Neuroendocrine Tumors: Nursing Implications for Oral Targeted Agents and Patient Management: Part II

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Advances in molecular biology have facilitated the identification of cellular signaling pathways, which, when altered in cancer, promote cancer cell division, survival, and angiogenesis. Researchers have used this knowledge to develop anticancer agents that target components of these pathways, such as growth factors, cell surface receptors, and intracellular proteins. Potential advantages of targeted agents include lower systemic toxicity because, unlike cytotoxic chemotherapy, these agents are selective for their targets (Chabner & Roberts, 2005) and improved patient selection and efficacy because the agents' use can be limited to patients possessing the targeted pathway component.

Targeted agents fall into two main categories: monoclonal antibodies and protein kinase inhibitors (Kay, 2006). These types have similar mechanisms of action in that they bind the target and inhibit signal transmission along the targeted pathway. However, monoclonal antibodies are large molecules that must be administered through IV, whereas protein kinase inhibitors are small molecules that may be formulated for oral administration. Oral targeted agents are becoming more widely used (see Table 1) and many additional oral agents are being evaluated in clinical trials (see Table 2). In the United States, the pace of approval of these agents for use in cancer treatment is accelerating (Aisner, 2007).

This article uses clinical experience with an oral investigational mTOR inhibitor, RAD001, in neuroendocrine tumors (NET) as an example in addressing safety issues related to oral administration and promoting patient adherence. Oncology nurses must familiarize themselves with these issues as more oral agents become approved for use in cancer treatment.

NET arise from neuroendocrine cells dispersed throughout the body. They are rare and their clinical course often is idolent, but, in the metastatic setting, the disease is incurable. Carcinoid tumors are the most common form. Pancreatic islet cell tumors also occur (Yao, 2007). Detailed information on NET were presented in part I of this feature (Jacobs, 2009).

mTOR Inhibitors

The mTOR inhibitors are members of a new class of targeted anticancer drugs. mTOR is an intracellular protein present in every human cell and serves as a central regulator of cell growth (size), proliferation, angiogenesis, and cellular metabolism by regulating protein synthesis (Bjornsti & Houghton, 2004). Because signaling through mTOR-linked pathways is deregulated in many types of cancer, mTOR inhibitors may have broad anticancer activity. Temsirolimus, an IV-administered mTOR inhibitor, was recently approved by the U.S. Food and Drug Administration (FDA) for use in advanced renal cell carcinoma (FDA, 2007). RAD001 has demonstrated anticancer activity in a wide range of tumor types (such as non-small cell lung cancer and colon cancer) in phase I clinical trials (O'Donnell et al., 2008). Phase II and III trials are ongoing. RAD001 is currently under review by the FDA.

Nursing Experience

Nursing Responsibilities With Oral Agents

One of the primary nursing responsibilities in oncology is monitoring patients to ensure their safety. Oral administration offers some advantages compared with IV injections, including patient convenience, fewer disruptions in work and daily activities for travel to an infusion clinic, and avoidance of pain and complications (e.g., infusion-related hypersensitivity reactions); disadvantages include possible lower adherence with self-administration (Gobel, 2007; Moore, 2007). However, daily oral dosing provides continuous drug exposure, compared to intermittent IV infusions, and multiple opportunities to modify dosages to manage side effects. At the same time, accessibility and affordability issues arise because oral drugs may

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