
RSNA Press Release

Radiologists Provide Safe Delivery Method for Gene Therapy

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OAK BROOK, Ill. - Computed tomography (CT)-guided injections offer a safe delivery method for gene therapy in patients with metastatic kidney cancer, according to a study in the May issue of the journal *Radiology*.

Gene therapy involves introducing genetic material directly into cells to fight disease. "The new gene therapies offer promise for controlling certain types of cancer, but delivering the agents directly into tumors poses its own set of challenges," said the study's lead author, Robert D. Suh, M.D., who is an assistant clinical professor of radiology and director of thoracic interventional services at the David Geffen School of Medicine at University of California, Los Angeles (UCLA). "As research in gene therapy, or immunotherapy, progresses, we need a good gene therapy delivery mechanism."

Treatment of metastatic kidney cancer is difficult because the disease is largely resistant to chemotherapy. The only Food and Drug Administration (FDA)-approved immunotherapeutic treatment, recombinant interleukin-2 (IL-2), has a response rate of only 15 percent when administered intravenously, and its use is limited by significant and occasionally life-threatening side effects. Researchers have developed several gene therapy agents to improve the effectiveness and minimize the side effects of IL-2. UCLA's technique involves injecting an IL-2-encoded recombinant gene directly into cancer cells.

The researchers assessed the feasibility of using CT guidance to safely position a needle in both superficial and deep tumor sites to deliver gene therapy (IL-2 plasmid DNA).

"The CT images enabled us to precisely target the tumor, eliminating any guesswork about where to angle the needle and how deeply to inject the therapy," said Dr. Suh.

Twenty-nine patients with kidney cancer that had spread to the chest or abdomen received up to three cycles of six weekly injections directly into their tumors. A total of 284 CT-guided injections were performed.

At A Glance

- Computed tomography (CT)-guided gene therapy is safe and feasible for the treatment of metastatic kidney cancer.
- Gene therapy involves injecting genetic material directly into cells to fight disease.
- For this study, researchers successfully used CT guidance to deliver gene therapy injections to cancer patients on a weekly outpatient basis with no serious adverse effects.

In every case, the UCLA team successfully placed the needle and injected the agent into the tumor. None of the patients experienced serious adverse effects. Minor complications occurred in 14.8 percent of injections. The most common complication was air collection in the chest, for which only one patient required drainage. The complication rate did not increase with the number of injections.

"Our findings validate that CT-guided injection and delivery of gene therapy agents is both feasible and safe," said Dr. Suh.

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"Metastatic Renal Cell Carcinoma: CT-guided Immunotherapy as a Technically Feasible and Safe Approach to Delivery of Gene Therapy for Treatment." Collaborating with Dr. Suh on this paper were Jonathan G. Goldin, M.D., Amanda B. Wallace, B.S., Ramon E. Sheehan, M.D., Stefan B. Heinze, M.D., Barbara J. Gitlitz, M.D., and Robert A. Figlin, M.D.

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