ABSTRACT

Soft tissue injury is the most common disease in orthopedics, and it is also the most easily neglected disease in sports. Without timely and effective treatment, it is easy to develop into malignant strain and seriously affect life and sports. In view of this, the aim of this study is to analyze the effect and mechanism of traditional Chinese medicine gel in treating such injuries in the light of the characteristics of sports-related soft tissue injury. The right gastrocnemius muscle injury was simulated in 36 adult male rats. Chinese medicine gel and tincture were used to treat it. The contents of interleukin, alanine aminotransferase, blood urea nitrogen and prostaglandin E2 in the blood of rats under different courses of treatment were analyzed to explore recovery in four rats. The results showed that the levels of interleukin and prostaglandin E2 in the blood of rats treated with drugs were significantly lower than those in the control group (p<0.05), indicating that both drugs have obvious therapeutic effects on soft tissue injury. The content of interleukin in the blood of the Chinese medicine gel group was slightly lower than that of the tincture group, indicating that the Chinese medicine gel could affect the recovery of soft tissue injury by affecting leukocyte interleukin. This result is helpful in the treatment of soft tissue injury in sports and to further improve the therapeutic effect of traditional Chinese medicine gel.

Keywords: Soft Tissue Injury; Medicine, Chinese Traditional; x’Sports.
INTRODUCTION

Traditional Chinese medicine has a good reputation in the world. External application of traditional Chinese medicine can reduce the side effects caused by drug metabolism in the body through the liver. The application methods of external traditional Chinese medicine mainly include application, fumigation, external washing, etc., but these traditional methods are cumbersome in process and complex in operation, which is not conducive to the wide promotion and exertion of efficacy. With the combination and progress of chemical raw material technology and pharmaceutical science, Chinese medicine gel preparation has become a stable and widely used drug dosage form. By purifying the gel matrix of midday purification by chemical technology, the property of Chinese medicine can be completely retained in the gel. During the use, the gel will soften the stratum corneum of the drug part, reduce the resistance of the stratum corneum to the drug entering the body, and greatly improve the penetration efficiency of the medicine. Many sports have strong antagonism, and participants sprain and fall under the action of muscle force and external force. Among sports injuries, there are also some minor soft tissue injuries and chronic strain injuries. Such injuries will not cause too much damage to the human body at the initial stage, so it is easy to be ignored and eventually develop into strain, which will seriously affect the competition and training of athletes. In view of the particularity of athletes’ time, it is necessary to treat the soft tissue injury caused by sports quickly and not hinder the normal training. In view of this, this study used rat test to simulate soft tissue injury in sports, and explored the efficacy and mechanism of Chinese medicine gel in treating such diseases.

In this study, we studied the efficacy and mechanism of Chinese medicine gel. First, we introduced the mechanism of Chinese medicine gel in treating soft tissue injury and the cause of soft tissue injury. Then, according to the characteristics of soft tissue injury, animal experiments were designed to establish gastrocnemius muscle injury models in 36 rats. Objective to analyze the levels of interleukin, alanine aminotransferase, blood urea nitrogen and prostaglandin E2 in the blood of rats at different stages of treatment, and observe the tissue sections of right gastrocnemius muscle and kidney organs, so as to obtain the therapeutic effect of the two drugs and their toxicity to individual kidney organs.

The innovation of this study is to compare the recovery of Chinese medicine gel and tincture by animal test. After comparing the two drugs, the recovery of the right gastrocnemius muscle after the treatment of the right gastrocnemius muscle before treatment, after five times and ten times after treatment was analyzed. Due to the particularity of animal experiment, the content of interleukin and prostaglandin E2, which can reflect the immune capacity of rats, was selected as the indicators of soft tissue recovery. Alanine aminotransferase (ALT) and blood urea nitrogen (BUN), which can reflect the function of kidney organs, were selected as indicators to reflect the toxicity of drugs to kidney. The research transforms subjective soft tissue recovery into quantitative indicators, so as to make the test results more accurate and convincing.

RELATED WORKS

Traditional Chinese medicine (TCM) has a good curative effect and reputation in the world, and it has been paid more and more attention by the academic circles. The use method, mechanism and dosage of traditional Chinese medicine are the topics of concern. Shuiqing Z C’s team systematically reviewed the randomized controlled trials of ear acupuncture / auricular point pressure (EAP) under all clinical conditions, and found that there were significant differences in other factors of treatment, such as score, treatment time and frequency, and believed that there was no definite conclusion that the design of EAP was the most appropriate pseudo control. Seda and other scholars introduced the impact of back massage on delivery pain and delivery by analyzing the delivery satisfaction of massage during delivery. They found that the score of massage group was 8.8 ± 0.7, which was significantly higher than that of control group. They proposed that health professionals can use massage intervention to reduce pain and shorten delivery time. On the basis of literature reports, Wang m and other scholars introduced the application of metabolomics in the evaluation of curative effect of traditional Chinese medicine and its biochemical mechanism, providing changes in the metabolic network of the system for describing the pathological state of animal models and clinical studies. In view of the characteristics of traditional Chinese medicine with low toxicity, less adverse reactions and more ingredients, Hua Dong Z’s team summarized the development of Chinese medicine in reversing tumor multidrug resistance, and provided a certain direction for the development of appropriate reversal agents to overcome multidrug resistance. Zhang’s team explored the effects of traditional Chinese medicine, astraigoloside IV and curcumin on tumor growth and angiogenesis in nude mice model of human liver cancer. The results showed that as IV and curcumin alone or in combination could significantly reduce the average tumor weight (P < 0.05), and the single use of as IV and curcumin could reduce the tumor microvessel count. Based on the above studies, most of the academic researches on traditional Chinese medicine are to explore the mechanism of action of traditional Chinese medicine and the influencing factors of recovery of sports injury by means of systematic review and animal experiments. There are few studies on the effect and mechanism of important effects in the treatment of sports injury. This study will explore the effect of external application of traditional Chinese medicine gel on simulated male sports rats with soft tissue injury, aiming at exploring the efficacy of Chinese medicine gel, and providing scientific and reasonable suggestions for athletes.

Effect and mechanism analysis of traditional Chinese medicine gel in treating soft tissue injury

IL-1β is a cytokine produced by monocytes, fibroblasts or other types of cells in response to infection. It can stimulate the production of colony-stimulating factor, platelet growth factor and other cytokines, and play a role in immune response and tissue repair. PGE2 is an important...
cell growth and regulatory factor with immunosuppressive and anti-inflammatory effects. Therefore, the contents of IL-1 and PGE2 in the blood of rats can reflect the recovery of soft tissue injury. This study analyzed the effect and mechanism of tincture and traditional Chinese medicine gel on the role of IL-1 beta and PGE2 in the blood of rats.

The "**" in Figure 1 indicates that compared with the normal group, P < 0.05; "*" indicates that compared with the control group, P > 0.05.

It can be seen from Figure 4 (a) that after soft tissue injury modeling, the content of IL-1 β in blood of group A was significantly lower than that of other groups, and the difference was significant (P < 0.05), which indicated that this study was successful in modeling right gastrocnemius muscle injury in rats. The levels of IL-1 beta in rats treated with tincture and Chinese medicine gel were significantly lower than those in A and B rats, that is, after any drug intervention. This indicates that the two drugs can reduce the level of IL-1 beta in the serum of rats. However, there was no significant difference in the content of IL-1 β between the two groups after drug intervention (P > 0.05). The content of IL-1 β in group D was higher than that in group C.

Figure 1 (b) shows the content of PGE2 in the blood of rats at 0, 5 and 10 days of treatment. Similar to the results shown in Figure 4 (a), after 10 times of treatment, the PGE2 content in blood of rats in groups C and D was significantly lower than that in rats without drug intervention (P < 0.05), but there was no significant difference between groups C and D (P > 0.05), and group D was higher than group C. This indicated that tincture and Chinese medicine gel could reduce the content of PGE2 in serum of rats, but there was no significant difference between the two groups.

The liver and kidney tissues of rats in each group were sectioned, and the image after 400 times magnification was shown in Figure 4. The "L" in the figure represents liver tissue and "K" represents kidney tissue. It can be seen from the figure that there are balloon like changes in kidney cells of rats in group B, which may be due to the pathological changes of liver induced by local inflammatory reaction after long-term untreated soft tissue injury. A. There were no obvious changes in the tissue sections of the rats in groups C and D, which proved that the two drugs had good therapeutic effects on soft tissue injury.

Figure 3 shows the levels of ALT and BUN in the blood of rats after 10 times of treatment, in which "**" indicates that compared with other groups, P < 0.05. Figure 3 (a) shows the content of ALT in blood, which is an important indicator for the diagnosis of viral hepatitis and toxic hepatitis. Under normal circumstances, the content of ALT in blood is 0-40u / L. After ten times of medication, the serum ALT level of Chinese medicine gel was significantly lower than that of the other three groups, and the difference was statistically significant (P < 0.05). There was no significant difference between the other three groups (P > 0.05). Figure 3 (b) shows the blood bun content, which is an important indicator of renal function and the main end product of protein metabolism. The images showed that there was no significant difference in bun content among all rats (P > 0.05). The contents of ALT and BUN in the serum of all rats were at normal level, indicating that Chinese medicine gels and tincture did not affect the function of liver and kidney.

The liver and kidney tissues of rats in each group were sectioned, and the image after 400 times magnification was shown in Figure 4. The "L" in the figure represents liver tissue and "K" represents kidney tissue. It can be seen from the figure that there are balloon like changes in kidney cells of rats in group B, which may be due to the pathological changes of liver induced by local inflammatory reaction after long-term untreated soft tissue injury. A. There were no obvious changes in the tissue sections of the rats in groups C and D, which proved that the two drugs had good therapeutic effects on soft tissue injury.
CONCLUSION

Traditional Chinese medicine gel is a safe, effective, convenient, clean and hygienic new dosage form for external use. It has been applied more and more in clinic. It has a very significant effect in the treatment of sports injury, fracture or tendon injury. It can promote blood circulation and remove blood stasis, reduce inflammation and relieve pain. The purpose of this study is to analyze the effect and mechanism of traditional Chinese medicine gel on sports injury. Soft tissue blunt impact model was used to establish soft tissue injury model in adult rats. The detection indexes of soft tissue recovery effect included inflammatory index IL-1 β, PGE2 and soft tissue examination of injury site, while the examination of drug toxicity included serum indexes ALT and bun. The results showed that there was no significant difference between Chinese medicine gel and traditional tincture in the treatment of soft tissue injury (P > 0.05), and there was no obvious toxic side effects on liver and kidney organs. The mechanism of action of the two drugs in the treatment of soft tissue injury is to reduce the levels of IL-1 β and PGE2 in the blood, and improve the level of local soft tissue recovery. The effect of gel preparation on the level of IL-1 and PGE2 is higher than that of traditional tincture, and the effect of treating soft tissue injury is slightly better than tincture. These findings will have some guiding significance for the treatment of soft tissue injury caused by sports. Further studies should be made on the actual effects and problems of Chinese medicine gel in the treatment of human soft tissue injury.

ACKNOWLEDGEMENTS

The study was supported by the Fundamental Research Funds for the Central University (No: 2020 Self research - Sports 009).

All authors declare no potential conflict of interest related to this article

AUTHORS’ CONTRIBUTIONS: The author has completed the writing of the article or the critical review of its knowledge content. This paper can be used as the final draft of the manuscript. Every author has made an important contribution to this manuscript. Meiling Miao: writing and execution. Li Chen: data analysis.

REFERENCES