

Radiosurgery For Kidney Cancer In And Beyond The Brain

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Kidney cancer represents a great hurdle for patients and physicians both here and abroad. While some are, so to speak, fortunate to be diagnosed with kidney cancer at an early stage thus having the possibility of potential cure. Many others are diagnosed once the cancer from the kidney has traveled into the lymphatic or blood stream. In the presence of metastatic cancer, cure is almost never seen with conventional treatment.

While new treatment approaches such as stem cell transplants are being performed in an attempt to improve prognosis, the overall situation for those with metastatic renal cell or kidney cancer is bleak - with usual technology employed.

A ray of hope has been that of stereotactic radiosurgery. Radiosurgery compares dramatically differently than standard radiation. I often compare standard radiation using a breadbox-size field just to get to the malignancy for what would be considered a plum-sized cancer. Standard radiation means a larger area of the body is unnecessarily radiated because of lack of precision. Therefore harm may well be inflicted on the adjacent healthy tissues. Furthermore, since larger areas are radiated, the doses of radiation are modest and often unlikely to control the cancer. In contrast, with stereotactic body radiosurgery we can hit the tumor - equal to the plum in the breadbox while in general avoiding unnecessary radiation of vast surrounding normal tissue. Importantly, higher and more focused and thus more effective doses can be utilized.

Control in radiosurgery parlance means cessation of growth, shrinkage or disappearance of the cancer for the rest of the life of the patient.

Kidney cancers are often referred to as radio-resistant because of the poor response to standard radiation. However, dramatically different than this is the world of stereotactic radiosurgery. Here higher doses and more effective treatment are offered. Higher radiation dose per fraction means higher success rate with body radiosurgery. In fact, the control rate is high - with the vast majority - 96% to 100% - successfully treated.

Stereotactic radiosurgery was pioneered first in the brain. Stereotactic cranial or brain radiosurgery took place first for brain tumors. Later it became available in sites beyond the brain thus is known as extracranial. Extracranial means in sites outside the cranium or skull.

Recently I was asked by one of my colleagues why don't we just let patients be treated with standard surgery or chemotherapy for kidney cancer? The answer is relatively simple. While patients with localized kidney cancers are essentially always sent to the urologist, for surgical removal, first many patients are not in such a favorable situation. With cancer having spread, standard chemotherapy or immunotherapy offering approximately less than 20% response rate - temporary in general - many with kidney cancer seek alternative and hopefully more successfully therapies. Many patients come to us after standard therapy has failed to shrink or eradicate the renal cell cancer. It's an instance where the theoretical is better than actuality.

How does our work compare? While certainly not perfect, body and brain stereotactic radiosurgery offers solutions with a high degree of appeal in certain situations. Stereotactic brain and body radiosurgery offers the appeal of high control rates in the treated area generally avoiding harm to the normal surrounding tissues.

Again, the rationale of this procedure is the precise nature of the delivered radiosurgery as well as the higher dose of radiation per fraction. All treatments are fractionated or divided in dose to help protect healthy normal tissues. Radiation oncologists have known for decades that fractionation is critical to help protect the patient.

There can never be 100% protection just like there is not a 100% success rate, but the results are certainly appealing and stimulating to many from near and far.

Our group has treated 23 cancers within the kidney itself in 21 patients. The patients have ranged in age from 31 to 85 years having a tumor volume to 2.4 to 1300cc (cc is cubic centimeter). The mean volume of cancer in the kidney is 323cc. All patients have received an equivalent dose rate of 800 rad (rad is a dose or unit of radiation) times five. Ours is the largest such experience worldwide to the best of my knowledge.

For this group of patients who are evaluated after treatment, the control rate is 100% meaning no tumor has shown enlargement in the area treated. Of course, we continue to follow all our patients to determine subsequent results if different. Also, our control rates are defined as success for the rest of the patient's life - unlike the transient definition of chemotherapy.

Of 53 kidney cancers treated beyond the kidney but excluding the brain, 3 have disappeared, 22 have decreased in size, 26 have shown cessation growth for an overall control of 96%. Two tumors have increased in size. It is often possible to re-treat our failures. This is discussed with the patients and their families.

Patients ranging in age from 44 to 79 years, with a mean of 62 with 39 brain metastases were treated. The tumor volume ranged from 0.5 to 73.2cc with a mean of 7.4cc. Patients lived up to 65 months after treatment with a mean of 19 months. This is dramatic in that the typical patient treated with whole brain radiation or standard radiation lives about 4 months from diagnosis. Thus, on average, our brain metastases patients with kidney cancer live dramatically longer than standard radiation and much longer than those treated in general with open surgery and radiation. Many of our patients even prefer to avoid radiating the entire brain for fear of late effects. That is a beneficial effect of radiosurgery - attempting to avoid normal parts of the body.

National organizations devoted to the study of kidney cancer frequently send their patients to us for such innovative treatment. Some patients undergoing bone marrow transplantation from throughout the United States were treated with body radiosurgery in an attempt to control bulky sites of disease before undergoing such immunologic treatment. A prominent report appeared in the New England Journal of Medicine about this. Other patients come to us with intractable symptoms not having responded to standard immunotherapy approaches such as Interleukin and Interferon.

Why do those with primary kidney cancer seek radiosurgery within the kidney itself? Some have kidney cancer that has metastasized and seek to have bulky, bleeding or painful cancers controlled. This relief of symptoms frequently appears quickly after body radiosurgery. Other patients have co-morbid conditions precluding open surgery. Some patients refuse such surgery because of religious or other beliefs.

Thus, stereotactic radiosurgery both for brain metastases, body metastases and primary cancers within the kidney may offer appeal in selected patients.

Obviously, patients before undergoing treatment are informed of all risks, benefits and alternatives of treatment. Included in this is no treatment, surgical, immunotherapy or otherwise. Our data is presented at national and international meetings in an attempt to stimulate discussion among physicians and patients dealing with this difficult disease. I just returned from the National body radiosurgery meetings in Tokyo, Japan where this information was presented for the first time. Other reports by our group will continue to appear stateside.