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Complications of Chemotherapy for Breast Cancer

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Abstract

Breast cancer is a non-communicable disease which becomes the second leading cause of death all over the world for women. Day by day the rate of this disease is increasing because of the risk factors related to lifestyle. Chemotherapy is a common treatment for breast cancer patients. Chemotherapy treatment depends on stage of cancer, patient's age, menopausal stage, hormone receptor status and lymph node involvement as a patient has the chance to face some complications to take this treatment. In this treatment, drugs are used to treat cancerous cells. And because of these anticancer drugs patients experience many complications. Though there have some complication patient should be aware about those before going to take breast cancer chemotherapy treatment which will help them to follow proper diagnosis and treatment guidelines.

Keywords

Breast cancer; Chemotherapy; Complications

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Introduction

Non-communicable diseases (NCDs) are now increasing among people world widely. At the beginning, NCDs has only seen among the people of developed countries but nowadays these are spreading in developing countries also [1]. Cancer is one of the Non-communicable diseases and the second most common cause of death is cancer. According to the world cancer report (2008), there is a high incidence rate of cancer throughout the world and it may reach about 20 million by 2030, nearly 70% of cancer deaths occur in low and middle-income countries. In developing countries, cancer is increasing because of people's lifestyle of living, increasing the level of smoking, consumption of fat, calorie-dense food and reduced physical exercise. Lungs, oral cavity, esophagus, breast, cervical are some common organs for the reason of death in developing countries [2]. Breast cancer (BC) is one of the most common cancers. Breast cancer is not only a disease for women; men also suffer from breast cancer. It is the second leading disease for women which lead to death [3]. It is a major public health problem in developed nations and is becoming an increasingly predominant problem in low and middle-income countries like Bangladesh. The incidence rates have been increased by up to 5% per year [4-8]. According to the World Health Organization, the incidence cerates in the developing countries will rise because of increasing life expectancy, growing urbanization, and great adoption of modern lifestyles.

There is no permanent treatment for any cancer. But the death rate of breast cancer has been decreased by screening, radiotherapy, surgery, chemotherapy, hormonal and latest immune therapies. Nowadays, women don't need to cut their breast to treat breast cancer as chemotherapy is used to destroy the cancer cell as much as possible. It can be used both before and after the surgery and also to control metastasis cancer. The drugs which are used for the chemotherapy treatment can be used in both ways via orally in a tablet and inject directly into blood (intravenously).

Breast Cancer

Breast cancer is linked with some risk factors which include increase parity duration of breastfeeding, older age at menarche and lower body mass index. Also, there are more factors including the use of menopausal hormone therapy, greater alcohol consumption, older age at menopause, and a positive family history that can increase the risk of breast cancer [9] (Figure 1).

Figure 1: Different types of breast cancer treatment.

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The common treatments for breast cancers are surgery, radiotherapy, immunotherapy, chemotherapy, targeted therapy and hormonal therapy. The cancer cell (in some cases the whole breast) has to cut down in surgery. High energy waves are used in radiotherapy treatment, different drugs are used for chemotherapy to make cancer cells smaller or kill. In hormonal therapy, drugs are used only to block estrogen and progesterone hormone as these two hormones can grow cancer cells. Drugs are also used in targeted therapy only block to protein's work to grow cancer cells. Immunotherapy is the new treatment procedure for breast cancer. It is also known as a biological treatment. But by this treatment there is a big problem that it can damage the healthy cell of body [9]. The treatment which one a patient will take depends on the stage of breast cancer (Figure 2). None of these treatments can assure full recovery even all of these treatment has some side effects.

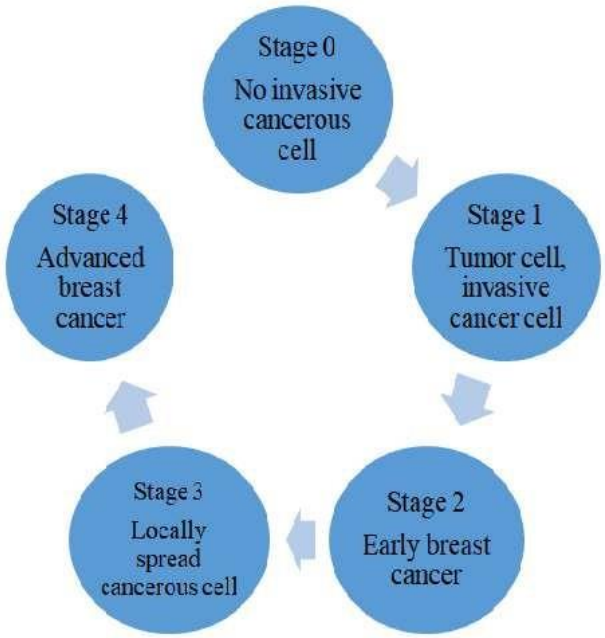

Figure 2: Stages of breast cancer.

Chemotherapy Treatment

According to Sporn chemotherapy is "the use of pharmacologic or natural agents that inhibit the development of invasive breast cancer either by blocking the DNA damage that initiates carcinogenesis or by arresting or reversing the progression of premalignant cells in which such damage has already occurred" [4]. Normally drugs are used in chemotherapy to destroy the cancer cell and to keep the cancer cell being large. Some drugs are also used to reduce the size of a large cancer cell to make surgery easy in neoadjuvant chemotherapy and some drugs are used after surgery in adjuvant chemotherapy. Most of the time combination of different drugs works more effectively than individual drug mostly for early and locally advanced stage of breast cancer. Among 50 common drugs of chemotherapy,some are Carboplatin (Paraplatin), Cisplatin (Platinol, Platinol-AQ), Cyclophosphamide (Cytoxan), Docetaxel (Taxotere), Doxorubicin (Adriamycin), Erlotinib (Tarceva, OSI-774), Etoposide (VePesid, VP-16), Fluorouracil (5-FU), Gemcitabine (Gemzar), ImatinibMesylate (Gleevec, STI 571), Irinotecan (Camptosar, CPT-11), Methotrexate (Folex, Mexate, Amethopterin), Paclitaxel (Taxol, Abraxane), Sorafenib (Nexavar), Sunitinib (Sutent), Topotecan (Hycamtin), Vincristine (Oncovin) and Vinblastine (Velban) [9,11].

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Complication of Breast Cancer Chemotherapy

There are some complications because of the drugs which are used in breast cancer chemotherapy. And complications vary from patients to patients and individual drugs. The most common complications are fatigue, nausea, vomiting, short term hair fall, diarrhea, decrease in blood cell count, rash, weight change, nerve pain, breathing problem, mouth ulcers and throat soreness [10,11]. All these complications may occur at the time of treatment or after the treatment or later after the final treatment of chemotherapy as individual patient's medical profile and diagnosis vary from others. Chemotherapy side effects are divided into two parts- one is short term & another one is long term (Table 1).

Short term side effects	Long term side effects
• Fatigue, nausea and vomiting • Dental problems • Skin and nail changes • Hair loss • Infections • Blood clots • Hand-foot syndrome • Peripheral neuropathy • Menopausal symptoms & Fertility problem • Chemo brain	• Pulmonary embolism • Lung damage • Heart damage • Permanent infertility • Another types of cancer

Table 1: Complications of breast cancer chemotherapy.

In chemotherapy treatment mainly different kind of drugs are used and at the time of chemotherapy, drugs not only destroy or kill the cancerous cells but also can damage other healthy cells of body including bone marrow cell, nerve cell and hair follicles etc. Many side effects have arrived at the time and also after the time of chemotherapy. The short term side effects mainly occur during the chemotherapy treatment and long term side effects occur after the treatment & also can lasting the sustained impacts for many years after the treatment whereas older age & chemotherapy cycle are also responsible for long term side effects. So before the treatment started the patients and physician need to be discussed about the side effects and consider the potential benefits from chemotherapy treatment [12].

Fatigue, nausea and vomiting, are most common short term side effects of B.cancer chemotherapy which rate is higher than noncancerous group of breast cancer patients [13]. Alopecia and some other infection side effects are more common short term side effect when AC (doxorubicin and cyclophosphamide)/CAF (cyclophosphamide, doxorubicin (Adriamycin), and 5-fluorouracil)/FAC (5-fluorouracil, doxorubicin, and cyclophosphamide)/FEC (5-fluorouracil, epirubicin, and cyclophosphamide) is used in chemotherapy as drugs. Others short term side effects are vary from drugs to drugs regimens. Whereas neutropenia is a common side effect in the chemotherapy of Breast cancer of CMF, MF regimens but neuropathy is rare [12].

CMF (cyclophosphamide, methotrexate, and 5-fluorouracil) is a combination of chemotherapy drugs which occurs many kinds of short & long term side effects including fatigue, nausea and vomiting, permanent infertility, neuropathy, cognitive impairment, cardiac dysfunction and heart damage. But the side effects are lower than use of other drugs such as anthracycline. These side effects can control with a median dose of chemotherapy. In the term of cardiac dysfunction or heart failure risk of breast cancer patients is also depends on patients age and

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history of cardiac problems [13-18] (Table 2).

Common combined drugs used in B. cancer chemotherapy	Side effects/ Complications
CEF & CMF	Menopause (permanent infertility)
CMF & MF	Neutropenia
CMF	Fatigue, nausea and vomiting
AC/CAF/FAC/FEC	Alopecia (hair loss), infection
More than 5 cycle of CMF	Heart , lung, brain dysfunctions

Table 2: Complications associated with drugs used in breast cancer chemotherapy treatment

Weight gain is very common long term side effects for those who are experienced menopause at the time of chemotherapy. Long term chemotherapy patient who was treated by AC faced greater risk of weight gain [14]. Many study suggested that weight gain can be the reason of intake more chemotherapy or not doing any physical works which can lead the breast cancer patients recurrence the disease [14-16].

By studying many case and analysis it has found that CMF regimens has less risk than other (such as anthracycline-based regimens) to build leukemia [17]. Premature ovarian failure can be occur for both young and old women in the treatment of chemotherapy. But in a study it has been seen lower incidence of ovarian failure with AC regimens chemotherapy. Day by day the chemotherapy treatment is improving to aim of occurring less side effects.

Limitations

Most of the breast cancer chemotherapy is adjuvant therapy based as it has lower risk of recurrence the cancer. So all the side effects are discussed here are occurred only related to adjuvant chemotherapy related.

Conclusion and Recommendation

Though there are many complications in breast cancer chemotherapy but most of the complications are short term and can get rid of these complications. After some times of finishing chemotherapy treatment does not mean that those are negligible. So the breast cancer patient has to clear about his/her other's physical health problem before taking breast cancer chemotherapy. At the time of making chemotherapy treatment decision both patients and doctors should know about its side effect's types, durations, frequency, potential benefits, risk of recurrence. So that patients can make a thoughtful choice and evaluate his/ her ability of daily activities after starting chemotherapy. Among breast cancer treatments one of the best chemotherapies for fighting cancer as it can kill both visible and invisible cancer cells. It has also other advantages like this treatment is more safe, tolerable and less harmful for health cells of body. Moreover, nowadays chemotherapy has improved than previous years and hopefully will be more improved with fewer side effects and also some medicines are used to prevent side effects including fatigue, sickness, vomiting etc. It is a tough work to control both short &

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long term side effects altogether and it cannot assure that no further long term side effects appeared. But as most side effects are occurred because of different chemotherapy drugs regimens, so it can suggest to find out all those regimens and improve them or use less risk regimens so that at least short term side effects can stop.

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