RETROSPECTIVE COMPARATIVE STUDY ON DOCETAXEL AND CYCLOPHOSPHAMIDE VS DOXORUBICIN AND CYCLOPHOSPHAMIDE IN BREAST CANCER CHEMOTHERAPY.

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Abstract

Background: It is claimed that breast cancer is the most common and devastating disease. Different anticancer drugs are used to treat different types of tumors with drug categories affecting abnormal cells in many ways. For adjuvant treatment, researchers have shown that certain chemotherapy drug combinations are sometimes more effective than single drug treatment. To treat a breast tumour, chemotherapy drugs or their combinations may be given as adjuvant therapies such as doxorubicin plus cyclophosphamide (AC) and docetaxel plus cyclophosphamide (TC) which is the focus of this research.

Aim and Objectives: The aim of the study is to determine the better drug combination either Docetaxel or Doxorubicin in combination with Cyclophosphamide in patients with breast cancer. The objective of the study is compare the outcomes of the Chemotherapeutic drug combinations in terms of Disease-free Survival and Overall Survival rates.

Methodology: It is a Retrospective Comparative study between the Two adjuvant chemotherapy drug combinations used in Breast Cancer Treatment i.e., Docetaxel with Cyclophosphamide vs Doxorubicin with Cyclophosphamide. The Patients data were collected based upon the Inclusion and Exclusion Criteria. Then they were randomly allocated into two groups by random sampling technique. One group (Group A) received Standard Adjuvant Chemotherapy Regimen Doxorubicin and Cyclophosphamide (AC), Whereas another group (Group B) received Docetaxel and Cyclophosphamide (AT) for 3 to 4 cycles depending on the Patient condition, data were collected and compared in terms of Primary end points on Disease Free Survival (DFS), Overall Survival (OS), and relapse rate to find out the better adjuvant chemotherapeutic regimen in the treatment of Breast Cancer. The Standard Dose of two drug combinations administered to the Groups A and B are Group A: 1. Doxorubicin 60mg and 2. Cyclophosphamide 600mg/m^2, whereas Group B received 1. Docetaxel 75mg and 2. Cyclophosphamide 600mg/m^2

Conclusion: This retrospective study compared the Adjuvant TC regimen (Docetaxel with Cyclophosphamide) with the sequential regular Classical regimen of AC (Doxorubicin with Cyclophosphamide) in terms of the Progression Free Survival and Disease-free Survival. It is found that as far as Progression Free Survival is considered, there are no significant differences between the Both AC and TC regimen, But When Overall Survival is concerned, the TC Regimen is better drug Combination in treating the Breast Cancer. Both Treatment Regimens (TC & AC) was well tolerated with respect to Prognostic Factors, but as far as Adverse Effects and overall survival is considered, TC Regimen (Docetaxel and Cyclophosphamide) is better tolerated and can be recommended Adjuvant Cancer chemotherapeutic regimen in Breast Cancer Patients.

Keywords: Chemotherapy, Combination, Taxanes, Cyclophosphamide.

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Introduction

The Breast Cancer is the most diagnosed cancer and the most leading cause of the cancer death in women. It is the most common occurring / accounting for 25% of the total cancer cases and 15% of the deaths due to cancer(Jemal et al., 2011)(Subramanian, 2018). The disease (Breast carcinoma) is treated with systemic and localized therapy and can be potentially curable, the rise of the recurrence and the distant spread of the tumor can be eradicated with the adjuvant systemic therapies. Some prognostic features/factors can be considered which are nothing but the clinical pathologic features such as tumor grade, tumor size and no. of axillary lymph nodes with metastasis and some of the predictive factors that can be considered while thinking of the adjuvant therapies include the estrogen receptor (ER) and progesterone receptor (PR)(Anampa et al., 2015). Identification /consideration of the predictive factors and the prognostic features helps in the identification of the patients who get benefited from the adjuvant chemotherapy which includes adjuvant endocrine therapy. Similarly, HER-2 gene amplification studies/Human epidermal growth factor receptor-2 (HER-2) protein can be done to identify the patient who has opted for the HER-2 directed therapy(Ahn et al., 2020)(Mokhtari et al., 2017).

Many clinical trials/clinical studies suggested that the available systemic therapies like endocrine therapy, anti-oxidant supplementation, chemotherapy anti HER-2 directed therapy has eventually reduces the recurrence of the tumor when added along with the local systemic therapy(Korde et al., 2021). National surgical adjuvant breast and bowel project reported in 1968 concluded that alkylating agent thiotepa, after radical mastectomy significantly decreases the recurrence of breast tumor(Suresh et al., 2022). Another randomized controlled trial in 1975 concluded that combination chemotherapy regimen CMF (Cyclophosphamide, methotrexate, and fluorouracil) significantly reduces the risk of recurrence, and it paved the way for the modern polychemotherapeutic regimen we are using in clinical practice now(Fisher et al., 1986)(L Preethi et al., 2021). This trial was the first among all demonstrating the polychemotherapeutic regimen in the post-menopausal women with the axillary node positive disease. After this breakthrough in the treatment of breast cancer, then in 2001, the US adopted the regimen in accordance with the national institute of health consensus panel. Although these systemic chemotherapeutic regimens contributed in declining of the breast cancer mortality, some of the assays and the evidence based guidelines suggesting these should be wise choice of drugs instead of classical regimen to prevent the patient from being over treated (Pilewskie and Morrow, 2017)(Nirenjen et al., 2020).Adjuvant chemotherapy is the commonly used method in clinical practice that aims at providing the potential benefits in patients with cancers especially breast cancer, adjuvant chemotherapy can be classified into three – first, second and third generation.

The most used regimens mainly include anthracyclines, like (doxorubicin and epirubicin) and taxanes which include (docetaxel and paclitaxel) which are the two most important cytotoxic agents in both the advanced as well as the early stage of breast cancer(Yin et al., 2020)(Gradishar, 2013). The Purpose of the study is to find out the better combination in terms of Therapeutic efficacy, DFS and OS. The aim of the study is to determine the better drug combination either Docetaxel or Doxorubicin in combination with Cyclophosphamide in patients with breast cancer. The objective of the study is compare the outcomes of the Chemotherapeutic drug combinations in terms of Disease-free Survival and relapse rates.

Anthracyclines

Anthracycline antibiotic is derived from the antibiotic named Rhodocytin-B; Anthracycline was initially found /identified from Streptomyces gram positive bacteria in early 1950 from the soil samples obtained from India. Several components were isolated from anthracycline, one among them is doxorubicin which is isolated from a mutant species of streptomycin found near Adriatic Sea i.e., Streptomyces paucities, it is also named as Adriamycin as it was strained near Adriatic Sea (NAKATA et al., 1992). Doxorubicin plays a major role, and it is the most important cytotoxic agent used in treating metastatic breast cancer. It is reported that doxorubicin may even have the risk of congestive cardiomyopathy, that's the major limiting factor where dose adjustments can be considered to reduce the risk of toxicity. Another major drug which is also an epimer of doxorubicin is epirubicin, which is less cardiotoxic than doxorubicin (Chatterjee et al., 2010).

Anthracyclines and early breast cancer

For the past 2 decades, anthracyclines act as backbone of chemotherapeutic regimens for

women with operable breast cancer. There are many improvements in the adjuvant chemotherapy because of emergence of other chemotherapeutic regimens cyclophosphamide, methotrexate, fluorouracil, taxanes and any new combinations with docetaxel (L. Preethi et al., 2021). Jones et al has conducted a trial between the two most important chemotherapeutic regimens AC (Doxorubicin and cyclophospha-mide) and TC which is (Docetaxel and cyclophosphamide) and concluded that TC regimen is more effective than AC regimen. Thus, this trial provides the breakthrough in the adjuvant chemotherapy where there is an end of the anthracycline era and emergence of the taxanes era(Jones et al., 2006). Anthracyclines are not widely used in the treatment of the superior anti-tumor efficacy in early breast cancer (Maheshwari et al., 2018). The available anthracycline and anthracycline/taxanes containing regimens are superior to AC i.e., doxorubicin and cyclophosphamide. There is a better efficacy of TC (Taxanes + cyclophosphamide than that of AC (Doxorubicin + cyclophosphamide). There emerges the new concept that there is an association between the HER-2 gene and anthracycline containing regimen whereas on the other hand TC regimens (taxanes + cyclophosphamide) works well both in the HER-2 positive and HER-2 negative disease (Ntellas et al., 2019).

Taxanes:

One of the most important drug among the taxanes derivatives paclitaxel which was originally isolated from taxus brevifolia and the anti-tumor activity of the species was described in early 70`s the paclitaxel usually binds with microtubules of the tumor cells and majority induces their mobilization thereby inhibiting the depolymerization inhibiting the mitotic cell division, thereby eliminating the growth of the tumor cell in spite of the specific mechanism of action of the taxanes, the initial development was really because of the poor stability and scarcity, the first taxanes drug was developed in 1994 by cremophor EL-paclitaxel by US – FDA for the treatment of the early breast cancer especially metastatic breast cancer (Škubník et al., 2021). These taxanes therapy was initiates either in the combination of the anthracycline derivatives (or) when anthracycline fails (or) when there is the relapse of the tumor cells if the patient is on any other chemotherapeutic agents mainly anthracycline derivatives. Another most important drug is the docetaxel, docetaxel has the similar, mechanism of action to the paclitaxel, but docetaxel will be more potent than that of the paclitaxel studies, invitro studies says this and docetaxel is more water – soluble than paclitaxel. Premedication before treating with these kinds of chemotherapeutic reagents is necessary to reduce the risk of fluid retention associated with docetaxel and to reduce the risk of acute hypersensitivity reactions (Verweij et al., 1994). There are some studies where comparison of the docetaxel with the paclitaxel was done in the metastatic breast cancer, states that docetaxel shows the greater efficacy but more toxic when compared to paclitaxel, both agents have been widely used in treating the metastatic breast cancer.

Cyclophosphamide, methotrexate, 5 – fluorouracil (CMF regimen):

This was the first combination adjuvant chemotherapy regimen that was in clinical practice after a series of prospective clinical trials. One such trial conducted in 1973 upon the node positive breast cancer patients who undergone radical mastectomy (Maheshwari, P.; Nirenjen, S.; Bibibergin, R. V.; Kumari, Thabitha; Shanmugarajan, T. S.; Shanmugasundaram, 2019). This combination proved efficacy as well as promoting the disease - free survival and the overall survival and decrease in the hazard ratio. It has been proved to have a decreased relapse rate (Fisusi and Akala, 2019).

Doxorubicin and cyclophosphamide

The most important trial which talk about the efficacy of the doxorubicin and cyclophosphamide is the NSABP B – 11, which helps in comparing melphalan and 5-flurouracil with (or) without doxorubicin (Yang et al., 2022). It concluded that this regimen proves the progressive disease-free survival as well as the overall survival rate, another most common relevant trial involving the doxorubicin and cyclophosphamide is the EBCTCG, concluded that using these regimens there is no difference in the outcomes in patients treated with CMF/AC (Yu et al., 2013).

Although Radical Mastectomy is one of the most Surgical Intervention in the Management of the Operable Breast Cancer for both Node positive & Node Negative Breast Cancer, These Adjuvant Chemotherapeutic Regimens plays a major role in preventing the relapse of the Tumor and to Wipe out the remnants of the tumor thereby Improving the Disease-Free Survival as well as overall

Survival Rate in Patients with Breast Cancer (Somasundaram et al., 2022). Despite adverse event like Chemotherapy Induced Nausea and Vomiting, still the most effective way of treating Breast cancer is relay on chemotherapy, as emerging new phenomenon like maintenance therapy and supplementation should also be considered in treatment of Breast cancer Chemotherapy (Moo et al., 2018).

For adjuvant treatment, researchers have shown that certain chemotherapy drug combinations along with supplementation of anti-oxidants are sometimes more effective than single drug treatment. Anti-oxidants play a pivotal role in the eradication of free radicals which are present prominent during many disease conditions like cancer, neurodegenerative diseases (Subramanian, 2018)(Subramanian*, 2019)(Prabakaran M, 2022), Diabetes, Hypertension, etc. To treat a breast tumour, chemotherapy drugs or their combinations may be given as adjuvant therapies such as doxorubicin plus cyclophosphamide (AC) and docetaxel plus cyclophosphamide (TC).

METHODOLOGY

Study site: Tertiary Care Hospital

Study design: Comparative Retrospective study

Study duration: The entire study was planned to be carried out for a period of four months.

Method involved: It is a Retrospective Comparative study between the Two adjuvant chemotherapy drug combinations used in Breast Cancer Treatment i.e. Docetaxel & Cyclophosphamide vs Doxorubicin & Cyclophosphamide. The Patients data will be collected based upon the Inclusion and Exclusion Criteria. Then they were randomly allocated into two groups by random sampling technique. One group (Group A) who receive Standard Adjuvant Chemotherapy Regimen Doxorubicin and Cyclophosphamide (AC), Whereas another group (Group B) who receive Docetaxel and Cyclophosphamide (AT) for 3 to 4 cycles depending on the Patient condition, data will be collected and compared in terms of Primary end points on Disease Free Survival (DFS), Overall Survival (OS), and relapse rate to find out the better adjuvant chemotherapeutic regimen in the treatment of Breast Cancer.

The Standard Dose of two drug combinations administered to the Groups A and B are given as follows.

Group A:

S.NO	DRUG	DOSE
1.	Doxorubicin	60mg
2.	Cyclophosphamide	600mg/m^2

Group B:

S.NO	DRUG	DOSE
1.	Docetaxel	75mg
2.	Cyclophosphamide	600mg/m^2

Sample size: sample size is calculated using Raosoft online sample size calculator. For a random sampling of a population of 100 persons with aconfidence interval of 95%, the sample size is found to be 60 with a 5.75 % margin of error.

PATIENT SELECTION:

Inclusion criteria:

1. Participants with age group above 18 years are included in the study
2. Participants with Invasive ductal Carcinoma are included in the study
3. Participants with Stage I – III Breast cancer are included in the study
4. Participants with ECOG Score 0-1are included in the study

Exclusion criteria:

1. Participants with age group below 18 years are excluded in the study
2. Participants with any other type of Cancers are excluded in the study.
3. Participants with Stage IV Breast cancer are excluded in the study
4. Participants with other systemic illness are excluded in the study.
5. Participants with ECOG Score 2 and above were excluded in the study

Table – 1 Baseline Characteristics of Patients

S.No	Base Line Characteristics	Total
1	Median Age	51.5 Years (Range 34-82 years)
2	Median Number of Cycles	2 (Range 1-6 Cycles)
	Receptor Status	
3	TNBC	29 (36.2%)
4	HER2 Positive	25 (31.2%)
5	ER Positive / HER 2 Negative	26 (32.5%)
	ECOG PS	
6	PS 0	22 (27.5%)
7	PS 1	40 (50%)
8	PS 2	18 (22.5%)

Table 1 Baseline characteristics of all the 80 Participants whose data has been considered for the study. The table shows the Median age of the participants is 51.5 years which is in between lower range of 34years and upper range of 82 years whose data were accounted for the study. The Median Number of Chemotherapeutic cycles is 2 cycles which is in between the lower range of 1 cycle to the upper range of 6 chemotherapeutic cycles respectively.

Figure 1 Receptor Status of the Participants

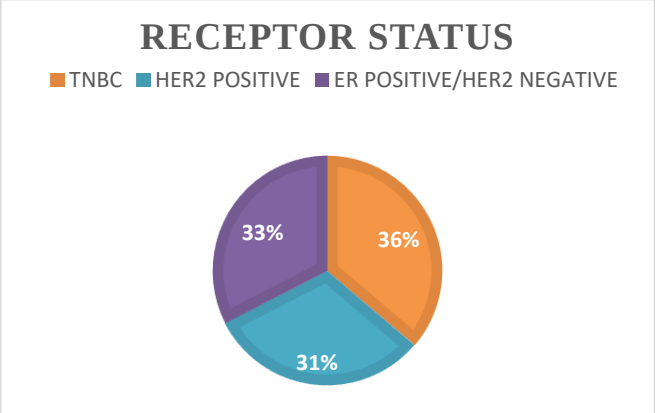

Figure 2 Receptor Status of the Breast cancer Patients, in which 29 (36.2%) patients out of total 80 had Triple Negative Breast cancer (TNBC) which is characterized by all the three negative biomarkers ER, PR & EGFR. 25 (31.2%) patients out of 80 had Human Epidermal Growth Factor Receptor (HER2) positive Breast cancer. 26(32.5%) out of 80 had Estrogen Receptor (ER) positive Breast cancer. From the above data, we can be able to know that comparatively Patients with TNBC has higher proportion of participants in this study as it also correlates with the Epidemiology of the TNBC reported by Nahlal.*et.al* in 2019.

Figure.2 ECOG Performance Status Score

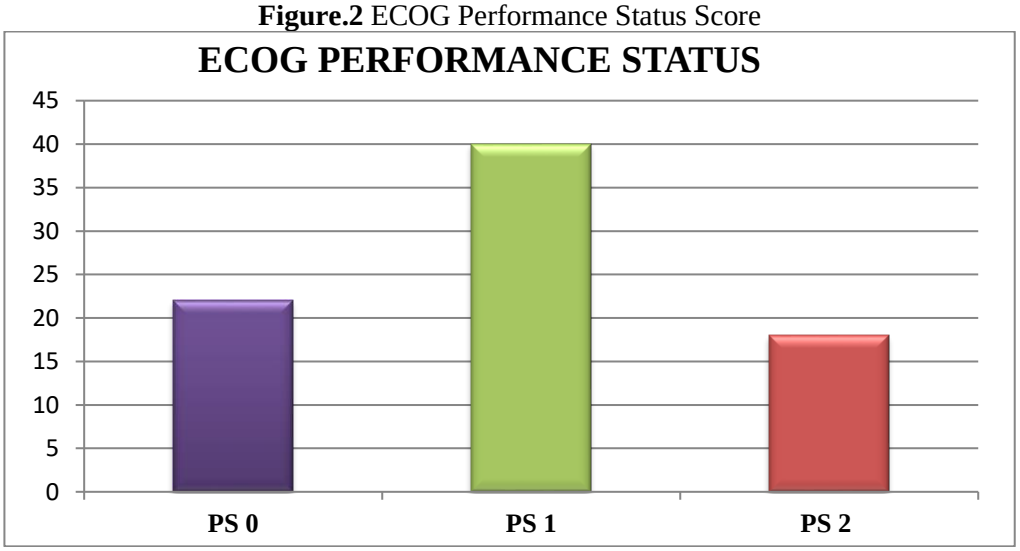

Figure 2 shows the Eastern Cooperative Oncology Group- Performance Status Score (ECOG-PS) which is a simple measure of the Functional Status of the Cancer Patients. 22 (27.5%) out of 80 Patients were showing the Performance Status of 0, where the patients are able to carry out all the pre-disease performance without any restriction. 40(50%) out of 80 Patients were showing the Performance status of 1, Where the patients are restricted in doing the strenuous activities. 18 (22.5%) out of 80 Patients were showing their Performance Status of 2, who were on ambulatory care with 50% reduction in pre-disease status.

Table – 2 Adverse Drug Reactions Reported

S.NO	ADVERSE DRUG REACTIONS	GROUP A AC	GROUP –B TC
1.	**Anaemia**	8 (20%)	5 (12.5%)
2.	**Neutropenia**	7 (17.5%)	nil
3.	**Asthenia**	3 (7.5%)	nil
4.	**Alopecia**	4 (10%)	3 (7.5%)
5.	**Skin Abscess**	2 (5%)	1 (2.5%)
6.	**Urinary Tract Infection**	1 (2.5%)	nil
7.	**Upper Respiratory Tract Infection**	3 (7.5%)	nil
8.	**Allergic Reaction**	3 (7.5%)	3 (7.5%)

Table 2 Adverse Drug Reactions noted after the subsequent chemotherapeutic Regimen are as follows.

Group A who receives an AC Regimen, i.e., Cyclophosphamide with Doxorubicin, 8(20%) out of 40 reports the Grade-I and II Anaemia, 7(17.5%) out of 40 reports Neutropenia, 3(7.5%) out of 40, 4(10%) out of 40 reports Asthenia and Alopecia respectively. Only very few 2(5%) out of 40 and 3(7.5%) out of 40 reported the Skin Abscess and Upper Respiratory Tract Infection. 1(2.5%) out of 40 and 3(7.5%) reported the Urinary Tract Infection and Allergic reactions respectively.

Group B in Contrary, 5(12.5%) out of 40 reported Anaemia, 3(7.5%) out of 40 reported Alopecia and Allergic reaction and only 1(2.5%) reported skin abscess.

Figure 3 Adverse Drug Reaction Reported

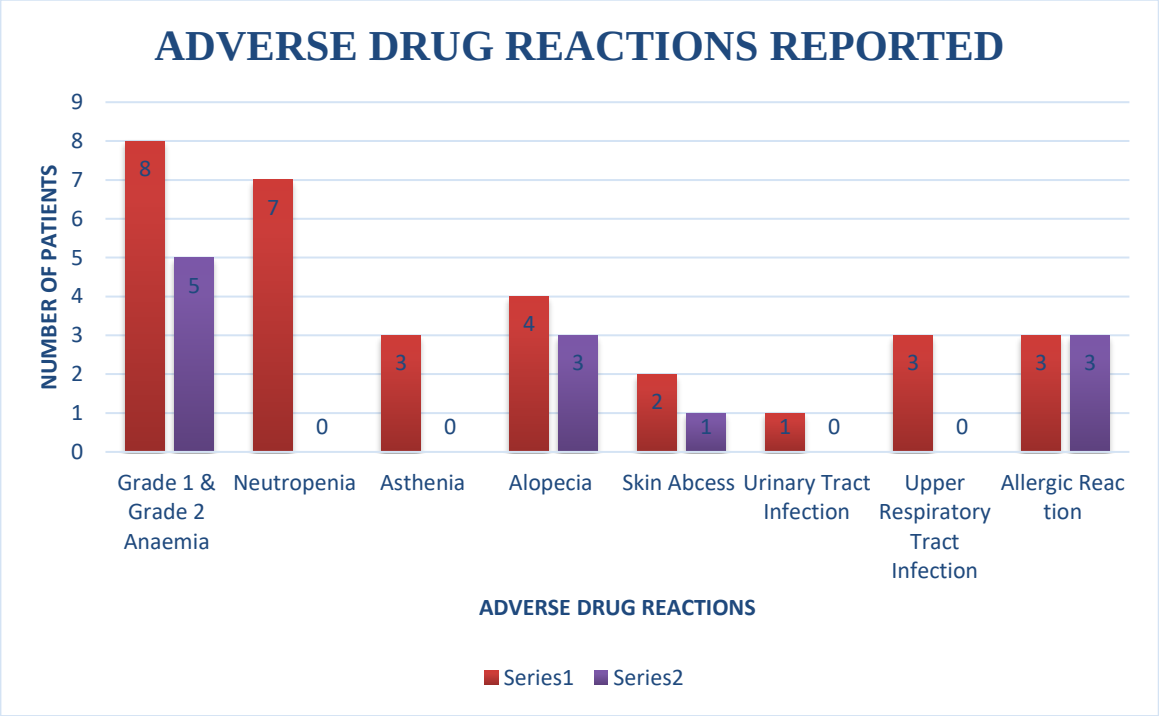

Figure 3 Group A who received AC regimen i.e., Cyclophosphamide and Doxorubicin reported the comparatively higher Adverse Drug Reactions than that of the Group B who receives TC Regimen i.e., Docetaxel with Cyclophosphamide.

Table.3 Co Morbidities

S.No	Co- Morbid Conditions	AC Regimen	TC Regimen	P Value
1.	**Type –II Diabetes Mellitus**	7 (17.5%)	5 (12.5%)	**0.857***
2.	**Systemic Hypertension**	8 (20%)	7 (17.5%)	
3.	**Bronchial Asthma**	2 (5%)	-	
4.	**Hypothyroidism**	1 (2.5%)	-	
5.	**No Co morbidities**	22 (55%)	28 (70%)	

p value <0.05 is considered to be significant

Table 3 Co-Morbid conditions of the Participants in both the regimens i.e., AC (Doxorubicin with Cyclophosphamide), TC (Docetaxel with Cyclophosphamide) respectively. It is Obvious that there is no such statistical significance between the Co-Morbid Conditions and the Treatment outcomes between both groups since the p value is not <0.05. These Co-Morbid conditions don't have any influence among the treatment outcomes.

Figure 4 Co-Morbid Conditions of the Patients

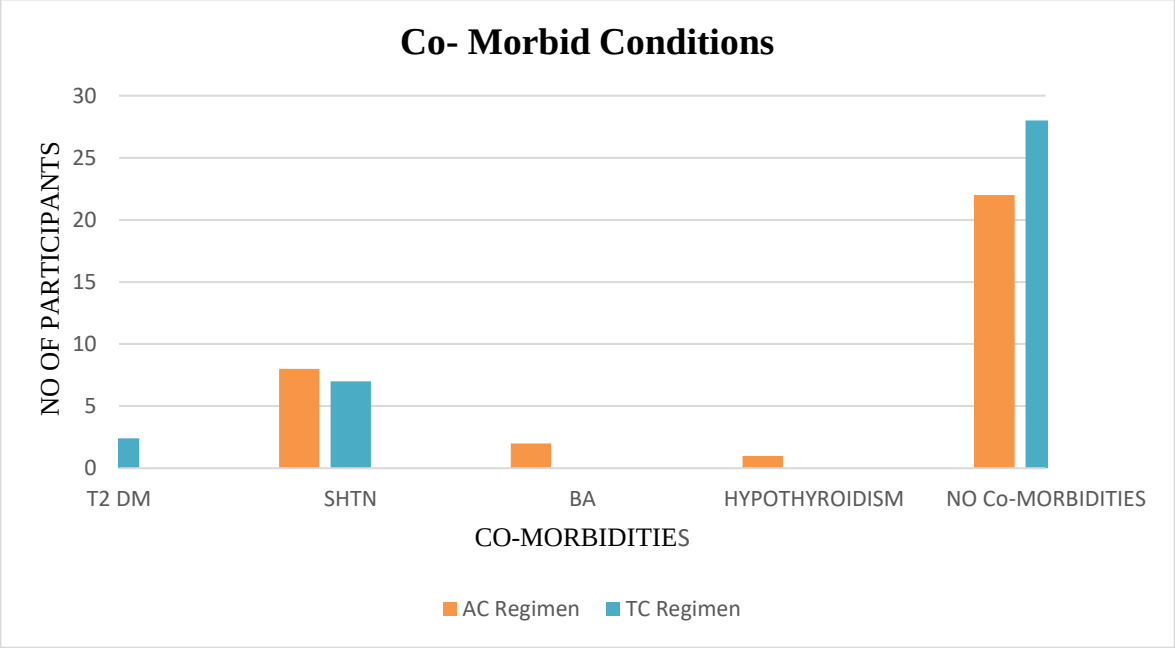

Figure 4 Co-Morbid conditions of the Participants in both the regimens i.e., AC (Doxorubicin with Cyclophosphamide), TC (Docetaxel with Cyclophosphamide) respectively.

Kaplan-Meier Survival Analysis

Table 4 Mean Survival Analysis Table – Progression Free Survival

Treatment	Estimate Months	Standard Error
AC Regimen	23.132	1.307
TC Regimen	21.179	1.208

Table 4 Mean Survival Analysis of two Chemotherapeutic Drug Regimens i.e. AC (Doxorubicin with Cyclophosphamide) and TC (Docetaxel with Cyclophosphamide) regimens, The Mean Progression Free Survival (PFS) in group A was found to be 23 Months and for Group B it was found to be 21 Months.

Table 5 Median Survival Analysis Table – Progression Free Survival

Treatment	Estimate Months	Standard Error	P Value
AC Regimen	21	0.640	**0.744**
TC Regimen	23	0.753	

p value <0.05 is considered to be significant

Table 5 Median Survival Analysis of two Chemotherapeutic Drug Regimens i.e. AC (Doxorubicin with Cyclophosphamide) and TC (Docetaxel with Cyclophosphamide) regimens, The Median Progression Free Survival (PFS) in group A was found to be 21 Months and for Group B it was found to be 23 Months and P value was calculated by comparing them using the Chi-Square test and was found to be 0.744 at 95% confidence interval which is not statistically significant.

Figure.4 Kaplan-Meier Curve for Progression Free Survival

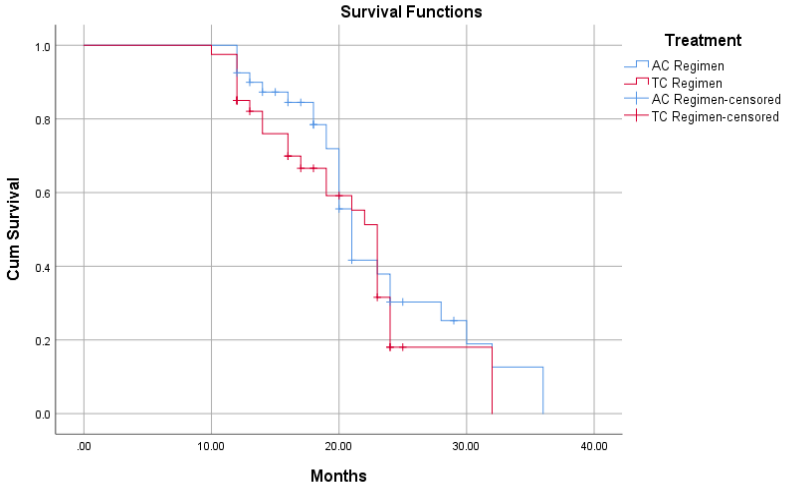

Figure 4 Kaplan-Meier Curve plotted against Cumulative Survival and Months between the two comparative drug regimens. The Median Progression Free Survival of Group A (AC Regimen) and Group B (TC Regimen) are 21 months and 23 Months Respectively.

Table.6 Mean Survival Analysis Table – Overall Survival

Treatment	Estimate Months	Standard Error	P Value
AC Regimen	30	1.606	
TC Regimen	24	1.491	**<0.05**

p value <0.05 is considered to be significant

Table 6 Mean Survival Analysis of two Chemotherapeutic Drug Regimens i.e., AC (Doxorubicin with Cyclophosphamide) and TC (Docetaxel with Cyclophosphamide) regimens, The Mean Overall Survival (OS) in group A was found to be 30 Months and for Group B it was found to be 24 Months. P value was calculated by comparing them using the Chi-Square test and was found to be at 95% confidence interval which is not significant. The Median OS is not reached.

Figure 5 Kaplan-Meier Curve for Overall Survival

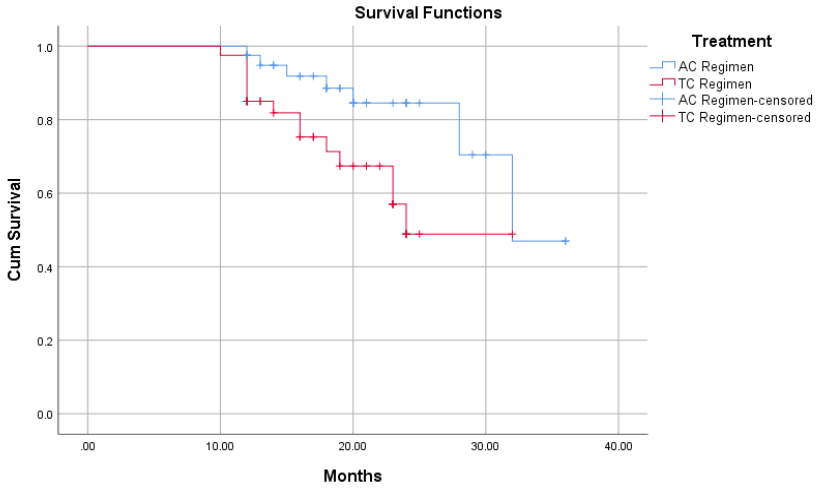

Figure 5 Kaplan-Meier Curve plotted against Cumulative Survival and Months between the two comparative drug regimens. The Mean Overall Survival of Group A (AC Regimen) and Group B (TC Regimen) are 30 months and 24 Months Respectively. The Median OS is not reached.

DISCUSSION:

Different Studies were presented including the disease related to the health status and the Toxicity of the anticancer drugs for Breast Cancer. Adjuvant Chemotherapy for the treatment of the Breast Cancer is claimed to be the better option especially in Elderly Patient who don't opt for the Surgical and Radiotherapy Management. There are different combinations of the chemotherapy for the post-operative therapy in Breast Cancer especially Combination of Docetaxel or Doxorubicin with Cyclophosph-amide as the first line of Chemotherapy in invasive Breast Cancer Chemotherapy.

The Study was a Retrospective Analysis in which the data were obtained between the Mean time Period of 3 years with the Median Age group of 51.5 Years and the Median Number of Chemotherapy cycles is 2 Cycles, where Docetaxel and Doxorubicin was administered at every 21 days cycle is an Adjuvant Chemotherapy regimen. Adjuvant Chemotherapy with Taxanes as well as Anthracyclines has equally provides the promising results in the Management of Breast cancer. Previously published studies often includes either one of those two regimens not both. Both AC and TC Regimen has been widely adopted as an Adjuvant Chemotherapy options in patient with Breast cancer, however both regimen has its own pros and cons with respect to their toxicity profile, Group A who received AC regimen shows wide range of Adverse Effects when compared to Group B who received TC Regimen.

Patient may also be presented with the other Co-Morbid such as Type-II Diabetes Mellitus, Systemic Hypertension, Bronchial Asthma and Hypothyroidism which doesn't have any influence in their treatment outcomes such as the Progression Free Survival and the Overall Survival. Since, it is a retrospective study comparing the two chemotherapeutic drug regimens, Kaplan Meier Survival Analysis was used in order to evaluate the PFS and OS.

Progression Free Survival is nothing but, after successive intervention with the interventional drug combinations, there must be at least 20% reduction in the volume and growth of the Breast Cancer Tumor. Here in case comparing the PFS of the two chemotherapeutic drug regimen (AC and TC), the Mean PFS in Group A who received AC regimen is 23 Months whereas in Group B who receives TC regimen was found to be 21 Months. Median Progression Free Survival of Group A is 21 months and for Group B is 23 Months. While performing the Chi- Square Analysis comparing the two regimens Progression Free Survival with respect to treatment outcomes, there was no Statistical significance in both regimens as depicted in the figure.4

Overall Survival is the overall Improvement in the Disease and mainly focusing on lengthening the lifespan of the Patient. The Mean Overall Survival of Group A who receives AC Regimens was found to be 30 months and for the Group B was found to be 24 months. The Median OS is not determined. While performing the Chi-Square analysis comparing two regimens, Overall Survival with respect to the treatment outcomes, there is a significant difference ($p< 0.05$). The overall survival of Group A is 30 months and Group B is 24 Months.

CONCLUSION:

Adjuvant AC Chemotherapy (Doxorubicin with Cyclophosphamide) in Breast Cancer Patients may induce important adverse effects. This retrospective study comparing the Adjuvant TC regimen (Docetaxel with Cyclophosphamide) with the sequential regular Classical regimen of AC (Doxorubicin with Cyclophosphamide) in terms of the Progression Free Survival and Disease-free Survival. It is found that as far as Progression Free Survival is considered, there are no significant differences between the Both AC and TC regimen, But When Overall Survival is concerned, the TC Regimen is better drug Combination in treating the Breast Cancer. Both Treatment Regimens (TC & AC) was well tolerated with respect to Prognostic Factors, but as far as Adverse Effects and overall survival is considered, TC Regimen (Docetaxel and Cyclophosphamide) is better tolerated and can be recommended Adjuvant Cancer chemotherapeutic regimen in Breast Cancer Patients.

Ethics approval and consent to participate

The protocol of this study was revised and approved by the Institutional Ethics Committee, VELS Institute of Science, Technology and Advanced Studies, Chennai, India- 600117. Ref:

VISTAS-SPS/IEC/I/2021/04. Written informed consent was obtained from each of the study participants after briefing them about the study and that the obtained data will be published.

Consent for publication

Consent was obtained from the hospital authorities for the publishing of the data obtained during the study**.**

Availability of data and materials

All the above-mentioned data and results of statistical analysis are available with the authors and are ready to be shared with approved personnel upon request.

Competing interests

The authors declare that they have no competing interests.

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