Progress and Clinical Reflection on the Application of Interventional Transarterial Chemotherapy in the Anti-tumor Treatment of Solid Tumors

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Abstract: The clinical treatment of malignant solid tumors still faces problems such as significant systemic chemotherapy toxicity and side effects, poor local tumor control effects, and limited treatment methods for advanced patients. Transarterial interventional chemotherapy is a minimally invasive local treatment method, which has the advantages of high local drug concentration, minimal systemic adverse reactions, and can be performed multiple times. It has been widely used in many solid tumors.

***Keywords*:** interventional transarterial chemotherapy; anti-tumor; treatment; application

1. Introduction

Arterial interventional chemotherapy, as a minimally invasive local treatment method, can be administered through the tumor blood supply artery to increase the concentration of drugs in the lesion, reduce systemic damage, with minimal trauma and reproducibility. [1] It has been widely used in various solid tumors. With the innovation of intervention technology and drug delivery materials, its scope of application continues to expand [2], but there is no unified standard for indications, dosing regimens, and combination therapy timing, and there are many clinical controversies. [3]

2. Clinical application progress of transarterial chemotherapy in common solid tumors

2.1 Application progress in solid tumors of the digestive system

Solid tumors of the digestive system are the most widely treated diseases with arterial chemotherapy, with primary liver cancer as the main indication, and are also one of the non-surgical treatment options for advanced liver cancer. [4] Numerous studies have shown that arterial chemoembolization can effectively eliminate intrahepatic lesions, inhibit tumor growth, and improve the quality of life of liver cancer patients who cannot undergo surgical resection. [5] For patients with colorectal cancer liver metastasis, it can effectively solve the problem of individual liver metastases and compensate for the poor control of local lesions by systemic chemotherapy. [6]

2.2 Application progress in solid tumors of the respiratory system

Solid tumors of the respiratory system are mainly non-small cell lung cancer, while traditional advanced lung cancer mainly adopts systemic chemotherapy, targeted therapy, and immunotherapy, but they are prone to drug resistance and poor control of local lesions. [7] For patients with advanced lung cancer who cannot undergo surgical resection or cannot tolerate radiotherapy, chemotherapy, or systemic treatment failure, arterial chemotherapy is widely used in clinical practice due to its characteristics of minimal trauma and high local drug aggregation. Compared to systemic treatment, pulmonary arterial chemotherapy can be administered directly through the bronchial or intercostal arteries, increasing the concentration of drugs reaching the tumor site in the lungs, effectively inhibiting the growth of the primary lesion.

2.3 Application progress in solid tumors of the urinary and reproductive system

Solid tumors of the urinary and reproductive system have abundant blood supply, which is in line with the advantages of arterial chemotherapy and is increasingly being used in clinical practice. [8] Renal cancer, bladder cancer and prostate cancer are the main indications, which are mainly used for patients with local progress, postoperative recurrence and distant metastasis that cannot be removed surgically. Traditional systemic treatment is ineffective for advanced urogenital system tumors and can easily cause serious adverse reactions, affecting the quality of life of patients. Transcatheter arterial interventional chemotherapy can directly target the tumor blood supply artery, rapidly inhibit tumor growth, reduce tumor

volume, and thus bring surgery opportunities to some patients. In palliative treatment of advanced bladder cancer, it can solve the problems of hematuria, urinary tract obstruction, and significantly improve the quality of life of patients.

3. Reflections and Existing Issues on the Clinical Application of Arterial Chemotherapy

3.1 Reflection on Precise Selection of Clinical Indications

Although arterial chemotherapy has good therapeutic effects on many types of solid tumors, not all cancer patients can benefit from it. Only by selecting the correct indications can good results be ensured and unnecessary treatment be reduced. [9] At present, some doctors in clinical practice relax the scope of use and intervene in patients who may have little benefit, resulting in resource waste and unnecessary harm. From a clinical perspective and literature reports, solid tumor patients with abundant blood supply and limited or oligometastatic lesions are suitable for arterial chemotherapy. However, for patients with extensive tumor metastasis, poor vascular conditions, severe liver and kidney dysfunction, or extreme weakness, interventional therapy is less effective and has more complications, which should be carefully considered.

3.2 Controversy and Optimization of Clinical Medication Plans

At present, there is no consensus or standardized standard for clinical use of arterial chemotherapy drugs. There are significant differences in the selection of chemotherapy drug types, concentrations, infusion times, and treatment courses among hospitals, and there is a lack of unified standards. [10] In addition, there is still controversy over the effectiveness and safety of high-dose and low-dose infusion, and no consensus has been reached, nor is there an optimal treatment plan. In addition, there is limited research on personalized medication adjustments for patients with different types of tumors, ages, and physical conditions. In clinical practice, most treatments are still based on the experience of doctors.

3.3 Shortcomings in Current Clinical Research and Application

At present, there are still many shortcomings in clinical research related to arterial chemotherapy, which affect the standardization and widespread use of this technology. Most of them are single center, small sample retrospective studies, lacking multicenter, large-scale, long-term follow-up prospective randomized controlled trials, and there is limited high-quality evidence-based medicine evidence. [11] Most scholars focus on short-term lesion relief, while neglecting research on patients' long-term quality of life and the occurrence of complications. Moreover, the basic research on the causes of drug resistance in tumors and the treatment targets suitable for each patient is not sufficient, which cannot provide targeted recommendations for clinical practice and hinders the development, progress, and promotion of this treatment method.

4. Conclusion

Arterial interventional chemotherapy has become an important local treatment for multi system solid tumors due to its advantages of high local drug concentration and low systemic toxicity. It has unique value in the palliative and translational treatment of non-surgical and metastatic solid tumors.

References

[1] MENG W, PAN L, HUANG L, et al. Applications of image-guided locoregional transarterial chemotherapy in patients with inoperable colorectal cancer: a review[J]. Frontiers in Oncology, 2024, 14: 1464242.

[2] SWIERZ M J, STORMAN D, MITUS J W, et al. Transarterial (chemo)embolisation versus systemic chemotherapy for colorectal cancer liver metastases[J]. Cochrane Database of Systematic Reviews, 2024(8): CD012757.

[3] HE Y, et al. Transarterial chemoembolization combined with tyrosine kinase inhibitors and programmed death receptor-1 inhibitors for unresectable hepatocellular carcinoma: a systematic review and meta-analysis[J]. Translational Cancer Research, 2025, 14(8): 4976-4988.

[4] ANKER J M, et al. Expanding the Scope of Interventional Oncology: Locoregional Therapies in Extrahepatic Malignancies[J]. Cancers, 2025, 17(5): 726.

[5] LIU Y, CHANG W, ZHOU B, et al. Conventional transarterial chemoembolization combined with systemic therapy versus systemic therapy alone as second-line treatment for unresectable colorectal liver metastases: randomized clinical trial[J]. The British Journal of Surgery, 2021, 108(4): 373-379.

[6] Huang Zhengli, Wang Xiaoyan, Xue Youhua, etc. A review of the scope of symptom group research in liver cancer patients after arterial chemoembolization [J]. Journal of Nursing, 2026, 41 (13) 121-124.

[7] Sun Wan, Song Ziyang, Ma Fei, etc. Animal experimental study on the application of multimodal imaging drug loaded

microspheres in transarterial chemoembolization of liver tumors [J/OL]. Journal of Oncology, 1-7 [2026-07-13] https://link.cnki.net/urlid/33.1266.R.20260622.1951.002.
[8] Yang Han, Li Mingjin, Zhao Nian, etc. Risk factors and predictive study of liver abscess in patients with liver cancer after transcatheter arterial chemoembolization [J]. Anhui Medical Journal, 2026, 30 (6) 1209-1214.
[9] Meng Dandan. The efficacy of hepatic artery catheterization chemotherapy infusion combined with hepatic artery chemoembolization in the treatment of advanced liver cancer and liver metastasis patients [J]. Medical Clinical Research, 2026, 43 (5) 746-749.
[10] Zhu Duo, He Li. Clinical efficacy and safety of transarterial chemoembolization combined with hepatic artery infusion chemotherapy in the treatment of giant hepatocellular carcinoma [J]. Chinese Journal of Practical Medicine, 2026, 21 (11) 13-17.
[11] Li Qianqian, Wang Jie, Li Yajie. The effect of evidence-based nursing on nausea and vomiting in patients with advanced liver cancer after transcatheter arterial chemoembolization [J]. Basic and Clinical Oncology, 2026, 39 (1) 117-119.

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