

# Gamma Knife® radiosurgery Arteriovenous Malformations



## Introduction

Over 90,000 intracranial arteriovenous malformations (AVMs) have been treated with Gamma Knife® since it was first used in 1968\*. It is increasingly used as a non-invasive adjunct and alternative to more invasive therapies including embolization and microsurgery with approximately 6,500 patients\* treated each year.

## Obliteration Rate

The goal of Gamma Knife® radiosurgery is complete obliteration of the AVM nidus while avoiding postprocedural adverse radiation effects. The obliteration process is cumulative, with earliest obliterations noted within 2–3 months, 50% of the effect often seen within one year, 80% within two years and 90% within three years.<sup>1-5</sup> If at the end of three years residual AVM is identified by imaging, patients may undergo repeat Gamma Knife® treatment.<sup>6-8</sup> Total obliteration appears to reduce the cumulative residual lifetime risk of hemorrhage to 1% or less. Patients remain at risk for hemorrhage during the latency interval between SRS and obliteration. Whether that risk gradually lessens as that interval increases remains to be fully confirmed.<sup>9</sup>

Dose volume guidelines for Gamma Knife® radiosurgery have been extensively published<sup>10,11</sup> and various grading schemes have been devised<sup>12-14</sup>. There are also over 500 peer reviewed articles elucidating the utility of Leksell Gamma Knife® in specific clinical situations including:

- Anatomical location (e.g., brainstem, basal ganglia and thalamus)<sup>15-22</sup>
- Volume (e.g., large lesions and staged Gamma Knife® radiosurgery)<sup>23-28</sup>
- Pediatric population<sup>29-34</sup>
- Adjunctive use with embolization.<sup>35-38</sup>

Gamma Knife® radiosurgery (GKS) is a safe and effective treatment for AVMs in eloquent, deep-seated areas and other intracranial locations in children and adults. GKS provides high obliteration and cure rates and has low morbidity. Large AVMs and AVMs in eloquent regions that could not be treated three decades ago are now treated quite cost effectively with good clinical outcome.

## Why Leksell Gamma Knife®?

Not all radiosurgery devices are created equal. Designed specifically for and dedicated to the brain, Leksell Gamma Knife® is widely recognized as the gold standard in radiosurgery. Leading centers worldwide have adopted Leksell Gamma Knife® as their tool for effective, efficient and patient centric treatment. Over 750,000 patients have been treated worldwide; over 50 percent of cases have been for non-oncologic indications.\*

Unique benefits of Leksell Gamma Knife® include:

- Fast treatment delivery and optimized workflow to ensure high patient throughput averaging over 400 cases per year\*
- Sharpest dose gradients and lowest dose outside the target minimize the risk of secondary cancer<sup>5-7</sup>
- Wealth of research providing evidence for safe and clinically effective solutions<sup>8-11</sup>
- Highest uptime with least quality assurance demands ensuring ease of use and reliability
- Able to routinely treat broadest spectrum of intracranial disorders in a single session enabling practice expansion beyond typical oncologic diseases
- Support for every step on the path to a world class SRS program.

\* Leksell Gamma Knife Society Survey, 2012

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