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Case Report

Case Report: Fatal Vaccine Strain Measles Infection in a Child

Roberto Calzada-Lang[1], Adriana Yock-Corrales[2]*, Mónica Nuñez[3] and Marcela Hernández-de Meserville[1]

[1]Infection Prevention and Control Disease Department, Hospital Nacional de Niños "Dr. Carlos Sáenz Herrera", CCSS, San José, Costa Rica

[2]Emergency Department, Hospital Nacional de Niños "Dr. Carlos Sáenz Herrera", CCSS, San José, Costa Rica

[3]Pathology Department, Hospital Nacional de Niños Dr. Carlos Sáenz Herrera", CCSS, San José, Costa Rica

***Corresponding Author:** Adriana Yock-Corrales, Emergency Department, Hospital Nacional de Niños "Dr. Carlos Sáenz Herrera", CCSS, San José, Costa Rica.

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Abstract

Measles outbreaks has become a popular topic due to anti-vaccination movements. Severe side effects after Mumps Measles Rubella (MMR) vaccination is a rare event. This is a case report of a 15-month-old patient who presented to the emergency department (ED) with a thirteen-day history of fever, maculopapular rash with hemorrhagic lesions and purpuric crusts; with previous MMR vaccination 4-days before symptoms. After he was stabilized in the ED, he was admitted in the ICU where he died due to severe septic shock and multiorgan failure. Vaccine strain measles infection was confirmed by Control of Disease Center (CDC).

Keywords: *Measles; Vaccine Strain; Pediatrics*

Introduction

Measles is a viral disease that is highly contagious and remains to be an important cause of death among young children in developing countries of Africa and Asia [1]. The infection is characterized by fever, malaise, cough, coryza, and conjunctivitis, followed by exanthematic maculopapular rash with hyperpigmented lesions [2]. Complications of this disease can vary from mild to severe, like pneumonia (most common severe cause of death in this group), encephalitis, acute disseminated encephalomyelitis and Subacute sclerosing panencephalitis [3].

Global measles death has decreased due to the introduction of immunization protocols in the late 1960`s [1], which is a topic that would be discussed further. Side effects for measles vaccine has been described, but as a cause of death has not yet being reported in the literature; therefore, the main aim of this case is to illustrate some clinical, radiological, histopathological and laboratory findings secondary to a fatal disease.

Case Presentation

A 15-month-old patient presented to the emergency department at the National Children's Hospital with a previous history of 4 days of fever, painful left arm, swelling of 2 cm with erythema, and mild rash on the scalp. Two days later he was admitted to a rural hospital with irritability, pharyngitis, maculopapular rash with hyperpigmented lesions throughout the body. He was discharged of this hospital with an initial diagnosis of chickenpox and symptomatic treatment was recommended. One day after discharged, he was taken to the National

Children's Hospital because of worsening symptoms characterized by distal cyanosis, hyporexia and irritability. Two weeks before admission, the patient received the MMR vaccine, and according to his mother the symptoms started 4 days after the vaccination.

In the Emergency department, the patient was irritable, without signs of dehydration, with tachycardia, temperature of 37.9°C and 90% of oxygen saturation. He had hyperemic pharynx with small ulcerated lesions in the tonsils and bilateral submandibular adenopathies of approximately 1cm, maculopapular rash with generalized hemorrhagic lesions and purpuric crusts (Figure 1), distal cyanosis and cold extremities. Lungs were clear on auscultation. He had normal heart sounds, and abdominal exploration was normal.

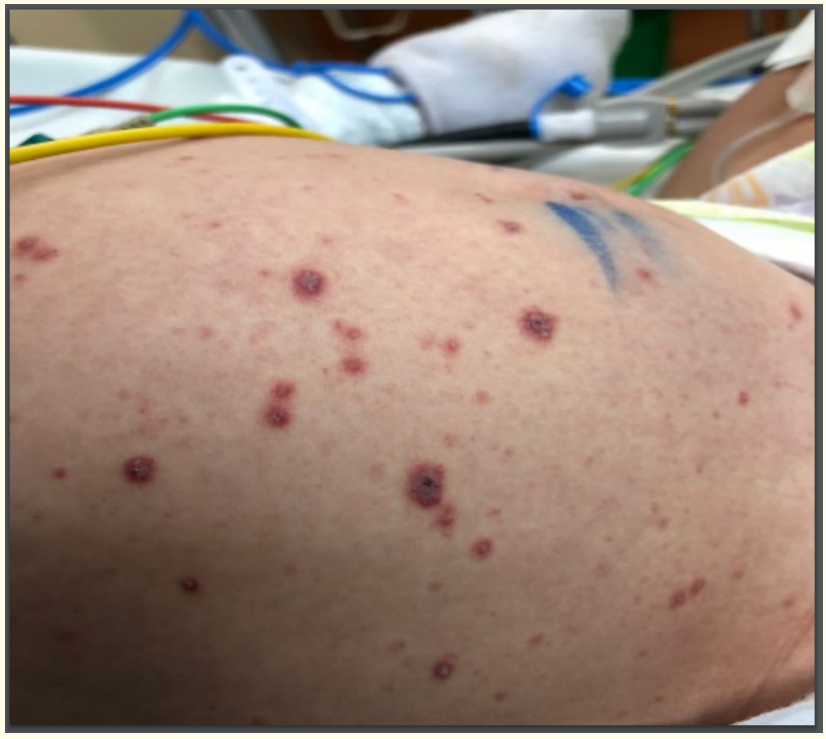

Figure 1: *Maculopapular rash with generalized hemorrhagic lesions and purpuric crusts. Initial laboratory investigations reported a CBC with 15.040 leukocytes/mm^3 (67% PMN`s, 8% bands), hemoglobin 12.1 gr/dL, and platelets 16.000/mm^3. Blood gases reported a pH of 7.29, pCO_2 of 46 mmHg, pO_2 of 35 mmHg, lactate of 2.4 mmol/L, HCO_3 of 22 mEq/L, BUN of 14.8 mg/dL, creatinine of 0.23 mg/dL, and a CRP of 82.9 IU/L. AST at 302 and ALT at 148 with normal bilirubin levels. A lumbar puncture was done. CSF had 5 leukocytes/mm^3, 75 erythrocytes/mm^3, glucose of 92 mg/dl, 29 mg/dL of proteins, with no bacteria and negative culture. Two blood cultures and one urine culture drawn on admission were negative. Fluid from skin vesicles were sent to the laboratory for molecular studies and VZV and Herpes 6 were reported.*

In ED, patient received therapy with IV fluids (saline) and platelet transfusion. After fluid reanimation the patient continued with tachycardia and cold extremities, therefore the septic shock protocol was started. He required intubation, mechanical ventilation and inotropic support; then he was admitted to the ICU.

A chest X-ray was performed and showed lung bilateral infiltrates with areas of consolidation (Figure 2).

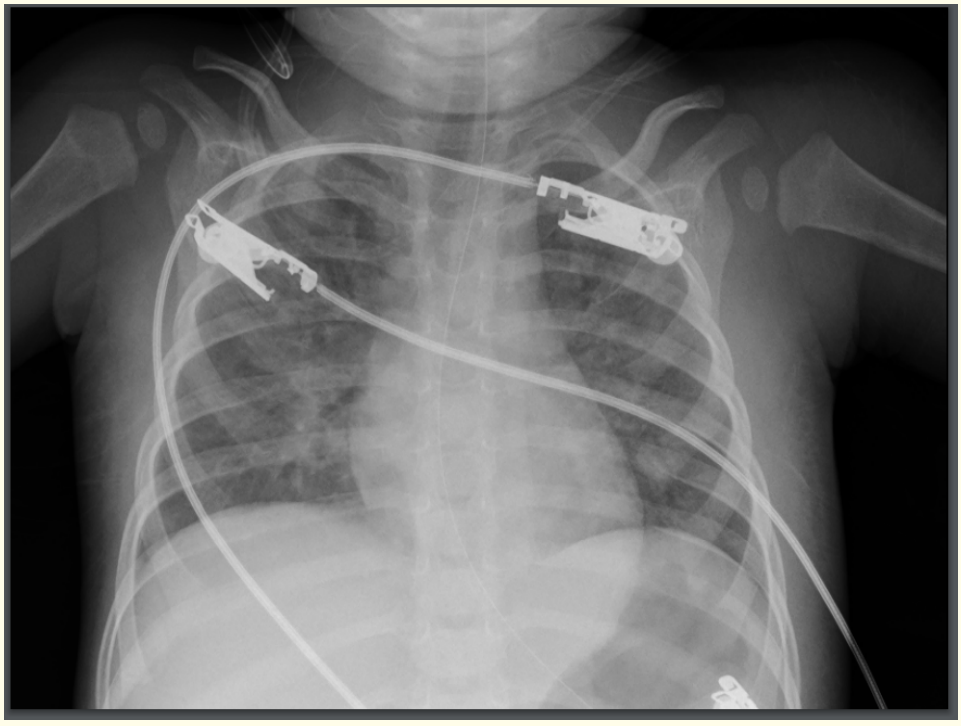

Figure 2: *Chest x-ray showing diffuse bilateral infiltrates. Abdominal and chest ultrasound was also performed showing right lung infiltrates with pleural effusion of 30 cc, and left pleural effusion of 10 cc. It also showed abdominal space with ascitic fluid of 60cc, with increased intraluminal fluid in intestine loops, hepatomegaly with inflammatory changes and cholecystitis due to gallstones.*

In ICU, the patient required high doses of inotropic support, treatment with vancomycin, cefotaxime and acyclovir was started; and plasmapheresis for 48 hours was also required. At the ICU flow cytometry was performed and it resulted with lymphocytic depletion with inversion of the relationship CD4/CD8, which was suggestive of immunodeficiency.

Other studies that were done during his stay in ICU were viral serologies with Ebstein Barr Virus IgM, Measles IgM and Rubella IgM that were positive, Immunoglobulins were within normal range, Ferritin levels that were 121,700 ng/ml and HIV test that was negative.

A hemophagocytic lymphohistiocytosis syndrome was diagnosed three days after admission in ICU, with multiorgan failure. He died 6 days after ICU admission. An autopsy was performed. The histopathologic pieces that were obtained and analyzed, demonstrated the presence of Warthin-Finkeldey giant cells. This pattern was presented in almost all the histopathologic pieces including thymus gland, lymphatic nodes and lungs (Figure 3).

Because of his aggressive presentation, the histopathologic pieces were sent to the CDC after his death**.** CDC performed a study with immunostaining by using measles IHC essay. This study was immunoreactive in: thymus, adrenal gland, skin, gastrointestinal tract, and in 2 more lung samples; in this case for the vaccine strain measles virus (Figure 3).

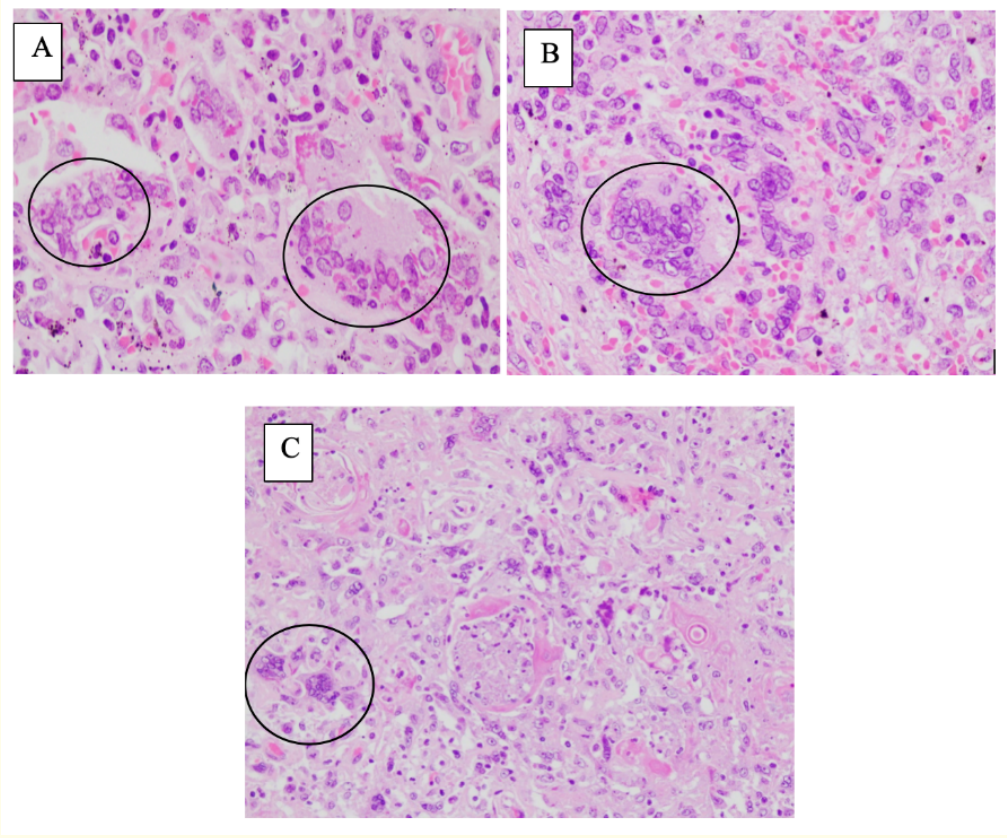

Figure 3: *Histopathologic images. Figure A. Warthin-Finkelday giant cells in Measles pneumonia. Figure B. Warthin-Finkelday giant cells in Lymphatic Nodes. Figure C. Warthin-Finkelday giant cells in Thymus.*

Discussion

Measles is a highly contagious viral infection that can cause serious complications for children's and adults health. It is known that following exposure of the virus, 90 percent of susceptible individuals will develop measles. Clinical manifestations are well described with fever, malaise, cough, coryza, and conjunctivitis, followed by exanthematic maculopapular that usually is presented from head and progressively to thorax, back, and extremities [2].

The diagnosis of measles should be considered in an unimmunized patient with clinically compatible symptoms and history of virus exposure. The diagnosis of infection is usually based on at least one of the following: positive serologic test for serum measles IgM antibody, significant rise in measles IgG antibody between acute and convalescent titers, isolation of measles virus in culture, or detection of measles virus RNA by reverse transcription polymerase chain reaction (RT-PCR) [4].

Long time ago it was one of the most devastating infections due that caused millions of deaths each year, but fortunately in the 1960´s the world of science introduces one of its major scientific outbreaks: the measles vaccine [5]. Nowadays measles has come to be one of the most preventable diseases around the globe.

Globally, it is estimated that there are 84% less cases worldwide according to WHO's data that runs from the year 2000 to 2016 (550,100 deaths in 2000 to 89,780 in 2016). The World Health Organization recommends immunization for all susceptible children and adults for whom measles vaccination is not contraindicated. Reaching all children with 2 doses of measles vaccine, either alone, or in a measles-rubella (MR), measles-mumps-rubella (MMR), or measles-mumps-rubella-varicella (MMRV) combination. This should be the standard for all national immunization protocols [1].

Measles outbreaks has become a popular topic recently due to anti-vaccination movements in different parts of the world. Despite there is more availability of vaccines and health organizations has done efforts for constructed scientific-based immunization protocols, there's an uprising tendency of vaccination hesitancy in the general population. This has led to an increasing in susceptible population because of suboptimal immunization levels.

Worldwide there has been many investigations to confirm the safety and effectiveness of measles immunization protocols, this includes all types of measles vaccines (MR, MMR or MMRV), and its doses [6,7]. Adverse effects of vaccines have always been an aspect of priority in research protocols. The measles vaccine continues to be a subject of interest in this aspect. Generally speaking, most of the AE were local and mild such as: pain, swelling, redness, or abscess formation at the injection site. Some other AE that were relatively commonly reported as systemic side effects was fever and headache [8,9].

The literature is scarce in regard to the severe and serious AE confirmed secondary to measles vaccine; the ones that have been described as more severe and rare are parotitis, thrombocytopenia and very rarely serious anaphylactic reactions [9].

Idiopathic Thrombocytopenic Purpura (ITP) is a very rare side effect that has been well demonstrated to have a relationship with the measles vaccination (MMR). ITP can occur in 1 to 3 children every 100,000 vaccine doses; but its incidence is lower than what is observed in regard to the progression of the natural disease. That is the reason why it cannot be considered as a limitation for the vaccine use [10]. Another adverse effect following immunization and that is also a rare event that even vaccine trials are unlikely to detect, is the anaphylactic reactions [11]. Some of this reaction have been studied in patients with egg allergy. Most cases in which there is an allergic reaction to egg, but not clinical manifestations of anaphylaxis, can be safely immunized without special concerns [11]. Also, some studies have tried to show that patients may be at risk of developing other complicated side effects after vaccination such as encephalitis, but none had proved to be related to measles vaccination [8].

In patients with an immunodeficiency, they are at higher risks for presenting some serious AE to vaccination in general [12]. Patients with HIV, cellular immune deficiencies, hypogammaglobulinemic and dysgammaglobulinemic states, or patients with immunosuppressive therapy (including biologic therapy), are the ones that are considered to have the MMR and varicella vaccines contraindicated and can present severe adverse events Some serious AE described in this populations are measles inclusion body encephalitis (MIBE), pneumonitis, and death as a direct consequence of disseminated measles vaccine virus infection [13].

This case illustrates a very severe presentation of post immunization measles infection in a patient with suspected lymphocyte depletion, reports of severe VAE in the literature are limited in Latin America and nonexistent in some countries. Severe VAE´s are infrequent in immunocompetent hosts but immunocompromised patients can have post vaccination fatal infections like in this patient. Unfortunately, due to his rapid progression to death, no further studies could be made to confirm his immunodeficiency.

Conclusion

As measles is a highly contagious infection where vaccination is extremely important, adverse events are rare. The importance of this case is to increase the awareness of the possible adverse events of the vaccines in patients with immunological diseases and the early approach in order to avoid the mortality of these patients.

Financial Disclosure

None.

Conflict of Interest

There are no conflicts of interest to declare.

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