Quantitative EASL: An improved way to assess tumor response after transcatheter arterial chemoembolization (TACE)

Abstract:

Purpose:
Multi-phasic contrast-enhanced MRI is the gold standard to assess liver tumor treatment response. EASL criteria is used to evaluate response based on tumor enhancement changes. The EASL limitations are: 1) used on a single axial tumor slice. A different slice selection can yield a different response assessment, and 2) assessment is grouped into quartiles. If the response is at the threshold between quartile levels, assessment will be inaccurate. We propose to improve the criteria by: 1) determining enhancement for the entire tumor volume, and 2) calculating exact enhancement. We propose this as quantitative EASL (qEASL).

Method and materials:
qEASL was calculated as follows: 1) 3D tumor segmentation was performed on the 20-sec scan. 2) The pre-contrast scan was subtracted from the 20-sec scan. 3) The 3D segmented volume from #1 was applied on #2. 4) Viable tumor was defined as areas in #3 where the enhancement was more than the normal parenchyma. 5) The viable tumor amount was defined as a % of the total tumor volume. qEASL was performed on 4 hepatocellular carcinoma patient cases before and 1 month after drug-eluting beads TACE.

Results:
qEASL pre-TACE was 76.1±19.3% and 24.2±14.9% post-TACE. qEASL was able to measure the enhancement for the entire tumor volume and provide a quantitative result.

Conclusion:
qEASL eliminates subjectivity in assessing tumor enhancement. This information can help the clinician in more accurately determining the response from treatment.