

Gadoxetic Acid Disodium (GD-EOB-DTPA) Liver Specific Magnetic Resonance Imaging Contrast Agent Executive Summary

[Adapted from the report by DR JUNAINAH SABIRIN]

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Introduction

Magnetic resonance imaging (MRI) has become the key technique for the characterization and detection of focal and diffuse liver disease. In order to adequately characterize focal liver lesions on MRI, it is necessary to utilize contrast agents which are able to modify the signal intensity of either the lesions or the normal liver parenchyma and thus contribute towards the characterization of the lesions. Various contrast agents can be distinguished on the basis of their distribution after intravenous injection; distribute in the extracellular, exclusive distribution to hepatocellular compartment and combined perfusion and hepatocyte-selective properties. Agents of this type include Gadobenate dimeglumine (Gd-BOPTA) and the newer Gadolinium-ethoxybenzyl-diethylenetriamine-pentaacetic-acid (Gd-EOB-DTPA); generic name: Gadoxetic acid disodium which now allows combined dynamic imaging and hepatocyte specific imaging in one examination. This technology review was conducted following a request from Consultant Radiologist, Diagnostic and Imaging Department, Serdang Hospital to look into the diagnostic accuracy of Gadoxetic acid disodium (Gd-EOB-DTPA) liver-specific contrast agent in detecting especially small liver lesions.

Objective/Aim

The objective of this systematic review was to assess the safety, efficacy/effectiveness and cost-effectiveness of Gadoxetic acid disodium (Gd-EOB-DTPA) liver-specific MRI contrast agent in the detection and characterization of liver lesions.

Results and Conclusions

The studies included consist of four RCTs, 21 diagnostic accuracy studies, one economic evaluation study and two FDA articles.

There was fair level of evidence to show that Gadoxetic acid disodium (Gd-EOB-DTPA)-enhanced MRI was safe.

Comparison with unenhanced MRI

There was fair level of evidence to show that Gadoxetic acid disodium (Gd-EOB-DTPA)-enhanced MRI improved sensitivity for lesion detection, classification and characterization of focal liver lesions compared with unenhanced MRI.

Comparison with CT

There was fair level of evidence to show that Gadoxetic acid disodium (Gd-EOB-DTPA)-enhanced MRI had the following characteristics:-

- Gadoxetic acid disodium (Gd-EOB-DTPA)-enhanced MRI was more effective in the detection, classification and characterization of liver lesions especially for lesions equal to or less than two centimetres in diameter compared with spiral CT
- Gadoxetic acid disodium (Gd-EOB-DTPA)-enhanced MRI had similar diagnostic performance but may be better for detection of HCC of one centimetre in diameter or smaller compared with triple phase MDCT
- Gadoxetic acid disodium (Gd-EOB-DTPA)-enhanced MRI had higher sensitivity for differentiation between hypervascular HCC and hypervascular pseudolesions compared with triple phase MDCT

Comparison with other liver-specific MRI contrast agents

There was fair level of evidence to show that:-

- Gadoxetic acid disodium (Gd-EOB-DTPA)-enhanced MRI was more

effective in detecting HCC than Gadopentetate dimeglumine (Gd-DTPA)-enhanced MRI

- Gadoxetic acid disodium (Gd-EOB-DTPA)-enhanced MRI was as efficacious in detecting liver metastases when compared with SPIO-enhanced MRI
- Gadoxetic acid disodium (Gd-EOB-DTPA)-enhanced MRI was more effective in detecting HCC compared with SPIO-enhanced MRI
- Gadoxetic acid disodium (Gd-EOB-DTPA)-enhanced MRI had similar diagnostic performance compared with double-contrast MRI (Gadopentetate dimeglumine-enhanced MRI and SPIO-enhanced MRI) in detection of small HCC
- Gadoxetic acid disodium (Gd-EOB-DTPA)-enhanced MRI showed better enhancement of liver parenchyma at 20 minutes post contrast compared with Gadobenate dimeglumine (Gd-BOPTA) at 40 minutes post contrast
- Gadoxetic acid disodium (Gd-EOB-DTPA)-enhanced MRI had similar diagnostic performance as Gadobenate dimeglumine (Gd-BOPTA)-enhanced MRI for detecting HCC

Cost/cost-effectiveness

There was limited evidence to show that although the cost of Gadoxetic-acid disodium (Gd-EOB-DTPA) liver-specific MRI contrast agent was found to be higher than the extracellular liver-specific MRI contrast agent [Gadopentetate dimeglumine (Gd-DTPA)], the strategy starting with Gd-EOB-DTPA enhanced MRI as a pre-operative diagnostic tool in patients with colorectal liver metastases was shown to be more cost saving.

Methods

Electronic databases were searched, which included PubMed, Medline, EBM Reviews-Cochrane Central Register of Controlled Trials, EBM Reviews-Cochrane database of systematic reviews, EBM Reviews - HTA Databases, Horizon Scanning databases, FDA website for published reports. There was no limit in the search. Relevant articles were critically appraised using Critical Appraisal Skills Programme (CASP) and diagnostic studies was graded according to NHS Centre for Reviews and Dissemination (CRD) University of York, Report Number 4 (2nd Edition).