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C REACTIVE PROTEIN, BLOOD PRESSURE AND BMI IN BREAST CANCER SUBJECTS

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ABSTRACT

Background: Breast cancer is a major cause of mortality and morbidity in women and C reactive protein is predictive of a poor prognosis of breast cancer. **Objectives:** The study evaluated the levels of C reactive protein (CRP), body mass index (BMI) and blood pressure in breast cancer subjects. **Methods:** A total of 100 women comprising 50 breast cancer subjects and 50 women without the history of cancer were investigated. C-reactive protein was evaluated using Enzyme linked immunosorbent assay (ELISA) kit from Diagnostic Automation Inc. BMI and Blood pressure were also monitored using standard procedures. **Results:** The results showed that CRP was significantly increased ($p<0.05$) in breast cancer subjects compared with people without breast cancer. The levels of diastolic and systolic blood pressure were significantly ($p<0.05$) raised in the breast cancer subject compared with the control. **Conclusion:** It was concluded that the level of CRP, blood pressure and BMI should be monitored in breast cancer subjects so that adequate care can be given to the subjects.

KEYWORDS: breast cancer, CRP, BMI, Blood pressure.

INTRODUCTION

Breast cancer is the most frequently diagnosed malignancy and the second principal cause of death among women worldwide as well as in Nigeria.[1] Breast cancer has been shown to be a major cause of mortality and morbidity amongst females and C-reactive protein is predictive of a poor prognosis of breast cancer. However, it has been shown that 64% of the deaths in the study on breast cancer prognosis were due to breast cancer.[2,3] The risk factors for

developing breast cancer include obesity, lack of physical exercise, drinking alcohol, hormone replacement therapy during menopause, ionizing radiation, early age at first menstruation, and having children late or not at all.[4] Some organs of the body show greater risk of cancer when they are chronically inflamed.[5] Serum CRP, an acute phase protein and a sensitive nonspecific marker of systemic inflammation, has been reported to be associated with a number of cancers, including breast cancer.[6] While there is an association between increased levels of CRP and risk of developing cancer, there is no association between genetic polymorphisms influencing circulating levels of CRP and cancer risk.[7]

The association between elevated circulating CRP levels and poor cancer prognosis may be explained by differences in host behavior. Previous studies have reported an association between elevated CRP levels and all-cause mortality in the general population circulating CRP levels may reflect the general health of the individual at the time of diagnosis of cancer.[8,9] Consequently, findings of an association between elevated CRP levels at the time of diagnosis of cancer and overall survival may not be due to CRP acting as a specific marker of cancer prognosis, but may be due to CRP acting as a general marker of health and longevity. Thus, the study aimed to evaluate CRP in breast cancer subjects because it is a major cause of mortality and morbidity amongst female and CRP is predictive of a poor prognosis of breast cancer.

MATERIALS AND METHODS

This is a cross sectional experimental research study designed to determine the CRP in breast cancer patients within Anambra state. This research involves 100 subjects comprising 50 breast cancer subjects and 50 women without the history of cancer.

The ethical approval for this research was obtained from the ethical committee of Nnamdi Azikiwe University Teaching Hospital (NAUTH) in accordance with Helsinki Declaration. The patients' consent was sought and obtained before blood samples were collected from them. BMI and Blood pressure were also monitored using standard procedures after which 5 milliliters of blood were drawn from the breast cancer subjects in NAUTH, Nnewi. The blood samples were allowed to clot and centrifuged. Serum samples were separated and kept frozen until analysis. The serum samples were allowed to thaw at room temperature before they were used for quantitative determination of CRP using Enzyme linked immunosorbent assay (ELISA) kit from Diagnostic Automation (UK).[10]

RESULTS

The mean ±SD of BMI (kg/m^2) in breast cancer subjects and control subjects was 27.00 ± 3.81 and 26.52 ± 3.61 respectively while the diastolic blood pressure (mmHg) and systolic blood pressure (mmHg) in the breast cancer subjects were 78.90 ± 8.35 and 118.00 ± 12.29 respectively. The diastolic and systolic blood pressures were 72.60 ± 6.16 and 105.20 ± 8.63 in the control subjects.

The Meant standard deviation (SD) generated from the data was used to make bar chart where the test group was compared with that of the control group. CRP is significantly higher in the test ($P < 0.05$).

Table 1: BMI and Blood pressure in breast cancer subjects and control.

PARAMETERS	BREAST CANCER SUBJECTS N=50	CONTROL SUBJECTS N=50	T-VALUES	P-VALUES
BMI (Kg/m^2)	27.00 ± 3.81	26.52 ± 3.61	-0.649	0.518
Diastolic Blood pressure(mmHg)	78.90 ± 8.35	72.60 ± 6.16	-4.293	0.000*
Systolic Blood pressure(mmHg)	118.00 ±12.29	105.20 ± 8.63	-6.028	0.000*

*Significant at p<0.05.

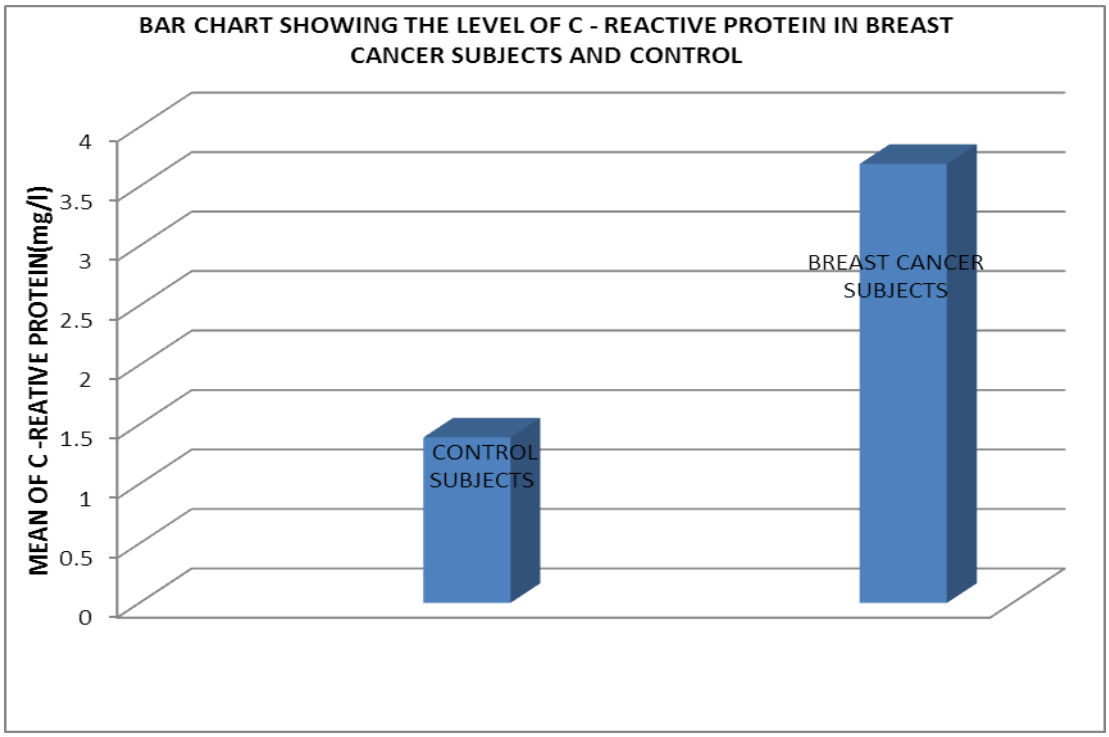

Figure 1: C reactive protein in breast cancer subject and control.

DISCUSSION

Breast cancer forms in the tissues of breast and it is the most common invasive cancer in women. In this study, the mean level of BMI (Kg/m2) in the breast cancer subjects was higher than the control female subjects but not statistically significant. This work is consistent with other findings that recorded increased mean levels of BMI.[11] According to the findings, obesity was defined as BMI value of 27 kg/m2 or greater. Increase in BMI has been implicated as a risk factor for the development and progress of breast cancer disease. It has been suggested that BMI may be a prognostic indicator in breast cancer[12] while some other findings have associated increase in breast cancer risk with increasing BMI among postmenopausal women[13,14] and that it may largely be the result of the associated increase in estrogens, particularly bioavailable estradiol. It was also reported that high BMI at diagnosis was positively correlated with an increased risk of breast cancer in postmenopausal Tunisian women.[15] According to the study, a significant dose-response relationship between BMI at diagnosis and breast cancer was demonstrated. This indicates that weight control may be an effective measure for breast cancer prevention in postmenopausal women. Furthermore, it has also been reported that breast cancer outcome was worse in patients with a raised BMI and this risk was greater in younger patients and in those with node positive disease.[16] The difference may be related to diagnosis at a more advanced stage in the obese but there was also an independent effect of BMI on survival. The mean levels of diastolic and systolic blood pressure were significantly raised ($P<0.05$) in the breast cancer subject when compared with the control in this study. Raised blood pressure has been implicated in a lot of disease processes and progresses including breast cancer. This work is in line with other reports which stressed that hypertension can occur in breast cancer.[17,18] It was stated that hypertension affects survival, just as it would in the general population and that it serves as mediator of age-related decrease of survival times.

Furthermore, it was observed that there is with significant in case in the mean serum level of CRP in the test group when compared to the control group. The result obtained showed an increase in the mean serum level of CRP of the test group compared with the control group. This is in line with other works which associated elevated CRP levels with increased risk of breast cancer.[19,20] It has been shown that the cumulative incidence of death from breast cancer among breast cancer patients increased with increasing levels of CRP among women, the cumulative incidence of recurrence among breast cancer patients was highest among women whether the highest titre of CRP.[21] Another study also reported that acute

inflammation status (CRP ≥ 10 mg/L) may be an important independent biomarker for long-term survival in breast cancer survivors.[22] The reason may be because CRP is one of several acute-phase proteins whose concentrations increase during inflammation.

CONCLUSION

CRP was significantly increased in breast cancer subjects compared with people without breast cancer. The levels of diastolic and systolic blood pressure were significantly raised in the breast cancer subjects compared with the control group. It was concluded that the level of CRP, blood pressure and BMI should be monitored in breast cancer subjects so that adequate care can be given to the subjects.

Conflicts of Interest

The authors declare no conflict of interest.

REFERENCES

1. Okobia M. N., Bunker C. H., Okonofua F. E and Osime U. Knowledge, attitude and practice of Nigerian women towards cancer: A cross-sectional study. World Journal of Surgical Oncology. 2006; 4: 11-20.
2. Allin, K. H. Nordestgaard, B.G, Zacho, J. Tybjærg-Hansen, A, Bojesen, S. E. C-reactive protein and the risk of cancer: a mendelian randomization study. Journal of the National Cancer Institute, 2010; 102(3): 202–206.
3. Allin H. Nordestgaard BG. Flyger H. Bojesen S.E. Elevated pre-treatment levels of plasma C-reactive protein are associated with poor prognosis after breast cancer: a cohort study. *Breast Cancer Research*, 2011; 13: R55 DOI: 10.1186/bcr2891
4. World Cancer Report. International Agency for Research on Cancer. World Health Organization. 2014.
5. Ouyang M.B Dash A.C, Fletcher T.C, Richardson N, Munn E. A, Feinsterin A. Analogues in other mammals and in fish of human plasma proteins, C-reactive protein and amyloid P component. Nature. 2006; 273: (168): 170-176.
6. Stoenescu, A., Gerlinger, C. Solomayer, E.F. Scholz, C. Juhasz-Böss, I. Radosa, J. Serum C-reactive protein as potential independent prognostic factor for breast cancer. Int J. Gynaecol. Obstet. 2015; 28-33.
7. Allin K.H. and Nordestgaard B.G."Elevated C-reactive protein in the diagnosis, prognosis and cause of cancer". *Clinical Laboratory: science.* 2011; *48(4): 155-157.*

8. Koenig, W, Khuseyinova, N. Baumert, J. Meisinger, C. Prospective Study of High-Sensitivity C-Reactive Protein as a Determinant of Mortality: Results from the MONICA/KORA Augsburg Cohort Study, 1984–1998 Clinical Chemistry 2008; 54(2): 1-8.
9. Zacho, J. Tybjærg-Hansen, A. Nordestgaard, B.G C-reactive protein and all-cause mortality—the Copenhagen City Heart Study. European Heart Journal. 2010; 31(13): 1624–1632.
10. Pepys M.B and Hirschfield G.M. C-reactive update. Journal Clinical Investment. 2003; 221(12).
11. Sinagra, D., Amato, C., Scarpitta, Am., Brigandì, M., Amato, M., Saura, G., Latteri, Ma., Caimi, G. Metabolic Syndrome and Breast Cancer Risk. *European Review for Medical and Pharmacological Sciences*. 2002; 6: 55-59.
12. Ryu, S.Y., Kim, C.B., Nam, C.M, Park, J.K., Kim, K.S. Soo, J.P., Yoo, Y and Cho, K.S. Is Body Mass Index the Prognostic Factor in Breast Cancer?: A Meta-Analysis. *Journal of Korean Medical Sciences*, 2001; 16: 610-614.
13. Hong T, Liu A, Cai D, Zhang Y, Hua D, Hang X, Wu X.Preoperative serum C-reactive protein levels and early breast cancer by BMI and meopausal status. Cancer Invest. 2013; 31(4): 279-85. doi: 10.3109/07357907.2013.789898.
14. Mohammed FM, Shafiq NA, Abdulhameed E (2016) High Sensitive C - Reactive Protein Levels in Pre and Post Menopausal Healthy Women in Kirkuk City-Iraq. Int J Vaccines Vaccin 2(1): 00021. DOI: 10.15406/ijvv.2016.02.00021
15. Awatef, M., Olfa, G., Kacem, M., Sami, L., Makram, H., Slim, B.A. Association between Body Mass Index and Risk of Breast Cancer in Tunisian Women. *Annals of Saudi Medicine.* 2011; 31(4): 393–397.
16. Imkampe, A.K., Bates, T. Impact of a Raised Body Mass Index on Breast Cancer Survival in Relation to Age and Disease Extent at Diagnosis. *The Breast Journal*. 2010; 16(2): 156-161.
17. Gąsowski, J. Piotrowicz, K. Breast Cancer, Age and Hypertension: A Complex Issue. Hypertension. 2012; 59: 186-188. https://doi.org/10.1161/HYPERTENSIONAHA.111.186544
18. Fraeman, K.H, Nordstrom, B.L, Luo, W. Landis, S.H, Shantakumar, S. Incidence of New-Onset Hypertension in Cancer Patients: A Retrospective Cohort. International Journal of Hypertension. 2013, Article ID 379252, http://dx.doi.org/10.1155/2013/379252

19. Guo, L. Liu. S. Zhang S. Chen Q. Zhang M. Quan P. Lu J. Sun X. C-reactive protein and risk of breast cancer: A systematic review and meta-analysis. 2015; *Sci. Rep.* 5, 10508; doi: 10.1038/srep10508
20. Balaji, S. A, Balaji N.A. Takalkar, UV., Advani, Thorat, AP. C-Reactive Protein and Breast Cancer: New Insights from Old Molecule. International Journal of Breast Cancer. 2015. Article ID 145647, http://dx.doi.org/10.1155/2015/145647
21. Begg C.B, Haile R.W, Borg A., Malone K.E, Concannon P., Thomas D.C, Langholz B., Bernstein L, Olsen J.H, Lynch C.F, Anton-Culver H, Capanu M, Liang X, Hummer A.J, Sima C, Bernstein J.L Variation of breast cancer risk among BRCA1/2 carriers. 2008; 123-125.
22. Villaseñor, A., Flatt, S.W, Marinac, C., Natarajan, L, Pierce J.P., Patterson R.P. Postdiagnosis C-Reactive Protein and Breast Cancer Survivorship: Findings from the WHEL Study. Cancer Epidemiol Biomarkers Prev., 2014; 23(1): 189-199. DOI: 10.1158/1055-9965.EPI-13-0852.