

Metastatic Clear Cell Renal Cell Carcinoma and Complicated Renal Cyst

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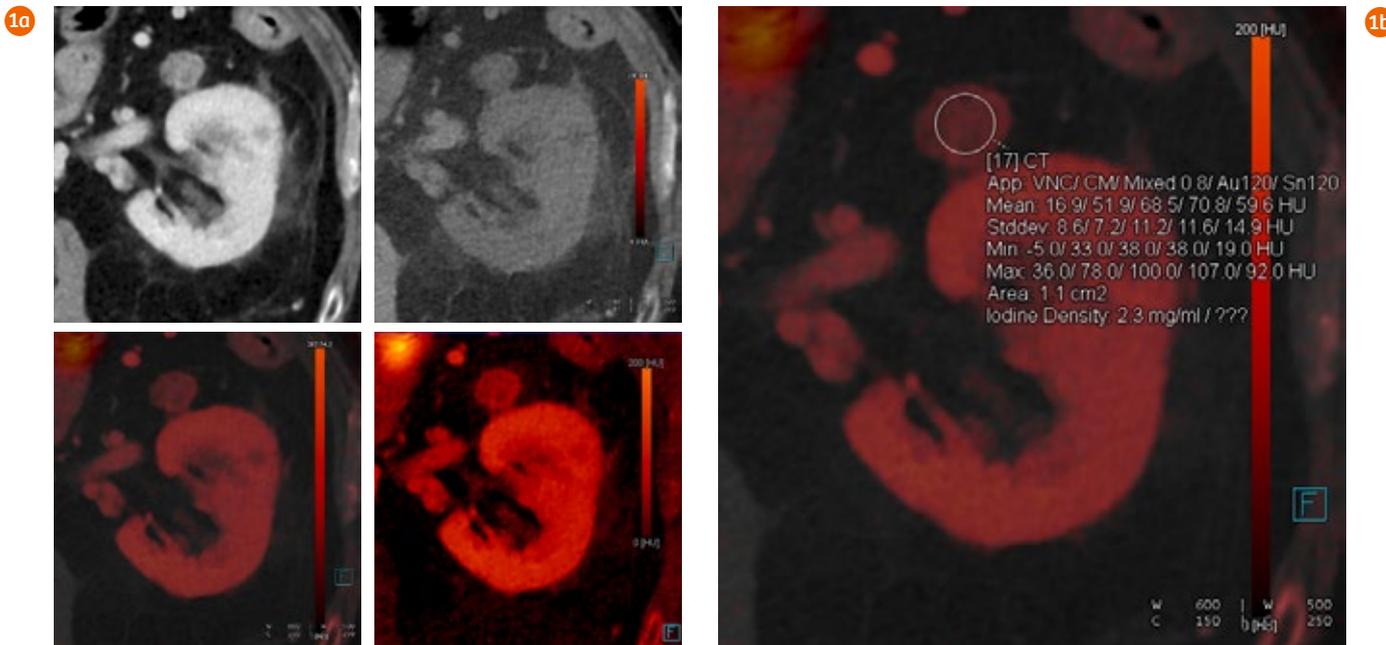
History

A 76-year-old male patient, suffering from metastatic clear cell renal cell carcinoma (RCC), underwent a right-sided nephrectomy and was post-operatively treated with Pazopanib. A follow-up thoraco-abdomino-pelvic CT examination was ordered for restaging. TwinBeam Dual Energy (TBDE) CT was performed.

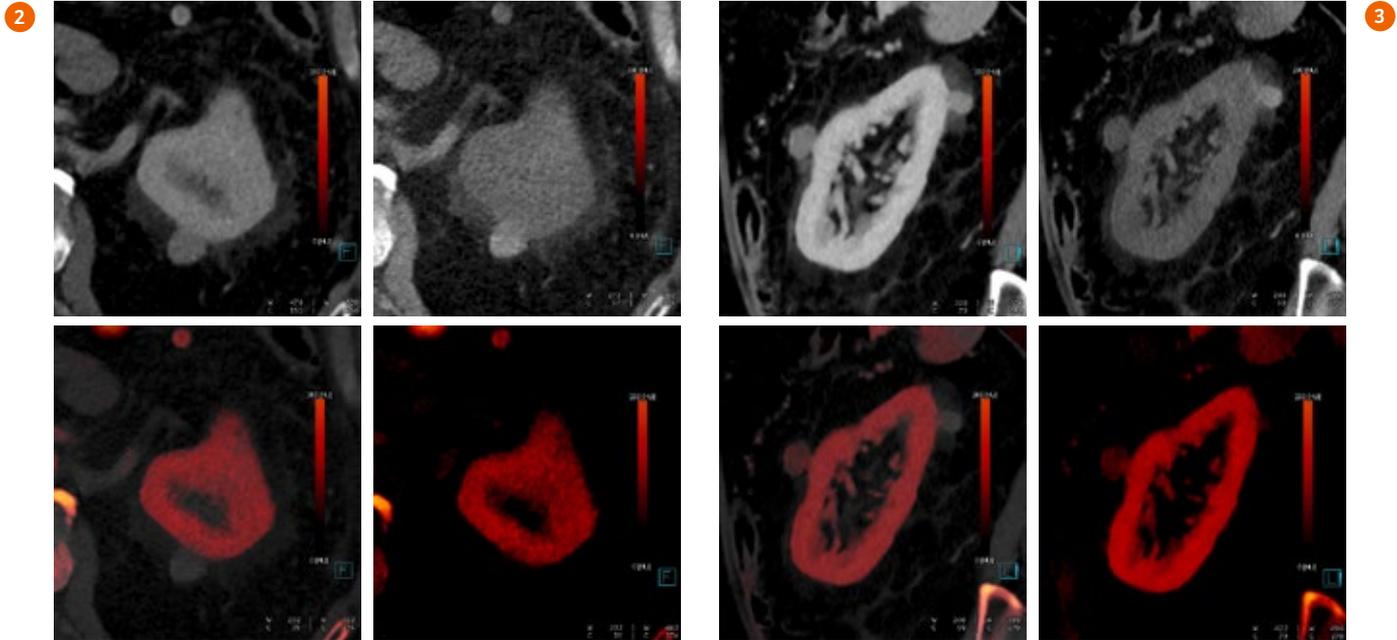
Diagnosis

TBDE CT mixed images revealed two small, regular-shaped renal lesions – middle anterior (lesion 1) and upper posterior (lesion 2) to the left kidney, measuring 2.1 × 1.6 cm and 1.2 × 1.5 cm in size, with elevated attenuation. Lesion 1 was hypodense in the virtual noncontrast (VNC) image and showed iodine uptake in the iodine map and iodine/VNC fused image (Figs. 1 and 3).

This suggested a metastasis. Lesion 2 remained hyperdense in the VNC image, and showed no iodine uptake in the iodine map and iodine/VNC fused image (Figs. 2 and 3). The lesion demonstrated characteristics compatible with a complicated cyst (Bosniak category II).



1 Lesion 1 is hypodense in VNC (UR) image and shows clear enhancement in mixed (UL), VNC/iodine fused (LL) and iodine (LR) images (Fig. 1a). DE ROI measurements (Fig. 1b) reveal an increased CT value of 51.9 HU with an iodine density of 2.3 mg/mL.



2 Lesion 2 is hyperdense in VNC (UR) image and shows no enhancement in mixed (UL), VNC/iodine fused (LL) and iodine (LR) images (A).

3 An overview of both lesions.

Comments

The differential diagnosis of a newly visualized renal lesion becomes essential for management of the patient and estimation of the prognosis.[1] In this case, two renal lesions were visualized and both showed elevated attenuation in the contrast scanning – does the increased density characterize contrast enhancement? Traditionally, it would require another noncontrast scan to find out. However, TBDE CT enables simultaneous image acquisition at two different energy levels. The same dataset can be processed using *syngo.CT DE Virtual Unenhanced* to generate virtual noncontrast images as well as iodine maps. Comparison of the attenuation values in the VNC images, mixed images, and iodine maps reveal iodine uptake in lesion 1 and no uptake in lesion 2, which correlates with the lesion characteristics of a metastasis (lesion 1) and a complicated cyst (lesion 2). In such a clinical scenario, TBDE CT helps the physician to make a confident differential diagnosis. ●

Examination Protocol

Scanner	SOMATOM Definition Edge		
Scan area	TAP	Rotation time	0.33 s
Scan mode	TwinBeam Dual Energy	Pitch	0.25
Scan length	648 mm	Slice collimation	64 × 0.6 mm
Scan direction	Cranio-caudal	Slice width	1.5 mm
Scan time	22 s	Reconstruction increment	1 mm
Tube voltage	AuSn120 kV	Reconstruction kernel	Q30f
Effective mAs	554 mAs	Contrast	370 mg/mL
Dose modulation	CARE Dose4D™	Volume	90 mL
CTDI _{vol}	11.8 mGy	Flow rate	3 mL/s
DLP	788.2 mGy cm	Start delay	45 s
Effective dose	11.8 mSv		

References

[1] L. Pallwein-Prettner et, al. Assessment and characterisation of common renal masses with CT and MRI. *Insights Imaging* (2011) 2:543–556

The outcomes by Siemens' customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption), there can be no guarantee that other customers will achieve the same results