

Preliminary Results of Phase I and II Study of “Simultaneous Modulated Accelerated Radiation Therapy” (Smart) for Non-Disseminated Nasopharyngeal Carcinoma

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Purpose : To introduce our preliminary results with intensity-modulated radiotherapy (IMRT) using SMART (Simultaneous Modulated Accelerated Radiation Therapy) boost technique in the treatment of nasopharyngeal carcinoma. The end points of this study were compliance, acute toxicity, initial tumor response, clinical feasibility, and dose statistics of this protocol.

Methods and Materials : Twenty patients who underwent IMRT for no disseminated nasopharyngeal carcinoma at the Asan Medical Center between September 2001 and December 2003 were evaluate by prospective analysis. According to the 1997 American Joint Committee on Cancer staging classification, 1 had Stage II, 11 had Stage III, and 8 had Stage IVB disease. The IMRT plans were designed to be delivered as a SMART using the “step and shoot” technique with a MLC (multileaf collimator). Daily fractions of 2.4Gy and 2Gy were prescribed and delivered to the GTV and CTV including clinically negative neck node, respectively. The prescribed dose was 72Gy to the gross tumor volume (GTV), 60Gy to the clinical target volume (CTV) and metastatic nodal station, and 46Gy to the clinically negative neck. This fractionation schedule was completed in 6 weeks with 5 daily fractions weekly. All patients also received weekly cisplatin during radiotherapy. Acute and late normal tissue effects were graded according to the Radiation Therapy Oncology Group (RTOG) radiation morbidity scoring criteria, subjective salivary function, weight loss, feeding gastrostomy, admission and the need for treatment split. Initial tumor re-

sponse was assessed by physical examinations including nasopharyngoscopy and FDG-PET scan.

Results : Median follow-up period was 20 months (ranging from 12 to 38 months). All but one patient completed the treatment without any interruption. This patient interrupted 2 weeks due to severe pharyngitis and malnutrition. Five patients (25%) had RTOG Grade 3 mucositis while 9 patients (45%) had Grade 3 pharyngitis. Nine of 20 patients (45%) had weight loss greater than 10% of their pretreatment weight. Ten patients (30%) required intravenous fluids, tube feeding or both. There were no Grade 3 xerostomia and all patients had experienced improvement of salivary gland function. All patients showed complete response and loco-regional control rate was 100%. Only one patient was found to have multiple bone metastases at 3 months follow-up. To date, there have been one nodal recurrence in the complete responders.

Conclusin : “Simultaneous Modulated Accelerated Radiation Therapy” (SMART) boost intensity-modulated radiotherapy technique allows parotid sparing as evidenced both clinically and by dosimetry. It may also be biologically more effective. Initial tumor response and loco-regional control was promising. It is clinically feasible. A larger population of patients and a long-term follow-up are needed to evaluate ultimate tumor control and late toxicity.

KEY WORDS : Intensity modulated radiotherapy · Nasopharyngeal carcinoma, Concurrent chemoradiotherapy.