Intra-individual comparison of gadobenate dimeglumine (Gd-BOPTA) and mangafodipir trisodium (Mn-DPDP) for the distinction of hepatic adenoma (HA) and liver adenomatosis (LA) from focal nodular hyperpl

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Synopsis: Gadobenate dimeglumine (Gd-BOPTA) and mangafodipir trisodium (Mn-DPDP) are two contrast agents with liver specific properties. However, while mangafodipir can be administered only as a slow infusion and used in conjunction with delayed phase imaging, Gd-BOPTA can be administered as a bolus and used for both dynamic and delayed phase imaging. The present intra-individual study compares these two agents in nine patients for the detection and differential diagnosis of hepatic adenoma (HA) and liver adenomatosis (LA) and concludes that Gd-BOPTA is better able to detect and differentiate the detected lesions from the more common focal nodular hyperplasia.

Introduction: The purpose of the present study was to compare imaging findings and clinical efficacy of Gd-BOPTA (gadobenate dimeglumine) and Mn-DPDP (mangafodipir) for the diagnosis of HA and LA.

Material and methods: ***Patients***: 5 patients with 8 HA and 4 patients with more than 10 HA each (>40 HA) were studied (3M/6F; 13-63 years; median 40 yrs) (Tab. 1). One Patient with 2 HA was submitted to surgical resection; all other patients with single or multiple HA underwent core biopsy (CB). When multiple lesions were seen in a single Patient (LA), CB was conducted in at least 2 lesions. Only one patient had previous significant history of oral contracteptive use (5 yrs.). One Patient had a history of juvenile pylethrombosis. There was no history of steroid use among the 3 males evaluated. ***MR imaging:*** Scanner: 1.5 Tesla super-conducting imager (Symphony, Siemens, Germany) using a phased array torso multi-coil. Two different MRI sessions with Gd-BOPTA and Mn-DPDP were conducted. MRI with Gd-BOPTA was performed pre-contrast (TSE T2w TR/TE: 3900-4200/90-110; GRE T1w: TR/TE/a: 120-140/4/80; VIBE: TR/TE/a: 4.5/1.8/10) and during the dynamic (arterial: 25 sec; portal-venous: 50-80 sec; equilibrium: 5 min) and delayed (1-3h) phases (GRE T1w; VIBE) after bolus (³2 ml/sec) intravenous injection of 0.1 mmol/Kg of Gd-BOPTA. MRI with Mn-DPDP (drip intravenous infusion of 0.5 ml/kg in 20 min) was performed pre-contrast (TSE T2w; GRE T1w; VIBE) and 1h after injection (GRE T1w; VIBE). ***Image assessment:*** Evaluation of the number of lesions detected and their signal intensity was performed for the pre-contrast unenhanced images (both T1 and T2w sequences), for dynamic arterial phase images after Gd-BOPTA and for hepatobiliary phase images after both Gd-BOPTA and Mn-DPDP.

Hepatic Adenoma	Sex	Age	Number of lesions				Lesion confirmation
			Unenhanced	Arterial Phase BOPTA	Delayed Phase BOPTA	Delayed Phase Mn-DPDP	
Patient 1	F	35	1	1	2	1	Resection
Patient 2	M	13	1	1	1	1	Biopsy
Patient 3	M	63	1	1	1	1	Biopsy
Patient 4	M	47	1	1	1	1	Biopsy
Patient 5	F	40	3	2	3	2	Biopsy
Total			7	6	8	6	
Liver Adenomatosis							
Patient 6	F	33	>10	6	>>10	3	Biopsy
Patient 7	F	47	7	4	>10	2	Biopsy
Patient 8	F	40	5	4	>10	1	Biopsy
Patient 9	F	40	0	6	>10	3	Biopsy
Total			22	20	>40	9	
Global			29	26	>48	15	

Table 1. Patient population and number of lesions recognized for each study

Results: Lesion size ranged from 5 mm to 7 cm. On unenhanced images, 29 lesions were identified, of which 26 were hypointense and 3 isointense. During the arterial phase after Gd-BOPTA administration, 26 hypervascular lesions were recognized. In the hepatobiliary phase after Gd-BOPTA more than 48 hypointense lesions were seen. On delayed phase images after Mn-DPDP only 15 lesions were identified of which 11 were isointense and 4 hyperintense. Significantly, HA and LA appeared hypointense on delayed images following Gd-BOPTA but predominantly isointense following Mn-DPDP (Fig. 1). This is in contrast to the situation with FNH which appears iso- or hyperintense in the delayed phase after both Gd-BOPTA and Mn-DPDP. Since HA and LA is frequently indicated for surgical resection due to the risk of hemorrhage, the ability to differentiate these lesions from FNH is a clinically important finding.

Conclusions: The differential diagnosis of HA and LA is easier with Gd-BOPTA than with Mn-DPDP. This is clinically relevant considering the frequent need for surgical intervention in cases of HA/LA.

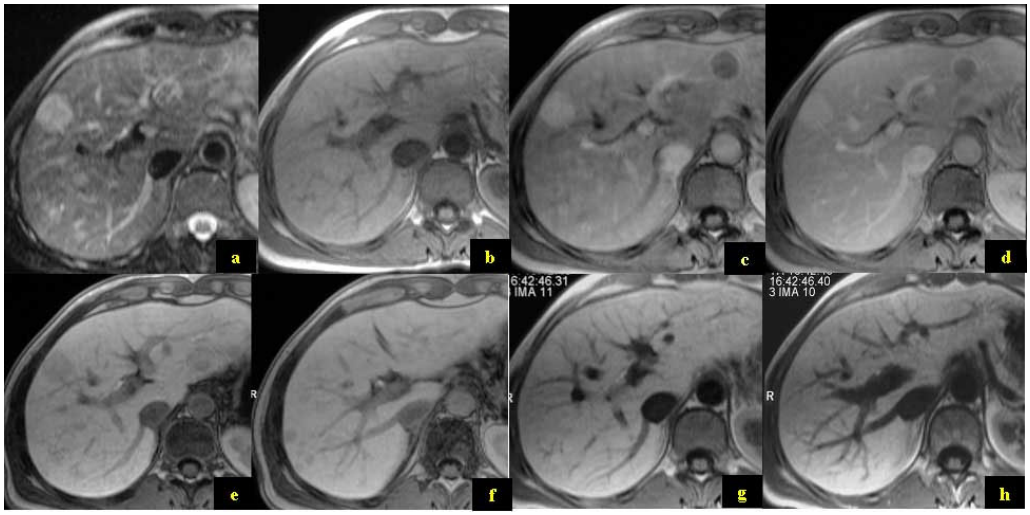

Fig. 1. Liver adenomatosis (histological confirmation). 40 year old woman with no history of oral contraceptive use. Multiple, hyperintense lesions are visible on the T2W TSE image (a). On the corresponding T1W GRE image, these lesions are isointense to the normal liver parenchyma (b). During dynamic imaging after bolus Gd-BOPTA administration (c: arterial phase; d: portal-venous phase) intense and homogenous enhancement of the nodules is seen. On the delayed, hepatobiliary phase images acquired 3 h after Gd-BOPTA (e, f), the lesions appear markedly hypointense. Conversely on delayed phase images after Mn-DPDP (g, h) no lesions are recognizable.