Interobserver Concordance Rates in Cancer Patients Imaged with CXCR4-directed PET/CT

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Abstract

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Introduction: C-X-C motif chemokine receptor 4 (CXCR4)-directed PET/CT has been utilized in recent years in varying tumor entities. Relative to other theranostic radiotracers, however, interobserver concordance rates for CXCR4-targeted imaging and therapy have not been provided yet.

Methods: In 50 cancer patients imaged with CXCR4-targeted PET/CT using [68Ga]PentixaFor, we evaluated interobserver agreement rates on a visual and quantitative level for imaging and therapy. In this regard, we evaluated scan results, CXCR4 density, number (No.) of affected organs and affected lymph node (LN) areas, as well as No. of organ and LN metastases. For quantification, readers identified target lesions (TL, for both LN and organ lesions). All readers also investigated whether patients would have been suitable for CXCR4-directed radioligand therapy (RLT). Intraclass correlation coefficients (ICCs) were interpreted in accordance to Cicchetti (0.4 - 0.59 fair, 0.6 - 0.74 good, 0.75 - 1, excellent agreement).

Results: For an overall scan results, fair concordance was recorded (ICC, 0.58). Moreover, good agreement was recorded as follows: No. of organ metastases (ICC, 0.74), CXCR4 density (ICC, 0.72), and No. of LN metastases (ICC, 0.65). Excellent concordance was then seen for No. of affected LN areas (ICC, 0.78) and affected organs (ICC, 0.76). For quantification, both organ and LN lesions also achieved excellent agreement rates with an ICC of minimum 0.92. When deciding on RLT, concordance was also excellent (ICC, 0.91).

Conclusions: Investigating patients scanned with [68Ga]PentixaFor PET/CT, we observed fair to excellent agreement rates for visual assessments. Excellent concordance was also recorded for quantification of TL and when to decide on patients eligible for CXCR4-RLT. Based on these favorable results, [68Ga]PentixaFor may be used more extensively in the clinic.