**Epstein–Barr Virus Infection Disguised as Acute Leukemia: A Case Report**

ABSTRACT:

Epstein Barr virus (EBV), the most prevalent viruses known to infect humans belongs to the herpes family. The genome of the EBV is the first to be fully sequenced. Infectious mononucleosis is a condition that commonly occurs in adulthood presenting with symptoms such as fever, sore throat and generalized lymphadenopathy. Here we present a case in which an infection was disguised as leukemia due to similar presentation of the disease thus, emphasizing the need for proper history to be taken in all patients. It is very essential to get the complete history of the patients to all possible exposures of infection and to include EBV-associated syndromes in differential diagnosis. A Thorough evaluation must be conducted to avoid mistakenly diagnosing the patient with lympho proliferative neoplasms.

Keywords: Epstein Barr virus (EBV), Infectious mononucleosis, leucocytosis, Leukemia

INTRODUCTION:

Epstein Barr virus (EBV), the most prevalent viruses known to infect humans belongs to the herpes family. Though less than 1% of cases result in serious consequences, the infection usually resolves on its own and seldom causes harmful side effects (1). The genome of the Epstein-Barr virus is the first human herpes virus to be fully sequenced. From benign infectious mononucleosis to malignant nasopharyngeal carcinoma, Burkitt's lymphoma, and primary Central Nervous System lymphoma in acquired immunodeficiency syndrome (AIDS) patients, it is linked to a wide range of illnesses.

EBV is aetiologically linked to wide range of lymphoproliferative lesions and malignant lymphomas of B-, T- and NK-cell origin. Some occur rarely as accidents of virus persistence in the B lymphoid system, while others result in viral entry into unnatural target cells. Early research showing that EBV strongly stimulates B-cell growth suggested that the virus might drive lymphoma development through a direct and simple oncogenic process. In reality, the pathogenesis of EBV-associated lymphomas includes a complex exchange between distinctive designs of viral quality expression and cellular hereditary changes(2).

Infectious mononucleosis is a condition that commonly occurs in adulthood presenting with symptoms such as fever, sore throat and generalized lymphadenopathy (1). Here we present a case in which an infection was disguised as leukemia due to similar presentation of the disease thus, emphasizing the need for proper history to be taken in all patients.

CASE presentation:

A 16-year-old female was admitted with complaints of fever-evening rise of temperature, cough with expectoration, loss of appetite and generalized tiredness for few days. She also had lower respiratory tract infection a few days back and was treated symptomatically for the same. On admission, the general physical examination revealed mild pallor. Bilateral cervical and right axillary lymph node enlargement was seen. Her blood investigation showed leucocytosis, elevated LDH and deranged LFT. Her WBC = 21820, Platelet = 196000 ALT =167, AST=168, LDH = 562 on admission. CRP was negative. The normal CRP level is considered to be less than 8 mg/dL.In our case, the CRP on admission was 4.56.

Table 1: Medical Report of Patients

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| LAB TESTS | NORMAL VALUES | 23/10/2024 | 24/10/2024 | 25/10/2024 |
| Total count | 4000-11000 | 21820 | 21420 | 21100 |
| Platelets | 1-4.4 Lakh/m |  | 196000 | 276000 |
| ALT | Upto 40 U/L | 167 | 216 | 165 |
| AST | Upto 40 U/L | 227 | 204 | 175 |
| CRP | <8 mg/dL | 4.56 |  | 2.2 |
| LDH | 200-400 mU/ml |  | 562 | 367 |

Urine and blood culture were sterile. Monospot -infectious mononucleosis, widal and all viral markers were negative. Her peripheral blood smear revealed hypochromic microcytic anemia, moderate leucocytosis with lymphocytosis,10 % of atypical cells and several reactive lymphocytes(22%).No malarial parasite seen. Based on her symptoms and elevated total count she was suspected of ALL.

In view of leucocytosis and presence of atypical cells in peripheral smear oncology consultation was sought in order to rule out acute lymphocytic leukemia. Her acute leukemia comprehensive panel revealed no blast cells and predominant T cell population seen. Bone marrow aspiration showed trilineage hematopoiesis with lymphocytosis (around 20-21%) and Bone marrow biopsy revealed showed trilineage hematopoiesis with erythroid hyperplasia.

Igm anti-viral capsid antigen for EBV was positive (18.70). The patient was managed conservatively. Her WBC counts came down with decrease in the percentage of atypical cells in peripheral smear and downward trend of LDH .The patient was followed up in the outpatient department after one week and had regression of lymph node enlargement as well as normalization of WBC counts.

DISCUSSION:

EBV is a herpes virus in which over 90% of the population worldwide has been infected. EBV infections often are associated with symptoms ranging from asymptomatic to infectious mononucleosis. (3) EBV infection present with systemic manifestations including splenomegaly, lymphadenopathy, headache, malaise, fever, and sore throat. In children these infections are often asymptomatic or present with vague symptoms and making it harder to diagnose at times.(4) Patients often experience symptoms such as fatigue as the most common lingering complaint for several months.

In a study done by Rea et al., physical exam findings such as cervical lymphadenopathy and pharyngitis, were observed even at six months after the initial infection in about one-fourth of the study group(n=140). The most common Lab abnormalities included lymphocytosis, with a presence of atypical lymphocytes, and most cases also showed abnormally elevated liver function tests(5).

Lympho-proliferative diseases are a close mimicker of EBV associated syndromes, as the primary target of this virus are B cells but it also leads to proliferation of T cells as well. To get definite diagnosis of EBV-associated illnesses, there are variety of techniques required, such as peripheral smear examination, viral serologic markers, PCR detection of viral DNA, and careful flow cytometry interpretation(6).

Epstein Barr virus often requires only symptomatic treatment with medications that can reduce fever and pain. It's difficult to maintain adequate nutrition, because many patients have anorexia during first two weeks of their illness,and they find it difficult to eat.Some studies found that while antiviral medications did lessen the amount of virus secreted in the mouth, overall symptoms remained same(7).

CONCLUSION:

Epstein-Some studies found that while antiviral medications did lessen the amount of virus secreted in the mouth, overall symptoms remained same. Barr virus infections are often presented with symptoms that resemble haematological malignancies. It is essential to get the complete history of the patients to all possible exposures of infection and to include EBV-associated syndromes in differential diagnosis. A Thorough evaluation must be conducted to avoid mistakenly diagnosing the patient with lympho proliferative neoplasms.

**CONSENT:**

The authors have taken written consent from the patient to conduct the study.

**Disclaimer (Artificial intelligence)**

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

**REFERENCES:**

1. Alli A, Nabil F, Ortiz JF. Infectious mononucleosis: a case report with unusual features and abnormal laboratory findings. Cureus. 2021 May;13(5):e14904. doi:10.7759/cureus.14904.
2. Shannon-Lowe C, Rickinson AB, Bell AI. Epstein-Barr virus-associated lymphomas. Philos Trans R Soc Lond B Biol Sci. 2017 Oct 19;372(1732):20160271. doi: 10.1098/rstb.2016.0271. PMID: 28893938; PMCID: PMC5597738.
3. Hoover K, Higginbotham K. Epstein-Barr virus. [Updated 2023 Aug 8; cited 2025 May 30]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan–. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK559285/>
4. Grotto I, Mimouni D, Huerta M, Mimouni M, Cohen D, Robin G, Pitlik S, Green MS. Clinical and laboratory presentation of EBV positive infectious mononucleosis in young adults. Epidemiol Infect. 2003 Aug; 131(1):683-9. doi: 10.1017/s0950268803008550. PMID: 12948368; PMCID: PMC2870009.
5. Rea TD, Russo JE, Katon W, Ashley RL, Buchwald DS. Prospective study of the natural history of infectious mononucleosis caused by Epstein-Barr virus. J Am Board Fam Pract. 2001 Jul-Aug; 14(4):234-42. PMID: 11458965.
6. Chhabra P, Law AD, Sharma U, Suri V, Sachdeva MS, Kumari S, Varma S, Malhotra P. Epstein-barr virus infection masquerading as acute leukemia: a report of two cases and review of literature. Indian J Hematol Blood Transfus. 2014 Mar;30(1):26-8. doi: 10.1007/s12288-012-0207-2. Epub 2012 Oct 25. PMID: 24554817; PMCID: PMC3921326.
7. Odumade OA, Hogquist KA, Balfour HH Jr. Progress and problems in understanding and managing primary Epstein-Barr virus infections. Clin Microbiol Rev. 2011 Jan; 24(1):193-209. doi: 10.1128/CMR.00044-10. PMID: 21233512; PMCID: PMC3021204.