

## Standardized Nursing Care Plan for Patients with Metastatic Neuroendocrine Tumor and Radiometabolic Therapy with <sup>177</sup>Lutetium-Dotatate

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**Received:** February 25, 2020; **Published:** August 29, 2020

### Abstract

**Objective:** The general objective is to describe the nursing care and possible complications of patients with neuroendocrine tumor treated with <sup>177</sup>Lutetium-Dotatate at the Day Hospital of the Nuclear Medicine Service of the Hospital Universitari de Bellvitge.

**Method:** A description is made of the standardized procedure of nursing work in patients with metastatic neuroendocrine tumor treated with <sup>177</sup>Lutetium-Dotatate admitted to the Nuclear Medicine Service of the Hospital Universitari de Bellvitge.

**Results:** The specialized nurse of radiometabolic therapy performs the reception of the patient. She is responsible for the correct preparation of the patient and administration of <sup>177</sup>Lutetium-Dotatate. Performs vital signs and the insertion of two peripheral catheters to administer premedication, amino acids and <sup>177</sup>Lutetium-Dotatate. The nurse controls the possible complications: the risk of multiorgan toxicity, the risk of hetero-irradiation, the risk of local reaction in the area of administration and the risk of anxious depressive syndrome.

**Conclusion:** The standardization of nursing care ensures the quality of health care in patients with metastatic neuroendocrine tumor who are treated with <sup>177</sup>-Lutetium. The nurse individualizes the care through clinical judgment and performing interventions such as support for decision-making, counseling, information, strengthening of safety, reducing the number of unnecessary procedures, reducing variability in clinical practice and the accompaniment to the patient.

**Keywords:** Neuroendocrine Tumors; Lutetium Dotatate; Nursing Care and Specialized Nurse

### Abbreviations

NET: Neuroendocrine Tumor; HUB: Hospital Universitari de Bellvitge; ICS: Institut Català de la Salut; ARES: Program for Harmonization of Standards of Priests

**Citation:** Inmaculada Bonilla Aguilar, *et al.* "Standardized Nursing Care Plan for Patients with Metastatic Neuroendocrine Tumor and Radiometabolic Therapy with <sup>177</sup>Lutetium-Dotatate". *EC Nursing and Healthcare* 2.9 (2020): 98-102.

## Introduction

Neuroendocrine tumors (NET) are a group of rare cancers that represent 0.46% of gastrointestinal and bronchopulmonary neoplasms [1]. They are a heterogeneous group of malignant tumors that can originate in the pancreas, lungs, ovaries, the thyroid, pituitary gland and adrenal glands, being found more frequently in the gastrointestinal system [1].

These tumors are characterized by the ability to produce peptides, causing carcinoid syndrome. This syndrome produces symptoms such as diarrhea, bronchospasm, facial skin redness, hot flashes and heart valve disease [1-3] that is, they mimic a wide variety of disorders causing a delay in early diagnosis of up to 7 years [3]. This facilitates the vast majority to progress to metastatic disease. Up to 71% of patients have metastases when NET is diagnosed [4]. In patients with metastases, the combination of slow disease progression and hormonal production produce debilitating symptoms with a great impact on their quality of life patients [1].

At European level, van der Zwan, *et al.* [5], in the context of a rare cancer project in Europe (RARECARE), analyzed a total of 20,000 cases of NET and detected an overall incidence rate of 25/1,000,000, being higher in patients older than 65 years. Nationally, García Carbonero, *et al.* [6], published the first results, representing all regions of Spain. Of the 837 patients evaluated, 55% were men and 45% women with a mean age at diagnosis of 59 years. At the time of diagnosis, 44% presented distant metastases and the most frequent organ of metastases was the liver in 42% of cases. The 5-year survival of the diagnosis was 75.5%.

The treatment of NET depends on the size of the tumor, the anatomic location of the primary tumor and the patient's clinical status [7]. Radical surgery is the main treatment, including resection of the primary tumor and liver metastases if appropriate [8,9]. Therefore, there are therapies such as trans arterial chemoembolization or radioembolization to treat unresectable liver metastases [7].

Most NETs express somatostatin receptors and can therefore be treated with somatostatin analogues. Somatostatin is a peptide hormone that has inhibitory effects on exocrine secretion and also reduces intestinal motility, gallbladder contraction and blood flow of the gastrointestinal tract [7]. The most frequent treatment is usually with Octreotide-LAR (compound synthetic derived from somatostatin) but there are other analogs such as lanreotide acetate, both administered subcutaneously. Chemotherapy is the treatment for tumors with rapid progression and when other treatments fail. Somatostatin analogs can be labeled with a radiopharmaceutical allowing the performance of somatostatin receptor scintigraphy and in turn the treatment of the tumor if it is positive [7].

Among the radiolabeled analogs is the <sup>177</sup>Lutetium-Dotatate radiopharmaceutical with a semi-disintegration period of 6,647 days. <sup>177</sup>Lutecio is a medium-energy beta emitting radioisotope, with a maximum penetration in the tissue of 2 mm. Radiation is almost exclusively limited to tumor cells protecting healthy tissue. It also emits low energy gamma radiation, allowing imaging and dosimetry studies after administration. This medicine is approved for compassionate use by the European Medicines Agency (EMA) and the American Medicines Agency (FDA) for the treatment of patients with NET. These therapies are usually performed in patients with inoperable NET or with metastases [10].

In 2017, a phase III multicenter randomized trial was published in which 41 centers from 8 different countries participated, including Hospital Universitari de Bellvitge (HUB). This trial evaluated the efficacy and safety of <sup>177</sup>Lutetium in 229 patients with midgut NET and metastasis. They showed lower disease progression in 79% of those treated with said radiopharmaceutical, therefore the results of the intermediate analysis suggest a longer overall survival of the patient with <sup>177</sup>Lutetium-Dotatate than with high doses of octreotide-LAR [11].

In 2007, in the context of the Argos project for the computerization of medical records in the hospitals of the Institut Català de la Salut (ICS), the Program for the Harmonization of Nursing Standards (ARES) of the ICS hospitals was initiated. One of the objectives of this program is to develop and implement a care information system as part of the electronic medical record. Standardized care plans have been

constructed using the ATIC interface terminology. To ensure a more effective and safe care provision of patients with NET in HUB in 2017, the standard care plan Day Hospital Outpatient treatment was created with <sup>177</sup>-Lutetium-Dotatate [12].

### Objective of the Study

The general objective of the present study is to describe the standard nursing care and possible complications of patients with NET treated with <sup>177</sup>Lutetium-Dotatate at the HUB Nuclear Medicine Service Day Hospital.

### Materials and Methods

249 articles found in databases were reviewed: Pubmed, Cinahl, SCOPUS and Cochrane Library with the keywords: neuroendocrine tumors, lutetium dotatate and nursing care. Articles published during the years 2007-2017 in English and Spanish were reviewed. 6 sessions were held with doctors specialists and nurses to perform the standardization of nursing care.

### Results and Discussion

To provide better care to patients with NET, the care of a specialized nurse from diagnosis to treatment and management of symptoms is crucial. This professional acts as a liaison many times among the various members of the multidisciplinary team. It is common for patients to be confused by the number of health professionals involved in their care. This professional can alleviate that anguish and become the person of trust of the patient during the whole process of his illness. They will also be competent in the administration of metabolic therapy and subsequent monitoring. They should be aware of the radiation protection standards and follow the rules to ensure that patients receive safe and high quality care due to the great complexity of the treatment [13].

**Nursing interventions in the pre-treatment phase:** The specialized nurse of radiometabolic therapy performs the reception of the patient following the protocol of the Day Hospital of care. She is responsible for the correct preparation of the patient and administration of <sup>177</sup>Lutetium-Dotatate. Values if the patient is a candidate for treatment during the scheduled session. Within the initial assessment, the patient is weighed and, in the case of a woman, of childbearing age, a pregnancy test is performed [14]. Prior to the administration of the drug, the patient's allergies are checked, the taking is made of vital signs and the insertion of two peripheral venous catheters. The corresponding premedication is administered, and the infusion of amino acids is started for four hours. Half an hour after starting the amino acids, <sup>177</sup>Lutetium-Dotatate is infused according to the standard working procedure [14].

**Nursing interventions in the trans-treatment phase:** Surveillance of possible complications described in the standard of care is included:

1. The risk of multi-organ toxicity, vital signs, mental state, pain, temperature, skin and mucous membranes will be controlled during administration [12].
2. The risk of heteroirradiation, it is recommended that patients treated with <sup>177</sup>Lutetium-Dotatate remain in the Day Hospital room for approximately 8 to 10 hours, the dose rate will be measured. After administration, it is advisable to drink plenty of water to maintain good hydration [12].
3. The risk of local reaction in the area of administration, may experience an inflammatory, vascular or hypersensitivity response by the administration of a medication parenterally, strict control of the catheter insertion area will be performed [12].
4. The risk of anxious depressive syndrome is contemplated with interventions such as active listening and help in the reconstruction of the patient's emotions [12].

**Interventions nurse's post-treatment:** It is important to take into account the recommendations and care at discharge in these patients, throughout the process the nurse performs health education [12]. The possible complications, diet and medication to be followed will be

explained. The patient will be discharged if: his vital signs are correct, absence of complications and the radiation emitted at discharge is within the acceptable limit (dose rate if < 40 Sv/h) [12].

The Royal Free Hospital in London in 2003 established that the nursing specialist for patients with NET contributed to greater patient well-being, through health education, skill in technical knowledge, thereby increasing the clinical safety of the patient. These professionals are nurses with expert knowledge, with the ability to execute complex decisions and that maximize the use of specialized skills necessary for professional practice within the context of a patient with NET [15].

A pilot study conducted in Norway in 2013 aimed to conduct an educational intervention on the self-efficacy of patients with NET, examining whether such intervention had effects on stress and quality of life. The intervention focused on creating discussion groups for patients to learn about the disease, the side effects of treatments, motivation training and problem-solving strategies in relation to NET. The final result established that the educational intervention improved stress and quality of life in patients affected by NET [16].

In a systematic review of 48 studies in 2016 they report that there is a growing interest in the evaluation of the quality of life of patients with NET, as it is part of the therapeutic objectives of this type of patients [17]. Scientific evidence shows deficiencies methodological, both in the processing and in the presentation of quality of life data. It is because the quality of life is usually included as a result of clinical trials [18].

## **Conclusion**

The standardization of nursing care ensures the quality of health care in patients with metastatic neuroendocrine tumor receiving treatment with <sup>177</sup>Lutetium-Dotatate. In addition, it helps to individualize care in the pre, trans and post-treatment phase and the performance of interventions adapted to each of the stages such as support for decision making, advice, information, safety enhancement, reduction of the number of unnecessary procedures, reduction of variability in clinical practice and the presence or accompaniment of the patient.

The lines of future research should be directed to experimental studies that measure the impact of a nursing educational intervention on the quality of life, decrease in comorbidities and decrease in anxiety and symptoms associated with metastatic NETs and in radiometabolic therapy with <sup>177</sup>Lutetium-Dotatate.

## **Acknowledgments**

To Dr. Vercher and Rosa Soldevila for making this project possible, for their involvement and unconditional support. To Cristina Munuera, Noemí Torres and David Coca for excellent care for patients with neuroendocrine tumor at the University Hospital of Bellvitge.

## **Conflict of Interest**

The present investigation has not received specific aid from public sector agencies, commercial sector or non-profit entities. No conflicts of interest.

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**Volume 2 Issue 9 September 2020**

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