

Significant Factor of Magnetic Resonance for Survival Outcome in Rectal Cancer Patients Following Neoadjuvant Combined Chemotherapy and Radiation Therapy: Stratification of Lateral Pelvic Lymph Node

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Abstract : Purpose: The purpose of this study is to determine the significant magnetic resonance (MR) imaging factors of lateral pelvic lymph node (LPLN) on the assessment of survival outcomes of neoadjuvant combined chemotherapy and radiation therapy (CRT) in patients with mid/low rectal cancer. Materials and Methods: The institutional review board approved this retrospective study of 63 patients with mid/low rectal cancer who underwent MR before and after CRT and patient consent was not required. Surgery performed within 4 weeks after CRT. The location of LPLNs was divided into following four groups; 1) common iliac, 2) external iliac, 3) obturator, and 4) internal iliac lymph nodes. The short and long axis diameters, numbers, shape (ovoid vs round), signal intensity (homogenous vs heterogenous), margin (smooth vs irregular), and diffusion-weighted restriction of LPLN were analyzed on pre- and post-CRT images. For treatment response using size, lymph node groups were defined as group 1) short axis diameter ≤ 5 mm on both MR, group 2) > 5 mm change into ≤ 5 mm after CRT, and group 3) persistent size > 5 mm before and after CRT. Clinical findings were also evaluated. The disease-free survival and overall survival rate were evaluated and the risk factors for survival outcomes were analyzed using cox regression analysis. Results: Patients in the group 3 (persistent size > 5 mm) showed significantly lower survival rates than the group 1 and 2 (Disease-free survival rates of 36.1% and 78.8, 88.8%, $p < 0.001$). The size response (group 1-3), multiplicity of LPLN, the level of carcinoembryonic antigen (CEA), patient's age, T and N stage, vessel invasion, perineural invasion were significant factors affecting disease-free survival rate or overall survival rate using univariate analysis ($p < 0.05$). The persistent size (group 3) and multiplicity of LPLN were independent risk factors among MR imaging features influencing disease-free survival rate (HR = 10.087, $p < 0.05$; HR = 4.808, $p < 0.05$). Perineural invasion and T stage were shown as independent histologic risk factors (HR = 16.594, $p < 0.05$; HR = 15.891, $p < 0.05$). Conclusion: The persistent size greater than 5mm and multiplicity of LPLN on both pre- and post-MR after CRT were significant MR factors affecting survival outcomes in the patients with mid/low rectal cancer.

Keywords : rectal cancer, MRI, lymph node, combined chemoradiotherapy

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