INTRODUCTION AND AIMS: The programmed cell death protein 1 (PD-1)-targeted antibody nivolumab has demonstrated a significant improvement in survival in patients with melanoma, non-small-cell lung cancer, and other cancers. However, adverse renal effects associated with the PD-1 inhibitor are not fully understood. The objective of this study was to evaluate the effects of cumulative administration of nivolumab on renal function and prognosis. We report the incidence of renal insufficiency after nivolumab, the relationship between cumulative dose and renal insufficiency, and the initial to long-term changes in estimated glomerular filtration rate (eGFR).

METHODS: This was a retrospective study of adult patients treated with nivolumab from September 1, 2014 to September 1, 2017, who had been followed for more than 1 month after the initial dose. The eGFR was calculated from serum creatinine using the three-variable Japanese equation constructed by the Japanese Society of Nephrology.

RESULTS: The mean follow-up period was 235 ± 203 days, and renal insufficiency occurred in 22.2% of patients. At any time point after the first administration of nivolumab, eGFR did not change compared to the baseline. Multivariate analysis showed that renal insufficiency was significantly associated with cumulative dose (HR: 0.9995; 95% CI: 0.9991-0.9999), but cumulative dose did not worsen eGFR. Baseline eGFR was also associated with renal insufficiency (HR: 1.0386; 95% CI: 1.0052-1.0418). The cumulative mortality rate was 72.7%, and a significant difference was not observed between the renal insufficiency group and non-renal insufficiency group (70.0% vs. 67.6%, p = 0.2677).

CONCLUSIONS: In this study, many patients experienced renal insufficiency, but the cumulative administration of nivolumab did not cause adverse effects on renal function. This is the first and largest study of adult patients with cancer who received nivolumab for treatment across multiple tumor types.