The radiotherapy protocol changed over time at our institution. Before 1994, the treatment A consisted of two fractions per day (2x 2.1 Gy), preceded by a dose of 50 mg/m2 carboplatinum i.v. daily. A total radiation dose of 56.70 Gy was applied to the neck and the primary tumour over 6 weeks as a split course regimen with a brake of 2 weeks.

After 1994, treatment B consisted of a conventional radiotherapy (50 Gy + 10 Gy Boost) delivered in 30 treatment fractions of 2.0 Gy.

Follow-up: All patients were examined every 6 months during the first 3 years after therapy, and every year after this period. They underwent clinical ENT-examination including magnifying laryngososcopy, ultrasound, and/or a computed tomography of the head and neck region if indicated.

Statistics: Survival and local-regional control probabilities were calculated from the day of surgery. Disease Free Survival (DFS) was defined as the absence of recurrent disease above the clavicles and the absence of distant metastases. The Kaplan-Meier product-limit method was used to determine survival and the time to local failure. The log rank method was used to test for statistical significance. Multivariate analyses were estimated by means of the Cox proportional hazards model. Follow-up data were available on all patients. Each of them was followed until death for those who died or until December 2001 for those who were alive. The median follow-up period was 75 months (range 31 to 137 months). The Disease Specific Survival (DSS) and the Locoregional Control (LRC) were estimated with the Kaplan Meier curves.

Results: Patients had 5-year locoregional control (LRC) and diseases specific survival (DSS) rates of 62.5 %, and 45 %, respectively. The 5-year DSS was 66 % and 38 % for the stage III and IV, respectively ($p = 0.006$). Patients treated with a hemoglobin level superior or equal to 13.5 g/dl before radiotherapy had a 5-year DSS of 48.5% as compared with 37 % for patients treated with a hemoglobin level inferior to 13.5 g/dl ($p = 0.01$). The largest difference was found between the patients who received treatment B and who had a hemoglobin level superior or equal to 13.5 g/dl before radiotherapy and the patients who received treatment A who had a hemoglobin level inferior to 13.5 g/dl. In the first group the 5-year DSS was 54% compared with 38% in the second group ($p = 0.002$).

Conclusions: In this series of patients with advanced head and neck tumours transoral laser surgery in combination with adjuvant radiotherapy resulted in locoregional control and DSS rates similar to those reported for radical surgery followed by radiotherapy. Laser surgery apparently leaves patients in a better clinical condition with higher hemoglobin levels and reduced surgical trauma, which is both likely enhancing the efficacy of postoperative radiotherapy.

2299 Favorable Outcome of Combined Proton Radiotherapy and Chemotherapy for T4 Nasopharyngeal Carcinoma

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Purpose/Objective: To evaluate the toxicity and outcome of proton radiotherapy with and without chemotherapy in the treatment of T4 nasopharyngeal carcinoma.

Materials/Methods: Between 1990 and 2002, 17 patients with newly diagnosed T4 N0-3 nasopharyngeal carcinoma received combined conformal proton and photon radiotherapy. Seventy-one percentage of patients had World Health Organization type 2-3 histology The median prescribed dose to the gross target volume was 73.6 Cobalt-Gray-Equivalent (CGE) (range 69-76.8). Eleven patients received accelerated hyperfractionated radiotherapy. Ten patients received induction or concurrent chemotherapy: 3 with induction docetaxel, cisplatin, and 5FU; and 7 with concurrent cisplatin, carboplatin, or taxol.

Results: All patients except one completed the planned concurrent radiation and chemotherapy treatments. With a median follow-up of 43 months, 1 and 2 patients developed local and systemic failures, respectively. There was no neck recurrence. The locoregional control and relapse-free survival rates at 3 years were 92% and 79%, respectively. For patients who received chemotherapy, the 3-year relapse-free survival rate was 91% compared to 50% for those without chemotherapy ($p = 0.09$). The overall 3-year overall survival rate was 74%. For patients who received chemotherapy, the 3-year overall survival rate was 91% compared to 40% for those without chemotherapy ($p = 0.01$). Late toxicities included five patients with radiographic changes of the temporal lobes and one osteoradionecrosis of the mandible.

Conclusions: This retrospective analysis suggests that combined use of chemotherapy with proton radiotherapy results in improved disease-free and overall survivals in patients with T4 nasopharyngeal carcinoma. The use of this treatment strategy will be further investigated in a Phase II trial at our Northeast Proton Therapy Center.

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2300 Optimal Field Arrangement for Elective Irradiation of Neck Nodes in Conformal Radiotherapy of Pharyngeal Tumours

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Purpose/Objective: The majority of patients with pharyngeal tumours have prophylactic irradiation of the lymph nodes in the neck. Conventional planning consists of two lateral fields to treat the primary tumour and upper neck nodes and the lower neck nodes are treated with a single matched direct anterior field. Routine CT planning for all ENT patients was initially introduced at St Bartholomews Hospital to facilitate the planning of a single isocentre, asymmetric match technique. All fields were defined conventionally using simulator radiographs. The availability of the dose distribution for the whole of the treated volume raised the question of the adequacy of this field arrangement to cover the PTV in the lower neck region. Examination of the dose distribution in the region below the match line led to an increasing number of requests from clinical oncologists to add a posterior neck field to increase the depth of the 95% isodose.

This study was undertaken to make a quantitative assessment of the dosimetry of the lower neck nodes and to determine whether there is dosimetric justification for increasing the complexity of planning and treatment.