

## BroadcastMed | Dr. Rowland - Gamma Knife Surgery

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Gamma knife surgery was designed to try to reach regions in the brain that neurosurgeons couldn't reach by doing surgery.

So what it entails is a series of cobalt sources that emit gamma rays into the brain.

But they do it in a way that it doesn't cause other tumors to form and it eliminates the tumor non-invasively.

So, for example, pain syndromes, movement disorders, psychiatric disorders, epilepsy, arteriovenous malformation-- those are some of the indications that we use for gamma knife surgery.

But the most frequent indication is brain tumors. It started out as a few kinds of brain tumors-- slow-growing, benign brain tumors-- and we've consistently expanded that spectrum to include even the most malignant, fast-growing tumors, such as glial tumors. The way we use it today is we normally take a minimum amount of the brain tumor out and then we schedule the patient to see us back in clinic once they have recovered from the brain surgery.

And then we irradiate the rest of it with gamma knife.

So we use it in tandem with real surgery or actual, invasive surgery. Now where the advantage of gamma knife surgery comes in is in relation to whole brain radiation.

So back in the '50s, '40s, the way to radiate a brain tumor was to simply expose the entire head to radiation.

But what happens is that causes other tumors to form.

So what Lars Excel, who was the inventor of gamma knife surgery did, or envisioned, is that you would have rays of gamma radiation that would focus in on just the tumor and leave everything else untouched.

And so back in those days, that was the vision that he had.

And so today, that's what we do, which is that we do an MRI.

We know exactly where the tumor is.

And with millimeter precision, we can focus right in on the tumor and then use the gamma rays to disrupt the DNA.

And the tumor actually just shrinks away on its own. The procedure entails a person coming in around 6:00 or 7:00 in the morning.

They have a metal frame that's attached to the head.

Those have numbers and measurements that tell the computer where to do the radiation, or to focus the radiation.

That person undergoes an MRI with the frame on, and then we use computer software to, again, tell the radiation sources where to focus the radiation.

The person then goes into the unit and they lie down on a bed in the unit for anywhere up to about one to three hours.

After that, they eat a small meal to let us know that they're OK to go home.

And after that, they go home.

So most people who have gamma knife surgery in the morning are home by the afternoon. There are side effects.

Most of the side effects are temporary-- so nausea, headache, things like that.

Those are things that we are watching for as they come out of the gamma knife surgery.

So we normally have patients stay with us for one to two hours after the surgery is finished.

And then once they eat a small meal, we know that their pain is well-controlled, and they have a ride with them.

Normally they're OK to go home at that point.

It is very rare for a person in need to be admitted overnight after surgery like this.

Now one complication could be swelling of the tumor.

So if the tumor is a large tumor and it's near what we would call very sensitive brain tissue or other regions in the brain-- eloquent tissue, for instance-- they may have other side effects such as inability to speak, severe headache, vision problems, something like that.

And for the cases like those, we just have them stay overnight.

We may give them steroids to reduce the inflammation and then they're OK to go home the next day. Gamma knife is as equally effective as whole brain radiation.

So whole brain radiation is when we would radiate the entire brain.

And with gamma knife, we're only radiating just the tumor itself.

And so it's equally effective as whole brain radiation, but it has many less effects, particularly cognitive side effects.

So heartrate radiotherapy has many cognitive side effects, whereas you can reduce or even eliminate those with gamma knife radiosurgery.

Now with regard to open surgery, we'd, again, normally use it in tandem.

So a person would come in for a surgical resection of a tumor, some of which would be dangerous to take out in an open fashion.

So we would actually just take out the part that's safe to take out.

Then we would have the person recover from that surgery-- takes about three or four weeks.

And then we would have them come back for the gamma knife radiation.

All right?

After that, sometimes tumors come back.

For instance, if it's a metastatic tumor.

At that point, we would not do any more surgery, we would only use radiation.

And for those tumors-- for repeat, recurrent tumors-- gamma knife is the best, and safest way, and most effective way, to eliminate those tumors. Gamma knife surgery is an option that many physicians don't know about, but it's something that can benefit the patient.

It's not invasive.

It's a one-day surgery.

And it's something that we can do repeatedly.

So if they do have recurrent tumors, there would be no further surgery involved.

We could do gamma knife many multiple times.

And, again, it would be non-invasive each time.