The purpose of our work is evaluation of the impact of 18FDG-PET/CT on the complex management of locoregionally advanced (T3-4N1-3) head and neck squamous cell cancer (LAHNSC), and on the target definition for 3D conformal (3DCRT) and intensity-modulated radiotherapy (IMRT). 18FDG-PET/CT were performed on 185 patients with LAHNSC prior to radiotherapy/chemoradiation in the treatment position between 2006 and 2011. Prior to it 91 patients received induction chemotherapy (in 20 cases of these, baseline PET/CT was also available). The independently delineated CT-based gross tumor volume (GTVct) and PET/CT based ones (GTVpet) were compared. Impact of PET/CT on the treatment strategy, on tumor response evaluation to ICT, on GTV definition furthermore on overall and disease-specific survival (OS, DSS) was analysed. PET/CT revealed 10 head and neck, 2 lung cancers for 15 patients with carcinoma of unknown primary (CUP) while 3 remained unknown. Second tumors were detected in 8 (4.4%), distant metastasis in 15 (8.2%) cases. The difference between GTVct and
GTVpet was significant (p=0.001). In 16 patients (14%) the GTVpet were larger than GTVct due to multifocal manifestations in the laryngo-pharyngeal regions (4 cases) or lymph node metastases (12 cases). In the majority of the cases (82 pts, 72%) PET/CT-based contouring resulted in remarkable decrease in the volume (15-20%: 4 cases, 20-50%: 46 cases, >50%: 32 cases). On the basis of the initial and post-ICT PET/CT comparison in 15/20 patients more than 50% volume reduction and in 6/20 cases complete response were achieved. After an average of 6.4 years of follow-up the OS (median: 18.3±2.6 months) and DSS (median: 25.0±4.0 months) exhibited close correlation (p=0.0001) to the GTVpet. In cases with GTVpet40 cm3 the median DSS was 8.4±0.96 months (HR=11.48; 95% CI: 5.3-24.9). Our results suggest that 18FDG-PET/CT plays an important role for patient with LAHNSC, by modifying the treatment concept and improving the target definition for selective RT modalities. Volumetric PET/CT-based assessment of the tumor response after ICT gives valuable contribution to further therapy planning.