

Case 12

Pulmonary Metastases from Renal Cell Carcinoma: Follow-up CT scan after Nephrectomy

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History

A 47-year-old female patient, with a history of nephrectomy due to renal cell carcinoma (RCC) 18 months previously, was presented for a follow-up CT scan. A combined thoracic and abdominal contrast CT scan was performed.

Diagnosis

CT images showed bilateral pulmonary lesions with contrast enhancement, suggesting multiple metastases (Fig. 1). The lesions with feeding arteries, as well as the absence of the left kidney and its artery, were highlighted in the VRT images (Fig. 2).

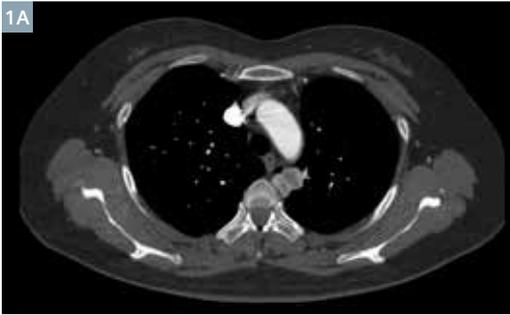
Comments

Follow-up CT scans are routinely performed on oncology patients to detect or to rule out recurrence and metastases of the tumor. In this case, 80 kV was applied to enhance the contrast and to reduce the radiation dose combined with CARE Dose4D (real-time anatomic exposure control). Image quality was greatly improved by using the iterative reconstruction technique SAFIRE (sinogram affirmed iterative reconstruction). Additional three-dimensional reconstructions of the pulmonary metastases provided a clear overview. ■

Examination Protocol

Scanner	SOMATOM Perspective
Scan area	Chest/Abdomen
Scan length	786 mm
Scan direction	Cranio-caudal
Scan time	12 s
Tube voltage	80 kV
Tube current	171 mAs
Dose modulation	CARE Dose4D
CTDI _{vol}	4.81 mGy
DLP	378 mGy cm
Effective dose	5.67 mSv
Rotation time	0.6 s
Pitch	0.9
Slice collimation	0.6 mm
Slice width	1.0 mm
Reconstruction increment	0.7 mm
Reconstruction kernel	I31s (SAFIRE)
Contrast	
Volume	80 mL + saline
Flow rate	4 mL/s
Start delay	Bolus triggering in the ascending aorta with a threshold of 100 HU and an additional delay of 7 s

In clinical practice, the use of SAFIRE may reduce CT patient dose depending on the clinical task, patient size, anatomical location, and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task. The following test method was used to determine a 54 to 60% dose reduction when using the SAFIRE reconstruction software. Noise, CT numbers, homogeneity, low-contrast resolution and high contrast resolution were assessed in a Gammex 438 phantom. Low-dose data reconstructed with SAFIRE showed the same image quality compared to full dose data based on this test. Data on file.



1

Axial (Figs. 1A and 1B), coronal (Fig. 1C) and sagittal (Fig. 1D) MPR images show bilateral pulmonary lesions with contrast enhancement, suggesting multiple metastases.



2

The pulmonary metastatic lesions with feeding arteries, as well as the absence of the left kidney and its artery, are highlighted in the VRT images.

