

Correlation of Circulating Tumor Cells With Response to SBRT for Inoperable Hepatocellular Carcinoma



V.H. Lee,^{1,2} V.C.L. Wong,³ C.T. Lam,³ P.P. Ho,⁴ M.H. Szeto,⁵ S.H. Ng,⁵ M. Li-Lung,⁴ J.M. Ko,⁴ and T.W. Leung⁴; ¹Department of Clinical Oncology, Queen Mary Hospital, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong, Hong Kong, ²Clinical Oncology Center, The University of Hong Kong-Shenzhen Hospital, Shenzhen, China, ³OncoSeek Limited, Hong Kong Science and Technology Parks, Hong Kong, Hong Kong, ⁴Department of Clinical Oncology, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong, Hong Kong, ⁵Department of Clinical Oncology, Queen Mary Hospital, Hong Kong, Hong Kong

Purpose/Objective(s): Stereotactic body radiation therapy (SBRT) is one of the standard treatments for inoperable hepatocellular carcinoma (HCC). However imaging tool even with MRI may not be sensitive enough to evaluate tumor response after SBRT. Circulating tumor cells (CTC) may act as a surrogate biomarker of response evaluation.

Materials/Methods: 10 consecutive patients with inoperable HCC received radical SBRT in 5 fractions (35–50 Gy) over 1-2 weeks. Peripheral blood was taken for CTC (7.5ml collected in Cell-Free DNA tubes) and serum alfa-feto protein (AFP) (5ml) before SBRT and then 3 months afterwards. Red cells were lysed before CTC isolation and enriched CTC outputs were labeled with DAPI, CK, EpCAM and CD45 antibodies. Nucleated CK/EpCAM+ CD45- CTCs were identified and enumerated using CellProfiler/CellProfiler Analyst software. Spearman's

correlations were performed for correlation between (1) baseline CTC counts and gross tumor volumes (GTV) of all irradiated tumors and serum AFP and (2) change in CTC and objective response (CR, PR, SD and PD) based on modified RECIST with MRI scan with primovist injection, GTV and serum AFP at 3 months after SBRT.

Results: The median baseline CTC, serum AFP and GTV were 18.5 counts per 7.5ml blood (range 3–86 counts per 7.5ml blood), 7 ng/ml (2–60521 ng/ml) and 28.3 cm³ (1.98–221.2 cm³) respectively. One, 8 and 1 patients achieved CR, PR and PD (metastasis to distant node outside SBRT field) after SBRT respectively. Baseline CTC did not correlate well with baseline GTV ($r=-0.468$, $p=0.172$), AFP ($r=0.187$, $p=0.606$) or log(AFP) ($r=0.201$, $p=0.577$). However, percentage change in CTC correlated very well with objective response at 3 months after SBRT ($r=0.703$, $p=0.023$) while percentage change in AFP ($r=0.006$, $p=0.987$) and percentage change in log(AFP) did not ($r=-0.328$, $p=0.354$).

Conclusion: CTC correlated better than serum AFP with tumor response to SBRT for inoperable HCC. It can serve as a surrogate predictive biomarker after SBRT.

Author Disclosure: V.H. Lee: None. V.C. Wong: None. C. Lam: None. P.P. Ho: None. M.H. Szeto: None. S. Ng: None. M. Li-Lung: None. J.M. Ko: None. T. Leung: None.