

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 cm³, range: 37 cm³ to 421 cm³), 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.