^{177}Lu-DOTATATE Peptide Receptor Radionuclide Therapy

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The peptide receptor radionuclide therapy (PRRT) ^{177}Lu-DOTATATE binds to somatostatin receptors (*1*). A multidisciplinary team should be involved when treating patients with ^{177}Lu-DOTATATE PRRT, including medical oncologists, nuclear medicine physicians and technologists, nurses, radiation safety professionals, and pharmacists (*2*).

Clinical Indications

Somatostatin receptor–positive gastroenteropancreatic neuroendocrine tumors in adults (*1*).

Contraindications

None (*1*).

Treatment Plan (*1*)

- 7.4 GBq (200 mCi) of ^{177}Lu-DOTATATE PRRT intravenously every 8 weeks (wk) for a total of 4 administrations.
- Concomitant amino acid infusion to reduce the radiation dose to the kidneys.
- Antiemetic medication(s) to reduce nausea and vomiting caused by amino acids.

Patient Preparation/Education

Patient education should include a detailed description of the treatment day and posttreatment care, including possible side effects, instructions about radiation safety to reduce exposure to others, fertility and precautions during sex, and the safe handling of body waste at home.

Before ^{177}Lu-DOTATATE PRRT, the patient should:

- Discontinue long-acting somatostatin analogs (long-acting-release octreotide [Sandostatin LAR Depot; Novartis] or Lanreotide Autogel [Somatuline Depot; Ipsen]) for at least 4 wk or short-acting somatostatin analogs (subcutaneous octreotide) for at least 24 hours (h) (*1*).
- Consider changing into scrubs for the day (*2*).

During ^{177}Lu-DOTATATE PRRT, the patient should tell the care team if any dizziness, flushing, loose stools, trouble breathing, or tightness of the throat occurs.

After ^{177}Lu-DOTATATE PRRT, the patient should:

- Empty his or her bladder as frequently as possible until the end of the third day after the treatment.
- Tell the care team if loose stools last more than 24 h after the treatment.
- Tell the care team if any trouble breathing, fatigue, fever, chills, cough, bleeding, or bruising occurs (*2*) (and seek immediate medical attention if, within 24 h of the treatment, dizziness, flushing, loose stools, trouble breathing, or tightness of throat occurs).
- Keep all lab appointments.

Treatment Instructions

- Check laboratory values, including creatinine, glomerular filtration rate, and complete blood count, before each treatment. Whether to proceed is a clinical decision (*2*).
- Give antiemetic medication 30 minutes (min) before starting the amino acid infusion and then as needed.
- Infuse at least 1/8 of the total volume of amino acids at least 30 min before the ^{177}Lu-DOTATATE PRRT infusion, and continue the amino acid infusion for at least 4 h and up to 6–7 h, depending on the rate. A slower rate may help reduce nausea and vomiting (*2*).
- Infuse the ^{177}Lu-DOTATATE PRRT for approximately 30 min. If a neuroendocrine hormonal crisis occurs (dizziness, flushing, loose stools, trouble breathing, or tightness of throat), report it immediately.
- Continue infusing amino acids until the entire volume has been given.
- If needed, administer a long-acting somatostatin analog 4–24 h after the end of the ^{177}Lu-DOTATATE PRRT (*1*).

Therapeutic Dose Calculations

- Give the standard adult dose of 7.4 GBq (200 mCi) every 8 wk for 4 total administrations (*1*).

TABLE 1
Radiopharmaceutical Identity, Dose, Route of Administration, Infusion Time, and Infusion Duration

Radiopharmaceutical	Dose	Administration route	Infusion start time	Infusion duration
^{177}Lu-DOTATATE	7.4 GBq (200 mCi)	Intravenous	At least 30 min (or 1/8 of total volume) after initiation of amino acid infusion	~30 min

TABLE 2
Pharmaceutical Identity, Dose, Route of Administration, and Administration Requirements

Pharmaceutical	Dose	Administration route	Administration requirements
Antiemetic	As prescribed	Oral or intravenous	30 min before starting amino acid infusion and as needed
Amino acids	18–24 g lysine and 18–24 g arginine	Intravenous	≥30 min (at least 1/8 of total volume) before starting ^{177}Lu-DOTATATE infusion until total volume is given (≥4 h total)

- If adverse events occur, reduce the dose by half and delay up to 16 wk as described in the prescribing information (*1*).

Warnings/Precautions

^{177}Lu-DOTATATE PRRT is a radioactive therapy, and appropriate radiation safety practices should be used (*1*).

REFERENCES

1. LUTATHERA® (lutetium Lu 177 dotatate) injection, for intravenous use [package insert]. Colleretto Giacosa (TO), Italy: Advanced Accelerator Applications S.r.l.; 2018.
2. Abbott A, Sakellis C, Andersen E, et al. Guidance on ^{177}Lu-DOTATATE peptide receptor radionuclide therapy from the experience of a single nuclear medicine division. *J Nucl Med Technol.* 2018;59:237–244.