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POSTER

Local control and overall treatment time in the radiotherapy of laryngeal cancer

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Purpose: This study assesses the significance of overall treatment time on the outcome of laryngeal cancer treated with curative radiotherapy.

Methods: Retrospective analysis was performed of 106 patients (pts.) with T3 and T4 squamous cell carcinoma of the larynx treated with elective radiotherapy at Oncological Institute Cluj, between January 1987 and December 1993. Radiotherapy was delivered with 2 schedules: standard (ST), 10 Gy/week, total dose (TD) 70–72 Gy in 7 weeks and hyperfractionated (HF), 12 Gy/week, 1.2 Gy twice daily, up to a TD = 84 Gy/7 weeks. There were 47 pts. in ST group and 59 in HF group. The outcome measures were: local control, local relapse and survival rates.

Results: The treatment was terminated without interruption in 60/106 pts. (57%). The cumulative failure rate at 2 years in the HF group: 37% in pts. without prolongation of treatment time and 47% for pts. with more than 4 days prolongation ($p = 0.04$). In the ST group: 29% local failures with no treatment interruptions, 56% for pts. with prolongation of treatment time. Significant differences in survival were in HF group: 54% at 3 years in pts. with no prolongation vs. 38% for pts. with treatment interruptions ($p = 0.05$).

Conclusions: In patients with laryngeal cancer treated with elective radiotherapy prolongation of overall treatment time is detrimental. In our study in both standard and hyperfractionated schedules this effect was obvious. Treatment gaps of more than 4 days should be avoided.

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A dual head spect scanner with PET capability: First experience in detection of local recurrence after radiotherapy for laryngeal cancer

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Introduction: Measurement of ¹⁸FDG uptake in the neck, using Positron Emission Tomography (PET) may be useful to distinguish local recurrence from radiation effects, after radiotherapy for laryngeal cancer. However, due to large costs a dedicated PET scanner is not widely available. With a dual head SPECT scanner with a coincidence module, PET scanning of ¹⁸FDG is possible, with a spatial resolution of 5 mm, comparable with a dedicated PET scan. In a pilot the possibility to discriminate between local control and local recurrence is investigated.

Methods and Materials: After a 12 hours fast, at 45 min after intravenously injection of 185 MBq ¹⁸FDG 11 patients underwent SPECT imaging of the neck during 25 min. Image interpretation was visually. Six patients (4 T₂, 2 T₁) had proven recurrent disease. Direct laryngoscopy under general anesthesia was performed 13 times in these patients. Five patients (2 T₂, 3 T₁) showed clinically local control.

Results: ¹⁸FDG PET scans were positive in all 6 locally relapsed cases. Histopathological examination of the laryngectomy specimen demonstrated a mean tumor size of 2.6 cm (range 1.4–5 cm). In one case ¹⁸FDG-uptake was false positive in a lymph node. ¹⁸FDG PET scans were negative in all five locally controlled patients.

Conclusion: Measurement of ¹⁸FDG with a dual head SPECT scanner with PET capability was very sensitive to detect local relapse, regional relapse was false pos. in 1/11 patients. The cost compares favorably with a dedicated PET scan. These results justify a prospective study on early detection of local relapse with this technique.

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Abnormalities in erythrocyte indexes as the new prognostic factors of laryngeal cancer treated by radiation alone

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Purpose: To evaluate the importance of hypoxia-related factors like abnormal mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) in radiotherapy of laryngeal cancer.

Material and Methods: In 295 patients with laryngeal cancer treated by definitive radiation therapy the MCV, MCH and MCHC were evaluated. The

influence of erythrocyte indexes on results of treatment was assessed using Kaplan-Meier's method.

Results: In the analyzed group 85% of patients had at least one abnormal erythrocyte index. There were no correlation between erythrocyte indexes and tumour stage. For early laryngeal cancer (T_{1,2}) 3-years recurrence rate (RR) for patients with macrocytosis of middle degree was 36% compared with 17% for patients with macrocytosis of small degree or with normocytosis ($p = 0.046$). RR for patients with normochromemia was 16% comparing to 26% for patients with hyperchromemia ($p = 0.023$). In the group with MCHC < 35% and with MCHC > 35% RR were 16% and 43% respectively ($p = 0.0076$). For advanced laryngeal cancer (T_{3,4}) abnormalities in erythrocyte indexes did not correlate with 3-years recurrence rate.

Conclusion: Majority of patients with laryngeal cancer had abnormal erythrocyte indexes. For early laryngeal cancer MCV, MCH and MCHC can significantly affect the recurrence rate.

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Iridium-192 brachytherapy (BT) in head & neck cancer (H&NSCC)

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Purpose: To evaluate results, prognostic factors and toxicity of Ir-192 interstitial BT both in primary and recurrent H&NSCC.

Patients and Methods: Between 1986 and 1993, 252 patients (pts) received BT as part of a combined modality approach. Median dose was 2200 cGy (range 1400–3600 cGy) with a median dose rate of 50 cGy/h (20–120 cGy/h). 184 pts had primary lesions (120 oral cavity, 64 oropharynx) and were mostly treated by enoral surgery (42) and external RT (38). Median follow-up was 30 mos.

Results: Overall survival (OS) and local control rate were 45% and 69% at 5 years for all pts, respectively. 15/252 (6%) had late effects requiring surgery (SX). Following SX, BT and external RT (N = 102) 13 local, 8 regional, 10 distant relapses and 11 secondary malignancies occurred. The only significant variable for local control was the time interval between SX and BT (<35 d: 1/13 vs. >35 d: 12/13; $p = 0.009$). UICC stage (I/II: 66% vs. III/IV: 41%; $p = 0.0023$) influenced OS.

Conclusion: Ir-192 BT is effective and safe as part of a multimodality concept in oral cavity and oropharyngeal cancer. Noteworthy is the critical time interval of 35 days between SX and BT.

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Acute normal tissue radiation damage and the activities of the free radical scavenging enzymes, during the conventional and continuous radiotherapy

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Background: Early side effects of radiation therapy may be a major limiting factor for treatment intensification for a head and neck cancers.

Methods: The correlations between the activity of Cu, Zn-superoxide dismutase, glutathione peroxidase, concentration of malonyldialdehyde, 7-ketocholesterol, and the severity of early mucosal radiation damage have been studied in 90 patients treated with radical radiotherapy with different dose-time intensities. Mucosal reactions were scored according to the Dische scale.

Results: Only glutathione peroxidase ($r = 0.54$) and glutathione peroxidase/superoxide dismutase activity ratio ($r = 0.52$) correlate with the severity of clinically observed early radiation damage. As a wide spectrum of the enzymatic activities has been observed for the same level of normal tissue injury, it was not possible to predict the clinical radiosensitivity of individual patients by the estimation of the free radical enzymatic scavenging activity.

Conclusion: The severity of early normal tissue damage was closer correlated with the intensity of treatment than with the activity of the enzymatic free radical scavenging system.