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Acute immune thrombocytopenic purpura as adverse reaction to oral polio vaccine (OPV)

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A case of acute immune thrombocytopenic purpura following oral polio vaccine (OPV) is reported. An 82-d-old infant developed purpura at the same day after the second dose of oral polio vaccine. Until the time of hospital admission, the male infant had been in good health and had not received any drugs, and the possible causes of this condition were excluded. His platelet count was 13 × 10^9/L. Platelet-associated IgG was elevated, but the amount of megakaryocytes in bone marrow aspirates was within the normal range, suggesting immune mechanism-associated thrombocytopenia. The infant recovered with the proper treatment within 30 d. Attention should be paid to OPV-associated thrombocytopenia, though it seems to be less frequent than after natural infections.

Introduction

Polio, an infectious disease caused by a virus that resides in the throat and intestinal tract, was once the leading cause of disability in China. Since the introduction of the oral polio vaccine, the incidence of this disease has gradually decreased in China. The oral polio vaccination remains one of the recommended childhood immunizations in China, although OPV has not been administered in the US since 2000. In most parts of the China, polio immunization is required before a child can start school. Most children who get the polio vaccine do not develop adverse effects. However, a vaccine, like any medicine, can cause adverse effects. Most polio vaccine adverse effects are minor, meaning that the symptoms improve on their own or are easily treated by the healthcare. The common adverse effects that have been reported with the polio vaccine include tiredness, low-grade fever, anorexia, persistent crying and irritability. When serious adverse effects do occur, which are rare, they can include high fever, breathlessness, hoarseness, wheezing, allergic reactions and vaccine-associated flaccid paralysis. However, most adverse effects are minor, meaning that the symptoms improve on their own or are easily treated by the healthcare provider. In rare cases, the polio vaccine's adverse effects can be very serious. Very rarely, they can cause disability even death. It is important to note, however, that getting the polio vaccine is much safer than getting polio.

Case Report

An 82-d-old boy was admitted with a two-day history of rash covering the body. We found his weight and height were 5.9 kg and 58 cm, respectively. Heart rate was 110/min, respiratory rate was 20/min and body temperature was at 36.6°C. Petechial-purpuric skin rash covered his body, more strikingly over the lower extremities and back. The size of his liver and spleen are normal during physical examination. Laboratory tests were as follows: hemoglobin, 97 g/L; white blood cells, 7.75 × 10^9/L with 77.04% lymphocytes and 9.54% neutrophils; platelets, 13 × 10^9/L; C-reactive protein, 0.30 mg/L; erythrocyte sedimentation rate, 4 mm/h; Prothrombin and partial thromboplastin time, C3 and C4, and immune complexes were normal. Prothrombin Time(PT) and activated partial thromboplastin time(APTT)were also normal. Renal and liver function tests were within normal limits. Serological assays for rubella, cytomegalovirus, adenovirus, mycoplasma, herpes simplex, rickettsia, chlamydia and toxoplasma, and cultures from blood, urine and stools were negative, but anti-HBs antibodies were positive.

Antinuclear antibodies and Coombs' test were negative. Cytology from bone marrow aspirate was normal. Antiplatelet antibodies (PAIgG) were found to be positive. The diagnosis of acute idiopathic thrombocytopenic purpura was considered.

Treatment consisted of intravenous injection of human immunoglobulin 400 mg/(kg·day) for 5 d, while intravenous dexamethasone 1.0 mg/(kg·day) for 5 d, changed to the treatment with oral prednisone 2 mg/(kg·day) on the sixth day.

After a week of treatment the platelet count increased to 392 × 10^9/L. This dose of prednisone was continued for a total of two weeks and then gradually decreased. After one month, the platelet count returned to normal and remained normal over the following 6 months.

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Discussion

Immune thrombocytopenic purpura (ITP) is a clinical syndrome in which a decreased number of circulating platelets (thrombocytopenia) manifests as a bleeding tendency, easy bruising (purpura), or extravasation of blood from capillaries into skin and mucous membranes (petechiae). The pathophysiologic mechanisms have been understood at cellular, molecular and humoral levels.[1] In persons with immune thrombocytopenic purpura (ITP), platelets are coated with autoantibodies to platelet membrane antigens, resulting in splenic sequestration and phagocytosis by mononuclear macrophages, PAIgG plays an important role in the pathogenesis of acute ITP.[2] Acute immune thrombocytopenic purpura is most commonly seen in young children. Boys and girls are equally affected. Symptoms often, but do not necessarily, follow a viral infection, such as Epstein-Barr virus (EBV),[3] rubella virus,[4] measles virus[5] and so on.

ITP is an adverse event that rarely follows vaccine administration and thus should not limit vaccine use. Cecinati et al.[6] found that ITP is very rare and that the only vaccine for which there may be a demonstrated cause-effect relationship is the measles, mumps, and rubella (MMR) vaccine that can occur in only 1–3 children in every 100,000 vaccine doses.

Polio is caused by an intestinal virus that spreads from person to person in stool and saliva. Most people infected with polio (approximately 95%) show no symptoms.[7] Minor symptoms can include sore throat, low-grade fever, nausea and vomiting. Some infected persons (1 to 2%) will have stiffness in the neck, back or legs without paralysis. Less than 1% of polio infections (about 1 of every 1,000 cases) cause paralysis.[8] In some cases, the poliovirus will paralyze respiratory muscles, leaving the victim unable to breathe on his or her own.[9] Many paralyzed persons recover completely. Those who do recover from paralytic polio may be affected 30 to 40 y later, with muscle pain and progressive weakness.[10]

Two types of polio vaccine (OPV, or oral polio vaccine, and IPV, or inactivated polio vaccine) were developed in the 1950s. Both were highly effective in preventing polio. Initially OPV was preferred because it helped to increase community immunity to polio. However, about 1 out of 2.4 million doses of OPV distributed actually caused vaccine-associated paralytic polio (VAPP) in the United States.[11] In an effort to reduce this terrible adverse effect, a new polio vaccine schedule was recommended in 1997 (two doses of IPV followed by two doses of OPV). The new schedule decreased, but did not guarantee elimination of, vaccine-induced paralytic polio; it was so effective that an all-IPV schedule was recommended in the year 2000, and OPV is no longer administered in the US. OPV continues to be used in countries including China where wild polio infections still occur. Two key steps made by Centers for Disease Control and Prevention (CDC)[12] will be taken to make further progress in polio eradication: (1) addressing local barriers to interrupting transmission and (2) using bivalent oral poliovirus vaccine (bOPV) broadly for WPV 1 and 3 in supplemental immunization activities (SIAs).

In summary, attention should be paid to OPV-associated thrombocytopenia, although it is much less frequent than after natural infections.

Disclosure of Potential Conflicts of Interest

No potential conflicts of interest were disclosed.

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