



Almost Complete Response with a Single Administration ^{225}Ac -DOTATATE in a Patient with a Metastatic Neuroendocrine Tumor of Unknown Primary

Primeri Bilinmeyen Metastatik Nöroendokrin Tümörlü Hastaya Tek Doz ^{225}Ac -DOTATATE Uygulaması Sonrası Tam/Tama Yakın Yanıt

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Abstract

Neuroendocrine tumors (NETs) are being seen increasingly frequently, and the only known curative treatment method is surgical resection. Peptide receptor radionuclide therapy (PRRT) is a treatment option that the most contributes to progression-free survival and overall survival in metastatic cases. β -emitting radionuclides are traditionally used for PRRT. Nowadays, alpha particle-emitting radionuclides are being developed, with advantages in terms of very high energy and a short path length, which should theoretically show higher efficacy. In this case; in a patient with NET diagnosis who had multiple (>50) lesions in the abdomen, almost all the lesions disappeared with a single dose application. This paper aims to present a case in which we observed the efficacy of ^{225}Ac -DOTATATE treatment, which is an alpha treatment.

Keywords: ^{225}Ac targeted alpha therapy, neuroendocrine tumors, peptide receptor radionuclide therapy

Öz

Nöroendokrin tümörler (NET) son yıllarda giderek artan hızda ortaya çıkmakta olup bilinen tek küratif tedavi yöntemi cerrahi rezeksiyondur. Peptid reseptör radyonüklid tedavisi (PRRT) ise metastatik olgularda progresyonsuz sağkalımı ve genel sağkalıma en çok katkı sağlayan bir tedavi seçeneğidir. Ancak PRRT’de en sık tercih edilen ^{177}Lu radyonüklit bir beta partikül yayıcısıdır. Son zamanlarda radyobiyojik özellikleri daha güçlü olan, yüksek enerjili ve kısa menzilli avantajı sunan ^{225}Ac gibi alfa ışını yayan radyonüklidler ile PRRT’nin yapılması gündeme gelmiştir. Bu olguda; batin içerisinde çok sayıda (>50) lezyonları olan NET tanılı hastada tek doz uygulamayla lezyonların neredeyse tamamı tedavi sonrasında saptanmamıştır. Bu yazının amacı bir alfa tedavi olan ^{225}Ac -DOTATATE tedavisinin etkinliğini gözlediğimiz olguyu sunmaktır.

Anahtar kelimeler: ^{225}Ac hedeflendirilmiş alfa tedavisi, nöroendokrin tümörler, peptid reseptör radyonüklid tedavisi

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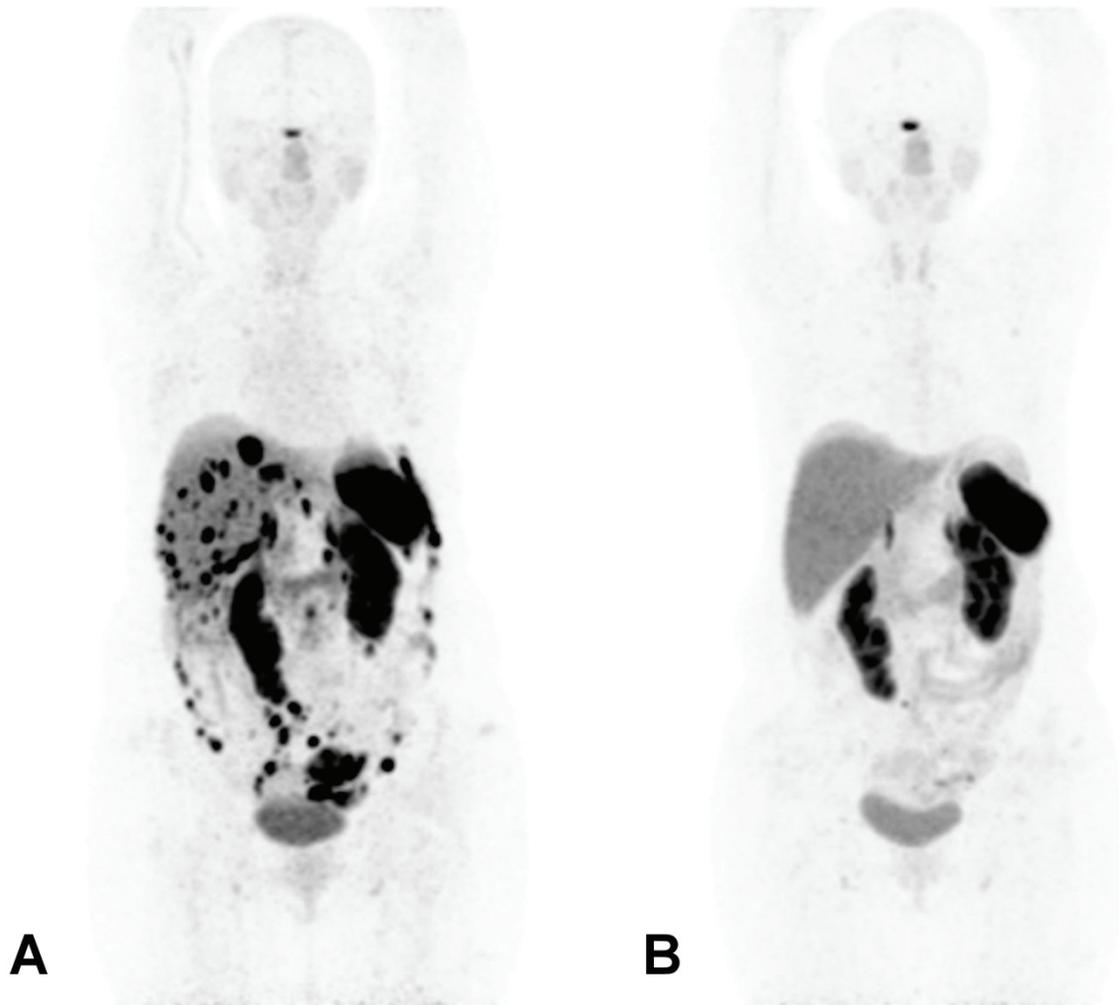


Figure 1. A 46-year-old woman was admitted to an oncology clinic with epigastric pain and weakness five years ago. Magnetic resonance imaging showed a retroperitoneal mass lesion along with peritoneal carcinomatosis. Resection of the retroperitoneal tumor revealed a metastatic neuroendocrine tumor of an unknown primary site (WHO grade 2). After carboplatin and etoposide treatment, thermal ablation and hyperthermic intraperitoneal chemotherapy, which to control the disease for 4 years, the recurrence was observed based on up-to-date ^{68}Ga DOTATATE PET/CT scan examination (somatostatin receptor positive more than 50 lesions in abdomen, liver and peritoneal space). For this purpose, the patient was referred to our department for ^{177}Lu DOTATATE treatment. After several investigations with consideration the specific conditions of the patient, a single administration of 10 MBq ^{225}Ac Ac-DOTATATE was administered to the patient as treatment. The radiopharmaceutical was injected slowly for 5 minutes. To lower radiation-absorbed doses of the kidney, an amino acid solution started 30-60 minutes before treatment and maintained for 4 hours according to the recommendations of current peptide receptor radionuclide therapy (PRRT) guidelines. The patient had a slow onset of abdominal pain which was resolved after corticosteroid treatment. The results of the post therapy ^{68}Ga DOTATATE positron emission tomography/computed tomography scan, which was performed 3 months after the therapy, showed almost complete response. All lesions in the abdomen with the exception of 5 mm lymph node in the paraaortic area disappeared.

Among the various therapeutic options, PRRT such as radioactive labeling DOTATATE conjugate molecule is highly effective and a well-tolerated therapy, improving progression-free survival and probably overall survival (1). Despite the multiple treatment options in NET, a considerable number of patients are found to be non-responders to the available therapy options. In this group, the use of high linear energy transfer (LET) alpha-emitting radioisotopes such as ^{225}Ac and ^{213}Bi instead of low LET beta-emitting radioisotopes like ^{90}Y and ^{177}Lu is a promising option (2,3,4). Although there are not enough studies on this topic in the literature, limited studies have shown that ^{225}Ac -DOTATATE is a promising treatment option, which adds a new dimension in patients especially who are refractory to ^{177}Lu -DOTATATE (5). Our case was the first case who received actinium in the first step and almost complete response at a single dosage in the PubMed.

Ethics

Informed Consent: Obtained from the patient.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: L.K., N.A.S., E.D., Concept: L.K., Design: N.A.S., E.D., Data Collection or Processing: E.D., T.T., M.O., S.E., Analysis or Interpretation: T.T., M.O., Literature Search: T.T., M.O., Writing: L.K., N.A.S., E.D., T.T., M.O.

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