

Case 5

SOMATOM Definition Dual Energy Scanning: Liver Imaging with Optimum Contrast

By Satoru Kitano, MD, Nagaaki Marugami, MD, Toshiaki Taoka, MD, PhD, Kimihiko Kichikawa, MD, PhD

Department of Radiology, Nara Medical University, Nara, Japan

HISTORY

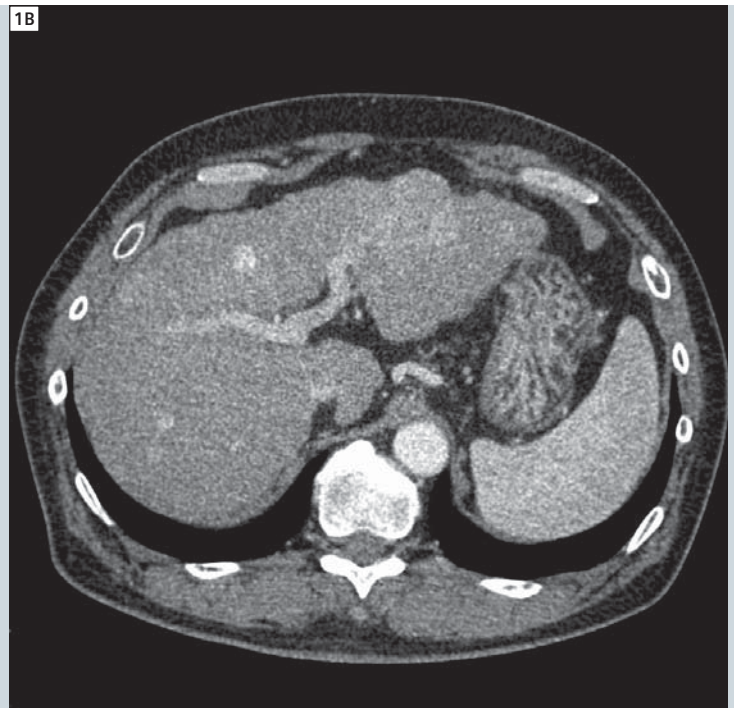
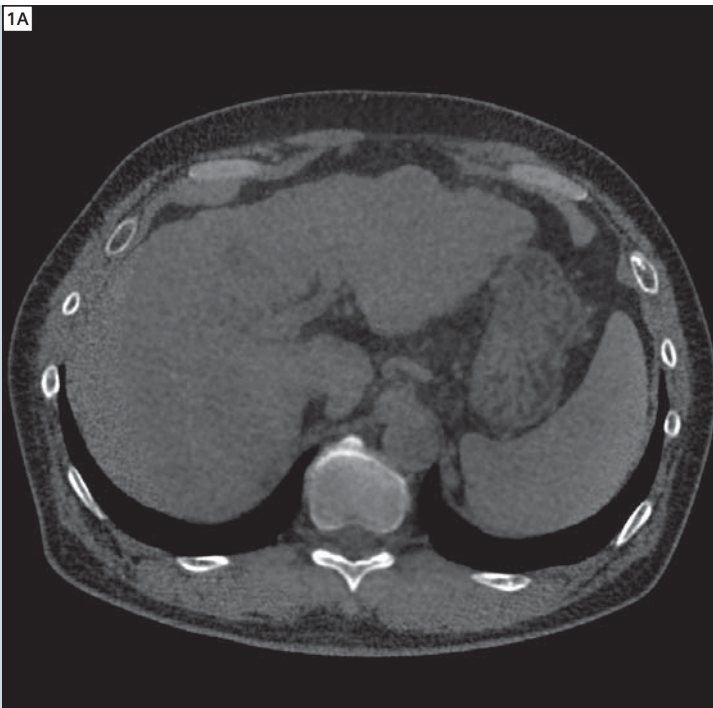
A 55-year-old male was referred for a Dual Source CT follow-up scan after transcatheter arterial chemoembolization (TACE) of his hepatocellular carcinoma (HCC) 6 years ago. A contrast enhanced, dynamic CT scan of the abdomen was performed on the SOMATOM Definition using Spiral Dual Energy for screening for recurrences after chemoembolization.

DIAGNOSIS

The hepatic arterial-dominant phase images revealed numerous hyper-attenuating lesions (Fig. 1B). In the virtual non-contrast image, the lesions showed almost iso-density with the liver parenchyma (Fig. 1A). From *syngo* Dual Energy (DE) Optimum Contrast images – improved even more after post-processing – a clear analysis of the visible lesions was possible (Fig. 1C). The patient was then diagnosed with multiple HCC recurrence with liver cirrhosis.

COMMENTS

In the Dual Energy mode, two X-ray sources can be operated simultaneously at different kV levels: 140 kV/80 kV. The results are two spiral data sets acquired in a single scan, providing diverse information that allows one to differentiate, characterize, isolate, and distinguish the imaged tissue and material. Enhanced patterns of liver lesions can be visualized with the *syngo* Dual Energy Liver VNC (Virtual Non-Contrast) application. With the VNC-mode,



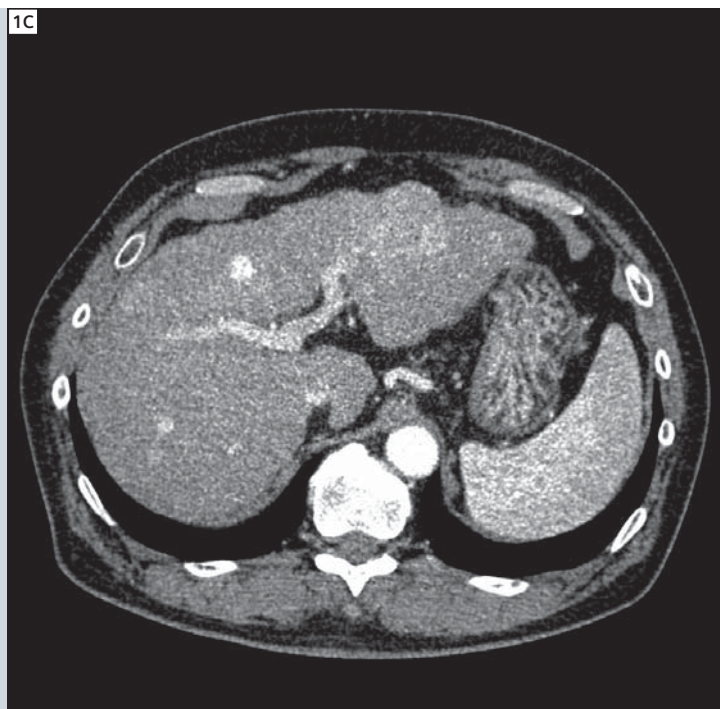
any contrast-medium generated contrast disappears, with the remaining images indicating just tissue related differences (Fig. 1A). The standard mixed view shows iodine-contrasted structures (light-col-

ored) against non-contrast enhanced structures (dark-colored) (Fig. 1B). With Optimum Contrast, an image that combines the high contrast of the 80 kV image and the low noise of the mixed image can

be generated (Fig. 1C). Optimized differentiation of contrasted and non-contrasted regions allows an even more detailed and clearer diagnosis compared to the standard mixed view.

EXAMINATION PROTOCOL

Scanner	SOMATOM Definition	
Scan area	Abdomen	Slice collimation 0.6 mm
Scan length	268 mm	Slice width 1 mm
Scan direction	cranio-caudal	Reconstruction increment 0.5 mm
Scan time	10 s	Reconstruction kernel 30 D
Tube voltage A/B	140 kV/80 kV	Contrast
Tube current A/B	80 Eff. mAs/345 Eff. mAs	Volume 100 ml
Dose modulation	CARE Dose4D on	Flow rate 3 ml/s Iodine 370 mg/ml
Rotation time	0.5 s	Postprocessing syngo DE Virtual Unenhanced
Pitch	0.8	Bolustracking



1 Virtual Non-Contrast mode: any contrast-medium generated contrast disappears with the remaining images indicating just tissue related differences (Fig. 1A).

Standard mixed view: shows iodine-contrasted structures against non-contrast enhanced structures (Fig. 1B).

Optimum contrast: an optimized noise-to-contrast ratio can be reached, resulting in clearer and better contrasted image quality (Fig. 1C).