A new approach to studying liver disease

Cover image courtesy of Dr. R. Schneider (Hamburg, Germany).

BIBLIOGRAPHY


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4. Multiple Pharmacokinetic Properties of Gadobenate Dimeglumine; A CT- and MR-Enhanced Contrast Agent; Radiology

5. Pharmacokinetic properties of gadobenate dimeglumine; A CT- and MR-Enhanced Contrast Agent; Radiology

6. DOXIL® (Doxorubicin HCl Liposome Injection). BIBLIOGRAPHY
Why does MultiHance® offer a new approach to the study of liver disease?

The double route of elimination permits imaging during the immediate post-injection dynamic phase and during a delayed post-injection hepatobiliary phase.

The problem of liver lesions characterization:

- **Cavernous hemangioma**
  - After MultiHance®, the mass (asterisk) is heterogeneously hyperintense on the SE T2-weighted image (A), hypointense on the precontrast GE T1-weighted image (B). During the arterial phase (C), multiple focal areas of nodular enhancement (arrows) that are isointense with the aorta are seen in the periphery. During the delayed liver-specific phase after MultiHance® (D), the lesion appears slightly heterogeneously hypointense (5).

- **Poorly differentiated HCC** in a Child A patient
  - Pre-contrast T1w image: no lesions are visible
  - Post-contrast delayed T1w image: the lesion (arrow) is markedly hypointense against the normal liver parenchyma (7).

- **Nodular regenerative hyperplasia** in a fatty liver
  - Pre-contrast T1w image: the lesion is hypointense against the surrounding normal parenchyma.
  - Post-contrast delayed T1w image: the lesion is markedly hyperintense, indicating a lesion containing hepatocytes that are able to take up MultiHance® (5).

- **Cavernous hemangioma**
  - Pre-contrast T1w image: no lesions are visible
  - Pre-contrast T2w image: two lesions are visible
  - Delayed T1w image acquired 90 min after administration of 0.05 mmol/kg MultiHance®: additional small lesions are detected (arrows)(1)

Can be solved with the use of MultiHance®!(7)
Dynamic and delayed phase imaging can improve liver lesion characterization

The problem of atypical FNH

Arterial phase image acquired 25 seconds after MultiHance® administration: the nodule (arrows) located in lateral segment of the liver shows homogeneous and intense enhancement.

Equilibrium phase image acquired 5 minutes after MultiHance® administration: the nodule appears less strongly hyperintense and a thin hypointense rim is evident.

Image acquired 3 hours after MultiHance® administration: the nodule is slightly and homogeneously hyperintense, indicating a lesion with functioning hepatocytes that are able to take up the contrast agent.

In a series of 100 FNH lesions, 21 lesions were considered to have atypical morphologic or enhancement features, making the diagnosis of FNH more difficult. Of these 21 lesions, 16 (76%) demonstrated a hyperintense appearance and 3 (14%) an isointense appearance on delayed T1w images acquired 3 hours after MultiHance injection. This ability to take up MultiHance® permitted a confident diagnosis of FNH in these atypical cases.

The higher MultiHance® relaxivity gives higher signal at lower dose.

A solitary lesion appears hypointense on unenhanced T1w images and hyperintense on unenhanced T2w images.

During the arterial and portal-venous phases the lesion demonstrates strong early enhancement and rapid washout. A pseudocapsule is also apparent in the portal-venous phase. These findings are indicative of a hypervascular HCC.

The lesion (arrow) appears hypointense on delayed images acquired approximately 1 hour after injection of 0.05 mmol/kg MultiHance®. This indicates a lesion with non-functioning hepatocytes which further underlines the diagnosis of HCC.

can be solved with the use of MultiHance®!(6)
Dynamic and delayed phase imaging can improve liver lesion detection

The lesion is hypointense on the unenhanced T1w image and hyperintense on the unenhanced T2w image.

Imaging during the arterial and portal-venous phases after the bolus injection of MultiHance® reveals early peripheral enhancement followed by rapid washout.

The lesion shows no capacity to take up MultiHance® on delayed hepatobiliary phase images acquired approximately 1 hour after contrast injection. A second very small hypointense nodule (arrow) can be seen only in the hepatobiliary phase.

MultiHance®: a complete liver exam with only one contrast medium injection!

A The pre-contrast T1w GRE image reveals a large primary lesion.

B Improved lesion conspicuity and delineation is achieved on the T1w GRE image acquired 90 min. after the injection of 0.05 mmol/kg MultiHance®. Additional small lesions are also apparent in the right lobe.
Dynamic and delayed phase imaging can improve liver lesion detection

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MultiHance®: a complete liver exam with only one contrast medium injection!

Dynamic and delayed imaging after MultiHance® permits improved lesion detection.

A The pre-contrast T1w GRE image reveals a large primary lesion.

B Improved lesion conspicuity and delineation is achieved on the T1w GRE image acquired 90 min. after the injection of 0.05 mmol/kg MultiHance®. Additional small lesions are also apparent in the right lobe.

Lesion detection
Dynamic and delayed phase imaging can improve liver lesion characterization

The problem of atypical FNH

Arterial phase image acquired 25 seconds after MultiHance® administration: the nodule (arrows) located in lateral segment of the liver shows homogeneous and intense enhancement.

Equilibrium phase image acquired 5 minutes after MultiHance® administration: the nodule appears less strongly hyperintense and a thin hypointense rim is evident.

Image acquired 3 hours after MultiHance® administration: the nodule is slightly and homogeneously hyperintense, indicating a lesion with functioning hepatocytes that are able to take up the contrast agent.

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The lesion (arrow) appears hypointense on delayed images acquired approximately 1 hour after injection of 0.05 mmol/kg MultiHance®. This indicates a lesion with non-functioning hepatocytes which further underlines the diagnosis of HCC. (2)
**Why does MultiHance® offer a new approach to the study of liver disease?**

The double route of elimination permits imaging during the immediate post-injection dynamic phase and during a delayed post-injection hepatobiliary phase.

- **Bile** (2-4% of I.D.)
- **Urine** (96-98% of I.D.)

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**The problem of liver lesions characterization:**

The problem of liver lesions characterization can be solved with the use of MultiHance®.

- **Poorly differentiated HCC in a Child A patient**
  - [A] Pre-contrast T1w image: no lesions are visible
  - [B] Post-contrast delayed T1w image: the lesion is more markedly hypointense against the normal liver parenchyma.

- **Nodular regenerative hyperplasia in a fatty liver**
  - [A] Pre-contrast T1w image: the lesion is hypointense against the surrounding normal parenchyma.
  - [B] Post-contrast delayed T1w image: the lesion is markedly hyperintense, indicating a lesion containing hepatocytes that are able to take up MultiHance®.

- **Cavernous hemangioma**
  - [A] Pre-contrast T1w image: hypointense on the precontrast GE T1-weighted image.
  - [B] Post-contrast delayed T1w image: the lesion is heterogeneously hyperintense, indicating a lesion containing hemangioma (arrows).
  - [C] During the arterial phase (C), multiple focal areas of nodular enhancement (arrows) that are isointense with the aorta are seen in the periphery.
  - [D] During the delayed liver-specific phase after MultiHance® (D) the lesion appears slightly heterogeneously hypointense.

5) G. Schneider, L. Grazioli, S. Saini MRI of the liver pag. 233 Springer 2003


incontinence and faecal incontinence. Laboratory abnormalities, such as albuminuria, leukocytosis, glucosuria, decrease in total iron and anaphylactic reaction (dyspnoe and laryngeal spasm) have been reported. Also reported were single incidences of myalgia, convulsion, urinary...