



Changes in Cervical Cancer FDG Uptake During Chemoradiation and Association With Response

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SUMMARY

- Stage Ib1-IVa cervical cancer, N=25
- PET SUV decreased at greater rate earlier in treatment cycle in responders than did mean tumor volume
- Pretreatment and week 4 of treatment represent the best time points for prediction of response.

ABSTRACT

Purpose. Previous research showed that pretreatment uptake of F-18 fluorodeoxyglucose (FDG), as assessed by the maximal standardized uptake value (SUVmax) and the variability of uptake (FDGhetero), predicted for posttreatment response in cervical cancer. In this pilot study, we evaluated the changes in SUVmax and FDGhetero during concurrent chemoradiation for cervical cancer and their association with post-treatment response.

Methods and Materials. Twenty-five patients with stage Ib1-IVa cervical cancer were enrolled. SUVmax, FDGhetero, and metabolic tumor volume (MTV) were recorded from FDG-positron emission tomography (PET)/computed tomography (CT) scans performed pretreatment and during weeks 2 and 4 of treatment and were evaluated for changes and association with response assessed on 3-month post-treatment FDG-PET/CT.

Results. For all patients, the average pretreatment SUVmax was 17.8, MTV was 55.4 cm³, and FDGhetero was -1.33. A similar decline in SUVmax was seen at week 2 compared with baseline and week 4 compared with week 2 (34%). The areas of highest FDG uptake in the tumor remained relatively consistent on serial scans. Mean FDGhetero decreased during treatment. For all patients, MTV decreased more from week 2 to week 4 than from pretreatment to week 2. **By week 4, the average SUVmax had decreased by 57% and the MTV had decreased by 30%.** Five patients showed persistent or new disease on 3-month post-treatment PET. These poor responders showed a higher average SUVmax, larger MTV, and greater heterogeneity at all 3 times. Week 4 SUVmax (P=.037), week 4 FDGhetero (P=.005), pretreatment MTV (P=.008), and pretreatment FDGhetero (P=.008) were all significantly associated with post-treatment PET response.

Conclusions. SUVmax shows a consistent rate of decline during treatment and declines at a faster rate than MTV regresses. Based on this pilot study, **pretreatment and week 4 of treatment represent the best time points for prediction of response.**