

New methods in the diagnosis and therapy of NPC (in situ hybridization, positron emission tomography and radiobiological investigations)

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Complex oncotherapy (i.e., radiation combined with various chemotherapeutical protocols) is fundamental while treating nasopharyngeal cancer (NPC). Due to significantly improved therapies, the 5-year survival rate presently is about 35-60%. The technical, diagnostic „armory”, applied to NPC-diagnostics, eg., in situ hybridization (ISH, FISH, etc.), positron emission tomography (PET), have undergone major improvements. Various radiobiological investigations have also been utilized in the process.

The herein reported patient group consists of 11 patients, who had been treated with combined chemoradiotherapy, 2 cases of familial clustering of NPC, 4 patients with hyperplastic nasopharyngeal tissue (prior to our extended studies of unknown nature) and 2 cases presenting long-standing radiogenic Lhermitte's sign (LS). Epstein-Barr virus (EBV) was detected with ISH, and PET examinations were performed as part of primary staging and therapeutical follow-up. Radiation induced side effects have been graded on the basis of the „Common Toxicity Criteria, Version 2.0”. We have examined individual radiosensitivity, and metabolic aspects of the possible reparative activity within radiogenic injury of the spinal cord were studied with PET.

EBV was detected in histological sections from both familial cases of NPC. Additional investigations with PET led to more exact staging in 5 cases. In 2 patients treated earlier, local, recurrent tumors were identified. In 4 patients, whose hyperplastic nasopharyngeal tissue had not been possible to classify with multiple sampling, were investigated for occult primary cancer and finally the lesions were correctly diagnosed as non-neoplastic. Two patients were identified with Lhermitte's sign. In one of them we found abnormally increased, individual radiosensitivity and inadvertently administered high biological effective dose (BED) to the cervical spinal cord (103,8 Gy). The other patient had normal radiosensitivity and the treatment was adequate, the radiation dose was conventional (BED 94,8 Gy). PET demonstrated increased ^{18}F -fluorodeoxyglucose (FDG) accumulation and ^{15}O -butanol perfusion, but negligible ^{11}C -methionin uptake in the irradiated spinal cord segments of both patients.

Our 2 cases and the review of the literature suggest that familial clustering of NPC in non-endemic geographical areas may be related to EBV infection(s). Precise localization of occult primary tumors by PET, correct staging, early detection of recurrences, better posttherapeutic assessment of nasopharyngeal masses and conformal treatment planning, all facilitate a more reasonable medical approach, that may improve survival results. Intrinsic, individual radiosensitivity may determine the development of radiation-induced toxic reactions. PET-investigation may be useful in the examination of the patients with radiogenic injury of central nervous system and help to understand metabolic changes induced by possible reparative processes within the spinal cord.