



Global Advanced Research Journal of Medicine and Medical Sciences (ISSN: 2315-5159) Vol. 5(6) pp. 183-187, June, 2016
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Review

Health care outcomes of the various treatment methods of breast cancer in Node-Positive Premenopausal Women with Breast Cancer

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Accepted 17 June, 2016

Breast cancer is caused by abnormal growth and may be triggered by both internal and external factors. It is more common in women than men. Moreover, it is worth mentioning that younger women are part of the population at risk as they are more vulnerable to this disease due to their attitude towards breast cancer the dense tissue of their breasts. Some of the cancerous growths may occur in the lymph or ducts of the breasts and may be either invasive or non-invasive. The advancement of medical technology has seen a revolution in the treatment methods of breast cancer. While such methods as chemotherapy, radiotherapy and surgery have seen emergence of more effective drugs and equipments, the new innovative methods have also been invented. The use of hormonal therapy and immunotherapy has relatively increased survivorship and disease-freeness among breast cancer victims including premenopausal node-positive women. Similarly, advancement in such conventional methods as radiotherapy, chemotherapy and surgery has seen the combined use of these three methods to effectively treat breast cancer, increase survivorship and improve disease-freeness.

Keywords: Chemotherapy, radiotherapy, hormonal therapy, immunotherapy

INTRODUCTION

Uncontrolled growth of breast cells under the influence internal and external factors usually lead to the formation of a lump in the breast. This lump is referred to as breast cancer. Failure of the process of apoptosis or cytotoxic action of the immune to take place leads to the formation of mass of cells forming in the breast. This is usually accelerated by such external factors as lifestyle and radiation among others. Despite the fact that all these factors cut across all genders, case of node-positive or women with cancerous breast cells are higher compared to their male counterparts.

Since the growth of breast cancer is under the influence of such hormones as estrogen and

progesterone, premenopausal women are usually at relatively low risk of suffering from breast cancer. In such women, the production of these hormones is declining with advancement of age thus reducing the prevalence of the disease in women belonging to this age category. Moreover, such women when undergoing breast cancer treatment have relatively high chances of survival compared to their younger counterparts who are still having their menses accompanied with production of estrogen and progesterone. The ductal breast cancer is usually invasive, that is, it can spread to other vital body organs including liver and kidney. This may lead to overgrowth of liver and kidney tissues as a result of

metastasis from breast ducts. This may result into severe kidney failure and liver malfunctions which may set into motion a series of various complications and diseases. The lobular breast cancer is generally non-invasive hence they do not spread to other body organs. The morphology of women breasts predisposes them to breast cancer. This is because the milk ducts and lobules of the mammary glands in women are more pronounced compared to men. Thus, breast cancer is more common in women than men. During the years leading up to 1970s, breast cancer was more prevalent in developed countries. However, there is an increasing increase in the number breast cancer cases being recorded in Third World Countries currently.

With advancement being made in the sector of technology, new methods of breast cancer treatment have been discovered with the old ones being bettered. These new methods are more efficient and effective in the treatment of breast cancer as they increase survivorship. These methods have varying health outcomes and survivorship. The preference of these breast cancer treatment and management methods by the patient's depends on a variety of factors including their affordability. However, even with these new innovations, cases of death are being recorded in the United States and globally. According to American Cancer Society, over 200,000 new cases of women suffering from cancer diagnosed with over 39,000 of them losing the battle to breast cancer. These numbers were recorded for women in all age brackets (American Cancer Society, 2012). Thus, there is need to carry out health care outcomes on these new ways of breast cancer treatment in order to optimize their end results. This will help in improving the overall survival of the breast cancer patients using the scientific evidence gathered from such researches.

Background

With advancements in the use of technology to treat many diseases, deaths resulting from such diseases as breast cancer should be relatively lower. However, the 39, 520 deaths of women from breast cancer recorded in the United States in 2011 is an indication that more should be done to improve on the quality of health care provision for those women suffering from breast cancer. Health care outcomes researches should be conducted with a view of improving quality, efficiency and affordability of health care decisions made with respect to breast cancer treatment. This should be done using scientific evidences gathered by analyzing patient's experiences, predilections and most importantly, survivorship after treatment. Such a research would turn the provision of health care from just treatment of breast cancer patients to a broad based undertaking aimed at scientifically evaluating the end results of health care

services decisions made by all the stakeholders involved in the health care including patients, and clinicians.

Since the safety of the patient is always paramount in any health care decision, the decisions should be made with the demographic, social and psychologic factors of the patient in mind. This will ensure that the patient's satisfaction is guaranteed. However, to achieve this there is need for the health care providers to have an effective plan of collecting data, monitoring of the patient and providing proper counseling to the patient. Counseling will help the patient understand the various risks that come with the disease and in the various treatment and management procedures available. Such psychological preparedness on the part of the patient is vital in increasing survivorship and effectiveness of the treatment procedures. While evaluating such decisions, greater emphasis should be laid on monitoring the health care providers as the patient's decisions are usually hinged on their decisions. It is their decisions that are used to assessment of the quality of the health care provision and not the patient's decision. The safety, effectiveness, affordability and efficiency of their health care provision will have a great bearing on the patient's satisfaction and decisions. Moreover, the timeliness, patient-centeredness and the absence or presence of barriers in provision of health care services by the health care system would also affect the decisions made by the patients. All these are the very vital components of conducting a health care outcomes research.

BREAST CANCER TREATMENT

Brief summary of epidemiology and causes of breast cancer

Caused by cancerous growth of cell both in the ducts and lymph nodes of breasts, breast cancer is caused by such internal factors such as defective genes, hormones and immune cells or external factors including lifestyle, radiation among others. Due to lifestyle change, cases of breast cancer rose significantly from 1970. However, with advancement in medical technology and creation of breast cancer awareness globally, deaths from breast cancer have significantly reduced. Young women below the age of 40 years are more vulnerable to dying or suffering from breast cancer due to late diagnosis as they normally ignore those vital symptoms of breast cancer. Moreover, they still produce estrogen and progesterone hormones which breast cancer is very sensitive to. This is further complicated by their dense breast tissues which in most cases hamper their detection on the lump that forms on their breasts. In contrast, women over the age of 40 years suffer less from breast cancer because they are more careful in detecting any lump forming in their breasts. This is also aided by the fact that their breast

tissues are lighter hence easier to detect lumps. Since most of them are almost approaching menopause, women belonging to this category have in most cases stopped producing estrogen and progesterone thereby lowering their chances suffering from breast cancer while increasing their survivorship chances.

Breast cancer is treated in a variety of ways which have undergone a revolution due to the advances made in the field of medicine and technology. Such treatment methods include radiotherapy, mastectomy, chemotherapy, hormonal therapy and immunotherapy.

Health outcomes in treatment of premenopausal node-positive women

Chemotherapy

Chemotherapy targets those actively dividing cells of the body such as cancer cells. However, the drugs do not discriminate hence leading to killing of the body cells which are usually actively dividing in nature (Morgan et al., 2004). This has led to various side effects including loss of hairs, low blood production due to destruction of the actively dividing bone marrow cells among others (Hampton, 2011). However, with the advancement of medical technology, new and more effective drugs have been invented. Moreover, chemotherapy is being used synergistically with radiotherapy and mastectomy to increase survivorship (Hirsch, 2006). Craig Henderson and his co-researchers (1976) discovered that disease free and survivorship in premenopausal node-positive women increases significantly up to 70% and 80% respectively when four cycles of paclitaxel drug was added to the chemotherapy treatment regime of cyclophosphamide and doxorubicin (CA). In addition, they also discovered that with addition of paclitaxel, the hazard levels of CA reduced significantly. In addition, use of such drugs as tamoxifen after an adjuvant chemotherapy improved the disease-free and survivorship of premenopausal node-positive with estrogen receptive tumors. However, the care should be taken while administering this drug to the patients because as the studies showed, it has serious side effects on those people who have no estrogen receptive tumors; the researches pointed out its high toxicity (Henderson et al., 2003). Thus, the oncologist should take it upon himself to determine the nature of the tumor first before administering this drug.

Surgery

Surgery, which is of different types, has been used for many decades for treatment of breast cancer. It was the initial method of breast cancer treatment before the invention of the modern means of treatment. It may involve cutting of the whole, a quarter or just a small part of the affected breast. These are referred to as

mastectomy, quadrantectomy and lumpectomy respectively. This ancient treatment has undergone through a series of revolutionary changes from cauterization to the more modern methods where special machines have been invented for diagnosis and surgical removal of the affected breast.

Radiotherapy

Radiotherapy is mostly used in combination with both mastectomy and chemotherapy to treat breast cancer. By using the ionizing energy, radiotherapy destroys the cancerous cells by damaging the delicate cell DNA which controls their growth. With no DNA the cancerous cells will eventually die. Since cells are microscopic in nature, there are chances that there might be some remnants of the cells especially after surgery. Thus, to increase survivorship the breast and reduce chances of the breast cancer recurring, the cells are eliminated using high energy radiations. In addition, high energy radiations are also used together with chemotherapy. This can be done during the chemotherapy regime or after the treatment. Moreover, it is also used as a primary treatment procedure before administering chemotherapy as a mop up strategy. While most radiotherapy is administered on the surface tissues of the breasts, it can also be administered internally by directing the radiation to the affected cells.

Since its invention, radiotherapy technology has been renovated to treat metastatic breast cancer. With this, survivorship and effectiveness of this method is relatively high. One important factor that should be considered before the administration of radiotherapy is its effectiveness in treatment of breast cancer (Galvin et al., 2004). Studies have shown that administration of radiotherapy after mastectomy or with and/or before chemotherapy reduce the chances of breast cancer recurring by approximately 70% (Lee et al., 2002). In a study conducted for ten years on 318 premenopausal women suffering from breast cancer, Joseph Ragaz et al. discovered that combining adjuvant radiotherapy with chemotherapy reduced mortality rate by 29% (Ragaz et al., 1997). When administered after mastectomy (postmastectomy radiation therapy – PMRT), radiotherapy increases overall survivorship of node-positive breast cancer patients by 55%. In terms of cost for a 15 year time frame, there will be an increment of up to \$ 48,100. The economic outcome of such treatment for the 0.29 years gained is approximately \$ 24,900. Thus, administration of postmastectomy radiation therapy is generally cost effective when it comes to treatment of breast cancer.

Provision of cancer treatment by either combining or singly using these three methods is usually done in both public and private health institutions. Thus, availability of treatment is not governed by race, gender, social or economic status of the patients. Premenopausal node-

positive breast cancer patients are thus able to get treatment from any hospital of choice. In such countries as Canada, tamoxifen use and provision is open to the public in all the major states. Moreover, health insurance usually covers most of the cost of breast cancer especially those bills resulting from radiotherapy, chemotherapy and surgery (Colleoni, 2006). However, for those individuals who do not have health insurance, the cost may seem challenging considering such treatment methods as chemotherapy and radiotherapy may go on for an extended period of time. Moreover, due to awareness which has been by governmental organizations, institutions, agencies, and non-governmental organizations, more people are aware of these methods and their side effects. Thus, many premenopausal node-positive breast cancer patients adhere to the therapies set out by the clinicians.

The numerous Cancer Treatment Centers of America (CTCA) which are spread all over the state provide personalized breast cancer treatment using these methods. To further ensure quality, these centers are equipped with state of the art equipments and machines operated with qualified professionals. Moreover, the personalized treatment gives the patient precedence through sharing of vital information about their conditions. This in effect improves the health care outcomes in treatment of breast cancer in premenopausal node-positive women. With personalization, patient safety is guaranteed while experts and state of the art equipments ensures quality of health care outcomes. Since these well trained professionals, they take the patient's medical history, race, psychologic, social and economic data. This is very vital in delivering quality health care services. Such information also helps in monitoring of the premenopausal patients which is a very important component in treating cancer. Treatment of any disease requires complete understanding of the patient hence these professionals usually try as much as possible to understand their patients. This usually helps in ensuring that the patients are safe, and also in learning of the patient's experiences and preferences. It also helps in dealing with side effects without making any medical error by making wrong assumptions about a given symptom of side effects. The ability to make sound medical decisions on a given patient's condition is a very vital component of health care outcome.

Hormonal therapy

Over the years, more researches have been conducted to explore the possibilities of using hormones in treatment of various diseases including breast cancer. One such hormone is trastuzumab. Breast cancer is caused by abnormal growth and multiplication of cells. Cell activity including growth and survival is controlled HER proteins. When over-expressed, such as in the case of breast cancer, abnormal growth of breast cells occur. That is,

the cells may overgrow or under-grow. However, this monoclonal antibody blocks the receptors of HER2 protein (Jahanzeb, 2008; Littlejohns, 2006; Vogel et al., 2002). The antibody usually targets the early stages of the cell cycle thereby preventing it from dividing (Piccart-Gebhart et al., 2005; Romond et al., 2005; Santin et al., 2008). Studies conducted by Hudis indicate that, when administered during late stages of breast cancer manifestation, the patient's survivorship improves up to two years (Hudis, 2007). Since it is a new concept in the treatment of breast cancer, preference by the patient's is relatively low. Accessibility to this method treatment going for approximately \$ 100,000 annually is usually limited to the rich in the society hence its use among premenopausal node-positive women is not equitable. This has also forced many insurance companies all over the world to exclude it in their insurance coverage for most of their clients. Due to its importance in increasing the rate of the breast cancer survival in many women of various ages, premenopausal involves the governments and that is why? for example, in Australia, the authorities have had to cut the deals with the manufacturers to avail the drug to the general public at relatively lower price (Gnant et al., 2007).

Immunotherapy

Another medical technological breakthrough that has seen increased survivorship and disease free period in premenopausal node-positive women is the use of immunotherapy to treat breast cancer. Under normal conditions, the immune system should be able to suppress growth and survival of body cells. Failure by the immune system to carry out this 'cleaning up' process usually leads to formation of cancerous cells. This failure may be attributed to defective genes or immunosuppression by either internal or external agents. To destroy the cells, the immune system uses such components as interleukins, cytotoxic and phagocytic cells and cytokines which are usually kill the cells. In immunotherapy, the immune system is rejuvenated by transfection, genetical engineering or adoptive cell transfer (Masihi, 2001). The cells are then capable of attacking the cancerous cells causing their regression (Holmberg and Anderson, 2004). In as early as 1984, this technology had been used to cause a reduction in cancer sizes by as much as 3.3%.

While conducting a randomized trial on the use of adoptive immunotherapy after surgery, Takayama and co-researchers concluded that recurrence of carcinoma reduced relatively with its efficacy increasing as much as 30% (Tashudi et al., 200). The cells are very specific nature hence will only attack the cancerous cells making this method safe for use in premenopausal node-positive women. Over the year, many women have also shown their preference for this method as its popularity rises among the general public. This treatment is readily

available to the public and is covered by health insurance. The CTCA have also created awareness to the general public on this method of treatment and with the use of their well trained experts and equipments, individualized treatment is always being carried out. This method is usually efficient as it requires a few visits to the clinicians. However, the patients are usually monitored by the clinicians for any side effects. However, the nature of this method requires a lot of care to ensure the safety of the patients. Towards this end, the data about the patient is collected and carefully analyzed. To eliminate chances of medical errors, only highly skilled and trained clinicians and specialized health centers and hospitals are licensed to treat patients using this method. The Agency for Healthcare Research and Quality (AHRQ) has set policies to ensure adherence to patient safety procedures as stipulated in the Patient Safety and Quality Improvement Act.

CONCLUSION

To sum everything up, it is worth mentioning that after receiving the outcomes of the health care research, the various government agencies, especially Agency for Healthcare Research and Quality, will ensure that the health care decisions that are made are safe and evidence based. Moreover, they also ensure that patients get value for their money while endeavoring to cut the cost of health care provision and making accessible to many people in the society. By trying as much as possible to eliminate medical errors, such agencies aim at improving the quality of health care and life in general. It is important that proper evaluation based on scientific evidence is carried out before adoption of any method of treatment. This will ensure that the interests of the patient are put first. As technology advances, the methods of treatment also advance like in the case of breast cancer. However, it is important to note that health care outcomes researches should also advance concurrently with these methods.

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