A Small, Incidentally Detected Pancreatic Somatostatinoma: Report of a Case

Hitoshi Tomono1, Hiroshi Kitamura1, Masanori Iwase1, Shingo Kuze1, Futoru Toyoda1, Naoharu Mori1, Eiji Tamoto1, Kazunori Inuzuka2, Hiromine Fujita1, Yukiko Komshi1, Masaaki Naito2, and Fumihiko Tanioka1

Departments of 1Surgery, 2Radiology, and 3Pathology, Iwata City General Hospital, 512-3 Okubo, Iwata, Shizuoka 438-8550, Japan

Abstract
We report an asymptomatic 72-year-old woman with a small, incidentally detected, pancreatic somatostatinoma. The tumor, measuring 1 cm in diameter, showed a hypervascular pattern of contrast enhancement on computed tomography, and was found angiographically to receive a blood supply from the posterior superior pancreaticoduodenal artery. The results of preoperative hormonal assays all were normal. No assay for somatostatin was performed. No abnormality in either the pituitary or parathyroid was found. We thus considered the tumor to be a sporadic, nonfunctioning endocrine cell tumor, and enucleation was carried out. As some tumor cells in the resected specimen showed immunoreactivity for somatostatin, a diagnosis of somatostatinoma was made. Therefore, the possibility of somatostatinoma should be kept in mind when making a differential diagnosis of pancreatic endocrine tumors in cases where even a small hypervascular tumor is detected on enhanced computed tomography.

Key words Somatostatinoma · Endocrine pancreatic tumor · Hypervascularity

Introduction
Since the first description of pancreatic somatostatinoma by Larsson,1 only 81 cases have been reported. This rare tumor is often not detected until an advanced stage because characteristic symptoms can be absent. Most reported occurrences therefore tend to involve relatively large tumors, often with a poor outcome associated with the presence of liver metastases at the time of discovery. We treated a patient with an incidentally discovered, superficial, exophytic tumor representing one of the smallest pancreatic somatostatinomas reported to date.

Case Report
A 72-year-old woman with no symptoms was referred to our hospital for further evaluation of a liver tumor which was detected by ultrasonography performed by her family physician for general health screening and was later found to be a hemangioma by post contrast computed tomography (CT) as well as magnetic resonance imaging (MRI). The initial CT incidentally showed a second tumor, measuring 1 cm in diameter, protruding from the pancreatic head, and the patient was therefore admitted to the hospital. No abnormality was noted on physical examination except for mild hypertension. Blood testing on admission revealed a carbohydrate antigen 19-9 (CA19-9) concentration of 15.2 U/ml (normal range <37.0 U/ml), a carcinoembryonic antigen concentration of 1.1 ng/ml (normal range 0.5–5.0 ng/ml), a serum calcium concentration of 8.6 mg/dl (normal range 8.6–10.6 mg/dl), and a blood sugar concentration of 98 mg/dl (normal range 70–110 mg/dl). The preoperative plasma hormonal determinations showed a total gastrin concentration of 154 pg/ml (normal range 42–200 pg/ml), a total glucagon concentration of 86 pg/ml (normal range 70–160 pg/ml), an adrenaline concentration of 0.02 ng/ml (normal range <0.1 ng/ml), a noradrenaline concentration of 0.36 ng/ml (normal range 0.10–0.50 ng/ml), a dopamine concentration of less than 0.01 ng/ml (normal range <0.03 ng/ml), a serotonin concentration of 12.8 µg/dl (normal range 10–30 µg/dl), and a calcitonin concentration of 18.0 pg/ml (normal range 17.0–55.8 pg/ml), which were all within the normal range. Somatostatin concentration

Reprint requests to: H. Tomono
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in the plasma was not measured. No occurrences of a hypoglycemia were evident, and no glucose intolerance was demonstrated. CT displayed a contrast-enhancing tumor, measuring 1 cm in diameter, protruding cranially from the pancreatic head, anterior to the portal vein (Fig. 1). Ultrasonography demonstrated a small, hypoechoic mass adjacent to the pancreas. On MRI the tumor showed a low signal intensity on T1-weighted images and a high signal intensity on T2-weighted images. Angiography performed via the common hepatic artery indicated the tumor to be intensely hypervascular; fine tumor vessels were supplied by the posterior superior pancreaticoduodenal artery (Fig. 2). No morphologic abnormalities of the pituitary or parathyroids were found by either cranial MRI or cervical ultrasonography, which were performed to rule out type I multiple endocrine neoplasia. We therefore considered the tumor to be a sporadically occurring nonfunctioning endocrine cell tumor of the pancreas. At laparotomy no liver metastases or peritoneal dissemination were identified, and a reddish tumor, measuring 1 cm in diameter, was found protruding from the cranial aspect of the pancreatic head associated with abundant draining veins. In addition the tumor was enucleated. The cut surface of the resected specimen was grayish white with a soft consistency, without necrosis or hemorrhage (Fig. 3). Histologically the tumor showed a homogeneous proliferation of neoplastic cells with round to oval hyperchromatic nuclei and eosinophilic cytoplasm, arranged in an acinar pattern. An incomplete fibrous capsule separated the tumor from the pancreas tissue, but pancreatic ducts were detected in the tumor-cell nest, thus indicating the tumor to have originated from the pancreas (Fig. 4). No definite invasion of surrounding tissues or vessels including the abundant veins was identified. A modified avidin-biotin-peroxidase complex immunostaining method showed some tumor cells to be reactive for somatostatin (Dako, Tokyo, Japan) (Fig. 5), while no cells stained for insulin, glucagon, or gastrin. We therefore diagnosed this case to be a somatostatinoma of the pancreas. The postoperative course was uneventful. The patient has remained well for 3 years with no evidence of recurrence.

![Fig. 1. Computed tomography displayed a contrast-enhancing tumor, measuring 1 cm in diameter, protruding cranially from the pancreatic head, anterior to the portal vein (arrow). PV, portal vein](image1)

![Fig. 2. Angiography performed via the common hepatic artery indicated the tumor to be intensely hypervascular; fine tumor vessels were supplied by the posterior superior pancreaticoduodenal artery (arrow). CHA, common hepatic artery; GDA, gastroduodenal artery; PSPDA, posterior superior pancreaticoduodenal artery; RGA, right gastric artery](image2)

![Fig. 3. The cut surface of the resected specimen was grayish white with a soft consistency, without necrosis or hemorrhage](image3)