Hyperosmolar Hyperglycemic Syndrome

Name
Institution
Course

Mr. Tim Smith's Case Scenario

Hyperglycemic hyperosmolar syndrome is well understood as one of the complication in patients with type 2 diabetes which is characterized with extra glucose in the blood with absence of ketones (byproducts in fats breakdown) (Buse, Polonsky, & Burant, 31). The syndrome is most prevalent in elderly or incapacitated patients who are not able to recognize diabetes or dehydration symptoms on their own or when their caregivers are not knowledgeable on the same issue (Umpierrez, Murphy, and Abbas 2000).

Dehydration should be given priority over the other clinical problems identified in Mr. Smith. This is because the decrease in concentration of plasma glucose in the condition indicates the need to have rehydration (Buse, Polonsky, & Burant, 31). The pathogenesis of the syndrome is characterized with glucosuric diuresis which has significance in the impairment of absorption ability of kidney (glomerular filtration) leading to excessive water loss (Inzucchi & Sherwin, 237). Therefore in order to manage this situation, adequate intake of fluids can help prevent osmotically active glucose from accumulating therefore managing

hyperosmolarity in the process. In addition, when there is adequate fluid intake, the kidney is able to maintain renal function and this helps in controlling hyperglycemia. On the contrary, inadequate fluid intake in case of an impaired glomerular filtration rate only promotes an increase in the levels of plasma glucose and the presence of undiffused active glucose results to hyperosmolarity.

Often, the case of inadequate intake of fluids is seen in patients with inability to communicate their thirst needs due to incapacities related to coma or communication problems (Umpierrez, Murphy, and Abbas 2000). This is unfortunate because they fail to correct osmotic diuresis and water loss due to excess electrolytes. As a result hyperosmolarity, hypovolemia and excess dehydration is experienced by the patient. Dehydration therefore triggers hyperglycemia, which in turn leads to the other related clinical problems such as tachycardia and hypotension (Inzucchi & Sherwin, 237). In case dehydration occurs without warning, the situation can be corrected by injecting insulin in order to correct hyperglycemia and then water is replaced instantly.

The beginning of hyperosmolarity can therefore be traced from when the kidneys fail to get rid of excess glucose through urine. This is facilitated by inadequate intake of fluids; and since the extra glucose remains in the system, the concentration rises than normal resulting to hyperosmolarity (American Diabetes Association, 88). Hyperosmolarity in turn causes the cycle of high levels of plasma glucose and dehydration. Correction of dehydration will improve the urine output therefore preventing accumulation of extra glucose and it will also help in improving blood pressure and circulation and this will help solve the other clinical problems with ease (American Diabetes Association, 90).

Umpierrez, Murphy, and Abbas 2000, notes that the high mortality rates from hyperosmolar hyperglycemic syndrome is usually a result of precipitating causes than from problems resulting from hyperglycemia. Umpierrez, Murphy, and Abbas 2000 have also suggested that fluid therapy in HHS works to restore renal function and the intravascular volume. They further mention that 0.9% NaCl can be given at the rate of about 500-1000ml/hr during the therapy (Umpierrez, Murphy, & Abbas 2000).

Treatment of Hyperthermia (fever) in Type II Diabetes

Paracetamol is well-known for its effectiveness in treating pain and fever (Hommertzheim R, Steinke, 152). It has acetaminophen as the active ingredient. Acetaminophen effectiveness in preventing fever and safety for home use has been registered.

Taking the medication in the right dosage is however very important as most of side effects of the drug are dose related; overdose has been linked to liver failure and renal function impairment (Hommertzheim R, Steinke, 156). There are also people who have allergic reactions to the drug therefore the patient reaction to the drug should be investigated well before it is administered.

One of the leading causes of hyperthermia in type 2 diabetes is inadequate fluid intake which leads to dehydration. In dehydrated situation, the ATPase pumps which function in regulating basal metabolic rate is put

under pressure as demand for its activity increase (Hommertzheim R, Steinke, 152). This results to the excess production of heat hence the fever (hyperthermia state). This condition contributes further to tachycardia, nausea and vomiting, dehydration, and fatigue experienced by type 2 diabetes patients (Mourad &, Detsky, 546).

While considering the drug to use in a type 2 diabetes patients, it is always vital to determine the impact the drug will have on blood sugar level of that individual (Mourad &, Detsky, 546). Acetaminophen does not have a significant effect on the blood sugar of a diabetic patient thus it can safely be used to treat fever in Mr. Smith. Hepatotoxity and nephrotoxicity effects of acetaminophen are important to consider while determining the right dosage in a patient with type 2 diabetes. This is because in case the patient has dehydration as one of the clinical problems it implies that the kidneys have impairment in glomerular filtration and thus nephrotoxicity may worsen the situation.

In Mr.Smith case, 1g of paracetamol is high dosage and it should be reduced to prevent nephrotoxicity effects. Mourad and Detsky (2003), suggest that a dosage of 325-650 mg after every 4 hours would be effective in treating fever with minimal side effects in diabetes cases (Mourad and Detsky, 544).

Hyperthermia in type 2 diabetes is mainly due to a metabolic problem especially when there is inadequate fluid intake (Mourad &, Detsky, 549). Apart from taking paracetamol to correct the fever problem, it is therefore important that the patient take adequate fluids in order to boost metabolic rate and also improve the renal functions.

Education Session for Type 2 Diabetes patient

It is important that diabetic patients realize that there are environmental factors that predispose one to type II diabetes especially those that lead to obesity or overweight. These are mostly related to sedentary lifestyle and poor nutrition (Nyenwe, Jerkins, Umpierrez & Kitabchi, 20).

Therapeutic lifestyle change

Type 2 diabetes needs not only medication in its management but lifestyle change is an important activity to integrate in the management. Interventions in lifestyle change should mainly be on physical activities of the patient and food intake. The patient should be provided with the approved curriculum of diabetes management with to provide guide on the right dietary intervention (National Institute for Health and Clinical Excellence, 2009). A focus on diet is especially important in checking weight. Overweight is a threat to the health of a diabetic patient because it makes glycemic control a challenge and it also risks impairment of cardiovascular related activities (Nyenwe, et al., 23).

Dietary interventions

Weight loss however should be in a health way (5-10%) in order to help achieve control over glucose levels (National Institute for Health and Clinical Excellence, 2009). It is also important to note that dietary advice

varies from one individual to the other; there are those who need to maintain their weight, those who need to lose, and those who are underweight and need to add some weight. It is therefore personalized advice, however in whatever the case, foods rich in fiber must be always included in every meal and low fat foods should be encouraged. Food considered being high-energy such as snacks, sweets, and products with saturated fats should be taken in small amounts and less frequently (National Institute for Health and Clinical Excellence, 2009).

Physical activity

Diabetic patients should be discouraged from being inactive; moderate physical activities are important in promoting weight loss and regulation of blood glucose level (American Diabetes Association, 30). The activities may involve aerobics, walks, or flexible training. Elderly and mobility challenged patients can concentrate on activities which promote cardiovascular functions (National Institute for Health and Clinical Excellence, 2009). The use of weight loss medications should not be used to replace the importance of physical activities (American Diabetes Association, 29).

Physical activities are of more value because apart from reducing weight, they help to improve blood circulation and keep both physical and mental fitness of a patient. The lifestyle therapy should be a routine activity and patients should take it as one of the most beneficial therapy instead of perceiving it as tiring. In fact it is more effective than medication therapy in the management of type 2 diabetes since it impacts directly on the body system where medication therapy may fail. Along with lifestyle change

therapy the patient need to use insulin therapy to maintain a normal blood glucose level. There are oral medicines and non-insulin injectables which help to stabilize blood glucose level (Sheehan, 190)