

Implementing a Standardized Educational Tool for Patients With Brain Tumors Undergoing Concurrent Temozolomide and Radiation Therapy

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BACKGROUND: Patients diagnosed with glioblastoma multiforme (GBM) often undergo concurrent temozolomide and radiation therapy. Antineoplastic medication nonadherence continues to be an issue for patients with cancer.

OBJECTIVES: This quality improvement project aimed to institute an evidence-based standardized educational tool for patients with GBM undergoing concurrent temozolomide and radiation therapy.

METHODS: To assess medication adherence, patients completed the Brief Adherence Rating Scale at the end of the last radiation therapy visit. Patients and providers completed satisfaction surveys.

FINDINGS: Data analysis from the administered Brief Adherence Rating Scale demonstrated a mean of 99.3% (N = 15) medication adherence among participants. Median medication adherence was demonstrated to be 100%, with scores ranging from 93% to 100%.

KEYWORDS

medication adherence; glioblastoma; temozolomide; radiation; education

DIGITAL OBJECT IDENTIFIER

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ABOUT 13,000 AMERICANS WILL BE DIAGNOSED with glioblastoma multiforme (GBM) each year (National Brain Tumor Society, n.d.), 90% of whom will undergo radiation therapy with concurrent temozolomide (TMZ) (Kamson & Grossman, 2021). A systematic review of prior research studies (Greer et al., 2016) showed that medication nonadherence to oral antineoplastic medications (OAMs) is common and continues to be an issue for patients with all cancer types including brain cancers. Overall estimates of nonadherence to OAM regimens range from 17% to 80%, with an average of 50% nonadherence (Hansen, n.d.). Nonadherence to OAM instructions was most correlated with forgetfulness, wanting to avoid side effects, and feeling overwhelmed (Krikorian et al., 2019). In patients with GBM, 47% of medication errors with TMZ were identified as patient errors, such as underdosing, overdosing, and incorrectly timing the dose (Letarte et al., 2014). A meta-analysis that reviewed adherence to OAMs across cancer diagnoses found overall estimates of adherence to long-term OAM were about 50% on average (Hansen, n.d.). Nonadherence to dose instructions commonly leads to toxicities, including bone marrow suppression and thrombocytopenia (Vallathol, 2018).

Standard-of-care therapy in patients with newly diagnosed brain tumors involves concurrent TMZ and radiation therapy (Fernandes et al., 2017). TMZ is an alkylating agent that can cross the blood-brain barrier and treat brain tumors. TMZ dosing is based on a patient's body surface area, so dosing is different for each patient (Kamson & Grossman, 2021). TMZ also comes in a range of capsules with different doses, so a patient could take a combination of multiple TMZ capsules to equal the correct dose (Kamson & Grossman, 2021).

The Center for Neuro-Oncology at Dana-Farber Cancer Institute (DFCI) in Boston, Massachusetts, treats patients with newly diagnosed brain tumors with concurrent TMZ and radiation therapy. TMZ, an OAM, requires self-administration. Self-administration leads to concerns surrounding medication adherence, such as avoiding dosing errors and adverse events from serious side effects. This can be difficult in patients with brain cancer because of cognitive changes caused by the disease and prior surgery. Nausea is prevented by prescribing ondansetron, or other antiemetics if there is known