Clinical Significance of Follow-up on Neutrophil-to-Lymphocyte Ratio in Patients with Renal Cell Carcinoma

Introduction and Objective: The elevation of pretreatment neutrophil-to-lymphocyte ratio (NLR) is associated with poor prognosis in various cancers, including renal cell carcinoma (RCC). However, to date, there has been no study on post-treatment changes in NLR in cancer patients. The aim of this study was to investigate the clinical implication of postoperative change in the NLR in RCC patients.
Materials and Methods: We reviewed 273 patients with non-metastatic RCC. The mean follow-up period was 74 months (range, 6–284 months). Peripheral blood samples were obtained at the time of hospitalisation (preoperative sample), 3–6 months after nephrectomy (postoperative sample), and at the time of recurrence. Associations among clinicopathological variables, preoperative NLR (pre-NLR), postoperative NLR (post-NLR), and recurrence-free survival (RFS) were analysed.
Results: Forty-three patients had developed recurrences; the mean time to recurrence was 40 months. The 5- and 10-year RFS rates of the patients were 87.3% and 76.3%, respectively. By univariate analyses, the mode of presentation, clinical T stage, C-reactive protein, haemoglobin level, lymphocyte count, pre-NLR, pathological T stage, nuclear grade, and microscopic venous invasion were significantly correlated with RFS. The RFS rates for patients with a pre-NLR of ≥2.7 were 78.3% at 5 years and 62.3% at 10 years, which were significantly lower than those for patients with a pre-NLR of <2.7 ($P = 0.0001$), i.e. 91.7% at 5 years and 83.6% at 10 years. When pre-NLR was combined with post-NLR, the patients with a pre-NLR of ≥2.7 could be further divided into 2 groups that had significantly different prognoses. The RFS rates for patients with a pre-NLR of ≥2.7 and a post-NLR of <2.7 were 72.2% at 5 years and 50.7% at 10 years, which were significantly lower than those for patients with a pre-NLR ≥2.7 and a post-NLR ≥2.7 ($P = 0.0332$), i.e. 90.2% at 5 years and 83.3% at 10 years. The RFS rates for patients with a pre-NLR of ≥2.7 and a post-NLR of ≥2.7 were similar to those for patients with a pre-NLR of <2.7. In patients who had a recurrence, the NLR value at the time of recurrence elevated significantly in comparison with the post-NLR value (2.91 ± 1.61 vs. 2.08 ± 1.05, $P = 0.0139$). Multivariate analysis showed that pathological tumour stage, nuclear grade, and NLR change (pre-NLRs and post-NLRs combined) were independent predictors of recurrence. The C-index of a prediction model using these 3 variables was 0.7472.
Conclusions: RCC patients with elevated pre-NLR—patients with a high probability of recurrence—were categorised into 2 groups of patients with significantly different prognoses. Postoperative NLR change was a significant prognostic factor for recurrence, as were pathological tumour stage and nuclear grade. Change in the NLR may be a useful tool for the follow-up of patients with non-metastatic RCC.