Hypoglycemia Associated with a Lung Mass*

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A previously healthy 70-year-old white woman was admitted with symptoms of obtundation, delirium and a blood glucose level of 45 mg percent. She had been having periods of weakness for six weeks and had two episodes of hypoglycemic coma. She was a nonsmoker and had no exposure to mining or asbestos. Physical examination findings were normal apart from decreased breath sounds at the right lower lung zone. Except for a significantly low blood glucose level, which was corrected on IVI dextrose water, as well as a low insulin level (5 μU/ml) and a low potassium (2.9 mmol/L) level, the laboratory tests were normal. Figures 1 and 2 are admission chest films.

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Diagnosis: Localized mesothelioma with associated hypoglycemia

Posterolateral and lateral chest roentgenogram (Fig 1 and 2) reveal an apparently elevated right hemidiaphragm. Screening of the diaphragm showed the right side to move less than the left side. CAT scan, and combined liver and lung scans were nondiagnostic. Ultrasonographic examination revealed a mass at the right base. Bronchoscopic examination showed distorted and narrowed right lower lobe bronchi, but no endobronchial lesion. Pleuroscopy and thoracotomy were performed and a large well-defined tumor was found at the right base above the diaphragm. It abutted on the pericardium, had a pedunculated connection to the diaphragm, and had a rich vascular drainage into the inferior vena cava. The tumor was removed totally.

Gross pathologic examination of the specimen revealed a rounded 14 x 11 x 9 cm well-encapsulated tumor (Fig 3). Histologic diagnosis was localized mesothelioma of moderate degree malignancy.

Initial postoperative blood glucose levels were high, but 24 hours later the levels were within the normal range. Four hourly glucose monitoring for two weeks postoperation revealed no further hypo- or hyperglycemic episodes, at which stage the patient was discharged.

Hypoglycemia associated with non-beta cell tumors was first described in 1930. Since then, more than 200 cases of hypoglycemia associated with extra pancreatic tumors have been reported. The majority of these patients had intrathoracic tumors and included rhabdomyosarcomas, fibrosarcomas, neurofibromas, and bronchogenic carcinoma. Only 15 cases of benign localized mesothelioma and associated tumor-induced hypoglycemia have been documented.

Localized mesothelioma of the pleura was first described in 1870. In 1931, Klempner and Rabin distinguished the diffuse from the localized form. The former accounts for about 75 percent of all cases. Diffuse mesothelioma is a malignant tumor with a poor prognosis. It arises from serosal surfaces and is about three times more common in the pleura than in the peritoneal cavity. The localized form of mesothelioma may be benign or malignant. It is unclear whether these tumors originate from mesothelial cells and are correctly diagnosed as variants of mesothelioma, or whether they arise from submesothelial fibrous connective tissue and should be classified as variants of fibroma. The exact histogenesis is still debated.

Although hypoglycemia has been observed with diffuse mesothelioma, it is more commonly associated with solitary fibrous mesotheliomas. In some cases (and in the patient presented here), hypoglycemia is the first manifestation of the disease that calls attention to the presence of an intrathoracic or intraabdominal mass. Many theories have been proposed to explain the possible ways by which such tumors might induce hypoglycemia. These include nonhumoral and humoral mechanisms. The nonhumoral factors include: 1) excessive glucose consumption by the tumor; 2) the state of the liver where there may be decreased glucose output, and 3) late stage of terminal neoplasia. The humoral mechanisms include: 1) release of insulin or insulin like substances or insulin potentiator from the tumor, and 2) suppression of pancreatic glucagon secretion by the tumor. Currently, the exact nature of the factor or factors producing hypoglycemia associated with extrapancreatic tumors is not clearly known.

Prognosis of the localized mesothelioma of the pleura (and its hypoglycemic manifestation) is good and the only therapy necessary is complete local resection.

References

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