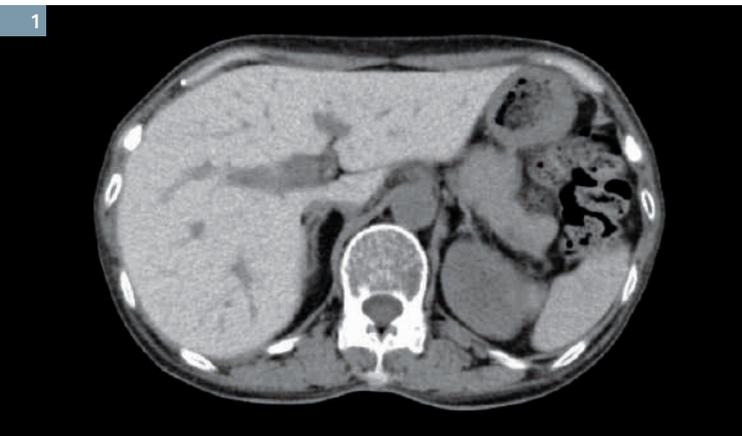


Case 9

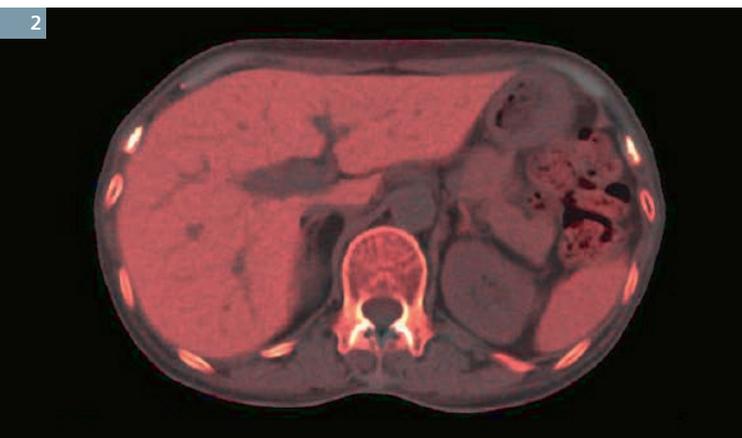
Dual Energy CT Assessment of Amiodarone Induced Liver Damage

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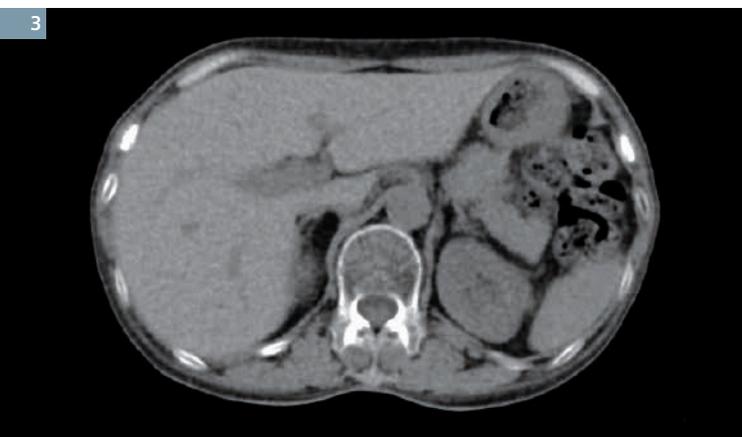
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1
The mixed 120 kV image shows higher CT attenuations in the liver and in the spleen.



2
Fused iodine imaging reveals high iodine depositions in the liver.



3
Virtual non-contrast CT shows normal liver density.

History

A 61-year-old female patient, suffering from ventricular fibrillation, had been under long-term control with a daily dose of amiodarone. She had an implanted cardiovascular defibrillator and no history of blood transfusions. Dual Energy (DE) CT was performed to assess the status of amiodarone-induced liver damage.

Diagnosis

In the mixed 120 kV image (Fig. 1), organs such as the liver, the spleen and the pancreas showed highly increased CT attenuations. Although the scan was performed without contrast media, CT values in the liver reached 117 HU. Similar increased densities were also measured in the spleen (98 HU) and in the pancreas (67 HU). In the fused iodine image (Fig. 2), an increased iodine concentration in both the liver and spleen was demonstrated, compared to that in the kidneys and in the muscles. In the virtual non-contrast (VNC) image (Fig. 3), the liver density was normal (67 HU). The measured iodine concentration in the liver was 2.4 mg/mL (Fig. 4). Measurement values of CT attenuations and iodine concentrations are summarized in table 1.

Comments

Amiodarone is an iodine-containing antiarrhythmic drug available worldwide. Long-term amiodarone administration causes hepatotoxicity due to iodine accumulation in the liver.[1,2] The lungs, myocardium, thyroid, spleen and pancreas are the main target organs for iodine deposition.[1,2,3] In cases in which amiodarone is considered life

sustaining, a liver biopsy can reveal the necessity of continuing the medication or not. A Dual Energy CT scan without contrast media can reveal an increased iodine concentration in the

liver and other organs, therefore providing information to analyze the extent of liver damage. In this case, CARE Dose4D was applied and the achieved effective mAs with 100/Sn

140 kV were 104/87, instead of the reference mAs of 230/178. This resulted in a DLP of 176 mGy cm and an effective dose of only 2.64 mSv. ■

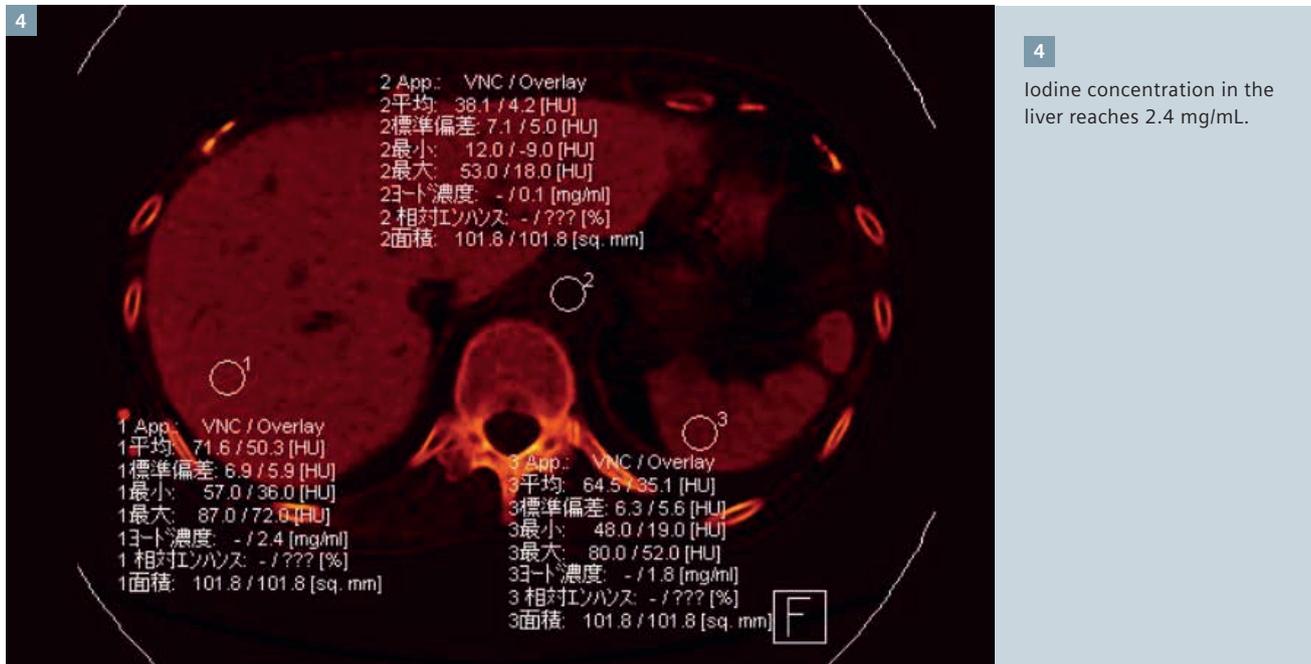


Table 1: CT attenuations and iodine concentrations

		Liver	Spleen	Pancreas	Aorta
Blended 120 kVp Image	HU	117	98	67	40
Virtual Noncontrast CT	HU	67	55	40	38
Iodine Concentration	mg/dL	2.4	1.8		0.1

Examination Protocol

Scanner	SOMATOM Definition Flash		
Scan area	Abdomen	DLP	176 mGy cm
Scan length	200 mm	Effective dose	2.64 mSv
Scan direction	Cranio-caudal	Rotation time	0.5 s
Scan time	10 s	Pitch	0.6
Tube voltage	100 kV / Sn 140 kV	Slice collimation	32 × 0.6 mm
Tube current	104 / 87 mAs	Slice width	0.6 mm
Dose modulation	CARE Dose4D	Reconstruction increment	0.5 mm
CTDI _{vol}	8.37 mGy	Reconstruction kernel	D30f

References

- [1] Goldman IS, et al. Increased hepatic density and phospholipidosis due to amiodarone. *AJR* 1985; 144: 541-546
- [2] Harris L et al. Side effects of long-term amiodarone therapy. *Circulation* 1983; 67: 45-51
- [3] Kuhlman JE, et al. Amiodarone pulmonary toxicity: CT findings in symptomatic patients. *Radiology*. 1990; 177: 121-125

The outcomes achieved 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.