# FACTORS INFLUENCING PAROTID GLAND FUNCTION IN NASOPHARYNGEAL CARCINOMA TREATED MAINLY WITH INTENSITY-MODULATED RADIOTHERAPY

Wen-Shan Liu[1,4], Mao-Chang Su[2], Chung-Han Hsin[2], Jong-Kang Lee[3], His-Hsien Chou[4], Hsiang-Chi Kuo[1]

*Department of Radiation Oncology[1], Otolaryngology[2], Nuclear Medicine[3], Chung Shan Medical University Hospital, Institute of Medicine[4], Chung Shan Medical University*

***Purpose*** **:** To report the experience with intensity-modulated radiotherapy (IMRT) in the treatment of nasopharyngeal carcinoma and to determine the factors influencing post-irradiation parotid gland function measured by sialoscintigraphy.

***Methods and Materials*** **:** This study included 19 patients with NPC treated mainly with IMRT between August 2000 and May 2001. Twelve of these patients had Stage I-II disease and seven had Stage III-IV disease (1997 AJCC). The planning target volume of gross target volume (GTV-PTV), visible lymph node and planning target volume of clinical target volume (CTV-PTV) were designed to receive 70, 65-70 and 55-60 Gy with daily fraction of 2.12, 2.0-2.12 and 1.7-1.8 Gy, respectively. Six patients received 9-18 Gy 3D conformal radiotherapy prior to IMRT. Except from external beam, there were eighteen patients received intracavitary brachytherapy with the dose of 7.0 Gy in two fractions. All Stage II to IV cases except one received two courses of concurrent chemo-radiotherapy with cisplatin and 5-FU during radiotherapy and two to four cycles thereafter. The mean follow-up time was 13.0 months (range: 8-18 months). Objective parotid gland function was assessed by sialoscintigraphy pre-irradiation and at one, three and six months post-irradiation. Mann-Whitney rank-sum test was used to determine the factors associated with the changes in post-irradiated secretion ratio (SR).

***Results*** **:**The mean dose administered to the GTV-PTV and CTV-PTV were 70.9 and 63.2 Gy, respectively. The mean dose administered to the right and left parotid glands was 38.1 and 38.6 Gy, respectively. All of the 19 patients had complete response of primary and lymph node disease at follow-up ranging from 8 to 18 months after radiotherapy (mean, 13 months). Acute side-effects which developed during this concurrent chemo-radiotherapy were RTOG Grade III mucositis in 15 (79%) patients. Clinical xerostomia of Grade I was noted in 9 patients, Grade II in 9, and Grade III in one. There was a significant difference between the pre- and post-irradiation parotid gland SR ($p= 0.002$). Poor prognostic factors for the preservation of parotid gland function were N (+) Stage ($p= 0.03$), median dose of parotid gland greater than 35 Gy ($p = 0.038$), 50% volume of parotid gland greater than 35 Gy ($p = 0.032$) and the habit of betel quid chewing for longer than 5 years ($p = 0.029$).

***Conclusions*** **:**This study demonstrated that the combination of IMRT and chemotherapy is an effective and safe method for the treatment of nasopharyngeal cancer. The N stage, median dose of parotid gland, 50% volume dose to the parotid glands and the habit of betel quid chewing were correlated with post-irradiated parotid gland function.

[ Therapeut Radiol Oncol 2004; 11(1): 1-7 ]

Key words: Nasopharyngeal carcinoma, Xerostomia, Intensity modulated radiotherapy, Sialoscintigraphy