

SAFETY CONSIDERATIONS FOR THOSE UNDERGOING RADIATION SEED IMPLANTATION

By: Gil Lederman, M.D.

Radiation seed implantation directly to the prostate gland is becoming an increasingly popular method of treatment. Compared to radical prostatectomy, our data shows superior outcome even in high risks patients when combined with a limited short course of sophisticated external radiation. The technology is chosen both because of its attractive results and quality of life issues.

Since brachytherapy is becoming a more important modality used in curative approaches, many are asking appropriately about radiation exposure to loved ones as well as to the general population.

Federal and hospital guidelines do not require any special precautions. Many men, however, are concerned about exposure to mates and to those pregnant or young. In a recently published paper by Smathers in the prestigious International Journal of Radiation Oncology Biology and Physics, the group evaluated radiation exposure to the general public after iodine or palladium seed implantation.

Seed implantation is performed by placing seeds directly through the skin and into the prostate, using sophisticated guidance technology. A small needle is placed through which the cancer-fighting seed is positioned. In our experience using fluoroscopy and ultrasound, positioning of this small radioactive metal-encased material is painless, minimally invasive and effective. Men usually return home within hour of having the seeds placed. Thus, the seeds are located in general deep within the body. Patients are told to limit time around children and potentially pregnant women for one half-life or about 17 days with palladium and 60 days with iodine. That is one more benefit toward our preferred use of palladium. A second major one is the minimal bowel effect compared to iodine.

Forty brachytherapy patients were studied to determine radiation exposure. Within hours of the procedure radiation measurements were taken at the skin and 1 meter (approximately 39 inches) perpendicular from the skin. This measurement was taken using an ionization chamber. The meter scanned over the skin anterior (in front of) and lateral to the pelvis (on the side) to find the highest possible reading. Of course, radiation exposure drops quickly after treatment - especially so after palladium since its half-life is much shorter.

Iodine 125 implantation amounts ranged from 30 to 52 millicuries and palladium ranged from 66 to 185 millicuries. The exposure rate at the skin in front of the pelvis after iodine was 2.2 to 8.9 millirems per hour with an average of five. The dose rate from palladium in the same position was 0.5 to 4.9 millirems per hour with an average of 1.7. The lesser exposure is another benefit of palladium seed implant.

Exposure rate at the lateral or side of the patient was markedly lower. This would be because the prostate is farther away from the side than from the front. Distance is an important factor in the radiation world. Lateral skin measurements for iodine were 0.19 millirems and palladium 0.06 millirems. Again, palladium produces less radiation exposure outside the body.

For all men measured, exposure rates 39" (which is one meter in distance) from the skin surface were less than 0.03 millirems per hour. Obviously, patients who were bigger had a greater distance between the prostate and the skin and therefore had lower exposure rates.

The National Regulatory Commission has recommended a total annual dose to the general population be 0.1 rem per year. The authors determined the time it would take for the general population at the anterior skin surface to get this exposure. It would be 20 hours for iodine 125

and 59 hours for palladium. Thus it would be highly unlikely that a child or pregnant woman would be located at the front of a man's abdominal or pelvic area for two and one-half full days after palladium seed implantation. A comparable time is nearly one full day for iodine.

At the lateral or side surface this time would require more than 500 hours. At one meter away or 39" it would take more than 1400 hours to reach the annual limit from iodine from the front and even longer for palladium. This is why rates are considered safe from adverse radiation exposure. Also, the half-life of palladium is just a little more than two weeks.

The authors note that this information would suggest, "Patients need not be concerned about being a radiation risk to the general public following their procedure."

Furthermore, the authors note that the likelihood for others next to the patient receiving the maximum yearly dose of radiation would likely be minuscule. They note, "that the actual exposure to a spouse's oocytes would be far lower than reported here because the ovaries would be shielded considerably by the overlying tissue of the spouse."

Of course, everyone wants to keep radiation exposure as low as possible. It's recommended to avoid extended close contact with others until after several radiation half lives. A commission has suggested only one half-life. This favors palladium since the palladium half-life is 17 days compared to iodine's 60 days. Furthermore, radiation exposure can be minimized to one's spouse by sleeping on the back rather than the side. Thus data actually shows that the risk of radiation exposure to others with seed implantation is minimal. The likelihood of receiving significant dose is highly improbable.

Of course, patients can do things to minimize further exposure by separating themselves or avoiding prolonged close contact. One can be sexually functional after seed implantation. Many of our patients take advantage of this possibility.

This data certainly suggests that radiation seeds are safe and even the most conservative precautions can be easily adopted if desired by those involved. This data is especially critical as more and more men are choosing this sophisticated method of potential cure of prostate cancer,

New data has shown that palladium seeds offer a safety benefit over iodine seeds. Yet many facilities may use iodine because they are less expensive.

Our patients seem to prefer palladium for several reasons. These include the shorter half-life. A shorter half-life means less exposure to those around us - even if this exposure is minimal already. A second is the diminished rectal irritation.

Also, studies at several facilities including Staten Island University Hospital show less adverse effects - especially on the rectum when using palladium compared to iodine seeds.

Currently there appears to be no therapeutic benefit for one seed type to the other. Choice is made by avoidance of side effects and radiation exposure with a lesser half-life for palladium.

This information along with the success rates for men to be cancer-free with better chance of maintaining urinary and sexual life favors innovative treatment approaches. Although, not the most commonly performed approach, it is rapidly gaining on the so-called gold standard because of cancer-free survival rates showing superiority and sexual and urinary life after treatment.

We believe every man should evaluate outcome of therapy before deciding on treatment approaches. There is supply of data today available to display results before choosing. Each patient is entitled to that.

Addendum:

Thus, the beauty of Palladium seeds is not only that the half-life is shorter – 17 vs. 60 days of Iodine seeds but as well, there appears to be greater cancer-free survival at ten years and less risk of severe rectal irritation.

Altogether, while it is true Palladium seeds do cost more, if our data continues to hold up showing a substantial improvement in cancer-free survival at ten years as well as less side effects, it should make this isotope a very appealing one for all the reasons described above. Our data will continue to be evaluated and updated to give everyone the current information concerning our statistical outcome.

Radiosurgery New York has established a hot line – 212-CHOICES – and an e-mail site: gil.lederman@rsny.org to answer questions. We believe by providing information, patients have a better relationship with their doctors and know more about treatment options, results and failure before deciding on a treatment course. Free seminars are open to the public, to meet our physicians in an informal setting.