

## MRCP after the injection of Gd-EOB-DTPA: Are 3 minutes safe for T2 weighted navigated 3D MRCP?

K. Ringe<sup>1</sup>, R. Gupta<sup>2</sup>, A. Reichel<sup>1</sup>, T. Rodt<sup>1</sup>, S. Dettmer<sup>1</sup>, N. Hellige<sup>3</sup>, M. Galanski<sup>4</sup>, E. M. Merkle<sup>2</sup>, and J. Lotz<sup>1</sup>

<sup>1</sup>Department of Radiology, Hannover Medical School, Hannover, Germany, <sup>2</sup>Department of Radiology, Duke University School of Medicine, Durham, NC, United States, <sup>3</sup>Department of Radiology, Hannover Medical School, Hannover, Germany, <sup>4</sup>Department of Radiology, Hannover Medical School, Hannover, Germany

### Introduction

T2 weighted MRCP and T1 weighted dynamic contrast series are important elements for the evaluation of hepatobiliary disease. Gd-EOB-DTPA is a hepatobiliary contrast agent with a biliary excretion fraction of about 50%. High concentration of Gd-EOB-DTPA can be seen within the major bile ducts 20 min [1] after contrast injection causing significant signal loss in the T2 imaging of bile ducts usually employed for MRCP imaging. This excretory phase of Gd-EOB-DTPA can be used as an additional source of information about hepatic lesions, hepatocellular function as well as the functional status of the bile ducts [2,3]. It is desirable to take advantage of the excretory phase without the need to increase the total time needed to complete the examination. One approach towards this end would be to start the imaging protocol with the dynamic contrast series and use the more time consuming components like respiration navigated MRCP to fill the interval needed for the excretory phase of the contrast agent.

We examined whether there are significant differences in image quality between a respiration navigated T2 MRCP before and about 3 minutes after the injection of Gd-EOB-DTPA.

### Materials and Methods

In a prospective approach, 25 consecutive patients scheduled for an MRCP for various clinical reasons were evaluated for the study. 4 patients were not included due to age (<18 years) or technical reasons (massive artifacts due to patient movement). 21 patients were included. Indication for the MRCP were primary sclerosing cholangitis (n=7), unspecified cholangitis (n=1), hepatobiliary status after liver transplantation or extensive liver surgery (n=8) or status before minimal invasive therapy for liver metastases (n=5). Male to female ratio: 15 to 6; median of age: 58 years. Laboratory parameters (Quick, thrombocyte count, CHE, total bilirubin) as well as clinical and histologic (if available) data were used to define patients with evidence of hepatocellular functional impairment.

In all 21 patients a respiration navigated T2 weighted 3D MRCP was performed before and within 3 minutes after the application of 0.025 mmol/kg bodyweight Gd-EOB-DTPA. Examinations were performed in a 1.5 T clinical scanner (Siemens Avanto; VB 15; Siemens AG Erlangen, Germany) using an 8 channel surface coil. Signal to noise (SNR) measurements were done in both MRCP datasets of each patient in the same position within the bile ducts by two experienced radiologists. Noise estimates were derived from a region outside the body in the vicinity of the liver.

### Results

Mean time between contrast media injection and the start of the second MRCP was 3.3 +/- 0.4 min. There was a significant drop of the mean SNR in the MRCP after Gd-EOB-DTPA injection. Mean SNR before contrast: 141 +/- 42; Mean SNR after application of contrast media: 104 +/- 59; p < 0.003. The maximal drop of SNR was about 90%, rendering the MRCP non-diagnostic. The population of the study was too small to allow for a valid subgroup analysis concerning age, sex or underlying liver disease. However there seemed to be a tendency towards a pronounced drop of SNR in younger (< 50 years of age) patients as well as a preserved SNR in patients with proven liver cirrhosis.

### Discussion

Our results suggest that 3 minutes after injection of Gd-EOB-DTPA a significant drop of SNR in the central bile ducts can be observed in respiration navigated T2 weighted 3D MRCP sequences. As there is not a single predictor as to how much this drop of SNR in the MRCP will be, nor to what extent this will impair the diagnostic value of the MRCP, the injection of Gd-EOB-DTPA should be done after a T2 weighted MRCP.

### References:

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