

Clinical Update

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Physician News

SERVICE LINE SPOTLIGHT:

SRS Update

One of the most highly specialized capabilities offered by John Muir Health’s comprehensive Brain Tumor & Neuro-Oncology program is stereotactic radiosurgery, (SRS) and stereotactic body radiotherapy (SBRT). This non-invasive, radiation-based treatment uses photon beams to precisely target tumors in the brain and spine.

More than 12 years ago, John Muir Health became the first health system in the East Bay to offer this advance in treatment. SRS/SBRT provides a pain-free, safe and effective means for treating specific cancers.

Recently, the original system was upgraded with a state-of-the-art TrueBeam STx system, the newest and most accurate radiosurgery system available. It is used for SRS and SBRT as well as conventional radiotherapy. A prime advantage of the new technology is that it delivers radiation up to four times faster than other systems, and has reduced treatment times for cancer patients from about 30- 60 minutes down to just 5-20 minutes.

According to Brenda Carlson, Executive Director, Oncology, “This faster treatment time not only enhances the accuracy of the treatment, but it is a great factor in improving patient comfort. Our patient-focused program is able to provide an easier, less stressful experience for those with cancers of the brain and spine, as well as certain other conditions. (See box.) The technology is remarkable. We are extremely pleased with our ability to bring even better care to our community by moving up to this superb level of cancer treatment.”

This month, JMHPN checked in with William Bice, MD, Chief Physicist and Director, Radiation Oncology, and George Counelis, MD, neurosurgeon and Medical Director of the Brain Tumor & Neuro-Oncology Program, to learn what the latest changes and upgrades in this technology mean for our patients at John Muir Health.

JMHPN: Tell us about the most recent developments in your department.

Dr. Bice: In 2004, we acquired the Novalis stereotactic radiosurgery system, which was very precise and in small fields, could shape a conformal beam tailoring the radiation dose to a tumor. It was a good system, and reliable, but slow. Speed makes a difference. Lying on the treatment bed can be uncomfortable for patients, and they may move, which can affect treatment. So we have replaced the standard accelerator with a TrueBeam STx linear accelerator. It doesn’t get any better than this. It has allowed us to keep the same imaging capabilities, but to be even more precise with regard to aim. It has sub-millimeter precision. It has added capability to do 4-D radiotherapy:

3-D plus time, the fourth dimension. While a target moves, we can correct for that movement. The idea is to be able to turn off the beam during breathing -- called gating.

We used to deliver IMRT, intensity-modulated radiation therapy, to treat tumors by putting together the computer beams with different amounts of radiation to conform closely to the shape of the tumor. We would shoot radiation from one direction, and do this with 7 to 11 angles. It took careful alignment, rotating the couch, and could take up to an hour. Now, with VMAT, or Volumetric Arc Therapy, that modulation in the beams is acquired while the machine rotates around the patient. The leaves used to modulate the beams move in and out. Now, it takes about 10 minutes for head and neck treatment. It’s wonderful for the patient; we align them once.

One other thing that is unique: This system uses two cross-beam X-rays. We can move the patient so he or she is in the right position, according to these precise X-rays. We have a special table, which offers more freedom: we can move it up/down, in/out, left/right and also control roll, pitch and yaw. When you put it all together, it equals very highly precise delivery, quickly. All this is very important for stereotactic delivery, providing more radiation than normal in a shorter time.

Dr. Counelis: The TrueBeam STx radiosurgery system represents the best technology available for SRS/SBRT treatment of cancer. More importantly, the team of professionals responsible for the treatments are expert, dedicated and caring people who believe they make significant contributions to the health of our patients.

Of what are you most proud?

Dr. Bice: I am most excited about our ability to treat the cancer better, with much speedier delivery.

I am also very proud of the fact that because many of our patients see us more than once, they become “family.” Our therapists have empathy, and are cordial and so good at what they do. We have a great staff. Patient satisfaction scores are consistently superior.

Dr. Counelis: I am most proud of the superior quality of care we provide our patients, both with regard to the highly technical nature of the treatment and the personal level of interaction offered by physicians and staff.

What do you wish John Muir Health MDs knew about your department’s changes?

Dr. Bice: Located between UCSF, Stanford and Davis, we compete with big university services that are state-supported, and doing cutting-edge research. To be competitive, we have to offer the same kind of treatments. You won’t find anything better.

Also, I’d like referring physicians to know that they will never lose contact with their patients. They are our partner, not a supply source. We have a very active tumor board, and a referring physician is welcome to attend. After treatment, that patient returns to you.

Dr. Counelis: We offer world class treatment to patients in our community, allowing them to be treated near home. For referring physicians in our community and beyond, our program provides a wonderful resource for interactive review of their patients’ needs and the ability to treat them definitively with technology only available at a few specialized centers.

What can you do now that you could not do earlier without the new linear accelerator?

Dr. Counelis and Dr. Bice agree that this advanced imaging allows clinicians to deliver treatment more accurately by providing a better view of the tumor. The sub-millimeter accuracy and precise shaping of the radiation fields is required for radiation delivered for tumors that arise in the brain, or have spread to the brain or spine from other sites, such as the breast, lung or prostate. This accuracy is made possible by a sophisticated control system, which choreographs imaging, patient positioning, motion management, beam shaping and dose delivery, while performing accuracy checks every 10 milliseconds throughout treatment.

The micro-multileaf collimator, or “beam shaper,” automatically and precisely shapes the photon beam to

match a tumor’s preregistered outline from every angle. The system delivers a continuous, even distribution of the prescribed dose as it rotates slowly around the patient’s head. For patients with primary and metastatic brain and spinal tumors that cannot be resected through traditional surgical interventions, this approach provides an alternative with a success rate that matches or betters results from conventional irradiation but with much less toxicity due to the fact that it targets the tumor and spares critical neurologic tissue.

How do you see your department moving toward the future?

Dr. Counelis: In the future I would like to see our department and program begin contributing to the field of SRS/SBRT through research efforts, both institutional and collaborative.



Dr. Bice shows John Muir Health’s new TrueBeam STx system, the newest and most accurate radiosurgery system available.

Conditions that can be treated with the TrueBeam STx radiosurgery system include:

- Acoustic neuroma
- Arteriovenous malformation
- Primary and secondary brain tumors
- Cavernous angioma (vascular malformation)
- Glioma
- Pituitary tumor
- Spinal tumor
- Trigeminal neuralgia
- Meningioma
- Glioblastoma