Diabetes mellitus essay sample

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Diabetes Mellitus is a chronic condition in which the pancreas produces little or no insulin, a hormone needed to allow glucose to enter cells to produce energy. This paper explores the aspects of the disease as it relates to the pathophysiology, clinical manifestations, diagnostic testing, collaborative care, and nursing care. Type 1 Diabetes Mellitus Type 1 Diabetes, previously referred to as " juvenile diabetes" most often occurs in people under 30 years of age. Diabetes mellitus is a multisystem disease with both biochemical and structural consequences. It is a chronic disease of carbohydrate, fat, and protein metabolism caused by the lack of insulin, which results from the marked and progressive inability of the pancreas to secrete insulin because of autoimmune destruction of the beta cells.

Pathophysiology

Type 1 diabetes is the end result of a long-standing process in which the body's own T cells attack and destroy pancreatic beta cells, which are the source of the body's insulin. A genetic predisposition and exposure to a virus are factors that may contribute to the pathogenesis of type 1 diabetes mellitus. " The pathogenesis of the autoimmune ?-cell destruction involves incompletely understood interactions between susceptibility genes, autoantigens, and environmental factors" (Crandall). Clinical Manifestations

The onset of type 1 diabetes mellitus may be sudden and commonly can present with diabetic ketoacidosis (DKA). A rapid onset of symptoms in a young, lean person with ketoacidosis has been considered diagnostic of type 1 diabetes mellitus. The most common symptoms of type 1 diabetes mellitus are polyuria, polydipsia, and polyphagia, along with a lack of energy, nausea,

and blurred vision, all of which are primarily due to the hyperglycemia. The first clinical presentation of a person with type 1 diabetes can typically be traced back several days to several weeks; " however, beta cell destruction may have started months, or even years, before the onset of clinical symptoms" (Khardori). The symptoms characteristic of DM develop when the person's pancreas can no longer produce insulin. The patient usually has a history of recent and sudden weight loss which occurs because the body is in a catabolic state as it cannot get glucose and turns to other energy sources, such as fat and protein.

The polyuria is due to osmotic diuresis and thirst is due to the hyperosmolar state and dehydration. Fatigue and weakness are also common symptoms experienced which may be due to the muscle wasting from the catabolic state of insulin deficiency, hypovolemia, and hypokalemia. Blurred vision is due to the effect of " the hyperosmolar state on the lens and vitreous humor; glucose and its metabolites cause dilation of the lens, altering its normal focal length." Peripheral neuropathy presents as numbness and tingling in both hands and feet, in a glove and stocking pattern; it is bilateral, symmetric, and ascending neuropathy, which results from many factors, including the accumulation of sorbitol in peripheral sensory nerves due to sustained hyperglycemia" (Khardori).

Diagnostic and Laboratory Testing

Correctly determining whether a patient has type 1 or type 2 diabetes mellitus is an important diagnostic and therapeutic concern because patients with type 1 DM are dependent on a continuous source of exogenous insulin

and carbohydrate for survival. If a patient presents with symptoms of diabetes mellitus, common diagnostic and laboratory testing performed may include: fingerstick blood glucose, urinalysis, WBC, fasting plasma glucose level, random plasma glucose level, two-hour OGTT level, and the fasting plasma glucose (FPG) test. A fingerstick blood glucose test would typically be done in the emergency department, however levels must be confirmed in serum or plasma to make a diagnosis. A urinalysis is performed to determine if ketones are in the urine, but it is not indicative of DKA. White blood cell cultures are done to rule out infection.

Most patients who present to the ED with undiagnosed type 1 diabetes have the classic symptoms of uncontrolled hyperglycemia, including polyuria, polydipsia, nocturia, fatigue, and weight loss. In these patients, a confirmatory random plasma glucose level of greater than 200 mg/dL is adequate to establish the diagnosis of diabetes. When the oral glucose tolerance test is used, the accuracy of test results depends on adequate patient preparation and attention to the many factors that can cause falsely elevated values (such as acute illness medications, or restricted activity and diet).

Collaborative Care and Medical Treatment
The goals of diabetes management are to reduce symptoms, promote well-being, prevent acute complications of hyperglycemia, and prevent or delay the onset and progression of long-term complications. Diabetes is a chronic disease that requires daily decisions about food intake, blood glucose testing, medication, and exercise. Education is the most important aspect of

diabetes management. Patients with new-onset type 1 DM require extensive education if they are to manage their disease safely and effectively and to minimize long-term complications. Such education is beyond the scope of ED practice and is best coordinated by the patient's long-term care providers. . Type 1 DM patients require insulin therapy to control initial hyperglycemia and maintain serum electrolytes and hydration. Multiple subcutaneous insulin injections are administered to control hyperglycemia after meals and to maintain normal plasma glucose levels throughout the day. This may increase the risks of hypoglycemia.

Therefore, patients should be well educated about their disease and about self-monitoring of plasma glucose levels. At every encounter, the physician or health care provider should educate the patient—and, in the case of children, the parents—about the disease process, management, goals, and long-term complications. In particular, physicians should make patients aware of the signs and symptoms of hypoglycemia and ways to manage it; should help patients both to acknowledge and to understand the course of diabetes (eg, by teaching patients that they have a chronic condition that requires lifestyle modification and that they are likely to have chronic complications if they do not take control of their disease); and should reassure patients about the prognosis.

Patient will demonstrate elastic skin turgor and pink, moist mucous membranes

1.) Monitor and document vital signs

2.) Assess skin turgor and mucous membranes for signs of dehydration

3.) Measure and record urine output hourly; report urine output less than 30 mL for 2 consecutive hours.

4.) Monitor serum glucose every 30 to 60 minutes.

5.) Assess for signs of hyponatremia: weakness, headache, malaise, confusion, poor skin turgor, weight loss, decreased CVP, nausea, abdominal cramps.

1.) Reduction in circulating blood volume can cause hypotension and tachycardia.

2.) Loss of interstitial fluid causes loss of skin turgor.

3.) Fluid volume deficit reduces glomerular filtration and renal blood flow causing oliguria. The patient in DKA may also be undergoing osmotic dieresis and have excessive outputs.

4.) Glucose has a high osmotic pull. Glucose levels need to be reduced gradually for the fluid balance to omlur

5.) Hyperglycemia can cause water to be pulled form intracellular fluid and placed in the extracellular compartment, causing dilution of serum sodium. Osmotic dieresis contributes to hyponatremia. Risk for unstable blood glucose level

R/T:

Insulin deficiency with inability to utilize nutrients

Excessive intake in relation to metabolic needs

Sedentary activity level

Patient maintains blood glucose and glycosolated hemoglobin levels within defined target ranges

1.) Monitor blood glucose levels at each office visit, and review blood glucose history

2.) Assess current knowledge and understanding of prescribed diet.

3.) Monitor HbA1c levels

4.) Assess pattern of physical activity

1.) Changes in blood glucose levels, as recorded by the patient, will indicate the patient's success in managing his or her diabetes.

2.) Nonadherance to dietary guidelines can result in hyperglycemia. Current guidelines from the American Diabetes Association recommend an individualized plan that promotes healthy eating.

3.) HbA1c is a measure of blood glucose over the previous 2 to 3 months.

4.) Physical activity has an insulin-like effect and helps lower blood glucose levels and reduces the risk for cardiovascular complications.

Risk for injury

R/T:
decreased tactile sensation, episodes of hypoglycemia

Patient experiences no injury resulting from decreased sensation in feet or hypoglycemia

1.) Provide information regarding the relationship between neuropathy, injury, and vascular disease and the risk for ulceration and lower extremity amputation in persons with diabetes

2.) Instruct individual to inspect inside of shoes daily for foreign objects, nail points, torn linings, and rough areas. 3.) Monitor for signs and symptoms of

hypoglycemia

4.) Determine patient's recognition of hypoglycemia signs and symptoms

5.) Instruct patient to have simple carbohydrates available at all times

1.) To promote commitment to care

2.) To avoid injury by factors that are not felt

3.) To alert patient to glucose/insulin imbalance and need for treatment

4.) To assess learning needs

5.) To treat hypoglycemia

Risk for peripheral neurovascular dysfunction

R/T: vascular effects of diabetes

Patient implements measures to increase peripheral circulatory status

1.) Perform a comprehensive appraisal of peripheral circulation

2.) Inspect skin for arterial ulcers or tissue breakdown

3.) Protect the extremity from injury

4.)Maintain adequate hydration

5.) Encourage the patient to exercise as tolerated

1.) To establish baseline findings

2.) To provide treatment to prevent infection and additional necrosis

3.) To prevent conditions that favor skin breakdown

4.) To decrease blood viscosity

5.) To increase peripheral circulation

Risk for Ineffective Therapeutic Regimen Management

R/T:

New-onset diabetes

Complex medical regimen

Insufficient knowledge about diabetes and its treatment

Patient demonstrates knowledge of diabetes self-care measures

1.) Assess the patient's prior efforts to manage diabetes care regimen.

2.) Evaluate self-management skills, including ability to perform procedures for blood glucose monitoring.

3.) Ensure that the patient has knowledge about symptoms, causes, treatment, and prevention of hyperglycemia

4.) Ensure that the patient has knowledge about symptoms, causes, treatment, and prevention of hypoglycemia.

5.) Review blood glucose monitoring results on each contact with the patient

1.) This knowledge provides an important starting point in understanding any complexities the patient perceives in implementation of diabetes management regimen.

2.) Self-management skills determine the amount and type of education that needs to be provided.

3.) Elevated blood glucose levels in individuals with previously diagnosed diabetes indicate the need to evaluate diabetes management.

4.) Frequent episodes of hypoglycemia in individuals with previously diagnosed diabetes indicate the need to evaluate diabetes management.

5.) This measures progress to achieving previously set blood glucose goals.

R/T:

Positive feedback on goal attainment helps motivate the patient to continue with health behaviors for effective diabetes management.

References

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