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Genetic and imaging factors affecting renal cell carcinoma survival

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Renal cell carcinoma (RCC), the most common type of kidney cancers, is the most deadly of urological malignancies. Scientists are studying to understand the renal cell carcinoma mechanism in order to improve treatment options and to provide patients longer and higher-quality lifetime. In this research, factors that affect renal cell carcinoma survival are studied in order to shed light on controversies in the literature, and these factors are mostly mutated gene (VHL) and imaging feature (tumor stage). The Cancer Genome Atlas and The Cancer Imaging Archive were used to obtain patient genetic and imaging data. Kaplan-Meier method and log-rank test were applied to evaluate the effect of genetic and imaging factors on survival of RCC patients. The effect of presence of mutated VHL gene at

different stage levels has been evaluated ($P=0.602$ for stage I, $P=0.005$ for stage IV). The results show that at stage I, VHL did not change the survival rate in our study. However, at stage IV, RCC patients who have mutated VHL gene have longer survival. Determining the factors affecting survival will help develop personalized treatments. The survival's association with therapeutic choices, image phenotypes and genetic factors follow complex relationships. It is therefore concluded that the few initial radiomics and radiogenomics studies should be pursued further. These studies have the potential to generate the reliable computer aided predictive models of survival and genetic mutations from patient image features.

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