Original Article

Evaluation of HTLV-1 in Human Subgingival Plaque of Seropositive Patients

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Abstract:

Objective: The aim of this study was to investigate the existence of human T-lymphotropic virus type 1 (HTLV-1) in subgingival plaque of HTLV-1 seropositive patients.

Materials and Methods: A total of 18 patients including 13 females and five males, with a mean age of 37 years participated in this descriptive study. Half of them were HTLV-1 carriers and the others were in HTLV-1 associated myelopathy tropical spastic paraparesia (HAM/TSP) stage. Subgingival dental plaque samples were taken using sterile paper points and examined to detect HTLV-1 using polymerase chain reaction (PCR).

Results: None of the carrier stage patients revealed HTLV-1 virus, while only one patient in the HAM/TSP group was found with the virus.

Conclusion: This study showed that the existence of HTLV-1 virus in subgingival plaque of patients suffering from HTLV-1 in carrier and HAM/TSP stages with healthy periodontium is rare. Studies with larger samples are recommended.

Key Words: Human T-lymphotropic virus 1; Dental Plaque; Polymerase Chain Reaction

Journal of Dentistry, Tehran University of Medical Sciences, Tehran, Iran (2008; Vol: 5, No.3)

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Received:12 September 2007
Accepted: 2 January 2008

INTRODUCTION

The role of microorganisms in the etiology of periodontitis has well been established. A few studies have been carried out on the presence of viruses in human subgingival plaque and their role in periodontal disease. These studies have indicated that human Cytomegalovirus, Epstein-Barr virus, and human herpes simplex virus might be recovered from subgingival plaque of sites with periodontitis [1-6].

It has also been suggested that the mechanism of action of viruses in periodontal pathology is by contaminating inflammatory cells which in turn may favor the up-growth of periodontal pathogenic bacteria such as *Porphyromonas gingivalis*, *Bacterioide forsythus*, *Prevotella intermedia*, *Prevotella nigrescence*, *Treponema denticola*, and *Actinobacillus actinomycetemcomitans* [7,8].

Human T-lymphotropic virus type 1 (HTLV-1) belongs to the retrovirus group C family, first described by Poiesz et al [9] in 1980 and exists endemically in South Japan, Caribbean, Central and South Africa, Melanesia, South America and the Middle East [10-12]. Studies reported Khorasan province of Iran as a new endemic area for the virus with a serologic prevalence of 2.3%-11% [13,14].

The prevalence of HTLV-1 infection in the city of Mashhad is 11-6%. As many as 3-5% of all HTLV-1 contaminated subjects were seen to develop adult T-cell leukemia (ATL) and approximately 25% of them to develop HTLV-1 associated myelopathy tropical spas-

tic paraparesia (HAM-TSP) [15]. Data on the presence of this virus in the oral cavity is limited. Achiron et al [16] demonstrated the virus in salivary samples and suggested the possibility of viral transmission through saliva. Considering the fact that Khorasan province is an endemic region for this virus, we sought to evaluate the presence of this virus in subgingival dental plaque. Presence of the virus in dental plaque and gingival fluid could potentially have some bearing on infection control and dental public health policies at least in areas where the virus is endemic. The aim of this study was to investigate the frequency of HTLV-1 virus in subgingival plaque of those infected by it.

MATERIALS AND METHODS

This was a descriptive study performed in 2005 at the Department of Periodontics, Mashhad Dental School and Dental Research Center. Eighteen patients (13 females, five males, and age 37 years) took part in the study. The patients were all contaminated by HTLV-1 as evidenced by blood test using polymerase chain reaction (PCR) technique. Of these patients, nine were in the carrier state without demonstrating any sign of HAM-TSP, while other nine had developed signs and symptoms of the disease.

After an informed consent was taken, subgingival plaque sampling was performed from anterior Maxilla to because it was easy to be done and less likely to be contaminated by saliva. Briefly, the teeth were isolated using cotton rolls; dried using a blast of air and supragingival plaque was removed and eliminated using scalers. Then, three sterile paper points were consecutively inserted into the bottom of the gingival pocket, and moved across the tooth surface in the gingival sulcus. Afterwards, plaque samples were taken into proteinase K containing tubes. After PCR technique (Biometra, Germany) the samples underwent electrophoresis and the resulted gels were stained using 0.5 µg/ml ethidium bromide for DNA visualization by a gel documentation machine (Imaga, Netherlands) under 300 nm UV light (Fig 1).

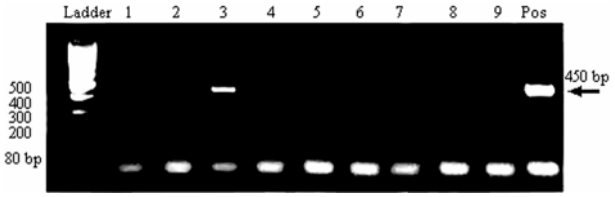

Fig 1. The PCR product of HAM/TSP group after electrophoresis. Column 3 shows a positive HTLV I sample with 450 bp.

RESULTS

Among the HAM/TSP patients, only one subject had the virus in his plaque sample. None of the healthy carrier patients showed the virus in their plaque sample. In the one patient whose plaque was positive for the virus, severe gingival inflammation was evident.

DISCUSSION

HTLV-1 is a form of oncorna viruses which has infected 10-20 million people worldwide and the first human retrovirus to be isolated in 1978 [9,17]. It has been shown that this virus is the causative agent of T-cell Leukemia in adults and some types of subacute myelopathies [18]. The target of HTLV-1 infection is CD4 positive peripheral blood mononuclear cells [19].

Considering the fact that dental plaque contains blood elements like mononuclear cells [20], we expected to recover HTLV-1 from the plaque samples of HTLV-1 serum-positive patients; however, our study demonstrated that only one of the 18 samples contained the virus. The patient had severe gingivitis and belonged to HAM/TSP group. The patients with HAM/TSP have 10-100 times more HTLV-1 infected cells than carriers. This increase could be explained either by proliferation of HTLV-1 infected cells or by efficient replication of the virus in the individual. The HAM/TSP pa-

tients have a relatively high percentage (11.63%) whereas the percentage of infected cells in most asymptomatic carries was less than 1% [21].

Several studies have so far depicted that localized chronic gingival inflammation exhibits several unique immunological features including elevated cellular and humoral immune responses [20,21]. Gingival mononuclear cells (GMCs) isolated from inflamed tissues, have been shown to contain large numbers of monocytes and macrophages (<50%) in addition to lymphocytes (30-40% CD4 and CD8) and plasma cells (5-17%) [22]. Proviral HTLV-1 is present in mononuclear cells of HAM/ TSP and carriers, as well. CD4 and CD8 T-cells are infected with HTLV-1 and express HTLV-1 antigen being viral reservoirs for HTLV-1 [23]. Additionally, high loads of HTLV-1 were demonstrated in mononuclear cells of HAM/TSP patients [24].

CONCLUSION

Presence of HTLV-1 in dental plaque and gingival sulcus is not common but is possible. Further studies with larger sample sizes are warranted.

ACKNOWLEDGMENTS

This study was supported by Research Center of Dental School and Neurology Department of Mashhad Ghaem Hospital.

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