squamous cell carcinoma of the head and neck (SCCHN) who are treated with combined chemoradiation (CRT). The aim was to find a potential SUV_{max} threshold to predict risk of distant failure (DF), local failure (LF) and regional failure (RF). This may help identifying patients at risk and subject them to intensified treatment.

**Materials and Methods:** In a study conducted between 2008 and 2014, 21 patients were prospectively analyzed for dynamics of tumor hypoxia during CRT. This consisted of radiotherapy in IMRT-technique (5 x 2 Gy/week up to 70 Gy) and concurrent platinum-based chemotherapy (weeks one, four and seven). Additionally the patients received pretreatment FDG-PET and MRI scans of the head and neck and FMISO-PET. The SUV_{max} determined in the FDG-PET/CT were used for further analysis to find a correlation with DF, LF and RF. In follow-up (FU) we performed regular CT and MRI scans of the head and neck and lung. For correlation analysis we used Spearman coefficient. We performed statistical analysis with SPSS Statistics 21 (IBM).

**Results:** Between 08/2008 and 04/2014, 22 patients (three women and nineteen men) with histologically proven SCCHN were recruited, mean ECOG score 1, average FU time was 30.6 months (0.6-63 months). 4 patients developed DF (18.2 %). Average SUV_{max}(tumor)/SUV_{max}(muscle) was 1.9/1.6/1.3 (weeks 0/2/5; n=22/20/17). Average SUV_{max} in FDG-PET was 14.4 (n=20). Average HB-concentrations were 14.1/12.6/10.9 g/dl (weeks 0/2/5). Average EPO-concentrations were determined in 9 patients (7.3 mU/ml). Correlation coefficient between DF and FMISO- SUV_{max}(tumor)/SUV_{max}(muscle) is -0.3/-0.4/-0.4 (in weeks 0/2/5). Correlation coefficient between HB and EPO, and between HB and FMISO is -0.02 and 0.02/-0.3/-0.4 (weeks 0/2/5), respectively.

**Conclusions:** There could not be shown any significant correlation between HB and EPO, and between tumor hypoxia and HB and/or EPO, nor were there any correlations between distant failure and SUV_{max}(tumor)/SUV_{max}(muscle). There is need for further data acquisition.

**EP-1147**

Hypoxia in SCCHN: is blood oxygenation (HB and EPO) a valuable biomarker in predicting local a/o distant failure?  
H. Kerti^1, A. Bunea^1, N. Wiedenmann^1, M. Mix^2, A.L. Grosu^1  
^1University Hospital Freiburg, Department of Radiation Oncology, Freiburg, Germany  
^2University Hospital Freiburg, Department of Nuclear Medicine, Freiburg, Germany

**Purpose/Objective:** Tumor hypoxia is commonly related to a poorer prognosis and to higher radioresistance. The degree of reoxygenation during radiotherapy contributes to improved therapy success. 18-Fluoromisonidazole PET/CT (FMISO-PET) non-invasively allows visualizing tumor hypoxia and its dynamics under chemoradiation (CRT) of squamous cell cancer of the head and neck (SCCHN). There is little evidence for the relation between hypoxia and changes in blood oxygenation determined by hemoglobin (HB) and erythropoietin (EPO) levels in blood. Matter of interest is also the relation between these biomarkers with metastasis-free survival (MFS) and loco-regional control (LRC).

**Materials and Methods:** Between 2008 and 2014 we prospectively analyzed the dynamics of tumor hypoxia during CRT in 21 patients at our center. This consisted of radiotherapy in IMRT-technique (5 x 2 Gy/week up to 70 Gy) and concomitant platinum-based chemotherapy (weeks one, four and seven). Additionally the patients received pretreatment FDG-PET and MRI scans of the head and neck and FMISO-PET for hypoxic imaging (in week ‘zero’). The hypoxia was further evaluated in week 2 and 5 with two more FMISO-PET scans. EPO and HB levels were also determined parallel to hypoxic imaging. Tumor hypoxia in FMISO-PET was defined as SUV_{max}(tumor)/SUV_{max}(muscle). In follow-up (FU) we performed regular CT and MRI scans of the head and neck and lung. For correlation analysis we used Spearman coefficient. We performed statistical analysis with SPSS Statistics 21 (IBM).

**Results:** Between 08/2008 and 04/2014, 22 patients (three women and nineteen men) with histologically proven SCCHN were recruited, mean ECOG score 1, average FU time was 30.6 months (0.6-63 months). 4 patients developed DF (18.2 %). Average SUV_{max}(tumor)/SUV_{max}(muscle) was 1.9/1.6/1.3 (weeks 0/2/5; n=22/20/17). Average SUV_{max} in FDG-PET was 14.4 (n=20). Average HB-concentrations were 14.1/12.6/10.9 g/dl (weeks 0/2/5). Average EPO-concentrations were determined in 9 patients (7.3 mU/ml). Correlation coefficient between DF, LF and RF and SUV_{max} was -0.061, -0.26 and 0.06, respectively. Median SUV_{max} in FDG-PET was 14.4 (n=20). Average FDG-SUV_{max} of patients with any treatment failure (DF, LF and RF) was 15.2 (n=7).

**Conclusions:** There could not be shown a significant correlation between DF, LF or RF and SUV_{max} in FDG-PET. But still our data shows that above an FDG-SUV_{max} of 14.4, a larger proportion of patients showed treatment failure, so there may be a higher risk for failure above that threshold. It remains an interesting question whether a larger cohort and a longer FU-time might show a correlation. There is need for further investigation.

**EP-1148**

Custom-designed oral prostheses improve accuracy of daily treatment setup for head and neck cancer radiotherapy  
N. Uchida^1, K. Nakamura^1, Y. Fujikawa^1, E. Matusue^1, T. Kanemitsu^1, O. Yoshida^1, K. Asakura^1, K. Kimura^1  
^1Tottori Perfectural Central Hospital, Radiology, Tottori, Japan

**Purpose/Objective:** In cases of head and neck cancer (HNC) radiotherapy, custom-designed oral prostheses are sometimes used to depress the tongue or push the hard palate away from the clinical target volume (CTV) and intended to reduce side-effects to surrounding organs at risk (OAR). We evaluated whether the use of custom-designed oral prostheses improved daily setup precision of HNC.

**Materials and Methods:** The custom-designed oral prostheses were made of resin to fit each patient’s oral cavity. The upper and lower parts and inter-space bar of the prostheses were made of resin to fit each patient’s oral cavity. The custom-designed oral prostheses improved daily setup precision of HNC.