9%. She is unwilling to continue this treatment despite your efforts and wants her treatment to be "easy." What is the next best treatment option?
A. insulin
B. exenatide
C. canagliflozin***
D. acarbose

**Correct Answer: C**

According to the American Association of Clinical Endocrinologists, alternative monotherapy options (in order of preference) are: glucagon-like peptide-1 receptor agonists, sodium-glucose co-transporter 2 inhibitors, dipeptidyl peptidase-4 inhibitors, thiazolidinediones, basal insulin, colesevelam, bromocriptine, alpha-glucosidase inhibitors, and sulfonylureas or meglitinides. Although the glucagon-like peptide-1 receptor agonists are listed first (e.g., exenatide), these agents are injectable which may be of concern to some patients; therefore, the next preferred agent may be selected. Canagliflozin, a sodium-glucose co-transporter 2 inhibitor, is a reasonable option.

7. When initiating insulin in a patient with type 2 DM, which of the following is the best type to use?

A. rapid-acting
B. intermediate-acting
C. short-acting
D. long-acting***

**Correct Answer: D**

Patients with type 2 DM require less intensive insulin therapy compared with patients with type 1 DM because endogenous insulin remains present to some degree. When insulin is initiated, long-acting or basal insulin is the first step. After 3 to 6 months of basal insulin, a rapid acting insulin or a glucagon-like peptide-1 receptor agonist may be necessary.

8. Which of the following statements is true?

A. Insulin should be used as a last line agent in the treatment of type 2 DM.
B. Concomitant use of exenatide and glyburide does not increase the risk of hypoglycemia.
C. Avoidance of hypoglycemia is more important than achieving the A1C goal.***
D. All elderly patients should have higher target A1C goals than younger patients.

**Correct Answer: C**

The American Association of Clinical Endocrinology guidelines stress the importance of avoiding hypoglycemia and weight gain in patients with type 2 DM. Thus, “c” is the correct response. Statement “a” is false because insulin may be used first-line for some patients especially those with very high A1Cs at baseline. Statement “b” is false because sulfonylureas (e.g., glyburide) can cause hypoglycemia, and additive hypoglycemic effects can occur with the addition of a glucagon-like peptide-1 receptor agonist (e.g., exenatide). Statement “d” is false.
based on the fact that some elderly patients who are not at increased risk of hypoglycemia may have similar A1C goals to younger patients.

9. A 41-year-old female was found to have a TSH of 13 mIU/L 6 weeks ago and she was started on L-thyroxine 100 mcg/day. Today her TSH is 10 mIU/L. What is the next best step for her treatment?

A. add liothyronine  
B. increase L-thyroxine to 150 mcg/day  
C. decrease L-thyroxine to 75 mcg/day  
D. ensure patient is using her L-thyroxine appropriately***

Correct Answer: D
There are a number of drug and food interactions that impair the absorption of L-thyroxine resulting in less than optimal therapeutic results. Thus, these factors should be assessed prior to changing the L-thyroxine dose. If a dosage adjustment is made, it should not exceed a change of 25 mcg/day.

10. Which of the following medications may be required in addition to prednisone in a patient with Addison’s disease?

A. fludrocortisone***  
B. hydrocortisone  
C. cortisone  
D. amiloride

Correct Answer: A
Patients with Addison’s disease require glucocorticoid supplementation with hydrocortisone, cortisone, or prednisone. Many patients will also require mineralocorticoid replacement with fludrocortisone.