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Analysis of the Application of Artificial Intelligence in Medical Imaging

Zhi Wang, Yong Zhan

Beijing Zhiyi Yunshang Technology Co., Ltd, Beijing, 100121;Email:emimeme@sina.com

Abstract: Medical imaging technology is considered one of the most critical diagnostic tools in the clinical analysis, and its imaging results provide medical interventions with the changes of patients' tissues and organs to support the diagnosis. With the development of computer technology, the application of artificial intelligence (AI) technology in clinical diagnosis has become increasingly more widespread. In order to enhance the quality of medical imaging work, this paper mainly analyzes the application effect of AI in medical imaging, further discovering the significance of the application of artificial intelligence in medical imaging.

Keywords: artificial intelligence; medical imaging; application analysis

1.Introduction

The stunning development of computer technology has enabled AI technology been employed in many fields of work, from production, education to people's daily work, and nowadays, artificial intelligence technology can be seen everywhere. AI technology integrates various disciplines such as computer science and mathematics. The computational learning ability, data resources, and algorithmic models are the basis for the development of artificial intelligence technology [1]. With the continuous improvement of China's medical level and the introduction of new technologies and equipment, AI technology has gradually penetrated the medical field and has been applied widely. In the hectic medical intervention, medical imaging is one of the important sources of work, which is an important reference for doctors to diagnose diseases [2]. In recent years, more and more AI technologies have been integrated into medical imaging work to improve the quality and efficiency of medical imaging workers by improving or combining traditional imaging.

2.Artificial Intelligence Technology

2.1 Artificial Intelligence

Artificial Intelligence, or AI, is a branch of computer science, a new technical science that looks into and develops theories, methods, technologies, and application systems for simulating, extending, and expanding human intelligence. AI has a wide range of research directions, including speech recognition, image recognition, machine learning, and intelligent robotics, etc. The theory of AI is not only limited to computer technology, but also incorporates mathematics, physiology, statistics, and systems science, and other aspects of discipline technology. Artificial intelligence is the study of the computer to simulate certain human thought processes and intelligent behavior so that the computer can achieve a higher level of application, better help humans to complete the corresponding needs.

2.2 Advantages of Artificial Intelligence

Artificial intelligence is based upon the theory of human intelligence, a technology formed relying on extension

and simulation. With strong computing ability, artificial intelligence, along with its computing power, can carry out various forms of fast data processing, and then output the information needed by people. Thanks to the high learning ability adherent to the intelligent learning program, AI is capable of machine learning, so as to adapt to the environment and improve the efficiency of artificial intelligence; with strong logical reasoning ability, AI technology can carry out logical reasoning through a variety of algorithms, thus enabling the computer system to solve more complex problems and provide people with corresponding decision support. In addition, the strong pattern recognition ability empowers the computer program to carry out the discovery of its intelligent features, which is more conducive to image recognition. With strong coordination and control and artificial intelligence algorithm, the computer program can better adjust the intelligent system of resource allocation and utilization, hence reduces resource consumption. Bestowed with the ability to reduce input costs and higher efficiency, AI technology has replaced manual work in many work areas and can reduce labor costs. In sum, the application value of AI is undoubtedly significant.

3.AI Medical Imaging

As the advantages of AI technology are known to the world, more and more artificial intelligence technologies are widely used in medical imaging, bringing new ways of examination and analysis to this field of work. Under the conventional medical level, the process of medical imaging work is not able to make detailed interpretation of image examination results, which causes bias in doctors' diagnosis and brings certain negative impact to medical intervention. With the wide application of AI technology in medical imaging, medical imaging diagnosis results have become more clear and accurate, effectively reducing the deviation of doctors in the diagnosis process, and to a certain extent, increasing the efficiency of diagnosis.

4.Application of Artificial Intelligence in Medical Imaging

4.1 Intelligent Reviewing

Artificial intelligence technology can determine whether pathological changes occur within a patient's visual presentation of examination during the process of medical imaging diagnosis, and the doctor will then check the results of his/her judgment, which can effectively help the doctor allocate time as well as energy. Today, intelligent imaging systems can not only identify the patient's lesion, but also determine the nature of the it. In general, with the combined help of large image data and clinical guidance, the intelligent image reviewing system can continuously learn the criteria for determining the type of disease and run continuously for a long time with high stability.

4.2 Artificial Intelligence in Radiotherapy

Nowadays, radiotherapy is still considered one of the most critical tools in clinical treatment in oncology. The process of radiotherapy treatment for tumors is complex, which includes simulated positioning, design of treatment plan, verification of treatment plan, and treatment implementation. Target volume delineation is a significant part of the process due to the fact that radiotherapy treatment is to treat the patient's focal tissues through various rays, which is more harmful and requires accurate positioning of the treatment area, thereby avoiding damaging the patient's normal tissue cells. Radiotherapists need to spend a considerable amount of time on manual indication based on the patient's medical imaging results, which slows the work efficiency. While the operation needs to be performed exclusively by radiotherapists, the shortage of radiologists caused by medical conditions leads to the fact that the majority of radiotherapists are concentrated in tertiary hospitals, and few primary hospitals are equipped with professional radiotherapists. This phenomenon further puts primary hospitals in a dilemma: even with radiotherapy equipment, they find it difficult to start radiotherapy work smoothly due to the lack of operators, which correspondingly requires patients to go to tertiary hospitals for treatment. Therefore, in order to improve the current treatment situation and increase the effectiveness of radiotherapists' work, medical institutions have combined artificial intelligence technology. The

developers set up the artificial intelligence technology system to effectively identify the focal tissue and surrounding organs to assist radiotherapists in target volume delineation of the patient's focal area through the artificial intelligent algorithm, which can obtain a higher accuracy rate and significantly enhance the work efficiency of radiotherapists.

4.3 Intelligent Analysis of Pathological Images

In contemporary medical intervention, there are relatively few pathologists. One study reported that the registered pathologists in China are far from the required standard of one to two case physicians for 100 beds, which cannot meet the medical needs[3]. In the course of medical intervention, cancerous cells are similar in size to ordinary cells, and pathologists need to identify cancerous cells that are difficult to identify in the high pixel pathology results, which, combined with a relatively busy workload, is prone to certain errors. Most of the pathologists' working time is spent on examining patient's pathology slides, which affects the efficiency to a certain extent. As AI technology becomes more widely used, it facilitates the acquisition of pathology slides during clinical analysis, which in turn leads to a large number of quantitative analyses. Therefore, many groups of expertise are developing and improving AI technology to strengthen its ability to analyze pathology data, which in turn improves the accuracy of pathology diagnosis results and enhances the quality of pathology diagnosis. The use of AI technology makes the diagnosis more concise and accurate compared with traditional diagnosis by the naked eye or microscope and improves medical efficiency to a certain extent. Moreover, the diagnosis is transparent and traceable, so that the cause of misdiagnosis can be quickly checked if it occurs.

5.Conclusion

AI is a branch of computer science that attempts to understand the essence of intelligence and produce a new intelligent machine that can respond in a similar way to human intelligence, and research in this field includes robotics, language recognition, image recognition, natural language processing, and expert systems[4]. Since its inception, AI has become increasingly sophisticated in theory and technology, and its application areas have expanded. Most of the medical data in today's treatment work are derived from medical images. At present, the analysis of most medical image data still consumes a lot of manpower, and the number of tasks and the complexity of images can lead to biased diagnostic results, which is very likely to affect the accuracy of diagnostic work to different degrees[5]. Therefore, the use of manual processing has certain disadvantages. In recent years, with the continuous development of information technology, more and more AI technologies have been gradually incorporated into the combination of medical impact work through continuous improvement, and the use of AI technology not only improves the traditional image processing methods in medical imaging work and increases the accuracy of imaging examination results, but also enhances the efficiency of medical imaging workers and thus improves the overall quality of medical imaging. According to the analysis of the current situation, the application of AI technology in medical imaging is more concentrated in the field of simple diseases and specific diseases. While the application value is small, the application results have not yet reached the ideal state. And in the process of application of AI technology, there are still problems that need targeted solutions. Therefore, the application of AI technology in medical imaging still needs further research and development. Eventually, it will be implemented gradually. The researcher believes with the continuous development of AI technology and the continuous improvement of research workers, the medical and clinic fields are expecting prosperity in the combination of AI technology and medical imaging applications, which is not only limited to intelligent reviewing or pathology diagnosis, but also will continue to expand to more levels. And we expect the combination of AI technology and medical imaging to play a higher value in the future.

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Research progress of insulin resistance in alcoholic liver disease

Yan Zhang

Guilin Medical University, Guangxi Guilin 541199, Email:18796250399@163.com

Abstract: Alcoholic liver disease (ALD) is a liver disease caused by long-term heavydrinking, but its pathogenesis is relatively complex, among which Insulin resistance(IR) is closely related to the formation of ALD. In this paper, the epidemiological status of ALD at home and abroad and the research progress of insulin resistance in alcoholic liver were reviewed from the relationship between ALD and IR.

Key words: Alcoholic fatty liver, Insulin resistance, insulin signaling pathway

1. Overview of alcoholic liver disease and insulin resistance

Ethyl alcohol (molecular formula CH3CH2) is the main component of ethyl alcohol. It is soluble with water in any proportion. After entering the human body, ethanol quickly enters the blood circulation through biofilm and is quickly metabolized and utilized by various tissues and organs, 90% of which is oxidized in the liver [1]. Some people who are long-term alcoholics have serious liver damage. The consumption of ethanol has a certain relationship with the severity of liver damage. Excessive drinking will lead to the occurrence of Alcoholic liver disease (ALD). In China, although viral hepatitis accounts for the majority of patients with liver diseases, the incidence of ALD is also increasing with the change of dietary structure [2], making the study on the prevention and treatment of ALD an important topic. In the process of ALD, starting from alcoholic fatty liver, due to adipocyte degeneration, it can gradually evolve into alcoholic hepatitis, liver fibrosis, cirrhosis, and hepatocellular carcinoma, which is difficult to reverse and has high morbidity and mortality [3].The pathogenesis of ALD is complex and not yet fully understood. Current studies have shown that after drinking, genetic factors, nutritional conditions, alcohol metabolism, oxidative stress, cytokines and other factors play a key role in the pathogenesis [4].Previous studies have shown that adipogenesis is a risk factor for the development of cirrhosis in the early stages of ALD.Intervention of early ALD with drugs or treatment has attracted extensive attention in the field of treatment and improvement of ALD.

Insulin resistance (IR), which is the pathological basis of a series of glucose and lipid metabolic diseases, refers to the decrease of Insulin utilization rate and sensitivity of the body to Insulin caused by various reasons. Current studies believe that the main cause of insulin resistance is the increase of inflammatory cytokines, which interfere with the phosphorylation of a series of receptors in insulin signal transduction and block a series of cascade amplification reactions activated by downstream signals, thus affecting physiological functions such as insulin generation and transport and causing IR[5].Several studies have shown that insulin signal activation may be positive antagonism ALD important endogenous protective mechanism of insulin signal regulation function obstacle is the most typical performance IR, IR can cause a variety of tissues and organs, including liver, a variety of REDOX metabolic abnormalities, it's in the occurrence and development of ALD has played an important role in [6, 7].By summarizing the mechanism of alcohol-mediated hepatic insulin resistance, this paper will discuss the role of impaired insulin signal transduction in the pathogenesis of ALD, and provide a reasonable reference for the prevention and treatment of alcohol-induced liver injury in the future.

2. The mechanism of insulin resistance in ALD

2.1 Alcohol and PI3K

Alcohol has multiple effects on hepatic insulin, and long-term alcohol feeding has been shown to reduce insulin receptor binding capacity. In De la Monte et al. 's experiment, using competitive saturation analysis, insulin receptor binding was reduced in rats fed an alcohol diet compared to a control group [8].Insulin acts on target tissues by binding to the insulin receptor and stimulating the phosphorylation of the receptor itself, thus recruiting and activating the insulin receptor substrate protein 1/2 (IRS1/2).IRS1/2 can activate phosphatidylinositol-3-kinase (PI3K) to convert phosphatidylinositol 4, 5-diphosphate (PIP2) into phosphatidylinositol 3,4, 5-triphosphate (PIP3), and continue to transmit signals downstream [9].Through experiments on the effects of alcohol on effectors PI3K, PIP2 and PIP3 [10], it was found that the data obtained were mixed, which may be related to the difference of animal model and alcohol concentration. Alcohol can not only upregulate phosphatase and tensin homologue (PTEN), but also inhibit the effect of PI3K.Low doses of alcohol can also increase the activity of PI3K by down-regulating the P55γ subunit post-transcriptional, thus increasing insulin sensitivity.PI3K is composed of two subunits, p85 and p110, of which p85 anchors and binds, while p110 plays a key regulatory role. Activated IRS-1 binds to p85 to activate the p110 subunit, and p110 phosphorylates phosphatidlinositol (PIP3) to transmit signals downwards.Akt is activated by 3-phosphate-dependent protein kinase (PDK) [11].Although it has been clear that alcohol can have a certain effect on PI3K, the role of its subunit is still not clear. Perhaps the regulation of its subunit on glucose and lipid metabolism can become a new target for the treatment of ALD.

2.2 Alcohol and Akt and their downstream targets

PIP3 is activated by phosphorylated protein kinase B (Akt) in muscle and adipose tissue and transmits signals downstream. Insulin-mediated Akt activation in the liver has several roles: Inactivation of transcription factor FoxO1 inhibits partial gluconeogenesis, activation of transcription factor sterol regulatory element binding protein-1 (SREBP-1) promotes the production of genes related to fatty acid synthesis, and phosphorylation of glycogen synthase kinase-3 (GSK-3) stimulates the production of glycogen [12].Phosphorylation of Akt is the center of typical insulin signal transduction. Long-term consumption of alcoholic diet resulted in decreased phosphorylation of Akt at Thr308, increased phosphorylation at Ser473, and increased cytoplasmic Akt content. The increase of TRB3, a negative regulator of Akt, was induced in the liver of alcohol-fed rats. Alcohol can induce TRB3 and Akt to bind to the original structure and organize its plasma membrane association, leading to the inhibitory effect of insulin signal [13].Alcohol also has effects on several target proteins of Akt, namely FoxO1, GSK and SREBP-1. Alcohol feeding can increase the FoxO1 mRNA and protein as well as its phosphorylation. Activation of FoxO1 promotes the transformation of hepatic stellate cells to collagenous myofiber cells and causes liver fibrosis, which has a certain connection with the development of ALD.GSK inhibits glycogen synthesis through phosphorylation, insulin inhibits GSK activation through phosphorylation of Akt to promote glycogen synthesis, and ethanol can increase GSK levels through reactive oxygen species and glucocorticoid receptor signaling pathways [14,15].SREBP-1 plays an important role in regulating the transcription of genes related to liver adipogenesis. As described in Liu's article [16], ethanol directly up-regulates the expression of SREBP-1 through its metabolite acetaldehyde, and indirectly up-regulates the expression of SREBP-1 by activating the endoplasmal reticulum stress response, enteric lipopolysaccharide and downstream proteins of SREBP-1.Elevated expression levels increased triglyceride accumulation in the blood and fat production in the liver, leading to the progression of ALD.

2.3 Alcohol and adipokines

Adipokine is a hormone derived from white adipose tissue, regulating blood glucose, blood lipid and energy homeostasis. Leptin and adiponectin are two major adipokines, which can promote insulin sensitivity and are related to a variety of liver diseases [17], including the pathogenesis of ALD. Leptin levels were positively correlated to the fat

quality and regulate food intake and energy expenditure, long-term edible alcohol feed mice prone to lard type hepatitis, and reduces the quality of white adipose tissue and decrease the blood thin element level, if taking exogenous leptin can improve fatty hepatitis [18], prompt leptin levels may be associated with development of ALD. Adiponectin is an adipocytokine secreted by adipocytes, which is closely related to the regulation of lipid metabolism in the liver, and also has anti-inflammatory and insulin sensitivity functions. Studies have shown that the decrease of adiponectin in the circulatory system is closely related to insulin resistance. Insulin resistant animals can be reversed after a period of adiponectin treatment, and it also has the effect of inhibiting inflammation. The promotion of insulin sensitivity by adiponectin may be closely related to the enhancement of free fatty acid oxidation by adenylate activated protein kinase (AMPK) and peroxisome proliferator-activated receptor (PPARα) pathways. Adiponectin can also inhibit the production of tumor necrosis factor (TNF-α) by immune cells in the liver, and can directly antagonize TNF-α.More and more experiments have shown that during the pathological process of ALD, adiponectin production obstacle exists in adipose tissue and adiponectin receptor expression decrease in surrounding tissue [19].

2.4 Alcohol and other substances

Bioactive lipids may also play an important role in the IR of ALD. Diacylglycerol (DAG) and ceramide are two major lipid metabolites, among which DAG can induce IR by inhibiting the activation of IRS1/2 and Akt, while ethanol and metabolite acetaldehyde can increase DGA level [9,20], and ceramide can inhibit the transport and activation of Akt. Akt dephosphorylation was also significantly increased in alcohol-fed mice, and drug reduction improved steatosis, glucose intolerance, and insulin sensitivity [21].In addition, changes in circulatory cytokines and metabolites of intestinal dysregulation may be related to IR of ALD. Studies have shown that the intestinal permeability of patients with ALD is increased and the recovery rate is higher after oral polyethylene glycol [22].There is indirect evidence that long-term alcohol consumption can alter intestinal flora, and such changes may have systemic effects on glucose and fat homeostasis [23].Future studies can be combined with in vivo metabolic phenotypes, metabolomics and microbiome studies to clarify the specific relationship between intestinal flora and glucose and lipid metabolism in patients with ALD.

3.Summary and outlook

ALD is a disease with high morbidity and mortality. At present, little is known about the factors that promote the disease progression.IR is common in patients with ALD and increases the risk of advanced disease. In ALD patients, there are a variety of IR mechanisms that may lead to accelerated progression of the disease, including insulin signal transduction pathway and indirect influence on target protein, adipokines and fat mediators, thereby damaging signal transduction. Many experiments have shown that targeted insulin signal pathway can improve the disease pharmacologically. Therefore, the clinical application of insulin sensitizer and ALD is of great significance. In the current studies, a number of experiments have been conducted to regulate IR in ALD from the microRNA level, such as miR-378, miR-192, and miR27a, etc. [24]. In future studies, glycolipid metabolism and the biological and environmental factors that play a role in ALD can be further discussed. To find new therapeutic targets and provide a new basis for therapeutic methods and drug interventions.

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A Clinical Observation and Study on Prunella Vulgaris Decoction in Promoting the Repair of Chronic Infective Refractory Wounds

Zhiwei Zhao[1],*, Xiaoling Li[2], Zhuqing Zha[1], Bo Cui[1], Yanfeng Li[1]

1 Department of Hand Microsurgery, Luoyang Orthopedic Hospital of Henan Province (Orthopedic Hospital of Henan Province), Zhengzhou, Henan, 450016, China

2 Health Management Center, Luoyang Orthopedic Hospital of Henan Province (Orthopedic Hospital of Henan Province), Zhengzhou, Henan, 450016, China

Email: zhaozhiwei999@126.com

Abstract: Objective: To further study the clinical efficacy of prunella vulgaris decoction in promoting the repair of chronic infective refractory wounds, and analyze and evaluate the feasibility of this treatment. Methods: A total of 80 patients with chronic infective refractory wounds were screened out from a hospital from March 2020 to March 2021. The random sampling method was used to divide the patients into the experimental group and reference group. The experimental group was treated with prunella vulgaris decoction while the reference group was treated with routine wound dressing change. Wound repair rate, bacterial negative conversion rate, healing time and clinical comprehensive efficacy in the two groups were used as evaluation indexes in this study. Results: After different treatment, the conditions of the patients in the two groups were statistically analyzed. It was found that the wound repair rate, bacterial negative conversion rate and total effective rate of the experimental group were much higher than that of the reference group. In addition, the wound healing time in the experimental group was also significantly shortened compared with that of the reference group. Conclusion: Prunella vulgaris decoction bears obvious anti-inflammatory and anti-bacterial effects and can accelerate the speed of wound repair, which has great practical value in clinic treatment and prosperous prospect in future development and application.

Keywords: Prunella Vulgaris Decoction; Chronic Infective Refractory Wounds; Clinical Observation

1. Introduction

Chronic infective refractory wounds are common in internal medical clinics and surgical clinics, and it appeared an increasing incidence in recent years with the aggravation of population aging. Although the disease will not pose a great threat to the patients' life and health, it is difficult to cure, and patients often need to bear both physical and psychological trauma in the long run. At present, clinical treatment methods such as closed negative pressure suction technique combined with skin flap transplantation have improved the cure rate of chronic infectious refractory wounds to some extent, but the expensive operation costs will bring economic burden to the family. For this reason, it is of certain practical significance to innovate the treatment means with low cost, few side effects and significant curative effect. Thus the external washing technique of traditional Chinese medicine is highly praised for its above advantages. Prunella vulgaris was first recorded in Agriculture God's Canon of Materia Medica, and was widely used as an anti-

tuberculosis drug in the clinical practice of ancient Chinese medicine. With the continuous exploration of modern medical science and technology to Chinese medicine, it is found that prunella vulgaris has obvious inhibitory effect on staphylococcus aureus and mycobacterium tuberculosis. In addition, the active components of prunella vulgaris extract, such as prunella polysaccharide and prunella alcohol, have been widely used in clinical medical treatment. Now as the safe medication has become a common sense in the medical field, it has been the research hotspot to explore new medicine for antibacterial wound repair from traditional Chinese herbal medicine. This study will further explore the clinical therapeutic effect of prunella vulgaris in promoting the repair of chronic infective refractory wounds. The contents will be summarized and reported in the following sections[1].

2. Materials and methods

2.1 General data

A total of 80 patients with chronic infective refractory wounds were screened from a hospital from March 2020 to March 2021. Randomly sampling method was used to divide the patients into the experimental group and the reference group, with 40 cases in each group. The experimental group was treated with prunella vulgari decoction while the reference group was treated with routine wound dressing change. In the experimental group, there were 22 male patients and 18 female patients, aged from 22 to 55 years old, with an average age of (36.25±3.52) years old. In the control group, there were 21 male patients and 19 female patients, aged from 20 to 53 years old, with an average age of (35.98±3.39) years old. This study was submitted to the Medical Ethics Committee for approval. All the patients had no diseases which may affect the analysis results of the study except chronic infective refractory wounds. The detailed information was learned and the relevant agreement documents were signed. By comparing the data of age, gender and pathological conditions of patients in the two groups, there was no significant statistical difference (P>0.05).

2.2 Research Methods

Patients in both groups enjoyed routine nursing care at the initial stage of admission, and they were allowed to adapt themselves to the ward and surrounding environment in a short period to reduce experimental variables. After 1 day, the experimental group was treated with prunella vulgari decoction in the contrast with the reference group. The specific treatment measures are as follows:

2.2.1 Reference group

In the reference group, 50mL normal saline with 0.9% mass fraction was used to clean the wound. After the excess liquid was washed, Vaseline was applied to the wound, and the wound was fixed with sterile gauze and bandage. The frequency of dressing change was once a day for three consecutive weeks.

2.2.2 Experimental group

In the experimental group, the drug package made of prunella vulgari was selected to clean the wound through sterile syringe without additional treatment. The other steps were the same as those in the reference group. The preparation method of prunella vulgari decoction is as follows: 250g prunella vulgari flower ear (dry product) and water in the ratio of 1:3 are decocted by gentle fire with decocting machine to leach the medicinal juice, and then filter the drug residue and disinfect the liquid, and finally pour 50mL of medical juice into a vacuum packing bag to make a medicine bag.

2.3 Evaluation indexes

Wound repair rate, bacterial negative conversion rate, healing time and clinical comprehensive efficacy of patients in the two groups were regarded as the main evaluation indexes of this trial.

2.4 Evaluation criteria

The higher rate of wound repair and bacteria negative conversion, as well as more cases of wound healing and

shorter healing time all indicate that the curative effect of wound repair are developing toward a good direction.

According to the Criteria for Efficacy in Diagnosis of Diseases and Syndromes of Traditional Chinese Medicine issued by the State Administration of Traditional Chinese Medicine, the comprehensive clinical efficacy can be divided into four grades: well-healed, excellent effective, effective and ineffective. Well-healed: The scab on the surface of the wound was completely covered, without the phenomenon of pseudo healing. Excellent effective: wound surface area was reduced more than 75% without purulent secretions; Effective: wound surface area was reduced more than 25% but less than 75%, containing a small amount of purulent secretions; Ineffective: there was no change in the wound surface and no reduction in pain. The total efficacy rate is the proportion of the total amount of treatment subtracting ineffective treatment[2].

2.5 Statistical analysis

In this paper, the collected patient-related clinical data were processed and analyzed with the help of SPSS20.0 software, which not only saved the cost of manual calculation, but also improved the calculation accuracy and work efficiency. t was used to test, and ($\bar{x}\pm s$) was used to represent the unit of measurement. χ^2 was used to test and the counting rate was represented by probability %. If $P<0.05$, the difference was proved to be statistically significant.

3. Results

3.1 Comparison of wound repair rates between the two groups

After data collection and statistics, it was found that the wound repair rate of the experimental group was much higher than that of the reference group. See Table 1 for detailed data.

Table 1. Comparison of wound repair rates between the two groups [$\bar{x}\pm s$, %]

Group	7d	14d	21d
Experimental group（n=40）	36.1±24.8	49.5±28.6	70.1±23.6
Reference group（n=40）	0.5±11.3	5.9±20.8	11.3±41.4

3.2 Comparison of on wound surface between the two groups

After data collection and statistics, it was found that the bacteria negative conversion rate on the wound surface of the experimental group was significantly higher than that of the reference group, and the detailed data were shown in Table 2.

Table 2. Comparison of on wound surface between the two groups [n(%)]

Group	7d	14d	21d	Total negative conversion rate
Experimental group（n=40）	32（80）	1（2.5）	1（2.5）	48（97.5）
Reference group（n=40）	14（35）	16（40）	10（25）	40（75）

3.3 Comparison of wound healing time between the two groups

After data collection and statistics, it was found that compared with the reference group, the experimental group had more patients with wound healing, and the healing time was about 5 days faster than that of the reference group, indicating that prunella vulgari decoction has a significant effect on the clinical treatment and will accelerate the repair speed of chronic infective refractory wounds. See Table 3 for detailed data.

Table 3. Comparison of wound healing time between the two groups[$\bar{x}\pm s$]

Group	Cases	Healing time
Experimental group（n=40）	39	22.9±3.3
Reference group（n=40）	30	27.9±2.8
T value		-5.976
P value		0.000

3.4 Comparison of clinical comprehensive efficacy between the two groups

After data collection and statistics, it was found that the total effective rate of the experimental group was significantly higher than that of the reference group, and the detailed data were shown in Table 4.

Table 4. Comparison of clinical comprehensive efficacy between the two groups [n(%)]

Group	Well-healed	Excellent effective	Effective	ineffective	Total efficacy rate
Experimental group （n=40）	6（15）	32（80）	1（2.5）	1（2.5）	48（97.5）
Reference group(n=40)	0（0）	14（35）	16（40）	10（25）	40（75）

4. Discussion

The etiology of chronic infective refractory wound is complicated, and it is easy to occur repeatedly. The incidence of chronic infective refractory wound is increasing year by year in clinical treatment, whose treatment is quite difficult. In the process of wound healing, hypoxia, infection, malnutrition and other conditions will delay the speed of wound healing. Although modern medical technology can effectively improve the cure rate, the burden of medical expenses is still heavy for patients. According to the survey statistics, the proportion of chronic infectious refractory wounds in surgical inpatients is about 1.5% to 3.0%, and the proportion of traumatic infections is as high as 67.5%, which is much higher than other types. In addition, under the current medical environment, there are many drug-resistant pathogenic bacteria strains, which made the situation even more serious. Therefore, how to realize symptomatic prevention and treatment, maximize the curative effect in the treatment process and guarantee the cost of drug use, has become an urgent problem for every clinician to consider.

Prunella vulgari belongs to a kind of Chinese herbal medicine. Since ancient times, it has been used to dispel heat and improve eyesight, as well as diffuse swelling. In recent years, with the advancement of the research and analysis on the chemical components and pharmacological effects of prunella vulgari in the medical field, prunella vulgari has been applied in clinical medicine from a brand-new perspective. In modern studies, it is known that prunella vulgari has obvious anti-tumor, anti-inflammatory, anti-bacterial, immunomodulatory and anti-oxidation effects. Compared with western medicines, Prunella vulgari does not produce too many toxic and side effects, especially in the case of antibiotic abuse, which has certain practical significance. This study shows that wound repair rate, bacterial negative conversion rate, the clinical total efficacy rate of the experimental group were higher than those in reference group, of which the rate of wound repair and bacteria negative conversion will be more apparent and the treatment effect will be greatly improved with the passage of the treatment time. And this may have a close relationship with the anti-inflammatory effect of prunella vulgari, which can inhibit the growth of bacteria of the trauma and provide a good environment for the growth of granulation, thus accelerating the wound healing. From the final observation results, the conditions of patients

treated with prunella vulgari decoction was better than those treated with conventional treatment both in cured cases and healing time, which proved that that prunella vulgari decoction had a certain positive effect and application value in the treatment of chronic infective refractory wounds.

In conclusion, prunella vulgari decoction has obvious anti-inflammatory and antibacterial effects and can accelerate the speed of wound repair, which has great practical value in clinic treatment and prosperous prospect in future development and application.

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Effect of Tibetan Compound Wuwei manna bath on langxiu disease

Li Mao Cuo

China Tibetology Research Center, Beijing 100101，474427115@qq.com

*Abstract:*Objective To observe the effect of Tibetan Compound Wuwei manna bath in the treatment of langxiu disease. Methods 96 patients with "langxiu" disease in our hospital from January 2020 to January 2021 were randomly selected for the study, according to the computer random method, 48 cases were divided into a group and group B were treated with Tibetan medicine compound five flavor manna bath. Then the therapeutic effect and adverse reactions of the two groups were compared. Results: after treatment, the treatment effect of group B was better than that of group A, and the incidence of adverse reactions of group B was lower than that of group A. $P < 0.05$；Conclusion: the patients with langxiu disease were treated with Tibetan medicine compound Wuwei manna bath,It can effectively improve the treatment effect and reduce the occurrence of adverse reactions, which is worthy of wide promotion and application.

*Key words:*Tibetan medicine compound Wuwei manna bath Langxiu disease; Treatment effect;

introduction

Langxiu disease is a kind of skin disease, including some dermatoses in western medicine, such as tinea corporis, tinea flavum, psoriasis, pityriasis rosea, ichthyosis and so on, it is a recurrent and intractable skin disease caused by many factors. The main manifestations are as follows: the skin is as hard and rough as the neck skin of cattle, accompanied by silvery white scales, skin itching, skin burning, skin pain, skin dryness and bleeding, etc, some patients may have joint swelling, pain and other conditions at the same time, and the metabolic syndrome such as dyslipidemia and abnormal blood glucose in patients with severe condition will increase the risk of cardiovascular disease induced by patients [1]. The Tibetan medicine compound Wuwei manna bath is one of the external therapies to achieve the therapeutic effect by directly contacting the skin lesions, it is made of Rhododendron, ephedra alpina, Lactuca sativa, water cypress twig and other medicinal materials through the special processing of Tibetan medicine, fermentation, degradation of harmful components and other processes, so that Wuwei manna has great efficacy. Wuwei Manna is the base drug, on this basis, it is boiled by adding musk, yellow water three drugs and other medicinal materials. After the manna juice is diluted and cooled, it can be used as a medicine bath, the specific implementation methods and results are summarized as follows.

1 data and methods

1.1 general information

Now 96 patients with "langxiu" in our hospital were randomly selected from January 2020 to January 2021 to carry out the study. 96 patients were divided into 48 patients in group A, aged 22-58 years, and the average age was 35.51 ± 9.93) years old; The course of disease was 1.5-5 years; Average course of disease (3.41 ± 1.23) 43 cases in group B, aged 23-59 years, average age (36.43) ± 9.89) years old; The course of disease was 1.4-4.9 years; Average

course of disease (3.42 ± 1.53）。 There was no difference between the groups (P > 0.05).

Inclusion criteria [2]: (1) patients with "langxiu" disease were diagnosed according to "blue glaze"（2) No other drugs were used for treatment within one month. (3) explain the situation to the patients and their families, and the patients or their families sign the informed consent.

Exclusion criteria [3]: (1) patients with communication barriers (2) Accompanied by other visceral diseases, such as heart, liver, kidney, and other skin diseases (3) Pregnant and lactating women

1.2 method

The patients in group A were given conventional treatment, and the specific operation methods were as follows: patients were given calcipotriol betamethasone ointment (manufacturer: Leo Chemical Pharmaceutical Co., Ltd., Guoyao Zhunzi h20130439) for treatment, and they were smeared once a day before going to bed for one month. The patients in group B were treated with seamless nursing mode，First of all, Rhododendron, ephedra alpiniana, Lactuca sativa, water cypress and other medicinal materials were processed and fermented. After boiling, they were placed in the environment of 10-15 degrees. After cooling, they were stored in the temperature of 20 degrees. After 2-3 days, they were treated specially. When treating patients, they should be heated first, According to the tolerance of each person, the temperature starts from 37-39 ℃ in the form of parabola, once a day, 20 minutes each time, seven days as a course of treatment. The temperature reaches the highest 43-45 ℃ on the fourth day, and then begins to fall back. On the seventh day, the temperature is the same as that on the first day. After completing the first course of treatment, rest for three days, and then start the second course of treatment, A total of three courses of treatment, a period of one month[1].

1.3 observation indexes

After nursing, the treatment effects of the two groups were compared (the clinical symptoms of the patients were significantly improved, the skin damage was reduced by about 70%, and there was no adverse reaction, in order to be effective, the clinical symptoms of the patients were improved, the skin damage was reduced by about 45%, and there was no adverse reaction, in order to be effective, the clinical symptoms of the patients were not improved, the skin damage was not reduced, and there were adverse reactions, The incidence of adverse reactions and adverse reactions[2].

1.4 statistical analysis

The software spss25.0 was selected as the tool, and t-test was used for the measurement data （ ± s) Expression; Count column 2 test, (n,%) indicates. P < 0.05, with statistical significance.

2 Results

2.1 comparison of therapeutic effects

After treatment, the treatment effect of group B was better than that of group A (P < 0.05),

Table 1. Therapeutic effect n (%)

group	Remarkable effect（n）	Effective（n）	invalid（n）
Agroup（n=48）	10（20.83）	30（62.50）	8（18.60）
Bgroup（n=48）	37（77.08）	11（22.91）	0（0.00）
c2 value	30.388	15.369	8.727
P value	0.000	0.000	0.000

2.2 comparison of adverse reactions

After treatment, the incidence of adverse reactions in group B was lower than that in group A (P < 0.05),

Table 2. Incidence of adverse reactions% (n)

group	skin Itch（%）	Slight burning sensation（%）	Folliculitis lesions（%）
Agroup（n=48）	10.41（5）	8.33（4）	6.25（3）
Bgroup（n=48）	0.00（0）	0.00（0）	0.00（0）
c2 value	11.676	9.121	6.685
P value	0.001	0.003	0.000

3 discussion

Langxiu disease is a kind of chronic inflammatory skin disease, which can be divided into three types according to its clinical manifestations: lung type, Chiba type and bacon type; Heat type and cold type; Mild type, moderate type, moderate type and other different classification methods, and this kind of disease has a long course, and is easy to relapse, which has adverse effects on the physical condition and mental state of patients. Clinically, it is mainly treated by drugs and physical therapy. Calcipotriol betamethasone ointment is composed of calcipotriol and betamethasone dipropionate, Although it can alleviate the patient's condition, the treatment effect is not obvious, and it will also cause some adverse reactions. Therefore, we propose to apply the Tibetan medicine compound Wuwei manna as the base drug in the treatment of "langxiu" disease. And there is no adverse reactions, drug safety is high, so the application of Tibetan medicine compound Wuwei manna bath in the treatment of patients with "langxiu" disease, will not have adverse effects on the patient's body, more conducive to the patient's health, improve their quality of life[3]. To sum up: Tibetan medicine compound Wuwei manna bath, can effectively alleviate the patient's condition, improve the treatment effect, and no adverse reactions, has high clinical application value, is worthy of wide use.

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Study on the Effect of PIWIL2 Expression on EMT of Breast Cancer Stem Cells and Its Mechanism

Haiying Liu,Yan Liu,Fang Shan

Hexi college,Zhangye City, Gansu Province   734000;Email:303803760@qq.com

Abstract: Objective: This study mainly elaborated the specific molecular mechanisms of breast cancer metastasis and EMT, which has important clinical value in judging the prognosis and treatment of breast cancer patients. Methods: A total of 493 patients with breast cancer were studied. The expression of PIWIL2 gene was analyzed by immuno-histochemistry and section analysis, and the correlation between gene expression and clinicopathological parameters and prognosis of the patients was investigated. TGF-β1 was used to induce breast cancer cells, and EMT model was constructed at the same time to compare the changes of EMT model cells in the control group and obervation group. The expression of PIWIL2 gene in EMT model was detected by Western bloting. After transfection and RNA interference, PIWIL2 expression was silenced. At the same time, the morphological changes of the cells after the reduction of PIWIL2 gene expression were observed through microscope. The gene changes related to EMT were detected by RT-PCR and Western bloting. The expression of PIWIL2 gene was decreased by invasion test. And the expression of breast cell invasiveness and other related expressions such as MMP-13, MMP-9, VEGF shall also be decreased. The effect of MAPKERK and P13K/AKT pathway on the regulation of PIWIL2 expression was studied by obseving the cellular mophology through the microscope. And RT-PCR and Western bloting were used to detect the expression, including Snail, Vimentin and SIug. The effects of PIWIL2 and the downstream transcription factor SIug in ER pathway in breast cancer cells were analyzed by light microscopy, RT-PCR, Western bloting and Transwell invasion experiment. Results: PIWIL2 expression was negatively correlated with its survival rate in estrogen receptor a negative patients, while was not directly related to estrogen receptor positive patients. After the induction of TGF-β1 in MCF-7 breast cancer cells, the cells were spindle shaped and would lose the intercellular adhesion. With the development of EMT, the inhibition of PIWIL2 gene expression would block the effect of TGF-β1 on EMT in MCF-7 cell lines. The changes of EMT-re-lated genes expression can be shown by RT-PCR and Western Bloting. SiRNA sclienced the Piwi12 expression, which will decrease the cellular invasiveness. At the same time, such matrix metalloproteinase as MMP9 and MMP13 and the mRNA transcription vascular endothelial growth factor was significantly down-regulated. After silencing the expres-sion of SIug, all EMT of TGF-β1 gene will be inhibited, and the estrogen a signal pathway can inhibit the expression of PIWIL2 and the downstream transcription factor SIug. Slug is a common downstream transcription factor of estrogen a and PIWIL2, which also serves as an important bridge connecting estrogen a and Piwi12. It can accept Piwi12 and estrogen a to inhibit or stimulate signals, and then effectively regulate the EMT of breast cancer cells. In addition, ER signal can also participate in the expression of Piwi12 and antagonize Piwi12 to promote EMT.
Keywords: PIWIL2; Breast Cancer Stem Cells; EMT Mechanism

1. Introduction

Invasive breast cancer, as a malignant tumor, will greatly affect the health of patients with a incidence of 8%. In recent years, the number of breast cancer patients in China has gradually increased. After standardized surgical treatment and radiotherapy, the mortality rate of breast cancer patients still reached 15%. For breast cancer patients, cell metastasis is the direct cause of death, so an in-depth exploration on the metastasis mechanism of breast cancer cells is of great significance for clinical cure and treatment[1]. EMT refers to the epithelial cells which will lose the polarity after patial stimulation and the adsorption and tight connection between cells, thus obtaining the ability of migration and infiltration, which is specifically manifested as interstitial characteristics, and is also the morphology of embryonic development[2]. In clinical practice, epithelial cells can obtain mesenchymal cell activity through EMT, and after losing the polarity of epithelial cells, maternal cell-like symptoms will appear, and then first migrate to the epithelial cortex and enter the mesoderm to form different tismoids, and further participate in embryonic development. At the same time, it can also participate in tissue regeneration, fibrosis, tumor metastasis, and play an important role in distant metastasis of tumor cells as well as in-situ metastasis and invasion.

2. Expression significance of PIWIL2 in clinical specimens

2.1 Research materials and methods

In this study, 493 patients with breast cancer, were selected as research objects, with an average age of 45 years. The patients chosen were those who did not receive radiotherapy, chemotherapy, or endocrine therapy before surgery. The reagents and drugs used include 3% hydrogen peroxide, PIWIL2 antibody, and DBA chromogenic agent. The instruments used include thermostat, slicer, microscope, refrigerator and so on. In this study, sections were prepared by immunochemical staining of genes, and were stained to evaluate the PIWIL2 protein. The staining range and intensity of the protein could be divided into 3 levels: when the index of PIWIL2 staining coefficient was greater than 8, it represents high expression; and when the staining coefficient of PIWIL2 staining protein was 0, the expression was negative; and when the staining coefficient of PIWIL2 protein was 1-7, it represents low expression.

2.2 Research results

Among the above 493 breast cancer tissue sections, 278 cases of invasive breast cancer tissues showed weakly positive and negative in negative in PIWIL2 protein, which referred to low expression; while 215 cases of breast cancer tissue sections showed strongly positive, which reffered to high expression. The positive expression was found in the nucleus of tumor cells (see Figure 1).
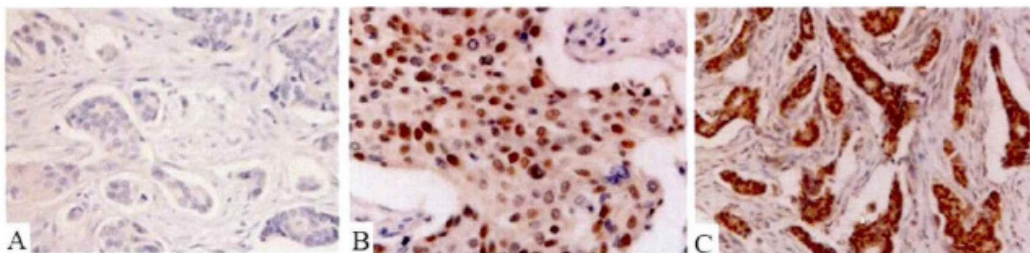

Figure 1. Expression of Piwil2 protein in invasive breast carcinoma

As is shown in the above figure, PIWIL2 protein is weakly positive and negative in breast invasive carcinoma tissues, and its expression level is low. Thus we can infer that the PIWIL2 protein expression is related to the parameters of breast invasion. According to different demerit points, the patients can be grouped into postmenopausal group and premenopausal group in combination with the pathological parameters of breast cancer or according to the menstrual state of the patients[3]. According to tumor size, they were divided into two groups: one group is tumor size less than 2

cm and the other is tumor size more than 2 cm; according to lymph node metastasis, they were divided into negative group and positive group; according to tumor histology, they were divided into group 1, group 2 and group 3. The results showed that the high expression of PIWIL2 protein is associated with the expression relationship, tumor analysis, distant metastasis, and cytological grade of HER2 and ER, while having no significant relationship with the tumor size, age, menopausal status, lymph node status, and clinicopathological indicators of the patients. In the tissue samples of 463 breast cancer patients without distant metastasis, their PIWIL2 expression was negatively correlated with their survival rate.

3. Establish EMT model and analyze the regulatory effect of PIWIL2 in EMT

3.1 Research materials and methods

In this study, breast cancer MCF-7 cell lines were selected for existing culture, which are cultured in a carbon dioxide incubator at 37℃. At this time, cells could be adherent culture and growth reagents including fetal bovine serum, DMSO and 0.25% trypsin, distilled water, Slugj antibody, Snail antibody, PIWIL2 antibody, PVDF membrane, chemical luminescent agent, etc. can be used to promote the adherent culture. The instruments used include cell counting board, super table, electronic balance, ordinary refrigerator, microscope, etc. In the specific operation, cell culture was required, including resuscitation of cells, cell passage, induction experiment, cell protein extraction after cell collection, RNA extraction by Matrigel experiment and RT-PCR.

3.2 Research results

The following figure (Figure 2) shows the cellular morphology of MCF-7 cells induced by TGF-β1. According to the results, it can be found that, compared with the control group, the cell morphology of MCF-7 cells can be significantly changed after 48 hours with 5ng/mlTGF-β1. The whole cell presents long spindle type, and the cells are relatively scattered, and the adhesion between cells is lost, which are characteristic changes of EMT. After adding 5ng/MTGF-β1 treatment, the most obvious changes of cell morphology were 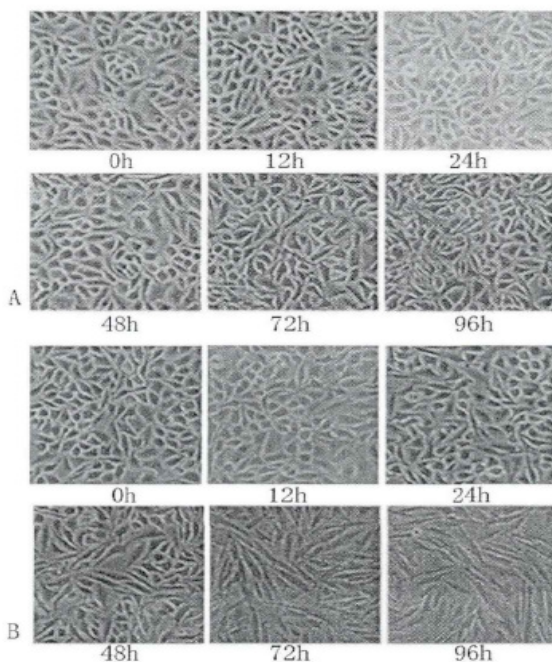observed 96 h later. To verify the presence of EMT, the expression of related proteins can be detected by Western Bloting, as is shown below.

Figure 2. Cell morphology of MCF-7 cells induced by TGF-β1

As can be seen from the above figure, 72h after treatment with LTGF-β1, the expression of E-cadherin and E-acdherin epithelial cell marker protein decreased, both of which are closely associated with EMT and can be considered as characteristic changes of EMT. In addition, the expression levels of nuclear transcription factors Slug, Snail and Fibronecitn significantly increased, which was consistent with the characteristics of EMT, while the expression levels of PAAWI L2 were not significantly changed. The effect of silencing PIWIL2 on key indicators of EMT can be achieved by silencing PIWIL2 expression through SiRNA. After TGF-β1-induced EMT-related gene detection, the cell morphology was observed by microscope. The results are as follows. When dealing with 5ng/mlTGF-β1, the expression of E-cadherin and the epithelial marker protein E-acdherin will reduce after 72 h, both of which are closely associated with EMT and can be considered to be characteristic changes of EMT. In addition,

the expression levels of nuclear transcription factors Slug, Snail and Fibronecitn were significantly increased, which was consistent with EMT characteristics, while the expression levels of PIWIL2 were not significantly changed. The effect of silencing PIWIL2 on key indicators of EMT can be achieved by silencing PIWIL2 expression through siRNA. After EMT-related gene detection induced by TGF-β1, the cellular morphology was observed through microscope. The results are as follows. After induction by TGFβ1 at 5 ng/ml for 48 h, MCF7 in breast cancer will exhibit the morphologic changes of the characteristics of EMT, with cells in long shuttle type and will lose the cellular adhesion. Western bloting was used to detect EMT-related gene expression. The results showed that Vimentin and Snail expression in MCF-7 cells were increased 48 h after stimulation with TGF-β1 per milliliter. At the same time, the expression level of E-cadherin was decreased, and there was no significant change in the expression level of PIWIL2, which was consistent with previous studies. Inhibition of PIWIL2 expression by siRNA can reduce the expression of PIWIL2, and decrease the expression levels of plasmid protein Vimentin, Fibroectin, nuclear transcription factors Slug and Snail. Compared with TGF-β1 group, the expression level of E-cadherin increased. But it was significantly lower than the control group. The results of RT-PCR showed that after induced by TGF-β1 for 48 hours, Piwi12 transcription was not significantly changed, while E-cadherin transcription decreased, and E-cadherin transcription was significantly increased after silencing of Piwi12 gene, indicating that Piwi12 gene expression was silenced, which will inhibit the effect of EMT induced by TGF-β.

4. Regulation mechanism of ERE signal and Piwi12 on EMT

4.1 Research materials and methods

The reagents used in this study include DMSO, transforming growth factor, PIWIL2 antibody, and 0.25% trypsin. The equipment used include electronic balance, cell culture flask, adjustable pipette, electrophoresis equipment, ordinary refrigerator, electrotransfer membrane meter, digital display PH meter, high speed refrigerated centrifuge, etc. In the specific operation, cell proteins were extracted, and liposome-mediated eukaryotic cells were detected by Western Blotting. After transfection of PIWIL2 gene, RNA was extracted and analyzed by RT-PCR.

4.2 Research results

PIWIL2 canal was transiently transfected into MCF-7 cell lines to overexpress PIWIL2 expression in cells by RT-PCR, as is shown in the following figure (Figure 3).

According to the results, the transcription level of mRNA in PIWIL2 was significantly increased after the transfection of PIWI12 cDNA in MCF-7 cells. At the same time, the transcription of Mrna in Slug also increased. Silencing the expression of Piwi12 gene with siRNA can reduce the expression of Slug. Combined with previous studies, it was found that Piwi12 expression in breast cancer samples without distant metastasis was negatively correlated with disease-free survival rate and overall survival rate, and this correlation was directly related to ER expression. In ER negative patients, the expression of Piwi12 gene was inversely proportional to the survival rate of patients, while not directly relating to ER positive patients. Therefore, it can be inferred that ER signal is correlated with Piwi12 expression and biological activity. Western Bloting results showed that the transcription of MCF-7 in breast cancer could further increase the expression of Piwi12 gene while reducing the expression of E-cadherin and increasing the expression of vimentin and Fibronectin. It is proved that Piwi12 can promote the occurrence of EMT.

After E2 activates the ER pathway, the expression of Slug and PIWIL2 will be restricted, while the expression of E-cadherin is up-regulated, the
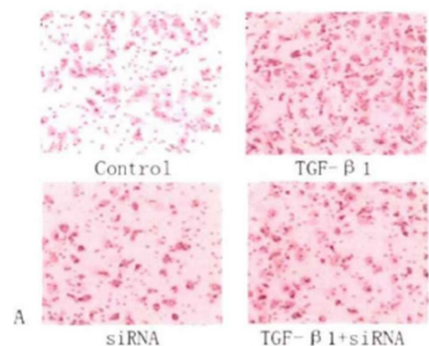

Figure 3. The overexpression of PIWIL2 by RT-PCR when transiently transfecting into MCF-7

expression of vimentin and Fibronectin will decrease. In addition, the transcription of Slug, E-cadherin and PIWIL2 is compared by RT-PCR, and the results show that the transfection level of PIWIL2 gene and the Slug transfection will reduce correspondently. E-cadherin, as an indicator of EMT epithelial gene, when increasing its transcription level, it will indicate that E2 or ER signals could effectively antagonize PIWIL2 and promote EMT generation. As PIWIL2 regulates EMT, ER can participate in it. According to the combined study, the downstream gene of PIWIL2, Slug, is also a co-transcriptome of EMT. It is speculated that the PIWIL2 gene plays an important role in the participation of ER signal, and in fact, the Slug gene can be silenced by Slug transfer into the molecule, as shown in the figure below. The expression of Slug gene was inhibited, which would decrease the expression of PIWIL2. In addition, EMT is an important part-time indicator, which can decrease the gene expression of Fibronectin and Vimentin, and meanwhile increase the transcriptional expression level of E-cadherin in epithelial gene indexes. Combined with RT-PCR results, it was found that the transcription level of E-cadherin in TGF-β1 group was decreased, while the transcription level of Slug was increased. After the silencing of Slug gene, the transcription of E-cadherin wil significantly increase compared with that in TGF-β1 group.

4.3 Disscussion and conclusion

In combination with studies, it was found that long-term exposure to E2 would increase the incidence of breast cancer in patients with different cancer-promoting effects, and ERA was considered to have a negative correlation with metastasis and invasion of breast cancer cells[4]. At the same time, ERA is also an independent prognostic factor of breast cancer. Negative expression of ERA will lead to poor prognosis of patients, with different effects for different patients. When patients with positive breast cancer receive post-operative anti-estrogen therapy, their cancer sells may inhibit metastasis during breast cancer treatment by antagonizing[5]. Analysis of ERA signal pathway to understand the relationship between breast cancer cell metastasis and ERA signal can provide a reference for clinical treatment. Finally, the study showed that in breast cancer cells, the expression of PIWIL2 gene was inversely proportional to the overall survival of patients. Therefore, PIWIL2 can be used as an important marker of biological behavior of breast cancer invasion, which is closely related to the prognosis of breast cancer patients. It also indicates that the expression of PIWIL2 itself and downstream transfer factors as well as biological activity are regulated by ER signal pathway.

In conclusion, this paper analyzed the specific role and regulatory mechanism of PIWIL2 in breast cancer. As a nuclear transcription factor, PIWIL2 can accept TGFβ-induced signals and control the invasion and metastasis of breast cancer cells by mediating the expression of various downstream transcription factors and related proteins. EMT is a prerequisite for breast cancer metastasis, which is also an important link of cancer cell metastasis and plays a role in the expression of PIWIL2 gene in breast cancer. TGFβ-induced EMT process can be limited by down-regulating PIWIL2 expression. However, due to the relatively complex processing mechanism of EMT, further investigation is needed to improve the conclusion.

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MicroRNAs and Lipid Metabolism

Jun Lu

Guilin Medical University,Guangxi Guilin 541199, Email address：lujun@stu.glmc.edu.cn

Abstract: Lipid metabolism is closely related to the occurrence and development of various diseases, and microRNAs, as important post-transcriptional regulatory factors, are involved in various biological processes of adipocyte differentiation and lipid metabolism to regulate lipid metabolism. In this paper, the effects of miRNAs on adipocyte differentiation, lipid synthesis, decomposition and transport reported in recent years are reviewed, with the hope of promoting the mechanism of microRNA in lipid metabolism disorders.
Key words: Lipid, Metabolism, MiRNAs

Introduction

Lipid metabolism is one of the three major metabolisms of the body, which is of great significance for the maintenance of energy, physiological function and regulation of the body. The regulatory process of lipid metabolism is mainly related to the formation and differentiation of adipocytes, lipid synthesis, decomposition and transport. MicroRNAs (miRNAs for short) are endogenous, highly conserved single-stranded non-coding RNAs with a size of about 18-25 nucleotides. Since the discovery of miRNAs[1], their relationship with diseases has attracted increasing attention. Up to now, miRNAs have been proved to be involved in many complex physiological processes in organisms, such as lipid metabolism. Oxidative stress. Current studies have found that miRNAs are closely related to various processes of lipid metabolism.

1.MiRNA and adipocyte differentiation

At present, it is generally believed that adipocytes are gradually differentiated from mesenchymalstem cells (MSC) from the mesoderm, through APC, preadipocytes, immature adipocytes, and finally mature adipocytes.Many studies have shown that adipocyte differentiation regulates lipid metabolism,and microRNAs[2] seem to play an important role in adipocyte differentiation.

Asha [3] reported the role of miR-26 family (miR-26a-1, miR-26a-2 and miR-26b) in regulating the differentiation of adipocytes into new adipocytes and adipose tissue quality. In vivo experiments, mice were deletions of all miR-26 coding sites in vivo, resulting in significant dilation of adipose tissue in adult animals fed a normal diet. In contrast, overexpression of miR-26a in mice protected the mice from high-fat diet-induced obesity.

Xu[4] found that miRNA-16-5p was significantly up-regulated during the differentiation of 3T3-L1 preadipocytes to mature adipocytes, and the overexpression of miRNA-16-5p led to the promotion of mature adipocyte-specific gene expression and fat droplet accumulation in vitro and in vivo.EPT1 was also identified as the target gene of miRNA-16-5p.Martinelli[5] showed that miR-519d specifically and in a dose-dependent manner inhibited the translation of PPARA protein and increased lipid accumulation during preadipocyte differentiation. The 30-UTR of PPARA contains a putative miRNA binding site that has been shown to bind specifically to miR-519d.

Zhang [5] pointed out that miRNA-200a plays an important role in promoting adipocyte differentiation in yaks in their study on the relationship between miRNAs and adipocyte differentiation in domesticated yaks, and miRNA-200a

can also lead to lipid accumulation in transfection adipocytes. The results also showed that miR-200a increased the expression of adipocyte-specific genes such as PPARγ, ELVOL and C/EBPα.

2. MiRNAs and lipid synthesis

Lipid mainly includes fats, sterols and lipids, while fats refer to triglycerides, which are synthesized by a molecule of glycerol and three molecules of fatty acids. Triglycerides account for the vast majority of human lipids. Triglyceride molecules represent the main form of storage and transport of fatty acids in cells and plasma. Liver [6] is the central organ of fatty acid synthesis. Fatty acids accumulate in the liver through uptake by liver cells from plasma and de novo biosynthesis.

MiR-122 is not only the first known miRNA to regulate lipid metabolism, but also a tissue-specific miRNA. Systemic or liver miR-122 deletion showed significant reductions in serum total cholesterol and triglyceride levels. Anti-miR-122 therapy resulted in a significant reduction in K-circulating cholesterol levels (25%-30%), suggesting that miR-122 may directly regulate cholesterol synthesis [7]. Chofit Chai [8] analyzed the activity of miR122 promoter, and verified its target mRNA by using luciferase reporter gene, and verified human AGPAT1 and DGAT1 mRNAs involved in triglyceride synthesis as miR-122 targets. Interestingly, miR-370 also affects lipid synthesis and has similar effects to miR-122. However, unlike miR-122, which directly regulates cholesterol synthesis, miR-370 plays a role mainly by modifying the expression of miR-122.In addition, miR-33a has also been proved to regulate cholesterol synthesis through targeting relationships [9].

Stearyl coenzyme A desaturase 1 (SCD-1) is A delta-9 fatty acid desaturase that catalyzed the synthesis of monounsaturated fatty acids [10].Cheng[11] verified the targeting of SCD-1 and miR-125b by bioinformatics analysis and dual luciferase method, and demonstrated the relationship between the targeting relationship of the two and lipid metabolism in vivo and in vitro. Overexpression of miR-125b decreased lipid droplets and triglyceride concentration accumulation, and inhibited SCD-1 protein expression and MUFA composition. The miR-125b inhibitor had the opposite effect. Small interfering RNAs tested in adipocytes further demonstrated a direct correlation between miR-125b and SCD-1.Himanshi Bhatia[12] showed that miR-107 inhibits fatty acid synthase FASN level by binding to its 3'UTR, and this interaction promoted ER stress induction and lipid accumulation in HepG2 cells and primary liver cells.

LXR activates and induces the expression of adipogenic genes, thereby promoting hepatic steatosis and steatohepatitis. After RNA-seq, mass spectrometry and bioinformatics analysis, Lei Fan[13] explored the relationship between miR-552-3p and lipid metabolism through in vivo experiments, and the results showed that miR-552-3p in the nucleus could regulate the transcriptional activity of LXRα and regulate lipid metabolism by binding to the complementary sequence of AGGTCA. Zhong[14] also found that miR-1/miR-206 has a similar regulatory relationship with LXRα

3. MiRNA and lipid decomposition

Lipid decomposition refers to the oxidative decomposition of fatty acids, cholesterol and triglycerides in the body [15].Catabolism of triglycerides, also known as fat mobilization, refers to the breakdown of triglycerides into fatty acids and glycerol under the action of hormone-sensitive triglyceride lipases in adipocytes and their release into the blood for oxidation by other tissues. Oxidative decomposition of fatty acids [16] refers to the β-oxidation of various fatty acids in mitochondria directly or after oxidation. In addition, fatty acids can be eliminated by secreting them into plasma via very low-density lipoprotein (LDL), which is rich in triglycerides. The main metabolic way of cholesterol in the body is to produce bile acid through oxidation in the liver [17], which is excreted with bile, and the daily excretion accounts for about 40%-50% of cholesterol synthesis.

MiR-378/378* is highly expressed during adipogenesis. Zhang[18] found that miR-378 significantly increased in fatty liver of diet-obese mice and human hepatocellular carcinoma HepG2 cells with accumulated lipids. Further studies identified NRF1 (nuclear receptor factor 1) as a key regulator of fatty acid oxidation (FAO) and as a direct target of

miR-378.and its ASO (antisense oligonucleotide) knockdown of miR-378 improved FAO and reduced intracellular lipid content in HEPA1-6 cells.

Mattis [19] found that after injecting miR-29a antisense oligonucleotide in mice, triglyceride accumulation in liver increased, and after being treated with LPL antisense oligonucleotide, triglyceride accumulation decreased, suggesting that miR-29a may reduce triglyceride accumulation by inhibiting LPL. After miR-29a was inhibited, the expression levels of LPLmRNA and protein were significantly increased, and the accumulation of triglyceride and cholesterol were significantly increased, suggesting the relationship between the binding of miR-29a and LPLmRNA and lipid decomposition in fatty liver mice. It is worth mentioning that Yang[20] found that miR-29b homologous to miR-29a also has a similar effect in binding to LPL targeting.

MiR-122 is not only involved in the synthesis of cholesterol in liver, but also closely related to the oxidative decomposition of fatty acids. Inhibition of miR-122 expression could enhance the activity of PMVK, increase the β-oxidation of fatty acids and promote the decomposition of fatty acids. Gatfield [21] indicated that miR-122 can directly act on peroxisomal proliferator-activated receptor genes, which can be activated by fatty acids and exogenous peroxisomal proliferators to regulate the expression of enzymes involved in fatty acid decomposition and participate in fatty acid metabolism. After knockout of miR-122, PPARβ protein level was significantly increased and fatty acid content was decreased. Similarly, miR-30b [22] has also been proved to be involved in lipid decomposition and also acts on peroxisome proliferator-activated receptor genes.

4. MiRNAs and lipid transfer

Microsomal triglyceride transfer protein (MTP) was first identified as an endoplasmic reticulum (ER) resident protein that helps transfer neutral lipids to neonatal apolipoprotein B(ApoB)[34-36].ApoB-containing lipoproteins are macromolecular lipids and protein micelles that can be used as specialized transport vehicles for hydrophobic lipids.The secretion of lipoprotein into circulation is conducive to reducing lipid accumulation in tissues or organs [23].

Zhang [24] observed that the overexpression of miR-130b in HepG2 cells significantly enhanced the secretion of very low-density lipoprotein (VLDL) particles, enhanced glycerol metabolism-labeled triglyceride (TG), respectively. The over- expression of miR-130b significantly increased the mRNA and protein expression levels of microsomal triglyceride transfer protein (MTP). These results suggest that miR-130b has a potential role in promoting hepatic VLDL assembly and secretion by significantly stimulating MTP expression and TG mobilization.

Ma[25] verified the targeting relationship between microRNA-101-2-5p and ApoB by database target prediction and dual luciferase reporter gene, and analyzed the effect of miRNA on the expression of ApoB in 17β-estradiol-stimulated chicken embryo hepatocytes. Bioinformatics algorithm showed that there were two potential binding sites of miR-548p on human ApoB mRNA, and Zhou[26] cotransfected with miR-548p,After a series of verifications such as site-directed mutagenesis, it was also confirmed that miR-548p interacted with the 3' -untranslated region of human ApoB mRNA to enhance transcription. James Soh[27.28] demonstrated that miR-30c regulates the assembly and secretion of ApoB lipoproteins by regulating MTP activity, and this regulation requires interactions between miR-30c and MTP genes, including seed and complementary sequences [29].However, it is worth mentioning that other members of the miR-30 family are not targeted at MTP because they do not form the same complementary interactions.

Adenosine triphosphate binding box transporter A1(ABCA1) is a key transporter for cholesterol reversal. Bioinformatics analysis of the target ABCA1-3'UTR was conducted to search for conserved miRNAs, and it was found that miR-106b [30] could target ABCA1 binding. Moreover, in neural cell lines, miR-106b can reduce cholesterol flow to apoAI under both physiological and LXR stimulation. In addition, Zhisheng Wang et al. [31] detected 9 candidate differential miRNAs in plasma exosomes of 42 patients with coronary atherosclerosis, and found higher expression of miR-30e and miR-92a in the patients. After bioinformatics analysis and confirmation, It was proved that ATP binding box (ABC)A1 was the direct target of miR-30e and miR-92a, and miR-30e was negatively correlated with ABCA1 or cholesterol content.

5. Summary

In general, the regulation of lipid metabolism by miRNAs is a complex network regulation process, with overlapping targeting sites among different miRNAs, and related mechanisms of action involve the synthesis, metabolism and transformation of lipids such as cholesterol, triglyceride and fatty acids. The regulation of miRNAs on lipid metabolism is no single, but multi-directional. A miRNA has several target genes, and a gene may be regulated by multiple miRNAs simultaneously. MiRNAs constitute an extremely complex regulatory network in vivo, and these phenomena can reduce the importance of specific miRNAs in normal cell homeostasis. From the perspective of evolution, miRNA plays a role in regulating gene mutation during evolution, and its main role may be to "fine-tune" gene expression. However, even though miRNA has limited effect on many target mRNAs, the superposition of regulatory factors of the same biological process can result in enhanced expression of a phenotype. The complexity of miRNAs not only adds another layer of complexity to the molecular causes of modern human disease, but also opens up the possibility of miRNA-based treatment of disease.

There is no doubt about the role of miRNA in lipid metabolism. With the in-depth study of miRNAs, their regulation of lipid metabolism has been gradually revealed. At the same time, more and more miRNAs involved in the regulation of lipid metabolism pathway will be discovered. It provides a new idea for the treatment and prevention of many diseases.

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The Role of Positive Communication in Hospital Social Work Service

Junjie Dong, Li Liu, Yawen Yang

Department of Social Work, Kunming Children's Hospital, 650228, Kunming, China

*Corresponding Author: sanuyo@163.com

*Abstract:*Objective: To study the role of positive communication in the social work service. Method: 82 families who were treated and hospitalized in the hospital were studied through dividing them randomly into an observation group and a control group, each with 41 families. Specifically, the control group was provided with routine social work services, while the observation group involved positive communication by volunteers, medical workers and psychological social workers during services. Then, the satisfactions of both groups were compared. Result: Families in the observation group has significantly higher satisfactions in social work services than families in the control group. The difference is statistically significant (P<0.05). Conclusion: Using positive communication methods in hospital social work services contributes to effectively enhancing patients and their families' satisfactions of the social work service as well as the hospital.

*Keywords:*Doctor-patient communication; family members of patients; social work; positive psychology

Social work has been underlined by all parties and vigorously introduced into communities, schools and hospitals in recent years[1-3]. To be specific, social work practitioners at hospital are mainly composed of volunteers, medical social worker and psychological social worker. On the one hand, they assist patients to connect to social resources, such as applying for charity aid funds, and organizing volunteer activities; on the other hand, they also act as mediators between doctors and patients, facilitating patients and family members to undergo the outpatient and the period of hospitalization in a more comfortable manner through providing psychological counseling and spreading health knowledge with family members[3-5]. In that case, communication skills are essential for social workers who frequently communicate with patients and family members in the hospital. Apparently, positive communication is conducive to bridging the distance between people as well as to mitigating unpleasant experience [6-8]. Based on this, the ways of utilizing positive communication to clinical social work services and the consequent effects are discussed in this study.

1. Methods

1.1 Participants

82 families were selected from patients and their families who received services provided by medical social workers, psychological social workers and volunteer social workers in Kunming Children's Hospital from December 2019 to December 2020 with the family as a vital unit. Family selection criteria for the study include possessing the knowledge reserves required to participate in the questionnaire (graduated from primary school), physical condition (to be capable of filling out the questionnaire with clear thinking), psychological health, and being informed and agreeing to join the study, Of which, 41 families were regarded as the control group, while another 41 families as the observation

group. Precisely, the average ages of the child patients and the parents in the control group were 8.52±3.21 years, and 27.61±5.97 years, respectively. There are 21 males and 20 females in the control group. Besides, the average ages of the child patients and the parents in the observation group were 7.85±3.69 years and 26.92±5.13 years, respectively. There are 22 males and 19 females in the observation group. Differences in age and gender of families in both groups are not statistically significant (P>0.05).

1.2 Method

Families in the control group were treated with routine social work services, namely, social workers and volunteers communicate with the patients and their families in an ordinary manner. Besides, social workers and volunteers served the observation group with positive communication. Specifically, positive communication incorporates (1) active communication: Social workers and volunteers are proactive to communicate with patients and their families to know more about the difficulties and needs of the patients and their families, and assist patients and their families, as well as answer questions raised by patients and their families. In other words, social workers and volunteers take the initiative to communicate with patients and their families in the ward, and actively provide social work services in cooperation with the medical staff. (2) Maintaining a positive attitude: Social workers and volunteers shall always be positive in communication, maximize patience with neither complaints nor impatience, keep smiling, concern patients and their families from a positive prospective, and answer patients and their families' questions with positive words as well as avoid negative emotions in front of patients and family members. (3) Establishing a positive psychology: Social workers and volunteers shall also help patients and their families to establish a positive psychological state, instruct them to treat the disease positively, and provide psychological counseling and emotion comforting to families in stress periods, guide them to face the disease correctly, and maintain their hopes for the future[7-10].

Surveys concerning the satisfactions with social work service and hospital were conducted on families in both groups by the end of the social work service, so as to find out the difference between both groups through comparing data obtained.

1.3 Tools

Satisfaction with social worker service: A self-made social work service satisfaction questionnaire was used in the form of scores ranging from 0 to 10. The higher the score, the higher the degree of satisfaction would be witnessed. And the served family could score the personnel who provide social work services as well as the overall social work services via the questionnaire.

1.4 Statistics

Data are processed by using Microsoft SPSS 32.0. And data of the control group and the observation group are compared with the t test. Setting that the difference is statistically significant when P<0.05.

2. Results

2.1 Comparison of the satisfaction of families in the two groups with social work services

As can be observed from Table 1, the observation group with positive communication has higher satisfaction with social work services than the control group with routine services over the satisfaction with social workers and volunteers as well as the overall satisfaction. Hence, data difference is statistically significance (P<0.05).

Table 1 Comparison of satisfaction of families in the two groups with social work services ($\bar{x}$±s)

Group	Cases	Satisfactions of social workers and volunteers	Overall satisfaction with the social work service
Observation group	41	7.90±1.30	8±1.26
Control group	41	6.10±1.67	5.95±1.69
t value		3.92	4.45
P value		P < 0.05	P < 0.05

2.2 Comparison of hospital satisfaction between the two groups

As can be seen from Table 2, the observation group with positive communication has higher satisfaction with the hospital, departments and the social work team than the control group with routine services. Data difference is statistically significant (P<0.05).

Table 2 Comparison of hospital satisfaction between the two groups (±s)

Group	Cases	Hospital satisfaction	Dept. satisfaction	Satisfaction with social work group
Observation group	41	7.48±1.08	7.67±0.97	8±0.89
Control group	41	5.71±1.49	6.10±1.55	6.43±1.25
t value		4.39	3.95	4.69
P value		P < 0.05	P < 0.05	P < 0.05

3. Discussion

Performing the social work service in the hospital is beneficial to the hospital, departments, patients and their families. In particular, the implementation of positive communication has considerably enhanced patients and their families' satisfaction with the hospital. United volunteers consisting of medical social workers and psychological social workers serve patients and their families in the hospital, which can not only compensate for deficient communication between medical staff and patients and their families, alleviates doctor-patient contradictions, but also provide a new service model for patients and their families to release negative emotions during treatment. In this way, patients and their families can have a better medical treatment experience. In addition, medical social workers, psychological social workers, and volunteers providing services with positive communication methods can accomplish social work services effectively with half the effort, and accelerate the construction of humanistic hospitals, changing the hospital into a warm place. By doing so, hospitals can get more satisfactions from patients and their families, whilst patients and their families have a favorable medical treatment experience.

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