MDCT features of pancreatic metastases from renal cell carcinoma

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Aims and objectives

Pancreatic metastases represent between 2% and 5% of all pancreatic malignant tumors [1]. Although pancreatic metastases from renal cell carcinoma (RCC) are rare, with an incidence ranging from 2% to 11%, the pancreas seems to be an elective site for metastatic spread in case of RCC [2, 3]. The disparity in prognosis and management of patients affected by primary or secondary tumors of the pancreas, together with the fact that in selected cases of pancreatic metastases a radical surgical resection can achieve prolonged survival, underlines the importance of detection and characterization of these lesions at imaging. The imaging technique of choice for staging RCC is multiphasic MDCT, which allows identification metastases in the whole body. Our aim was, therefore, to describe imaging characteristics of RCC metastases to the pancreas at MDCT.
**Methods and materials**

We retrospectively reviewed the CTs from 28 patients with a histologically confirmed diagnosis of renal cell carcinoma and metastases to the pancreas. The patient population include 13 females and 15 males, with a mean age of 66.8 years and with a total of 87 pancreatic metastases from renal cell carcinoma. All patients underwent multiphasic MDCT of the abdomen including late arterial and portal-venous phase scans.

Images were evaluated on a PACS workstation in consensus by two readers with 5 years of experience in abdominal imaging and 8 years of experience in abdominal imaging, respectively. All the lesions encountered in each patient were analyzed.

For each lesion in the pancreas we analyzed the site (head, body or tail of the pancreas), the diameter, the margins (well-defined or ill-defined), the presence of vascular infiltration, and the caliber of the main pancreatic duct upstream to the neoplasm. Both in the arterial and in the venous phase each lesion was subjectively evaluated as hypervascular, isovascular or hypovascular compared to the normal pancreatic parenchyma, and the enhancement pattern was considered homogeneous or inhomogeneous.

The lesions were divided in two groups based on their maximum diameter: lesions with a diameter ≤10 mm formed Group A (n=45) while lesions >10 mm formed Group B (n=42).

Fisher's test was used to compare enhancement patterns between the two groups.
Results

- Pancreatic metastases were solitary in 11 patients (39.3% of cases) and multiple in 17 patients, with a mean number of 3.1 lesions per patient. The lesions were located in the head, body and tail of the pancreas respectively in 50 (57.5%), 19 (21.8%) and 18 (20.7%) cases. The mean tumor diameter was 17.6±17.8 mm. All the lesions had well-defined margins, and the main pancreatic duct was dilated (caliber > 4mm) in 12.6% of cases.

- In the arterial phase 85 (97.7%) lesions were hypervascular, 1 (1.15%) was isovascular, and 1 (1.15%) hypovascular compared to the normal parenchyma, with homogeneous enhancement in 60 cases (68.96%) Fig. 1 on page 5 Fig. 2 on page 5.

- In the venous phase 52 (60.5%) lesions were hypervascular, 33 (38.4%) isovascular and 1 (1.15%) hypovascular compared to the normal pancreatic parenchyma, with homogeneous enhancement in 54 cases (62.1%) Fig. 3 on page 6.

- When comparing vascularity in the different phases in the two groups, in the arterial phase hypervascularity was observed in 100% of the lesions in group A and 95.3% of the lesions in group B (p=n.s.) and in the venous phase in 71.1% of lesions of group A and 50% of cases of group B (p=n.s.).

- When comparing the homogeneity of enhancement in the two groups, the difference between group A and group B was significant both in the arterial and in the venous phase. In the arterial phase the enhancement was homogeneous in 91.1% of group A and in 45.2% of group B, while in the venous phase, similarly, in 82.2% of cases of group A and in 40.5% cases of group B (all p<0.0001). In the arterial phase the diameter of homogeneous lesions was significantly smaller than that of inhomogeneous lesions (13.08 ± 1.734 vs 27.59 ± 4.253 mm; p=0.0003) Fig. 4 on page 7. A similar though not significant difference was noted in the venous phase, where homogeneous lesions tended to be smaller than inhomogeneous lesions (13.52 ± 1.92vs 24.24 ± 3.69 mm; p=0.0057).
Fig. 1: 74 year-old male with a small homogeneous hyperenhancing metastasis in the head of the pancreas.

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Fig. 2: 63 year-old female with a small homogeneous metastasis in the body of the pancreas, hyperdense in the arterial phase, causing dilatation of the main pancreatic duct upstream.

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**Fig. 3:** 63 year-old female with a small homogeneous metastasis in the body of the pancreas, isodene in the venous phase, causing dilatation of the main pancreatic duct upstream.

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**Fig. 4:** 54 year-old male with a large hyperenhancing inhomogeneous metastasis in the tail of the pancreas.

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Conclusion

Contrast-enhanced multiphasic CT is commonly used for staging of renal-cell carcinoma. In our series, most cases, metastases from RCC to the pancreas appeared hyperattenuating both in the arterial and venous phase, with variable enhancement patterns. The majority of lesions smaller than 10 mm had homogeneous enhancement both in the arterial phase and in the venous phase, while this occurred only in less than half of the lesions larger than 10 mm. In conclusion, pancreatic metastases from RCC are solid well-defined lesions, hypervascular in the arterial phase and most often hyperdense in the venous phase. Smaller lesions, with diameter up to 1 cm, show homogeneous enhancement in the vast majority of cases.
References

