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Advances in clinical diagnosis and treatment of Kawasaki disease in children

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Abstract: *Kawasaki disease (KD), also known as cutaneous mucosal lymph node syndrome, is an acute self limiting vasculitis of unknown cause. The disease was first found in Japanese children in 1967 and its characteristic clinical features were described. The typical clinical symptoms of Kawasaki disease include fever ≥ 5 days, bilateral non suppurative conjunctivitis, rash, cervical lymphadenopathy and changes of skin and mucosa. These characteristics are still the main basis for the diagnosis of KD. However, the listed clinical features are not unique to KD, and other diseases can also have the above-mentioned clinical manifestations. Therefore, KD cannot be diagnosed only by clinical features. However, timely diagnosis and treatment is the key to reduce the incidence of related heart diseases. About 25% of untreated KD children develop coronary artery aneurysms (CAA). At present, KD is an important cause of acquired heart disease in children in the United States. For the treatment of KD, most studies recommend high-dose intravenous immunoglobulin (IVIG), which can significantly reduce the incidence of cardiac involvement. In recent years, with the continuous progress of relevant diagnosis and treatment technology, the diagnosis and treatment of KD has made great progress. This study reviews the relevant literature and briefly summarizes the clinical diagnosis and treatment of Kawasaki disease in children, in order to provide some reference for the clinical diagnosis and treatment of KD.*

Keywords*: children; Kawasaki disease; diagnosis; treatment; progress*

1. Introduction

Children with Kawasaki disease (KD), also known as mucocutaneous lymph node syndrome (MCLs), is mainly characterized by immune system activation and large-scale damage to the internal system of blood vessels. [1] The basic pathological change is systemic vasculitis, which promotes the damage of small and medium-sized arteries, especially coronary arteries. Some children have coronary aneurysms and a small number of children have coronary artery stenosis. It is a common cause of acquired heart disease in children, so we should actively make clinical diagnosis and treatment. In recent years, due to the increasing incidence of the disease, it has become the most common acquired heart disease in children. Accurate diagnosis and treatment are needed to improve the cure rate and reduce the risk of complications. [2]

2. Clinical Diagnosis of KD

According to the different clinical manifestations of children with KD, the disease can be divided into two types: complete KD and incomplete KD. The former has clear and standardized diagnostic criteria, but the diagnosis of incomplete KD has not been unified [3]. At present, pediatric KD is mainly an exclusive diagnosis based on clinical manifestations. If the clinical diagnosis conditions are insufficient, it needs to be diagnosed in combination with various auxiliary examinations. On the one hand, the diagnostic criteria of complete KD. At present, the new diagnostic criteria revised by the Japanese KD Research Committee are still used [1]: ①Fever of unknown cause, lasting for 5 days or more; ②Conjunctival congestion in both eyes; ③Oral and pharyngeal mucosa showed diffuse hyperemia, red and dry lips, and red bayberry tongue; ④At the initial stage of onset, the hands and feet were swollen and red, and the fingertips and toes were desquamated at the recovery stage; ⑤Erythema is formed at the driving part, but there is no blister and scab; ⑥Non suppurative swelling of cervical lymph nodes. Five of the above six clinical symptoms can be diagnosed. If two-dimensional echocardiography detects coronary artery tumor or dilation, only four can be diagnosed. On the other

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hand, the diagnostic criteria of incomplete KD. The diagnosis of incomplete KD is defined as: fever for more than 5 days, including only 2 or 3 clinical features, but there are significant coronary aneurysms in the results of cardiac color Doppler ultrasound, but the brightness of coronary artery wall is significantly enhanced, and other febrile diseases are excluded [4-6]. Relevant researchers have shown that children with persistent fever have KD face, plaque reaction and abnormal rise of platelets. The diagnostic criteria can be appropriately relaxed. For patients suspected of KD, we should strive to obtain early treatment and reduce coronary artery damage [7].

3. Clinical Treatment of KD

The purpose of the actual clinical treatment of pediatric KD is to select reasonable treatment methods and drugs, including the following types, in order to reasonably control the systemic vascular inflammatory response and avoid the formation of coronary aneurysm and thrombotic obstruction.

3.1 Aspirin

Aspirin, as the first choice drug for the disease and an inhibitor of prostaglandin synthesis, has the effect of anti-infection and anti-platelet. When aspirin is given in large doses, it mainly shows anti-infective effect; at low dose, it shows the effect of anti-platelet aggregation, blocking the formation of thromboxane A_2, so as to achieve the goal of anticoagulation and antithrombotic. Therefore, large doses should be taken in the acute stage. If the dose is reduced too early, it will lead to poor control of inflammatory response and failure to prevent all kinds of complications; after the acute phase, it should be reduced to a small dose in combination with the actual condition of the disease. Japan suggests that the medium dose is 30-50Mg / (KGD), and gradually reduce the dose after the fever is reduced to 5-10mg / (KGD) until the symptoms disappear and the platelets are in normal condition. The actual course of treatment is 2 months. Patients with coronary artery disease need to take it until the recovery of coronary artery diameter does not exceed 3mm.

3.1.1 Gamma Globulin (IVIG)

At present, it is actually advocated that early intravenous injection (7-10 days after onset) can effectively alleviate the degree of coronary artery disease. The basic mechanism and principle of its practical treatment is to interrupt the immune response causing vascular injury and reduce the actual aggregation function of platelets. IVIG is recommended internationally, with a single dose of 2G / kg and 10-12h input [8, 9].

3.1.2 Adrenal Glucocorticoids (GCS)

The incidence of coronary artery aneurysm was 65% in the prednisone group and 11% in the aspirin group. On the basis of IVIG and aspirin, appropriate addition of glucocorticoid can further shorten the whole fever time, and the actual incidence rate of coronary artery aneurysm is low. The actual dose is generally methylprednisone, the impact dose is 20-30mg / (KGD), the continuous use is changed to prednisone 2mg / (KGD) for 1-3 days, the CRP is reduced to 1mg / (KGD) after normal, and the drug is reduced and stopped after 2 weeks. At present, it is generally agreed that it is not the first choice for KD treatment, and it is suitable for children with KD and severe carditis with cardiac insufficiency or unresponsive to IVIG treatment, and the whole condition is difficult to control [10-12].

3.2 Non-reactive Gamma Globulin (IVIG)

At the initial stage of KD, the fever did not alleviate 36 hours after IVIG treatment, which was a high-risk factor for coronary artery tumor. IVIG 1-2kg was added for one intravenous drip. If the fever still does not subside in time, GCS is used for treatment, and methylprednisone pulse therapy is commonly used. The dose is controlled at 20-30mg / (KGD). It is administered intravenously for 1-3 days [11, 13, 14]. The follow-up change is adjusted to prednisone, which is taken orally in several times. After rechecking that the serum CRP is in normal state, it can be actively reduced, and gradually reduced to stop the drug within two weeks, or methylprednisolone is divided into three intravenous injections, or direct oral prednisone treatment, with a dose of 1-2mg / (KGD). After fever subsides, it can be gradually reduced, and the medication lasts for 4-6 weeks. GCS treatment can aggravate blood hypercoagulability and should always be used in combination with aspirin. During high-dose CGS shock treatment, it is recommended to use heparin anticoagulation, ultrasonic ECG monitoring and blood pressure detection. If the fever does not decrease after treatment with CGS, it can be

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appropriately treated with antibodies to specific inflammatory cytokines such as Ulinastatin. Generally, the common dose of ulinastatin is 5000U / kg, which is used in a continuous slow pig house for 1-3 days [15-17].

4. Conclusion

KD is mainly characterized by immune system activation and large-scale damage to the internal system of blood vessels. Some children have coronary aneurysms and a small number of children develop coronary artery stenosis. It is a common cause of acquired heart disease in children that clinical diagnosis and treatment should be actively carried out [18, 19]. KD has a high incidence rate in infants and young children. It may cause limb edema in the early stage. With the development of the disease, it may cause diffuse congestion of oral mucosa. It is necessary to make accurate clinical diagnosis and treatment to improve the cure rate of children and promote their recovery in a short time.

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