

## A new era of brain radiosurgery excellence at **Gamma Knife Radiotherapeutics**



*Leksell Gamma Knife Icon allows **Gamma Knife Radiotherapeutics** to expand patient treatment options*

Leksell Gamma Knife® Icon™ represents brain treatment innovation, enabling **Gamma Knife Radiotherapeutics** physicians to offer unparalleled precision and accuracy without some of the side effects associated with traditional treatment approaches. As **Sanjay Ghosh, MD, FAANS, Medical Director GKR**, explains, “Approaching brain lesions with either surgical or with whole brain irradiation carries potential complications, side effects or even death due to factors such as the lesion’s depth and inaccessibility, its closeness to critical structures, and the radio-sensitivity of adjacent vital tissues. Even if accessible, open surgery still involves risks such as hemorrhage, infection and other post-operative complications, as well as a hospital stay and lengthy recovery.”

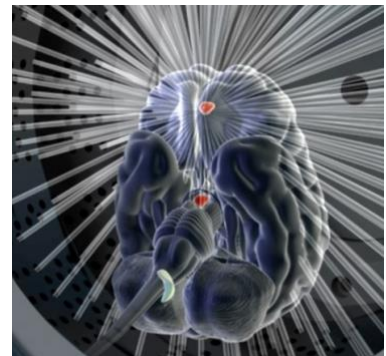
While whole brain irradiation does not pose the same risks as open surgery, radiation cannot distinguish between types of cells, meaning healthy tissue that impacts brain function can also be destroyed by whole brain irradiation. This has led to the

development of a specialized approach, stereotactic radiosurgery (SRS), which delivers precisely focused high doses of radiation to small localized areas of the brain. “With SRS,” explains **Dr. Ghosh**, “the beams of radiation more closely conform to the size, shape and volume of the lesion than with conventional radiation, allowing the delivery of a higher, more effective dose to the affected site. Leksell Gamma Knife Icon presents distinct advantages when performing brain SRS.”

### **Brain-specific SRS technology**

Leksell Gamma Knife Icon is unique technology specifically designed for brain SRS, allowing noninvasive intracranial surgery to be performed with extreme precision while minimizing dose to the surrounding tissue that could impact brain function. Based on preoperative imaging, such as CT-scans, MR-scans, conventional X-rays and/or angiography, Icon’s accuracy enables accurate irradiation of critically located targets, using up to 192 collimated beams of ionizing radiation that, at their point of intersection, create a powerful dose to destroy targeted tissue while sparing healthy surrounding tissue.

Leksell Gamma Knife Icon is the latest advance in Gamma Knife radiosurgery, the most clinically proven radiosurgery technique. Developed by Elekta, this innovative technology offers unparalleled accuracy in both location and dose delivered to targeted brain tissue. The advances contributing to Icon are the result of Elekta’s 40-year leadership in SRS technology and decades of collaboration with surgeons and radiation oncologists around the world.



*Multiple radiation beams intersect in a custom-programmed manner to deliver precise accurate dose where needed, with minimal impact to surrounding tissue*

Types of indications		
Acoustic neuroma / vestibular schwannoma	Medically refractory essential tremor	Recurrent glioblastoma
Arteriovenous malformation (AVM)	Meningioma	Trigeminal neuralgia
Brain metastases	Pituitary adenoma	

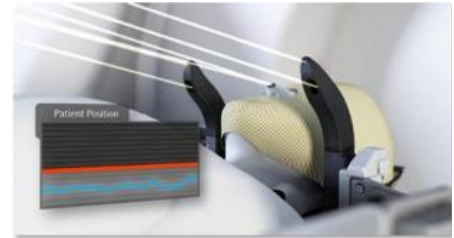
## Expanding treatment possibilities

“Icon will enable us to extend intracranial SRS to an expanded patient base, and is expected to improve the efficacy of intracranial SRS with fewer side effects,” reports **Dr. Ghosh**. “Features such as advanced motion management and imaging capabilities enable frame-based and frameless (mask-based) treatments with exceptional accuracy. The dose to normal brain tissue is typically 2 times lower than with other technologies<sup>1</sup>, and dose to the rest of the body is up to 130 times lower<sup>2</sup>. These Icon advantages allow for greater potential to protect patient quality of life both during treatment and after recovery.”

The frameless mask solution is one of several distinct features of Icon and is integrated with a novel high definition motion management system. Icon also provides the flexibility for single dose administration or a fractionated approach (multiple sessions over time), which enables treatment of larger tumor volumes, targets close to critical brain structures and new or recurring brain metastases. Multi-fraction and mask-based radiosurgery with Icon significantly expands the range of treatment possibilities.

Another feature that makes Icon revolutionary is its integrated cone beam computed tomography (CBCT, a 3D x-ray) imaging system. At the time of SRS, pre-treatment MRI images and CBCT images are aligned to identify precise coordinates for radiation targeting within the brain. “This technology is especially important for patients who undergo multiple treatment sessions,” comments **Dr. Ghosh**. “Because the CBCT images are based on fixed structures within the brain, they ensure that dosage and delivery area are calculated correctly for each session, even if the patient's head is in a slightly different position from one treatment session to another.”

“With this advanced technology, we can offer more patients additional treatment options that combine exceptional treatment efficacy with quality of life.”



*Icon's frameless solution is integrated with a high definition motion management system*

## References

- <sup>1</sup>Ma L, Nichol A, et al. Variable dose interplay effects across radiosurgical apparatus in treating multiple brain metastases. *Int J Comput Assist Radiol Surg* 2014; 9(6):1079-1086. Published online 2014 Apr 20. doi: 10.1007/s11548-014-1001-4
- <sup>2</sup>Lindquist C and Paddick I. The Leksell Gamma Knife Perfexion and comparisons with its predecessors. *Neurosurgery* 61: ONS 130-141 2007; Vlachopoulou V, Antypas C, Delis H, et al. Peripheral doses in patients undergoing Cyberknife treatment for intracranial lesions. A single centre experience. *Radiation Oncology (London, England)* 2011;6:157