Study Population

All patients completed a pretreatment evaluation, including a complete patient history, physical examination, hematology and biochemistry profiles, an MRI scan of the nasopharynx and neck, chest radiography, abdominal sonography, and a single photon emission computed tomography (SPECT) whole-body bone scan.

During the study period, all patients underwent radical radiation therapy based on intensity-modulated radiation therapy (IMRT) for the whole course of treatment. Target volumes were delineated slice-by-slice on treatment planning CT scans using an individualized delineation protocol that complies with International Commission on Radiation Units and Measurements reports 50 and 62. The prescribed doses were 66–72 Gy at 2.12–2.43 Gy/fraction to the planning target volume (PTV) of the primary gross tumor volume (GTVnx), 64–70 Gy/ 28-33 fractions to the PTV of the GTV of the involved lymph nodes (GTVnd), 60-63 Gy/ 28-33 fractions to the PTV of the high-risk clinical target volume (CTV1), and 54–56 Gy/ 28-33 fractions to the PTV of the low-risk clinical target volume (CTV2). All targets were treated simultaneously using the simultaneous integrated boost technique. The institutional guidelines recommended no chemotherapy for stage I, concurrent chemoradiotherapy (CCRT) with or without neoadjuvant for stage II to IVA–B (defined by the 7th edition of the UICC/AJCC staging system). In total, chemotherapy was administered to 94.7% (451/476) patients with locoregionally-advanced disease in this study. Reasons for deviation from guidelines included individual patient's refusal, age, or organ dysfunction suggestive of intolerance to treatment. Whenever possible, salvage

treatments including intracavitary brachytherapy, chemotherapy, and surgery were given to patients after documented relapse or persistent disease.

Follow-up was administrated from the date of therapy to either the date of last examination or the date of death. All patients were examined at least every 3 months during first 2 years, and every 6 months for 3 years thereafter or until death.

Imaging Protocol

MRI imaging was performed with a 1.5-T system (Signa CV/i; General Electric Healthcare, Chalfont St. Giles, UK). The region from the suprasellar cistern to the inferior margin of the sternal end of the clavicle was examined with a head-and-neck combined coil. T1-weighted fast spin-echo (FSE) images in the axial, coronal, and sagittal planes (repetition time 500–600 ms; echo time 10–20 ms), and T2-weighted FSE images in the axial plane (repetition time 4,000–6,000 ms; echo time 95–110 ms) were obtained before injection of contrast material. After intravenous injection of gadopentetic acid (Gd-DTPA; Magnevist, Schering, Berlin, Germany) at a dose of 0.1 mmol/kg body weight, spin-echo T1-weighted axial and sagittal sequences, and spin-echo T1-weighted fat-suppressed coronal sequences were performed sequentially, with parameters similar to those used before Gd-DTPA injection. Sections of 5 mm thickness with a 1 mm interslice gap were used for imaging in the axial plane, and 6 mm thick sections with a 1 mm interslice gap were used for imaging in the coronal and sagittal planes.