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PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.997169>Available online at: <http://www.iajps.com>**Review Article****BONE METASTASIS OF BREAST CANCER-A REVIEW****Fateme parooei, Sara Zamanpour, Morteza Salarzaei***Medical student, Student Research Committee, Zabol University of Medical Sciences,
Zabol, Iran**Abstract:**

Introduction: According to published statistics by the World Health Organization in 2011, cancer is the second leading cause of death after cardiovascular diseases throughout the world. The American Cancer Society announced in its latest report that out of every eight women, one is diagnosed with breast cancer. The rate of cancer in developed countries is increasing from 1 to 0.2% and in developing countries about 0.5% annually.

Methods: In this review article, the databases Medline, Cochrane, Science Direct, and Google Scholar were thoroughly searched to identify the Bone Metastasis of Breast Cancer. In this review, the papers published until early January 2017 that were conducted to study the relationship between the Bone Metastasis of Breast Cancer were selected.

Results: Breast cancer cells are different in terms of metastatic ability. Cancer cells separate from the tumor site and reach the secondary tissues. Yet these cells can only be replaced in these tissues if they are grown and proliferated and have the ability to produce new vessels. The metastatic mechanism is complex and its sequence varies according to the target tissue.

Discussion and conclusion: Considering the environmental pollution and various stresses which surround man today, knowing the influence of pathogenic factors detrimental to human health in normal cells and vital molecules is significant which in turn could minimize carcinogenic effects of these agents. There have been plenty of advances in this regard, all of which attempt to prevent the development of cancers and not just to treat the occurred detriment.

Key words: Bone, Metastasis, Breast Cancer

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INTRODUCTION:

According to published statistics by the World Health Organization in 2011, cancer is the second leading cause of death after cardiovascular diseases throughout the world. The American Cancer Society announced in its latest report that out of every eight women, one is diagnosed with breast cancer [1]. The rate of cancer in developed countries is increasing from 1 to 0.2% and in developing countries about 0.5% annually. According to a report by the World Health Organization in 2011, cancer in Iran was reported to be 12% widespread and was recognized as the third most common cause of death [2]. Gastric cancer, breast cancer, and colorectal cancer are the three common cancers in Iran respectively. Breast cancer is the first place cancer widespread among women [3]. The average age of breast cancer diagnosis in the Western countries is 56 years and in Iran 45 years. New developments in the patients care with breast cancer have increased the overall survival rate of the patients in recent years. This increase in survival has doubled the importance of predictive factors of local recurrence and distant metastases of the disease [4]. In addition, it should be noted that the progression or regression of some diseases are not constant over time, as in the stages of recovery or worsening of the disease, the occurrence of some consequences changes the course of the disease, and the disease progress declines and this risk begins to decrease in the 2-5 years after treatment, which make the recovery process speed [5].

METHODS:

In this review article, the databases Medline, Cochrane, Science Direct, and Google Scholar were thoroughly searched to identify the Bone Metastasis of Breast Cancer. In this review, the papers published until early January 2017 that were conducted to study the relationship between the Bone Metastasis of Breast Cancer were selected.

FINDINGS:

Breast cancer cells are different in terms of metastatic ability. Cancer cells separate from the tumor site and reach the secondary tissues. Yet these cells can only be replaced in these tissues if they are grown and proliferated and have the ability to produce new vessels [6]. The metastatic mechanism is complex and its sequence varies according to the target tissue. For instance, bones are one of the most common places for breast cancer metastases, so that up to 75 % of breast cancer patients who develop metastatic diseases have bone involvement. When cancerous cells reach the bone, they release a large amount of cytokines which stimulate the osteoclast cells in the bone. The increased activity of the osteoclasts

produces a wide range of lymphokines and growth factors which affect tumor cells and stimulate their proliferation [7]. Thus, a network of cytokines is formed in the bone which disrupts the balance between bone production and reabsorption, and gradually extends the bone tumor, and bone reabsorption increases due to stimulated osteoclasts, which results in a decrease of bone strength, as well as fractures and pain.

DISCUSSION AND CONCLUSION:

Hundreds of years ago, surgeons only regarded the anatomy of a disease and visible and observable cases. As science progressed, they gradually focused on the function of the organs and their functional interactions, and the surgical treatment promoted from dissection to physiology which made a remarkable improvement in the range of treatment [8]. Nevertheless, despite all the efforts, mortality rate due to various cancers especially breast cancer is still high, and in spite of the full operation of various therapeutic approaches, such as chemotherapy and radiation therapy, still a lot of people die because of cancer [9]. In the last two decades, it has been attempted to focus on further viewpoints toward cancer diseases, which is the consideration of the biomolecular infrastructure of this deadly and complex disease, and it seems that the final and definitive approach for curing the disease is to place the first line of battle on the cancerous cells rather than the affected organs [10]. Considering the environmental pollution and various stresses which surround man today, knowing the influence of pathogenic factors detrimental to human health in normal cells and vital molecules is significant which in turn could minimize carcinogenic effects of these agents. There have been plenty of advances in this regard, all of which attempt to prevent the development of cancers and not just to treat the occurred detriment [11].

REFERENCES:

- 1.Zhang XH, Wang Q, Gerald W, Hudis CA, Norton L, Smid M, Foekens JA, Massagué J. Latent bone metastasis in breast cancer tied to Src-dependent survival signals. *Cancer cell*. 2009 Jul 7;16[1]:67-78.
- 2.Deckers M, van Dinther M, Buijs J, Que I, Löwik C, van der Pluijm G, ten Dijke P. The tumor suppressor Smad4 is required for transforming growth factor β -induced epithelial to mesenchymal transition and bone metastasis of breast cancer cells. *Cancer research*. 2006 Feb 15;66[4]:2202-9.
- 3.Sethi N, Dai X, Winter CG, Kang Y. Tumor-derived jagged1 promotes osteolytic bone metastasis

of breast cancer by engaging notch signaling in bone cells. *Cancer cell*. 2011 Feb 15;19[2]:192-205.

4.Minn AJ, Gupta GP, Siegel PM, Bos PD, Shu W, Giri DD, Viale A, Olshen AB, Gerald WL, Massagué J. Genes that mediate breast cancer metastasis to lung. *Nature*. 2005 Jul 28;436[7050]:518.

5.Kang Y, He W, Tulley S, Gupta GP, Serganova I, Chen CR, Manova-Todorova K, Blasberg R, Gerald WL, Massagué J. Breast cancer bone metastasis mediated by the Smad tumor suppressor pathway. *Proceedings of the National Academy of Sciences of the United States of America*. 2005 Sep 27;102[39]:13909-14.

6.Katsuno Y, Hanyu A, Kanda H, Ishikawa Y, Akiyama F, Iwase T, Ogata E, Ehata S, Miyazono K, Imamura T. Bone morphogenetic protein signaling enhances invasion and bone metastasis of breast cancer cells through Smad pathway. *Oncogene*. 2008 Oct 23;27[49]:6322-33.

7.Stopeck AT, Lipton A, Body JJ, Steger GG, Tonkin K, De Boer RH, Lichinitser M, Fujiwara Y, Yardley DA, Viniegra M, Fan M. Denosumab compared with zoledronic acid for the treatment of bone metastases in patients with advanced breast cancer: a randomized, double-blind study. *Journal of Clinical Oncology*. 2010 Nov 8;28[35]:5132-9.

8.Park BK, Zhang H, Zeng Q, Dai J, Keller ET, Giordano T, Gu K, Shah V, Pei L, Zarbo RJ, McCauley L. NF- κ B in breast cancer cells promotes osteolytic bone metastasis by inducing osteoclastogenesis via GM-CSF. *Nature medicine*. 2007 Jan 1;13[1]:62.

9.Jones DH, Nakashima T, Sanchez OH, Kozieradzki I, Komarova SV, Sarosi I, Morony S, Rubin E, Sarao R, Hojilla CV, Komnenovic V. Regulation of cancer cell migration and bone metastasis by RANKL. *Nature*. 2006 Mar 30;440[7084]:692.

10.Weigelt B, Peterse JL, Van't Veer LJ. Breast cancer metastasis: markers and models. *Nature reviews. Cancer*. 2005 Aug 1;5[8]:591.

11.Daubiné F, Le Gall C, Gasser J, Green J, Clézardin P. Antitumor effects of clinical dosing regimens of bisphosphonates in experimental breast cancer bone metastasis. *Journal of the National Cancer Institute*. 2007 Feb 21;99[4]:322-30.