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Diabetic Ketoacidosis

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Diabetic Ketoacidosis

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Introduction:

According to "Statistics About Diabetes" (2014), in 2012, 29.1 million Americans, or 9.3% of the population, had diabetes. Additionally, of the 29.1 million, 21 million of the population were diagnosed, and 8.1 million were undiagnosed. With such a high prevalence, it is imperative that the hospital nurse is aware not only how to treat diabetes, but also how to look for complications of diabetes.

One of the severe complications of diabetes is Diabetic Ketoacidosis, or DKA. DKA occurs as a result of prolonged untreated diabetes. It is the result of the body not being able to produce, or use, insulin to meet the body's demands for energy. The result of this is a mixture of a hyperglycemic state, the presence of ketone bodies, and metabolic acidosis (Bogle-Bell & Cox, 2014, p. 15).

DKA is often seen in the emergency room and ICU setting, as it is a very acute complication, that can result in death if not properly cared for. When a patient is experiencing DKA, there are many complicated pathophysiological processes that need to be intently monitored to ensure that the patient has a positive outcome. Caring for a patient in DKA requires a keen awareness of not only the various pathophysiological processes, but how these processes might manifest themselves.

Signs and Symptoms

A patient suffering from Diabetic Ketoacidosis can have many different signs and symptoms. According to Bogle-Bell and Cox, polyuria, polydipsia, weakness, fatigue and weight loss due to vomiting and abdominal pain could be symptoms that the patient could be experiencing for several days or weeks prior to admission (2014, p. 15). Per Dhatariya, a cardinal feature will be dehydration, which is exacerbated by vomiting and an inability to drink fluids due to an impaired consciousness (2014, p. 723). The majority of DKA patients will be Type 1 diabetics, however, during an acute illness, type 2 diabetics can develop DKA (Bogle-Bell & Cox, 2014, p.14).

Per Bogle-Bell and Cox, on physical examination the nurse should expect to find dry mucous membranes, decreased skin turgor, tachycardia, hypotension, and possibly an altered mental status (2014, p. 15). Additionally, deep labored breathing, also known as kussmaul breathing, which have a fruity smell. Definitive diagnosis comes from laboratory data, which shows hyperglycemia, ketonemia, and metabolic acidosis. All three must be present as ketones can develop from malnourishment and severe alcoholism (Bogle-Bell, Cox, 2014, p. 15).

Underlying Pathophysiology

Insulin is necessary for the body to use glucose to produce energy. Per "Statistics About Diabetes", DKA begins when cells do not get the glucose they need for energy as a result of the body not producing enough insulin (2014). Per Blouin, a decrease in insulin causes increased hepatic gluconeogenesis (production of glucose from non-carbohydrate sources), accelerated glycogenolysis (breakdown of glycogen to glucose), and impaired glucose use by peripheral tissue, thus putting the body in a hyperglycemic state (2012, p. 55). An additional result of these processes an increase in free fatty acids result from lipolysis, thus increasing hepatic production of ketone bodies and metabolic acidosis (Bogle-Bell & Cox, 2014, p. 14).

Additionally, there are sociological factors that contribute to developing DKA. A lack of knowledge about diabetes as a disease process and managing ones blood sugars put the patient at risk for developing DKA (Butalia, 2013, p. 571). According to Schwartz, there is an increase in poor blood sugar control for adolescents living in single parent households and/or who are

Significance of Pathophysiology

Serious consequences can arise due to an uninformed nurse caring for a patient in DKA. Brain damage, cardiac arrhythmias, and even death can occur as a result of not understanding the pathophysiological concepts involved with DKA. It is imperative that the nurse not only understand what orders to expect, but why they might be ordered, can go a long way in improving short and long term patient outcomes. According to Azevedo, 36% of DKA patients were readmitted within one year, and 1 in 10 DKA patients die within one year of the admission (2014, p. 974).

Additionally, a nurse with a good knowledge base will be better equipped to educate patients and families on the signs and symptoms of DKA, and what the patient should do if they begin to notice any symptoms. Preventing further episodes of DKA not only keep hospital beds open, but can save

Implications for Nursing Care

Nursing care is multifaceted and the nurse must be able to monitor many different aspects of the patient to ensure adequate patient care. Ongoing physical assessments must be frequently done as any change in level of consciousness can be a result of cerebral edema, which can develop during the treatment of DKA (Watts, 2014, p. 275). Additional areas of nursing care are as follows:

Insulin Therapy - Insulin therapy is necessary to suppress ketogenesis, reduce blood glucose and help correct electrolyte imbalance. Additionally, insulin increases peripheral glucose use, decreases hepatic glucose production, and inhibits the release of free fatty acids, thus decreasing ketogenesis (Bogle-Bell & Cox, 2014, p. 16). This typically is done through a fixed rate insulin drip until DKA is resolved.

Monitoring Lab Values - Potassium can be high on admission, but will fall rapidly with insulin treatment as potassium will shift from outside the cell to inside the cell (Bogle-Bell & Cox, 2014, p. 16). Additionally, blood glucose checks should be done every 1-2 hours to prevent hypoglycemia (Bogle-Bell & Cox, 2014, p.16).

Diabetes Education - The RN or a diabetes educator should teach the patient how to properly manage their blood glucose, and signs and symptoms of DKA (Bogle-Bell & Cox, 2014, p. 16). In a study by Elliott, the risk of DKA was reduced by 61% after participants were put through a training course in which they were taught to adjust their insulin dosages based on their diet (2014, 851). Additionally, patients with Type 1 diabetes should be taught that even if they are not eating they still need to check their blood glucose and administer insulin. Even if a diabetic is not consuming food, the body could be producing it, and without insulin the glucose can not enter into the cell to be used for energy (Thompson, 2011, p. 339).

Conclusion

Diabetic Ketoacidosis is a very acute illness that requires the nurse to be both knowledgeable and able to think quickly on their feet. Caring for a patient in DKA requires assessing multiple areas, often at the same time, to increase the patients changes of a positive outcome. The nurse is often the fulcrum on which all care is balanced, and it often falls to the nurse to recognize signs and symptoms that the patient is decompensating and immediately notify the proper providers.

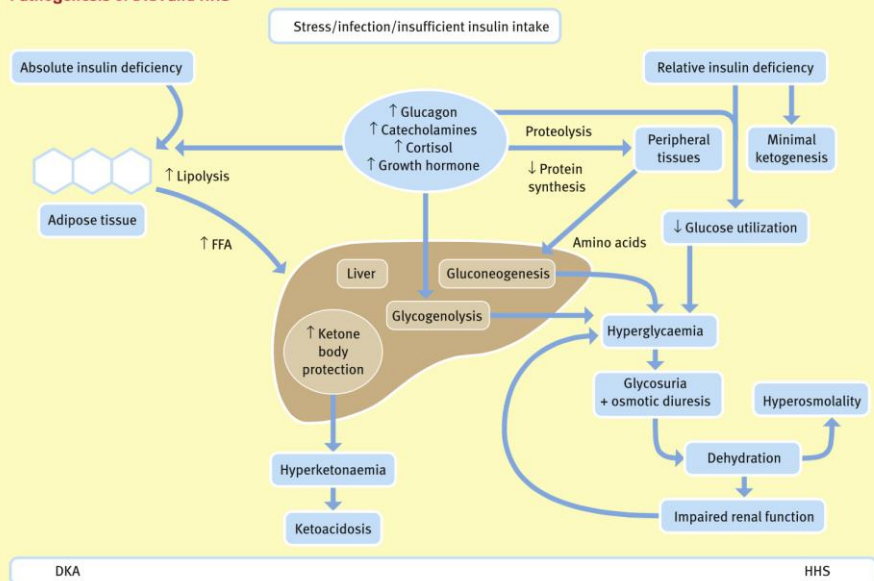
Additionally, it is just as important to treat the reason DKA has developed, to prevent further episodes of DKA, and to help the patient be able to live a full, active, and healthy life. The nurse plays a pivotal role in providing education to both the patient and the patients family. The nurse is there to coordinate educational services that can be provided both during the hospital stay, and after discharge.

The combination of these two important, and often difficult, areas requires that the nurse be increasingly vigilant not just during the acute phase of DKA, but also afterward to provide education. It is the hope of this educational poster could be used as a reference to nurses caring for a patient suffering from DKA.

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Pathogenesis of DKA and HHS



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