

of these women and clearly denied only in 21% and 26% respectively. In 5 (6%) patients surrogate markers of HPV infection were registered (sexually transmitted disease or cervix disease including cancer). Sixteen women had other cancers.

**Conclusion:** With the data assessed until now, no change in clinical and epidemiological changes or women with head and neck SCC referred to our institute could be detected.

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POSTER

#### Different predictors of asymptomatic carotid artery stenosis in patients having received radiotherapy for head and neck cancers

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**Background and Purpose:** Carotid artery stenosis (CAS) is one of the major complications of external irradiation (radiotherapy, RT) to the head and neck cancers. Few large-scale studies of CAS after radiotherapy were reported. We try to predict the severity, extent and progression of radiation-induced CAS in these patients and discuss its related factors.

**Methods:** In a cross-sectional study, CAS was detected by color-coded carotid duplex. We enrolled 290 consecutive Taiwanese patients of head and neck cancers with (RT group, 192 patients) or without (control group, 98 patients) receiving RT. Detailed review of cerebrovascular risk factors was documented. Multivariate regression was performed for analysis of independent factors for CAS.

**Results:** The mean duration after radiotherapy in the RT group was 4.9±3.9 years (median 3.8 years) and the mean dosage of irradiation was 6225±906 (median 6600) cGy on the neck. There was no statistically significant difference of age and common risk factors of cerebrovascular diseases between RT and control groups. The majority (82.3%) of CAS had more than one atherosclerotic plaques of any degree of stenosis in the RT group, and was significantly more than that of the control group ( $p < 0.001$ ). Significant ( $\geq 50\%$ ) stenosis was observed only in the RT group (19.8%,  $p < 0.001$ ). In all segments of carotid arteries, the summation of plaque scores was statistically significant higher in the RT group with highest score at both bulb bifurcations ( $p < 0.001$ ). Multiple linear regression analysis showed the increase of total plaque scores was independently associated with dosage of RT, age, time interval after RT and male gender.

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POSTER

#### Papillary thyroid microcarcinoma: prognostic factors, management and treatment outcome in 228 patients

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**Background:** Within the group of patients with papillary thyroid microcarcinoma (PTMC), the prognostic factors have not been well defined and the optimal treatment has not been proved. The aim of this study was to find out the factors associated with the tumor recurrence in patients with PTMC.

**Material and Methods:** A total of 228 patients with PTMC (189 females, 39 males; age 14–85 years, median 46 years) were treated at our Institute between 1975 and 2006; among them 98 patients had incidental PTMC. The data on patients' gender, age, extent of disease, pathomorphological characteristics, therapy, locoregional control, disease-free survival and disease specific survival were collected. Statistical correlation between possible prognostic factors and tumor recurrence was analyzed by chi-square analysis.

**Results:** The tumor diameter ranged from 0.1 to 10 mm (mean 6.1 mm). Initially, lymph node metastases were present in 56 patients (25%) and distant metastases in 1 patient (0.4%). Pathology revealed that, in 211 patients (92.5%), PTMC was confined to the thyroid and, in 17 (7.5%), the tumor invaded into surrounding tissue. The tumor was multifocal in 60 patients (26%). Primary surgical treatment consisted of total or near-total thyroidectomy in 189 patients (83%), lobectomy in 25 (11%) or subtotal thyroidectomy in 14 patients (6%), lateral lymph nodes dissection in 51 (22%) and central lymph nodes dissection in 23 (10%) patients. Radioiodine ablation of the thyroid remnant was performed in 111 patients (49%). During the follow-up period, the recurrence was diagnosed in 7 patients (6 locoregional and 1 distant). None of the patients with the tumor diameter of 6 mm or less had recurrent disease. There was no cancer related mortality. The median length of observation was 84 months (range 1–385). The 5-year, 10-year and 20-year disease-free survival was 98.5%, 98% and 93%, respectively. None of the patients died of disease. Incidentally diagnosed PTMC, tumor size, tumor differentiation and presence of lymph node metastases were the factors which correlated with tumor recurrence. Neither the extent of thyroid surgery nor radioiodine ablation of thyroid remnant correlated with tumor recurrence.

**Conclusions:** Patients with PTMC have a favorable long term prognosis. Lower recurrence rate was found in the patients with incidentally diagnosed

PTMC, and those with the tumor diameter  $\leq 6$  mm, with well differentiated tumor and without lymph-node metastases.

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POSTER

#### Treatment for the patients with clinically lymph node-negative squamous cell carcinoma of the oral cavity

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**Introduction:** Oral cavity is cosmetically and functionally important structure. It is not easy to find phase III study about oral cavity cancer in the literature, because the incidence is relatively low. There are still many debates concerning the optimal treatment of oral cavity cancer. A retrospective analysis for the patients with clinically lymph node-negative squamous cell carcinoma of the oral cavity was performed to evaluate treatment outcome and determine optimal treatment strategy.

**Materials and Methods:** From January 1990 through December 2004, 227 patients with squamous cell carcinoma of the oral cavity including mobile tongue, floor of mouth, gingiva, retromolar trigone, hard palate, and buccal mucosa received radiotherapy with curative intent. We retrospectively analyzed 69 patients with clinically lymph node-negative disease. There were 46 patients (67%) presented with early stage disease (T1 or T2). Forty-four patients (64%) had well-differentiated disease. The patients were divided into two groups according to the treatment modalities for local disease: those treated with surgery plus external beam radiotherapy (EBRT) ( $n = 43$ ) and those with EBRT alone ( $n = 26$ ). The median doses were 63.0 Gy (range; 45.0–70.2 Gy) in the former group and in 70.2 Gy (range; 61.2–72.0 Gy) in the latter, respectively.

**Results:** The incidences of occult metastasis were 60% for T1, 69% for T2, 100% for T3, and 39% for T4, respectively. Contralateral occult metastasis occurred only in two patients. After median follow-up of 27 months (range; 6–170), 24 patients had failed treatment as follows: local ( $n = 10$ ); regional ( $n = 10$ ); distant ( $n = 1$ ); local plus regional ( $n = 2$ ); and regional plus distant ( $n = 1$ ). Of the 10 patients who received salvage treatment with curative intent for loco-regional failure, 50% were salvaged. The 5-years overall survival (OS), disease free survival (DFS), local control (LC), and regional control (RC) rates for patients analyzed were 56%, 48%, 67%, and 78%, respectively. The 5-years OS, DFS, LC, and RC rates were 63%/ 42% ( $p < .01$ ), 65%/ 16% ( $p < .01$ ), 91%/ 21% ( $p < .01$ ), and 73%/ 88% ( $p = 0.12$ ) for surgery plus EBRT group/ EBRT alone group, respectively. Similarly, significant differences in OS, DFS, and LC between the treatment groups were found for patients with early stage disease. There were fewer regional failures in patients treated with neck dissection than in those without neck dissection, but the differences were not significant (21% vs. 23%,  $p = 0.70$ ).

**Conclusion:** The risk for occult metastasis in ipsilateral neck is high in patients with early squamous cell carcinoma of the oral cavity as well as advanced disease and therefore, elective treatment for ipsilateral neck should be considered. Excellent regional control can be achieved with EBRT alone for subclinical disease of the neck. However, EBRT alone for primary tumor treatment resulted in poor local control and combined treatment with surgery and EBRT appeared to be better treatment strategy.

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POSTER

#### Impact of nuclear factor kappa B activity for local tumor controllability by radiotherapy in patients with T1/T2N0 laryngeal cancer

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**Background:** External radiotherapy (ERT) plays a critical role in organ preservation in patients with early stage laryngeal cancer. From previous reports, 5-year local control rates were 80–90% in patients with stage I, and 65–85% in patients with stage II laryngeal cancer. Although surgical salvages have been developed in the latest decade, it seems to be unfortunate that local controllability by radiotherapy has not been improved in these two decades. Aberrant NF-kappa B activity has been associated with inflammatory disorders, carcinogenesis, and response to chemotherapy and radiotherapy. The purpose of this study are to investigate whether the NF-kappa B activity affects local tumor controllability and to assess that NF-kappa B could be a predictive marker for the radioresistant laryngeal cancer.

**Materials and Methods:** Between 1990 and 2005, 251 patients with stage I/II laryngeal cancer were treated with ERT at Kobe University Hospital. Tumor sites were at glottic region in 223 patients, supraglottic in 25 patients, and subglottic in 3 patients. T-stages of glottic cancers were T1a in 101 patients, T1b in 65 patients, and T2 in 57 patients. Median age was 66 years (range: 36–92). Median radiation dose was 65 Gy (range: 50–80). Cumulative probability of overall survival (OS), cause-specific survival (CSS), and local control (LC) rates were calculated by Kaplan-Meier method according to T-stage. Immunohistochemical analyses using pretreatment biopsy specimens were performed. Immunoreactivity of NF-kappa B activity between both two groups (patients with recurrence, or those without recurrence) was compared by a chi-square test.

**Results:** Median follow-up period was 5 years (range: 1–16). Ten-year OS and CSS rates were 93% and 98% in patients with stage I disease, while those were 84% and 90% in patients with stage II disease. Five-year LC rates were 86%, 78%, and 72% in patients with T1a, T1b, and T2 glottic disease, respectively, whereas 45% in patients with supraglottic or subglottic disease. Totally, local recurrence was diagnosed histologically in 51 patients throughout the period, and samples from 28 patients were available for the further analyses. Because of above reason, case-matched 30 patients were chosen from 200 patients who did not experience a recurrence as a control group. Among those 28 patients with a local recurrence, 17 cases (61%) showed strong immunoreactivities (strongly stained) of NF-kappa B, whereas only 10 patients (33%) did in the control group. The comparison between patients with recurrence and those without recurrence in regard to NF-kappa B activity resulted in a statistically significant difference ( $p = 0.036$ ).

**Conclusion:** Although LC was consistent with previous reports, excellent OS and CSS was achieved by ERT. Our data indicated the NF-kappa B activity could be a useful marker for the prediction of radioresistant subgroup among patients with early stage laryngeal cancer.

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POSTER

#### On-site cytotechnician screening improves efficient management of thyroid nodules

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**Background:** Fine needle aspiration cytology (FNAC) is vital in the diagnostic workup of thyroid nodules, but can give unsatisfactory hypocellular specimens. Repeated visits and repeated biopsies are inefficient and contribute to the delay between initial assessment and definitive surgical management. A clinic-based cytotechnician can screen the specimens for adequacy, allowing for immediate rebiopsy if needed, thus facilitating decision making.

**Methods:** We looked at data from the first year of a prospectively gathered database of thyroid FNACs screened by an experienced on-site cytotechnician and compared this with retrospective data on thyroid cytology from the previous year. Our questions were 1) what proportion of decision making could be done at the initial visit and 2) what was the overall delay between first assessment and surgery?

**Results:** In the year before having an on-site cytotechnician 162 thyroid FNACs were done, and 33% were unsatisfactory, mostly due to hypocellularity. 37 patients had surgery, and the average time elapsed was 108 days (range 48–265).

In contrast, 62 patients had FNAC with cytotechnician screening, and in 84% the cytology at the first visit allowed definitive decision making. 8 of these patients had surgery, and the average time from initial visit to operation was 32.5 days (range 23–46).

**Conclusion:** An on-site cytotechnician capable of screening thyroid cytology specimens decreases the unsatisfactory rate of thyroid biopsies, thereby contributing to efficient decision making and rapid surgical management when indicated

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POSTER

#### Monte Carlo evaluation of systematic dosimetric inaccuracies for recurrent nasopharynx carcinomas treated with fluence-based IMRT and replanned with rotating aperture optimization

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**Introduction:** Recurrent nasopharyngeal carcinomas (rNPC) present a clinical challenge due to their proximity to critical organs (OAR). These OAR have often received significant doses during their initial

treatment. The difficulty is compounded by the use of pencil beam algorithms (PB), which are notoriously inadequate in regions of electronic disequilibrium ie. adjacent to air cavities. We have previously shown that conventional fluence based IMRT (cIMRT) and PB dose calculations result in systematic overestimation of dose, as demonstrated by Monte Carlo (MC) recalculation. Rotating aperture optimization (RAO) is a variant of direct aperture optimization (DAO) in which different collimator angles are used for each beam. The advantages of RAO over IMRT at fixed collimator angle are higher spatial resolution (due to smaller beamlet size), smaller systematic error due to interleaf leakage (which is blurred out due to multiple collimator angle superposition), and greater flexibility in generating aperture shapes, which results in more efficient optimization. In this study, we will use MC to evaluate the dosimetric accuracy of Eclipse versus RAO.

**Methods:** PTV's and OAR for 10 previously treated cases of rNPC were contoured by a single oncologist. These cases presented a wide range of complexity as the PTVs varied in volume (mean: 143 cm<sup>3</sup>, range: 37 cm<sup>3</sup> to 421 cm<sup>3</sup>), shape, and proximity to critical structures (brainstem, spinal cord, temporal lobes, brain, visual pathways). A commercially available cIMRT planning system (Eclipse 6.5 – Varian Medical Systems) and our in-house RAO algorithm were used by two independent teams to optimize each case. All PTV's were prescribed 60 Gy, and strict dose volume constraints were used for each OAR. Final doses were calculated in Eclipse (pencil beam algorithm) and Monte Carlo, and DVH's were generated for all structures.

**Results:** A detailed analysis of the 10 cases will be presented. We observed a systematic shift in the DVH's where the MC calculation demonstrated consistent underdosing, particularly with the PTV; this was more pronounced for the fluence based cIMRT technique, and was not as pronounced for the OAR's, which were further away from the inhomogeneities. There was a marked reduction of the total number of monitor units in the RAO plans as compared to the fluence based ones.

**Conclusion:** In the case of previously treated rNPC adjacent to air cavities, dosimetric accuracy is of particular concern. This study has demonstrated that, in the absence of a MC based inverse treatment planning system, RAO is a superior planning technique leading to plans that show better dosimetric agreement between the PB and MC calculations.

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POSTER

#### The role of imaging studies for the detection of retropharyngeal lymph node metastasis in head and neck cancer

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**Background:** To determine the diagnostic value of different imaging methods; Computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET)-CT for retropharyngeal lymph nodes (RPLNs) metastasis and to evaluate the relationship between RPLN metastasis and the stage of cancer.

**Materials and Methods:** Preoperative CT (n = 52), MRI (n = 36), PET-CT (n = 13) images of 52 patients with head and neck cancer were reviewed by one radiologist. All patients underwent RPLN dissection. The results of preoperative imaging study were compared with the histopathological findings of the RPLNs and the results of each modality were analyzed for sensitivity, specificity, and overall accuracy.

**Results:** The pathologically positive RPLNs were found in 17 (32.7%) of the 52 patients. The sensitivity, specificity, overall accuracy were 88%, 57%, and 67% for CT; 94%, 60%, and 75% for MRI; 75%, 78% and 77% for PET-CT, respectively. The majority of these tumors (12, 70.6%) were located in oropharynx or hypopharynx. A high incidence of RPLN metastasis was present in patients with advanced nodal stage ( $p < 0.05$ ), but there was no significant relation with primary tumor stage ( $p > 0.05$ ).

**Conclusions:** The radiologic imaging in the presence of retropharyngeal node metastasis could offer high sensitivity rate, but low specificity rate. Thus we should consider the tendency of overestimation to predict the RPLNs metastasis, even including PET-CT. And, elective RPLNs dissection is highly recommended for the patients with advanced N stage, particularly in oropharyngeal and hypopharyngeal cancer.