

FLaNET

NET Light Guide



Volume 4 | IR and Nuc Med in NETs

Treating NETs with Precision:

Understanding Liver-Directed Therapy and PRRT

People living with a neuroendocrine tumor (NET) know that it can mean navigating a wide range of treatment options. Some treatments work throughout the body, while others target tumors in a particular organ or even a specific area within an organ.

For patients with advanced NETs, **interventional radiology and nuclear medicine can offer highly targeted approaches to controlling disease and managing symptoms.** Two important categories are liver-directed therapies, which focus treatment on tumors in the liver, and peptide receptor radionuclide therapy (PRRT), which delivers radiation to NET cells throughout the body that express specific receptors.

Choosing between these approaches is not just about deciding which treatment is "stronger." Disease location, tumor behavior, symptoms, prior treatments, liver and kidney function, and future treatment options may all influence the decision.

As discussed during our [webinar on interventional radiology and nuclear medicine](#), the goal is to look at the whole patient and build a treatment strategy that can control disease today while preserving options for tomorrow.

KEY TAKEAWAYS *at a glance*

Liver-directed therapies can target NET metastases in the liver.

Ablation may be an option for a small number of appropriately sized and located liver tumors.

Embolization can treat multiple tumors by delivering therapy through the liver's blood supply.

PRRT is a systemic treatment that targets somatostatin receptors on NET cells.

A specialized PET scan helps determine whether a patient's tumors have the receptors needed for PRRT.

Treatment selection and sequencing should consider both current disease and future treatment options.

What Are Liver-Directed Therapies?

The liver is a common site of metastatic disease in people with neuroendocrine tumors. When disease in the liver cannot be treated surgically, or when surgery is not appropriate for a particular patient, liver-directed therapies may provide another way to control tumors.

These treatments can also be considered when a patient’s disease is present elsewhere, but the most significant changes are occurring in the liver. In these situations, a patient’s broader systemic treatment may continue while an additional therapy specifically addresses liver-dominant disease.

Our recent webinar on [IR and Nuclear Medicine in Nets](#), discussed two major approaches: ablation and intra-arterial therapies.

Ablation: Targeting Individual Tumors

Ablation uses imaging such as ultrasound or CT to guide a probe directly into a liver tumor. Energy then destroys the targeted tissue. Radiofrequency and microwave ablation use heat. Other forms of ablation may use cold or electrical energy.

Ablation is generally most useful when a limited number of tumors (approximately 3 centimeters or smaller) can be safely targeted, although location and other individual factors are also important.

For appropriately selected tumors, ablation can function almost like a “mini surgery,” treating a specific area without removing a portion of the liver.

Embolization: Using the Tumor’s Blood Supply

When there are multiple tumors throughout the liver, treating each individually may not be practical.

Instead, an interventional radiologist can guide a catheter through the blood vessels and into the hepatic arteries supplying the liver. Neuroendocrine tumor metastases are often highly vascular, meaning they receive substantial blood flow. This allows treatment to reach the tumors preferentially.

SEVERAL FORMS OF EMBOLIZATION MAY BE USED:



Bland embolization
Small particles are delivered through the hepatic arteries to reduce blood flow to the tumors.



Chemoembolization
Chemotherapy is delivered directly into the liver through the arteries supplying the tumors, followed by particles that slow blood flow.



Radioembolization
Tiny radioactive particles are delivered through the hepatic arteries, allowing radiation to concentrate within the treated area.

The best approach depends on the individual patient, tumor behavior, prior treatments, and the treating center’s experience.

Why Treat the Liver if Cancer Is Somewhere Else Too?

Liver-directed therapy is not necessarily limited to patients whose disease exists only in the liver.

If scans show that most meaningful disease progression is occurring in the liver, the care team may consider treating that area directly while continuing systemic treatment to address disease throughout the body.

This is one reason multidisciplinary review can be so important in NET care.

Beyond Tumor Growth

Treating Symptoms and Protecting Quality of Life

Controlling tumor size is only one reason a care team may consider liver-directed therapy.

Some neuroendocrine tumors release hormones that can cause **carcinoid syndrome**. During the webinar, the physicians discussed how embolization can sometimes improve hormone-related symptoms and quality of life, including flushing and diarrhea.

This means treatment decisions may consider **how a tumor is making someone feel, not simply whether it has grown on a scan.**

WHAT CAN PATIENTS EXPECT AFTER EMBOLIZATION?

- Abdominal pain
- Nausea or vomiting
- Low-grade fever
- Fatigue
- Flu-like symptoms

Patients undergoing embolization may stay in the hospital overnight so their care team can manage pain, nausea, and other immediate effects. Fatigue can continue after returning home and may last for a week or longer.

When both sides of the liver require treatment, the procedures may be separated by several weeks. This gives the untreated portion of the liver and the patient time to recover before the next procedure.

Radioembolization can be a different experience. It is generally performed as an outpatient procedure and may cause less immediate pain, although fatigue can develop later and last longer.

Why Long-Term

Planning Matters

NET treatment is often more of a marathon than a sprint. A treatment may control tumors, but the care team must also consider how it affects healthy liver tissue and whether it could limit future options.

Bland or chemoembolization may sometimes be repeated if the patient previously responded well and liver function remains adequate. Radioembolization requires additional consideration of the amount of radiation previously delivered to both the tumors and normal liver.

The objective is not simply to use every available treatment. It is to use each treatment when it is most likely to provide meaningful benefit.

What About Histotripsy?

Histotripsy is a newer, noninvasive approach that uses focused ultrasound energy rather than heat, cold, or radiation to destroy targeted liver tissue.

At the time of the webinar, histotripsy had recently received FDA authorization for use in liver tumors, but the speakers emphasized that important questions remained about its role specifically in neuroendocrine tumors.

Tumor location can also affect whether histotripsy is technically possible because structures such as ribs, lungs, and air can interfere with the ultrasound pathway.

As research continues, histotripsy may become another tool available to appropriately selected patients, but its specific role in NET treatment continues to evolve.

PRRT:

Targeted Radiation Throughout the Body

While liver-directed therapies focus treatment on the liver, peptide receptor radionuclide therapy, or PRRT, is systemic. It travels through the bloodstream and can reach tumors in multiple areas of the body.

PRRT takes advantage of a characteristic found on many well-differentiated neuroendocrine tumor cells: an abundance of somatostatin receptors.

The treatment combines a molecule that binds to these receptors with a radioactive component. Once attached to the tumor cell, the radiation can damage the cell.

How Do We Know Whether PRRT Can Target a Patient's Tumors?

Before treatment, imaging determines whether a patient's tumors express the receptors PRRT needs to target.

A somatostatin receptor PET scan, such as a DOTATATE PET scan, can show how strongly tumors take up the imaging agent. In general, greater uptake indicates greater expression of the target receptor.

Importantly, not every tumor within the same patient necessarily behaves identically. For example, one lesion may have strong receptor expression while another does not, which is why careful imaging review is essential when deciding whether PRRT is appropriate.

What Does PRRT Treatment Involve?

The standard PRRT schedule discussed in the webinar consists of **four treatments approximately eight weeks apart**.

Although administration of the radioactive therapy itself takes about 30 minutes, the overall appointment generally takes several hours.

Patients also receive an amino acid infusion before and after PRRT, which helps protect the kidneys by reducing the amount of radiation they reabsorb.

Blood tests are monitored between treatments to evaluate how the body is tolerating therapy, particularly the bone marrow, kidneys, and liver. Depending on those results, treatment may occasionally need to be delayed, adjusted or stopped.

What Happens When You Go Home?

Because some radiation leaves the body through urine after treatment, patients receive instructions about temporary precautions at home.

THESE MAY INCLUDE: _____



Following careful bathroom hygiene



Washing hands thoroughly



Taking precautions with bodily fluids



Limiting prolonged close contact with young children and pregnant people for the recommended period

These precautions do not mean that patients need to completely isolate themselves after treatment. Your nuclear medicine team will provide specific instructions based on your treatment and individual circumstances.

Looking Ahead

The Future of PRRT

Current PRRT uses lutetium-177, a radioactive isotope that emits beta radiation. Researchers are studying new ways to make radionuclide therapy even more targeted and effective, including investigating different molecules that bind to NET cells as well as radioactive materials that emit alpha particles.

Alpha-emitting therapies may deliver greater energy over a shorter distance, potentially increasing their ability to damage tumor cells. However, researchers must also understand their potential effects on healthy tissue.

Clinical trials are continuing to explore how these treatments may fit into NET care and how they might eventually be sequenced with existing therapies.

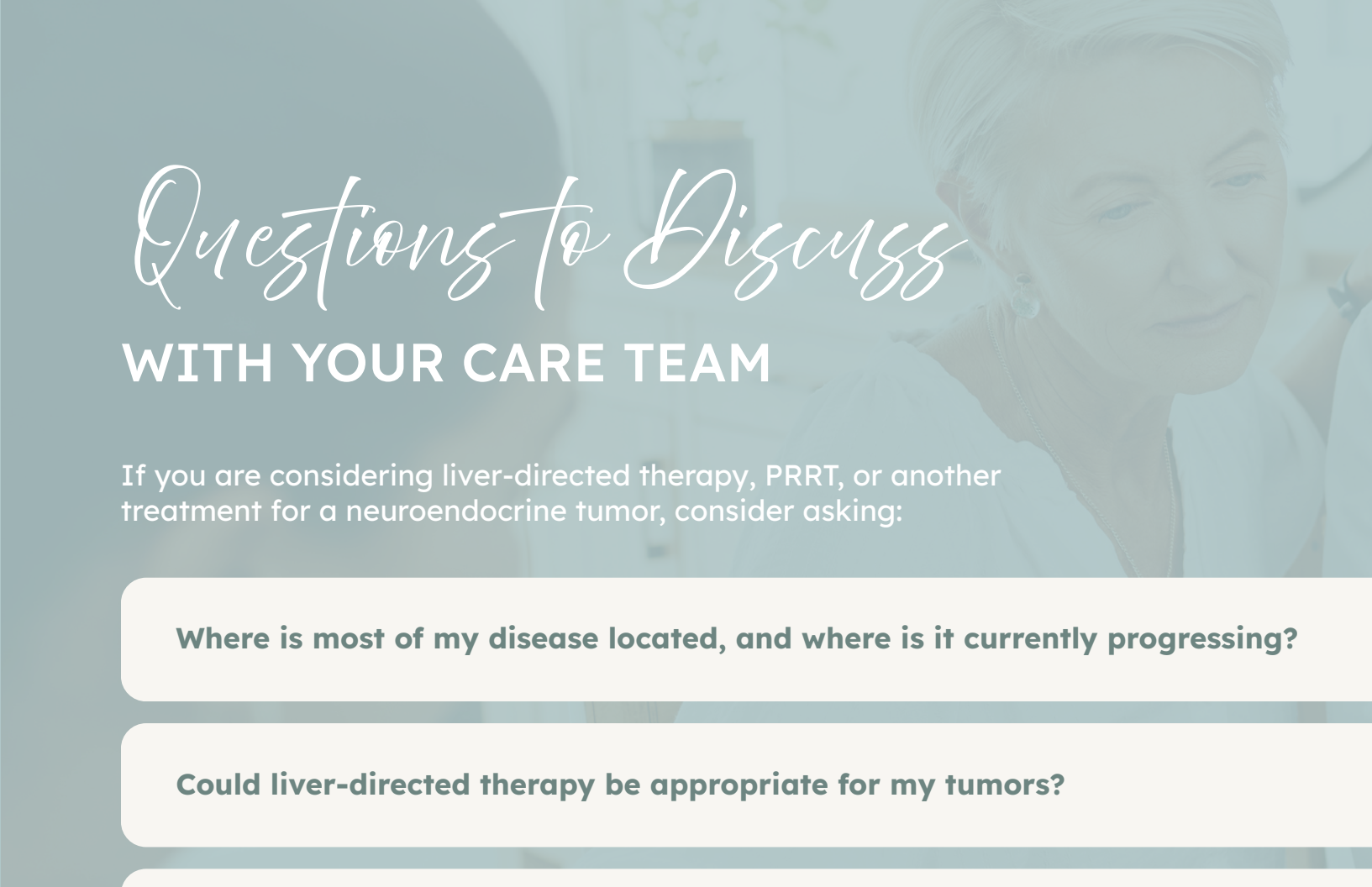
LOCAL OR SYSTEMIC TREATMENT?

Liver-directed therapy may be considered when:

Disease is primarily changing in the liver, individual liver tumors can be targeted, or liver tumor burden is contributing to hormone-related symptoms.

PRRT may be considered when:

Disease is present in multiple areas of the body and imaging demonstrates sufficient somatostatin receptor expression for the treatment to target. These are not absolute rules, and a patient’s care team will individualized based on their complete clinical picture.



Questions to Discuss WITH YOUR CARE TEAM

If you are considering liver-directed therapy, PRRT, or another treatment for a neuroendocrine tumor, consider asking:

Where is most of my disease located, and where is it currently progressing?

Could liver-directed therapy be appropriate for my tumors?

Would ablation or embolization be an option for me?

Could treatment help control hormone-related symptoms and tumor growth?

Does my somatostatin receptor imaging suggest that I may be a candidate for PRRT?

What side effects and recovery should I expect?

How could this treatment affect my future treatment options?

Would my case benefit from review by a multidisciplinary NET team?

Connect, Understand, and
Move Forward with FLaNET Care

FLaNET: Neuroendocrine Cancer Community

We know that living with a neuroendocrine tumor means facing many treatment decisions, and those decisions can become more complex as new therapies and technologies become available.

At FLaNET, we are committed to helping patients and caregivers better understand their options through clear educational resources, expert-led discussions, and connection with the NET community.

Understanding **why** a particular treatment is being recommended can help you ask informed questions and work alongside your care team to make decisions that reflect both your needs today and your long-term treatment plan.



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