Extreme High Levels of CA19-9 Associated with Adenocarcinoma of the Lung

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KEY WORDS: CA19-9, tumor markers, pancreatic cancer, lung cancer, adenocarcinoma

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The diagnosis of pancreatic adenocarcinoma can be difficult. In addition to risks factors, clinical presentation and radiological tests, an elevated level of the tumor marker CA19-9 may help in the diagnosis of pancreatic cancer. Although high levels of CA19-9 may also be found in a variety of other malignant and benign conditions, extreme levels of CA19-9 are not seen in these conditions. In the presented case an extremely high level of CA19-9 was documented in a patient with non-small cell lung cancer without lesion in the pancreas.

PATIENT DESCRIPTION

A 51 year old man without a medical history except for smoking presented to his primary physician in June 2005 with a complaint of low back pain of a few weeks duration. The physical examination and the X-ray were normal. Bone scan showed areas of increased uptake at the lumbar spine and in the left ribs; the patient was referred for further evaluation.

The serum level of CEA (carcinoembryonic antigen) was 2921 ng/ml, NSE (neuron-specific enolase) 10.37 ng/ml and CA19-9 42141 U/ml. Computed tomography revealed a 6 cm mass in the left lower lobe of the lung, enlarged lymph nodes in the hilum, and two hypodense lesions in the liver. The other abdominal organs, including the pancreas, were normal. CT-guided lung biopsy confirmed the diagnosis of poorly differentiated adenocarcinoma of the lung which stained positive for CA19-9 and CK7, and negative for TTF-1 and CK20. Palliative radiotherapy was delivered up to a total of 30 Gy in 10 fractions to the lumbar spine due to bone metastasis. After the completion of radiotherapy, chemotherapy using carboplatin, gemcitabine and cetuximab was begun. Despite aggressive treatment, no improvement was observed. Dyspnea appeared and his pain worsened, and in September the patient died.

COMMENT

CA 19-9 is a sialyl derivative of lacto-N-fucopentaose II, hapten of human Lewis, a blood group determinant. This carbohydrate antigen is expressed in bronchiolar epithelial cells and found in bronchoalveolar lavage in patients with pulmonary fibrosis. Purified CA19-9 stimulated neutrophil chemotaxis to C5a, IL-8 and fMLF. Normally, CA19-9 may be found in healthy individuals at concentration < 40 U/ml and it increases in benign hepatobiliary disease, with the highest levels in excretory ductal pancreatic adenocarcinoma, biliary, hepatocellular and cholangiocarcinoma cancer. Correlation between CA19-9 and the size of the pancreatic adenocarcinoma was reported in previous studies [1]. CA19-9 is associated as a tumor marker with metastatic disease in pancreatic cancer, colorectal cancer, urothelial cancer and melanoma. Neoplasm transformation is induced by high expression of CA19-9. Extravasations of tumor cells from the bloodstream and formation of metastatic disease were associated with CA19-9. The mechanism is probably due to its interaction with E-selectin expressed on endothelial cells.

The radiological findings in the current case, including a 6 cm mass in the left lower lobe of the lung, enlarged lymph nodes in the hilum without a pancreatic lesion in the presence of extremely high levels of CA19-9, support the diagnosis of a primary lung tumor. Moreover, the presence of bone metastasis agrees with the diagnosis of lung cancer rather than pancreatic cancer. The absence of TTF-1 staining in the lung specimen and the positive staining of CA19-9 is not infrequent in lung adenocarcinoma. Malignant epithelial tumors of the lung stained positively for CA19-9 in 59% [2] and negatively for TTF-1 in 26.8% [3]. In addition, staining that is positive for CK7 and negative for CK20 strongly supports the diagnosis of lung cancer [4].

The presence of elevated CA19-9 levels in patients with lung cancer has been described in Japan. Most of these patients were diagnosed with adenocarcinoma [5]. In addition, cell lines from poorly differentiated adenocarcinoma of the lung may produce this tumor marker.

In conclusion, CA19-9 may be elevated not only in the case of pancreatic cancer but also in patients with non-small cell lung cancer. Due to the similar demographic and environmental risk factors for both conditions, it is important to interpret the CA19-9 results in light of the clinical presentation as well as chest and abdomen imaging.
References


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Stem cell therapy reverses brain birth defects

Neural and behavioral birth defects such as learning disabilities are particularly difficult to treat, compared to defects with known cause factors such as Parkinson’s or Alzheimer’s disease, because the prenatal teratogen – the substances that cause the abnormalities – act diffusely in the fetal brain, resulting in multiple defects. Prof. Yosef Yanai and team at the Hebrew University-Hadassah Medical School have succeeded in reversing brain birth defects in animal models, using stem cells to replace defective brain cells. The embryonic neural stem cells migrate in the brain, search for the deficiency that caused the defect, and then differentiate into becoming the cells needed to repair the damage. While stem cells may develop into any type of cell in the body, at a certain point they begin to commit to a general function, such as neural stem cells, destined to play a role in the brain/nervous system, and at more advanced development stages, the neural stem cells take on an even more specific role as neural or glial cells within the system. In their model, Yanai and team reversed learning deficits in the offspring of pregnant mice that were exposed to organophosphate and heroin by directly transplanting neural stem cells into the brains of the offspring. The recovery was almost 100%, as proved in behavioral tests. On the molecular level, brain chemistry of the treated animals was also restored to normal. The researchers went one step further: Puzzled by the stem cells’ ability to work even in those cases where most of them died out in the host brain, the team went on to discover that before dying, the neural stem cells succeed in inducing the host brain itself to produce large numbers of stem cells that repair the damage. This discovery, finally settling a major question in stem cell research, evoked great interest and was published earlier in *Molecular Psychiatry*, a leading journal in the field. These scientists are now developing procedures for the least invasive method of administering the neural stem cells, probably via blood vessels, thus making the therapy practical and clinically feasible. Normally, stem cells are derived from individuals genetically different from the patient and therefore the efficacy of the treatment suffers from immunological rejection. This will be resolved by taking cells from the patient’s own body – from a place where they are easily obtained – by manipulating them to return to their stem cell phase of development, and then transplanting them into the patient’s brain via the bloodstream. One important advantage of this approach is that it obviates the controversial ethical issues involved in use of embryo stem cells.

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“"It is impossible to enjoy idling thoroughly unless one has plenty of work to do"
Jerome K. Jerome (1859-1927), English humorist and playwright, best known for the humorous travelogue *Three Men in a Boat"

“"When you battle with your conscience and lose, you win""
Henny Youngman (1906-1996), British-born American comedian and violinist famous for "one-liners," short, simple jokes usually delivered rapid-fire