Bronchial washing and serum amylase levels in lung cancer and pulmonary infection

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A total of 95 patients treated in Chest Diseases Department of Medical School of Gazi University and Ataturk Chest Diseases and Chest Surgery Center were included in the study as diagnostic groups of lung cancer, pulmonary infection and normal respiratory system. No statisticaly significant difference was detected in serum and bronchial washing amylase levels between the groups. Hyperamylasemia in lung cancer or in lung infection could not be detected in the study but it is concluded that more detailed evaluations as including amylase isoenzyme detections and electron microscopic examinations shoulds be performed in this field. [Turk J Med Res 1993; 11 (6): 286-288]

Keywords: Amylase, Bronchial irrigation, Lung neoplasms, Infection

Amylase is an enzyme of the digestive system which hydrolises glycose units bound to 1. and 4. carbon atoms of starch and divides is to oligosaccarides. It has a molecular weight of 40000-50000 D (1). The secretion of amilase is mainlyfrom salivary glands and zimogen granules of pancreas (2). When an amylase level of 150 SU/dl or higher in serum is detected, acute pancreatitis is the most probable diagnosis but hyperamylasemia or hyperamylasuria can accompany many diseases other than pancreatitis (3) (Table **1).**

Recent reports have emphasized on high amylase levels in serum or in pleural fluid due to pulmonary infection or lung cancer (4,5). We investigated the serum and bronchial washing amylase levels in a group of patients hospitalized in Chest Diseases Department of Medical School of Gazi University and Ataturk Chest Diseases and Chest Surgery Center.

MATERIALS AND METHODS

A total of 95 patients 81 men, 14 women without any pancreas or salivary gland disease were included in the*study. According to the diagnosis they were divided into 3 groups. The first group (I) included lung cancer patients which was also divided into 2 as with or without endobronchial lesion. The second group (II) was pulmonary infection group which included pnomonia or tuberculosis and the third group (III) included healthy subjects or the patients with non-infectious, non-malign pulmonary disease (Table 2). Patients with chronic obstructive pulmonary disease were not included in the study because of the difficulty in excluding infection.

Blood samples of the patients were taken and sent for amylase level detection to the laboratory on the same day of bronchoscopic examination. After premedication with 5 mg diazepam and atropine 1/2 Citanest was given with ultrasonic nebulizer (Hico Ultrasonat 806 F) for local anesthesia Olympus BF-IT20D flexible fiberoptic bronchoscope was used for the procedure. In patients without endobronchial lesion right middle lobe bronchial washing was performed but in the ones with endobronchial lesion the bronchus of the lesion was selected for the procedure. 50-100 cc saline was injected and aspirated for the washing.

Caraway method was used for amylase level detection in the samples. The principle of this method is that, certain amounts of enzyme hydrolises starch, addition of iodine forms a blue color which is compared to the color of a reference mixture. 60-220 U/dl is accepted as the normal range (6).

Analysis of variance is used as the statistical test for the data.

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Table 1. Causes of hyperamylasemia and hyperamylasurea.

1 - Pancreatic Disease	E) Burns
A) Pancreatitis	F) Diab. Ketoacidosis
a-Acute	G) Pregnancy
b-Chronic	H) Renal Transplant
c-Complications	I) Cerebral Trauma
B) Pancreatic Trauma	J) Drugs Morphine
C) Pancreatic Carcinoma	3-Other Abdominal Dis.
2-Nonpancreatic Disease	A) Gall bladder Dis.
A) Renal Failure	B) Perforated, Penetrated Peptic Ulcus
B) Salivary Gland Diseases	C) Intestinal Obstr. Infarction
a-Mumps	D) Ruptu rated Ectopic Pregnancy
b-Stone	E) Peritonitis
c-Radiation Sialadenitis	F) Aortic Anevrism
d-Maxillofacial Surgery	G) Chronic Liver Dis.
C) Tumor Hyperamilasemia	H) Postoperative Hyperamylasemia
a-Lung cancer	
b-Oesophagus cancer	
c-Breast, over ca	
D) Macroamylasemia	

Table 2. Diagnostic groups of the patients.

	Women		Men		Total	
Diagnostic	Number	%	Number	%	Number	%
Lung Cancer	3	5.6	51	94.4	54	100.0
PI. Infection	4	15.4	22	84.6	26	100.0
Normal	7	46.7	8	53.3	15	100.0
Total	14	14.7	81	85.3	95	100.0

RESULTS

The patient population included 14 women and 81 men with the mean age 54.4 (20-80). The distribution of the subtypes of 54 lung cancer patients is seen in Table 3. In 34 out of 54 patients endobronchial lesion was present in bronchoscopic view. The patients as 34 with and 20 without endobronchial lesion were examined as two different groups (Group IA and IB). In 7 patients lung cancer subtype could not be exactly detected. In these patients the diagnosis relied on clinical, radiologic and bronchoscopic Signs. In 6 lung cancer patients the diagnosis relied on clinical, radiologic and bronchoscopic signs. In 6 lung cancer patients grouped as others, 1 had malign mesothelioma, 1 had anaplastic carcinoma and 4 had carcinoid tumor.

In the group II with pulmonary infection a total of 26 patients which included 10 pulmonary tuberculosis, 13 pneumonia, 2 complicated (infected) hydatic cyst, 1 lung abcess were present.

III. Group covered 15 patients with 11 normal pulmonary system, 2 pneumoconiosis, 2 noncomplicated hydatic cyst.

Among the four groups there were no significant difference with regard to age and sex. Table 4 shows the mean serum amylase levels of the groups. There is no statisticaly significant difference (F:0.779, p>0.05).

DISCUSSION

The importance of the lung with regard to hyperamylasemia was first emphasized by Takano in 1938, as he had found high amilase activity in the left ventricule of rabbit in comparison to the right side (7). Later many investigaters looked for hyperamylasemia with pulmonary disease.

As it is well known amylase is an enzyme that divides glucose polymers to oligosaccarides. There are two types of amylase according to the origin: 1-P type isoamylase that comes from pancreas, 2- Non-pancreatic S type isoamylase (Salivary gland).

In healthy subjects 35-45% P type amilase is found in serum (2). When there is hyperamylasemia, it is important to know which type of isoamylase level is high for differential diagnosis.

There exists some reports in which high amilase levels are detected in serum, pleural fluid or lung tissue in pulmonary infection and in lung cancer (7-10). It is important to notice that these investigations have been made on a small number of patients. Electrophoretic and chromotographic investigations have shown that it is usually S type isoamylase detected in pulmonary diseases (7,9). There are several theories about the mechanism of hyperamilasemia found in lung diseases. One of these is the theory of activation of amylase normally found in lung tissue because of hypoxia due to insufficient tissue perfusion or several inflamatory events (7,9). Otsuki et al have shown amilase activity in normal lung tissue (9). In lung cancer the idea of ectopic S type

Table 3. Distribution of lung cancer patients.

Subtype	Number	Percentage
Epidermoid Ca	19	35.2
Small Cell Ca	11	20.4
AdenoCa	8	14.8
Others	6	11.0
Methastatic	3	5.6
Subtype?	7	13.0
Total	54	100.0

Table 4. Mean serum amylase levels of the groups

Group	n	Mean*	St. Deviation	Median
IA	34	230.1	154.0	208
IB	20	196.6	109.8	173.5
II	26	242.8	140.4	228.5
III	15	240.6	118.7	221

IA: Lung Cancer
IB: Lung Cancer+Endobronchial

IhPulmonary Infection
III: Normal
* No statistical difference (p>0.05).

Table 5. Mean bronchial washing amylase levels of the groups.

Group	n	Mean*	St. Deviation	Median
IA	34	345.1	296.9	184
IB	20	325.9	287.1	191
II	26	272.8	258.4	153.5
III	15	310.1	291.0	156

IA: Lung Cancer
IB: Lung Cancer+Endobronchial
II: Pulmonary infection
III: Normal
* No statistical difference (p>0.05).

amylase secretion from tumoral tissue is accepted by some investigators. In some case reports zimogen granules have been shown by electron microscopy especialy in lung adenocarcinoma and adenocarcinomateus differentiation regions of small cell carcinoma (11,12).

In our investigation on 95 subjects, there were no significant difference in both serum and bronchial washing amylase levels between the groups. With regard to the theory of ectopic amilase secretion from tumor cells we expected to find high amilase levels especialy in lung cancer group with endobronchial lesion, but this was not the case. To get more reliable information at this point, bronchoscopic biopsy material of tumor should be examined for zimogen granules by electron microscopy. Again, usually adenocarcinoma type of lung cancer is told to be with hyperamylasemia so a greater number of lung cancer patients should be investigated according to the subtypes of the disease. In our study only 14% of the group had the diagnosis of adenocancinoma.

We have found high levels of amylase in bronchial washings of all the groups. This result may support the theory of high amylase activity in normal lung tissue. At this point a possible question can be if there is a saliva contamination during bronchoscopy. To prevent this in our study we used different tubes and different channels of the bronchoscope for washing and routine aspiration. So we believe that in our study there is no possibility of saliva contamination.

In our study also no significant difference was found in serum amylase levels of the groups. So we could not find any evidence supporting the theory of hyperamylasemia in lung cancer and in pulmonary infection. In conclusion we believe in the necessity of more detailed investigations including amylase isoenzyme detection and electron microscopic evaluation.

Enfeksiyöz ve malign akciğer hastalıklarında bronş lavajı ve serum amilaz düzeyleri

Gazi Üniversitesi Tıp Fakültesi Göğüs Hastalıkları Kliniği ve Atatürk Göğüs Hastalıkları ve Göğüs Cerrahisi Merkezinde yatarak tedavi gören, tanılarına göre akciğer kanseri, enfeksiyöz akciğer hastalığı ve normal solunum sistemi olarak 3 gruba ayrılan toplam 95 hastada serum ve bronş lavajı amilaz düzeyleri incelendi. Gruplar arasında serum yada bronş lavajı amilaz düzeyleri açısından istatistiksel olarak anlamlı farklılık tesbit edilmedi. Akciğer kanseri yada enfeksiyöz akciğer hastalıklarının hiperamilazemi ile birlikte gittiğine yönelik bir bulguya ulaşılamamasına karşın, bu konuda amilaz izoenzimlerinin tesbit edildiği ve elektron mikroskobik incelemelerin yapıldığı geniş kapsamlı çalışmalara gereksinim olduğu kanısına ulaşıldı. [Turk J Med Res 1993; 11 (6): 286-288]

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