Perioperative Management of the Patient with Diabetes Mellitus

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Recommended Citation
High, Alexa, "Perioperative Management of the Patient with Diabetes Mellitus" (2021). Nursing Student Class Projects (Formerly MSN). 482.
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Diabetes Mellitus
• Type I diabetes generally presents (usually before age 10) with ketosis in patients with diabetes, and that an estimated 10% of the population has diabetes mellitus (Huether, 2018). According to the Center of Disease Control and Prevention (CDC) in 2020, diabetes is the seventh leading cause of death in the United States. Additionally, the medical cost of diabetes, along with its complications, is a threat for $326 billion per year in the U.S. (CDC, 2020).
• The American Diabetes Association conservatively estimates that 25% of hospitalized adults have diabetes mellitus, and that the number of people with diabetes who require surgery is up to 25% of 50% of diabetic patients will require surgery (Boppehall & Ellis, 2018, p. 60).
• This topic was chosen because of the prevalence of DM as a co-morbidity and the need for understanding of the condition as an anesthesia provider.

Perioperative Management of the Patient with Diabetes Mellitus: Alexa High, RN, BSN, CCRN
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Signs & Symptoms

• Obesity is a major component of Type 2 Diabetes, present with 60-90% of those diagnosed. Obesity contributes towards insulin resistance through adipocytokines (hormones produced in adipose tissue), elevated levels of free fatty acids, cholesterol and triglycerides, as well as inflammatory cytokines from intra-fat adipocytes (McCauley & Houston, 2018).

Pathophysiology

• The age of understanding according to the hospitalization will be the prevalence of 50% (Cornelius, 2016). The prevalence of diabetes (Cornelius, 2016, pp. 202-203).
• The prevalence of diabetes is on the rise with the increase in obesity and sedentary lifestyles. The prevalence of Type 2 Diabetes is much higher and is commonly known as adult-onset diabetes (Diabetes Mellitus, McCance & Huether, 2018).

Significance of Pathophysiology

• Several disorders may occur in those whose diabetes has progressed without treatment. "Cardiorenal and other chronic diseases, including cardiovascular disease and diabetic nephropathy, is the major cause of death in patients with type 2 diabetes" (Cornelius, 2016, pp. 210-211).

Signs & Symptoms

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Pathophysiology

• The type 2 diabetes DM “affects the metabolism of fats and carbohydrates” (McCauley & Houston, 2018, p. 793). "The type 2 diabetes is characterized by a complete lack of insulin production, an inadequate amount of insulin secreted by the beta cells of the pancreas, tissue insensitivity to insulin, or insulin that is ineffective or destroyed before it can reach its target cell, 2020." (Cornelius, 2016, p. 208). As excess glucose accumulates in the blood, it appears in the urine causing osmotic diuresis. Symptoms of polyuria and polydipsia can be seen. (McCauley & Houston, 2018).
• This also causes wide fluctuations in blood glucose levels, protein and fat breakdown resulting in weight loss (McCauley & Houston, 2018). When glucose is not regulated with exercise and dietary intake, extreme hyperglycemia can occur. This causes the release of free fatty acids from adipocytes [and increases] the production of ketone bodies. (McCauley & Houston, 2018, p. 793). Accumulation of these ketone bodies lead to a drop in pH and metabolic acidosis. This condition is termed Diabetic Ketoacidosis (DKA) and can be life threatening if left untreated (McCauley & Houston, 2018). DKA may be the “first sign of diabetes in people who have not yet been diagnosed” or caused by insulin, missing insulin shots, a long-acting insulin pump or wrong insulin dosing (Diabetic Ketoacidosis, 2021).

Implications for Nursing Care

• There are a plethora of risk factors associated with Type 2 Diabetes that nurses should be aware of.
• Non-modifiable risk factors include: family history, race or ethnic background [diabetes is more prevalent in African-American, African-American, Latino-Hispanic American, Native American or of Pacific Islander descent], age (most frequent over 40) and gestational diabetes [those women with gestational diabetes are more likely to develop diabetes later in life] (Diabetes Risk Factors, 2021).
• Modifiable Risk factors include: weight management, increasing physical activity, blood pressure management, control of cholesterol/lipid levels, smoking diet, alcohol, stress management & sleep (Diabetes-Risk Factors, 2021).
• Type 2 Diabetes can be managed with lifestyle modifications, including diet and exercise, and medications; however, Type 1 diabetes requires lifelong exogenous insulin (JDC, 2021).

Perioperative Considerations

• Most instances require lifestyle modifications, physical activity and an unhealthy diet) and medications to maintain their blood glucose levels, cholesterol and blood pressure (Presenting and Treating Diabetics, 2021).
• Most patients newly diagnosed with Type 2 Diabetes will receive Metformin, a pill that helps decrease the amount of carbohydrates where their kidneys can use (Presenting and Treating Diabetics, 2021).
• Metformin may be taken in combination with subcutaneous insulin to help regulate blood glucose (Presenting and Treating Diabetics, 2021).
• Once diagnosis has been made, patients may see a dramatic decrease in their A1C, 6.5% or higher (Symptoms, Diagnosis and Monitoring of Diabetes, 2021).
• The final test is the Oral Glucose Tolerance Test which examines how your body handles a certain amount of glucose. The healthcare provider draws blood samples 1 hour and 2 hours after a large meal to test for hyperglycemia or hypoglycemia (Cornelius, 2016, pp. 210-211).

References & Additional Sources

• Careful preoperative history and physical examination should be completed to minimize any surgical risks to the patient as well as preoperative lab work.
• Goals throughout surgery should include “management of hypoglycemia, prevention of hypokalemia, maintenance of fluid and electrolyte balance, and avoidance of marked changes in blood glucose levels” (Cornelius et al., 2012).
• Precordial insulins (regular, lispou, aspart, and glulisine) should be stopped when patient is NPO for surgery (Khan et al., 2011).
• Medical professionals should be aware that surgery and general anesthesia can cause the body to compensate for any under regulation of counter regulatory hormones causing insulin resistance, increased lipogenesis and hyperglycemia (Khan et al., 2011).