The Eurasia Proceedings of Science, Technology, Engineering & Mathematics (EPSTEM)
ISSN: 2602-3199

The Eurasia Proceedings of Science, Technology, Engineering & Mathematics (EPSTEM), 2018

Volume 4, Pages 108-112

IConTES 2018: International Conference on Technology, Engineering and Science

The Relationship between Zinc, Copper and Manganese Levels on Bone Formation, Which Increases the Risk of Uterine Cancer

Zena A.M. ALJAWADI
University Of Mosul

Abstract: Due to the lack of previous studies on the impact of osteoporosis on the incidence of uterine cancer, and the rapid spread of uterine cancer in recent years all the world, and the exact mechanism of its occurrence is not entirely clear. The study focused on the possibility of consideration of osteoporosis as a marker to uterine cancer by study the relationship between osteoporosis and uterine cancer through the measurement of both Zinc, Copper and Manganese which operate inside the body as antioxidation when its linked with enzymes, which affect the bone density and their impact on the incidence of uterine cancer. The study involved collecting samples from hospitals in Mosul, women without uterine cancer as the control group and divided into two groups (44 women with good health and 38 women diagnosed as osteoporosis only). And patients women also divided to the two groups did not receive any treatment (43 with uterine cancer only and 58 women with osteoporosis and uterine cancer). Each patient was evaluated clinically and then was estimated Zinc, Copper and Manganese in serum using atomic absorption spectroscopy technique as well as appreciation of both estrogen and progesterone in the serum. The results showed that osteoporosis may increase the incidence of uterine cancer through hormonal changes and the concentration of antioxidants and their impact on the bone-building and thus its impact on the amount of free radicals in the body which cause increase the likelihood of uterine cancer before and after menopause. The study showed that osteoporosis is a new risk factors increase the likelihood of uterine cancer. Women should pay attention to bone health by maintaining the concentration of antioxidant mineral, which has a role in bone health and prevent fragility and early diagnosis and treatment of osteoporosis to reduce the risk of uterine cancer.

Keywords: Uterine cancer, Zinc, Copper, Osteoporosis

Introduction

Uterine cancer is the third most common malignant tumor in women and the rate of uterine cancer has doubled over the past six years (Yang *et al.* , 2011; Haughian *et al.*, 2009). More than 40% of malignancies in women are endometrial cancer. It is one of the most serious public health problems in the world in addition to breast cancer and ovarian cancer, which causes severe suffering with the disease and high mortality (Colombo *et al.*, 2011). Although a large number of women are affected by this disease, the molecular mechanisms involved in the pathophysiology of this type of cancer of the female genitalia are still largely unknown (Haughian *et al.* , 2006). The role and mechanics of antioxidant systems and chemical compounds for patients with endometrial cancer should be studied and understood, leading to an understanding of the factors that cause the disease, and therefore a higher risk of cancer treatment, especially in patients with increased risk of disease(Demirci *et al.*, 2011; Badjatia *et al.*, 2010; Gokul *et al.*, 2010). Recent epidemiological studies show that antioxidants may reduce the risk of osteoporosis, but little is known about dietary patterns of antioxidants and vitamins and their relationship to bone mineral density (BMD) (Sugiura *et al.*, 2010). Older women with osteoporosis have a low level of antioxidant(Sendur *et al.*, 2009; Chuin *et al.*, 2009). As women age, they become more susceptible to disease as the level of estrogen decreases (Sahni *et al.*, 2009). The lack of zinc, copper and manganese, which act as antioxidants often when combined with enzymes called mineral antioxidants, results in anemia, low body temperature, osteoporosis, bone fractures, low white blood cells, arrhythmia (Richmond *et al.*, 2009). And that a combination of calcium, zinc, copper, and manganese helped reduce osteoporosis in the spine in a group of women after the period of menstruation (Kazi *et al.*, 2009).

Aim of the Study

The aim of the study is to study the effect of some antioxidants (Zinc Zn, Copper Cu and Manganese Mn), which affect bone density and its effect on the incidence of uterine cancer

Method

A total of (82) blood samples were collected from women, such as the control group. The first two groups were composed of (44) samples, such as apparently healthy women, as a control group, and the second consisted of (38) samples of patients with osteoporosis without cancer or any other disease. , And ranged between (82-30) years. In addition, 101 blood samples were collected for infected women. The first two groups consisted of (43) samples of women with uterine cancer only and the second consisting of 58 samples of women with endometrial cancer and osteoporosis in cooperation with the Specialized Oncology and Nuclear Medicine Hospital in Mosul. The patients were diagnosed by specialized doctors and ranged in age from (82-30) years. The concentration of antioxidants (zinc, copper and manganese) was estimated in the serum model using the atomic absorption spectrometry technique because of its speciality and sensitivity in estimating the small quantities of elements in biological models after dilution of serum models. Ions (Antanasopoulos, 2009). The standard curve of the zinc was prepared at a concentration of (1000µg / ml). Standard solutions were then prepared at different concentrations and the samples were measured at a wavelength of 213.9nm. The standard copper curve was prepared at a concentration of 1000µg / ml. Standard solutions were then prepared at different concentrations and sample absorption was measured at a wavelength of 324.8nm. And to prepare the standard manganese solution at a concentration of 1000µg / ml. Standard solutions were then prepared at different concentrations and the models absorbed at a wavelength of 279.5nm.

The statistical analysis was performed to find the mean and the standard deviation of the SD. The T-test and the Duncan Test were used to compare the variables and find the difference between the values that emerged from the value of P-Value (P00.05) showed significant differences (P> 0.05) and non-significant differences (Kirkpatrick, 2012).

Results and Discussion

The results in Table 1 showed a high level of estrogen (P <0.001) in women with osteoporosis, uterine cancer, women with endometrial cancer, and women with osteoporosis compared with healthy women. Estrogen in women with endometrial cancer was significantly higher than Healthy women. This may be due to the fact that estrogen stimulates the rapid growth of endometrial cells and that the rise of estrogen leads to the rapid and abnormal growth of endometrial cells and thus may lead to the risk of uterine cancer (Kim *et al.*, 2013; Llaurado *et al.*, 2012; Lee *et al.*, 2012; McTiernan *et al.*, 2010). It also works on the balance of bone and bone cells and any abnormalities that may lead to small openings in the bone causing the increase of bone-eating cells compared with the cells of the builder as well as the possibility of the effect of calcium on the hormone estrogen so the rise of estrogen increases the risk of osteoporosis and this is consistent with what he found Other researchers (Wehrli, 2010; Raisz, 2010). The rise in the level of estrogen in women with endometrial cancer and women with osteoporosis confirms a relationship between the level of estrogen with women with osteoporosis and uterine cancer. The results also showed a decrease in the level of progesterone hormone (P = 0.002) in women with osteoporosis, uterine cancer and women with endometrial cancer compared to women with osteoporosis due to the relationship between progesterone and the immune system through bone building and stem cell interactions in the bone marrow and A defect in the progesterone hormone will lead to the risk of osteoporosis and this is consistent with what Orenzo and his group found (Orenzo *et al.*, 2008). Finally, the results showed a decrease in the level of metal antioxidants zinc, copper and manganese in women with uterine cancer, osteoporosis and uterine cancer compared to healthy women and women with osteoporosis at the probability of (P <0.0001) and (P = 0.011) and (P = 0.004) Respectively due to increased free radicals and low antioxidants. This will lead to a decrease in bone mineral density and thus increase the risk of osteoporosis. This is consistent with what others have found (Mackinnon *et al.*, 2011; Baek *et al.*, 2010; Zhang *et al.*, 2006). As the decline leads to the occurrence of uterine cancer and increase oxidation, and oxidation is a disorder in the state of balance of the system Proxidant on antioxidants in healthy cells with the consequent damage of fats, proteins, carbohydrates and nucleic acids, leading to cell death and this is consistent with what other researchers found (Medeiros Pinheiro *et al.*, 2011; Berger., 2005; Clark, 2002).

Table 1. Biochemical parameters of women control, women with osteoporosis, women with uterine cancer and women with osteoporosis and uterine cancer

Parameters	Control Mean ± S.D	**Women with osteoporosis** Mean ± S.D	**Women with uterine cancer** Mean ± S.D	**Women with osteoporosis and uterine cancer Women with uterine cancer** Mean ± S.D
Estrogen pg/ml	18.11± 10.4	23.50 ± 10.3 ***	24.59± 12.2 ***	30.83 ± 14.2 ***
Progesterone ng/ml	1.25 ± 0.12	2.41 ± 0.5	0.75 ± 0.3 ***	0.92 ± 0.2 ***
Zn µg/ml	1.01 ± 0.25	0.87 ± 0.17 **	0.053 ±0.02 ***	0.14 ± 0.14 ***
Cu µg/ml	1.91 ± 0.8	2.12 ± 1.44 **	1.55 ± 0.28 ***	1.59 ± 0.43 ***
Mn mg/L	48.35± 4.71	49.22 ± 4.0	45.39 ± 4.3 ***	46.09 ± 4.61 ***

* Significant difference at P = 0.05, ** significant difference at P = 0.01, *** significant difference at P<0.001.

The decline and rise before and after menopause in the level of antioxidants in women with osteoporosis and women with osteoporosis and uterine cancer is shown in Table (2).

Table 2. The relation between age and with antioxidants in women with osteoporosis as control group, and women with osteoporosis and uterine cancer.

Parameters	**30-39 age**		**40-49 age**		**50-59 age**		**60-69 age**		**70≥ age**	
	Women with osteoporosis Mean ± S.D	Women with osteoporosis and uterine cancer Women with uterine cancer Mean ± S.D	Women with osteoporosis Mean ± S.D	Women with osteoporosis and uterine cancer Women with uterine cancer Mean ± S.D	Women with osteoporosis Mean ± S.D	Women with osteoporosis and uterine cancer Women with uterine cancer Mean ± S.D	Women with osteoporosis Mean ± S.D	Women with osteoporosis and uterine cancer Women with uterine cancer Mean ± S.D	Women with osteoporosis Mean ± S.D	Women with osteoporosis and uterine cancer Women with uterine cancer Mean ± S.D
Zn µg/ml	0.84^{cd}± 0.15	$^{***}0.04^{d}$± 0.03	0.77^{d} ± 0.15	$^{***}0.04^{d}$ ±0 .015	0.87^{cd}± 0.1	$^{***}0.09^{d}$± 0.04	1.10^{b}± 0.12	$^{***}0.07^{d}$± 0.008	0.56^{c}± 0.54	$^{***}0.85^{cd}$± 0.05
Cu µg/ml	1.22^{de}± 1.6	$^{**}1.64^{b}$± 0.62	1.81^{cd}± 0.36	1.47^{b}±0 .51	1.83^{cd}± 0.01	$^{*}1.51^{b}$ ± 0.17	5.14^{a}± 0.5	$^{**}1.64^{b}$± 0.35	1.82^{b}± 0.42	2.09^{c}± 0.53
Mn mg/L	47.0^{abc}± 0.5	$^{*}43.20^{c}$± 0.45	49.0^{ab}± 1.58	$^{*}44.11^{c}$ ± 1.9	39.0^{ab}± 4.22	$^{*}43.11^{ab}$± 5.86	43.0^{a}±1 .5	42.08^{bc}± 2.84	39.0^{a}± 1.5	$^{**}40.0^{bc}$± 4.34

The results showed a significant difference in the antioxidants in women with osteoporosis and uterine cancer, and the vulnerability before and after menopause compared with healthy women, where the difference in morale is more pronounced after menopause, the decline before and after menopause may be due to increased free radicals and increase body oxidation And therefore a few antioxidants as a result of hormonal changes. The rise after the age of 70 may be due to the liberation of minerals from bone and the stimulation of metal enzymes Metallo enzymes include protein synthesis enzymes and DNA cloning and thus increase the level of blood and this is consistent with what others found (Oveisi *et al.* 2011; Sahni *et al.*, 2009; Chavan *et al.* 2007).

Conclusion

Finally, it is clear from this study that the reduction in the level of antioxidant minerals necessary to build healthy bones, namely zinc, copper and manganese in women with cancer of the uterus and women with osteoporosis confirms the relationship between antioxidants with women with osteoporosis and uterine cancer, Osteoporosis is a risk factor for uterine cancer.

Acknowledgements or Notes

The author would like to thank the Dean of College of Science for their support.

References

Yang, S., Thiel, K. W. and Leslie, K. K., Trends in Endocrinology & Metabolism Progesterone 22(4): 145-152, (2011).

Haughian, J. M., Reno, E. M., Thorne, A. M., and Bradford, A. P., Int J Cancer.125(11): 2556-2564, (2009).

Colombo, N., Preti, E., Landoni, F., Carinelli, S., Colombo, A., Marini, C. and Sessa, C., Ann Oncol. 22(6): 35-39, (2011).

Haughian, J. M., Jackson, T. A., Koterwas, D. M. and Bradford, A. P., Endocrine-Related Cancer. 13: 1251-1267, (2006).

Demirci, S., Ozsaran, Z., Celik, H. A., Aras, A. B. and Aydin, H. H., Tumori. 97: 290-295, (2011).

Badjatia, N., Satyam, A., Singh, P., Seth, A. and Sharma, A., Urol Oncol. 28: 360-367, (2010).

Gokul, S., Patil, V. S., Jailkhani, R., Hallikeri, K. and Kattappagari, K.K., Oral Dis. 16: 29-33, (2010).

Sugiura , M., Nakamura, M., Ogawa, K., Ikoma, Y., Ando, F., Shimokata , H., and Yano, M., International Osteoporosis Foundation and National Osteoporosis Foundation. 22: 143-152, (2010).

Sendur, O. S., Turan, Y., Tastaban, E. and Serter, M., Joint bone spine. 76(5): 514 – 518, (2009).

Chuin, A., Labonté, M., Tessier, D., Khalil, A., Bobeuf, F., Doyon, C. Y., Rieth, N. and Dionne, I. J., International Osteoporosis Foundation and National Osteoporosis Foundation. 20(7): 1253-1258, (2009).

Sahni, S., Hannan, M. T., Gagnon, D., Blumberg, J., Cupples, L.A ., Kiel, D.P., and Tucker, K.L., International Osteoporosis Foundation and National Osteoporosis Foundation. 20(11): 1853-1861, (2009).

Richmond, S. J., Brown, S. R., Campion, P. D., Porter, A. J., Moffett, J. A., Jackson, D. A., Featherstone, V. A. and Taylor, A. J., Complement Ther Med. 17(5-6): 249-256, (2009).

Kazi, T. G., Afridi, H. I., Kazi, N., Jamali, M. K., Biol Trace Elem Res. 122(1): 1-18, (2008).

Antanasopoulos N., Flame methods manual for atomic absorption, published by GBC scientific equipment PTY Ltd, 2010.

Kirkpatrick L. Feeney B. C. A Simple Guide to IBM SPSS Statistics for Version 18.0 and 19.0 11th Edn., Wadsworth Cengage Learning, Belmont, ISBN-10:1111352550,2012; P115.

Kim, H. J., Kim, T. J. and Lee, Y. Y., J Gynecol Oncol. 24(2): 120-127, (2013).

Llaurado, M., Ruiz, A., Majem, B., Ertekin, T., Colas, E., Pedrola, N. and Reventos, J., Molecular and cellular endocrinology. 358(2): 244-255, (2012).

Lee, W. L., Lee, F. K., Su, W. H., Tsui, K. H., Kuo, C. D., Hsieh, S. L. and Wang, P. H., Taiwanese journal of obstetrics & gynecology. 51(4): 495-505, (2012).

McTiernan, A., Irwin, M. and Vongruenigen, V., Journal of clinical oncology. 28(26): 4074-4080, (2010).

Wehrli, F. W., J Bone Miner Res. 23(5): 730-740, (2008).

Raisz, L. G., Pathogenesis of osteoporosis: concepts, conflicts and prospects. J Clin Invest. 115: 3318-3325, (2005).

Orenzo, J., Horowitz, M. and Choi, Y., Endocrine Reviews. 29(4): 403-440, (2008).

Mackinnon, E. S., Rao, A. V. and Rao, L. G., The Journal of Nutrition, Health & Aging.15(2): 133-138, (2011).

Baek, K. H., Oh, K. W., Lee, W. Y., Lee, S. S., Kim, M. K. and Kwon, H. S., Calcified Tissue International. 87(3): 226-235, (2010).

Zhang, J., Munger, R.G., West, N. A., Cutler, D. R, Am. J. Epidemiol. 163 (1): 9-17, (2006).

Medeiros Pinheiro, M., Ciconelli, R. M., Chaves, G. V., Aquino, L., Juzwiak, C. R., Genaro, P. D. S. and Ferraz, M. B., Nutrition Journal. 10(39): 1-8, (2011).

Berger, M.M., Clin Nutr. 24: 172-83, (2005).

Clark, S. F., Nutr Clin Pract. 17: 5-17, (2002).

Oveisi, M. R., Sadeghi, N,. Jannat, B., Hajimahmoodi, M., Hadjibabaie, M. and Behfar, A., Iranian Journal of Basic Medical Sciences. 14(2): 158-166, (2011).

Chavan, S. N., More, U., Mulgund, S., Saxena, V. and Sontakke, A. N., Indian Journal of Clinical Biochemistry. 22 (2): 101-105, (2007).

Author Information

Zena A.M. Aljawadi
Chemistry Department, Science College,
Mosul University
Mosul / Iraq
Contact E-mail: *zena_aljawadi@yahoo.com*