

Tumor-treating fields (TTFields) are a new technology used for cancer treatment consisting of battery-powered, insulated electromagnetic transducers that are placed on the scalp. This wearable, adhesive device is a certified physician-prescribed therapy for patients with glioblastoma multiforme, a type of primary brain cancer. TTFields are being used concomitantly with temozolomide (Temodar®) in patients with newly diagnosed glioblastoma and as a monotherapy in patients with recurrent glioblastoma after radiation therapy and chemotherapy. Nursing professionals caring for patients using this emerging technology should be able to educate patients regarding proper use of TTFields and monitor for side effects.

#### AT A GLANCE

- TTFields are an innovative therapy currently used in the treatment of glioblastoma.
- Patient education is essential to ensure correct use of the device and maximize efficacy of therapy.
- Nursing professionals should routinely monitor for side effects associated with TTFields use by performing a focused physical assessment on patients undergoing treatment.

#### KEYWORDS

tumor-treating fields; glioblastoma multiforme; patient education

#### DIGITAL OBJECT

##### IDENTIFIER

10.1188/17.CJON.302-304

# Tumor-Treating Fields

## Nursing implications for an emerging technology

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**G**lioblastoma multiforme (GBM) is one of the most common types of glioma or primary brain tumor, with about 2–3 new cases arising per 100,000 adults per year (American Association of Neurological Surgeons, 2015). Although the incidence of primary brain tumors has increased during the past few decades, some experts speculate this trend may be attributed to multiple factors, including improved detection and imaging methods (Mason & Abrey, 2011). Unfortunately, advances in seeking a cure for glioblastoma have not paralleled the advances in imaging and detection. Prior to the introduction of tumor-treating fields (TTFields), the standard therapy for treatment of GBM was surgical resection, followed by radiation therapy and temozolomide (Temodar®), a chemotherapy agent that can be given orally or via IV infusion. Given the aggressive nature of GBM tumor cells, patients on standard therapy have a median overall survival of 14–16 months (Neagu & Reardon, 2015). Therefore, a need exists for improved treatments. Studies have shown that TTFields, in conjunction with temozolomide, improve progression-free survival and overall survival (Stupp et al., 2015).

TTFields use alternating electromagnetic fields to disrupt cell division through physical interactions with key molecules during mitosis, leading to cell death (Zhang & Knisely, 2016). The device is manufactured by Novocure, Inc., under the brand name Optune® and was approved by the

U.S. Food and Drug Administration in 2011 for treatment of recurrent GBM as a monotherapy. In October 2015, it was approved for newly diagnosed GBM as an adjunct therapy (U.S. Food and Drug Administration, 2015). Patients treated by the device must be aged 22 years or older and have either newly diagnosed supratentorial GBM or recurrent GBM despite previous treatment with standard therapy (Novocure, Inc., 2016b).

#### Patient Education: Directions for Use

The TTFields system, considered durable medical equipment, consists of an electric field generator, a connection cable and box, four transducer arrays, four batteries and a charger, a power supply, and a carrying bag. One-time use, disposable transducer arrays are applied directly to the shaved scalp and connected to a portable battery pack that is carried by the patient in a shoulder bag. The second-generation Optune system is small and light, weighing 2.7 lbs. Four batteries are provided with the kit, and each lasts for two to three hours, with an overall battery life of six to nine months (Novocure, Inc., 2016b).

Some barriers to compliance with TTFields include reluctance of the patient to shave their head regularly, as well as reluctance to wear the electrodes and carry the battery pack for many hours each day. Because patients may be concerned about the stigma surrounding cancer, it is important for nurses to address concerns of physical appearance and adherence to the regimen as directed (Zhang & Knisely, 2016).