

Diagnosis and management chronic anemia in herpes simplex virus (HSV) type 1 infection

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Received; February 2, 2022, Revised; April 15, 2022, Accepted; June 2, 2022

ABSTRACT Herpes Simplex Virus type 1 (HSV-1) is usually the cause of oral infection. This infection often precedes the development of this chronic anemia, and it is reasonable that the blood in circulation through virus-infected tissue becomes contaminated with virus particles on the red cell surface. These virus-contaminated red blood cells may stimulate the reticuloendothelial system to produce antibodies that destroy the red blood cells and lead to anemia. Describe the clinical manifestations, pathogenesis, laboratory examination, diagnosis, and therapies for managing Chronic Anemia in HSV-1 infections. (HSV) Infection 1 causes infections above the waist majority of oral and pharyngeal and can be transmitted through direct contact with infected individuals. Prodromal symptoms preceded HSV-1 infection for 1 or 2 days consisting of fever, headache, malaise, arthralgia, and submandibular lymphadenopathy; subsequently, small blisters appear and quickly rupture, leaving shallow round discrete ulcers at all portions of the mouth. Diagnosis of anemia and HSV type 1 infection requires a complete history, clinical examination, and laboratory examinations (anti-HSV 1 IgG and IgM) or HSV isolation. Symptomatic treatment with antipyretics/analgesics, local antiseptics, vitamins, a soft diet, and adequate fluid intake is usually sufficient. Antiviral medication, either systemically or topically, may help if the infection is identified early in the prodromal stage. **Conclusion:** Chronic Anemia and HSV Type I infection should be diagnosed and managed with complete anamnesis, clinical manifestation, and laboratory examination.

KEYWORDS: Infection, HSV-1, Anemia, Diagnosis, Management

INTRODUCTION

Anemia is a multifactorial condition with several pathological mechanisms. Anemia, based on the World Health Organization (WHO) criteria, is defined as a hemoglobin concentration of less than 12 g/dL in women and less than 13 g/dL in men. High anemia prevalence is found in the elderly and women because it has many risk factors for anemia, such as nutritional deficiencies, bleeding, and chronic diseases. Symptoms of anemia begin to appear when there is a decrease in the amount of normal hemoglobin, hematocrit, and erythrocytes count in the blood circulation.^{1,2}

Anemia is a public health problem worldwide. According to WHO in 2014, the prevalence of anemia is said to be a public health problem categorized as follows: not a public health problem if <5%, a mild public health problem if 5-19.9%, a moderate level health problem if 20-39.9%, and is a serious health problem if 40%. The risk factors most

prevalent in low- and middle-income countries include nutritional deficiencies, infection/inflammation, and genetic hemoglobin disorders.^{1,3,4}

Cases of anemia in Indonesia there are 19.7% in women, 13.1% in men, and 9.8% in children who have anemia. As many as 60.2% of these anemias are hypochromic microcytic anemia (small cells with a low amount of hemoglobin in the cells), which is mostly caused by iron deficiency anemia. Meanwhile, based on the Basic Health Research in 2010, more than 10% of school-age children in Indonesia are anemic.^{1,2,3}

Anemia is a condition in which there is a decrease in the number of erythrocytes, as indicated by a reduction in hemoglobin levels, hematocrit, and erythrocyte count. The synthesis of hemoglobin requires the availability of sufficient iron and protein in the body.^{5,6}

How to cite this article: Mailiza F. Diagnosis and management chronic anemia in herpes simplex virus (HSV) type 1 infection. JDS. 2022; 7(1): 51-54

Anemia can cause the activity of enzymes in the epithelial cell's mitochondria to decrease due to disruption of oxygen and nutrient transport, thereby inhibiting the differentiation and growth of epithelial cells. As a result, the end-stage differentiating epithelial cells towards the stratum corneum is inhibited. Then the oral mucosa will become thinner because of loss of normal keratinization, atrophy, and more efficiently being ulcerated. Anemia also causes damage to cellular immunity, reduced bactericidal activity from polymorphonuclear leukocytes, inadequate antibody response, and abnormalities in epithelial tissue.^{6,7}

Oral Mucosa can manifest systemic diseases, nutritional deficiencies, and early signs of severe or chronic disease. Herpes Simplex Virus type 1 (HSV-

DISCUSSION

Herpes Simplex Virus type 1 (HSV-1) is usually the cause of oral infection. This infection often precedes the development of these chronic anemias. It is reasonable that the blood in circulation through virus-infected tissue becomes contaminated with virus particles on the red cell surface. These virus-contaminated red blood cells may stimulate the reticuloendothelial system to produce antibodies which destroy the red blood cells and lead to anemia. Hematological examination shows that hematocrit, hemoglobin value, and the number of erythrocytes are lower than the expected value range.^{10,11}

Clinical Manifestation in Oral Infection Virus was prodromal symptom as tingling, pain, burning sensation, or itching at the site of reactivation. Reactivation may result in irregular oral ulceration in the distribution of an affected nerve. Oral lesions of HSV-1 infection can be vesicular, erosive, erythematous, and ulcerated. Differential diagnosis is needed because many HSV-1 infectious lesions are similar to other diseases. HSV-1 condition can be diagnosed in comparison with RAS herpetiform type, Singapore flu, herpangina, erythema multiforme, intraoral zoster, acute ulcerative gingivitis, pemphigoid, and pemphigus.^{12,13}

The diagnosis of HSV-1 can be established through a complete history, careful physical examination, and laboratory investigations in the form of viral culture, PCR, Direct Fluorescent Antibody tests, and serological tests, namely IgM and IgG HSV type 1 antibodies. They were still in the form of blisters because they had high viral titers (89% gave positive results). The virus will grow in cultural media within 5 days. PCR is a more

1) is usually the cause of oral infection, lifelong persistence in the human body and activates the macrophage protection system, which leads to disruption of iron utilization by the cells of the hematopoietic system and the development of anemia of chronic disease.^{7,8,9}

Herpes simplex virus (HSV) is a virus that most often causes a human infection that can be transmitted through body fluids such as saliva and other body fluids with latent characteristics and can reactivate during immunosuppression (reduced immune system).^{10,11,12}

This review describes clinical manifestations, pathogenesis, laboratory examination, diagnosis, and therapies for managing Chronic Anemia in HSV-1 infections.

accurate laboratory test for HSV and can be used for asymptomatic HSV development conditions. Direct Fluorescent Antibodies can detect HSV from air-dried specimens and give as many as 80% positive results when modified by viral culture.^{10,12}

A serological examination is required to confirm the diagnosis of HSV-1. Infections associated with increased immunoglobulin M (IgM) titers followed by permanent IgG titers (seroconversion) indicate previous infection but not resistance to reactivation. IgM is the main antibody formed after infection, 1-2 weeks after onset. After a few weeks or months, IgM will not be detected because it decreases rapidly. Otherwise, IgG antibodies will form slowly over months or years. Recurrent HSV-1 infection is associated with elevated IgG titers. An increase in IgG up to four times (fourfold) is an indication criterion for active infection.^{11,13,14}

Micronutrients have an important role in homeostasis, supporting the production of enzymes, hormones, and other substances, which the body needs for energy production. Vitamin B12 is one of the coenzymes and is needed in the formation of red blood cells. Folic acid also has an important role as a component of enzymes needed by DNA, RNA, production of red blood cells and white blood cells. It is important in cell growth, replication, and maintaining cell life metabolic pathways. Lifestyle and eating habits of less nutritious food disrupt metabolic processes through oxygen reduction reactions in cellular respiration. It causes a decrease in homeostasis in the body, which impacts the inhibition of the healing process of oral lesions.^{15,16,17}

HSV-1 infections identified early (within about three days) can be treated with antiviral (acyclovir) either topically or systemically. Antiviral therapy will control the signs and symptoms of infection. It is essential in treating oral lesions of HSV-1 disease in the form of advice for adequate rest, lots of drinking and eating soft foods high in calories and high in protein, giving antipyretics or analgesics to reduce pain and fever, along with multivitamins. For extra-oral lesions, penciclovir 1% or 5% acyclovir cream can be provided during the prodromal period. For intra-oral lesions, oral antiviral can be given at the onset of the disease. In conditions after the beginning of anti-inflammatory therapy can be given that help the healing of oral lesions supported by multivitamins. Many patients do not require treatment because this disease is self-limiting for 1 to 10 days.^{13,14}

Giving vitamin B12 with folic acid oral will form S-adenosylmethionine compounds involved in the immune function of body cells. Vitamin B12 and folic acid also play a role and work together in erythrocyte regeneration and cell reepithelialization. Vitamin B12 is a cobalt-containing vitamin synthesized by microorganisms. It occurs in different chemical forms in foods of animal origin, including milk, cheese, and eggs, or foods fortified with vitamin B12 artificially. Vitamin B12 in the human body has two critical metabolic functions, first as methylcobalamin which acts as a coenzyme in the methylation of homocysteine to methionine in

the cytosol. This reaction is an essential initial step in converting folic acid to its metabolically active form. It is required as a coenzyme in synthesizing thymidine for DNA, the second function of which is vitamin B12 as 5'-deoxyadenosine cobalamin, or a coenzyme in the conversion of coenzyme. Enzyme A L-methylmalonyl to coenzyme A sanity in mitochondria.^{18,19}

Folic acid is essential in nucleic acid synthesis, methionine regeneration, reverse reactions, and redox reactions necessary for normal metabolism. Folate is required in various biochemical reactions of S-adenosylmethionine (SAM) synthesis for DNA, RNA, and protein methylation. Folic acid also has a role in the de novo synthesis of purines and thymidylate for DNA replication and repair.^{24,25} Purines have an essential role in cell growth, repair, and development because they align with the pyrimidine bases of the DNA helix and the de novo synthesis of thymidylate. Thymidylate synthase is an enzyme that plays a role in cell and tissue replication.^{20,21}

Vitamin B12 and folic acid are involved in metabolic pathways for DNA and protein synthesis, namely methyl donors. So the administration of micronutrient therapy containing vitamin B12 and folic acid in these patients can help the process of DNA and protein synthesis of oral mucosal epithelial cells, which affect the growth, development, and repair processes of cells and help accelerate the healing process of oral lesions.^{22,23,24}

CONCLUSION

Knowledge of the 3G motions in brushing teeth, using mouthwash, and changing toothbrushes once in 3 months is essential for students to understand because dental and oral hygiene must be maintained. This study aims to determine the effectiveness of online 3G motions education in maintaining dental and oral health in children during the new standard period of the Covid-19 pandemic era. Based on the results of the research on 3G Motions Education in the New Normal Period of

the Covid 19 Pandemic Era for the 4th Graders of SD Kartika 1-11, it showed low effectiveness. It could happen because the constraints caused by the percentage of the level of understanding of each student varies depending on the teaching method used. Learning techniques with adequate exposure can be remembered as much as 10%-30% of the information heard. Inadequate internet access disrupts communication because the information respondents get is not perfect.

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