

Detection of Cytomegalovirus in a sample of multiple sclerosis

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ABSTRACT

Multiple sclerosis (MS) is an autoimmune disease characterized by losing the myelin sheath surrounding axons in the central nervous system, although the etiology of the disease still unclear, but many of environmental factors such as infectious diseases might contribute in inducing the disease. One of these infectious diseases is cytomegalovirus. The current study involved examining 45 patients with multiple sclerosis (MS) and 25 apparently healthy persons as control, to detect the anti-Cytomegalovirus antibody in their sera by a rapid test and ELISA technique. Our results showed that three sera sample were positive in patients with MS (6.66%), which suggest that cytomegalovirus may be one of the triggering agent to multiple sclerosis.

Keywords: autoimmune disease, multiple sclerosis, viruses, Cytomegalovirus.

1. INTRODUCTION

Multiple sclerosis (MS) is the most prevalent demyelinating disease of young adults, affecting many persons in the developed countries. It is an autoimmune disease characterized by losing the myelin sheath surrounding axons in the central nervous system [1], although the etiology of the disease still unclear, but many environmental factors may contribute in triggering the disease like infectious agents (viruses and bacteria) in individual with genetic predisposition [2]. There are four major clinical subtypes of MS based on disease pattern were introduced, relapsing-remitting (R.R.), primary progressive (P.P.), secondary progressive (S.P.) and relapsing progressive (R.P.) [3]. Therefore, a variety types of evolution do exist for MS, not to mention the vast range of rates of accumulation of irreversible neurological disability during the disease from one patient to another. The risk of developing MS in the general population is approximately 0.2% [4].

Many viruses have been investigated as “triggers”, to date no virus has been definitively associated with MS. Many studies related to viral infection in MS are serological and involve the demonstration of increased

antibody titers against particular viruses [5]. Human herpes virus (HHVs) has been associated with the pathogenesis of a wide range of severe diseases based on serologic, molecular and histopathology findings [6, 7]. Cytomegalovirus (CMV) is a member of the Herpesviridae (beta herpes virus) with a double stranded DNA (235 kb) that infects more than 40-60% of general population and up to 100% within some subpopulations and/or geographic areas [8, 9]. CMV infection most commonly develops between ages 10-35 years and most people are exposed to CMV early in life and do not realize it because they have no symptoms. Laboratory signs of acute CMV infection and anti-CMV antibodies have been observed in autoimmune diseases [10, 11, 12, 13, 14]. Moreover, CMV has been implicated as a co-etiological agent in brain cancer and associated with a wide range of inflammatory diseases [10, 15]. CMV uses a variety of strategies that target host defenses, from the disruption of antigen-processing pathways to the modulation of cytokines [16], all of which may contribute to the success of CMV in establishing coexistence. During active infection, CMV can be found in most tissues and organs, as well as in most bodily fluids especially urine and saliva [17]. As

aforementioned, the current study aimed to assess the anti-CMV IgG antibody in the sera of MS patients comparing with control group by using two different techniques.

2. MATERIALS AND METHODS

This study included 45 patients with MS with an age range of 20 – 39 years (29.5±1.04 years) and 25 apparently healthy individuals as control group with an age matched to patients group (30±1.06 years). The MS group were referred to the Consultant Clinic at the Department of Rheumatology, Baghdad Teaching Hospital during the period January – March 2017 for diagnosis and treatment. The anti-CMV IgG antibody was estimated in the studied groups by using two different techniques, first, the sera were examined by using a rapid cassette technique for IgG and IgM antibodies detection (CTK Biotech, Inc., USA), then the

anti-CMV IgG antibody assessment done by using ELISA technique (Biocheck, Inc., USA).

Statistical analysis

The data were expressed as mean ± SD, T-test was used to expressed the significant differences between the studied groups ($p<0.05$) by using computer program IBM SPSS version 23

3. RESULTS AND DISCUSSION

The results of current study showed that three sera sample of the 45 MS patients sera samples had a seropositive for anti-CMV IgG (6.66%) by a rapid cassette test compared with seronegative of control group (100%). The mean ± SD of patients group was 1.7 ± 0.43 IU/ml, while in control group was 0.45 ± 0.2 IU/ml, when using ELISA technique to assess the anti-CMV IgG antibody, as illustrated in table (1).

Table 1: Anti-CMV IgG antibody in studied groups

Test	MS group		Control group		Probability
	positive sera	negative sera	positive sera	negative sera	
Cassettes technique	3	45	0	25	P<0.05
ELISA technique	1.7± 0.43		0.45 ± 0.2		P<0.05

The present results appeared a possible association between CMV infection and MS, Other study agreed this result, that showed the anti-CMV IgG antibody was positive in 65 (79.3%) of patients with MS, and CMV is negatively associated with adult-onset MS pathology [18].

When HCMV plays any causative role for the MS pathogenesis and onset of autoimmunity, it should be expected that a higher prevalence of HCMV IgG antibodies is found in patients suffering from defined types of autoimmune diseases. [19].

Multiple sclerosis (MS) is a chronic autoimmune disease of the central nervous system (CNS). Cytomegalovirus (CMV), a β herpes virus, there was evidence indicates that CMV contributes to MS disease via interplay of different mechanisms such as molecular mimicry, and epitope spreading [20].

4. CONCLUSION

As aforementioned, the present study requires more samples to evaluate the role of CMV in Multiple sclerosis (MS) and thus may lead to suggest that CMV may be trigger factor in MS.

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