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FDG-PET after radiotherapy is a good prognostic indicator of rectal cancer

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In the management of rectal cancer after the combined therapy of the radiation and surgical operation, the evaluation of the prognosis is important. Although fluoro-18-deoxyglucose positron emission tomography (FDG-PET) is considered as a useful tool for evaluation of therapeutic effect of this cancer as well as the other cancers, however, there are few articles that clearly describe the appropriate procedure of the FDG-PET in order to obtain the best prognostic value. The purpose of the present study is to compare several variations of a semi-quantification method, the Standardized Uptake Values (SUV) and to determine the most appropriate parameter for the prognostic prediction and to propose the quantitative guideline of the FDG-PET. Especially, the authors focused on the SUV after radiotherapy, which had not been considered as a key quantitative value, as it was rather taken as a mere indicator of the therapeutic (radiotherapeutic) effect, not a direct indicator of the prognosis for the cancer itself. ***Methods:*** Forty patients with rectal cancer in the lower rectal region underwent two series of FDG-PET study before and after pre-operative radiotherapy. Their SUVs were calculated from FDG-PET data and compared with the results of the long-term follow-up of the patients as well as with histopathological outcomes. ***Results:*** All 40 patients had high FDG uptake before radiotherapy. The mean value of SUV before radiotherapy (SUV1) was 7.6. After radiotherapy, the mean value of SUV (SUV2) decreased to 4.2. There was a significant difference in SUV2 between the groups with and without recurrence ($p < 0.05$), however, SUV1 or SUV ratio (SUV2/SUV1) displayed no significant difference with the incidence of recurrence. ***Conclusion:*** SUV2 was considered to be a good prognostic indicator for long-term prognosis of rectal cancer patients. SUV1 nor SUV ratio SUV2/SUV1 did not have the equivalent prognostic usefulness. Subsets of patients with SUV2 greater than 3.2 should be observed closely.

Key words: FDG-PET, Standardized Uptake Value, rectal cancer, prognostic indicator