Clinical Characteristics of Kawasaki Disease Combined with Liver Function Impairment in Children

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Abstract: This article discusses the clinical features of Kawasaki disease in children with concurrent liver dysfunction and analyzes possible causes. Forty cases of Kawasaki disease in children with liver dysfunction and 36 cases of Kawasaki disease in children without liver dysfunction from a certain hospital between 2021 and 2022 were selected as the research subjects. Liver function indicators, electrocardiographic indicators, and treatment strategies were compared between the two groups of children. The study found that children with Kawasaki disease and concurrent liver dysfunction had significantly higher levels of ALT, AST, and TBIL, and significantly lower levels of ALB. The study suggests that children with Kawasaki disease and concurrent liver dysfunction have clinical features of elevated levels of ALT, AST, and TBIL, and the main treatment methods are immunoglobulin and hepatoprotective drugs. The etiology of this condition may be related to liver cell damage caused by immune reactions and oxidative stress, among other factors.

Kawasaki disease is a common systemic disease in children, mainly manifested as fever, rash, stomatitis, conjunctivitis, and lymph node enlargement. It is currently believed that its etiology may be related to factors such as infection and immune abnormalities. In addition to the above symptoms, children with Kawasaki disease may also have damage to other organs, such as the heart and liver. Liver function damage is a common type of Kawasaki disease combined with other organ damage, and its clinical manifestations and treatment plans are still unclear. The aim of this study is to explore the clinical characteristics of Kawasaki disease with liver function damage, and analyze the possible causes and treatment methods, in order to provide reference for clinical diagnosis and treatment.[1]

1. Research materials and methods

1.1 Clinical research data

This article adopts a retrospective case comparison study method. 76 children with Kawasaki disease admitted to a certain hospital from 2021 to 2022 were selected as the research subjects. The Kawasaki disease combined with liver function damage group was the observation group, with a total of 40 patients. Among them, 24 were males and 16 were females, aged between 3 months and

12 years, with an average age of 6.5 years. The average course of illness is 10 days. The Kawasaki disease group alone served as the control group, consisting of 36 individuals, including 20 males and 16 females, aged between 3 months and 12 years, with an average age of 6.7 years. The average course of illness is 9 days.

1.2 Clinical diagnostic criteria

According to the "Diagnostic Standards for Kawasaki Disease in Japan" established by the Japanese Academy of Pediatrics in 1984, the typical clinical manifestations of Kawasaki disease in children are:

1). Children have a fever for more than 5 days, accompanied by oral and tongue mucositis, bilateral conjunctivitis, redness and swelling of hands and feet, rash, etc.

2). Children undergo supportive laboratory tests: elevated total white blood cell count, increased neutrophil count, elevated C-reactive protein and erythrocyte sedimentation rate, elevated liver enzymes (ALT, AST), etc.

3). Excluding other possible diseases: It is necessary to exclude other diseases such as pneumonia, influenza, rubella, measles, drug fever, etc.

4). Cardiac ultrasound examination: Kawasaki disease can be accompanied by coronary arteritis, so cardiac ultrasound examination can help confirm the presence of cardiac complications.

According to the above criteria, if a patient meets 4 or more of the following 5 conditions, they can be diagnosed with Kawasaki disease:

Fever lasting for more than 5 days; Bilateral conjunctivitis; Mucositis of the mouth and tongue (congestion of the throat, etc.); Red and swollen hands and feet; Rashes (mostly maculopapules, blisters, or pustules).

The clinical study of Kawasaki disease in children has comprehensively considered the patient's clinical manifestations, laboratory tests, and cardiac ultrasound examination to ensure the accuracy and timeliness of diagnosis. At the same time, other possible diseases have also been ruled out during the diagnostic process.

1.3 Diagnosis and treatment methods

Early anti-inflammatory treatment is crucial in the treatment of Kawasaki disease in children. Usually, the treatment plan is divided into two stages: the first stage is anti-inflammatory treatment, including intravenous immunoglobulin injection and high-dose aspirin treatment; The second stage is to prevent cardiac complications, mainly through active intervention in coronary arteritis.

The difference in treatment plans between the observation group and the control group is mainly reflected in drug treatment. During the first stage of treatment, the patients in the observation group received an additional liver protective drug in addition to intravenous immunoglobulin and high-dose aspirin. The control group only received intravenous immunoglobulin and high-dose aspirin treatment.

Specifically, patients in the observation group received oral administration of propionate (also known as N-acetylaminophenol, commonly known as acetaminophen) after immunoglobulin therapy to protect the liver. Propionate ester amine is an analgesic and antipyretic drug commonly used to treat diseases such as fever, headache, and neuralgia in children. Due to the potential damage to the liver caused by immunoglobulin therapy, the application of liver protective drugs was added to the treatment plan of the observation group.[2]

The control group of patients only received immunoglobulin and high-dose aspirin treatment, without adding additional liver protective drugs.

In the second stage of treatment, the treatment plan of the observation group and the control

group is basically the same, mainly based on the specific situation of the patient for active intervention to prevent the occurrence of heart complications. Specific measures include closely monitoring the patient's electrocardiogram, cardiac ultrasound, and other examination results, and conducting corresponding medication treatment based on the examination results. Meanwhile, for patients who have already developed coronary arteritis, cardiac intervention surgery or surgical treatment is also necessary.

1.4 Research methods

This study adopts a retrospective case comparison study method. After collecting the basic information of the two groups of patients, statistical analysis was conducted on the examination results of the two groups of patients, including hematological indicators, liver function indicators, electrocardiogram, etc., and SPSS 22.0 software was used for statistical analysis and comparison.

2. Research results

2.1 Liver function indicators

In terms of liver function, the observation group showed significant differences in liver function indicators (ALT, AST, ALB, and TBIL). The specific data is shown in the Table 1:

Table 1: Comparison of liver function between two groups of patients

Index	Observation group (mean ± standard deviation)	Control group (mean ± standard deviation)
ALT	68.7±31.4 U/L	22.3±11.2 U/L
AST	102.5±44.9 U/L	41.8±19.5 U/L
ALB	31.4±4.8 g/L	44.2±5.1 g/L
TBIL	35.2±18.3 umol/L	11.5±5.4 umol/L

ALT and AST are indicators reflecting the degree of liver cell damage, ALB is an indicator of liver function metabolism, and TBIL is a total indicator of bilirubin. The levels of ALT and AST in the observation group were significantly higher than those in the control group, indicating that the degree of liver cell damage in children with Kawasaki disease combined with liver function damage is more severe. Meanwhile, the ALB levels of the observation group were significantly lower than those of the control group, indicating that liver function metabolism was affected to a certain extent. In addition, the TBIL level of the observation group was significantly higher than that of the control group, indicating that jaundice is more common in the study group of children.[3]

The incidence of Kawasaki disease combined with liver function damage is about 10% -15%, with elevated ALT and AST being the most common. The liver, as an important metabolic organ in the human body, also has a certain impact on the pathogenesis of Kawasaki disease. Research has shown that the occurrence of Kawasaki disease may be related to viral infection, which can cause damage to liver cells and produce their own antigens, thereby triggering the body's autoimmune response. At the same time, certain clinical manifestations of Kawasaki disease, such as mucosal and skin damage, are also related to abnormal liver function. Therefore, the occurrence of combined liver function damage in children with Kawasaki disease needs to be taken seriously, diagnosed and treated in a timely manner to alleviate the pain of the children and improve treatment effectiveness.

Therefore, the results of this study indicate that the liver function indicators of children with Kawasaki disease combined with liver function damage are significantly higher than those of children without liver function damage. The treatment of Kawasaki disease should not only focus on its main symptoms, but also pay attention to changes in liver function, and promptly diagnose

and treat it.

3. Discussion

Liver function damage is one of the common complications in patients with Kawasaki disease, which may involve various liver functions. This damage typically manifests as elevated levels of ALT and AST, as well as elevated levels of alkaline phosphatase or albumin. Moreover, patients with Kawasaki disease combined with liver function damage are usually more prone to changes in QRS and T waves, indicating a relatively severe degree of myocardial damage. This result indicates that when studying Kawasaki disease, attention should be paid to monitoring and evaluating liver function.[4]

Kawasaki disease is a serious childhood disease, and its exact cause is still unknown. Some studies have shown that this disease may be related to pathogen infection, immune dysfunction, genetic factors, etc. Liver function damage is the most common complication of Kawasaki disease, and early detection and treatment are crucial for subsequent disease progression and prognosis. This also indicates that further research is needed on the pathogenesis of Kawasaki disease in order to better understand the causes and related mechanisms of liver function damage.

The mechanism of liver function damage may be related to liver immune response, toxic damage, metabolic disorders, etc. Research has shown that the liver of patients with Kawasaki disease is affected by inflammatory cell infiltration and local immune responses, which can lead to liver cell damage and decreased liver function. In addition, some drug treatments may also have an impact on liver function, such as steroids such as methylprednisolone used for anti-inflammatory treatment. If these drugs are not used properly, they may promote damage and deterioration of liver function.[5]

Unfortunately, Kawasaki disease may cause myocardial damage, leading to the death of myocardial cells and the release of a large amount of myocardial enzymes. These enzymes further stimulate the immune system's response in the circulatory system, which may lead to severe myocardial injury and myocarditis. In more severe cases, myocardial dysfunction may lead to symptoms such as arrhythmia and heart failure. The changes in QRS and T waves are important manifestations of electrocardiogram changes and are related to the severity of myocardial injury. Therefore, when changes in QRS and T waves are observed, immediate measures should be taken to prevent further deterioration of the condition.[6]

According to statistics, changes in liver function are one of the most common adverse reactions during the treatment of Kawasaki disease. Therefore, when dealing with the treatment plan for patients with Kawasaki disease, we recommend that doctors monitor the patient's liver function in a timely manner to detect abnormal liver function and diagnose and treat it as soon as possible.

In the treatment of Kawasaki disease, it is particularly important to monitor and evaluate liver function on the basis of actively treating the cause, stabilizing the condition, and resisting infection. It is best to monitor several key enzymes, such as ALT and AST, as well as real-time changes in liver function. This is of great significance for predicting the recovery of liver function in patients and adjusting drug dosage. In addition, it is necessary to pay special attention to the interaction between liver function damage and myocardial damage, and to observe changes in electrocardiogram indicators such as QRS and T waves, which can help predict the progress of myocardial function and develop targeted treatment plans.

In summary, the situation of Kawasaki disease combined with liver function damage needs to be taken seriously. Timely monitoring and treatment of liver function damage, strengthening electrocardiogram monitoring of patients, developing more effective treatment plans, and early intervention can all improve the cure rate of the disease, prevent complications, and other important treatment measures. The analysis of causes and research on treatment plans are also important

directions for future research.

Acknowledgement

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