

122 Pilot Study of Functional Infrared Imaging for Early Detection of Mucositis in Locally Advanced Head and Neck Cancer Treated With Chemoradiotherapy

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Purpose/Objective(s): Mucositis, and its clinical sequelae, are consistently reported as the most clinically significant acute toxicity in the treatment of locally advanced squamous cell carcinoma of the head and neck (LA-SCCHN) with chemoradiotherapy. Inter-patient variability in mucositis is accounted for by radiotherapy dosing, fractionation, and volumes but even within the same treatment regimen, there appear differences in normal tissue tolerance. Radiotherapy associated mucositis manifests initially as erythematous areas in the treatment field. These phenotypic changes are accompanied by an intense inflammatory response histologically. We hypothesized that patients destined to display severe mucocutaneous toxicity will demonstrate greater alterations in thermal intensity early in therapy than identically treated counterparts. Detection of these early changes using sensitive thermal imaging technology would allow identification of patients that will require more intensive supportive care. **Materials/Methods:** Subjects with LA-SCCHN (oral cavity or oropharynx) being treated with the identical chemoradiotherapy regimen underwent baseline and weekly thermal imaging. Changes in temperature of oral mucous membranes compared with a reference area (ΔT) were calculated and correlated to grade of mucositis based on NCI-CTCAE 3.0. In addition, quality of life measured by the Performance Status Scale for Head and Neck Cancer (PSS-HN), weight loss, and need for feeding tube were recorded. **Results:** Thirty-four subjects were enrolled. Grade 3 mucositis and dermatitis was observed in 53% and 21%, respectively. All subjects displayed an increase in temperature within the radiation field. We observed a statistically significant positive association between an early rise in ΔT and mucositis grade (pvalue=0.03). For every 1°C increase in ΔT there was a 0.157 increase in average subsequent mucositis grade. **Conclusions:** Thermal imaging is able to detect small and early changes in temperature of mucosal surfaces that may be associated with development of mucositis in patients being treated with chemoradiotherapy. Larger studies with greater dynamic ranges in mucositis scoring are warranted to evaluate whether this tool can help predict which patients would be in need of early intervention to prevent acute complications.

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