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Dynamic Contrast-Enhanced CT to Evaluate Response in Neuroendocrine Liver Metastases Treated with Everolimus and Radiation

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BACKGROUND: The optimal method for evaluating response in neuroendocrine liver metastases (NELM) to RT is unknown; tumor perfusion parameters were measured by dynamic contrast-enhanced CT (DCE-CT) to correlate with efficacy in a pilot study utilizing everolimus (E) with radiotherapy (RT) for NELM.

METHODS: Fourteen patients with < 4 progressive NELM received E for 28 days prior to, concurrent with, and 14 days following RT. Each patient had a DCE-CT at baseline (T_0), prior to RT (T_1) and 7 days post RT (T_2). Per lesion response evaluated per RECIST v1.1. Perfusion parameters of blood flow (BF) and blood volume (BV) were correlated with max. % change in size of NELM within the 12 month follow-up (12m). NELM not treated with RT served as an internal control. Statistics were performed using Wilcoxon Signed-Rank Test and Spearman's coefficient.

RESULTS: Twenty-one treated NELM in 10 patients were evaluable. Compared to T_0, BV increased at T_1 (median 11%, range -50 to +63%, p=.59), then decreased at T_2 (median -20%, range -58 to +53%, p=.01). Compared to T_0, decrease in BF was observed at T_1 (median -7%, range -31 to +100%, p=.79), and decreased further at T_2 (median -13%, range -51 to +90%, p=.16).

Compared to T_1, decrease in BV at T_2 correlated with the max.% change in the size of the treated NELM (r_s=-0.45, p=0.04). Conventional ORR was 33%; no progression was seen within 12m. Trend of increased BV in internal controls at each time point supports that the effect seen is due to RT.

CONCLUSION: Changes in DCE-CT are observed in patients receiving E and E+RT for NELM, with BV decreasing significantly post-RT and correlating with treatment response. Given the challenges in assessing response in NELM using traditional RECIST criteria in any context, DCE-CT appears to be a promising modality; further studies are required.

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