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EDITORIAL

Liver magnetic resonance imaging: State of the art

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Abstract

Magnetic resonance imaging (MRI) has now been used for about three decades to characterize the human liver in a non-invasive way, that is without the need of using ionizing radiation or removing tissue samples. During the past few years, technical progress has been considerable and novel applications of MRI have been implemented in the clinic. The beginning of a new decade offers an excellent opportunity for having five experts to present their view on the current status of MRI (and magnetic resonance spectroscopy) in the study of perfusion, fat and iron contents, diffusion and the metabolism of diffuse liver diseases. This topic highlight series thus provides an update of current knowledge in the field of liver MRI.

Key words: Liver; Magnetic resonance imaging

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In this Topic Highlight "Liver MRI, state of the art", we focus on five magnetic resonance imaging (MRI) methods offering opportunities for parametric exploration of the liver[1]. The first contribution focuses on the microcirculatory status in liver parenchyma and liver lesions as studied by perfusion MRI, i.e. MRI with the use of (contrast) agents to improve the contrast between the features on images[2]. Great progress has been made in turning perfusion weighted imaging into a quantitative method for detecting tumor, evaluating tumor viability after therapy and, for instance, the diagnosis of liver cirrhosis and its severity. Another important development is that nowadays, the sampling of liver tissue for the assessment of hepatic steatosis, related to alcoholic and non-alcoholic liver disease, metabolic syndrome, obesity and insuline resistance, can be replaced by the use of MRI or magnetic resonance spectroscopy (MRS) for determining liver fat content[3]. The next review is a thorough assessment of the present status in another novel application of MRI presenting an alternative to biopsy: liver iron content determination[4]. Accurate evaluation of iron overload is necessary to establish the diagnosis of hemochromatosis and guide chelation treatment in transfusion-dependent anemia. Diffusion weighted imaging (DWI), best used in combination with conventional unenhanced MRI and perfusion weighted MRI, is a promising tool used in predicting tumor responsiveness and following up oncological treatment since DWI might be capable of detecting recurrent disease earlier than conventional imaging[5]. The final contribution features the use of MRS to study metabolism in diffuse liver diseases, diabetes and cancer[6]. Although this method still is in the preclinical stage, it is anticipated that future developments such as clinical magnets with a higher field strength (3 T, 7 T) and improved delineation of multi-component signals, will lead to intensified research in metabolic syndrome, cardiovascular disease, hepato-biliary diseases, *etc.* We believe that this issue will be of interest not only to gastroenterologists, but also to those involved in metabolic studies, cell physiology and pathology.

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