Peptide Receptor Radionuclide Therapy (PRRT)

What is PRRT?

PRRT (Peptide Receptor Radionuclide Therapy) is a treatment used for neuroendocrine tumors (NETs). This treatment combines a medication called octreotide (a type of peptide) with a small amount of radioactive material (called a radionuclide). This combination is called a radiopeptide.

How does PRRT work?

Most NETs have lots of receptors on their cells for a hormone called somatostatin. Octreotide is a manmade version of somatostatin, which is attracted to these receptors on the NETs. IN PRRT, the octreotide has a radionuclide attached to it. This allows the octreotide to bring the radiation right to the tumor, and not to healthy tissues. This “targeted therapy” limits the radiation exposure to healthy tissue and often has fewer side effects when compared to chemotherapy medications.

There are several types of radionuclide that can be used and what you receive depends on what is used at the center where you are treated. Possible radionuclides include: Yttrium 90 (Y-90), Lutetium 177 (Lu-177), Iodine-131 MIBG, and Indium-111. There have been no studies comparing the effectiveness of different radionuclides.

What is PRRT used for?

PRRT is mainly used to treat neuroendocrine tumors. It is being studied in the treatment of other types of cancer that express the somatostatin receptor, including oat cell carcinoma, islet cell carcinoma of the pancreas, pheochromocytoma, and medullary thyroid cancer.

How is PRRT performed?

This varies depending on the center performing the treatment and the radionuclide being used. Patients can have as many as 10 treatments, given anywhere from 6 to 12 weeks apart. The steps of treatment are as follows:

- Patients are given medication to prevent or lessen nausea and vomiting.
- Next, they are given an intravenous (IV, into a vein) infusion of amino acids. This is used to protect the kidneys from being damaged by the radiation.
- Then the radiopeptide is given by IV, followed by more of the amino acid solution.
- This treatment can take 4 hours or more.

Whether or not the patient stays overnight in the hospital depends on the local regulations/laws and which radionuclide is used. Some radiation remains in the body for a few days, and you will be taught how to keep family members safe at home. Your instructions may include temporary isolation for several days after treatment (staying a safe distance from other people and sleeping in a room to yourself), safe bathroom use (the radiation is excreted in urine and stool), and any travel restrictions. Your care team will talk with you and your caregivers about any special precautions you might need to take.

What are the side effects of PRRT?

The most common side effects of PRRT are nausea, vomiting, belly pain, and temporary hair loss. Nausea is mainly caused by the amino acid infusion. You will be given anti-nausea medicine to lessen this side effect. PRRT can cause low blood counts, which tend to occur after a month or more of treatment. In rare cases, the treatment can damage the kidneys or liver. Your care team will watch for these problems.
Will my insurance pay for PRRT?

The FDA has approved the use of a radionuclide, lutetium Lu 177 dotatate (Lutathera®), to be used with PRRT. You and your team should investigate coverage and if precertification is needed for this treatment before it is given. Co-pay assistance may be available for commercially insured individuals (NOT for those with Medicare/Medicaid). PRRT is offered at centers in Europe and Asia, though these do not accept US insurance, and payment is typically expected before treatment.

Resources for More Information

Fact Sheet: What Is Peptide Receptor Radionuclide Therapy (PRRT)? From Society of Nuclear Medicine and Molecular Imaging

Carcinoid Cancer Foundation

Lutathera® Patient Support

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