GAVIN PUBLISHERS

Journal of Vaccines, Immunology & Immunopathology

Asamarai AM et al. J Vaccines Immunol 2017: J104.

DOI: 10.29011/2575-789X.000004

Editorial

Association of Human Cytomegalovirus and Epstein-Barr virus with Breast Cancer

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Citation: Alsamarai AM, Alobaidi AHA (2017) Association of Human Cytomegalovirus and Epstein - Barr virus with Breast Cancer. J Vaccines Immunol 2017: J104. DOI: 10.29011/2575-789X.000004

Received Date: 28 January, 2017; **Accepted Date:** 06 February, 2017; **Published Date:** 13 February, 2017

Breast cancer forms the most common cancer in women worldwide [1,2] and in Arab countries [3]. Breast cancer accounts for about 1/3 of the registered female cancer in Iraq [4] and with incidence rate of 31.1/ 100 000 in Iraqi women , while it was 18.4 for Iran, 22.4 for Saudi Arabia, 23.0 for Syria, 28.3 for Turkey, 47.0 for Jordan, and 47.7 for Kuwait [5,6]. Recent study in Iraq reported a trend for breast cancer to affect younger age group [7]. This study shows that the highest frequency of breast cancer (32.4%) was in women with age of 21-30 years. Unfortunately, 79.7% of breast cancer cases were in women with age of ≤ 40 years. In addition, 14.9% of breast cancer cases were in women with age of 16-18 years and 52.7% were in those with age of ≤ 30 years. This age shift pattern of breast cancer in Iraqi women was not consistent with previous studies in Iraq [6-12], Arab countries and globally [13,14]. The peak frequency of our study was 21-30 years, while previous studies in Iraq [15-21] indicated that breast cancer frequency peak was in fifth decade of life, in Asian countries in 40-50 years and it was 60-70 years in Western countries [22].

The mean age of women with breast cancer in our recent study was 30.6 ±11.5 years and was not agreed to previous studies in Iraq [6,15-25], Arab countries [13,26] and globally [27]. Thus breast cancer diagnosis age was a decade earlier than previous Iraqi and Arab countries studies and two decade earlier than Western countries [7].

The high incidence of breast cancer in younger age group may be attributed to the environmental pollution in Iraq during the period from 1991 to date, which may act as a risk factor for breast cancer development [28-34]. In addition, possibility of that cancer may be of infectious origin may contribute to the increase in the cancer incidence in younger age group. A virus was implicated to play a role in cancer induction [35-37]. Herpesviridae family has been implicated as a cause of breast cancer [1]. Both Human cytomegalovirus [HCMV] and Epstein–Barr virus [EBV] infections in Arab countries including Iraq were with high rate of infection [38-41]. Previous studies suggest that HCMV and EBV infections are linked with the development of breast cancer [42-45]. CMV transform cells in vitro [46-48] and thus may induce cancer in vivo through many mechanisms [7], including their ability for induction of immune-suppression [49-50].

The association between HCMV and EBV infections and development of breast cancer depend on the detection of viral particle in breast cancer tissue and / or serological studies [36,37,44,51-58]. Previous studies found that HCMV was detected in 7.4% to 100% in breast cancer tissue [45,51,54,57,59-62], however, other studies not detected CMV in breast cancer tissue [42,53,59]. In a recent study we detected HCMV DNA in 20% of breast cancer tissue by using PCR [63], which was lower to that reported by others [64,65] in Iraqi population.

While EBV was detected in 26.7% in our recent study [63], however, other studies detected EBV in 6.5% to 35.25% in breast cancer tissue [43,55,60,66-79]. In addition, EBV detection rate in breast cancer tissue was the lowest in USA (18.27%) and the highest in Asia (35.25%) [80], while Zerki et al [81], reported that EBV was detected in 28% of Iraqi women and in 40% of Egyptian women. Furthermore, Hanna et al [82] detected EBV in 40% of breast cancer tissue in Iraqi women.

In our recent study [63], we found that mean serum and frequency of positivity for CMV IgG, EBV VCA IgG, EBV EBNA -1 IgG and heterophile antibodies were significantly higher in women with breast cancer as compared to controls. In addition, area un-

der Receiver Operating Characteristic curve [ROC] and Odd Ratio [OR] confirmed an association between CMV and EBV infections and breast cancer. Previous studies from other geographical areas show high prevalence of IgG positivity as compared to controls [44,36,37,52,53]. In addition, EBV seropositivity and mean serum antibody were significantly associated with breast cancer [53,83-85]. However, other studies not confirmed such association [44,52].

In conclusion, HCMV and EBV may play a role in the development of breast cancer. These two viruses may be an etiology of breast cancer or it may induce immune-suppression [86-87] that enhance the development of breast cancer. Multiple viral infections may increase the risk of breast cancer development in women and viral co-infection may be an important mechanism that plays a role in the induction of breast cancers demonstrated by viral co-infection high prevalence in breast cancer tissue.

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