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Yutaro Shiota*

Masahiro Kitade†

Keizo Furuya‡

Nobuo Ueda**

*Ehime Prefectural Central Hospital,

†Ehime Prefectural Central Hospital,

‡Ehime Prefectural Central Hospital,

**Okayama University,

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Abstract

A 38-year-old female presented with cough and fever. A chest X-ray examination revealed an abnormal shadow in the posteroinferior portion of the left hemithorax, and a laboratory examination showed that the serum carbohydrate antigen 19-9 (CA19-9) level was markedly high (1000 U/ml). A left thoracotomy showed an intralobar pulmonary sequestration of the left lower lobe, and after a left lower lobe lobectomy, the serum level of CA19-9 decreased to normal. Increased CA19-9 activity was detected by immunohistochemistry in the epithelia of bronchioles in the pulmonary sequestration. This communication is the first to report a case of increased activity of CA19-9 in pulmonary sequestration.

KEYWORDS: intralobar pulmonary sequestration, carbohydrate antigen 19-9, monoclonal antibody, immunohistochemistry, benign lung disease

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A Case of Intralobar Pulmonary Sequestration with High Serum CA19-9 Levels

Yutaro Shiota*, Masahiro Kitade, Keizo Furuya^a and Nobuo Ueda^b

Divisions of Internal Medicine and ^aPathology, Ehime Prefectural Central Hospital, Matsuyama 790, and ^bSecond Department of Medicine, Okayama University Medical School, Okayama 700, Japan

A 38-year-old female presented with cough and fever. A chest X-ray examination revealed an abnormal shadow in the posteroinferior portion of the left hemithorax, and a laboratory examination showed that the serum carbohydrate antigen 19-9 (CA19-9) level was markedly high (1000 U/ml). A left thoracotomy showed an intralobar pulmonary sequestration of the left lower lobe, and after a left lower lobe lobectomy, the serum level of CA19-9 decreased to normal. Increased CA19-9 activity was detected by immunohistochemistry in the epithelia of bronchioles in the pulmonary sequestration. This communication is the first to report a case of increased activity of CA19-9 in pulmonary sequestration.

Key words : intralobar pulmonary sequestration, carbohydrate antigen 19-9, monoclonal antibody, immunohistochemistry, benign lung disease

CA19-9, a carbohydrate-containing antigen, was detected with a hybridoma antibody against a cultured colorectal cancer cell line by Koprowski (1). It was found that the concentration of this antigen was increased in the sera of patients with gastrointestinal malignancies, especially of those who suffered from pancreas cancer (2). The serum concentration of CA19-9 was also elevated in patients with breast cancer and lung cancer (3). There are some reports which describe high serum CA19-9 levels in patients with non-malignant diseases such as pancreatitis, liver cirrhosis, biliary diseases and diabetes mellitus (4-7). We report here a case of pulmonary sequestration with high serum

levels of CA19-9. We successfully resected the sequestration and detected increased activity of CA19-9 in the region by immunohistochemistry.

A 38-year-old female had an acute onset of cough and fever two months before admission. The patient was placed on antibiotic therapy ; however, cough and fever persisted. A chest roentgenogram on admission showed an opacity in the posterior basal segment of the left lower lobe. Computed tomography of the chest revealed a well-defined homogeneous mass adjacent to the descending aorta in the posteroinferior portion of the left hemithorax. Bronchogram revealed that normal appearing bronchi draped around the mass and that the bronchial tree was numerically complete. The results of laboratory

* To whom correspondence should be addressed.

studies were normal except for high serum CA19-9 levels, which varied on three occasions from 760 to 1000 U/ml (normal, < 37 U/ml). CA19-9 was measured with a solid phase immunoradiometric assay using the ELSA CA19-9 kit (Compagnie ORIS industrie S.A. France). Serum amylase, elastase, trypsin, serum carcinoembryonic antigen and alpha-fetoprotein levels were normal. Abdominal and pelvic computed tomography, abdominal sonography, upper gastrointestinal endoscopy, and barium enema were performed to exclude the possibility of an underlying abdominal malignant lesion, and there was no abnormal finding in the abdomen or pelvis. A left lateral thoracotomy was performed, which disclosed an intralobar sequestration of the left lower lobe with two feeding arteries from the descending aorta. A left lower lobectomy was performed. On the 31st postoperative day, the serum CA19-9 level had decreased to 95 U/ml and remained in the normal range 5 months after the operation (Fig. 1).

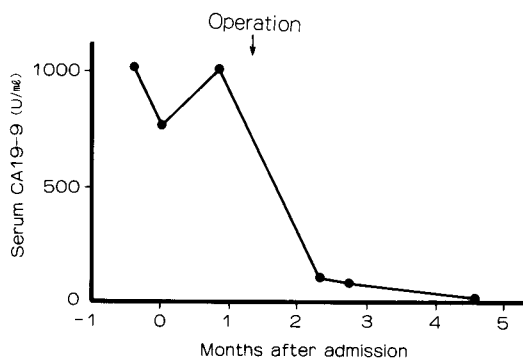


Fig. 1 Serum CA19-9 levels before and after operation of intralobar pulmonary sequestration. CA19-9 was determined with a solid phase immunoradiometric method.

The sequestered region of the lung measured 9.8×6.5 cm at its greatest diameter, and it was relatively hard. On transection, multiple cysts filled with brownish mucoid material were noted. The specimen was fix-

ed in 10% formalin, was cut and then embedded in paraffin. Each of the serially cut $4\text{-}\mu\text{m}$ sections was stained with hematoxylin and eosin stain (H.E.). Upon microscopic examination, the alveolar structure was found to be completely obliterated by marked fibrosis, and the bronchial lumina were noted to be dilated in the sequestered region. Bronchiolitis was seen in the area in which alveolar structure was preserved. In the immunohistochemical study, after deparaffinization and blocking of endogenous peroxidase activity by 0.3% hydrogen peroxide/methanol for 20 min, the sections were incubated for 10 min at room temperature with the primary mouse monoclonal antiserum: anti-CA19-9 (Fujirebio Inc., Tokyo, Japan; imported from Centrococ Co., USA). The antiserum was used at a 1:200 dilution. Reactivity of the antiserum with the lung tissue was demonstrated by the peroxidase-antiperoxidase method (PAP, Ortho-mune Monoclonal Antibody Immunoperoxidase Kits, Ortho Diagnostic Systems Inc, New Jersey, USA). The sections were reacted in 3-amino-9-ethylcarbazole with hydrogen peroxide. Finally, the sections were counterstained with Mayer's hematoxylin for nuclei. The specificity of the primary antiserum was confirmed by using the antiserum preabsorbed with an excess of the corresponding antigen and omitting the incubation with the primary serum. Tissues of pancreatic adenocarcinoma were immunostained as a positive control. Almost all cells of the bronchiolar epithelia in the sequestered region were positive for CA19-9 at intensities which varied from cell to cell (Fig. 2). The staining of non-ciliated bronchiolar epithelia for CA19-9 was stronger than that of ciliated epithelia. The mucinous material in bronchial lumina was positive for CA19-9 at various intensities. In normal lungs of other patients, there were only a few CA19-9 positive cells.

CA19-9 has been thought to be a specific

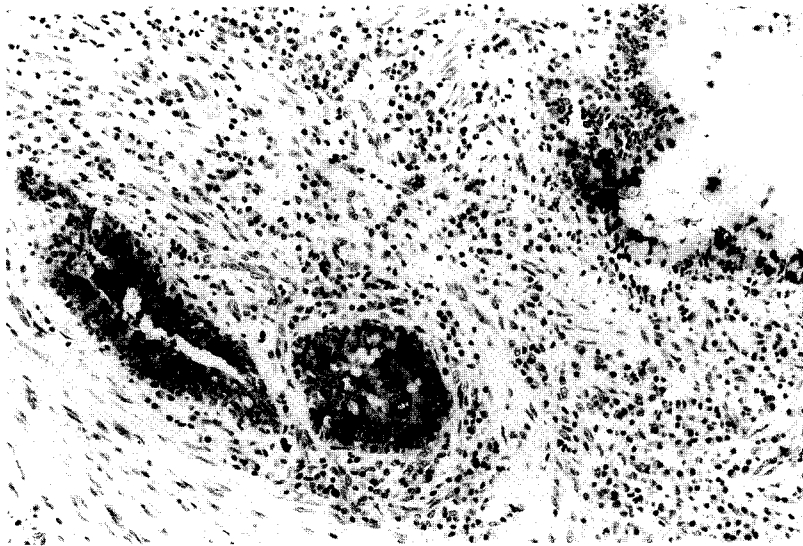


Fig. 2 Immunohistochemical staining of CA19-9 in bronchiolar epithelia using peroxidase-antiperoxidase method. $\times 148$.

marker of gastrointestinal and pancreas cancers. It has been identified as a sialylated lacto-N-fucopentose II, which is related to Lewis blood group substances (8). Recently some studies reported increased serum values of CA19-9 in patients with non-neoplastic diseases (4-7). Encabo *et al.* (4) reported that in the examination of 892 patients with non-tumoral pathologies, serum concentrations of CA19-9 above 100 U/ml were observed in 28 cases (3%), and above 500 U/ml in 3 cases (0.3%). In 68 cases of respiratory diseases, the mean serum concentration of CA19-9 was 11.7 ± 9.7 U/ml (range, 0-41 U/ml). The antigen was demonstrated in the normal epithelia lining the biliary tract, gastric mucosa, pancreatic duct and bronchial glands by an immunohistochemical method (9), and large amounts of CA19-9 were found in normal human seminal fluid and human milk (10). Accordingly, there are doubts about the specificity of CA19-9 as a tumor marker. Up to now, few papers have reported an increase in serum CA19-9 levels in non-malignant lung diseases. This communication is the first to re-

port high serum CA19-9 levels in a patient with pulmonary sequestration, and there is no other report. Therefore, it is not known whether serum concentrations of CA19-9 in patients with pulmonary sequestration are frequently high or not. The decrease in our patient's CA19-9 level to normal about one month after the operation indicate that the CA19-9 was released into the blood stream from the sequestered lesion, causing serum CA19-9 levels to increase. The reason why it took about one month for CA19-9 to return to the normal level is unknown. Presently, we are interested in the possibility of the appearance of CA19-9 in the lesions of other non-neoplastic lung diseases such as bronchiolitis and interstitial pneumonia.

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