

Intense Ga-67 uptake in adenosquamous carcinoma of the pancreas

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Gallium-67 citrate (Ga-67) scintigraphy was performed in a patient with adenosquamous carcinoma of the pancreas. Intense and homogeneous uptake was observed in the tumor. Few reports have dealt with Ga-67 findings in pancreatic cancers. Ga-67 uptake in the tumor was assumed to be due to accumulation in the component of squamous cell carcinoma. This case suggested that Ga-67 citrate scintigraphy may be useful in detecting adenosquamous carcinoma of the pancreas. To our knowledge, no report has described findings of Ga-67 citrate scintigraphy of adenosquamous carcinoma of the pancreas. Radiologists should remember adenosquamous carcinoma of the pancreas when encountering such scintigraphic findings.

Key words: adenosquamous carcinoma, gallium-67 citrate, pancreas cancer

INTRODUCTION

WHOLE-BODY SCINTIGRAPHY with gallium-67 citrate (Ga-67), the most widely used tumor seeking radiopharmaceutical, seems to have its greatest value in detecting lung cancer and malignant lymphoma. Meanwhile, pancreatic cancer is detectable by Ga-67 scan at low sensitivity. There have been several reports on Ga-67 scintigraphy in unusual pancreatic tumors, but, to our knowledge, no Ga-67 scintigraphic findings for adenosquamous cancer of the pancreas has been reported. We present and assess the imaging findings in a patient with pancreatic adenosquamous carcinoma.

CASE REPORT

A 73-year-old man was admitted complaining of upper abdominal pain and anorexia. Laboratory investigations revealed marked inflammation with leukocytosis (white blood cells (WBC); 22,400/mm³, C-reactive protein (CRP); 13.9 mg/dl) and anemia (red blood cells; 297 × 10⁴/mm³, hemoglobin; 9.3 mg/dl, hematocrit; 27.1%). The serum

amylase level was normal (131 IU/l). The serum tumor marker of CA 19-9 was very high (7,200 U/ml). Serum alpha-fetoprotein, carcinoembryonic antigen and squamous cell carcinoma related antigens were within the normal ranges. Neither diabetes mellitus nor any other pancreatic endocrinological dysfunction was observed. Abdominal ultrasonography revealed a 6 cm-in-size hypoechoic mass in the pancreatic body. CT also showed a low density mass in the pancreatic body which compressed the stomach and the left lobe of the liver (Fig. 1). The tumor was marginally enhanced on contrast-enhanced CT images. MR imaging showed the tumor as a low-intensity area on unenhanced T1-weighted images, and as a high-intensity area with a low-intensity rim on T2-weighted images (Fig. 2A, B). The tumor was enhanced marginally after administration of gadopentetate dimeglumine (Magnevist®, Scheling, Berlin, Germany) (Fig. 2C). These findings suggested that the tumor had central necrosis and rich marginal vascularities. Endoscopic retrograde cholangiopancreatography showed an encasement and an arch-shaped defect of the common bile duct, indicating an interruption of the main pancreatic duct at the neck-to-body transient zone of the pancreas.

A whole-body scan with a dual head rectangular gamma-camera (GCA901-B, Toshiba, Japan) was obtained at 72 hours after intravenous injection of 111 MBq Ga-67 citrate. The anterior planar image demonstrated well-demarcated uptake of oval configuration in the midabdomen,

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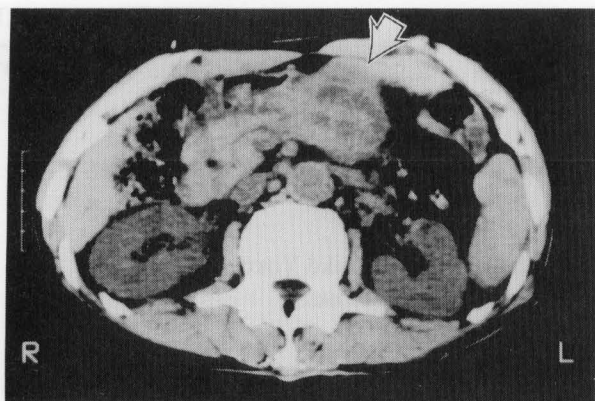


Fig. 1 Unenhanced CT image. Large round-shaped mass with heterogeneous density (open arrow) was demonstrated on unenhanced CT image.

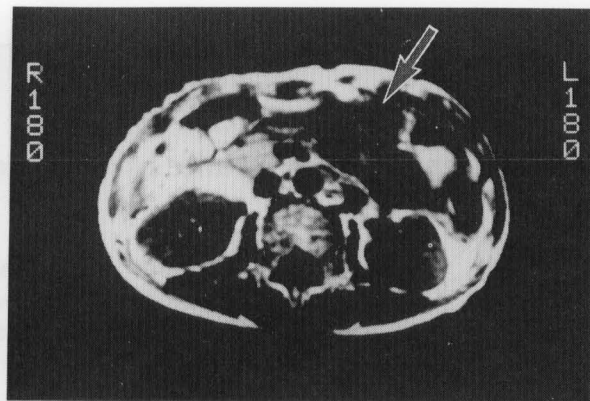
which corresponded to the pancreas (Fig. 3).

Angiography revealed that the tumor was fed by the dorsal pancreatic artery. It also revealed encasements of the gastroduodenal artery and compression of the portal vein caused by the tumor. Definitive surgery including total pancreatectomy, subtotal gastrectomy, right hemicolectomy and portal vein resection was performed.

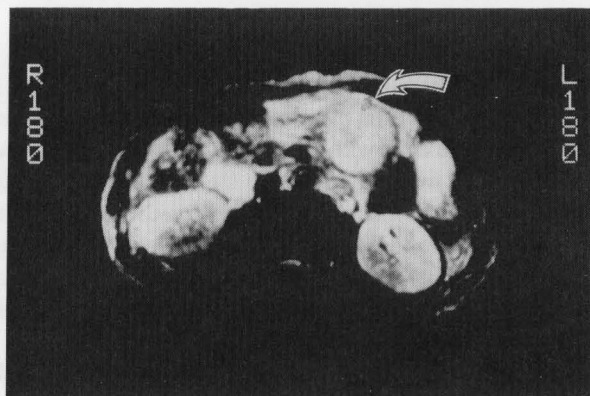
The pathological diagnosis was an adenosquamous carcinoma of the pancreas, which contained two distinct malignant histologic components: malignant well-differentiated squamous cells with intracellular bridges, keratohyaline granules, and occasional pearl formation, and well-differentiated adenocarcinoma with duct-like structures lined by columnar cells containing a fair amount of intra-cytoplasmic mucosubstances. The tumor-associated chronic pancreatitis was shown as a complication of the pancreatic cancer. Two months later, he died of massive bleeding from esophageal mucosa due to disseminated intravascular coagulation caused by methicillin-resistant *Staphylococcus aureus* infection.

DISCUSSION

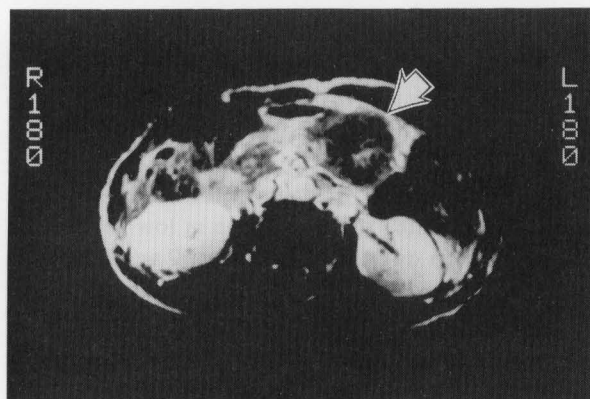
Adenosquamous carcinoma of the pancreas is a relatively rare carcinoma which consists of two heterogeneous pathological elements, adenocarcinoma and squamous cell carcinoma. Despite the current widespread use of Ga-67 citrate, no reports of its use in cases of pancreatic adenosquamous cancer could be found. Although the incidence of adenosquamous carcinoma ranged 3.0 to 4.2% of pancreatic carcinomas, Ishikawa et al. suggested that adenosquamous carcinoma of the pancreas is much more common than one would expect.¹ Saijo et al. reported a doughnut-shaped Ga-67 uptake in a case of squamous cell carcinoma of the pancreas.² Kudo et al. reported vivid accumulation in adenocarcinoma of the pancreas.³ Weiland et al. showed accumulation in a Sister Mary Joseph nodule, a metastatic umbilical tumor, in a patient with primary pancreatic carcinoma.⁴ Although Ga-67 accumu-



A



B



C

Fig. 2 Large mass in pancreatic body was also demonstrated on T1-weighted (A), T2-weighted (B) and enhanced T1-weighted (C) MR images. Tumor showed low intensity (arrow) on T1-weighted MR image (A) and high intensity with low intensity margin (curved open arrow) on T2-weighted MR image (B). The tumor was enhanced marginally (open arrow) after administration of gadopentetate dimeglumine (C).

lation has been demonstrated in many neoplastic process, particularly lymphoma and lung cancer, few have reported an incidence of Ga-67 uptake in pancreatic cancer. In a review series, Ga-67 uptake has been found in only two of 14 pancreatic cancers.⁵

In this case, Ga-67 scintigraphy demonstrated an intense and homogeneous accumulation in the pancreatic



Fig. 3 Intense well-demarcated Ga-67 uptake in the upper abdomen (arrow) corresponds to the mass of pancreas. Uptake in the right lower lung field showed pneumonia (curved arrow).

cancer. The uptake mechanisms in this case may be explained in two ways: first, Ga-67 citrate accumulated in the adenosquamous carcinoma cells which had a high affinity for Ga-67 citrate, and second, Ga-67 accumulated in the inflammation caused by the cancer invasion. An intense uptake is often recognized in squamous cell carcinoma of other organs such as lung, maxilla, or upper respiratory tracts, which suggests that Ga-67 citrate scintigraphy may visualize the squamous cell element. Increases in serum CRP and the WBC count may support the second mechanism. Several reports have been made on Ga-67 uptake of pancreatic inflammatory tumors such as pancreatitis⁶ or infected pseudocyst.⁷ Because the se-

rum amylase level did not indicate severe acute pancreatitis, Ga-67 uptake in this case presumably was not due to pancreatic inflammation. It is reasonable that pneumonia affected the laboratory data indicating inflammatory changes. From these points of view, the first mechanism seemed to play a major part in this case. Adenosquamous carcinomas of the pancreas may be demonstrated with Ga-67 scan at high incidence. The Ga-67 scintigraphy may be useful in diagnosing pancreatic cancer with malignant squamous cell elements. Radiologists should remember adenosquamous carcinoma of the pancreas when encountering such scintigraphic findings.

CONCLUSION

A case of pancreas adenosquamous carcinoma with a discrete uptake of Ga-67 citrate suggested the potential utility of Ga-67 scintigraphy in the diagnosis of pancreatic adenosquamous carcinoma. Further investigations of the usefulness of Ga-67 scintigraphy and the mechanism of uptake in adenosquamous carcinoma are necessary.

REFERENCES

1. Ishikawa O, Matsui Y, Aoki I, Iwanaga T, Terasawa T, Wada A. Adenosquamous carcinoma of the pancreas: a clinicopathologic study and report of three cases. *Cancer* 46: 1192-1196, 1980.
2. Saijo N, Maeda K, Kita S, Ishigaki S, Sone H, Koshida Y, et al. An autopsy case of squamous cell carcinoma arising from pancreas. *Jpn J Clin Radiol* 28: 313-315, 1983.
3. Kudo M, Ikekubo K, Hino M, Todo A. Avid accumulation of Ga-67 citrate in adenocarcinoma of pancreas. *Clin Nucl Med* 14: 843-845, 1989.
4. Weiland FL, Carretta RF. Ga-67 citrate accumulation in a Sister Mary Joseph nodule. *Clin Nucl Med* 3: 335-336, 1978.
5. Silberstein EB. Cancer diagnosis. The role of tumor-imaging radiopharmaceuticals. *Am J Med* 60: 226-237, 1976.
6. Aburano T, Yokoyama K, Hisada K, Kakuma K, Ichiyanagi K. The role of Ga-67 citrate imaging in pancreatitis. *Clin Nucl Med* 13: 808-811, 1988.
7. Kennedy TD, Martin NL, Robinson RG, Preston DF. Identification of an infected pseudocyst of the pancreas with Ga-67 citrate: case report. *J Nucl Med* 16: 1132-1134, 1975.