positive. 8% (15/187) of patients had N2a, 57% (107/187) had N2b, 16% (29/187) had N2c, and 5% (9/187) had N3 disease. 80.2% received chemoradiotherapy. Median follow-up was 30 months (IQR 21.6-39.7). Median time from end of radiotherapy to PET scan was 90 days. Overall locoregional control at 2 years was 92.3% (95% CI, 86.8-95.6) and 2 years survival was 83.0% (95% CI, 76.6-88.3). A total of 21 NDs were performed, of which 57.1% were pathologically positive. Further analysis revealed 59.4% (111/187) had CR, 23.0% (43/187) EQR and 17.6% (33/187) ICR nodal response. 2 year recurrence rate was 12.8% (95% CI, 6.1-20.2), 11.8% (95% CI, 3.4-28.2) and 37.5% (95% CI, 19.8-70.1) for CR, EQR and ICR groups, respectively. 2 year survival was 91.9%, 87.5% and 50.0%, respectively. There was significantly higher disease recurrence (p=0.004) and lower survival (p=0.001) amongst the ICR compared to CR and EQR. There were no statistical differences in recurrence and survival rates between CRs and EQR at 1-year or 2-years. 10 NDs were carried out for the EQR group with 50% pathological involvement. 20 patients with EQR underwent a repeat PET 6 months after radiotherapy, resulting in a further 13 CRs.

Conclusion
Real life application of the PET-NECK protocol has resulted in similar outcomes to that seen in the landmark study. Most patients are therefore spared a ND and disease control is maintained with PET-CT surveillance post-radiotherapy. Fewer neck dissections were performed than recommended by the PET-Neck protocol for those with EQR, however, disease recurrence and survival outcomes were comparable between the EQR and CR. This suggests good outcomes are not due to salvage ND and more likely to be related to slowly responding disease, which is supported by the large number of patients achieving a CR at the 6 month repeat PET scan.

Symposium: Symposium 2: New developments in radiation therapy

SP-025 The fourth major salivary gland and its clinical implications
V. Vougel
The Netherlands

Abstract not received

SP-026 Modern IMRT planning, how high can we push the bar?
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Abstract text
Modern radiotherapy is evolving more rapidly than ever before. The knowledge of how to create the best radiotherapy treatment plan for the specific patient is changing year after year. Treatment plans that were seen as state of the art a few years ago are now days seen as obsolete. There are many contributing factors, like better and faster computers and evolving accelerator hardware. The knowledge of how to best utilize these improvements is not well understood and therefore multiple publications are being published on this topic continually. The talk will summarize where treatment planning for head and neck is at the moment. Which factors have increased the treatment planning quality and in which areas are there still room for improvements. Specific details related to use of national and international guidelines, automated treatment planning, normal tissue complication probabilities, the plan comparison between photon and proton treatments etc. is touched upon. The figure shows a patient example on how the radiotherapy treatment technique has evolved over a relatively short period. The start of Intensity Modulated RadioTherapy (IMRT) typically used few beams (5 beam) with limited complexity resulting in a conformity index of 1.9, meaning the treated volume is 90% larger than the target volume, for this example. Quickly the number of beams used for IMRT increased to 7, 9 or 11 beams allowing for an increased conformity (CI=1.85). The introduction of Volumetric Modulated Arc Therapy (VMAT) further increased the conformity, since most beam angles where now usable resulting in even better conformity (CI=1.33). Automated planning has pushed the bar of plan quality even further with extreme conformity (CI=1.10) and significant better sparing of organs at risk.

SP-027 New developments in proton therapy in Head and Neck cancer
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Abstract text
Over 60% of patients treated with chemo-IMRT for head and neck cancer experience grade 3 acute side effects. Acute toxicities include fatigue, mucositis, pain, taste disturbance, reduced oral intake, dysphagia, aspiration pneumonia, requirement for tube feeding and hospital admissions, which can result in treatment gaps and poor chemotherapy compliance. Acute toxicities are also a
precursor to late effects, which adversely impact long-term quality of life. Large deteriorations in multiple patient reported physical symptoms are observed at least 12 months following treatment, corresponding with moderate to severe changes in physical, emotional and global quality of life scores. The observed improvement in local tumour control and survival outcomes, especially for HPV-related oropharyngeal cancer, makes focusing on improving treatment related toxicities and health related (HR)-QoL a priority. Technological advances in radiotherapy deliver aim to increase sparing of normal tissues, to realise improved functional outcomes and HR-QoL for patients and can be potentially exploited for dose escalation strategies. The superior dosimetric properties of protons with sharp lateral penumbra and distal fall-off reduce the radiation dose to normal tissues beyond the target volume, which compared with photons may lessen treatment-related toxicities and/or improve target volume coverage in proximity to critical structures. The state of play for use of protons in head and neck cancer will be reviewed, including patient selection, NTCP models and clinical trials.

SP-028 Early response evaluation in radiation therapy driven larynx organ preservation

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Abstract text

Long-term laryngectomy-free (LFS), tumour-specific (TSS) and overall survival (OS) is achieved by non-surgical larynx organ preservation (LP) only in a proportion of patients with locally advanced laryngeal or hypopharyngeal cancer. A score facilitating decision-making after 1 cycle induction chemotherapy (IC-1) may improve LFS and TSS. The German multicenter randomized phase II larynx organ preservation (LOP) trial DeLOS-II was carried out to prove the hypothesis that cetuximab (E) added to induction chemotherapy (IC) and radiotherapy improves laryngeectomy-free survival (LFS; survival with preservation of larynx) in locally advanced laryngeal/hypopharyngeal cancer (LHSCC). The DeLOS-II trial met its primary objective of 24 months LFS >35% in arm B. Cetuximab given concomitantly over 16 weeks during IC+RT achieved 24 months LFS in 41 patients (46.6%, 80% CI 39.8% to 53.4%), whereas 40 patients in A had a 24 month laryngectomy-free survival (47.1%, 80% CI 40.1% to 54.0%) and demonstrated similarly improved outcome (p=0.925 for A versus B). Early response to IC-1 with TPF ± cetuximab was assessed in 52 patients as subgroup of the DeLOS-II-trial using endoscopic tumour staging for selecting total laryngectomy for non-responders with endoscopic tumour surface shrinkage <30% versus induction chemotherapy plus radiotherapy (IC + RT) for responders. Computed tomography (CT)-based volumetry was used to assess volumes of primary tumour, neck nodes and their sum; maximum and mean standardised uptake value (SUVmax, SUVmean) were measured by 18F-FDG-PET/CT. Baseline and residual values after IC-1 were calculated and correlated with LFS, TSS and OS. After IC-1, 39/52 patients (75%) were early responders. Early response predicted complete response to IC + RT (p = 0.48 × 10-9). Early laryngectomy was performed in responders with endoscopic tumour surface shrinkage >70% and best OS. Significant independent predictors for LFS in responders are number of CT-staged suspect positive neck nodes (N+), residual primary tumour volume, residual total tumour volume and the ratio of residual SUVmax and SUVmean (resSUVmax/resSUVmean). Our LFS-score combines ≥2N+, residual primary tumour volume >20%, residual total tumour volume >5.6 mL and resSUVmax/resSUVmean ≥ 1.51 weighted by their hazard ratio (12, 6, 5 and 4); LFS-score ≥ 16 predicts increased LFS, OS and TSS (p < 0.05). LFS-score ≥ 16 identifies in responders to IC-1 the patients with maximum benefit of non-surgical LP achieving long-term LFS. Even more importantly, a LFS-score > 16 defines patients unsuitable for LP applying the TPF/TP IC + RT protocol.

LJS:

Poster discussion: Poster discussion

PD-029 Phase II trial: melatonin oral gel for prevention of mucositis in oropharynx and oral cavity tumors


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