Case Report

Ectopic mediastinal parathyroid carcinoma presenting as acute pancreatitis

Chih-Wei Tseng, Shan-Zu Lin, Chih-Hao Sun, Chun-Chia Chen, An-Hang Yang, Full-Young Chang, Han-Chieh Lin, Shou-Dong Lee

Division of Gastroenterology, Department of Medicine, Buddhist Dalin Tzu Chi General Hospital, Chiayi, Taiwan, ROC
Division of Medicine, Tzu Chi University, Hualien, Taiwan, ROC
Division of Pathology, Taichung Veterans General Hospital, Chiayi Branch, Chiayi, Taiwan, ROC
Division of Gastroenterology, Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan, ROC
Division of Pathology, Taipei Veterans General Hospital, Taipei, Taiwan, ROC
National Yang-Ming University School of Medicine, Taipei, Taiwan, ROC
Department of Medicine, National Defense Medical Center, Taipei, Taiwan, ROC

Received January 11, 2011; accepted October 13, 2011

Abstract

Parathyroid carcinoma is a rare cause of hyperparathyroidism, accounting for fewer than 1% of cases. The incidence of acute pancreatitis in patients with hyperparathyroidism was reported to be only 1.5%. We report a very rare case of ectopic mediastinal parathyroid carcinoma presenting as acute pancreatitis. A 72-year-old man presented with acute pancreatitis and hypercalcemia. During the work-up for hypercalcemia, a mediastinal parathyroid tumor was identified by 99mTc-sestamibi scintigraphy and magnetic resonance imaging. The tumor was completely removed via a lower cervical collar incision. The histopathology revealed parathyroid carcinoma. There was no tumor recurrence or abdominal symptoms at 3-year follow-up.

Copyright © 2012 Elsevier Taiwan LLC and the Chinese Medical Association. All rights reserved.

Keywords: hypercalcemia; hyperparathyroidism; pancreatitis; parathyroid neoplasms

1. Introduction

Biliary tract stones and alcohol are the most common causes of acute pancreatitis. Acute pancreatitis due to hyperparathyroidism is uncommon. The incidence of acute pancreatitis in patients with hyperparathyroidism was reported to be only 17 of 1153 cases (1.47%). Parathyroid carcinoma is a rare cause of primary hyperparathyroidism, accounting for 0.74% of 20,225 cases. The major clinical presentations of parathyroid carcinoma are hypercalcemia, neck mass, bone disease, and renal disease. The occurrence of pancreatitis in patients with parathyroid carcinoma is unusual, ranging from 0% to 15%. We report a very rare case of ectopic mediastinal parathyroid carcinoma presenting as acute pancreatitis.

2. Case report

A 72-year-old man was admitted to our hospital because of severe epigastric pain radiating to his back for 1 day. He had had Type 2 diabetes mellitus for 5 years under the control of oral medication. He had a history of gouty arthritis and had undergone appendectomy approximately 40 years previously. The patient denied history of alcohol drinking or cigarette smoking. Two months before admission, he had suffered from fatigue, depression, sleep disturbance, nausea, and vomiting. Body weight loss of approximately 10 kg was also noted. Intermittent severe epigastric pain that radiated to his back occurred before this admission. He visited our emergency room, where abdominal examination revealed epigastric tenderness without rebounding pain. Laboratory data showed...
white blood cell (WBC) count of 6200/\mu L, hemoglobin level of 11.9 g/dL, serum creatinine level of 2.8 mg/dL, serum amylase level of 1044 U/L (normal < 180 U/L), serum lipase level of 1479 U/L (normal < 190 U/L), and C-reactive protein (CRP) level of 0.05 mg/dL (normal < 0.5 mg/dL). A computed tomography (CT) scan of the abdomen depicted enlargement of the pancreas and bilateral renal stones (Fig. 1). No biliary tract stone was found. Acute pancreatitis subsided 1 week later after conservative treatment. Routine biochemical test revealed hypercalcemia (14.0 mg/dL, normal < 10 mg/dL). Further work-up for hypercalcemia showed decreased serum phosphorus level (1.8 mg/dL, normal > 2.0 mg/dL) and increased serum parathyroid hormone (PTH) level (intact PTH: 168 pg/mL, normal < 50 pg/mL). The serum levels of free thyroxine, thyroid-stimulating hormone, carcinoembryonic antigen, carbohydrate antigen (CA)-199, CA-125, \alpha-fetoprotein, and prostate-specific antigen were all within normal range. US of the parathyroid gland and neck showed no evidence of abnormal mass. \textsuperscript{\textit{99m}}Tc-sestamibi scintigraphy revealed an ectopic functioning parathyroid gland in the upper mediastinum (Fig. 2). Magnetic resonance imaging (MRI) of the thorax showed a small nodule approximately 1.3 cm in diameter in the anterior mediastinum (Fig. 3). Under the diagnosis of primary hyperparathyroidism related to ectopic parathyroid tumor, resection of the mediastinal tumor was performed via lower cervical collar incision. A tumor over the left paratracheal space with extension into the upper mediastinum was found. A 2.0 x 1.5 x 1.0-cm tumor weighing 1.8 g was removed by \textit{en bloc} resection of all involved tissue. Histopathologic examination revealed a parathyroid carcinoma with tumor emboli (Fig. 4). The serum levels of PTH (intact PTH: 45 pg/mL) and calcium (9.4 mg/dL) returned to normal 2 weeks after surgery. \textsuperscript{\textit{99m}}Tc-sestamibi scintigraphy at 3-month and 3-year follow-up revealed no tumor recurrence (Fig. 5). There were no abdominal symptoms or pancreatitis episode at 3-year follow-up. The patient died due to an unrelated aspiration pneumonia 4 years postoperation.

3. Discussion

Primary hyperparathyroidism accounts for 1% of all admissions for pancreatic diseases.\textsuperscript{1} In 6.8–12% of patients with primary hyperparathyroidism, the disease is initially suspected because of unexplained pancreatic disease.\textsuperscript{1} Although hypercalcemia-related acute pancreatitis is uncommon, primary hyperparathyroidism should be suspected in these patients.\textsuperscript{2} Parathyroid carcinoma is a rare malignancy. The incidence of ectopic parathyroid glands in healthy individuals is approximately 6%.\textsuperscript{5} They may be found in the anterior superior mediastinum, either within or outside the thymus, along the esophagus into the posterior superior mediastinum.\textsuperscript{5,6}

There are a few case reports describing ectopic mediastinal parathyroid adenoma with presentation of hyperparathyroidism or acute pancreatitis.\textsuperscript{7–9} Foroulis et al\textsuperscript{8} reported a 71-year-old woman with paraesophageal parathyroid adenoma presenting as acute pancreatitis.\textsuperscript{8} The adenoma was preoperatively localized by using the combination of \textsuperscript{\textit{99m}}Tc sestamibi...
scintigraphy and CT scan, and was managed successfully with surgery. Imachi et al. recently reported a 38-year-old man with ectopic mediastinal parathyroid adenoma manifesting as acute pancreatitis. The ectopic parathyroid adenoma was also confirmed by 99mTc sestamibi scintigraphy and CT scan. To the best of our knowledge, there is no medical report in the literature describing ectopic mediastinal parathyroid carcinoma as a cause of acute pancreatitis.

The appearance of acute pancreatitis in patients with hyperparathyroidism may be due to hypercalcemia, calculi in the pancreatic ducts, and genetic predisposition. Felderbauer et al. found that pancreatitis risk in primary hyperparathyroidism was related to mutations in the serine protease inhibitor Kazal type I (SPINK1) gene and cystic fibrosis transmembrane conductance regulator (CFTR) gene. A combination of both hypercalcemia and genetic variants in SPINK1 or CFTR increases the risk of developing pancreatitis in patients with primary hyperparathyroidism.

Because parathyroid carcinoma mimics clinical and biochemical benign primary hyperparathyroidism, it is difficult to distinguish between parathyroid adenoma and carcinoma at the time of surgery. However, patients with parathyroid carcinoma are more likely to have clinical symptoms, nephrolithiasis, and markedly elevated serum levels of calcium (often 3–4 mg/dL above the upper limit of normal) and PTH (more than five times the upper limit of normal). In addition, parathyroid carcinomas are larger than parathyroid adenomas (median size 3.3 cm vs. 1.5 cm). In a review of 311 patients with primary hyperparathyroidism, of whom nine had parathyroid carcinomas, Robert et al. demonstrated that when PTH is less than four times the upper limit of normal and tumor weight less than 1.9 g, the probability of parathyroid carcinoma is zero. According to this parameter, our patient could be considered low risk for malignant parathyroid carcinoma (PTH level 3.4 times the upper limit of normal and tumor weight 1.8 g). However, the pronounced syndrome (weakness, fatigue, anorexia, and weight loss), high serum calcium (4 mg/dL above the upper limit of normal), nephrolithiasis, and renal function impairment did raise the suspicion for parathyroid carcinoma.

The optimal preoperative technique for detecting parathyroid tumors is 99mTc-sestamibi scintigraphy with subtraction imaging or washout imaging. The overall sensitivity for enlarged parathyroids was 79%, with a false-positive rate of 10%. Anatomic imaging including ultrasound, CT, magnetic resonance imaging (MRI) or single-photon emission

Fig. 3. T1-weighted image with contrast shows one well-defined isosignal nodule (arrow) measuring 1.3 cm in diameter in the upper pretracheal region.

Fig. 4. Histopathology of the parathyroid carcinoma. (A) The tumor cells (arrow) show round to ovoid, markedly enlarged nuclei with clearly demarcated cytoplasm (hematoxylin and eosin stain). (B) The parathyroid hormone staining is positive. (C) The tumor is invading a vessel with emboli formation (arrow).
computed tomography (SPECT) is frequently applied for localizing studies. Ultrasound evaluation of parathyroid glands is operator-dependent, with sensitivity of 38–92%, and does not adequately evaluate the ectopic gland in the mediastinum. The sensitivities of CT and MRI to localize adenomas were reported to be 43–92% and 50–93%, respectively. MRI has a possible advantage over CT. The combined use of SPECT and CT is considered to offer more precise localization of the functional ectopic glands. Because parathyroid carcinoma is extremely rare, the usefulness of CT or MRI has not yet been fully investigated in this disease. In our case, combined 99mTc-sestamibi scintigraphy and CT or MRI successfully detected the ectopic parathyroid carcinoma. Although parathyroid carcinomas are slow-growing neoplasms, they have a high propensity to recur locally. En bloc resection of the parathyroid carcinoma at the time of initial surgery appears to provide the best chance for cure. Inadequate preoperative or intraoperative localization may lead to unsuccessful surgery with a high local recurrence rate. Further surgical resection should be undertaken for patients with recurring disease.

In conclusion, we have reported a rare case of ectopic mediastinal parathyroid carcinoma causing acute pancreatitis. Combined 99mTc-sestamibi scintigraphy and CT or MRI can detect the ectopic parathyroid tumor preoperatively. En bloc resection of all involved tissue is the appropriate surgical treatment.

References


