

A Study On Influence of Taste Disorders on Dietary Behaviors in Breast Cancer Patients Undergoing Chemotherapy with Carboplatin Drug



Home Science

KEYWORDS: Chemotherapeutic agent, Carboplatin, Recognition threshold, Detection threshold

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ABSTRACT

The present study attempts to evaluate the self-perceived taste function in patients with breast cancer diagnosis undergoing chemotherapy with carboplatin drug before and after 1st, 2nd and 3rd cycle to determine differences in taste perception (salt, sweet, sour and bitter) and nutrient intake. This study consists of two groups, control group includes normal subjects free from diseases and experimental group includes subjects treated with the drug carboplatin. Anthropometric indices, dietary pattern, and the detection and recognition threshold values were collected from each subject before the commencement of the treatment and at the end of the three consecutive cycles. The study revealed that there was a significant increase in the detection and recognition threshold values of salt, sweet and sour and a decrease in the bitter values between the cycles of chemotherapy. It also revealed that there is a significant drop in the nutrient intake and body mass index as well

INTRODUCTION:

Cancer is a disease that has been known since ancient times. The word cancer refers to any uncontrolled growth of abnormal cells. Cancer prevalence in India is estimated to be around 2.5 million, with over 8,00,000 new cases and 5,50,000 deaths occurring each year due to this disease. More than 70% of the cases report for diagnostic and treatment services in the advanced stages of the disease, which has led to a poor survival and high mortality rate (Chobanian, 2008).

Cancer can affect any site in the body and about one hundred human cancers are recognized. Kobayashi, 2004 opines that there is a marked variation among gender in the incidence of different cancers. Among men, lung, esophagus, stomach, oral and pharyngeal cancers are more prevalent, while in women, cancers of cervix and breast are most common, followed by those of stomach and esophagus. A trend analysis of the data on cancer incidence for the period 1998- 2008 has demonstrated that the overall occurrence of cancer is increasing among females. The greatest increase among females was for cancer of the breast and among males for cancer of the prostate. There was an increasing trend for lymphoma, urinary bladder, gall bladder and brain tumors in both sexes.

The incidence of breast cancer in India is on the rise and is rapidly becoming the number one cancer in females pushing the cervical cancer to the second spot. The seriousness of the situation is apparent after going through recent data from Indian Council of Medical Research (ICMR), 2008. It is reported that one in twenty two women in India are likely to suffer from breast cancer during their lifetime.

Chemotherapy destroys cancer cells because the medicines target rapidly dividing cells. But as normal cells in the blood, mouth, intestinal tract, nose, nails, vagina, and hair also divide rapidly, chemotherapy affects them, too (Kaufman et al, 2005). The side effect of chemotherapy depends on the regimen given to the patients, the amount of medicine, the length of treatment, and general health. The side effects may be different from individual to individual who is on the same regimen. Most chemotherapy side effects go away shortly once finished with chemotherapy treatment. Still, some side effects may take several months or longer to go away completely

Kaufman et al, 2007 reported that taste changes are common during chemotherapy. The exact reason for taste changes is not clear, although it is thought that it is a result of the damage to the cells in the oral cavity, which are especially sensitive to chemotherapy. About 50 percentages of patients getting chemotherapy experience taste changes. Drugs most commonly associated

with taste changes include carboplatin, cisplatin, cyclophosphamide, dacarbazine, dactinomycin, doxorubicin, 5- fluorouracil, levamisole, mechlorethamine, methotrexate, paclitaxel and vincristine.

Chemotherapy losses sense of taste that can occur purely from the association of an experience of nausea and vomiting with chemotherapy. Taste changes may occur during therapy and lasts for hours, days, weeks, or even months after chemotherapy. When food has no flavor, it can be mentally difficult to chew and swallow. After a few days the person may feel impossible not to focus on the consistency or texture of foods, but may find repulsive without flavor. This can lead to an aversion to certain foods or eating altogether, which can ultimately result in weight loss and malnourishment (Lagergren et al, 2004).

NEED FOR THE STUDY:

Malnutrition and weight loss are common in patients with cancer, both factors could potentially affect the response and tolerance to treatment, decrease quality of life (QOL), and associate with poor survival. Multiple pathogenic mechanisms have been linked to weight loss and malnutrition in cancer patients. Modifications in smell or taste senses could play a significant role in the etiology of anorexia in cancer patients. Taste disorders may affect food selection and contribute to poor meal intake and low quality of life. (Schiffman et al, 2007). Taste disorders are common in patients with cancer under chemotherapy. Chemotherapeutic drugs associated with taste changes include cisplatin, carboplatin, cyclophosphamide, doxorubicin, 5-fluorouracil, and methotrexate. Chemotherapy drugs could affect other rapidly growing cells such as the taste receptors. A variety of circulating drugs that permeate into saliva and diffused from blood to taste receptors resulting in a phenomenon called venous taste change.

Several studies have reported alterations of the four basic flavors (sweet, salty, sour and bitter) in cancer patients, the most common complain during cytotoxic drugs administration occurs in bitter and sweet flavor recognition.

This study evaluates the self-perceived taste function in patients with breast cancer diagnosis undergoing chemotherapy with carboplatin before and after 1st, 2nd and 3rd cycle to determine differences in taste perception and nutrient intake.

GENERAL OBJECTIVES:

- To select subjects free from any diseases, as control group.
- To select breast cancer patients on treatment with carboplatin drug, as experimental group.
- To determine the thresholds of the four basic taste qualities

(salt, sweet, sour and bitter) of the control group and the experimental group before the first cycle and at the end of all the three consecutive cycles of chemotherapy.

- To compare the thresholds of the four basic taste qualities (salt, sweet, sour and bitter) of the control group and the experimental group before the first cycle and at the end of all the three consecutive cycles of chemotherapy.
- To assess the nutritional anthropometry of the control group and the experimental group before the first cycle and at the end of all the three consecutive cycles of chemotherapy.
- To compare the nutritional anthropometry of the control group and the experimental group before the first cycle and at the end of all the three consecutive cycles of chemotherapy.
- To assess the dietary pattern of the control group and the experimental group before the first cycle and at the end of all the three consecutive cycles of chemotherapy.
- To compare the dietary pattern of the control group and the experimental group before the first cycle and at the end of all the three consecutive cycles of chemotherapy.

MATERIALS AND METHODS:

Oncologists and Surgeons of the breast cancer department were contacted for the samples and permission was sought for conducting the study, in one of the specialized centers for treating cancer patients in Chennai. The patients were short listed taking into account, the aspects namely, 1) their stage of cancer 2) the treatment regimen prescribed by the physician 3) the specific drug used for the chemotherapy and 4) the chemotherapy cycle for which the patient was admitted.

Samples were collected based on their drug log sheet used by the physicians. The patients who were on the first, second and third stage of cancer before the commencement of first cycle of chemotherapy exclusively with the drug carboplatin were selected, as this drug is commonly administered for the breast cancer patients depending on their severity. Their medical reports were scrutinized for obtaining further information about their disease condition. Short listing was done and then patients were convinced in order to seek their co-operation for the assessment of anthropometry and dietary pattern and also for the analysis of taste change. A good rapport was established with the patients.

Method of data collection -

Data was collected at regular intervals. The actual time duration is given below;

- 1) First cycle – Samples were selected based on the drug log sheet, keeping in mind their stage of cancer, drug used to treat them and the cycle of chemotherapy they were admitted for. Before the commencement of the first cycle of chemotherapy, patient was admitted and the height, weight, dietary pattern and the threshold values were collected. On the day of discharge after the first cycle of chemotherapy, data was collected again.
- 2) Second cycle – After a period of 3 weeks, data was collected in the same way at the end of the cycle from the patients.
- 3) Third cycle – Data collection was repeated after the third cycle also.

Assessment of anthropometric measurements – Selected anthropometric indices were measured for all the subjects. The anthropometric measurements like height and weight are measured using a standard procedures recommended by WHO, 2004 report.

Assessment of the dietary pattern – The dietary patterns of all the subjects were assessed using a twenty four hours dietary recall method.

Collection of detection and recognition threshold values -

1. Ten concentrations of the four basic taste qualities (salt, sweet, sour and bitter) are dissolved in distilled water- salt, sugar, lemon powder and neem powder.
2. Solutions are prepared freshly
3. 50 ml of the samples are taken in 100 ml of plastic cups for the testing.

4. The values obtained from the above tests are statistically analyzed.

Statistical analysis

The results will be determined using appropriate descriptive and inferential statistical measures. The statistical measures that will be used are: Arithmetic mean, standard deviation and student t-test

RESULTS AND DISCUSSIONS:

On comparing the efficacy of carboplatin on the taste changes, dietary pattern and on the anthropometric indices, from each subject before the commencement of the treatment and at the end of the three consecutive cycles, the following results were obtained:

On comparing the detection and recognition threshold levels of all the four basic taste qualities (salt, sweet, sour and bitter) between the carboplatin group and the control group, it was observed that there was no significant difference in the detection and recognition threshold levels of salt, bitter and the detection threshold of sour; but a 5 percent significant difference in the recognition threshold of sweet was observed between the carboplatin group and the control group a significant difference at 1 percent level was observed in the detection threshold level of sweet and sour.

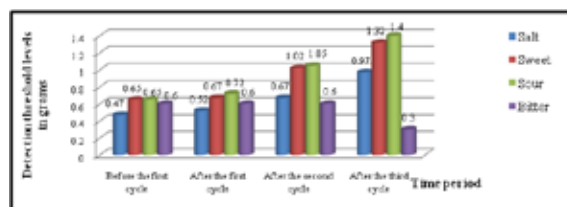


Figure 1 shows the effect of carboplatin on the detection threshold levels of the four basic taste qualities (salt, sweet, sour and bitter) before the commencement and between the three cycles of chemotherapy.

A significant increase at 1 percent level was found in all the basic taste qualities, except that of bitter which was found to be constant even after the first cycle of chemotherapy but after the second cycle, a significant decrease at 1 percent level was observed in the taste quality of bitter.

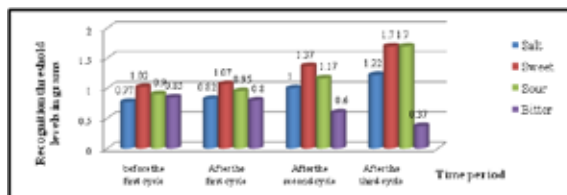
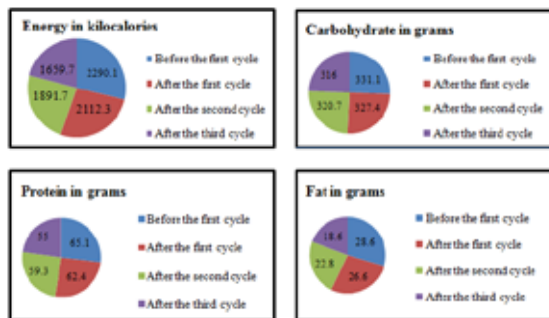


Figure 2 shows the effect of carboplatin on the recognition threshold levels of the four basic taste qualities (salt, sweet, sour and bitter) before the commencement and between the three cycles of chemotherapy.

There was no significant difference in all the four taste qualities before the first cycle but a significant difference was found at 1 percent level after the second cycle in all the taste qualities, except that of bitter which was not significant after the third cycle.

On comparing the effect of carboplatin group over the control group on the nutrient intake of energy, carbohydrate, protein and fat, it was observed that there was no significant difference in the nutrient intake of energy, carbohydrate, protein and fat with the 't' value 1.39, 0.22, 1.16 and 1.73 respectively.

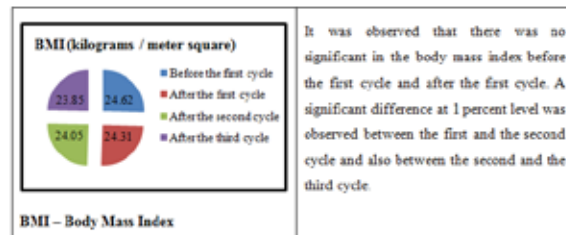
Figure 3 shows the effect of carboplatin on the nutrient intake before the commencement and between the three cycles of chemotherapy



On comparing the effect of carboplatin on the energy and carbohydrate intake before the start of the cycle and between the three consecutive cycles, it was observed that there was a significant decrease in the mean value of both energy and carbohydrate intake. It was observed that there was no significant difference in the protein and fat intake before the first cycle and after the first cycle but a significant difference at 1 percent level was observed in both protein and fat between the first cycle and the second cycle and also between the second cycle and the third cycle.

On comparing the effect of carboplatin group over the control group on the body mass index before the commencement and between the three cycles of chemotherapy, it was observed that there was no significant difference in the body mass index between the cisplatin group and control group, with the 't' value 1.09

Figure 4 shows the effect of carboplatin on the BMI before the commencement and between the three cycles of chemotherapy



It was observed that there was no significant in the body mass index before the first cycle and after the first cycle. A significant difference at 1 percent level was observed between the first and the second cycle and also between the second and the third cycle.

CONCLUSION:

Chemotherapy by itself has many side effects such as anemia/ low red blood cell counts, diarrhea, fatigue, fertility issues, hair changes, infection, memory loss, menopause and menopausal symptoms, mouth and throat sores, nail changes, nausea, neuropathy (problems with hands and feet), taste and smell changes, vaginal dryness, vomiting, and weight changes. In spite of these side effects, certain chemotherapeutic drugs cause nutritional deficiencies which makes the condition of the patient even worse.

As a nutritionist it is our duty to overcome malnutrition and weight losses which are common in patients with cancer that could potentially affect the response and tolerance to treatment, decrease quality of life (QOL), and associate with poor survival

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