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Type II Diabetes Mellitus

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Signs and Symptoms of DMII include:
- Polyuria
- Polydipsia
- Polyphagia
- Glycosuria

Type II Diabetes Mellitus (DMII) affects an estimated 8-9% of the adult population or 382 million people worldwide [Cornell, 2017, p. 413]. The research is currently an emergency department registered nurse and future advanced practice practitioner of family medicine. DMII was chosen by the researchers as the primary topic to gain a better knowledge and understanding of the pathophysiology and implications of DMII, thus the future APP will be able to provide the best treatment for the patients with the best quality of life for patients with DMII.

Criteria for the diagnosis of diabetes is the
- Hyperglycemia (HbA1c) of 6.5% or greater
- 8-hour fasting plasma glucose (FPG) of 126 mg/dl or greater
- A small-glycated hemoglobin test with 2-hour plasma glucose level of 200 mg/dl or greater

Mr. B presents to his PCP’s office with complaints of increased fatigue, increased thirst, and numbness in his toes. Mr. B is a 52-year-old Native American male. Mr. B’s past medical history is reviewed and his height, weight, and vital signs are obtained, the abnormal values as follows: BMI 31.3, BP 130/90. Furthermore into Mr. B’s medical history is reviewed and he is diagnosed with hyperglycemic symptoms (Kadwell, 2017).

Ms. B presents to her PCP’s office with complaints of increased fatigue, increased thirst, and numbness in her toes. Ms. B is a 52-year-old Native American female. Ms. B’s past medical history is reviewed and her height, weight, and vital signs are obtained, the abnormal values as follows: BMI 31.3, BP 130/90. Furthermore into Ms. B’s medical history is reviewed and she is diagnosed with hyperglycemic symptoms (Kadwell, 2017).

The pathophysiology of DMII is complex, in that it involves multiple organs. The islet of Langerhans located within the pancreas produces beta cells that secrete insulin, and alpha cells that secrete glucagon (McCulloch & Robertson, 2018). Although the etiology of DMII is still unclear, it is thought to be a multifactorial caused by genetic predisposition, obesity, hypertension, lack of exercise, environmental factors, and other correlated health conditions and medications (Kadfer, Cooper, & Del Prato, 2014). The release of free fatty acids and adipokines by excess adipose tissue or fat cell cause inflammation that can lead to insulin resistance (Waddell, 2017). In DMII, the response of insulin-sensitive tissues, such as liver, muscle, and adipose tissue become insulin resistant (McCulloch & Robertson, 2018). Initially, the beta cells release insulin in response to glucose in the blood. Insulin reduces blood glucose levels by binding to the insulin receptors on insulin sensitive tissues. Activated insulin receptors cause the glucose transporter (SLC2A1) protein inside the cell to fuse to the cell membrane allowing glucose, amino acids, and fatty acids to be transported into the cell (McCulloch & Robertson, 2018). In DMII, when the insulin-sensitive tissues do not respond to the normal amount of insulin that is secreted, the beta cells secrete more insulin in order to maintain normal blood glucose concentrations; this is done by beta cell hypertrophy and hyperplasia to secrete more insulin to maintain blood glucose homeostasis (McCulloch & Robertson, 2018). Along with insulin, beta cells also secrete more proinflammatory cytokines, whereby oxidative stress builds up in and aggregates in the islets thus produces amyloid deposits (McCulloch & Robertson, 2018). Eventually the beta cells become dysfunctional, and result in chronic hyperglycemia and become hypoinsulinemia and hyperglycemia (McCulloch & Robertson, 2018). As a result of beta cell dysfunction, further glycaemia occurs and impaired glucose intolerance is present which will lead to the development and diagnosis of DMII (Kadfer, Cooper, & Del Prato, 2014).

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Implications for Nursing Care

There are many nursing interventions and implications for DMII; the most important being to educate patients on prevention of diabetes, but also education on how to manage blood glucose with DMII. Education includes diet and lifestyle modification to prevent DMII education (Lay et al., 2016).

- Healthful diet
- BMI of 25 or less
- Exercise for at least 30 minutes/day
- Smoking cessation
- Consuming alcohol in moderation
- Minimum of 7 hours of sleep/night
- Behavior support and counseling
- Glycemic control

Significance of Pathophysiology

“Approximately 90% to 95% of newly diagnosed cases of diabetes are DMII” (Waddell, 2017, p. 24). With the rising of DMII incidence amongst individuals, it is important for healthcare providers to pay close attention to those who are at risk, and treat hyperglycemia and DMII early to prevent long-term complications of hyperglycemia. Chronic hyperglycemia over time damages both, micro and macro blood vessels causing vision loss, nerve damage, kidney disease, cardiovascular disease, risk of stroke, and increase in blood circulation (Cornell, 2015).

References

Waddell, J. (2017). An update on Type 2 Diabetes mellitus. Prim Care. 11, 621-632. doi:10.1097/01.NPR.0000520827.83911.28
A complete list of references can be found at the end of the manuscript.