CASE REPORT

Radiation Medicine: Vol. 23 No. 3, 213–215 p.p., 2005

MR Imaging of Primary Malignant Lymphoma of the Pancreas

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Pancreatic lymphoma is rare and is usually found as a large pancreatic mass. We report the case of a small 2-cm pancreatic lymphoma in a 54-year-old woman that had its histological origin in the pancreatic parenchyma. The mass showed homogeneously high signal-intensity on T2-weighted images and low signal-intensity on T1-weighted images. The infiltrative nature and hypovascularity in early-phase dynamic contrast study without encasement of arteries and veins were well demonstrated by MR imaging and were consistent with malignant lymphoma.

Key words: pancreas, magnetic resonance imaging, malignant lymphoma

Introduction

Malignant lymphoma predominantly involving the pancreas is rare.[1,2] In some cases, differentiation between pancreatic lymphoma and carcinoma might be difficult on radiological findings. It is important to make a correct diagnosis since the prognosis and essential treatment differ significantly. Several researchers have described that one of the characteristic features of malignant lymphoma of the pancreas is a homogenous large mass.[3-7] We report a case of pathologically proven small primary pancreatic lymphoma, which MR imaging clearly demonstrated.

Case Report

A 54-year-old woman was found to have a 2-cm mass in the body of the pancreas by abdominal sonography in a medical health check-up. She had no symptoms or abnormal laboratory data. CT demonstrated the tumor in the pancreas, which was minimally enhanced in an early-phase of dynamic contrast study. T2-weighted MR imaging revealed a homogeneously high signal-intensity mass in the pancreatic body that spread infiltratively and partially surrounded the splenic vein (Fig. 1A). On T1-weighted imaging, the mass was recognized as a low signal-intensity area (Fig. 1B). An early-phase dynamic contrast image with Gd-DTPA-BMA showed the poorly enhanced mass in the inferior aspect of the pancreatic body (Fig. 1C). There were no stenotic changes of the splenic vasculature (not shown as MR angiography), which was confirmed by contrast angiography. Multiple small lymph nodes were noted in the peritoneum (Fig. 1C). On the delayed-contrast T1-weighted images, the mass was homogeneously enhanced but was slightly lower in signal intensity than the adjacent parenchyma (Fig. 1D). MR cholangiopancreatography did not reveal stenosis or dilatation of the pancreatic ducts. No other primary lesions were revealed in the body by several imaging modalities including sonography, CT, gallium scintigraphy, and gastrointestinal survey. These imaging findings suggested malignant lymphoma of the pancreas. To determine the definisive diagnosis and treatment, surgical resection of the tumor with the pancreatic body and tail was performed. The resected specimen contained a 2-cm mass in the inferior aspect of the pancreatic body (Fig. 1E). Pathological examination revealed that the tumor was a B-cell lymphoma with a follicular growth pattern, partly containing diffuse foci, and mainly involving the pancreatic parenchyma (follicular lymphoma, Grade 2) (Fig. 1F).[3] The capsular structure was not identified at the periphery of the tumor, and the infiltrative nature of the tumor was demonstrated. Lymphomatous involvement of the peripancreatic lymph nodes, which were surgically removed, was not recognized.

Three years after resection of the tumor, para-aortic and pelvic lymphadenopathy was identified as recurrence, and chemotherapy was performed.

Received September 1, 2004; revsion accepted October 4, 2004.
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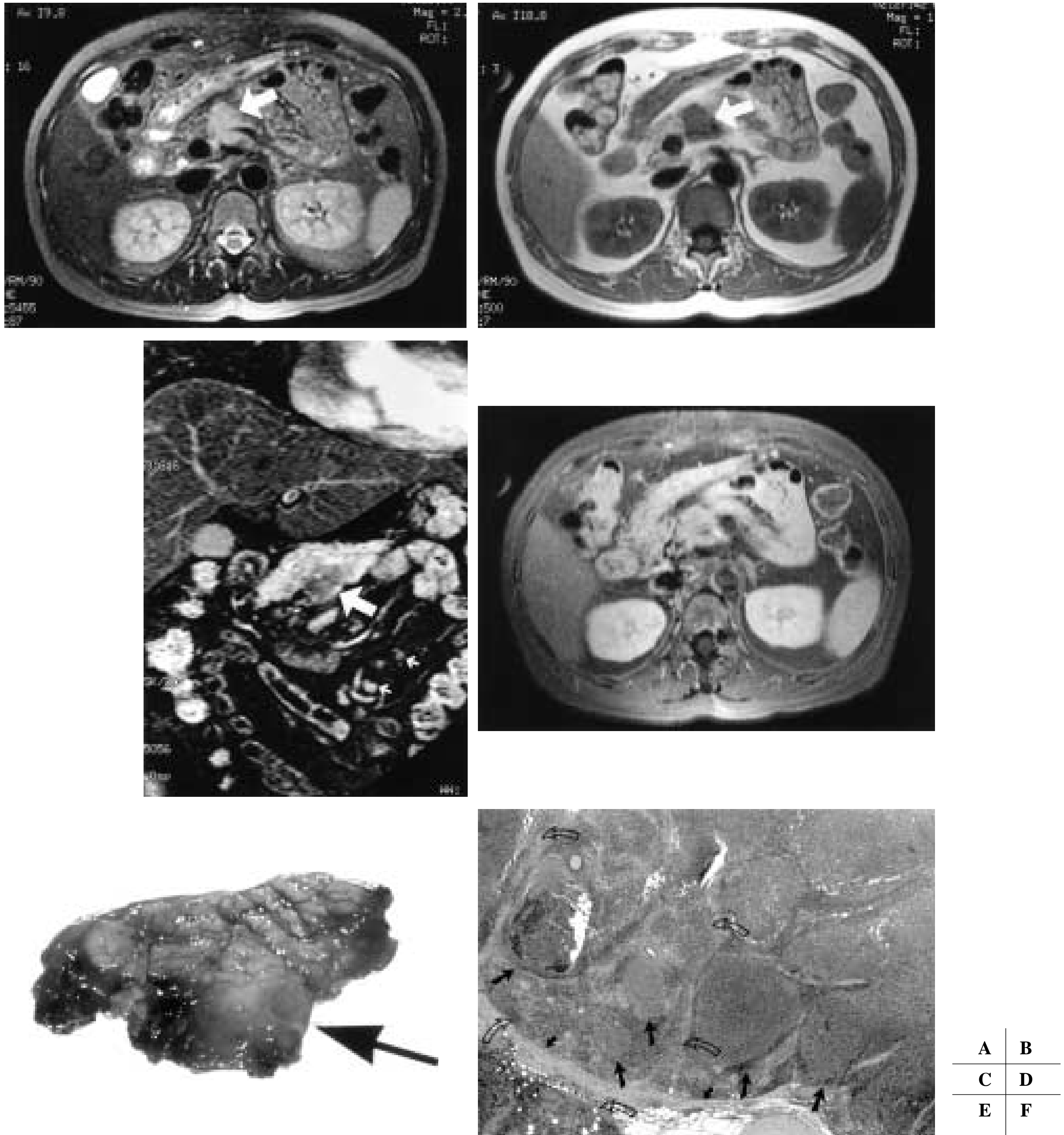

Fig. 1. A 54-year-old woman with malignant lymphoma in the pancreas.
A: T2-weighted MR image (TE=94 ms, echo train length = 16) with respiratory triggering shows a 2-cm homogeneously high signal-intensity mass (*arrow*) in the pancreatic body that partially surrounds the splenic vein.
B: T1-weighted MR image (TR=500 ms, TE=7 ms, echo train length = 3) with breath-holding shows the mass as a low signal-intensity area (*arrow*).
C: Dynamic contrast 3D fast spoiled gradient echo image (TR=5.1 ms, TE=1.2 ms, flip angle = 20°) in an early-phase demonstrates the poorly enhanced mass (*arrow*) in the inferior aspect of the pancreatic body. Multiple small peritoneal lymph nodes are noted (*small arrows*).
D: Postcontrast T1-weighted MR image (TR=500 ms, TE=7 ms, echo train length =3) reveals the homogeneously enhanced tumor, which is slightly hypointense compared with the adjacent pancreatic parenchyma.
E: Gross specimen demonstrates the mass (*arrow*) in the inferior aspect of the pancreatic body.
F: Microscopic examination with hematoxilin-eosin staining (×5) shows a follicular growth pattern partly containing diffuse foci (*arrows*) without any capsular structure between the pancreatic parenchyma (*blank arrows*) and the tumor, which might have been identified if the tumor had originated from either extra- or intra-pancreatic lymph node. Interlobular connective tissue (*small curved arrows*) is noted.

Discussion

Primary pancreatic lymphoma is rare. Less than 2% of 207 cases with histologically proven pancreatic malignancies were found to be malignant lymphoma.[1] Behrns *et al.* reviewed 107 cases of pancreatic involvement with non-Hodgkin's lymphoma, and 11% of them were regarded as primary pancreatic lymphoma.[2] Presenting symptoms were usually weight loss, abdominal pain, nausea, and palpable abdominal mass.[4,8] Most of the reported primary pancreatic lymphomas have formed a large solid mass greater than 5 cm in diameter, and the tumor infiltrated and surrounded the pancreas with or without regional lymphadenopathy.[4-7] One of the characteristic CT findings suggesting pancreatic lymphoma was a homogenous pancreatic mass larger than 7 cm in diameter.[9] The other CT pattern of the tumor has been reported as focal and circumscribed single or multiple masses.[10] The patient in this case had no symptoms, and the small pancreatic mass was found incidentally at a medical health check-up. These features were not typical for pancreatic lymphoma.

However, the MR findings of a homogenous pancreatic mass measuring 2 cm without obstruction of the pancreatic duct or encasement of the vasculature were consistent with malignant lymphoma.[4-6,9]

Because the prognoses of pancreatic lymphoma and carcinoma are so different, differentiation between them is very important.[2,4] Desmoplastic pancreatic ductal carcinoma demonstrates hypovascularity. However, carcinoma usually shows low signal-intensity on T2-weighted imaging and encasement of the splenic vein would be inevitable if the mass had partially surrounded it as in the current case.[11] The other possibility can be islet cell tumor, which demonstrates high signal-intensity on T2-weighted images. However, islet cell tumor is usually hypervascular on early-dynamic contrast study.[11] Pancreatic metastasis from another origin might also be raised,[10] in which case, vascular encasement might be observed. Thus, the possibility of these tumors was less likely than that of pancreatic lymphoma.

Pancreatic lymphoma has been reported to show an infiltrative growth pattern and may result in diffuse swelling of the pancreas or formation of a large mass.[4-7] In the case of large pancreatic lymphoma, the criteria for primary pancreatic lymphoma are still controversial. From the histogenetic point of view, the mass may develop from pancreatic parenchyma, intra-/peri-pancreatic nodes, or metastatic deposits from the other sites. Histological examination of the present tumor revealed that the lymphoma cells proliferated mainly in the pancreatic parenchyma. A nodal capsular structure at the periphery of the tumor, which might have existed if lymphoma had originated from the lymph node, was not found. Systemic examinations revealed no primary lesions of lymphoma. From these findings, the current case was regarded as primary pancreatic lymphoma, although this was difficult to conclude from radiological study alone.

The current MR study was basically performed with the breath-holding technique, except for respiratory triggered T2-weighted imaging. Using these methods, the small pancreatic mass and relationship between the pancreatic parenchyma and mass could be well demonstrated.

In conclusion, we report a case of small pancreatic lymphoma that was histologically determined to originate from the pancreatic parenchyma. MR imaging revealed the features of the mass including its infiltrative nature and hypovascularity in early-phase dynamic contrast study without any encasement of vasculature, findings which are consistent with malignant lymphoma.

References

1) Reed K, Vose PC, Jarstfer BS. Pancreatic cancer: 30 year review (1947 to 1977). *Am J Surg*, 138: 929–933, 1979.
2) Behrns KE, Sarr MG, Strickler JG. Pancreatic lymphoma: is it a surgical disease? *Pancreas*, 9: 662–667, 1994.
3) Jaffe ES, Harris NL, Stein H, Vardiman JW: eds. World Health Organization Classification of Tumors: Pathology and genetics of tumors of haematopoietic and lymphoid tissues. International Agency for Research on Cancer (IARC) Press, *Lyon France*, 2001.
4) Webb TH, Lillemoe KD, Pitt HA, Jones RJ, Cameron JL. Pancreatic lymphoma. Is surgery mandatory for diagnosis or treatment? *Ann Surg*, 209: 25–30, 1989.
5) James JA, Milligan DW, Morgan GJ, Crocker J. Familial pancreatic lymphoma. *J Clin Pathol*, 51: 80–82, 1998.
6) Teefey SA, Stephens DH, Sheedy PF 2nd. CT appearance of primary pancreatic lymphoma. *Gastrointest Radiol*, 11: 41–43, 1986.
7) Salvatore JR, Cooper B, Shah I, Kummet T. Primary pancreatic lymphoma: a case report, literature review, and proposal for nomenclature. *Med Oncol*, 17: 237–247, 2000.
8) Popescu RA, Wotherspoon AC, Cunningham D. Local recurrence of a primary pancreatic lymphoma 18 years after complete remission. *Hematol Oncol*, 16: 29–32, 1998.
9) Prayer L, Schurawitzki H, Mallek R, Mostbeck G. CT in pancreatic involvement of non-Hodgkin lymphoma. *Acta Radiol*, 33: 123–127, 1992.
10) Sheth S, Fishman EK. Imaging of uncommon tumors of the pancreas. *Radiol Clin North Am*, 40: 1273–1287, 2002.
11) Semelka RC, Ascher SM. MR imaging of the pancreas. *Radiology*, 188: 593–602, 1993.