American Journal of
Biomedical Science & Research

www.biomedgrid.com
ISSN: 2642-1747

Opinion

The Relationship Between Toxoplasmosis and Breast Cancer

Hadi MH Al Mayali*, Wejdan M Kadhem and Taghreed H Abd al Ameer

Biology department, College of Education, University of Al-Qadisiyah, Iraq

***Corresponding author:** Hadi MH Al Mayali, Biology department, College of Education, University of Al-Qadisiyah, Iraq.

To Cite This Article: *Hadi MH Al Mayali, Wejdan M Kadhem and Taghreed H Abd al Ameer. The Relationship Between Toxoplasmosis and Breast Cancer. Am J Biomed Sci & Res. 2021 - 14(3). AJBSR.MS.ID.001998.* DOI: 10.34297/AJBSR.2021.14.001998.

Received: September 27, 2021; **Published:** October 07, 2021

Keywords: Sporozoites; Toxoplasmosis; Breast Cancer; Mammals; Birds; Humans; Immunosuppressed; Upiquitous; Obligatory; Intracellular; Lymphoma; Hematologic; Malignancy; Nervous System; AIDS

Introduction

Toxoplasma gondii is upiquitous, obligatory, intracellular parasite causing a serious and common disease known as toxoplasmosis. It is one of the common zoonotic parasites between humans and animals and causes serious problems for humans, especially immunosuppressed people [1]. *T. gondii* is still a risk on animals and human health in the world due to it is uncontrolled until now because to it's a complexity of its lifecycle which include a sexual cycle in epithelial cells of cat's intestine and asexual cycle in birds & Mammals involving human [2]. This parasite is still a real danger to human and animal health due to the complexity of its life cycle, which includes a sexual cycle in epithelial cells of the cat's intestine, which produces sporozoites, and an asexual cycle in birds and mammals (humans), which produces bradyzoites & tachyzoites [3]. All phases contain a unique virulence component that allows it to influence the immune system and form a persistent infection. Furthermore, until today, there has been no widely acknowledged human vaccination against toxoplasmosis [4]. Breast cancer is the most frequent disease in women worldwide, accounting for 23% of the 1.1 million new women cancer diagnoses each year. It is additionally the biggest causing of cancer-related fatalities worldwide, with low-resource countries having the greatest case fatality rates. Breast cancer has claimed the lives of over 4.4 million women in the last five years, making it the most common cancer in women, making breast cancer in women the most prevalent cancer globally.

According to the most recent Iraqi Cancer Registry, breast cancer act the most common type of women malignancy, accounting for almost one-third of all recorded female cancers ,this shows that the breast is the leading cancer site among the Iraqi population in general , Immunodeficient Patients with hematologic malignancies especially lymphoma, bone marrow transplants, solid organ transplants, or AIDS are among the immunocompromised patients who are more susceptible to toxoplasmosis and *Toxoplasma* infection has a high seroprevalence rate of about 50% in immunocompromised patients [5] and the commonality cause of nervous system lesions in HIV patients [6]. Toxoplasmosis is caused by the reactivation of a latent infection in most immunocompromised people. The biggest risk of developing disease is in the presence of initial infection in heart transplant patients and a limited number of other immunocompromised individuals [7,8]. When *T. gondii* infection is suspected in immunocompromised patients who have been infected with the parasite for a long time [7], data showing apparent reactivation (increasing IgG and IgM titers) may be observed even though there is no clinically visible illness.

Additionally, in the presence of toxoplasmosis, serologic test results compatible with chronic infection may be found [6,7]. Indicating that Toxoplasmosis and another types of cancer, particularly Nasopharyngeal cancer, and Rectal cancer, are likely linked [9]. There is a great relationship between toxoplasmosis and breast cancer, as the hormonal system of the host infected

with toxoplasmosis plays a major role in the process of the parasite's stability, as it affects the parasite's tissue activities, and the parasite can harness these cells during its presence in the host cells for its benefit and hormones play a major role in Stability of the parasite by affecting the host's immune system in favor of the parasite, The parasite also has the ability to exploit hormones in the host's immune system. The hormones bind to special receptors on the parasite, which leads to blocking the effect of antibodies secreted against the parasite by the host [10]. There are a several studies that have demonstrated the relationship of toxoplasmosis with breast cancer, including the study by Mahmood et al. (2019) which demonstrated an association between toxoplasmosis and breast cancer, and the study by Anvari et al. (2019) and the study by [11] Canada et al. (2015) An association was found between toxoplasmosis and immunosuppressed patients.

The reason for the association of pathogens (bacteria, viruses, and fungi) with cancerous diseases is attributed to the fact that chronic infections are accompanied by secondary infections and serious complications that lead to the occurrence of a tumor in infection that turns into a cancerous tumor in the future [12]. Several investigations have discovered a relationship between toxoplasmosis and tumors. Toxoplasmosis has been linked to a variety of cancers, including many types of cancers, Furthermore, infection is thought to account for almost 20% of pathogens of malignancies, involving viruses, parasites, & bacteria [13]. Sanad et al. 2014 [14] found that intact immunity is critical in treating parasite infections. Immunocompromised people, particularly cancer patients, are susceptible to opportunistic infections such toxoplasmosis, People with low immunity, the parasitic infection might have life-threating risk [15]. Reportedly, Toxoplasmosis has been implicated in increasing fatality rates in various types of cancers: Hodgkin's lymphoma, Leukemia, melanoma, and brain cancers [16]. Despite a serious infect for toxoplasmosis in immune-compromised individuals, the epidemiology of toxoplasmosis among breast cancer patients in Iraq does not have been studied efficiently so far.

Conclusion

In this context, study of a case-control analysis. Several meta-analysis studies conducted around the world found a substantial link between certain diseases such as breast cancer and hepatoma., Squamous cell carcinoma of the bone, lymphoma, brain tumor, bladder cancer, benign uterine tumor, and *T. gondii* infection [17,18]. And may be chemotherapy for cancer patients may stimulate the transition of the parasite into chronic phase that affects some physiological parameters (hemoglobin, leukocyte count, antioxidants, and hormones).

Acknowledgement

None.

Conflict of Interest

No conflict of interest.

References

1. Dubey JP (2016) Toxoplasmosis of Animals and Humans. CRC Press Boca Raton Florida.
2. Torre LA, Bray F, Siegel RL, Ferlay J, Lortet Tieulent J, et al. (2015) Global cancer statistics, 2012. CA Cancer J Clin 65(2): 87-108.
3. Flegr J (2013) Influence of latent *Toxoplasma* infection on human personality, physiology, and morphology: pros and cons of the *Toxoplasma*-human model in studying the manipulation hypothesis. J Exp Biol 216(1): 127-133.
4. Verma R, Khanna P (2013) Development of *Toxoplasma gondii* vaccine: A global challenge. Hum Vaccin Immunother 9(2): 291-306.
5. Ahmadpour, A Daryani, M Sharif, Shahabeddin Sarvi, Mohsen Aarabi, et al. (2014) Toxoplasmosis in immunocompromised patients in Iran: a systematic review and meta-analysis. J Infect Dev Ctries 8(12): 1503-1510.
6. Israelski D, Remington J (1993) Toxoplasmosis in patients with cancer. Clin Inf Dis 17(2): 423-435.
7. Luft BJ, Frances C, Jack SR, Michel L, Jerome FL, et al. (1983) Outbreak of central-nervous-system toxoplasmosis in western Europe and north america. Lancet 1(8328): 781-784.
8. Derouin F, Gluckman E, Beauvais B, Devergie A, Melo R, et al. (1986) *Toxoplasma* infection after human allogeneic bone marrow transplantation: clinical and serological study of 80 patients. Bone Marrow Transplant 1(1): 67-73.
9. Yuan Z, Gao S, Liu Q, Xianzhu Xia, Xiaofeng Liu, etal. (2007) *Toxoplasma gondii* antibodies in cancer patients. Cancer Lett 254(1): 71-74.
10. Aabasian L, Shirbazou S, Shamsi M, Damghani S, Delpishen A (2016) Hormonal changes in women with breast cancer infected with *Toxoplasma gondii*. J Bas Res Med Sci 3(1): 16-21.
11. Canada Ahmad PE, Daryani A, Sharifi M, Sarui S, Aarabi Mizan, et al. (2015) Toxoplasmosis in Immunocompromised pateints in Iran: a systematic reviews and meta-analysis. J Infect Dev Count 8(12): 1503-1510.
12. Kharana S, Dubey ML, Malla N (2005) Association of parasitic infection and cancer. Indian J Med Microbiol 23(2): 74-79.
13. Jung BK, Song H, Kim MJ, Cho J, Shin EH, et al. (2016) High *Toxoplasma gondii* Seropositivity among Brain Tumor Patients in Korea. Korean j parasitol 54(2): 201-204.
14. Sanad MM, Thagfan FA, Al Olayan EM (2014) Opportunistic coccidian parasites among Saudi cancer patients presenting with diarrhea: prevalence and immune status. J Parasitol Res 9: 55-63.
15. Mohammadi Manesh R, Hosseini Safa A, Sharafi SM, Rasool Jafari, Mehran Bahadoran, et al. (2014) Parasites and chronic renal failure. J Renal Inj Prev 3(4): 87-90.
16. Scerra S, Coignard Biehler H, Lanternier F, et al. (2013) Disseminated toxoplasmosis in non-allografted patients with hematologic malignancies: report of two cases and literature review. Eur J Clin Microbiol Infect Dis 32(10): 1259-1268.
17. Wang L, He L, Meng D, Zhao wu Chen, He Wen, et al. (2015) Seroprevalence and genetic characterization of *Toxoplasma gondii* in cancer patients in Anhui Province, Eastern China. Parasit Vectors 8: 162.
18. Bajnok J, Muyassar T, Helen Carlin, Kevin B, Thomas S, et al. (2019) High frequency of infection of lung cancer patients with the parasite *Toxoplasma gondii*. ERJ Open Res 5(2): 00143-2018.