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RESEARCH ARTICLE

PREVALENCE OF TOXOPLASMOSIS AMONG CANCER PATIENTS.

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Abstract

The objective of the present study is to detect of toxoplasmosis infected patients compared with cancer patients attending the Unit of Tumors in the Medical City, in compared with together healthy individuals as a control group. Enzyme Linked Immunosorbent Assay ELIZA was used to investigate the anti- *Toxoplasma gondii* antibodies, type IgM and IgG. However, the tumor antibody in serum and its relationship with other affecting factors was detected by Ca19-9 test. The study involved 148 are cancer patients, while 59 are apparently healthy individuals (control group) and 59 are infected with *Toxoplasma gondii*. Blood specimens were taken from all studied individuals from the period 1st January 2016 to 30th December 2016. Results of this study revealed that 52.24% of cancer patients and 30.5% of the control group had chronic toxoplasmosis disease. 15.73% of cancer patients had acute *Toxoplasma* infection. However, 33.89% of toxoplasmosis patients had a cute infection. There have been no cases of the control group showed results of the study; also there were no significant differences at the level of probability of P <0.001.

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Introduction:-

Toxoplasma is transmitted to people by ingestion of oocysts in cat feces or by consuming uncooked meat of infected animals. At normal immunologic conditions, Toxoplasmosis can be widely asymptomatic. Nevertheless, the infection can be highly distributed and could cause severe toxoplasmosis especially for immunocompromised patients such as AIDS, cancer patients who are receiving chemotherapy and patients with organ transplantation [1, 2, 3]. Due to the fact that, no vaccine has been developed yet, it is required to perform continuous and detailed epidemiological monitoring to determine the infection. By the way, this kind of infection is directly attached to pregnant women. Also, this infection can be diagnose in the same way for immunocompromised people. The diagnosis of toxoplasmosis is most commonly made by detecting the immunoglobulin (IgG and IgM) antibodies in the serum samples of patients by using different methods like ELISA, IFA, IgM-ISAGA, etc [4]. To sum up, the aim of this work was to determine the antibodies (IgG and IgM) against *Toxoplasma* in malignant patients to motivate the consciousness of this opportunistic parasite, in order to refer the patients at a suitable time to the hospital for treatment. The study was, also, focused on the detection of the *Toxoplasma gondii* infections and its distribution in the cancer patients and healthy group of people.

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Materials and Methods:-

1. Samples collection: two hundred sixty six of 5ml blood samples were collected in clean plain tubes from 148 individuals with cancer, 59 apparently healthy persons as a control groups and 59 individuals infected with toxoplasmosis. Blood samples were collected during period 1st January 2016 to 30th December 2016.
2. ELISA technique was used to detect IgM and IgG anti- Toxoplasma antibodies immunoglobulin's assays in 147 sample. Lab – Chek Company, USA was used. for both IgM and IgG Elisa Kit.
3. CA 19-9 was used for estimating the level of the cancer marker “Tumor Marker”.

The principle of ELISA operation:-

This kit is used to determine the amount of cancer antigen CA 19-9 in human serum. The principle of operation is based on testing the interaction of antibodies with the antigen mixed with B solution. The mixture is configured as a complex antigenic-antibody. It is imperative to cover the kit with Streptavidin. The complex of antigenic-antibody is produced by biotin interaction. The Biotin with Streptavidin with adding E pairing Solution (enzyme teacher antibody) will generate an output of blue color complex. This color will be changed eventually to yellow when the stop solution is added. The absorbance of the resultant color is measured by means of ELISA reader device which set up at a wavelength of 450 nanometers.

Another German company called Human kit has been used in the laboratory to check over the CA 19-9.

Statistical Analysis:-

Statistical analysis of the following data was worked out and the results were analyzed based on Statistical Package for the Social Science (SPSS) program. The results have been compared to the totals for the study by using the statistical test T. test and compare the rates results using LSD.

Results:-

The results shown below in table (1) are presented the percentage of cases of infection toxoplasmosis of samples under study with the help of the ELISA test, with the percentage of 100% of the people infected with toxoplasmosis the number of patients was 59. 18 patients of control group; the percentage was 30.5% were infected. While the percentage of infected cancer patients amounted to 52.24%. No statistical analysis significant differences were found at the $P < 0.001$, $P < 0.003$, levels of probability.

Table 1:- Seroprevalence of IgG for *T. gondii* infection

The students groups	Positive No.	Negative No.	P. value
Toxoplasmosis patients	59 (100%)	0	0.001P<
Control group	18(30.5%)	(69.49) 41	0.001P<
Cancer patients	93(52.24%)	(47.75) 85	0.003P<

Seroprevalence IgM antibody in toxoplasmosis:-

The results are shown in table (2) seroprevalence of antibody distribution type IgM for toxoplasmosis, as the percentage of people with diabetes amounted to toxoplasmosis 33.89% with no significant variation differences at the $P < 0.001$ level. The control group did not show any positive serological antibody of IgM with variation at the $P < 10.00$ level was found. Meanwhile, the percentage of positive serological in cancer patients amounted to 15.73% of the statistical analysis, with no significant differences revealed at the $P < 0.003$ level when compared with the control group where $P < 0.001P$.

Table 2:- Seroprevalence of IgM in toxoplasmosis

The students groups	Positive No.	Negative No.	P. value
Toxoplasmosis patients	20(33.89%)	0	0.001P<
Control group	0(0%)	(69.49) 41	0.001P<
Cancer patients	23(15.73%)	(47.75) 85	0.003P<

The total levels of IgG antibody in patients with *T. gondii* group, cancer group and the control group 87.32 ± 35.6 units / ml and 105.80 ± 96.11 units / ml and 63.26 ± 14.20 units / ml, respectively, with no significant difference between both sets of toxoplasmosis and a cancer in comparison with control group, as shown in the table (4-4). While the results of serum levels showed the index Ca19-9 rise in the two sets of toxoplasmosis and cancer was

(145.51 ± 41.13 and 197.11 ± 12.11, respectively) with high significantly, while the control group showed low levels of this index (55.49 ± 13.11 (and the existence of significant difference for the two groups, as shown in the table (3).

Table 3:- A comparison between the serum levels of the variables Ca19-9 and IgG in the totals study

Test	Average of standard deviation± of Toxoplasmosis	Average of standard deviation± of cancer patients	Average of standard deviation± of Control group
IgG	35.76±87.32 ^a	96.11±105.80 ^a	14.20±63.26 ^b
CA19-9	±145.51 41.13 ^a	12.11 ±197.11 ^b	11.13 ± 55.49 ^c

Toxoplasma gondii infection between different types of cancer:-

Results indicated are shown in table 4 the toxoplasmosis among cancer patients, depending on the type of cancer, through the measurement of IgG and IgM, as the percentage of chronic injury for patients with liver cancer was 55% and the statistical analysis, the presence of significant difference (P <0.001), The acute infection has reached the percentage of the preparation of cationic 15% and 85% for negative numbers and the statistical analysis showed significant differences (P <0.001), while the percentage of chronic injury to the lung cancer patients reached 68% for the preparation of the positive and 32% negative to prepare As for acute injuries have The percentage of the number of positive 12% and 88% negative for the preparation and the statistical analysis, the presence of significant difference (P <0.001) and for patients with cancer of the uterus percentage of chronic injury to patients with cancer have reached uterus 56.52% of the number of positive and 43.47% of the number of negative cases and the analysis there no statically significant variations at the P <0.001 level of probability between the number of positive acute injuries and 5 cases increased by 21.73%, while the number of negative cases and 18 by 78.26% and the statistical analysis, the presence of significant difference (P <0.001). While the percentage of chronic injury to patients amounted to colon cancer 61.9% of the number of positive and 38.09% of cases of a number of negative cases the acute infection has reached 28.57% of the number of positive and 71.42% of the number of negative cases, and showed the results of the statistical analysis, no significant difference (P< 0.001). As for breast cancer patients it has the percentage of chronic injury.

Table 4:- Toxoplasma gondii infection between different types of cancer

Types of cancer	IgG			IgM		
	Positive No.%	Negative No.%	P. value	Positive No.%	Negative No.%	P. value
Liver	11(55%)	(%45)9	P<0.001	(%15)3	(%85)17	P<0.001
Lung	17(68%)	(%32)8	P<0.001	(%12)3	(%88)22	P<0.001
Uterus	13(56.52%)	(%43.47)10	P<0.001	(%21.73)5	(%78.26)18	P<0.001
Colon	13(61.9%)	(%38.09)8	P<0.001	(%28.57)6	(%71.42)15	P<0.001
Breast	39(43.82%)	(%56.17)50	P<0.001	(%12.35)11	(%87.64)78	P<0.001
Kidney	93(52.24%)	(%47.75)85	P<0.001	(%15.37)28	(%84.26)150	P<0.001
Control	18(30.5%)	(%69.49)41		(%0)0	(%100)59	P.valu

Discussion:-

The present study recorded the incidence of disease acute toxoplasmosis, and IgG depending on the positive results recorded. However, the IgM in the totals for cancer patients and people with toxoplasmosis with severe infection did not register in the control group. These results are consistent with the results of other studies conducted by AL-Hussien, 2016 [5], Hassan and others (2010) [6]. As these studies have shown the presence of severe infection in the tested samples, which were consistent with the current study. Also it showed the presence of severe infection in some samples with toxoplasmosis and cancer patients. The presence of acute infection in previous studies mentioned above due to the nature of the studied groups some of them were members of the workers in the massacres, and the other were pregnant women while the rest were couples as well as other samples were randomly taken, especially pregnant women and those were workers in the massacres which is exposed to risk factors from workers who could be infected with acute toxoplasmosis in the current study, the presence of severe infection consistent with both Nimir and others (2015), [7] and Wang *et al*; (2015),[8] who pointed to the existence of severe infection toxoplasmosis among patients of cancer and in spite of the presence of acute infection. Those patients did not show

symptoms of toxoplasmosis. The severe infection among these patients due to the low level and the efficiency of the immune system have as a result of cancer and receiving chemotherapy, making them susceptible to many diseases, including toxoplasmosis, especially in the event of exposure to risk factors such as during water contaminated food and eating or contact with cats or dealing with contaminated materials infectious those phases of the parasite (meat, dust and other) (Mahammad and others, 2012; Wang *et al.*, 2015)[8, 9]. Khudair (2012)[10] and Kalantari ,N. *et al.*; (2015) [11] . The comparison between serums levels of both IgG and marker cancerous Ca19-9 revealed that the values of two variables are increased among cancer patients and toxoplasmosis patients as compared to control AL-Dujali study and others (2009)[12]. The growing use of tumor markers as an indication of serological diagnosis of cancer and as a way for early diagnosis. Also, the tumor markers cannot be used, also, as an indication for some other cases which are not accompanied by a disease which has been diagnosed with marker Ca19-9 as an indicator of infection for many types of cancer and cancer of the pancreas and colon, stomach, uterus, rectum, ovary, lung, bladder lining. Many resources suggest that the possibility of follow-up the development of cancer during the follow-up of its concentration in the patient serum (Ahmad N., *et al.*; (2016), Ahmad Pour (2015) Aabasian, *et al.* ; (2014);[13,14,15]. As a result, the increase in the concentration of this indicator in patients with toxoplasmosis might signal to the possible presence of cancer, as indicated study by AL-Dujaili *et al.*; (2009)[11] which pointed that the tissue infected with cancer are producing this protein and launched into the blood, so the chance of cancer is high. However, the high Ca19-9 in human's sera does not give an inevitable consequence of the presence of cancer, as it found that this protein could increase in cases of polyps and malignant. In spite of several indications of the presence of the tumor, but it is still in need for many clinical examinations to get a conclusive result of the occurrence of malignant tumors (Deivendran, S. *et al.*;2014, Cong ,W.*et al.*;2015, Morjaria, S. *et al.*; 2016) [16,17,18]. Mclorman and others 2014), [19].

Conclusions:-

The high rate of toxoplasmosis among cancer patients compared to the control group, the similarity of some risk factors for cancer and toxoplasmosis.

References:-

1. AL-Bajalan, R.R.; AL-Nasiri, F.S. and Mahmood, S. M.. Detection *Toxoplasma gondii* by Latex and ELISA test in infertile and fertile men in Kalar city , Kurdistan region , Iraq. Int .J.Curr. Microbiol .App.Sci (2015)., 4(10):570-585.
2. A L-Dabagh, I . I ; Jasim, B.M. and Jarjees, M. T.. Seroprevalence of antibodies to Toxoplasmaosis , Brucellosis and Chamydiosis In abortive sheep in Nineveh Governorate.Iraq I .J. Vet .Sci.; (2014), 28(1):21-25
3. ALghamdi, J. ; Elamin , M.H. and Alhabib, S., Prevalence and genotype of *Toxoplasma gondii* among Saudi Pregnant women in Saudi Arabia .Saudi Pharm. J.: [http://dx . doi.org10-1016/ j .JSPS.](http://dx.doi.org/10.1016/j.JSPS.2015.05.001): 2015. 05. 001
4. AL-Jebouri, M.; AL-Janabi , M. and Ismail , H . The Prevalence of toxoplasmosis among female patients in AL-Hawija and AL-Baiji Districts in Iraq. Open J. Epidem. (2013)., 3:85-88
5. AL-Hussien, E.F.A. ; Nassir , N.F. ; Kadhim , A.. Study of Prevalence and some immunological characteristics of *Toxoplasma gondii* infections in pregnant women . J. Babylon .Uni , (2016) 2: 24-26.
6. Hassan , J.S. ; Ghazi , H .F. and Ahmed , A. A . . Rapid evaluation of chromatographic immuno assay with Latex , Agglutination test and ELISA for diagnosis of human toxoplasmosis .J. Fac. Med. Baghdad, (2010) 52(4): 468-470.
7. Nimir, A. ; Othman , A.; Ee , S.and Musa ,Z *et al.* Latent Toxoplasmosis in patients with different malignancy : Ahospital based study .J. Clin. Med. Res . (2015)., 2(3): 117 -120.
8. Wang ,L.;He. ; Meng ,D.and Chen ,Z.*et al.* Seroprevalence and genetic characterization of *Toxoplasma gondii* in cancer patients in Anhui Proince ,Eastern China .J. Parasites & Vectors . .(2015),8:162.
9. Mahmmad, M. ; Ahmed, S. and Hussain, A., Seroprevalence of *Toxoplasma gondii* in couplas in Remadi city using enzyme linked immunosorbent assay (ELISA). Int.J.Med.Sci ., 2012, 4(3): 55-59.
10. Khudair, Mohammed Khalifa. Identifying toxoplasmosis in pregnant women in the province of Diyala. Diyala Journal of Pure Sciences, (2012), 8 (2): 1-8.
11. Kalantari ,N. ; Ghaffari , S. ; Bayani , M. ; Elmi, M. ; Moslemi , D.; Nikbakhsh ,N . and Ghavipankeh , F. Preliminary study on association between toxoplasmosis and breast cancer in Iran. J. Asian Pac J . Trop. Biomed . (2015), 5(1): 44-47.

12. AL-Dujali, A.H. ; AL-Taei, W.F. ; Turky, K.M. and AI-Ubaidi, G.H.. Comparative study of Ca19-9 levels as tumor marker in sera and tissues of patients with stomach, colon and rectum cancer. J. Fac. Med. Baghdad (2009), 51(2): 223-226.
13. Aabasian, L ; Shirbazou, S. ; Shamsi, M. ; Damghani, S. and Delpishen, A. . Hormonal changes in women with breast cancer infected with *Toxoplasma gondii*. J. Bas. Res. Med. Sci., (2016), 3(1): 16-21.
14. Ahmad Pour, E, Daryani, A, Sharifi, M. ; Sarui, S. ; Aarabi, Mizan ; A ; Rahimi, T. and shokri, A. (2015). Toxoplasmosis in Immunocompromised patients in Iran: a systematic reviews and meta analysis. J. I.Develop.Count,8(12):1503-150.
15. Ahmed, N. and Qayyum, M., Seroprevalence and risk factors for toxoplasmosis in large ruminants in northern Punjab, Pakistan. J. Infect. Dev. Ctries. (2014), 8(8): 1022-1028.
16. Deivendran, S. ;Marzook,K.H. and Radha Krishna, P.M.. The role of inflammation in cervical cancer. Adv.Exp.Med. Biol. (2014), 816: 377-399.
17. Cong, W.; Liu, G.H. ; Meng, Q.E. *et al* . *Toxoplasma gondii* in cancer patients : prevalence, risk factors, Cancer letter. (2015),359(2):307-313.
18. Morjaria, S. ; Epstein, D.J. and Romero, F.A. *et al*. *Toxoplasma* E. incephalitis in A typical hosts at an Academic Cancer Center. Open Forum Infect. Dis. (2016); 3(2): 070.
19. Mclorman, D.P. ; List, A. and Mufti, G.j. . Applying synthetic lethality for the selective targeting of cancer. N. Engl. J. Med. (2014), 37(18): 1725-1735.