Amylase: sensitive tumor marker for amylase-producing lung adenocarcinoma

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ABSTRACT Hyperamylasemia in patients with lung cancer is rarely, comprising 1% to 3% of all lung cancers. This report describes two cases of lung adenocarcinoma coexisting with hyperamylasemia in two women aged 77 and 57, respectively. In these two cases, CT revealed a normal pancreas. We monitored the serum and urine amylase levels during therapy and found it paralleled tumor response to chemotherapy and metastasis. We suggest that the amylase levels are related to the tumor size and might be a valuable factor in predicting chemotherapy and progression of disease for amylase-producing lung cancer.

KEY WORDS Hyperamylasemia; lung adenocarcinoma; chemotherapy

J Thorac Dis 2013;5(4):E167-E169. doi: 10.3978/j.issn.2072-1439.2013.08.37

Introduction

Occasional reports have documented an association of hyperamylasemia with lung cancer, ovarian cancer, multiple myeloma and pheochromocytoma (1-4). We herein present two rare cases of amylase-producing lung adenocarcinoma, in which the serum and urine amylase levels were found to be parallel to the chemotherapy efficacy and progression of disease.

This study was approved by the Committee on the Ethics of Treatment of Human Subjects of the First Affiliated Hospital of Nanjing Medical University, and a written informed consent was also obtained from each participant.

Case report

Case 1

A 77-year-old female was diagnosed osseous metastases of lung adenocarcinoma in September 2009 with hyperamylasemia, and the isozyme pattern was salivary type. She was soon to undergo chemotherapy (zometa and cisplatin) and it caused unpleasant side effects.

She started to take the tarceva in November 2009. The serum and urine amylase levels decreased to below the cutoff range (200 and 480 U/L) in April 2010.

In August 2010, a slightly raised serum and urine amylase levels, of 227 and 480 U/L were noted. A CT scan and magnetic resonance imaging (MRI) of the brain demonstrated macroscopic metastases in the brain in November. At this time, the serum and urine amylase levels increased to 256 and 560 U/L. The same drug tarceva as that used initially was administered. However, the serum and urine amylase levels were still increased to 379 and 635 U/L in February 2011. Then she was treated with pemetrexed and bevacizumab, the serum and urine amylase level decreased (250 and 485 U/L) in March but increased soon (395 and 665 U/L) in April. CT scan and MRI showed new metastases in bone and brain and marked growth of the primary site. After treated with tarceva and paclitaxel she improved and was out of hospital. She was hospitalized again for pleural effusion in October 2011. Her condition steadily deteriorated and was dead in January 2012.

The serum tumor markers carcinoembryonic antigen (CEA; normal range, <3.4 ng/mL), neuronspecific enolase (NSE; normal range, <16.3 ng/mL), and cytokeratin19 fragment (cyfra21-1; normal range, <3.3 ng/mL) were detected at the same time. The serum and urine amylase levels fluctuated similar with the tumor markers CEA, NSE and cyfra21-1.The clinical

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Submitted Jul 31, 2013. Accepted for publication Aug 16, 2013.
Available at www.jthoracdis.com

ISSN: 2072-1439

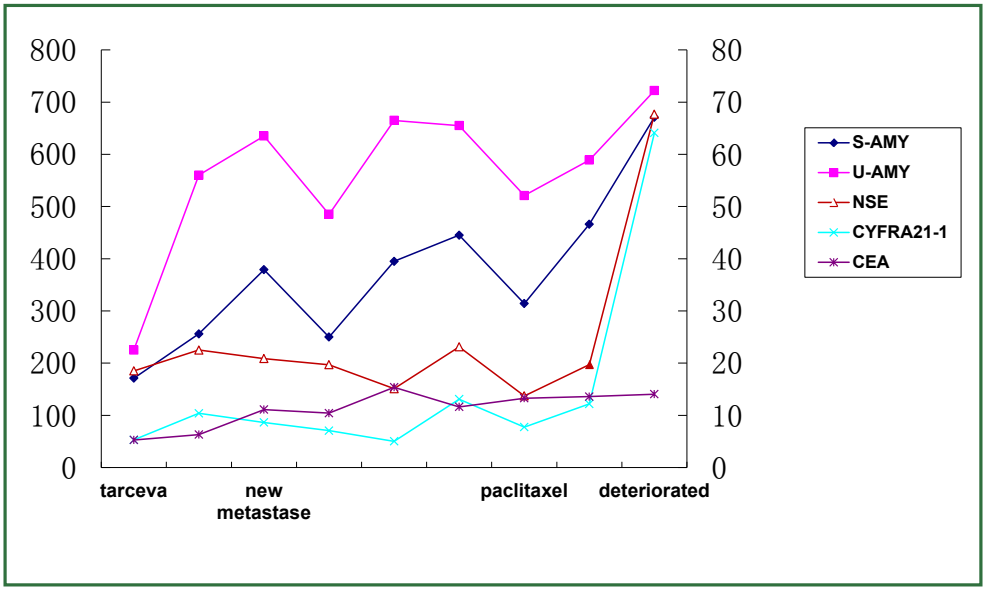

Figure 1. Serial changes in amylase and tumor marker levels (case 1).

course of the patient's serum amylase levels and tumor marker levels is indicated in Figure 1.

Case 2

A 57-year-old female was diagnosed adrenocortical carcinoma and improved after surgical treatment in 2007. She was confirmed lung metastatic adenocarcinoma by pathology in April 2010. She did not receive any treatment and macroscopic metastases were observed in the bone, liver and spleen in November 2011. At this time she received two cycles of chemotherapy with pemetrexed. However, the amylase and tumor markers maintained a high level and she finally died in February 2012.

In the development of the disease the serum amylase levels were from 553 to 679 U/L and the urine amylase levels were 589 to 721 U/L.

Discussion

Hyperamylasemia in patients with lung carcinoma is relatively rare. Previous studies support the mechanism by which lung cancer cells can produce amylase, predominantly salivary-type isoenzyme (1,5). Yanagitani N, *et al.* considered amylase might be a sensitive tumor marker for amylase-producing small cell lung cancer in their case report (1).

In our case report, hyperamylasemia was found in two lung adenocarcinoma patients and the isozyme pattern was salivary type. CT revealed a normal pancreas.

In the two cases, the serum and urine amylase levels fluctuated similar with the tumor markers CEA, NSE and cyfra21-1. The amylase and tumor markers maintained a high level when the patient's condition worsened, for example, new metastasis. The above results indicated amylase level might vary with the tumor size.

Nevertheless they fell when the anticancer drugs were effective but had no change when the chemotherapy was ineffective (Figure 1).

The amylase was cost-effective compared with the traditional lung tumor makers. Therefore it may be a better alternative tumor marker for the pathogenetic condition monitoring in amylase-producing lung adenocarcinoma.

How-Wen Ko found that the amylase levels fell after treatment with gefitinib in lung adenocarcinoma with hyperamylasemia (5). In our case 1, the amylase fell to below the cutoff range after treatment with tarceva at first. The gefitinib and tarceva are both EGFR tyrosine kinase inhibitor. These confirmed that the treatment with EGFR tyrosine kinase inhibitor is an effective therapeutic option for this rare patient subset.

According to the above, we suggest that the serum and urine amylase levels were both good tumor marker for monitoring the treatment for lung adenocarcinoma and follow-up.

Conclusions

In this report, we have described two cases of lung carcinoma with hyperamylasemia. The serum and urine amylase may be good tumor markers to chemotherapy and progression of disease for amylase-producing lung adenocarcinoma.

Acknowledgements

Funding: this work was supported by Key Laboratory for Laboratory Medicine of Jiangsu Province of China (No.

XK201114); and the Priority Academic Program Development of Jiangsu Higher Education Institutions; and National Natural Science Foundation of China (No. 81272324, 81000754, 81101322, 81201359).

Disclosure: The authors declare no conflict of interest.

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Cite this article as: Zhang J, Zhang L, Pan S, Gu B, Zhen Y, Yan J, Zhou Y. Amylase: sensitive tumor marker for amylase-producing lung adenocarcinoma. J Thorac Dis 2013;5(4):E167-E169. doi: 10.3978/j.issn.2072-1439.2013.08.37