AbstractID: 11245 Title: Use of FLT PET imaging to assess tyrosine kinase inhibitor (TKI) treatment response

Background: Sunitinib (SU) is a tyrosine kinase inhibitor (TKI) with activity against VEGFR. During VEGFR TKI withdrawal, increased pain at sites of metastasis has been observed, which we hypothesize is due to the proliferative flare. [^{18}F]-fluoro-3'-deoxy-3'-L-fluorothymidine (FLT) PET imaging was used as a marker of treatment response, to assess the proliferative flare and to investigate perfusion and vascular status of the tumor.

Methods: 14 patients with advanced solid malignancies have been enrolled. SU was given at the standard dose of 50 mg for 4 weeks, followed by a 2 week break. 90-minute dynamic FLT PET/CT scans were obtained at the baseline, week 4, and week 6. 8 patients with adequate follow-up time were classified in two groups: with clinical benefit (CB; progressive disease (PD)>6 mo) or without clinical benefit (noCB; PD<6 mo). Changes in the peak FLT standardized uptake value (SUV_{peak}) were calculated. In addition, FLT kinetic analysis was performed to extract perfusion and vasculature status of the tumor.

Results: The differences in FLT uptake were significant between the two groups (CB: -20%, noCB: ~0%). Interestingly, both groups exhibited a significant increase in SUV_{peak} during SU withdrawal, but with a significantly higher increase in the group without clinical benefit (CB: +20%, noCB: +50%). The kinetic analysis revealed significant differences in the perfusion at week 4 between the groups (CB: ~0%, noCB: -40%), with no significant differences at the end of the treatment cycle.

Conclusions: Change in SUV_{peak} was associated with the degree of clinical response. Proliferative increase in the target lesions during SU withdrawal was observed, and was higher for patients with poor clinical outcome.

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