



# International Journal of Multidisciplinary Research and Growth Evaluation.

## Research progress of inducing drugs and prevention of chemical phlebitis

Cuiling Tong <sup>1\*</sup>, Rong Xu <sup>2</sup>, Zhe Zhou <sup>3</sup>, Ping Wang <sup>4</sup>, Tian Liu <sup>5</sup>

<sup>1-5</sup> Jingzhou Institute of Technology, Jingzhou, Hubei, China

\* Corresponding Author: **Cuiling Tong**

---

### Article Info

**ISSN (online):** 2582-7138

**Volume:** 04

**Issue:** 05

**September-October 2023**

**Received:** 17-08-2023;

**Accepted:** 06-09-2023

**Page No:** 343-345

### Abstract

In this paper, the triggering drugs and prevention and treatment of chemical phlebitis are summarized and summarized, especially the research progress of traditional Chinese medicine in the prevention and treatment of chemical phlebitis is reviewed, and its prevention and treatment mechanism is deeply discussed, which provides a reference basis for the clinical use of traditional Chinese medicine and Western medicine in the treatment of chemical phlebitis, so as to improve the effective prevention and treatment of chemical phlebitis, reduce patients' pain and reduce hospitalization costs. Improve nurses' work efficiency and promote nursing quality.

**Keywords:** Glauber's salt, rhubarb, chemical phlebitis

---

### 1. Introduction

Intravenous indwelling needle is the main tool for intravenous therapy such as clinical infusion, blood transfusion or blood collection. It was invented by BD Company in 1957 and widely used in developed countries such as Europe and the United States in the 1960s. China began to use in the 1990s, because it has the advantages of protecting blood vessels, reducing the pain of patients with repeated puncture, convenient for timely treatment of patients, improve nursing efficiency, etc., it has been widely used in clinical practice, about 70% of infusion treatment patients need to apply peripheral venous short catheter. Due to the wide application of short peripheral venous catheter, complications also follow, 80% of patients with short peripheral venous catheter infusion have different degrees of complications such as phlebitis, venous thrombosis, catheter blockage, and liquid extravasation, among which phlebitis is the most common and serious complication, with an incidence of 5.5~77.5% <sup>[1]</sup>. In clinical practice, drugs with low pH value, high osmotic pressure and high concentration are often injected, causing chemical stimulation of the vascular intima, resulting in vascular endothelial damage and producing a sterile inflammatory response, called chemical phlebitis. The incidence of chemical phlebitis caused by infusion was more than 57.6%, which increased the pain of patients and shortened the catheter retention time. According to the theory of traditional Chinese medicine, chemical phlebitis belongs to the category of traditional Chinese medicine "pulse bi, carbuncle and evil pulse". Its mechanism is mainly due to the fact that most of the chemical drugs are hot and hot products, which can be transformed into hot and toxic evil, damage the vein, blood stasis and qi stagnation, and dampness and heat poison congesting in the blood, resulting in the local vein qi and blood not running properly, local fever, vein damage, blood spilling the skin or blood heat accumulation, and local redness. Therefore, the research on prevention and treatment of chemical phlebitis has been a hot spot at home and abroad, and has achieved more results.

### 2. Chemical phlebitis trigger drug - Antitumor drug

In clinical practice, chemical treatment is more common for tumor patients. Anti-tumor drugs include vinblastine, doxorubicin, etc. While effectively treating cancer cells, they have great side effects on veins. For example, vinblastine is a lipophile drug that directly causes damage to vascular endothelial cells and has hyperosmolar properties, which can penetrate into extravascular tissues and cause local vascular inflammation <sup>[2]</sup>. And make the osmotic pressure inside and outside the cell membrane imbalance, pH value change, cause serious phlebitis and thrombosis.

Doxorubicin belongs to the foaming agent class of chemotherapeutics, which is easy to damage cell membrane lipids and DNA, causing chemical damage to blood vessels, manifested as local redness, swelling, pain, and even local chondrocyte necrosis.

### 3. Chemical phlebitis trigger drug -Hypertonic drugs

Hypertonic drugs can effectively treat certain diseases under special circumstances. For example, 20% mannitol can effectively reduce brain edema, reduce myocardial reperfusion and improve renal perfusion, because it can reduce tissue edema and prevent the occurrence of cerebral hernia. Peripheral parenteral nutrition solution can be provided through peripheral veins to patients who cannot be ingested through gastrointestinal tract or whose intake of nutrients cannot meet metabolic needs. It mainly includes fat milk, amino acids, carbohydrates, vitamins and minerals. However, as a hypertonic drug, the osmotic pressure is high, which increases the plasma and tissue osmotic pressure during infusion, leading to the dehydration of vascular endothelial cells and the aggregation of local platelets, thereby inducing vascular endothelial injury and apoptosis, and causing the occurrence of chemical phlebitis [3].

### 4. Prevention and treatment of chemical phlebitis - Western medicine

The common corticosteroids used in western medicine therapy, such as dexamethasone and prednisolone, can significantly reduce the incidence of chemical phlebitis. In addition, cimetidine can significantly inhibit the adhesion of neutral particles to endothelial cells, and can effectively prevent the occurrence of chemical phlebitis. Proanthocyanidin oligomers can be specifically attached to the surface of endothelial cells [4]. When inflammatory response occurs, they can reduce the increase of capillary permeability caused by inflammatory mediators histamine and slow micropeptide, thus improving the resistance of capillaries, and thus have a strong anti-infection effect. The experimental results showed that early wet application of Lankefuenin or hirudoid had a good protective effect on chemical phlebitis, but the side effects were obvious.

### 5. Prevention and treatment of chemical phlebitis - Traditional Chinese medicine

Single Chinese medicine used to prevent chemical phlebitis is more common, such as ulmus, bezoar, aloe vera, potato and so on have good anti-inflammatory effect [5]. The study shows that the application of traditional Chinese medicine oil, or wet application of yarn strips, has the exact effect on the prevention and treatment of chemical phlebitis, and not only the cost is low, the effect is good, and the adverse reaction is small, which is convenient for clinical promotion.

The protective effect of TCM mixture on chemical phlebitis was obvious. In the theory of compatibility of traditional Chinese medicine prescriptions, according to the needs of disease and the characteristics of drugs, two or more flavors of drugs are selected to be used together to make drugs and correct errors, and the comprehensive effect of complementing or opposing each other is used. Traditional Chinese medicine mixture in clinical prevention of chemical phlebitis effect is remarkable, in many special studies of traditional Chinese medicine prevention of phlebitis shows that the combination of drugs is far better than the use of single dose. The commonly used traditional Chinese

medicine mixture includes sesame oil Golden powder, Sanyu Zhitong tincture, Xinhuang tablet Mirabilite combined with rhubarb, etc. Some studies have found that during the infusion of drugs, patients simultaneously mash the traditional Chinese medicine mixture, dilute it with distilled water to make a paste, and apply it on the top of the trocar. It has excellent effects of clearing heat and detoxifying, promoting blood circulation and removing blood stasis, reducing inflammation and relieving pain, and it is simple to operate and has high safety.

Glauber's salt is a kind of mineral Chinese medicine, is a kind of medicine commonly used in Chinese medicine, the main components of water-containing sodium sulfate and a small amount of chloride natural minerals, has good moisture absorption, soluble with water, strong permeability, low freezing point, has the characteristics of heat absorption, "Chinese Medicine Dictionary" described: Glauber's salt taste bitter, bitter can relieve heat, salty can soft and firm; Its nature is good to eliminate, into the blood, so good to eliminate blood stasis, can Tonghua all stasis. Because of its high permeability, it can effectively reduce the leakage of blood components into the tissue space, so as to keep the incision dry and achieve the purpose of reducing swelling. Glauberite can also stimulate the nervous system, play a role in promoting local blood circulation, at the same time, the reticuloendothelial system has a significant stimulating effect, so that its proliferation phenomenon and phagocytic ability has been enhanced, to achieve the purpose of pain relief, anti-inflammatory [6].

Rhubarb is one of the common Chinese medicine, its main active components are emodin, rhein tannic acid, chrysophanol and so on. Emodin can inhibit cell mitosis, lymphocyte division and abnormal proliferation of macrophages, and can play a role in immune regulation. Rhubarb tannic acid can inhibit the reproduction of gram-positive and gram-negative bacteria. Chrysophanol can reduce the fragility of blood vessels and the activity of antithrombin factors, so as to promote blood coagulation and achieve the purpose of hemostasis. The pharmacological effects of rhubarb include: inhibiting inflammatory factors, playing a role in anti-inflammatory, detumescence antibacterial, antiviral role.

Mirabilite and rhubarb are classified as sedimentation class according to the ups and down. In the case of the same disease, the combined use of the two has a synergistic effect to increase the anti-inflammatory and detumorization effect. Moreover, mirabilite and rhubarb are cheap, simple and effective, and the research on their combined use is increasing year by year.

### Conclusion

Both Western medicine and Traditional Chinese Medicine offer viable strategies for managing chemical phlebitis. Western treatments, such as corticosteroids and proanthocyanidin oligomers, effectively reduce inflammation and endothelial injury, though they may have notable side effects. Conversely, Traditional Chinese Medicine presents a promising alternative with lower costs and fewer adverse reactions. Techniques involving Chinese medicinal oils, pastes, and mixtures, such as Glauber's salt and rhubarb, show strong efficacy in reducing inflammation, promoting circulation, and alleviating symptoms. Integrating these approaches could enhance patient outcomes and broaden therapeutic options in the prevention and treatment

of chemical phlebitis.

**6. Funding:** This work was supported by the Jingzhou Institute of Technology - General Science and Technology Research Project of 2023 (grant number jzzp202308).

## 7. References

1. Ge GF, Shi WW, Yu CH. Baicalein attenuates vinorelbine-induced vascular endothelial cell injury and chemotherapeutic phlebitis in rabbits. *Toxicology and Applied Pharmacology*. 2017;318:23-32.
2. Chi Y, Wang D, Li HY. Therapeutic effect of wet compress of magnesium sulfate combined with vitamin B12 on chemotherapy-induced phlebitis in rabbits. *International Journal of Clinical and Experimental Medicine*. 2016;9:12356-12360.
3. Zhang J, Shen J, Yin W. The intervention research on treatment by Xianchen to rabbits model of chemotherapeutic phlebitis. *Acta Cirúrgica Brasileira*. 2016;31(8):549-556.
4. Zhang J, Wang H, Gui Y. Influence of compound aescine gel on ultrastructure of vein infused mannitol and its mechanism. *Forensic Medicine & Anatomy Research*. 2013;1:30-35.
5. Keogh S, Marsh N, Higgins N. A time and motion study of peripheral venous catheter flushing practice using manually prepared and prefilled flush syringes. *Journal of Infusion Nursing: The Official Publication of the Infusion Nurses Society*. 2014;37(2):96-101.
6. Paragioudaki M, Stamouli V, Kolonitsiou F. Intravenous catheter infections associated with bacteraemia: a 2-year study in a university hospital. *Clinical Microbiology and Infection: The Official Publication of the European Society of Clinical Microbiology and Infectious Diseases*. 2004;10:431-435.