

## Liver lesion conspicuity in interactive MR fluoroscopic sequences: dependency on lesion histology, size and image weighting

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### PURPOSE

To evaluate the conspicuity of primary and secondary liver lesions at fluoroscopic MR sequences used for applicator placement at MR-guided radiofrequency ablation.

### METHOD AND MATERIALS

MR-guided radiofrequency ablation was performed in 103 patients using a wide-bore 1.5 T MR scanner. Interactive fluoroscopic MR sequences were applied for applicator placement using a T1 weighted multislice spoiled gradient echo sequence and a T2/T1 weighted balanced steady-state free precession sequence. Three image planes containing the lesion and the applicator were consecutively updated. Only non-enhanced examinations were selected for this study. The lesion conspicuity of 41 hepatocellular carcinomas (size  $22 \pm 8$  mm) and 67 liver metastases of different primary tumors (size  $21 \pm 10$  mm) was assessed retrospectively (easily detectable/difficult to detect/ not detectable). The contrast-to-noise ratio (CNR) of all lesions was calculated.

### RESULTS

HCC could better be visualized in the SSFP sequence. The majority of HCC were hypointense in the GRE sequence (mean CNR 9.1, range 0 – 30) and hyperintense in the SSFP sequence (mean CNR 16.4, range 0 - 89). Size of the lesions and lesion conspicuity (CNR) did not correlate. HCC was easily detectable in 33/52% (GRE/SSFP), difficult to detect in 30/18%, and not detectable in 37/30% of the cases. 8/41 HCC lesions were neither detectable in GRE and nor in SSPF-fluoroscopy. The mean size of the lesions classed “not detectable” was 20.1 mm/21.1 mm (GRE/SSFP). Targeting was performed in these cases step-by-step or by using anatomic landmarks.

Liver metastases were hypointense in the GRE sequence in 65/67 cases (mean CNR 11.5, range 0 – 41) and hyperintense in T2 to a variable extent (mean CNR 12.7, range 0 – 63). Size of the lesions and lesion conspicuity (CNR) did not correlate. Liver metastases were easily detectable in 58/41% (GRE/SSFP), difficult to detect in 14/21%, and not detectable in 28/38% of the cases. 13/67 metastases were neither detectable in GRE and nor in SSPF-fluoroscopy. The mean size of the lesions classed “not detectable” was 15.1 mm/17.6 mm (GRE/SSFP).

### CONCLUSION

The majority of liver lesions can be visualized in MR fluoroscopy without using contrast agent. Lesion conspicuity seems to depend more on lesion histology than on lesion size. Metastases tend to be better visualized in spoiled GRE imaging, and HCC in balanced SSFP imaging. Both weightings should be used complementary.