### ABSTRACT SUBMISSION FORM

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- [x] Oral presentation preferred
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### PRESENTATION TITLE

SUPERIOR TARGET DELINEATION FOR STEREOTACTIC BODY RADIOTHERAPY OF BONE METASTASES FROM RENAL CELL CARCINOMA ON MRI COMPARED TO CT

### AUTHOR(S)

Prins FM, van der Velden JM, Gerlich AS, Kotte ANTJ, Eppinga WSC, Kasperts N, Verlaan JJ, Pameijer FA, Kerkmeijer LGW*

### ABSTRACT
**PURPOSE:**
In metastatic renal cell carcinoma (mRCC) there has been a treatment shift towards targeted therapy, which has resulted in improved overall survival. Therefore, there is a need for better local control of the tumor and its metastases. Image-guided stereotactic body radiotherapy (SBRT) in bone metastases provides improved symptom palliation and local control. With the use of SBRT there is a need for accurate target delineation. The hypothesis is that MRI allows for better visualization of the extent of bone metastases in mRCC and will optimize the accuracy of tumor delineation for stereotactic radiotherapy purposes, compared with CT only.

**METHODS:**
From 2013 to 2016, patients who underwent SBRT for RCC bone metastases were included. A planning CT and MRI were performed in radiotherapy treatment position. Gross tumor volumes (GTV) in both CT and MRI were delineated. Contouring was performed by a radiation oncologist specialized in bone metastases and verified by a radiologist, based on local consensus contouring guidelines. In both CT and MRI, the GTV volumes, conformity index (CI) and distance between the centers of mass (dCOM) were compared.

**RESULTS:**
Nine patients with 11 RCC bone metastases were included. The GTV volume as defined on MRI was in all cases larger or at least as large as the GTV volume on CT. The median GTV volume on MRI was 33.4 mL (range 0.2-247.6 mL), compared to 18.1 mL on CT (range 0.1-195.9) (P=0.013).

**CONCLUSIONS:**
Contouring of RCC bone metastases on MRI resulted in clinically relevant and statistically significant larger lesions (mean increase 41%) compared with CT. MRI seems to represent the extend of the GTV in RCC bone metastases more accurately. Contouring based on CT-only could result in an underestimation of the actual tumor volume, which may cause underdosage of the GTV in SBRT treatment plans.

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**Figure 1** Visual example of a lytic iliac lesion showing the difference between CT and MRI. (A) Transversal reconstruction of computed tomography (CT) scan of the iliac bone showing a seemingly well-described lytic lesion; (B) T1 weighted MRI of the same lesion, the CT delineation is projected on this reconstruction showing a more extensive bone marrow infiltration medial and ventral of the lesion (yellow arrows); (C) diffusion weighted imaging of the same lesion, showing that the CT delineation is too narrow; (D) difference on MRI (green) and CT (red) GTV delineation.

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