CASE REPORT

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Lung Adenocarcinoma and Hyperamylasemia Associated with Paraneoplastic Syndrome: A Case Report

Akciğer Adenokarsinomu ve Paraneoplastik Sendrom ile Birlikte Görülen Hiperamilazemi

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ABSTRACT

Paraneoplastic syndromes are systemic manifestations arising from tumor-associated biochemical or immunologic effects, occurring independently of direct tumor invasion. While common paraneoplastic syndromes such as hypercalcemia and hyponatremia are frequently observed in lung cancer, hyperamylasemia is a rare phenomenon, particularly associated with metastatic lung adenocarcinoma. A 67-year-old male presented with complaints of fatigue and shortness of breath. Laboratory investigations revealed elevated serum amylase (1330 U/L). The patient had no abdominal symptoms, and imaging showed no pancreatic pathology. Chest computed tomography identified a spiculated lesion in the left upper lobe of the lung, and biopsy confirmed a diagnosis of lung adenocarcinoma. Additional evaluations found no other cause for the amylase elevation, leading to a diagnosis of paraneoplastic hyperamylasemia. Following chemotherapy with carboplatin and paclitaxel, a significant reduction in serum amylase levels was observed, alongside partial tumor regression. This case highlights hyperamylasemia as a rare paraneoplastic syndrome in lung adenocarcinoma. Unexpected biochemical abnormalities in cancer patients should be evaluated as potential paraneoplastic syndromes associated with malignancy and closely monitored. In this case, the decrease in amylase levels following chemotherapy supports a paraneoplastic etiology.

Keywords: Hyperamylasemia, lung adenocarcinoma, paraneoplastic syndrome

ÖZ

Paraneoplastik sendromlar, kanserin doğrudan invazyonu olmaksızın, tümörle ilişkili biyokimyasal veya immünolojik etkiler sonucu ortaya çıkan sistemik belirtilerdir. Hiperkalsemi ve hiponatremi gibi yaygın paraneoplastik sendromlar akciğer kanserinde sık görülürken, hiperamilazemi nadir bir fenomen olup özellikle metastatik akciğer adenokarsinomunda izlenebilir. Altmış yedi yaşında erkek hasta, halsizlik ve nefes darlığı şikayetleriyle başvurdu. Yapılan laboratuvar incelemelerinde serum amilaz yüksekliği (1330 U/L) tespit edildi. Hastanın abdominal şikayeti yoktu ve görüntülemelerde pankreasa ait patoloji izlenmedi. Toraks bilgisayarlı tomografide sol akciğer üst lobunda spiküle kenarlı lezyon saptandı; biyopsi ile akciğer adenokarsinomu tanısı doğrulandı. Ek incelemeler sonucunda amilaz yüksekliğine başka bir neden bulunamadı ve paraneoplastik hiperamilazemi tanısı düşünüldü. Hastaya uygulanan karboplatin ve paklitaksel ile kemoterapi sonrası serum amilaz seviyelerinde belirgin düşüş gözlendi ve tümörde kısmi gerileme sağlandı. Bu olgu, akciğer adenokarsinomunda nadir görülen bir paraneoplastik sendrom olan hiperamilazemiyi vurgulamaktadır. Kanserli hastalarda beklenmeyen biyokimyasal anormallikler maligniteye bağlı paraneoplastik sendromlar olarak değerlendirilmeli ve izlenmelidir. Bu olguda kemoterapi ile amilaz seviyesindeki düşüş paraneoplastik etiyolojiyi desteklemektedir

Anahtar Kelimeler: Hiperamilazemi, akciğer adenokarsinom, paraneoplastik sendrom

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INTRODUCTION

Paraneoplastic syndromes are systemic manifestations that arise without direct tumor invasion, due to biochemical substances secreted by tumor cells or an immune response to the tumor. These syndromes can be the first sign of disease in some types of cancer and can play a significant role in early diagnosis. Lung cancers, particularly non-small cell lung cancer of the adenocarcinoma type, can be associated with various paraneoplastic syndromes[1-3]. Although hypercalcemia and hyponatremia are common paraneoplastic syndromes in lung cancer patients, hyperamylasemia is quite rare and is seldom reported in non-pancreatic tumors[4,5]. Hyperamylasemia associated with non-pancreatic organs is rarely reported, particularly in lung cancer cases. This article presents a patient with lung adenocarcinoma who presented with elevated serum amylase. Despite no pancreatic pathology in the patient, the high serum amylase level was evaluated as paraneoplastic hyperamylasemia. Given the limited number of similar cases in the literature, this case aims to raise awareness about the diagnosis, differential diagnosis, and management of paraneoplastic hyperamylasemia.

CASE REPORT

A 67-year-old male patient presented with increasing fatigue, weakness, and shortness of breath over the past months. The patient had a 45 pack-year smoking history but no alcohol use. Physical examination was within normal limits; there was no abdominal tenderness, and no complaints of abdominal pain. Routine biochemical tests revealed elevated serum amylase level (1330 U/L). The patient was admitted for further evaluation. Due to the absence of abdominal pain history and no pathology in the pancreas on abdominal ultrasound and computed tomography (CT) examinations, a pancreatic cause was not considered (Figure 1,2).

Thoracic CT examination revealed a 6 cm lesion with spiculated margins in the left upper lobe of the lung. Tru-cut biopsy from this lesion resulted in a diagnosis of lung adenocarcinoma (Figure 3-5). Fluorine-18 fluorodeoxyglucose positron emission tomography/CT showed a primary lesion in the left upper lobe with maximum standardized uptake value (SUV_{max}) value of 10.2 and 6.6 cm in size, as well as multiple metastatic lesions measuring 1.5-2 cm in both lung parenchyma (Figure 6).

To exclude other possible causes of hyperamylasemia, ultrasonography of the salivary glands and polyethylene glycol precipitation tests for macroamylasemia were performed. Both examinations were evaluated as normal. Spot urine and 24-hour urine amylase levels were found to be high, suggesting that the amylase elevation was due to overproduction. In the differential diagnosis, no abnormality was detected in the patient's kidney and thyroid function tests to exclude other causes of hyperamylasemia. Plasma and urine catecholamine levels, liver function tests, and alfa-fetoprotein values were within normal limits for the differential diagnosis of other causes of hyperamylasemia such as pheochromocytoma and hepatocellular cancer, and no pathology was seen in the relevant organs on imaging. The patient's performance status was evaluated as 1, and oxygen dependency was present. The patient, with negative driver mutations, was started on a three-month chemotherapy regimen with weekly carboplatin and

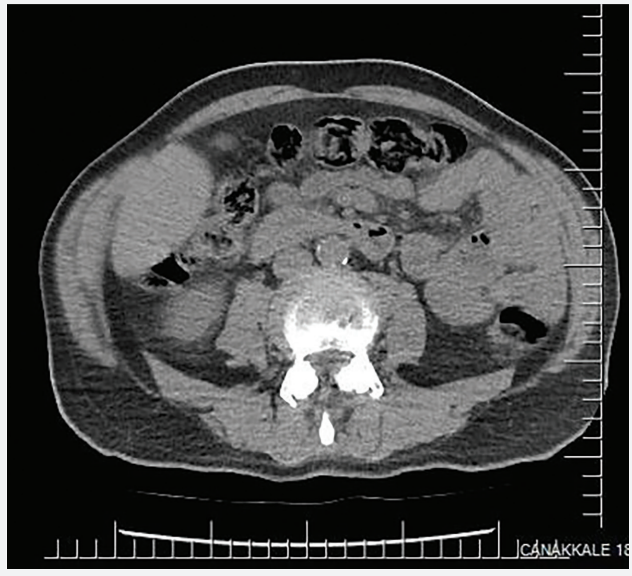

Figure 1. Normal pancreatic CT image at diagnosis
CT: Computed tomography

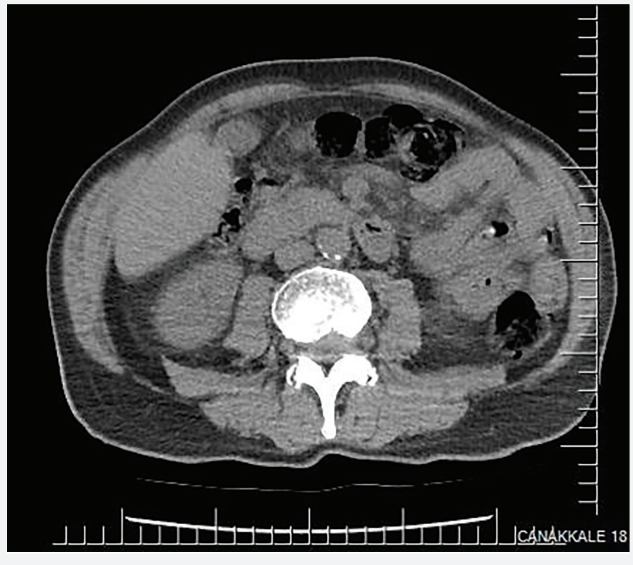

Figure 2. Normal pancreatic CT image at diagnosis
CT: Computed tomography

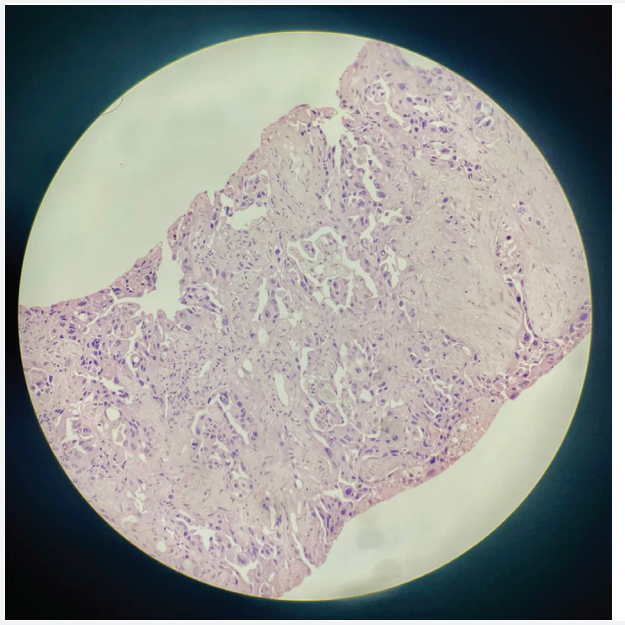

Figure 3. Pathological biopsy image of lung adenocarcinoma at diagnosis (hematoxylin-eosin x10)

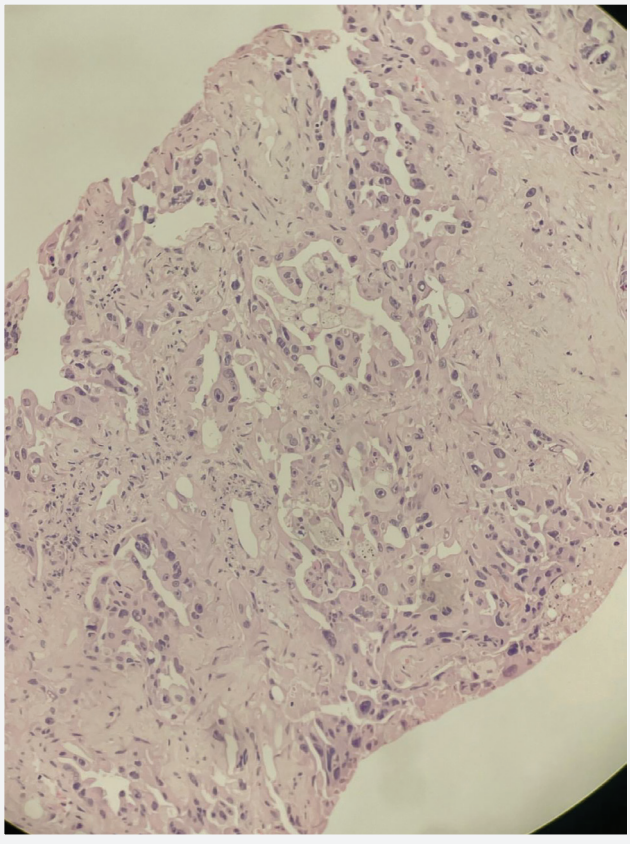

Figure 4. Pathological biopsy image of lung adenocarcinoma at diagnosis (hematoxylin-eosin ×20)

paclitaxel. Serum amylase levels were monitored weekly during the treatment. Post-treatment controls after three months showed that the primary lesion in the lung had shrunk to 3 cm, the SUV_{max} value decreased to 5.8, and there was significant

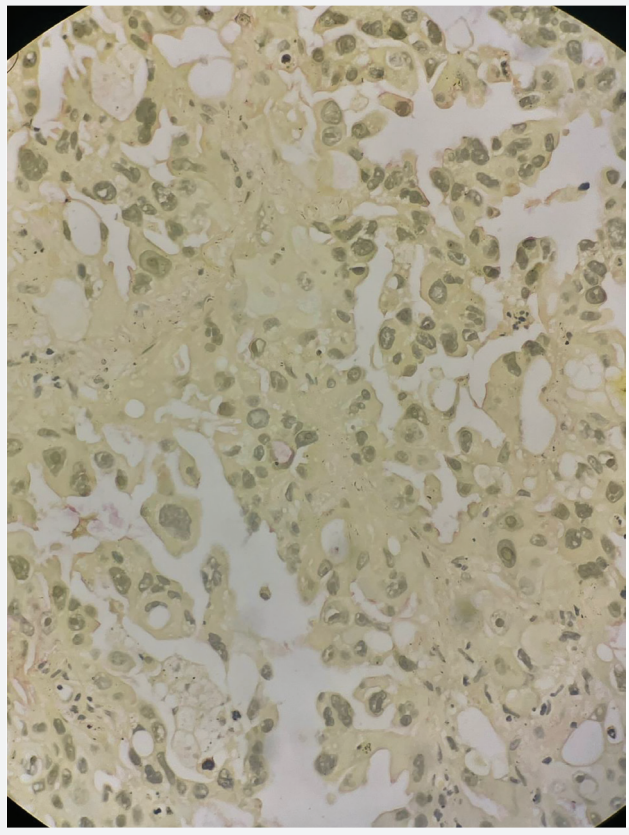

Figure 5. Pathological biopsy image of lung adenocarcinoma at diagnosis (mucin stain ×40)

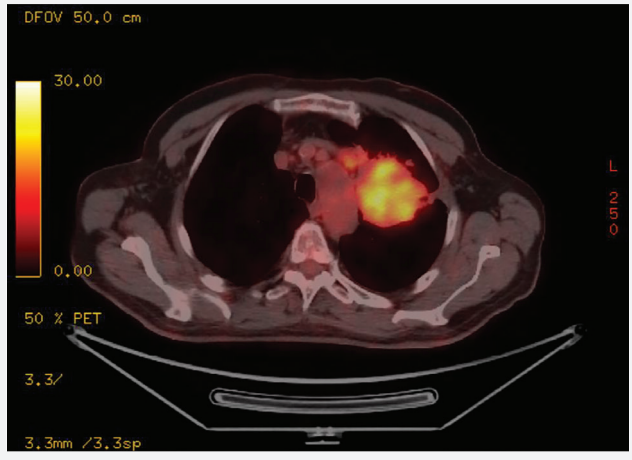

Figure 6. PET-CT image at diagnosis (04/04/2024) showing the primary lesion in the lung

PET-CT: Positron emission tomography-computed tomography

regression in metastatic lesions (Figure 7). The serum amylase value, which was 1330 U/L before treatment, dropped to 173 U/L at the end of treatment (Figure 8).

Patient Perspective

The patient stated that increasing fatigue and shortness of breath in recent months made daily activities difficult and negatively affected quality of life. Initially, the patient thought these symptoms were due to smoking, but sought medical help as complaints worsened. The diagnosis of lung cancer and the report of high serum amylase levels were unexpected and challenging for both the patient and family. The patient was explained that cancer can cause some side effects called paraneoplastic syndromes, and that amylase elevation could be part of this syndrome. The decrease in serum amylase levels and tumor sizes during weekly chemotherapy treatment increased the patient's faith in the treatment and strengthened hopes for the future. The patient understood the importance of closely monitoring amylase levels during treatment and expressed that this process provided great confidence in terms of health. Informed consent was obtained from the patient.

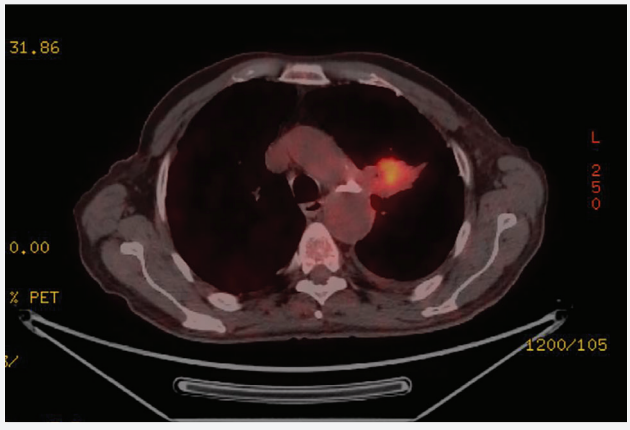

Figure 7. PET-CT image after treatment (20/09/2024) showing the responding lesion in the lung

PET-CT: Positron emission tomography-computed tomography

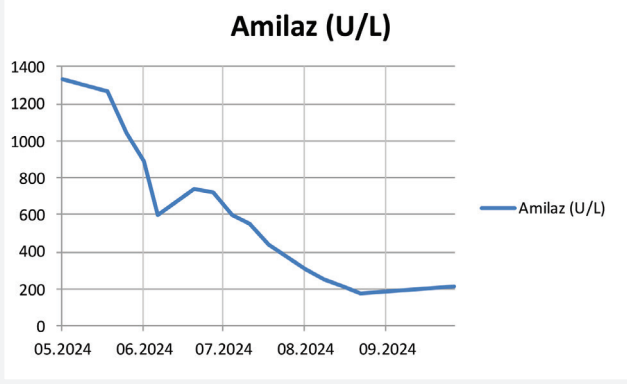

Figure 8. Change in amylase levels with treatment

DISCUSSION

Paraneoplastic syndromes are systemic manifestations in cancer patients resulting from biochemical or immunological changes related to the tumor, often due to substances secreted by tumor tissue. These syndromes are important indicators that can complicate or delay diagnosis in the early stages of cancer. Lung adenocarcinoma is a type of cancer that can be associated with paraneoplastic syndromes. While common paraneoplastic syndromes include hypercalcemia, hyponatremia, Cushing's syndrome, and neurological disorders, hyperamylasemia is a rarer finding[3,6]. In reported cases in the literature, associations with other paraneoplastic syndromes have also been seen; cases involving the salivary glands or pancreas, amyloidosis, hypercalcemia, Cushing's syndrome, hyperglycemia, hypocalcemia, elevation in liver enzymes, etc., have been reported. In our reported case, there was no additional paraneoplastic pathology, and even in similar cases reported in the literature, amylase values as high as in our case were rarely encountered[7-10]. Hyperamylasemia is usually associated with pancreatic diseases, but it can also occur in tumors of non-pancreatic organs. In some cancers like lung adenocarcinoma, especially in metastatic disease, elevated serum amylase levels can emerge as a paraneoplastic phenomenon. In the literature, there are limited case reports of hyperamylasemia associated with lung cancer, and the pathophysiology of this syndrome is not fully understood. However, in most of these cases, amylase levels increase without pathological conditions in the salivary glands or pancreas[5,11,12].

This case demonstrates that in a patient diagnosed with lung adenocarcinoma, serum amylase levels were high without any pathology in the pancreas or salivary glands, and this was accepted as a paraneoplastic effect of lung adenocarcinoma. The significant decrease in amylase levels in response to treatment supports this hypothesis. Paraneoplastic hyperamylasemia usually occurs in advanced stages of cancer, and monitoring biochemical abnormalities during treatment can provide important information about the patient's response to therapy. This case emphasizes the importance of recognizing the paraneoplastic effects of malignant diseases like lung adenocarcinoma and incorporating such biochemical changes into clinical management.

CONCLUSION

This case demonstrates that hyperamylasemia developing in a patient with lung adenocarcinoma, in the absence of any pancreatic or salivary gland pathology, may represent a rare manifestation of a paraneoplastic syndrome. Paraneoplastic

hyperamylasemia is considered one of the indirect biochemical effects of malignancies and, although uncommon, should be taken into account during the diagnosis and follow-up of patients with lung cancer.

In our patient, a marked decrease in amylase levels was observed following the administration of carboplatin and paclitaxel therapy, suggesting the chemosensitivity of paraneoplastic hyperamylasemia. The reduction in amylase levels was consistent with the partial regression observed in the tumor, indicating that this biochemical marker may be useful for monitoring treatment response. This case highlights that unexpected biochemical alterations in patients with lung adenocarcinoma may be associated with paraneoplastic syndromes and underscores the importance of regular monitoring of biochemical parameters during treatment. Recognition of paraneoplastic syndromes and follow-up of their biochemical markers may support the diagnostic process and provide clinical benefit in assessing treatment response.

Ethics

Informed Consent: Informed consent was obtained from the patient.

Footnotes

Authorship Contributions

Surgical and Medical Practices: Ö.Y., Concept: V.Ç., Design: V.Ç., Data Collection or Processing: V.Ç., S.C., G.U., Analysis or Interpretation: V.Ç., S.C., G.U., Literature Search: V.Ç., Writing: V.Ç., S.C., G.U.

Conflict of Interest: No conflict of interest was declared by the authors.

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