Diagnosing and quantification of acute alcohol intoxication--comparison of dual-energy CT with biochemical analysis: initial experience

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PURPOSE
To quantify the correlation between fat content of an acute alcohol intoxication and the difference of computer tomography attenuation value in dual-energy CT in comparison to biochemical triglyceride analysis and to evaluate qualitatively the value of DECT in the diagnosis of fatty liver caused by ethanol-dosage in rats.

MATERIALS AND METHODS
DECT at 140 kV and 80 kV was performed on 20 rats before and two days after the administration of 3 ml of 50% ethanol. The CT attenuation value in the livers at 140 kV, 80 kV and the differences between them in Hounsfield units (ΔH) were collected. Parts of the liver (100 mg) were measured in biochemical triglyceride analysis as the reference standard. A blood sample was also taken to measure specific liver enzymes.

RESULTS
Linear correlation between biochemical triglyceride analysis and CT density of ΔH was found (r=0.949). 140 kV attenuation data were between 44 HU and 61.3 HU, 80 kV attenuation data were between 58.4 HU and 64.7 HU, and ΔH data were between 3.4 HU and 14.4 HU (p≤0.037). The biochemical triglyceride analysis data were between 7.1 mg/g and 41.1 mg/g. The hepatic enzymes serum aspartate (ASAT) aminotransferase and alanine aminotransferase (ALAT) were elevated in all rats. ASAT correlated directly with ΔHU (r=-0.86).

CONCLUSION
DECT provides a non-invasive method to determine and evaluate hepatic fat content after acute alcohol intoxication. It provides the possibility to detect and quantify the hepatic fat content of liver graft.
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