

Study on the Influence of Virus Infection on the Treatment Strategy of Rheumatoid Arthritis and Systemic Lupus Erythematosus

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Abstract: The purpose of this study is to explore the influence of virus infection on the treatment strategy of rheumatoid arthritis and systemic lupus erythematosus. In order to systematically explore the influence of virus infection on the treatment strategy of rheumatoid arthritis and systemic lupus erythematosus, our research adopts the methods of literature review, clinical trial, and data analysis. First of all, the literature on the relationship between rheumatoid arthritis, systemic lupus erythematosus, and viral infection will be comprehensively searched, and we will conduct in-depth analysis and evaluation. Secondly, clinical trials will be designed and implemented to verify the efficacy of the treatment strategy for viral infection on rheumatoid arthritis and systemic lupus erythematosus. Finally, the research results will be processed and explained by statistical analysis methods. Studies have shown that viral infection has an important influence on the treatment strategy of rheumatoid arthritis and systemic lupus erythematosus. For patients with rheumatoid arthritis, the prevention and treatment of viral infection may help to slow down the progress of the disease. For patients with systemic lupus erythematosus, the treatment strategy for viral infection may be helpful to improve the prognosis of patients. Our aim is to provide new ideas and methods for clinical treatment.

1. Introduction

Rheumatoid arthritis and systemic lupus erythematosus are common autoimmune diseases, and patients usually have joint inflammation and autoantibodies, leading to joint damage and systemic symptoms [1]. Although the pathogenesis of these diseases is not completely clear, many studies show that virus infection may be related to their pathogenesis [2-3]. In the past decades, more and more evidence shows that viral infection plays an important role in the pathogenesis of rheumatoid arthritis and systemic lupus erythematosus [4]. These findings provide a theoretical basis for the treatment strategy for viral infection and help to improve the therapeutic effect of rheumatoid arthritis and systemic lupus erythematosus [5]. However, previous studies mainly focused on the influence of viral infection on rheumatoid arthritis and systemic lupus erythematosus, and few

people paid attention to the influence of viral infection on the treatment strategies of these two diseases [6].

In this study, we deeply discussed the influence of virus infection on treatment strategy, so as to provide a basis for optimizing the treatment plan. Through experimental research on the subjects, we found that viral infection can increase the risk of rheumatoid arthritis, and the treatment strategy for viral infection may be of great significance to the treatment of rheumatoid arthritis and systemic lupus erythematosus. The purpose of this study is to explore the influence of virus infection on the treatment strategy of rheumatoid arthritis and systemic lupus erythematosus. Through this study, we hope to clarify the mechanism of virus infection on the treatment strategy of rheumatoid arthritis and systemic lupus erythematosus, and discuss the existing problems and challenges. At the same time, we hope to put forward the treatment strategy for rheumatoid arthritis and systemic lupus erythematosus infected by virus and provide new ideas and means for clinical treatment.

2. Basic pathogenesis of rheumatoid arthritis and systemic lupus erythematosus

Rheumatoid arthritis is a common autoimmune disease, characterized by chronic and inflammatory joint lesions. Although the exact cause of rheumatoid arthritis is not clear, some studies have shown that viral infection may play an important role in its pathogenesis [7]. For the pathogenesis of rheumatoid arthritis, some studies have shown that some viruses and influenza A virus may be related to the pathogenesis of rheumatoid arthritis. These viruses can stimulate the immune system to produce antibodies against autoantigens, which can lead to inflammation and joint injury [8]. In addition, cellular immune response also plays an important role in the pathogenesis of rheumatoid arthritis. These cells, including T lymphocytes, macrophages, and dendritic cells, play an important role in inflammatory reactions and joint injuries.

Systemic lupus erythematosus is an autoimmune disease, which can affect many organs and systems, including skin, joints, kidneys, blood, and the nervous system. Its pathogenesis is considered to be due to the comprehensive effects of heredity, environmental factors, and an abnormal immune system. Among them, virus infection is also considered as a possible environmental trigger. The pathogenesis of systemic lupus erythematosus is more complicated and heterogeneous. Patients with systemic lupus erythematosus often have genetic susceptibility to multiple genes, the most important of which are the human leukocyte antigen (HLA) gene and some non-HLA genes [9]. However, genetic susceptibility alone is not enough to cause diseases, and environmental factors such as virus infection also play a key role. Some studies have shown that some viruses may induce or aggravate the symptoms of systemic lupus erythematosus. These viruses can affect the body by direct infection, inducing autoimmune responses, or regulating immune responses. In addition, the interaction between genetic and environmental factors is also one of the important factors in the pathogenesis of systemic lupus erythematosus.

Generally speaking, the basic pathogenesis of rheumatoid arthritis and systemic lupus erythematosus involves many factors, including heredity, environmental factors, and abnormal reactions of the immune system. As an environmental trigger, viral infection may play a role in the pathogenesis of rheumatoid arthritis and systemic lupus erythematosus [10]. These findings contribute to a deeper understanding of the pathogenesis of these two diseases and provide ideas for future research and treatment strategies.

3. Study on the influence of virus infection on rheumatoid arthritis and systemic lupus erythematosus

In terms of treatment strategy, because virus infection may play an important role in the pathogenesis of rheumatoid arthritis and systemic lupus erythematosus, the treatment strategy for

virus infection is of great significance in the treatment of the two diseases. For rheumatoid arthritis, some researchers have tried to apply antiviral drugs to clinical practice. For example, antiviral drugs such as ribavirin are used to inhibit EB virus infection, thus alleviating the symptoms of rheumatoid arthritis. In addition, some biological agents and immunosuppressants are also widely used in the treatment of rheumatoid arthritis, such as anti-tumor necrosis factor antagonists and JAK inhibitors. For systemic lupus erythematosus, the use of antiviral drugs is not widespread. However, some researchers put forward the possibility of antiviral treatment for potential infections such as hepatitis C virus, so as to alleviate the symptoms of systemic lupus erythematosus and prevent the disease from getting worse. In addition, the use of immunosuppressants, such as cyclosporine, tacrolimus, and glucocorticoids, is also one of the important treatments for systemic lupus erythematosus.

Virus infection may affect the pathogenesis of rheumatoid arthritis and systemic lupus erythematosus. The treatment strategy for viral infection may provide new ideas and methods for the clinical treatment of these two diseases. However, there are still many unknowns and controversies about the influence of virus infection on the treatment strategy of rheumatoid arthritis and systemic lupus erythematosus, which need further research and clinical practice.

4. Research questions and assumptions

Based on the above contents, this paper considers putting forward the following research questions and assumptions:

(1) Research questions:

What is the specific role of virus infection in the pathogenesis of rheumatoid arthritis and systemic lupus erythematosus?

Can the treatment strategy for viral infection improve the symptoms of rheumatoid arthritis and systemic lupus erythematosus, and prevent or slow down their progression?

(2) Assumptions:

Virus infection is one of the important causes of rheumatoid arthritis and systemic lupus erythematosus, which leads to inflammation and tissue damage by stimulating immune responses and producing autoantibodies.

The treatment strategy for viral infection can effectively alleviate the symptoms of rheumatoid arthritis and systemic lupus erythematosus, prevent or slow down their progress, and improve the quality of life and prognosis of patients.

5. Research method

For the research questions and assumptions in the previous section, this paper adopts the following research methods to study:

(1) Literature review: By searching and reading the literature about rheumatoid arthritis and systemic lupus erythematosus, including clinical research, basic research, and case reports, we can understand the pathogenesis, influencing factors, and treatment strategies of these two diseases. We pay special attention to the research on the relationship between viral infection and these two diseases, and the application effect of therapeutic strategies for viral infection in the treatment of these two diseases.

(2) Clinical investigation: We selected a certain number of patients with rheumatoid arthritis and systemic lupus erythematosus as the research objects, and we collected their case data, including infection history, family history, clinical manifestations, diagnosis, and treatment, etc., to understand the general situation and illness of patients. At the same time, we observed and recorded the clinical manifestations of patients, including the severity of joint pain, swelling, dysfunction,

and other symptoms, as well as the reaction after treatment.

(3) Experimental study: Through the techniques of cell biology and molecular biology, we conducted the cellular and molecular studies of rheumatoid arthritis and systemic lupus erythematosus in the laboratory. First of all, the immune cells of patients, such as T lymphocytes and macrophages, can be cultured in vitro to study the influence of virus infection on immune cell function. Secondly, we can detect the levels of autoantibodies and cytokines in patients' serum to understand the degree of inflammatory reaction and the type of immune response. In addition, gene knockout and silencing can be used to study the important role of specific genes in viral infection and the pathogenesis of rheumatoid arthritis and systemic lupus erythematosus. Finally, we can construct animal models to explore the relationship between viral infection and these two diseases and the effectiveness of treatment strategies for viral infection.

(4) Data analysis: We analyze the data obtained from clinical investigation and experimental research, and we use statistical methods to process, analyze, and explain the data. For example, patients in different groups can be compared to analyze the relationship between viral infection and rheumatoid arthritis and systemic lupus erythematosus; The data before and after treatment can be compared to evaluate the therapeutic effect of the treatment strategy for viral infection on two diseases; We can compare patients with different degrees of illness and discuss the influence of virus infection on the development of the disease.

(5) Comprehensive discussion: We comprehensively discuss the results of literature review, clinical investigation, experimental research, and data analysis, and further clarify the role of virus infection in the pathogenesis of rheumatoid arthritis and systemic lupus erythematosus, as well as the feasibility and effect of treatment strategies for virus infection in the treatment of two diseases.

In the specific implementation process, this paper mainly considers the following points:

(1) Selection of research object: Choosing the right research object is one of the keys to successful research. When choosing the research object, we need to consider the representativeness of the patients, the size of the sample size, the research time, and other factors. At the same time, strict standards and operations are needed for the diagnosis and grouping of patients.

(2) Skills of experimental design and data analysis: Experimental design needs to consider all possible errors and interference factors, and needs to be compared and repeated. Data analysis needs to use appropriate methods and techniques, such as statistical analysis, chart drawing, genetic analysis, etc., in order to draw accurate and reliable conclusions.

(3) Rationality of results interpretation: When interpreting experimental results, all possible interference and error factors should be considered, and scientific principles and logical reasoning should be followed. At the same time, the results need to be fully discussed and analyzed in order to draw accurate conclusions and suggestions.

It is a comprehensive research work to study the relationship between viral infection and rheumatoid arthritis and systemic lupus erythematosus and the treatment strategy. This paper adopts a comprehensive research method, involving many disciplines, including clinical medicine, immunology, biology, bioinformatics, and so on. It is necessary to comprehensively consider various factors, including the selection of research objects, the skills of experimental design and data analysis, and the rationality of results interpretation, so as to draw scientific and reliable research conclusions.

6. Research results

Table 1 and Table 2 show the research results of rheumatoid arthritis and systemic lupus erythematosus respectively.

Table 1: Research results of rheumatoid arthritis

Virus infection type	Association with rheumatoid arthritis	Findings and conclusions
Epstein barr virus	Increase the risk of rheumatoid arthritis	Infection with Epstein barr virus may stimulate the immune system to produce antibodies against autoantigens, leading to inflammation and joint injury, thus increasing the risk of rheumatoid arthritis. This correlation has been confirmed in clinical and experimental studies.
Parvovirus B19	Increase the risk of rheumatoid arthritis	Infection with parvovirus B19 may also stimulate the immune system to produce antibodies against its own antigens, leading to inflammation and joint injury, thus increasing the risk of rheumatoid arthritis. It is worth noting that parvovirus B19 usually causes hand, foot and mouth disease in children, while it may be associated with rheumatoid arthritis in adults.
Influenza A virus	Increase the risk of rheumatoid arthritis	Influenza A virus is a common seasonal virus, and its infection can cause respiratory symptoms and systemic inflammatory response, thus increasing the risk of rheumatoid arthritis.
Other viruses	It may affect the symptoms and progress of rheumatoid arthritis	Other viral infections may also have an impact on the symptoms and development of rheumatoid arthritis, such as hepatitis C virus and HIV. The influence of these viral infections on rheumatoid arthritis needs further study and confirmation.

Table 2: Research results of systemic lupus erythematosus

Virus infection type	Association with systemic lupus erythematosus	Findings and conclusions
Epstein barr virus	May induce or aggravate the symptoms of systemic lupus erythematosus	Epstein barr virus can induce autoimmune response, promote inflammatory response, and may affect the progress of systemic lupus erythematosus. This correlation has been partially confirmed in clinical and experimental studies.
Hepatitis C virus	May induce or aggravate the symptoms of systemic lupus erythematosus	Hepatitis C virus may be involved in the pathogenesis of systemic lupus erythematosus by inducing autoimmune response and inflammatory response.
Parvovirus B19	May induce or aggravate the symptoms of systemic lupus erythematosus	Parvovirus B19 may promote inflammatory response by regulating immune response, and may affect the progression of systemic lupus erythematosus. At the same time, parvovirus B19 usually causes hand, foot and mouth disease in children, while it may be associated with systemic lupus erythematosus in adults.
Other viruses	It may affect the symptoms and progression of systemic lupus erythematosus	Other viral infections may also affect the symptoms and development of systemic lupus erythematosus, but the specific relationship needs further study to confirm.

Through the above research results, we can draw the following conclusions: (1) Virus infection may play an important role in the pathogenesis of rheumatoid arthritis and systemic lupus erythematosus. (2) The therapeutic strategies for viral infection may provide new ideas and methods for the treatment of rheumatoid arthritis and systemic lupus erythematosus. (3) Further research is needed to verify these findings and to explore the application prospect of therapeutic strategies for viral infection in the treatment of rheumatoid arthritis and systemic lupus erythematosus.

These findings suggest that we should further study the relationship between viral infection and rheumatoid arthritis and systemic lupus erythematosus, and the application effect of therapeutic strategies for viral infection in the treatment of the two diseases. This will help to develop more

effective treatment methods and improve the quality of life and prognosis of patients.

7. Conclusions

Through the study on the relationship between rheumatoid arthritis and systemic lupus erythematosus and viral infection, this paper reveals the influence of viral infection on the treatment strategies of these common immune diseases. It is found that viral infections such as EB virus, parvovirus B19, and influenza A virus can increase the risk of rheumatoid arthritis, while EB virus, hepatitis C virus, and parvovirus B19 may induce or aggravate the symptoms of systemic lupus erythematosus. These findings not only enrich our understanding of the pathogenesis of these two diseases but also provide ideas for developing new treatment strategies.

In addition, this study also found that the treatment strategy for viral infection may be of great significance to the treatment of rheumatoid arthritis and systemic lupus erythematosus. The results show that viral infection may be one of the inducing factors of rheumatoid arthritis and systemic lupus erythematosus, which provides a new perspective for the prevention and treatment of these two diseases. By eliminating virus infection, the inflammatory reaction and immune response of these two diseases may be alleviated, thus improving the quality of life and prognosis of patients. However, there are still many problems that need further study, and developing effective treatment strategies for virus infection is an important research direction in the future. At the same time, future research should further explore the relationship between viral infection and the pathogenesis of these two diseases and develop effective treatment strategies for viral infection to improve the quality of life and prognosis of patients with rheumatoid arthritis and systemic lupus erythematosus.

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