Oncology and Translational Medicine
DOI 10.1007/s10330-016-0214-4
June 2017, Vol. 3, No. 3, P91–P92

EDITORIAL

Whole process control and precision therapy in lung cancer

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Xiaodong Xie Professor and Chairman, Cancer Center of People's Liberation Army, General Hospital of Shenyang Military Region, China. In 1980, he entered the Fourth Military Medical University of PLA in Xi'an, and he acquired a Master's degree in Urology in 1996. From 2000 to 2001, he studied as a research fellow in the Department of Oncology, Cancer Institute & Hospital, Chinese Academy of Medical Sciences. At present, he is a doctoral supervisor at the Liaoning University of Chinese Medicine and the Fourth Military Medical University. He is a member of the council of the Chinese Anti-Cancer Association (CACA), a member of the standing committee of the Professional Committee of Cancer Rehabilitation and Palliative Care (CRPC) of the CACA, a member of the standing committee of the Professional Committee of Tumor Markers of the CACA, an Executive Member of the Chinese Society of Clinical Oncology (CSCO), a Member of the Standing Committee of the Chinese Medical Doctor Association (CMDA), and Vice Chairman of the Cancer Professional Committee of the People's Liberation Army. In 2012, he received the Second Award of Scientific and Technological Advancement in Liaoning Province, and received the Outstanding Paper Award at the annual meeting of the CACA-CRPC.

Lung cancer is one of the most common malignant tumors in the world. Non-small cell lung cancer (NSCLC) accounts for approximately 80% of lung cancer cases, and approximately 75% of patients are diagnosed in the middle and late stages. The treatment methods mainly include surgery, chemotherapy, radiotherapy, molecular targeted therapy, traditional Chinese medicine therapy, and immune therapy. We summarize the current status of lung cancer-related treatment options and targets.

Cisplatin-based regimens are given priority for chemotherapy in NSCLC, but chemotherapy induced nausea and vomiting (CINV) is a common and debilitating side effect. The most common anti-emetic drugs are the first generation of 5-hydroxytryptamine-3 (5-HT3) serotonin receptor antagonists, which have poor efficacy. Palonosetron is a new 5-HT receptor antagonist, with a long half-life and a strong affinity that is more than 100 times that of the first-generation 5-HT receptor antagonists. In our study, the efficiency and control rate of palonosetron versus aprepitant have an obvious advantage compared with tropisetron; palonosetron combined with aprepitant has a remarkable effect on acute and delayed vomiting caused by cisplatin-based regimens.

Recently, maintenance chemotherapy has been extensively investigated for NSCLC; the purpose is to gain a maximum effect of tumor control after delivering systematic treatment. Etoposide is an important chemotherapeutic agent used for the treatment of a wide spectrum of human cancers. Thalidomide is an oral anti-angiogenic agent, which inhibits angiogenesis mediated by vascular endothelial growth factor (VEGF), basic fibroblast growth factors and microvessel formation in experimental models. If NSCLC patients have a stable response after first-line four to six cycles of platinum-based therapy, then such patients upon treatment with etoposide plus thalidomide have a significantly longer progression-free survival (PFS) with tolerable toxicity in maintenance therapy for advanced NSCLC.

Molecular targeted therapy has been the main treatment option in our clinic. For patients with *EGFR* mutations, tyrosine kinase inhibitors (TKI) can obviously prolong the patient's PFS and overall survival as compared with chemotherapy. However, disease progression occurs rapidly for patients who develop resistance to TKIs.

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Hence, we observed the efficacy and safety of pemetrexed combined with continuous daily administration of erlotinib or gefitinib in advanced-stage NSCLC patients undergoing TKI treatment. The treatment showed a higher objective response rate (ORR) and disease control rate (DCR) among patients, and the adverse effects were well tolerated. Pemetrexed combined with erlotinib or gefitinib may be more efficient than the conventional second-line treatments (pemetrexed, docetaxel, and *EGFR* TKIs) in NSCLC.

TKI-based treatment combined with chemotherapy has a better clinical benefit, but the combined treatment has been extremely limited for elderly patients because of poor tolerance and adverse reactions. However, traditional Chinese medicine has been widely used in China as adjuvant treatment during chemotherapy and radiotherapy. Our study analyzed the efficacy and adverse reactions of TKI treatment combined with Kanglaite injections (KLTs) in elderly patients with NSCLC, and we found that the administration of KLT combined with erlotinib or gefitinib has a better curative effect and that this drug combination is well tolerated by the patients. KLT combined with TKI treatment might provide a satisfactory therapeutic strategy for elderly NSCLC patients.

Although surgery is the only treatment that can cure patients, many patients often have lost the chance of surgery. For patients without *EGFR* mutations, stimulating the body's immune system by immunotherapy may improve the effect of antitumor immunity, and has become a new kind of treatment for cancer. Programmed cell death-1 (PD-1) and its ligand PD-L1 can regulate the tumor microenvironment and mediate immune escape of tumor cells. Monoclonal antibodies against PD-1 and PD-L1 are proven to be safe and effective in patients with NSCLC, not only in elderly patients with poor organ function, but also in advanced stage patients with poor performance status who refuse to accept radiotherapy and chemotherapy. Immunotherapy will offer a new direction and bring new hope for the treatment of NSCLC.

At present, chemotherapy and molecular targeted therapy have been the main treatment methods of lung cancer, especially for the patients who have lost the chance of surgery. Increasing the antitumor activity and reducing the adverse effects are the keys to breakthroughs in traditional therapy. Through the development of personalized gene sequencing techniques and molecular biological mechanism research, new targets and molecular pathways will provide a new direction for the treatment of lung cancer. The treatment of these tumors is gradually achieving the transition from macro to micro, realizing the application of individual precision medicine in the future.

DOI 10.1007/s10330-016-0214-4
Cite this article as: Liu ZZ, Xie XD. Whole process control and precision therapy in lung cancer. Oncol Transl Med, 2017, 3: 91–92.