자유연제 1-1

SMART(Simultaneous Modulated Accelerated Radiotherapy) for Nasopharyngeal Carcinoma : The National Cancer Center Experience

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Purpose : To investigate the clinical outcome of simultaneous modulated accelerated radiotherapy (SMART) in patients of nasopharyngeal carcinoma.

Methods and Materials : Between January 2003 and May 2005, 24 patients with nasopharyngeal carcinoma underwent SMART with concurrent chemotherapy at the National Cancer Center, Korea. Eighteen patients were men and 6 were women with median age of 46 years (range, 16−65 years). Two (8%) patients had Stage IIB, 14 (59%) Stage III, 2 (8%) Stage IVA, and 6 (25%) Stage IVB. SMART was performed with 6-MV photons using IMRT (intensity modulated radiotherapy) technique. The treatment fields encompassed 3 targets ; gross tumor volume of primary and nodal disease (GTV), high risk subclinical disease (CTV1) and low risk subclinical disease (CTV2). Daily fractions of 2.4Gy, 2.15 Gy and 1.9Gy were prescribed and delivered to GTV, CTV1 and CTV2 to a total dose of 64.8Gy, 58.05Gy and 51.3Gy in 27 fractions, respectively. All patients received concurrent cisplatin with or without 5-fluorouracil (5-FU) during the SMART. Twenty (83%) patients received adjuvant cisplatin and 5-FU chemotherapy following SMART. Acute and late toxicities were assessed using Radiation Therapy Oncology Group (RTOG) scoring criteria.

Results : Twenty-two patients (92%) achieved complete response (CR) and 2 patients (8%) had partial response (PR). With a median follow-up of 12 months (range 3 to 31 months), of the patients with PR, One patient had local-regional persistent disease and subsequently developed distant metastasis. Another patient with regional persistent disease was successfully salvaged with neck dissection. None of CR patients experienced treatment failure. The 2-year local recurrence-free, regional recurrence-free, and distant metastases-free survival rates were 95%, 91%, and 95% respectively. The 2-year overall survival was 93%. The RTOG grade 3 mucositis and pharyngitis were observed in 15 (62%) and 14 patients (58%), respectively. 10 patients (42%) had weight loss greater than 10% of their pretreatment weight and 12 patients (50%) required percutaneous endoscopic gastrostomy (PEG). Addition of 5-FU to cisplatin during the concurrent chemo-radiotherapy was associated with the risk of severe mucosal toxicity and PEG placement compared to cisplatin alone ($p<0.01$). At 6−12 months after SMART, the grade 1 or 2 xerostomia was documented in 15 (79%) and grade 3 in 4 (21%) patients. At average, 50% of the total parotid gland volume received 31Gy (mean dose, 33.4 Gy).

Conclusion : Although a longer follow-up is needed, encouraging local-regional control was achieved by SMART at the cost of increasing acute mucosal toxicity. SMART allowed significant sparing of salivary gland function. Concurrent administration of 5-FU should be avoided to reduce mucosal toxicity.

Nasopharyngeal carcinoma, simultaneous modulated accelerated radiotherapy (SMART), local control, xerostomia.