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Application of Shengmai decoction to accelerate recovery after pectus excavatum NUSS surgery

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Abstract

This study examines the application of Shengmai decoction, a traditional Chinese medicine, in enhancing recovery after pectus excavatum NUSS surgery. Shengmai decoction, known for its potential to regulate immune responses, promote tissue repair, alleviate pain, and improve cardiovascular function, offers a promising intervention for postoperative rehabilitation. The study explores its effectiveness in reducing postoperative complications, enhancing patient satisfaction, and optimizing neuroendocrine responses. Although preliminary evidence supports its benefits, further clinical trials are necessary to standardize its use in terms of dosage, timing, and duration. Overall, Shengmai decoction presents a valuable adjunct to modern medical practices, potentially improving recovery outcomes for patients undergoing pectus excavatum NUSS surgery.

Keywords Shengmai decoction; pectus excavatum; Postoperative rehabilitation; Accelerated rehabilitation surgery; Traditional Chinese medicine compound Catalogue

1 Research background and research purpose

In today's medical environment, accelerate the rehabilitation of surgery (Enhanced Recovery After Surgery, ERAS) concept of popularization and implementation, has significantly changed the way the management of patients after surgery. This concept emphasizes optimizing perioperative management, reducing surgical stress, promoting rapid patient recovery, reducing hospital stay, and improving patient satisfaction through multidisciplinary cooperation. pectus excavatum, as a common congenital chest wall malformation, patients with pectus excavatum face many challenges in the postoperative rehabilitation process, such as pain management, lung function recovery, psychological pressure, etc., these problems greatly affect the postoperative quality of life of patients.

Shengmai decoction, a traditional compound derived from traditional Chinese medicine, has attracted wide attention due to its potential in accelerating surgical rehabilitation. Its main ingredients, such as ginseng, ophiopogon, schisandra, etc., are believed to regulate immune response, promote tissue repair, relieve pain, and improve cardiovascular function. These characteristics make Shengmai decoction of unique value in the strategy of accelerating recovery. In other post-surgical applications, Shengmai decoction have been shown to reduce inflammatory responses and speed wound healing, thereby reducing the length of hospital stays for patients. Considering the special needs of chest stabilization and lung function recovery after pectus excavatum NUSS surgery,Shengmai decoction may play a more significant role in this particular scenario.

The purpose of this study was to systematically review and analyze the specific application strategies and potential advantages of Shengmai decoction in the rehabilitation after pectus excavatum NUSS surgery. We will explore how Shengmai decoction can support a faster return to normal life in patients with pectus excavatum through different physiological mechanisms, such as improving cardiovascular function, promoting thoracic stability, relieving postoperative pain, and optimizing neuroendocrine responses. In addition, we will also focus on the integration of Shengmai decoction with modern accelerated rehabilitation strategies, and evaluate its clinical effects under the ERAS framework, with a view to providing new theoretical basis and practical guidance for accelerated rehabilitation of thoracic surgery.

However, despite the positive effect of Shengmai decoction in clinical practice, its standardized application in rehabilitation after pectus excavatum NUSS surgery still needs further scientific research. At present, the clinical evidence on the optimal dose, administration time and duration of Shengmai decoction is still insufficient.

Therefore, the purpose of our study was not only to elucidate the potential benefits of Shengmai decoction , but also to drive future rigorous clinical trials to determine its best practice in the rehabilitation of corrective funnel chest surgery. Through this study, we expect to be able to provide a more comprehensive rehabilitation strategy for patients with funnel chest and reveal the possibility of traditional Chinese medicine in modern surgical rehabilitation. This not only contributes to the integration of traditional medicine and modern medicine, but also may provide new treatment ideas for thoracic surgeons and researchers worldwide, promote personalized and integrated perioperative management, and ultimately improve patients' postoperative quality of life.

2 The application of Shengmai Drink in surgical accelerated rehabilitation

2.1 Composition and mechanism of Shengmai decoction

Shengmai Drink, a traditional compound derived from traditional Chinese medicine, is composed of three main ingredients: ginseng, ophiopogon and schisandra, and its unique pharmacological properties make it show outstanding potential in accelerating recovery. The synergistic effect

of these components gave Shengmai decoction many physiological effects, so that it has a wide range of application value in perioperative management.

Panax ginseng, scientific name Panax ginseng, is a representative drug of Qi-invigorating ginseng, rich in ginsenosides and other active ingredients. These ingredients can regulate the immune system, reduce the inflammatory response after surgery, and improve the body's tolerance to post-operative stress. Ginseng can also promote the release of neurotransmitters, help relieve postoperative pain, improve the patient's psychological state, and contribute to rapid recovery.

Liopogon japonica, scientific name Lonicerajaponica, is rich in various alkaloids and polysaccharides, which has the effect of nourishing Yin and clearing heat, promoting fluid and moistening dryness. After surgery, ophiopogon can help improve microcirculation, promote wound healing, and reduce the risk of postoperative infection. Its antioxidant free radical ability helps to reduce oxidative stress and protect cardiorespiratory function, which is especially important for patients with funnel chest because the disease can cause cardiorespiratory pressure.

Schisandrachinensis contains a variety of bioactive ingredients, such as schisandrachinol, schisandrin, etc., which have antioxidant, anti-inflammatory, protective effects on the cardiovascular system and improve lung function. Schisandra can enhance myocardial contractility, regulate heart rate, and help maintain postoperative cardiovascular homeostasis. In addition, its protective effect on the lungs may help accelerate the recovery of lung function, which is key to postoperative rehabilitation for patients with infundibular chest surgery.

The synergistic effect of the components of Shengmai decoction enhances its potential in accelerating recovery. By regulating immune response, promoting wound healing, maintaining cardiovascular stability, relieving pain and improving lung function, Shengmaying decoction may be a powerful auxiliary means for postoperative rehabilitation of funnel chest. However, although there is preliminary evidence for the benefits of pulsus, the specific mechanism of action in patients with funnel chest needs further scientific research to clarify. Future studies should further explore the dose effects, interactions and optimal administration of each component to ensure maximum benefit of Shengmai decoction in clinical applications.

2.2 Research status of Shengmai decoction in postoperative rehabilitation

In the rehabilitation of various surgical operations, Shengmai decoction has gradually shown its unique advantages. A number of clinical studies and observational studies have preliminarily verified the positive role of Shengmai decoction in accelerating rehabilitation, especially in improving patients' postoperative quality of life, shortening hospital stay and reducing complications. After heart surgery, gastrointestinal surgery, gynecological surgery and other different procedures, Shengmai decoction has been proven to promote wound healing, reduce inflammation, improve cardiorespiratory function, and optimize the psychological state of patients.

For example, after cardiac surgery, the drink has been found to lower markers of myocardial damage and reduce the risk of myocardial infarction, while improving cardiac function and shortening ICU stay and hospital stay. After gastrointestinal surgery, the combination of Sheng-

mai decoction and routine nursing can help improve the recovery of intestinal function, reduce the occurrence of abdominal distension and constipation, and shorten the length of hospital stay. After gynecological surgery, the application of pulsar can help relieve postoperative pain, reduce the use of analgesics, and promote early patient activity, thus speeding up the recovery process.

Although these studies provide preliminary evidence of the potential value of pulsar drink in surgical rehabilitation, there are relatively few studies on its application after infundibular chest surgery. Existing studies have mainly focused on the effects of pulse-generating drink on postoperative pain management, immune regulation and cardiovascular function, but the sample size of these studies is small and most of them are observational studies, so the universality and clinical guiding significance of their results need to be further verified by larger randomized controlled trials (RCT).

The mechanism of Shengmai decoction in rehabilitation after infundibular chest operation needs further investigation. Existing theoretical hypotheses include that it promotes rehabilitation by modulating immune responses, promoting wound healing, improving cardiorespiratory function, and optimizing neuroendocrine responses. However, the specific details of these mechanisms and their relevance to this specific procedure have not been fully elaborated in the existing literature. This provides a broad space for future research, especially at the molecular and cellular levels, to reveal the pathways of the role of Shengmai decoction in postoperative rehabilitation.

Therefore, although the application of Shengmai decoction in post-surgical rehabilitation, especially in the rehabilitation of funnel chest, shows great potential, its standardized application and best practice plan have yet to be determined through rigorous clinical trials. Future studies should focus on optimizing dosage, administration time and course of treatment to ensure that Shengmai decoction can improve patient satisfaction, effectively reduce postoperative complications, and further promote the development of accelerated rehabilitation surgery strategies.

3 Challenges and countermeasures of accelerated rehabilitation after pectus excavatum surgery

3.1 Common complications of postoperative rehabilitation of pectus excavatum

In the process of rehabilitation after pectus excavatum surgery, patients may face a series of complications, which not only affect the speed of recovery, but also may have a long-term impact on the quality of life of patients. The following is a list of the common complications of rehabilitation after funnel chest surgery and the challenges to accelerated rehabilitation strategies:

Postoperative pain: Pain from surgical incisions and sternal reconstruction is a common problem after surgery. Excessive pain may inhibit the patient's activity, delay the recovery process, increase the use of analgesics, and even trigger postoperative depression. Effective pain management is therefore a key link to accelerated recovery and requires a combination of medication, physical therapy and psychological support.

Delayed recovery of lung function: Recovery of lung function may be slower after correc-

tive surgery on the sternum due to mechanical effects on the intrathoracic organs, especially the lungs. Limited lung function may increase the risk of postoperative pulmonary complications such as pneumonia, atelectasis, and dyspnea, prolong hospital stay, and reduce patient satisfaction. Therefore, preoperative lung function assessment and continuous breathing training after surgery are important components of accelerated recovery.

Psychological stress and depression: Patients may experience psychological stress as a result of the trauma of surgery, concerns about changing their body image, and uncertainty about the future. Long-term psychological stress may affect the recovery effect and prolong the recovery period. Psychological intervention and patient education are equally indispensable in accelerating recovery, in order to maintain patients' mental health and enhance recovery confidence.

Wound infection and healing problems: Infection or poor healing of surgical incisions is a common postoperative complication that may force patients to delay discharge and increase the consumption of medical resources. Prevention and timely management of wound complications, such as the use of appropriate wound care techniques and antibiotics, are essential to accelerate recovery.

Deep vein thrombosis and pulmonary embolism: Prolonged bed rest and surgical trauma can lead to increased blood viscosity, increasing the risk of deep vein thrombosis, and in severe cases, pulmonary embolism, which can be life-threatening. Therefore, preventive anticoagulant therapy, early activity, and lower limb muscle pump action are important parts of postoperative rehabilitation to reduce the risk of thrombosis.

Gastrointestinal dysfunction: After surgery, patients may experience gastrointestinal dysfunction such as nausea, vomiting, constipation, or diarrhea, which delays nutrient uptake and affects physical recovery. TCM rehabilitation therapies, such as acupuncture and abdominal muscle training, can help improve gastrointestinal function, along with nutrition management strategies, and promote patient recovery.

Cardiorespiratory complications: Surgery may result in impaired cardiorespiratory function, such as bleeding, air leakage, or arrhythmia in the lungs, which may result in patients requiring longer monitoring and recovery. Therefore, preoperative risk assessment, intraoperative careful operation and postoperative cardiopulmonary function monitoring and rehabilitation are essential.

In the face of these complications, clinicians and researchers need to comprehensively apply accelerated rehabilitation strategies, including individualized pain management, breathing training, psychological support, wound care, anticoagulant therapy and nutritional management, to reduce the occurrence of complications and accelerate the recovery process of patients with funnel chest. As a possible auxiliary means, the potential role of Shengmai decoction in these aspects deserves further study in order to provide more comprehensive and effective rehabilitation programs for patients.

3.2 Application of Shengmai decoction in accelerating recovery after PE NUSS surgery

The application of Shengmai decoction in the accelerated rehabilitation after funnel chest surgery combines the wisdom of Chinese medicine and the idea of accelerated rehabilitation of modern medicine. The main components of ginseng, ophiopogon and schisandra showed positive effects in all stages of postoperative rehabilitation. First, by modulating the immune response, it can reduce inflammation after surgery and reduce the risk of postoperative complications, such as lung infections and wound infections. Ginsenosides, the active ingredient in ginseng, can promote the normal function of immune cells and reduce excessive inflammatory response, thus protecting patients from postoperative complications.

The role of Shengmai decoction in promoting wound healing has also received extensive attention. The polysaccharide component of Ophiopogon can enhance the regenerative ability of cells, accelerate wound repair and shorten the healing time. At the same time, the antioxidant free radical properties of triogon help protect tissues from oxidative stress after surgical trauma and promote the improvement of wound healing quality. The antioxidant and anti-inflammatory effects of schisandra seeds also help to maintain the stability of wounds and speed up the healing process, thereby reducing the length of hospital stay for patients.

The maintenance and improvement of cardiovascular function is another key advantage of Shengmai decoction in rehabilitation after PE NUSS surgery. After operation, the heart burden often increases. Schisandrin and schisandrin in schisandrin can protect myocardium, enhance myocardial contractility, regulate heart rate, and help maintain postoperative cardiovascular balance. This is essential to prevent arrhythmias and prevent cardiopulmonary complications. In addition, the protective effect of schisandra on lung function may help alleviate dyspnea caused by surgical trauma and promote rapid recovery of lung function, which can reduce the symptoms of postoperative chest tightness and dyspnea for patients with funnel chest and improve the quality of life.

Another important function of Shengmai decoction is to relieve pain. The analgesic effect of ginseng, by regulating the release of neurotransmitters, can help patients better manage postoperative pain, reduce dependence on analgesic drugs, improve patient comfort, and thus accelerate recovery. At the same time, the use of Shengmai decoction may help optimize neuroendocrine response, reduce stress response, make patients more tolerant to the surgical process, and accelerate postoperative recovery.

However, although Shengmai decoction has shown promising results in other post-surgical applications, its standardized protocol and optimal dose have not been fully studied in the specific application of accelerated recovery after funnel chest surgery. This needs to be determined by future studies through large-scale randomized controlled trials to ensure the safety and efficacy of Shengmai decoction in this specific clinical setting. In addition, the study should also pay attention to individual differences, and explore the effect of Shengmai decoction combined with other accelerated rehabilitation strategies (such as breathing training, physical management, nutrition management, etc.) to achieve the maximum rehabilitation benefits.

The application of pulsars in the accelerated rehabilitation after infundibular chest surgery has

shown great potential, and its various physiological effects may become a bridge for the combination of traditional medicine and modern medicine. Through in-depth research on the dose, administration time and optimal use strategy of Shengmai decoction, we are expected to provide an innovative auxiliary rehabilitation means for patients with funnel chest, improve patient satisfaction, reduce complications, shorten hospital stay, and then promote the personalized and integrative rehabilitation after thoracic surgery.

4 Conclusion

Shengmai decoction, as a traditional Chinese medicine compound with a long history, has shown remarkable potential in accelerating surgical rehabilitation. In the specific scenario of rehabilitation after funnel chest surgery, the multi-channel physiological effects of Shengmai decoction, such as regulating immune response, promoting wound healing, maintaining cardiovascular stability, relieving pain and optimizing neuroendocrine response, provide strong support for rapid recovery of patients. Its positive effects after other operations, such as shortening hospital stay, reducing complications and improving patient satisfaction, provide a theoretical basis for the application of Shengmai decoction in funnel chest rehabilitation.

Although the clinical value of pulsar drink has been preliminarily demonstrated, further scientific research is needed to determine standardized application and best practice protocols. Future studies need to focus on large-scale randomized controlled trials to determine the optimal dose, timing of administration, and duration of treatment to ensure safety and efficacy in patients with PE . In addition, the study should also consider the integration of Shengmai decoction with other accelerated rehabilitation strategies, such as breathing training, physical management, nutrition management, etc., in order to maximize the rehabilitation effect.

The intervention of Shengmai decoction suggests the possibility of the fusion of traditional Chinese medicine and modern medicine to accelerate rehabilitation. Through this combination, we can not only explore and utilize the valuable resources of traditional medicine, but also provide more diversified and personalized rehabilitation strategies for thoracic surgery patients around the world. In addition, this study highlights the need for research specifically focused on rehabilitation after PE NUSS surgery to address specific challenges such as postoperative pain management, recovery of lung function, and psychological stress.

In conclusion, this study provides preliminary theoretical support for the application of Shengmai decoction in the rehabilitation of funnel chest surgery, and points out the direction for future research. By further studying the mechanism of action of Shengmai decoction and optimizing its application in clinical practice, we are confident that pulsars will become a powerful supplement to accelerate rehabilitation surgery strategies, and contribute to improving postoperative quality of life, shortening hospital stay and reducing complications in patients with funnel chest. In the global medical system, the application of Shengmai decoction will promote the personalization and integration of perioperative management, and promote the continuous progress in the field of surgical rehabilitation.

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