

Computed tomography findings of pancreatic metastases from renal cell carcinoma*

Achados da tomografia computadorizada em metástases pancreáticas do carcinoma de células renais

Adilson Prando¹

Abstract **OBJECTIVE:** To present computed tomography findings observed in four patients submitted to radical nephrectomy for renal cell carcinoma who developed pancreatic metastases afterwards. **MATERIALS AND METHODS:** The four patients underwent radical nephrectomy for stage T1 ($n=2$) and stage T3a ($n=2$) renal cell carcinoma. The mean interval between nephrectomy and detection of pancreatic metastases was eight years. Two asymptomatic patients presented with solitary pancreatic metastases (confined to the pancreas). Two symptomatic patients presented with single and multiple pancreatic metastases, both with tumor recurrence in the contralateral kidney. **RESULTS:** Computed tomography studies demonstrated pancreatic metastases as solitary ($n=2$), single ($n=1$) or multiple ($n=1$) hypervascular lesions. Partial pancreatectomy was performed in two patients with solitary pancreatic metastases and both are free of disease at four and two years after surgery. **CONCLUSION:** Pancreatic metastases from renal cell carcinoma are rare and can occur many years after the primary tumor presentation. Multiple pancreatic metastases and pancreatic metastases associated with tumor recurrence in the contralateral kidney are uncommon. Usually, on computed tomography images pancreatic metastases are visualized as solitary hypervascular lesions, simulating islet-cell tumors. Surgical management should be considered for patients with solitary pancreatic lesions.

Keywords: Pancreatic metastases; Renal cell carcinoma; Computed tomography.

Resumo **OBJETIVO:** Apresentar os achados da tomografia computadorizada observados em quatro pacientes submetidos a nefrectomia radical por carcinoma de células renais e que apresentaram metástases pancreáticas. **MATERIAIS E MÉTODOS:** Os quatro pacientes foram submetidos a nefrectomia radical por carcinoma de células renais, estádios T1 ($n=2$) e T3a ($n=2$). O intervalo médio entre a nefrectomia e a detecção das metástases foi de oito anos. Dois pacientes apresentaram metástase pancreática solitária (confinada ao pâncreas) e dois apresentaram metástases pancreáticas única e múltiplas, respectivamente, ambos com recorrência tumoral no rim contralateral. **RESULTADOS:** As metástases pancreáticas foram visualizadas, na tomografia computadorizada, como lesões hipervascularizadas, solitária ($n=2$), única ($n=1$) ou múltiplas ($n=1$). Foi realizada pancreatectomia parcial em dois pacientes com metástase solitária. Estes pacientes estão livres da doença quatro e dois anos após a cirurgia, respectivamente. **CONCLUSÃO:** Metástases pancreáticas de carcinoma de células renais são raras, podendo ocorrer muitos anos após a apresentação inicial. Metástases pancreáticas múltiplas e metástases pancreáticas associadas a recorrência tumoral no rim contralateral são incomuns. À tomografia computadorizada, as metástases pancreáticas aparecem como lesões hipervascularizadas e solitárias, simulando tumores das ilhotas celulares. O tratamento cirúrgico das lesões solitárias deve ser considerado.

Unitermos: Metástases pancreáticas; Carcinoma de células renais; Tomografia computadorizada.

Prando A. Computed tomography findings of pancreatic metastases from renal cell carcinoma. *Radiol Bras.* 2008;41(4):225–228.

INTRODUCTION

Renal cell carcinoma (RCC) is the most frequent type of cancer affecting the kid-

neys, and represents about 2% of all malignant lesions affecting adult individuals⁽¹⁾. RCC is characterized by a significant morbidity and mortality, with an estimate of about 35,000 new cases and 12,480 deaths reported in 2003 in the United States of America⁽²⁾.

Complete surgical resection still remains as the sole curative management in these cases. However, recurrence occurs in about 20%–30% of patients with localized

tumors, most of times within a mean period ranging between one and three years following the surgery⁽³⁾. Occasionally, a late tumor recurrence may occur, generally many years after the initial treatment. Most frequent sites of tumor recurrence are lungs, bones, renal lodges, brain, liver and contralateral kidney⁽⁴⁾. Less frequently, the following organs are involved: adrenal glands, gall bladder, thyroid, pancreas, muscles, skin or subcutaneous tissue.

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Received July 26, 2007. Accepted after revision September 24, 2007.

The present study was aimed at describing computed tomography (CT) findings observed in four patients who had developed pancreatic metastases after radical nephrectomy. Two patients presented only with solitary pancreatic metastasis (confined to the pancreas), the third one, with single pancreatic metastasis associated with tumor recurrence in the contralateral kidney, and the fourth one, with multiple pancreatic metastases in association with recurrent tumor in the contralateral kidney, pulmonary and subcutaneous metastases.

MATERIALS AND METHODS

Medical records and CT studies of four (three women and one man) patients with pancreatic metastases from RCC were reviewed. The patients' ages ranged between 38 and 63 years.

At the time of the diagnosis, all the primary tumors were T1-stage (two patients) and T3a-stage (two patients) conventional clear cell carcinomas. The mean time interval between nephrectomy and detection of pancreatic metastases was eight years.

All of the patients were submitted to single slice helical CT. After localization of the pancreas, (non-contrast-enhanced, 10 mm collimation, 10 mm interval scans), two intravenous contrast-enhanced phases were obtained in the pancreatic area (at 25 and 70 seconds). Each of the series was obtained in a single apnea, with 3 mm col-

limation, *pitch* 2:1, 120 kVp and 240–280 mA. A third phase was obtained at 120 seconds (7 mm collimation and *pitch* 1:1), covering the whole abdomen, with 150 ml non-ionic contrast injection with 300 mg of iodine/dl, at a rate of 3 ml/s. So the images were reconstructed to 2.5 mm for obtention of multiplanar reformatting.

Solitary pancreatic metastasis, that is to say, with lesions confined exclusively to the pancreas, was observed in two patients, both asymptomatic. The third patient presented a single pancreatic metastasis associated with tumor recurrence in the contralateral kidney, and the fourth patient presented with multiple pancreatic metastasis associated with pulmonary and subcutaneous metastasis besides tumor recurrence in the contralateral kidney. These two latest patients were symptomatic (with weight loss, abdominal pain or hematuria).

RESULTS

Four patients (three women and one man) with mean age 50 years presented with pancreatic metastases from RCC classified into solitary ($n = 2$), single ($n = 1$) or multiple ($n = 1$). At the time of the radical nephrectomy, all of the patients presented T1-stage ($n = 2$) and T3a-stage ($n = 2$) RCC (conventional clear cell carcinomas). Mean time interval between nephrectomy and detection of pancreatic metastasis was eight years. All of the single lesions presented

hypervascularized at intravenous contrast-enhanced CT studies mimicking pancreatic islet-cell tumors.

The mean size of the lesions was 1.8 cm (ranging between 0.8 and 2.8 cm). In two patients with solitary metastasis, the lesion was localized in the tail of the pancreas (Figures 1 and 2). These two patients were submitted to partial pancreatectomy, and both are currently free of the disease, respectively four and two years after the surgery. One patient presented with single metastasis in the body of the pancreas (Figure 3) and tumor recurrence in the contralateral kidney. The follow-up of this patient was discontinued. The fourth patient presented with multiple, small, hypervascularized pancreatic metastases, recurrence of the tumor in the contralateral kidney and pulmonary and subcutaneous metastases (Figure 4). This patient has been treated with immunotherapy and, 27 months after the diagnosis, he shows stabilized metastatic disease.

DISCUSSION

Twenty-three percent of patients present with metastases at the time of detection of RCC, and 25% of them develop metastasis within five years following nephrectomy⁽⁵⁾. The greatest diameter, stage of the tumor, as well as its nuclear grade represent relevant factors for determining the prognosis for tumor recurrence⁽⁴⁾.

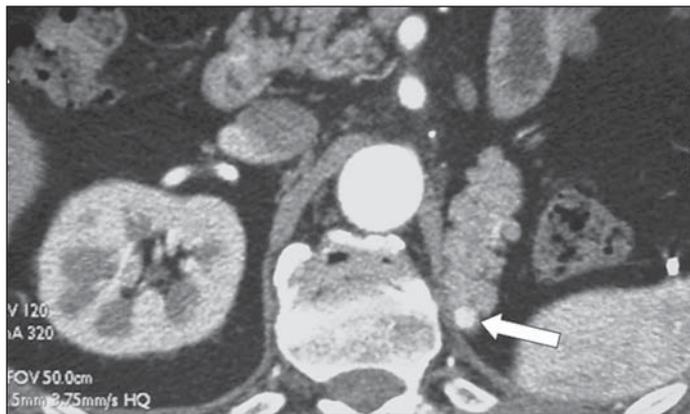


Figure 1. Solitary pancreatic metastasis. Male, 58-year-old patient submitted to left radical nephrectomy for T1-stage RCC. Twelve years later, abdominal CT has demonstrated the presence of a small-sized, solid, hypervascularized lesion with 0.8 cm in diameter in the tail of the pancreas. Partial pancreatectomy and anatomopathological study demonstrated a solitary metastasis from RCC confined to the pancreas.



Figure 2. Solitary pancreatic metastasis. Female, 63-year-old patient submitted to left radical nephrectomy for T1-stage RCC. Five years later, intravenous contrast-enhanced helical CT demonstrated a solid, hypervascularized lesion measuring 2.5 cm × 1.6 cm in diameter (arrow) in the pancreatic tail. Partial pancreatectomy and anatomopathological study demonstrated a solitary metastasis from RCC confined to the pancreas.

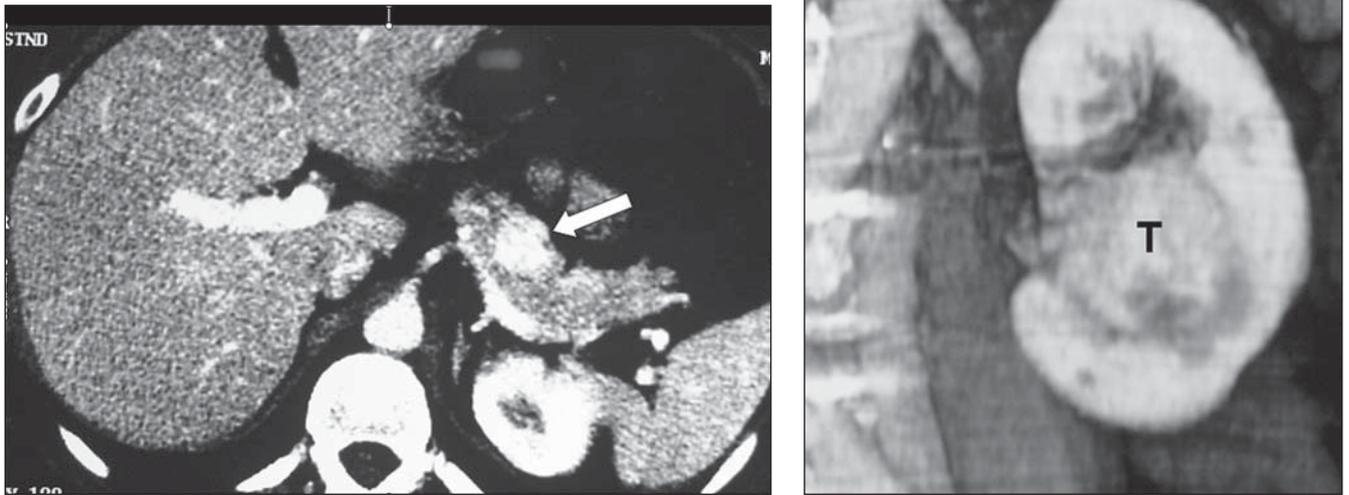


Figure 3. Single pancreatic metastasis associated with tumor recurrence in contralateral kidney. Female, 38-year-old patient was submitted to right radical nephrectomy for T3a-stage RCC. Six years later, the patient presented with abdominal pain, weight loss and hematuria. **A:** Intravenous contrast-enhanced CT has demonstrated the presence of a solid, hypervascularized mass in the pancreatic body/tail transition (arrow); **B:** intravenous contrast-enhanced axial slice has demonstrated a tumor-like, central, solid lesion centralized (T) in the left kidney.

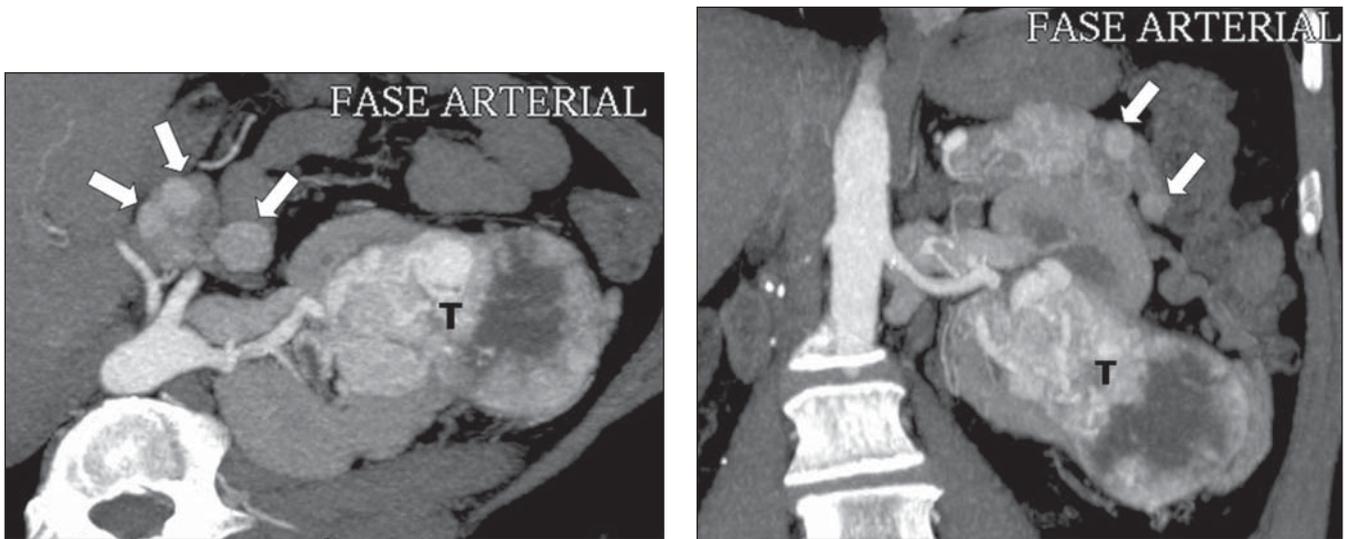


Figure 4. Multiple pancreatic metastasis and tumor recurrence in contralateral kidney. Female, 43-year-old patient submitted to right radical nephrectomy for T3a-stage RCC. Eleven years later, the patient complained of weight loss and hematuria. **A:** Axial 3D reconstruction of axial intravenous contrast-enhanced CT slices has demonstrated multiple, small solid, hypervascularized lesions in the head and tail of the pancreas (arrows); **B:** Coronal reconstruction of axial intravenous contrast-enhanced CT slices has demonstrated a large, tumor-like (T), solid and heterogeneous lesion in the left kidney. The patient also presented with pulmonary and subcutaneous metastases.

Pancreatic metastases from any tumor are exceptionally uncommon. Pancreatic involvement by metastasis from RCC represents only 0.25%–3% of cases⁽⁶⁾. RCC propagation may occur via the vascular system (hematogenic metastasis) or via the

lymphatic system (lymphogenic metastasis)⁽⁷⁾.

Pancreatic metastases from RCC are solitary (exclusively confined to the pancreas) in 80% of patients and present a more favorable prognosis than primary

pancreatic tumors^(8–11). Although a consensus is still to be reached regarding a protocol for following-up patients submitted to radical nephrectomy for localized neoplastic disease⁽¹²⁾, intravenous contrast-enhanced CT, particularly the arterial phase

of the study, is considered by the authors as the modality of choice in the follow-up of patients submitted to surgery for renal cancer. Considering that, metastases from RCC may occur many years after the surgical resection, follow-up should include CT of chest, abdomen and pelvis at least one a year. This method is useful not only for detecting local recurrence but also distant metastases. Magnetic resonance imaging and PET-CT also constitute useful methods in the follow-up in selected cases⁽¹³⁾.

Usually, pancreatic metastases from RCC are solitary and hypervascularized and so may mimic primary islet cell tumors⁽¹⁴⁾, like in the case of two patients in the present casuistic. These two patients with solitary pancreatic metastasis presented T1-stage tumors at the time of the nephrectomy and developed metastases, respectively, 12 and five years after the surgery. The third patient presented a single pancreatic metastasis and tumor recurrence in the contralateral kidney. These findings were detected six years after the nephrectomy for a T3a-stage RCC. The fourth patient presented multiple pancreatic metastases in association with tumor recurrence in the contralateral kidney, pulmonary and subcutaneous metastases, 11 years after surgical resection a T3a-stage RCC. The differentiation between a primary islet cell tumor and metastatic involvement by RCC may be difficult, considering the hypervascularized appearance of both lesions at CT. In this circumstance, antecedents of a primary tumor should be researched, considering that metastases from RCC may occur many years after nephrectomy. Generally, functional islet cell tumors are small and symptomatic, whereas the non-functional ones are large. In dubious cases and if possible, CT-guided percutaneous fine-needle aspiration biopsy should

be performed to allow an appropriate pre-operative diagnosis⁽¹¹⁾.

The finding of multiple pancreatic metastases observed in a patient in the present casuistic is compatible with previous descriptions^(10,15). Although the majority of bilateral tumors present synchronically, asynchronous lesions may occur many years after the original nephrectomy, demanding long follow-up periods⁽¹⁶⁾. Pancreatic metastases in association with synchronic renal lesions like those observed in two patients in the present casuistic have not been reported in the literature. In cases of a solitary metastatic lesion (confined to the pancreas), where the tumor can be completely resected, the patients may present excellent rates of disease-free survival lasting as long as five years⁽¹⁷⁾.

CONCLUSIONS

Pancreatic metastases from RCC are not frequent and may occur many years after the initial presentation. The solitary nature of pancreatic metastases from RCC, i.e. metastasis restricted to the pancreas, is reported in the greatest majority of cases. At CT, pancreatic metastases appear as hypervascularized lesions mimicking islet cell tumors. Patients with solitary pancreatic metastasis may benefit from surgical resection of the lesion. Multiple pancreatic metastases, as well as metastases associated with tumor recurrence in the contralateral kidney are not often seen.

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