All measured values were evaluated using the gamma index with dose difference/distance-to-agreement criteria of 3%/2 mm ($\gamma_{3\%/2\ mm}$) for the area receiving more than 10% isodose as compared with a static pattern. A γ passing rate > 90% was considered acceptable in this study.

Results: For Group A, $\gamma_{3\%/2\ mm}$ was less than 90% for translational errors ≥ 3 mm in the LAT and VRT directions and ≥ 2 mm in the LNG direction. For Group B, $\gamma_{3\%/2\ mm}$ was less than 90% for rotational errors ≥ 3° (Table 1). Table 2 summarizes $\gamma_{3\%/2\ mm}$ for Group C. Translational errors of 2 mm and rotational errors of 2° always gave a $\gamma_{3\%/2\ mm}$ of less than 90%. $\gamma_{3\%/2\ mm}$ was less than 90% for tilt and roll angles of 2°, even without translational errors. Even when translational errors were 1 mm, $\gamma_{3\%/2\ mm}$ was less than 90% for two patterns with rotational errors of 1°. By correcting the translational errors, $\gamma_{3\%/2\ mm}$ was more than 90% for tilt and roll angles of 1°. Note that correction of the translational errors degraded $\gamma_{3\%/2\ mm}$ for the pattern with a tilt angle of 1° and roll angle of -1° and with a tile angle of 2° and roll angle of -2°.

Table 1. $\gamma_{3\%/2\ mm}$ for Group A and Group B.

Group A				Group B		
Translational error (mm)	γ3%/2 mm (%)			Rotational error (°)	γ3%/2 mm (%)	
	LAT	LNG	VRT		Tilt	Roll
1	99.4	96.5	100.0	1	99.3	97.4
2	93.7	85.6	98.2	2	92.8	92.5
3	83.7	76.2	88.6	3	83.5	87.7
5	59.5	56.7	66.5	5	73.5	72.1

Table 2. $\gamma_{3\%/2\ mm}$ for Group C.

setup error					γ3%/2 mm (%)
LAT (mm)	LNG (mm)	VRT (mm)	Tilt (°)	Roll (°)	
2	2	2	2	2	62.5
2	2	2	2	-2	84.1
2	2	2	-2	2	49.4
2	2	2	-2	-2	58.6
1	1	1	1	1	93.2
1	1	1	1	-1	96.8
1	1	1	-1	1	76.4
1	1	1	-1	-1	80.8
0	0	0	2	2	79.9
0	0	0	2	-2	73.8
0	0	0	-2	2	83.3
0	0	0	-2	-2	79.5
0	0	0	1	1	94.8
0	0	0	1	-1	94.2
0	0	0	-1	1	96.1
0	0	0	-1	-1	96.3

Conclusions: This study have demonstrated that rotational errors ≥ 3° in either angle or ≥ 1° in multiple angles most likely gave a $\gamma_{3\%/2\ mm}$ of less than 90%, even with translational errors < 2 mm; therefore, it is preferable to correct rotational errors < 2° in each angle for spine SRS under correction of translational errors.

Symposium with Proffered Papers: Future directions for HPV negative head and neck cancer

SP-0532

Molecular imaging of proliferation and hypoxia

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HPV-status has been recognized as the strongest prognostic indicator for treatment outcome of oropharynx cancer overpowering clinical and other biological tumor characteristics. Nevertheless, the latter remain of value for selection of subgroups within the HPV-negative and HPV-positive entities that qualify for treatment intensification or de-intensification, respectively. Among the clinical factors are smoking habits and T- and N-stage. Classical radio- and chemotherapy resistance mechanisms include DNA-repair capacity, tumor repopulation and hypoxia, for which various biomarkers have been identified. To improve the outcome of HPV-negative patients the challenge is to identify the pivotal resistance mechanisms and apposite treatments to counteract them. There will not be a "one-size-fits-all" solution and customized treatment additions and/or adaptations will be essential, necessitating selection tools.

For a biomarker assay to be successful for wide clinical application it should preferably be non-invasive, fast, not too complex, and suited for repetitive assessments. PET-scanning meets these criteria although specific tracer availability can be a limitation. The current status and future directions of PET-scanning with proliferation- and hypoxia-specific tracers for outcome prediction and early response assessment will be discussed.

SP-0533

Combined modality treatment: risk-adapted intensified strategies and quality of life

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HPV negative head and neck cancer remains a challenging disease with a poor prognosis for many patients, especially those with locally advanced disease stage. Future developments are likely to focus on a number of areas.

Techniques to identify and target patients with radioresistant disease are required. Current clinical trials in this area are testing radiation dose escalation to overcome radioresistance. Advances in functional imaging have allowed the detection of sub-volumes of radioresistant tumour tissue due to hypoxia, proliferation or other processes. Dose painting techniques are in development to attempt to deliver increased radiatin dose to these areas.

In parallel the development of combinations of radiation with chemotherapy and novel agents are underway. The ability of agents to overcome the processes leading to radioresistance such as hypoxia, DNA damage repair and other processes will be discussed.

OC-0534

An RCT on the value of postoperative accelerated radiotherapy in squamous cell head and neck cancer: final results

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Purpose/Objective: In head and neck squamous cell carcinoma (HNSCC), the overall treatment time of radiation (OTT) is significantly associated with locoregional control (LRC), which is consistent with rapid repopulation of cancer clonogens during radiotherapy. However, the importance of