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Supporting Information

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Fig. S1 The albumin (*ALB*) gene analysis of the patient. The DNA sequence of *ALB* of the patient showed heterozygous substitution of c.653G>C, resulting in albumin with Arg218-Pro, which had been reported as a cause of familial dysalbuminemic hyperthyroxinemia.

Purpuric skin lesions possibly associated with acquired cytomegalovirus infection

Hiroyuki Esaki,[1] Yoshikazu Otsubo,[1] Muneichiro Sumi,[1] Masako Moriuchi[2] and Hiroyuki Moriuchi[2]
[1]*Department of Pediatrics, Sasebo City General Hospital, Sasebo and* [2]*Department of Pediatrics, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki, Japan*

Key words cytomegalovirus, thrombocytopenia, vasculitis.

Purpuric skin lesions often result from thrombocytopenia or generalized vasculitis involving the small vessels of the skin. Both conditions are sometimes associated with an abnormal immune response to an infection. Acquired cytomegalovirus (CMV) infection has been associated infrequently with immune thrombocytopenic purpura (ITP) and very rarely with vasculitic purpura. We herein report the case of an infant with acquired CMV infection who developed purpura, possibly caused by both thrombocytopenia and vasculitic processes.

A previously healthy 2-month-old boy was referred to Sasebo City General Hospital due to a 2 days history of fever and runny nose. His perinatal history was uneventful without any signs suggestive of congenital CMV infection. His general condition was good, and physical examination was normal. On laboratory analysis, white blood cell count was 11 840/μL with 37% neutrophils, platelet count was 140 000/μL, C-reactive protein (CRP), 1.72 mg/dL; aspartate aminotransferase (AST), 72 IU/mL; and alanine aminotransferase (ALT), 55 IU/mL. After he was started on ampicillin (100 mg/kg/day) and cefotaxime (100 mg/kg/day), he became afebrile and was discharged on day 4. At day 8 when he had a blood sample taken at an outpatient clinic, multiple prominent purpura rashes emerged in his arm peripherally from the tourniquet (Fig. S1). On blood test, platelet count was 45 000/μL; immature platelet fraction, 13.3%; fibrinogen/fibrin degradation product (FDP), 6.0 μg/mL (normal range, <5.0); D-dimer, 3.1 μg/mL (normal, <1.0); CRP, 0.52 mg/dL; AST, 204 IU/mL; and ALT, 124 IU/mL. Prothrombin time (PT), activated partial thromboplastin time (APTT), and fibrinogen were within the normal range. He was hospitalized again with a diagnosis of ITP. Given that the platelet count had decreased to <30 000/μL, he was given i.v. immunoglobulin (IVIG; 1 g/kg/day for 2 days), leading to a prompt increase in platelet count. He was discharged on day 14. Although the platelet count increased to 180 000/μL, he developed multiple purpura rashes peripherally from the tourniquet and mild bloody stool on day 21 (Fig. 1). Subsequently, his serum was found to be negative for parvovirus B19-IgM but positive for CMV-IgM antibody and CMV-DNA (1,400 copies/mL) on day 10. The purpuric lesions gradually improved without relapse during a 6 months follow-up period after discharge.

Cytomegalovirus infection has been infrequently associated with ITP in Japan. Kawasaki et al. reviewed pediatric cases of CMV-associated ITP, in which most of the patients had platelet count <30 000/μL and high AST and ALT. None of those patients developed severe bleeding. Prompt improvement was observed after treatment with steroid and/or IVIG, except in one case, suggesting an immunopathological mechanism in most cases.[1]

Cytomegalovirus-associated vasculitic purpura in immunocompetent hosts is very rare. The vasculitis may result from direct vascular injury through viral proliferation at the vascular

Correspondence: Hiroyuki Esaki, MD, Department of Pediatrics, Sasebo City General Hospital, 9-3 Hirase-machi, Sasebo, Nagasaki 857-8511, Japan. Email: esaesaesaki@yahoo.co.jp

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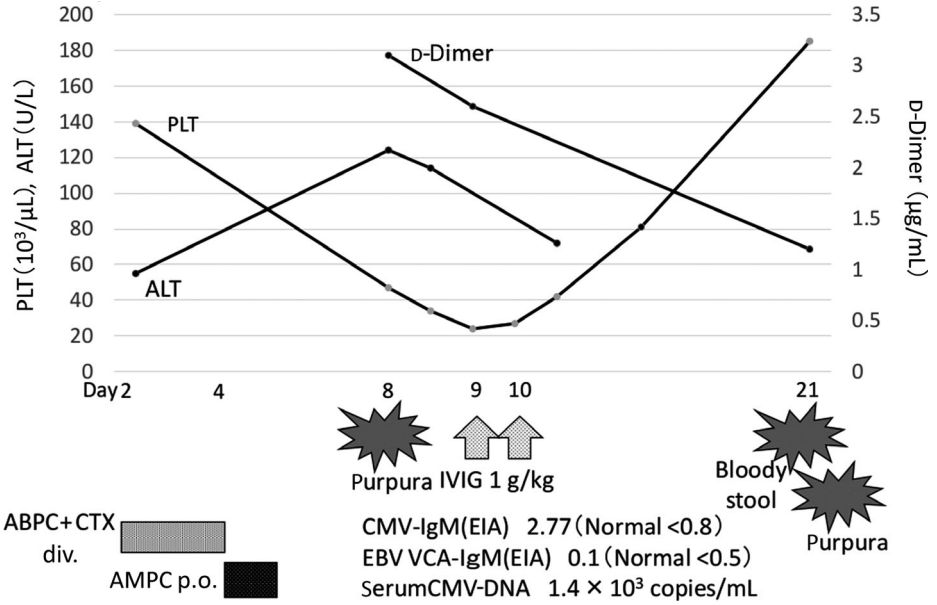

Fig. 1 Clinical course. ABPC, ampicillin; ALT, alanine aminotransferase; AMPC, amoxicillin; CMV, cytomegalovirus; CTX, cefotaxime; div, intravenous drip; EBV, Epstein–Barr virus; IVIG, i.v. immunoglobulin; PLT, platelets; p.o., per os; VCA, viral capsid antigen.

wall or from indirect vascular injury through immunopathological mechanism. On a literature search, only three pediatric cases of CMV-associated vasculitis were identified.[2–4] One of them might have been a case of congenital CMV infection, and another was thought to be CMV reactivation induced by steroid therapy. The third involved a patient with CMV mononucleosis syndrome who was not immunocompromised, and a punch biopsy specimen taken from the papular lesion showed an inflammatory process of the upper and middle dermis with lymphocytic vasculitis. None of these patients had ITP.

In the present case, thrombocytopenia existed and appeared to respond to IVIG therapy promptly, but the patient developed purpura and bloody stool even after the platelet count had returned to normal. The transient clinical course and coagulation studies (PT, APTT and fibrinogen) did not indicate a congenital etiology or coagulation disorder, and the elevated FDP and D-dimer suggested vascular injury. Therefore, it is possible that mucocutaneous vasculitis contributed to the purpura and bloody stool in this patient.

The major limitation in this report is that we were unable to perform a skin biopsy because the patient's clinical condition was stable. Despite the lack of histological confirmation, we believe that infection with a common virus, such as CMV, could lead to mucocutaneous bleeding through two different immunopathological processes: thrombocytopenia and possible vasculitis.

Disclosure

The authors declare no conflict of interest.

Author contributions

H.E., Y.O., M.S., M.M. and H.M. were involved in the clinical management of the subject and decisions concerning the treatment. H.E. wrote the manuscript. Y.O., M.S. and H.M. critically reviewed the manuscript. All authors read and approved the final manuscript.

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Fig. S1 Multiple purpura rashes induced peripherally by the tourniquet at day 8.