Controlling Malglycemia in Patients Undergoing Treatment for Cancer

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Patients with or without preexisting diabetes undergoing treatment for cancer may be at risk for malglycemic events. Malglycemia, particularly hyperglycemia and diabetes in patients with cancer, may lead to adverse outcomes. Prevention, prompt recognition, and early intervention to regulate malglycemia can optimize the effects of cancer treatment, minimize the harmful consequences, and improve quality of life for patients with cancer. The development of evidence-based standards of care and protocols are needed to guide clinical practice when caring for patients with cancer.

At a Glance
- Malglycemia has been associated with increased risk for adverse patient outcomes.
- Multiple known and unknown factors contribute to the onset of malglycemia.
- Formal guidelines or protocols are needed to best manage malglycemia in patients receiving cancer treatment.

The development of evidence-based standards of care and protocols for the treatment of malglycemia are needed to guide clinical practice when caring for patients with cancer. These best practices can be integrated into patients’ individualized treatment plans, thereby mitigating the untoward effects of malglycemia.

Background

Patients with established diabetes (American Diabetes Association, 2015) are at increased risk for developing certain types of cancers, such as liver, pancreatic, endometrial, colorectal, breast, and bladder cancers (Giovannucci et al., 2010) (see Figure 1). In addition, patients with or without preexisting diabetes undergoing treatment for cancer may be at risk for malglycemic events because of numerous factors, including steroids (Mazali, Lalli, Alves-Filho, & Mazzali, 2008) and certain chemotherapeutic agents (e.g., docetaxel [Taxotere®], everolimus [Afinitor®], temsirolimus [Torisel®], androgen deprivation therapy) (Hershey et al., 2014). In addition, higher body mass index (Roumen, Blaak, & Corpeleijn, 2009), nutritional imbalances (Butler, Braiche, & Alaniz, 2005), nutritional support, stress (Butler et al., 2005), physical inactivity (Katz, 2007), and older age (Campisi & d’Adda di Fagagna, 2007) are potential contributors. Studies in patients who underwent treatment for hematologic malignancies (Storey & Von Ah, 2012) and, in particular, those who received allogeneic or autologous hematopoietic cell transplantsations (Derr, Hsiao, & Saudek, 2008; Fuji et al., 2007; Hammer et al., 2009; Olausson, Hammer,
for blood glucose is unknown, as are the best protocols for controlling glucose in patients with cancer.

**Current Guidelines**

No formal established guidelines or protocols are available regarding how to best manage malglycemia in patients undergoing cancer treatment. Oyer, Shah, and Bettenhausen (2006) offered an overview of approaches to the management of steroid-induced diabetes in patients with cancer, which ranged from the use of oral agents to insulin. Metformin (GlucoPhage<sup>®</sup>, Glumetza<sup>®</sup>, Glucophage XR<sup>®</sup>) has gained popularity for use in patients with cancer and diabetes, in part because of its reported protective effect (Simon & Balkau, 2010). An article by Brady, Grimes, Armstrong, and LoBiondo-Wood (2014) noted that the glycemic management of inpatients receiving steroids consisted primarily of insulin therapy. Jacob and Chowdhury (2015) suggested a variety of approaches to the management of diabetes, ranging from correction doses of insulin (if patient is not eating) to multiple-dose insulin therapy. Basal-bolus insulin therapy has been recommended for use in patients receiving high-dose steroids (Brady, Thosani, et al., 2014; Gosmanov, Goorha, Stelts, Peng, & Umpierrrez, 2013). Although many are aware that hyperglycemia and diabetes in patients with cancer may lead to adverse outcomes, a lack of consensus exists, and wide variations in treatment algorithms are reportedly being used, indicating the need for the development of evidence-based standards of care.

**Implications for Nursing and Conclusion**

Prevention and early intervention is important because malglycemia, particularly hyperglycemia, has been shown to affect diagnostic imaging studies (Rabkin, Israel, & Keidar, 2010), alter response to treatment (Biernacka et al., 2013; Zeng et al., 2010), and influence progression of cancer (Duan et al., 2014; Ryu, Park, & Scherer, 2014). In addition, reviews of studies examining the impact of malglycemia have noted less than desirable health outcomes for patients who experience malglycemia (Olausson et al., 2014; Storey & Von Ah, 2015). Malglycemia can be monitored using blood glucose meters or continuous glucose monitors, both of which require patient engagement to understand trends and patterns. Prevention, prompt recognition, and early intervention to regulate malglycemia can optimize the effects of cancer treatment, minimize the harmful consequences, and improve quality of life for patients with cancer.

**References**


Derr, R.L., Hsiao, V.C., & Saudek, C.D. (2008). Antecedent hyperglycemia is associated with an increased risk of neutropenic infections during bone marrow

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**Hemoglobin A1c ≥ 6.5%**

The test should be performed in a laboratory using a method that is National Glycohemoglobin Standardization Program certified and standardized to the Diabetes Control and Complications Trial assay<sup>®</sup>. 

**OR**

**Fasting plasma glucose ≥ 126 mg/dl (7 mmol/L)**

Fasting is defined as no caloric intake for at least eight hours<sup>®</sup>. 

**OR**

**Two-hour plasma glucose ≥ 200 mg/dl (11.1 mmol/L) during an oral glucose tolerance test**

The test should be performed as described by the World Health Organization, using a glucose load containing the equivalent of 75 g anhydrous glucose dissolved in water<sup>®</sup>. 

**OR**

In a patient with classic symptoms of hyperglycemia or hyperglycemic crisis, a random plasma glucose ≥ 200 mg/dl (11.1 mmol/L)

<sup>®</sup>In the absence of unequivocal hyperglycemia, results should be confirmed by repeat testing.