Pancreatic Metastases from Renal Cell Carcinoma 12 Years after Nephrectomy: a case report

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Metastasis of renal cell carcinoma to the pancreas is uncommon. We present the case of a 77-year-old woman with pancreatic metastases from renal cell carcinoma, found 12 years after nephrectomy, and describe our radiologic findings. The metastatic tumors revealed intense enhancement on arterial phase CT scan after intravenous contrast medium administration, indicative of hypervascular characteristics. It also showed intense vascular blush on angiography. Special attention should be paid to the possibility of renal cell carcinoma metastases even more than 10 years after surgery, and contrast-enhanced dynamic imaging studies should be employed during routine follow-up to detect the metastatic lesions.

Key words: Pancreas, CT; Pancreas, metastases; Kidney neoplasms

Although rare, renal cell carcinoma is known to metastasize to the pancreas [1]. It comprises 2% of all pancreatic tumors resected in large pathologically proven case series [2]. Not uncommonly, late recurrence or metastases of renal cell carcinoma can present many years after surgery [3]. This long disease-free interval may lead to a diagnostic challenge. Advances in image techniques make early detection of such lesions more easily [4]. We report a case of isolated pancreatic metastases from renal cell carcinoma, and emphasize the image appearance on dynamic CT study.

CASE REPORT

Our patient was a 77-year-old woman who had undergone left radical nephrectomy in 1990 for renal cell carcinoma. No evidence of metastasis had been demonstrated at the time of the initial diagnosis. In November 2002, the patient presented with tarry stool passage. Panendoscope showed a protruding mass at second portion of the duodenum with bleeding. Epinephrine injection was given for hemostasis. Endoscopic biopsy of the aforementioned mass was also performed, but yielded a specimen without malignant cells. The hemogram revealed no abnormal findings except mild normocytic anemia. The results of levels of tumor markers and hormone tests were all within normal limit.

Abdominal CT scan was obtained using helical CT protocol for evaluation of the upper abdomen. The dynamic scans through the pancreas were performed in two series beginning 35 and 90 seconds after the start of administration of intravenous contrast medium (Iopamiro, 300 mg I/dl) delivered at a rate of 2.5 ml/sec. Seven discrete lesions were demonstrated in the pancreas, ranging from 0.5 ~ 2.5 cm in size and distributing over the head, body, and tail. They showed intense contrast enhancement, most conspicuous during arterial phase CT scan (Fig. 1a-1c). The largest
one at pancreatic head had central non-enhancing necrotic areas and protruded into the duodenal lumen with hourglass-like appearance (Fig. 1a). The angiography also revealed hypervascular lesions in the head, body, and tail of the pancreas (Fig. 2).

The patient underwent total pancreatectomy with splenectomy. The pancreas had multiple tumor deposits, which were consistent with metastases from renal cell carcinoma histologically (Fig. 3). In addition, a huge lipoma is found on round ligament (*) is also found incidentally (A: superior mesenteric artery; V: superior mesenteric vein; P: main portal vein). Note post left nephrectomy change.

**Figure 1.** CT scans obtained 35 seconds after intravenous contrast medium administration demonstrate multiple enhancing lesions (arrows) in the pancreatic head (a, b), body (b), and tail (c). A huge lipoma on round ligament (*) is also found incidentally (A: superior mesenteric artery; V: superior mesenteric vein; P: main portal vein).

**DISCUSSION**

The pancreas is an unusual site of metastasis from non-pancreatic primary tumors. Metastatic pancreatic tumors account for less than 5% of all pancreatic malignancies in clinical series. The most common primary sites of pancreatic metastasis include the large bowel, lung, breast, skin, and kidney [1, 2]. Among them, renal cell carcinoma is the most common primary tumor leading to a solitary pancreatic metastasis [5].

Renal cell carcinoma may behave in a highly variable manner. McNichols et al. reported that 11% of metastatic renal cell carcinoma occurred more than
10 years after initial diagnosis, even following complete resection of early-stage renal cell carcinoma [3]. In other words, patients treated for renal cell carcinoma are always at risk of delayed metastatic disease.

Patients with pancreatic metastases from renal cell carcinoma may experience weight loss or abdominal pain, and some of them are diagnosed incidentally during regular image surveillance for the primary renal cell carcinoma [1]. Our patient presented with gastrointestinal bleeding, which had been described in previous reports [6, 7].

Depiction of metastatic renal cell carcinoma in the pancreas is important, since aggressive surgical resection may be beneficial, particularly for isolated pancreatic metastases. Identification of the sites and extent of multiple lesions is also crucial for surgical planning [8]. Thus, routine image follow-up plays an important role in early detection and detailed evaluation of these lesions.

Pancreatic metastases from renal cell carcinoma usually appear as hyper-vascular lesions on radiologic imaging. Ultrasound characteristically shows solitary or multiple hypo-echoic masses, or rarely, global enlargement of the pancreas with diffuse hypo-echogenicity. Either color or power Doppler sonography can demonstrate their hyper-vascularity [9]. The CT features closely resemble those of primary renal cell carcinoma. Well-defined hyper-enhancing masses are displayed after intravenous contrast medium injection. Smaller lesions are likely to enhance uniformly, whereas larger lesions often have internal ischemic or necrotic components that present as central non-enhancing areas [10]. One of our lesions showed central area of necrosis with peripheral enhancement even of small size (Fig. 1b). The angiography typically demonstrates hyper-vascular masses with an intense vascular blush [6]. On MR images, the...
distinctive features include homogeneous enhancement in small lesions, rim enhancement in large lesions, and high signal intensity on T2-weighted images [7]. In addition, chemical shift MRI may be useful in diagnosis of pancreatic metastases from clear cell renal carcinoma based on loss of signal intensity secondary to intra-cellular lipid [11].

In patients with suspected metastatic renal cell carcinoma of the pancreas, early-phase contrast-enhanced CT scan should be performed. The imaging characteristics of the lesions in dynamic helical CT had been defined by Ng et al. The patterns of enhancement of the metastatic deposits and the normal background pancreatic tissue differed. The metastatic deposits enhanced most conspicuously during the early phase and were less well seen in the delayed phase. Small lesions might be overlooked in conventional CT techniques without early-phase scanning [4]. These findings highly correlate with the hypervascular nature of such metastases, providing important clues in the differentiation from primary pancreatic ductal adenocarcinoma, which tends to be relatively hypovascular.

Distinction between metastatic renal cell carcinoma of the pancreas and primary pancreatic islet cell tumors may be more problematic. Both these lesions are hypervascular tumors and show intense contrast enhancement on CT, MRI, and angiography. The differentiation may be obtained from a clinical history of known renal cell carcinoma. Furthermore, elevated hormone levels and related symptoms may be seen in patients with functioning islet cell tumors. Chemical shift MRI may be helpful in differentiation [4, 7, 11].

Surgical resection of pancreatic metastases from renal cell carcinoma is currently the treatment of choice in selected cases when metastatic disease is confined to the pancreas. In such cases, surgery may provide a 5-year survival rate of 31%. Immunotherapy with interferon has shown promising results in some studies, but its definite efficacy remains controversial. As late recurrence is not uncommon and surgical intervention can improve outcome, long-term follow up is mandatory in patients with history of renal cell carcinoma [2].

In conclusion, pancreatic metastases from renal cell carcinoma have distinctive CT features. Their CT characteristics closely resemble those of primary renal cell carcinoma. Thus, we recommend dynamic CT study for follow-up, thus facilitate early detection of pancreatic metastases from renal cell carcinoma.

REFERENCES
腎細胞癌手術切除後十二年出現胰臟轉移：病例報告

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腎細胞癌很少轉移到胰臟。本文報告一名七十七歲女性腎細胞癌患者於手術切除腎臟十二年後出現胰臟轉移，並描述其影像學之表現。轉移的腫瘤在靜脈注射對比劑後的動脈相電腦斷層掃描中呈現強烈的顯影，表示其高血管性的特徵。其血管攝影亦顯示出其高血管性。腎細胞癌即使已手術切除十年以上，仍需特別注意其轉移的可能性，並在常規追蹤中應用對比劑顯影之動態影像學檢查來偵測可能的轉移病灶。

關鍵詞：胰臟轉移、胰臟、電腦斷層、腎腫瘤