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622.LYMPHOMAS: TRANSLATIONAL-NON-GENETIC

Non-Interventional Observational Analysis of the Clinical Outcomes with IO-FIVE (Immune-Oncology Fast In Vivo Efficacy Test) in Lymphoma Patients

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Background: Lymphoma is a malignant lymphatic system tumor with a significant global incidence. The treatment of lymphoma involves various approaches, including chemotherapy, immunotherapy, and immune checkpoint inhibitor therapy, which are considered promising avenues for exploration. Currently, Patient-Derived Xenograft model (PDX model), as the classical mouse xenograft tumor model that best represents the genetic information characteristics of human tumors, can be used to predict the therapeutic effect, and develop individualized treatment for patients. However, due to the lack of immune cells in the model, there is insufficient evidence at a satisfactory level to support functional testing of immunotherapeutic agents which are now widely available. We explored the drug efficacy consistency of a functional testing technology called Immuno-oncology Fast in Vivo Efficacy (IO-FIVE), which possesses the ability to evaluate immune drug efficacy, in patients with lymphoma.
Methods: This study was a non-interventional observational research. The patient's sample was collected for IO-FIVE testing. However, the patient's clinical treatment was in accordance with clinical guideline and experience, without reference to the IO-FIVE results. Post hoc analyses were designed to evaluate the consistency of IO-FIVE with clinical outcomes in patients with lymphoma. The experimental procedure of IO-FIVE is as follows: Fresh tumor samples and peripheral blood from clinical patients are obtained and enzymatically digested into single-cell suspensions. Tumor cells and immune cells are then mixed in the predetermined ratio and loaded into the dedicated IO-FIVE device. The device is subsequently implanted subcutaneously in mice, followed by a systemic drug administration for 10 days. Finally, the device is retrieved, and its relative fluorescence intensity is measured to determine the cytotoxic effect of the drug on tumor cells.
Results: A total of 12 patients underwent treatment, with drug sensitivity testing conducted on the clinical drug regimens of 8 patients using IO-FIVE. These 8 patients included 3 cases of T-cell lymphoma and 5 cases of B-cell lymphoma. The clinical outcomes and prognosis of 4 (50%) patients were consistent with IO-FIVE results (Patient ID: 1, 7, 8 and 9), with 2 cases demonstrating positive consistency and 2 cases showing negative consistency. The tested regimens included chemotherapy drugs and immunotherapy drugs. It is worth noting that among the samples with inconsistent results (ID: 3, 6, 11 and 12), we observed that patient 3 benefited from the clinical use of R-CHOP combined with Zanubrutinib in controlling cancer. Patient 6 initially responded well to the R-CHOP regimen clinically but experienced rapid disease progression due to cachexia. Furthermore, through flow cytometric analysis, we observed a significant reduction in the number of $CD20^+$ B cells during the administration cycles of R-CHOP, suggesting the involvement of $CD20^+$ B cells in tumor cytotoxicity.
Conclusion: The IO-FIVE drug sensitivity testing technology has demonstrated a certain level of clinical consistency. However, its evaluation is limited by the insufficient number of samples and lack of follow-up clinical data, which prevents a complete alignment between IO-FIVE and clinical data. As a result, determining the correlation between IO-FIVE results and clinical outcomes accurately remains challenging. To address this, prospective randomized controlled trials (RCTs) are needed to match IO-FIVE results with patient clinical outcomes, providing new evidence for assessing the clinical consistency of IO-FIVE.

Disclosures No relevant conflicts of interest to declare.

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