**Peptide receptor radionuclide therapy (PRRT)**

Category Name: **Cancer/Oncology**

Peptide receptor radionuclide therapy (PRRT) also called radioisotope therapy is known for treating neuroendocrine tumors.

In this therapy a protein (or peptide) called octreotide is combined with a small amount of radioactive material, or radionuclide, to create a radiopeptide.

This radiopeptide is then administered into the patient’s bloodstream which then binds to neuroendocrine tumor cells and delivers a high dose of radiation to the cancer.

The cells found in neuroendocrine tumors have a of a specific type of protein that extends from the cell’s surface—that binds to a hormone in the body called somatostatin. Octreotide is a laboratory-made version of this hormone that binds to somatostatin receptors on neuroendocrine tumors. In PRRT, octreotide is combined with a therapeutic dose of the radionuclides. Yttrium 90 (Y-90) and Lutetium 177 (Lu-177) are the most commonly used radionuclides.

**What conditions are treated with PRRT?**

PRRT is used to treat the following types of cancers:

1. Neuroendocrine tumors
2. Pancreatic carcinoma
3. Small cell carcinoma of the lung
4. Rare thyroid cancers that do not respond to radio iodine treatment.

PRRT treatment provides symptom relief, to stop or slow tumor progression and to improve overall survival.

**How is PRRT performed?**

The treatment usually depends on the type of cancer being treated. A patient may require up to 10 PRRT sessions spaced two to three months apart. Now wether or not the patient will have hospitalised would depend on the type of radionuclide being used.

At the start of every session amino acid solution delivered intravenously to protect the patient’s kidneys from the effects of the radiation. Post this radiopeptide is then injected into the patient, followed by some more amino acid. The duration of the session is usually four hours.

To monitor that the injected radiopeptide travels correctly imaging scans are taken.

**Advantages of PRRT?**

PRRT offer more personalized cancer treatment because radiopharmaceuticals can be customized to the unique biologic characteristics of the patient and the molecular properties of the tumor.

Also PRRT typically has milder side effects compared with chemotherapy.

**PRRT Risks:**

As with most, if not all, of the treatment options open to neuroendocrine tumor patients, there are risks associated with using PRRT to treat metastasized tumors. The greatest risks arise from radiation toxicity affecting three things:

1. The blood system producing Red Blood Cells, White Blood Cells and Blood Platelets,
2. The functioning of the kidneys and
3. The functioning of the liver.

**Side effects And Risks**

The administration of the PRRT itself is quite well tolerated, but patients often experience nausea and vomiting (which can be severe) during the amino acid in. This is managed with anti-nausea medication or slowing down the administration of the amino acids. More long term, the side effects can include a suppression of blood cell counts. Overall, however, the treatment is well tolerated by most patients.

The More Common Side-effects are:

* Nausea
* Vomiting
* Abdominal discomfort or pain

The Less Common Side-effects are:

* Subacute hematological toxicity
* Temporary hair loss

In some cases there is delayed toxicity to the kidneys and renal insufficiency is experienced.

Serious hematologic toxicity is rare.

**Home care**

Your attending doctor will provide you with instructions for special care to be taken following treatment. Since small amounts of radiation can remain in the body, patients need to be quarantined from others for one to two days after the therapy. The elimination of left over radionuclide is eliminated from the body through the urine and feces.