

Exploration of the Antitumor Synergistic Strategy and Mechanism of Acupuncture Combined with Targeted Drugs

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Abstract: With the continuous development of tumor treatment concepts, the combined application of acupuncture and targeted drugs has gradually attracted attention. Acupuncture, as a traditional Chinese medicine therapy, may enhance the efficacy of targeted drugs by regulating the body's immune function and improving the microenvironment. Studies have shown that certain targeted drugs can inhibit the growth of tumor cells and effectively prevent tumor metastasis by regulating signal pathways. Acupuncture can not only reduce the side effects caused by targeted drugs but also promote drugs to act on tumor tissues more effectively by improving blood circulation and metabolism. The mechanism of this synergistic strategy may involve multiple levels such as the release of cytokines, activation of the immune system, and improvement of the tumor microenvironment. Future research should focus on optimizing the combined scheme of acupuncture and targeted drugs to achieve better antitumor effects and provide new ideas and basis for clinical treatment.

1. Introduction

1.1. Research Background

Malignant tumors are one of the main causes of death worldwide. Although traditional therapies such as surgery, radiotherapy, and chemotherapy can significantly prolong patients' survival time, they are often accompanied by many adverse reactions, which affect patients' quality of life. In recent years, targeted drugs have brought new hope for tumor treatment. By specifically acting on specific targets of tumor cells, they improve treatment effects while reducing damage to normal cells ^[1]. However, targeted drugs still face serious drug resistance problems in clinical application. Many patients experience recurrence or progression after taking drugs for a period of time. New adjuvant treatment methods are urgently needed to improve efficacy. In contrast, traditional Chinese medicine therapies such as acupuncture, by stimulating specific acupoints, can effectively regulate the body's immune function, relieve pain, and improve mental state. They are gradually attracting the attention of modern medicine. Studies have shown that acupuncture has a positive effect on the quality of life of patients with malignant tumors and can enhance the antitumor effect of targeted drugs through various mechanisms. Acupuncture can promote blood circulation, increase drug concentration at tumor sites, reduce adverse reactions of targeted drugs, and stimulate changes in the tumor microenvironment to enhance immune responses. Studying the potential mechanism of the combined application strategy of acupuncture and targeted drugs will provide new perspectives and methods for tumor treatment. The aim of this study is to investigate the synergistic effect of acupuncture and specific drugs, to understand their biological nature, and to give more effective plan of clinical treatment.

1.2. Research Significance

With the increasing incidence of tumors, patients' requirements for treatment effects and quality of life are rising. Developing more efficient treatment methods is particularly important. Traditional Chinese medicine therapies such as acupuncture, with a long history and rich clinical practice experience, have gradually gained recognition in improving the quality of life of tumor patients and

relieving related symptoms. The development of targeted drugs has made tumor treatment tend to be personalized and precise. They have a tendency to undergo drug resistance and adverse reactions during clinical use and therefore diminish the effects of treatment. The combined application of acupuncture and targeted drugs, and their synergistic treatment mechanism, are of great significance for improving clinical efficacy. The research value lies in integrating the advantages of acupuncture and targeted drugs to optimize patients' overall treatment effects, relieve adverse reactions caused by targeted drugs, enhance patients' drug resistance, prolong survival time, and improve quality of life. Exploring their potential biological mechanisms can provide a scientific basis for the integration of traditional Chinese and Western medicine and promote the integration of modern medicine and traditional medicine. This study can provide a new perspective for clinical treatment. By constructing a reasonable combined treatment scheme, it can realize the optimal combination of different treatment methods and bring more hope to tumor patients. Exploring the combined application of acupuncture and targeted drugs has significant clinical and structural value.

2. Current Status of the Application of Acupuncture Combined with Targeted Drugs in Antitumor Therapy

2.1. Theoretical Basis and Syndrome Differentiation of Acupuncture Combined with Targeted Drugs in Antitumor Therapy

The integration and complementarity of traditional Chinese and Western medicine constitute the theoretical basis of the antitumor strategy combining acupuncture with targeted drugs [2]. Traditional Chinese medicine theory holds that the formation of tumors stems from yin-yang imbalance, disharmony of qi and blood, and disorder of zang-fu functions. Acupuncture can effectively restore the internal balance of the body, enhance patients' immunity, and relieve symptoms by regulating qi and blood, optimizing zang-fu functions, and dredging meridians. Targeted drug therapy focuses on selecting specific drugs according to the molecular characteristics of tumors to precisely inhibit the proliferation and transformation of tumor cells.

In terms of constitution syndrome differentiation, traditional Chinese medicine classifies tumor patients into various types according to their specific pathological constitution changes, such as liver stagnation and qi stagnation, spleen deficiency and dampness excess, yin deficiency and fire hyperactivity, etc. Implementing individualized treatment for different syndromes can select corresponding meridians and acupoints for acupuncture on the basis of targeted drug intervention. For patients with liver stagnation and qi stagnation, relevant acupoints of the liver meridian can be selected to soothe the liver and relieve stagnation. For patients with spleen deficiency and dampness excess, acupoints of the spleen meridian can be used to invigorate the spleen and promote diuresis, thereby enhancing patients' absorption function. Through customized treatment plans, acupuncture combined with targeted drugs can optimize patients' overall conditions and improve quality of life. From a mechanism perspective, the synergistic application of acupuncture and targeted drugs has a scientific basis, jointly opening up new ways for tumor prevention and treatment, making the treatment model more holistic and standardized, and providing patients with efficient treatment options.

2.2. Analysis of Application Scenarios

2.2.1. Enhancing the Efficacy of Targeted Drugs

Acupuncture has the effect of regulating immunity, stimulating the body's immune system function, and enhancing the activity of immune cells such as natural killer cells and cytotoxic T lymphocytes [3]. Through the synergy of the targeted drugs, these cells are able to recognize and kill the cancerous cells hence expanding the treatment effect. Studies indicate that in case some specific medications are blended with immunoboosting responses, the cancer cell rate of inhibition is enhanced considerably. Acupuncture can reduce the side effects of targeted drugs, help patients adhere to a complete treatment plan, and avoid interruption of treatment due to adverse reactions, thus improving patients' tolerance. When patients receive targeted drug treatment, they usually reduce

drug compliance due to side effects. The pain relief and relief of discomfort provided by acupuncture and moxibustion help to enhance the adaptability of overall treatment. Acupuncture strengthens the role of targeted drugs through multi-level mechanisms, providing new ideas and methods for clinical tumor treatment, which are worthy of further research and practice.

2.2.2. Reducing Adverse Reactions of Targeted Drugs

By stimulating specific acupoints, acupuncture can significantly relieve nausea and vomiting [4]. Its mechanism of action has been widely used in chemotherapy and the control of targeted drug-related symptoms. Acupuncture can activate the vagus nerve, promote intestinal peristalsis, improve the absorption function of patients, and enhance gastrointestinal tolerance. Acupuncture has been proven to effectively reduce the fatigue caused by drug-targeted treatment, help patients recover physical strength, and improve their daily activity ability. In psychology, acupuncture has the effect of reducing stress and improving mood. It can effectively alleviate the anxiety and depression caused by the disease and treatment, and help patients face the treatment process with a more positive attitude. Acupuncture plays a key role in improving the overall comfort and treatment compliance of patients, making patients more inclined to persist in completing targeted drug treatment. Through the collaborative application of acupuncture and targeted drugs, the treatment effect can be enhanced, adverse reactions in the treatment process can be reduced together, and humanized comprehensive interventions can be provided for patients, so as to improve the quality of life.

2.2.3. Improving Patients' Quality of Life and Immune Function

By regulating the operation of qi and blood in the body and strengthening zang-fu functions, acupuncture can significantly promote appetite, optimize nutrient absorption and utilization, help patients recover physical strength and energy, and improve daily activity levels [5]. Psychologically, acupuncture helps patients relieve anxiety and depression by stimulating specific acupoints, improve their mental state, and make patients face the treatment process with a more positive attitude. The improvement of the quality of life helps patients achieve physical and mental balance and lays a solid foundation for the consolidation of the therapeutic effect. In terms of immune function, acupuncture research has confirmed that it can activate the human immune system and improve the activity of immune cells such as natural killer cells and cytotoxic T cells. These cells play a key role in the anti-tumor process. Enhancing immune function can help patients better tolerate targeted treatment, reduce the risk of tumor recurrence, and provide a guarantee for long-term survival. Acupuncture combined with targeted drug treatment can improve the clinical symptoms of patients, improve the quality of life, and open up a new way and strategy for the comprehensive treatment of immunity and tumors.

3. Antitumor Synergistic Strategy of Acupuncture Combined with Targeted Drugs

3.1. Theoretical Paths

3.1.1. Construct a Standardized Syndrome Differentiation and Treatment System

A key link in building a standardized system lies in syndrome types. It is necessary to consider the symptom characteristics and physical differences of tumor patients. The corresponding relationship between different tumor types and syndrome differentiations should be promoted. By applying different syndrome types such as liver stagnation and qi stagnation, spleen deficiency and dampness excess, and yin deficiency and fire hyperactivity, corresponding acupuncture intervention plans are formulated. Appropriate acupoint stimulation methods are clarified to achieve the expected effects of regulating qi and blood and optimizing zang-fu functions [6]. Combined with the pharmacological mechanism of targeted drugs, the optimal synergistic strategy of acupuncture and drugs is explored. The improvement of the standardized syndrome differentiation and treatment system requires continuous accumulation of experience and feedback in clinical practice. Through information collection and analysis, the verification and optimization of curative effects are realized. Special training and education are carried out to enhance medical staff's understanding and operational

capabilities of acupuncture combined with targeted drugs. Efforts are made to ensure the standardization and normalization of the treatment process, providing more accurate and efficient integrated treatment strategies for tumor patients. Through the above measures, the constructed syndrome differentiation and treatment system can significantly enhance the synergistic effect of acupuncture and targeted drugs, and promote the clinical management and treatment effect of tumor patients.

3.1.2. Clarify the Synergistic Mechanism Combined with Modern Medicine

Acupuncture intervention can enhance the efficacy of targeted drugs through multiple pathways. Acupuncture optimizes the local microenvironment. By promoting blood circulation and lymphatic absorption flow, it accelerates the diffusion of targeted drugs in cancer tissues and improves drug bioavailability. Acupuncture can regulate the immune system, strengthen the activity of tumor-related immune cells such as natural killer cells and cytotoxic T lymphocytes ^[7]. It enhances the body's immune surveillance function against tumors and improves the antitumor effect of targeted drugs. Acupuncture can relieve adverse reactions caused by targeted drug treatment, such as nausea, vomiting, and fatigue, by regulating the nervous and endocrine systems. It improves patients' quality of life and treatment compliance. Under the synergistic effect of multiple mechanisms, the combined application of acupuncture and targeted drugs can promote the improvement of patients' overall conditions and treatment effects, providing a scientific basis for combined treatment. To clarify the synergistic mechanism, it is necessary to carry out basic research and clinical trials. The optimal plan, specific mechanism of action, and implementation strategy of the combined therapy of acupuncture and targeted drugs should be determined. This realizes the efficient integration of traditional medicine and modern medicine, providing more comprehensive management for tumor patients.

3.2. Strategies to Improve the Effectiveness of Clinical Practice

3.2.1. Explore a Standardized Plan for Core Acupoint Compatibility with Syndrome-Based Modifications

Acupuncture and moxibustion treatment should follow the principle of dialectical treatment. Adjust the combination of acupoints flexibly according to the patient's actual symptoms and reactions ^[8]. For patients with pain caused by qi stagnation, add acupoints to moisten the liver and dispel stagnation. People with spleen deficiency and loss of appetite can be included in the acupoints related to strengthening the spleen and benefiting the stomach. This flexible adjustment strategy helps to improve the overall therapeutic effect, reduce adverse reactions, and enhance the effect of targeted treatment. In order to ensure the standardized implementation of the plan, detailed operating procedures and evaluation standards should be formulated. These include factors such as acupoint selection, acupuncture technique, stimulation intensity and treatment frequency. In the process of clinical application, medical personnel should regularly record the patient's treatment feedback and changes in the condition. Build a systematic information system and constantly optimize the compatibility scheme. Through the research and establishment of a standardized core acupoint matching scheme, combined with dialectical treatment, the clinical value of acupuncture and moxibustion in anti-tumor treatment can be improved. It provides a more solid theoretical and practical foundation for the combination of traditional Chinese and Western medicine, so as to better serve the majority of tumor patients.

3.2.2. Establish a Synergistic Treatment Model of Acupuncture and Targeted Drug Therapy

It is crucial to develop standardized treatment procedures. During the implementation process, the treatment plan should be adjusted according to the changes in the patient's condition. This involves the specific drug measures of specific drugs and the time the acupuncture is conducted. One of the priorities is to treat efficiently and with a stable state. It is recommended to combine acupuncture and moxibustion intervention at the key node of targeted drug dosing. Acupuncture is carried out before and after the patient uses targeted drugs to optimize the drug absorption and metabolism process and reduce adverse reactions. Patient follow-up management should cover the whole treatment process.

Regular evaluations of patients' clinical responses, physiological indicators, and psychological adaptation are conducted [9]. The treatment plan is adjusted in a timely manner to strive to provide patients with the best integrated care. The analysis and collection of data contribute to continuous optimization of the foundation of combined usage of acupuncture and specific drugs, which facilitates the clinical research. The impact of the continuous implementation of acupuncture and effective drugs can be increased by creating a standardized synergetic treatment model. This also offers a systematic way of treatment against tumors, increases in the quality of life of the patient, and makes the whole treatment process more efficient and comfortable.

3.3. Scientific Research and Evaluation Guarantee Measures

3.3.1. Conduct High-Quality Randomized Controlled Trials

The inclusion and exclusion criteria must be adhered to when making research samples. Bring out the representativeness and balance of the sample and reduce the effect of individual differences on the result. The most important part of the experiment is randomization of grouping. In administering acupuncture and moxibustion together with specific drug treatment, one should make sure that the subjects are randomly grouped into either the experimental or the control group. This enhances the validity of the research findings. To enhance scientific nature of the research, blind design should be adopted. The researchers and the subjects that took part in the assessment were not aware of the grouping so that the influence of subjective factors was minimized. The collection and analysis of the data should be in the form of rigorous guidelines of statistics. Interpret the results with proper use of statistical technique and aim at making statistical significance. It should focus on the ethical review and an informed consent of the subject matter. This should be done at all at will on the assumption of full knowledge regarding the purpose and risks involved in the study. Regularly evaluate the progress of the experiment, adjust the research plan, and ensure the smooth progress of the whole experiment. By carrying out high-quality randomized controlled trials, provide a solid scientific basis for the effectiveness of acupuncture and moxibustion combined with targeted drug treatment. A stable framework support has been built for the comprehensive management of tumor patients.

3.3.2. Construct a Multidimensional Comprehensive Efficacy Evaluation System

The evaluation system should include objective indicators of tumor efficacy, such as tumor contractility rate, survival rate, recurrence, etc. These indicators reflect the significant effect of targeted therapy and acupuncture in tumor treatment. Attention should be paid to the patient's physiological indicators and adverse consequences related to targeted treatment. Regular detection of changes in hematology, liver and kidney function helps to detect adverse reactions at an early stage and provides data support for adjusting the treatment plan. Psychological assessment is also very important. The patient's depression, anxiety and mental state should be evaluated. The use of standardized instruments like the Hamilton Depression Scale (HAMD) and the State-Trait Anxiety Inventory (STAI) make sure the efficiency of psychological aid provided by the clinician [10]. This helps patients maintain good psychological adjustment during treatment. Quality of life assessment should be included in the evaluation framework. Internationally recognized quality of life assessment tools such as EQ-5D and SF-36 can be used. These tools learn about the daily living functions of patients, the ability to participate in activities and social involvement in their lives thoroughly. In practice, data should be sorted and analyzed regularly. The evaluation results are combined with clinical treatment to dynamically adjust the treatment plan and achieve the best effect. By constructing a multidimensional integrated efficacy evaluation system, the effect of the combined treatment of acupuncture and targeted drugs is fully reflected. It provides a scientific basis for clinical decision-making and improves the overall treatment experience and quality of life of tumor patients.

4. Exploration of the Antitumor Synergistic Mechanism of Acupuncture Combined with Targeted Drugs

4.1. Regulating the Tumor Microenvironment

4.1.1. Improving the Hypoxic State of Tumor Tissues

Acupuncture stimulates specific meridians and acupoints to promote local blood circulation. It increases blood flow and improves the oxygen supply to the tumor tissue. Experiments show that acupuncture can significantly promote angiogenesis in tumor sites and optimize the function of new blood vessels. This ensures that more oxygen and nutrients are delivered to the tumor cells. Blood circulation accelerates, promotes cell metabolism, and helps to relieve the inhibition of cell proliferation and survival by hypoxia. The effect of acupuncture regulating the physiological environment in the body on tumor cells cannot be ignored. Enhancing oxygen supply can increase the distribution and concentration of targeted drugs and enhance the effect of drugs on tumor cells. Reasonable use of acupuncture and the formulation of personalized treatment plans for tumor patients are conducive to optimizing treatment methods at different stages. Especially timely intervention before and after the use of targeted drugs. Comprehensive evaluation of the clinical effect and biological mechanism of acupuncture to improve the hypoxia of tumor tissue can provide a reliable basis for improving the application effect of targeted drugs in tumor treatment. It also provides a new perspective for future research and clinical practice.

4.1.2. Regulating the Activity of Tumor-Associated Fibroblasts

Acupuncture optimizes the local microenvironment, affecting the activity of fibroblasts and regulating the secretion of cytokines. Studies have shown that acupuncture can reduce the intensity of inflammatory reactions in tumor tissues, decrease the content of pro-inflammatory cytokines, and inhibit the activity of CAFs (cancer-associated fibroblasts). The mechanism aids in the normalization of the signal pathways associated with tumor development hence preventing the growth and dissemination of cancerous cells. Balance of CAFs though growth and transformation of tumors can be maintained through the enhanced local circulation of blood and improved oxygen supply caused by acupuncture. This inhibits their promoting action on cancer cells. In targeted therapy, modulation of the activity of CAFs can decrease the drug tolerance of palliative tumor cells, thereby increasing the therapy of targeted drugs. Acupuncture used in conjunction with specific drugs could maximize the overall medical table, and ARMT would have the greatest impact through the inhibitory action of CAFs on tumors occurrence. Based on existing research, acupuncture regulates the activity of tumor-associated fibroblasts and combines with the antitumor strategy of targeted drugs. This opens up new exploration directions for future clinical treatment and basic research, and constructs a theoretical framework for subsequent clinical practice and basic research.

4.2. Influencing Tumor Cell Signaling Pathways

4.2.1. Enhancing the Inhibitory Effect of Targeted Drugs on Key Signaling Pathways

By optimizing the local microenvironment, acupuncture can promote drugs to reach effective concentrations in tumor tissues. It improves the bioavailability of targeted drugs. This optimization reduces the activity of key signaling pathways such as PI3K/AKT and MAPK/ERK pathways, thereby inhibiting the proliferation and spread of tumor cells ^[11]. Acupuncture can regulate the function of the immune system, enhance the body's immune recognition of tumor cells, and affect the expression of relevant signal molecules. This allows targeted drugs to exert an inhibitory effect more effectively. At the same time, acupuncture can reduce the inflammatory reaction in the tumor microenvironment. Studies show that inflammatory factors can promote tumor cells to activate growth factors and anti-apoptosis signaling pathways. Acupuncture helps to enhance the inhibitory effect of targeted drugs on key signaling pathways by reducing the level of inflammation in the tumor microenvironment. Acupuncture enhances the inhibitory effect of targeted drugs on key signaling pathways through multiple ways to improve the effect of anti-tumor treatment. It provides new ideas and methods for strengthening the clinical application of targeted treatment, which has important

research value and clinical significance.

4.2.2. Reversing Tumor Cell Drug Resistance

After optimizing the body's overall disease resistance, acupuncture and moxibustion can strengthen the resistance of cells to cancer cells, thus improving the sensitivity of cancer cells to targeted drugs. By stimulating the activation of cytokine release at acupuncture points, it can adjust the body's immune system and weaken the immune escape mechanism of tumor cells. Acupuncture and moxibustion promotes by improving the local microenvironment, The blood supply of tumor tissue creates more favorable conditions for the role of targeted drugs. Good oxygen supply and nutritional conditions help to increase the concentration of targeted drugs in cancer cells, thus enhancing the therapeutic effect. In addition, acupuncture can also inhibit the expression of pro-inflammatory factors in the tumor microenvironment. Improve the sensitivity of cancer cells to targeted drugs. In drug-resistant cancer cells, pro-inflammatory factors often activate the relevant survival signaling pathway, causing cancer cells to have stronger resistance to drugs. Acupuncture and moxibustion reduces the tolerance of cancer cells to drugs by reducing the inflammatory response. The comprehensive use of the above mechanism, the combination of acupuncture and targeted drugs. Combined application can effectively reverse the drug resistance of cancer cells, improve the treatment effect, and bring more hope and treatment options to tumor patients. Future research can further explore the specific role of acupuncture in reverse drug resistance, so as to optimize the combined treatment plan..

4.3. Regulating the Body's Systemic Reactions

4.3.1. Regulating Immune Function and Enhancing Antitumor Immune Surveillance

Acupuncture enhances the exertation of immune cells including natural killer cells, cytotoxic T cells and macrophage using acupoints. It also enhances their capacity of detecting cancer cells in case of tumor. Research has found that acupuncture also enhances the release of cytokines to the body such as interleukin-2 and interferon. This impacts the immune system making the immune cells more effective in increasing their fighting with cancer cells. Acupuncture also maximizes the local and systemic blood flow and increases the efficiency of oxygen delivery and, consequently, the tumor microenvironment. Immune cells activity is reinforced and the chances of survival of cancer cells are minimized when there is enough oxygen in the air. Simultaneously, their invasivity is (alternatively) diluted. The application of acupuncture can prevent the occurrence of adverse reactions, as well as enhance the quality of life of patients. This enhancement assists in boosting anti-tumor immune response of the body. Acupuncture can maximize the immune status and interact with specific medicines, thereby improving the anti-tumor effect in the target drug treatment process. The use of acupuncture has expanded a wider scope of application in its targeted treatment to restore the body immune process and enhance the ability of the body immune to monitor tumors in the body. The research that needs to be conducted in the future should be based on the deep insight of the mechanism of acupuncture in order to help in improving anti-tumor immune monitoring, and to provide a more adequate foundation to clinical practice.

4.3.2. Inhibiting Inflammatory Reactions and Blocking Pro-Tumor Progression Inflammatory Pathways

Acupuncture activates specific acupoints to promote the secretion of anti-inflammatory cytokines in the body, such as interleukin-10 and transforming growth factor- β . At the same time, it inhibits the release of pro-inflammatory cytokines, such as tumor necrosis factor- α and interleukin-1 β . The balanced regulation of inflammatory factors helps reduce the inflammatory load in the tumor microenvironment and inhibit the proliferation and spread of tumor cells. During targeted drug therapy, acupuncture can reduce treatment-induced inflammatory reactions. It prevents unnecessary exacerbation of inflammation when the body receives drugs, thereby enhancing the therapeutic effect of targeted drugs. Studies have shown that targeted drugs often affect antitumor effects in an inflammatory environment. Acupuncture intervention can improve the effectiveness of targeted

therapy by alleviating inflammatory reactions. Blocking pro-tumor inflammatory pathways can effectively inhibit tumor progression and improve patients' quality of life. The combined application of acupuncture and targeted drugs provides a new strategy for tumor treatment by comprehensively regulating immunity and inflammatory reactions. Future research should continue to verify its specific efficacy and mechanism of action in different types of tumors to enhance the overall effect of antitumor treatment.

5. Conclusion

The anti-tumor strategy of targeted drugs and acupuncture brings a new and efficient method for tumor treatment, with significant clinical application value. Through the interaction of multiple mechanisms, acupuncture can improve the quality of life of patients, relieve discomfort during treatment, adjust the body's immune response, and optimize the tumor microenvironment. Inhibit inflammatory reactions and enhance the efficacy of targeted drugs. In combined treatment, acupuncture improves the hypoxia of tumor tissue by promoting blood circulation and oxygen supply, creating favorable conditions for the efficient delivery of targeted drugs. Acupuncture can regulate the activity of tumor-related fibroblasts and the signaling pathway of tumor cells. Reverse the drug resistance of tumor cells, so as to improve the success rate of treatment. More importantly, acupuncture effectively inhibits the progression of tumors by strengthening the anti-tumor immune surveillance function and inhibiting the inflammatory pathway of promoting cancer. Future research needs to deeply explore the specific mechanism of combined treatment of acupuncture and targeted drugs, and optimize the clinical application scheme to give full play to the synergy of the two and carry out large-scale randomized controlled trials and long-term follow-up studies, which helps to provide a solid scientific basis for joint treatment. Through continuous exploration, it is expected to provide safer, more efficient and personalized treatment plans for tumor patients, thus improving the overall effect of tumor treatment.

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