

# Temsirolimus, an mTOR Inhibitor for Treatment of Patients With Advanced Renal Cell Carcinoma

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Temsirolimus is a targeted therapy that inhibits mammalian target of rapamycin (mTOR), a central regulator of tumor cell responses to growth stimuli. Temsirolimus has a broad anticancer activity profile that impacts tumor cell growth, proliferation, and survival through its specific inhibition of mTOR. In a randomized phase III trial that enrolled previously untreated patients with advanced renal cell carcinoma (RCC) and poor prognostic features, temsirolimus significantly prolonged overall survival compared with interferon- $\alpha$ , a standard therapy ( $p = 0.008$ ). Because of the results, temsirolimus was approved by the U.S. Food and Drug Administration for treatment and is considered a first-line treatment for patients with advanced RCC with poor prognostic features. Temsirolimus is administered at a flat weekly IV dose of 25 mg given over 30–60 minutes. Gastrointestinal disorders (stomatitis, anorexia, nausea, diarrhea, and vomiting), rash, fatigue, edema, infections, and dyspnea, as well as hematologic and metabolic laboratory abnormalities occur in patients receiving temsirolimus. Metabolic side effects include hyperglycemia, hypercholesterolemia, hypertriglyceridemia, and hypophosphatemia. Most adverse reactions associated with temsirolimus can be managed medically or addressed by supportive measures. Nurses can improve patient outcomes through early recognition of side effects and prompt interventions.

The incidence of kidney cancer has increased steadily by about 2% per year since the 1940s (National Comprehensive Cancer Network [NCCN] Kidney Cancer Panel, 2008). However, the estimated incidence rate for newly diagnosed cases in the United States increased 38%, from 39,000 in 2006 to 54,000 in 2008 (American Cancer Society, 2006, 2008). Reasons for the increase are unknown but may be related to increased awareness of symptoms and improved diagnostic testing, resulting in earlier diagnoses. Obesity also has been linked to increased risk for several types of cancer, including tumors of the kidney. As of 2005, 253,502 men and women in the United States were living with kidney cancer (National Cancer Institute [NCI], 2008).

Ninety percent of all kidney cancer diagnoses are renal cell carcinoma (RCC) (NCCN Kidney Cancer Panel, 2008). The most important prognostic determinants of five-year survival are tumor grade, local extent of the tumor, presence of regional lymph node metastases, and metastatic disease at presentation. According to NCI (2008), 55% of kidney and renal pelvis cancer cases are diagnosed while the cancer is confined to the primary site (localized stage), 19% are diagnosed after the cancer has spread to regional lymph nodes or directly beyond the primary site, 20% are diagnosed after the cancer has already metastasized (distant stage), and 6% of the staging information is unknown. The corresponding five-year relative survival rates were 89.6% for local-

## At a Glance

- ◆ Temsirolimus is an anticancer agent that inhibits mammalian target of rapamycin, a central regulator of tumor growth and angiogenesis.
- ◆ Temsirolimus is the first targeted therapy to show survival benefits in patients with renal cell carcinoma and can be considered first-line treatment for advanced renal cell carcinoma with poor prognostic features.
- ◆ Oncology nurses have varied and important roles in optimizing patient outcomes with temsirolimus therapy, such as patient education, safe administration, and the recognition and management of side effects.

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