

Evaluation early response of hepatocellular carcinoma after transcatheter arterial chemoembolization(TACE) with ^1H Magnetic resonance spectroscopy in vivo

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Introduction: Transcatheter arterial chemoembolization(TACE) has significantly improved the survival for patients with inoperable hepatocellular carcinoma(HCC). However, there is no reliable imaging method to detect the early response to such treatment quantitatively. In vivo ^1H magnetic resonance spectroscopy(MRS) has been used successfully in evaluation of brain, prostate ,skeletal muscles and liver diseases as a non-invasive technique. The choline-containing compounds(Cho) in hepatic tumors detected by ^1H MRS has known to be linked to malignancy.

The purpose of the current study is to find the feasibility of using 1.5T MR scanner clinically in acquiring reliable spectroscopic procedures and to investigate the potential value of ^1H MRS in the assessment of the early metabolic processes in large HCC after TACE .

Materials and Methods: In this prospective study, 30 consecutive patients with 43 large(not less than 3cm in diameter) lesions and 5 normal volunteer were included. All of the patients with proven HCC were evaluated before and one week after TACE. The choline-to-lipid(cho/lipid) ratio was measured by dividing the peak amplitude(or area) of composite choline at 3.2ppm by the peak amplitude(or area) of lipid at 1.3ppm.

Results: The technical successful rate for the single-voxel MRS was 93.3%(28/30). Both of the peak amplitude and area were measured by using SAGE(spectroscopy analysis GE) software in ADW4.0 workstation. The mean \pm standarderror of cho/lipid of untreated lesions for peak amplitude was 0.29 ± 0.04 and 0.18 ± 0.04 for peak area, while after TACE were 0.17 ± 0.03 , 0.08 ± 0.02 respectively. The mean cho/lipid ratios were significantly decreased fr after TACE ($t= 3.386$ (peak amplitude), 3.647 (peak area) $P<0.05$, two-tail paired t -test)

Conclusions: In vivo ^1H -MRS is technically feasible to evaluate HCC and to detect the early metabolic process in malignant liver tumors after TACE through depicting spectroscopic changes, with potential benefit to modify clinical scheme. The water and lipid may viable in different patients, absolute quantification for choline in patients with liver tumors will be mandatory for further studies to detect the actual changes in the metabolites.

Reference:

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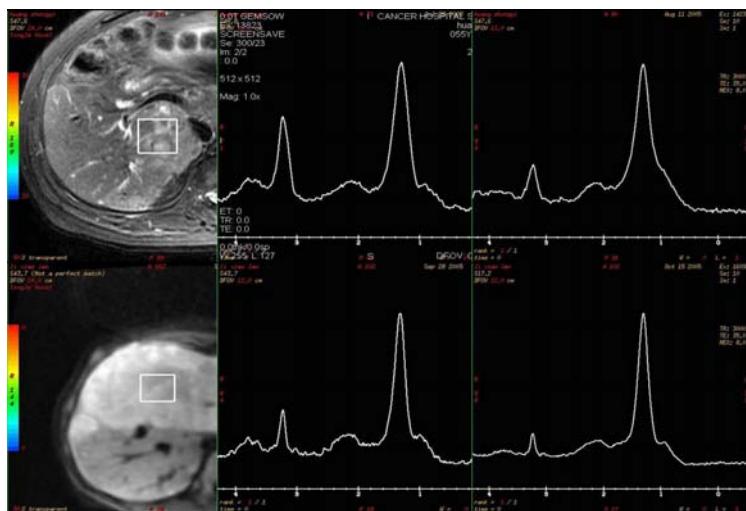


Figure1: ^1H MRS before(middle) and after(right) TACE with the same scaling.
left picture depicts the location of the voxel in tumors
the choline-containing compounds(Cho) peak which represents metabolites within the tumor drop after TACE.