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CAPECITABINE EFFICACY WITH ADJUVANT RADIOTHERAPY IN THE TREATMENT OF EARLY STAGE BREAST CANCER (RETROSPECTIVE STUDY)

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Objectives: *Our goal is to assess the effectiveness and toxicity of capecitabine as radio-sensatizer with adjuvant radiotherapy in breast cancer (BC) patients.* ***Methods:*** *On the radiation days, the patients got capecitabine 825 mg/m^2 every 12 hours with a 25% dosage reduction if creatinine clearance was lower than 30 ml/min with radiation therapy of dose of 4240 cGy administered in 16 fractions at a rate of 2.65 Gy each over the course of three weeks. In addition, a boost dose of 14 Gy administered in 7 fractions was added to the lumpectomy bed.* ***Results:*** *Study group were evaluated at 3, 12, 24, 36, 48, and 60 months. At 3 and 12 months, 29 patients (61.7%) exhibited G1 skin hyperpigmentation. At 60-month, 3 patients (7.5%) had G2 lymphedema (p = 0.226). At 24th month, 4 patients (9.3%) had G1 telangiectasia, 5 patients (11.6%) developed G1 skin fibrosis (p = 0.001). Moreover, one patient (2.3%) experienced a G1 cardiac event (p = 0.416). At 3 month radiation pneumonitis G1 was identified in 3 patients (6.4%) (p = 0.416). Despite the fact that 6 patients (15%) developed distant metastases, there were no instances of local recurrence. the OS rate was 85.1%.* ***Conclusion:*** *Adjuvant radiation combined with capecitabine is well tolerated and effective*

Key words: *Radio-sensitizer, capecitabine, efficiency, breast cancer*

INTRODUCTION

Breast cancer (BC) is currently the most common tumor in the globe and a continuing public health concern. Thousands of women from all horizons are diagnosed with BC every day[1]. In addition to being the most prevalent cancer, BC is also the leading cause of cancer death in women worldwide. Now it accounts for 1 in 8 cancer diagnoses and 2.3 million new cases in both sexes combined. It also accounts for a quarter of all cancer cases in women, and its prevalence has been rising globally, especially in transitioning nations[2]. In the United States, BC accounts for 31% of all female cancer cases; 297,790 new cases will be estimated to be diagnosed with BC in 2023, and 43,170 deaths are anticipated[3].

In a multidisciplinary treatment of BC, radiotherapy is crucial. Post-mastectomy radiation therapy (PMRT) decreased the loco-regional recurrence rate (LRR) and BC-specific mortality in patients with one to three metastatic lymph nodes (LNs), as well as those with four or more metastatic LNs, according to the meta-analysis conducted by the Early Breast Cancer Trialist Collaborative Group in 2014[4,5].

The Danish Breast Cancer Cooperative group discovered that patients who underwent mastectomy for stage II or stage III BC had considerably higher rates of disease-free survival (DFS) and overall survival (OS) following irradiation of the chest wall and regional LNs[6]. Patients with less aggressive tumors, such as hormone receptor (HR) positive, human epidermal growth factor

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receptor 2 (HER2/neu) negative, and Luminal A type tumors, were found to benefit from PMRT most significantly on a systemic level. Fewer long-term survival benefits are associated with more aggressive tumors, likely because they may have spread before receiving loco-regional treatment and are therefore uncontrollable, especially when compared to the less aggressive systemic therapy used in this trial[7].

In general, the 30-year cumulative incidence of LRR was 9% in irradiated patients compared to 37% in non-irradiated patients who received adjuvant systemic therapy alone, according to the results of a 30-year long-term report from the Danish Breast Cancer Cooperative Group (DBCG) trial (2022). At 30 years, the likelihood of distant metastasis was 49% in irradiated individuals versus 60% in non-irradiated patients. Accordingly, irradiation was found to reduce BC mortality by 56% compared to 67% and overall death by 81% compared to 86% at 30 years (p =0.0001)[8]. In a more recent study, the significance of regional LNs irradiation was studied and validated as a key element in lowering overall mortality in node positive patients, particularly internal mammary nodes[9].

Adjuvant breast irradiation reduces the 10-year risk of LRR rate after breast conserving surgery (BCS) from 35% to 19.3%, according to a meta-analysis of individual patient data for 10,801 women in 17 randomized studies. Radiotherapy not only significantly decreased BC recurrence but also moderately decreased BC death: the 15-year absolute risk reduction was 3.8%[10]. BCS with RT can lower the risk of death by 15% and the risk of a specific death from breast cancer by 18%, according to Portman's et al study analysis[11].

Integrating radiation with radio-sensitizing drugs not only offers the chance to improve and prolong RT-induced anticancer responses, but also permits an additional level of tumor selectivity[12]. Drugs used for radio-sensitization intended to affect tumor cells differently from healthy cells. DNA repair processes in tumor cells are flawed and rely on different pathways than those in normal cells. Synthetic lethality is brought on by targeting these pathways[13].

Increasing numbers of patients with metastatic BC are being treated with capecitabine. A meta-analysis revealed that capecitabine-based chemotherapy outperformed capecitabine-free treatment in terms of overall response. OS was discovered to be non-significantly greater for chemotherapy based on capecitabine[14]. Using standard adjuvant regimens and capecitabine at doses between 1600 and 2500 mg/m^2 daily, Zhang et al conducted a meta-analysis and discovered that early BC OS was improved, but only in certain subtypes like triple negative breast cancer (TNBC) and those with high-risk features (lymph node involvement and high Ki67)[15].

Compared to single modality treatments, concurrent chemo-radiotherapy regimens using a combination of chemotherapeutic drugs have been proven to offer greater response rates. In matched controls with locally advanced BC, concurrent pre-operative RT with the 5-FU, epirubicin, cyclophosphamide, and docetaxel (FEC-D) chemotherapy regimen led to a higher rate of pathologic complete response (pCR) (22%) than chemotherapy alone (14%)[16].

In node-positive BC afterwards surgery, several studies believe that concurrent chemo-radiotherapy may provide superior loco-regional control than chemotherapy and afterwards radiation. Rouesse et al compared concomitant chemo-radiotherapy with 5-fluorouracil, mitoxantrone, and cyclophosphamide versus 5-fluorouracil, epirubicin, and cyclophosphamide with subsequent radiotherapy and discovered that it was associated with significantly better loco-regional control in node-positive BC after surgery, though they also discovered a slight increase in acute toxicity[17].

The efficacy and safety of capecitabine combined with radiation therapy in the adjuvant treatment of high risk BC were assessed by DeRose et al. The efficacy was defined as the percentage of patients who completed the course of RT and capecitabine. Patients successfully completed the RT course at a rate of 97%, and capecitabine therapy at a rate of 76%, demonstrating the effectiveness of the treatment plan[18].

The patients were treated with a mean dose of 60 Gy to the chest wall (including the boost) and 45Gy to the supraclavicular fossa, according to Panoff et al who retrospectively reviewed patients with stage II-IV BC who received concurrent capecitabine and RT. The

study came to the conclusion that concurrent capecitabine and RT provided effective loco-regional control in this group of BC patients at extremely high risk of LRR despite short follow-up, a small patient population, and higher acute toxicity[19].

Our study's main goal is to evaluate the effectiveness and safety of concurrent capecitabine and external beam radiotherapy in individuals with early-stage BC. Determining the DFS and OS for those patients over a 5-year period is the secondary end aim.

PATIENTS AND METHODS

Study population

The current study included 47 female patients with non-metastatic BC who had concurrent capecitabine and adjuvant radiation who attended in South Egypt Cancer Institute between October 2016 and September 2018, with a 5-year follow-up period. All patients who met the following criteria were included in the study: Female patients aged ≥ 18 years old underwent BCS or mastectomy had early stages of BC. The Eastern Cooperative Oncology Group (ECOG) performance status (PS) 0-2, the patient underwent adjuvant chemotherapy based on anthracyclines and taxol. Radiotherapy contraindications, such as past radiation to the chest wall or skin problems, being pregnant or nursing, and contraindications to capecitabine, such as severe renal impairment or allergies, were the exclusion criteria.

Study design

All patients underwent adjuvant chemotherapy based on anthracyclines, either with or without taxol. The patients received adjuvant radiation therapy with a dose of 4240 cGy administered in 16 fractions at a rate of 2.65 Gy each over the course of three weeks. In addition, a boost dose of 14 Gy administered in 7 fractions was added to the lumpectomy bed for BCS patients. On radiation days, capecitabine 825 mg/m^2 was administered concurrently, every 12 hours, with a 25% dosage reduction if creatinine clearance was lower than 30 ml/min.

Ethical approval

Before any data were collected, the review board of the Assiut University Faculty of Medicine's ethics committee authorized the research protocol. (NCT04815616).

Toxicity evaluation

Evaluation of skin toxicities

The late effects on normal tissue scoring method (appendix 1) was used to grade the late skin toxicities (telangectasia, hyperpigmentation, and fibrosis), which were evaluated yearly at 12, 24, 36, 48, and 60 months.

Evaluation of pulmonary toxicity

All patients who have abnormal chest X-ray results or pulmonary symptoms undergo evaluation by computer tomography (CT). The late radiation lung morbidity scoring method appendix 2 of the Radiation Therapy Oncology Group/European Organization for Research and Treatment of Cancer (RTOG/EORTC) was used to assess chronic lung radiation toxicity[20].

Evaluation of cardiac toxicities

Before beginning treatment and three months after the recommended course of treatment, all patients underwent an echocardiogram.

Evaluation of lymphedema

All patients had examined for arm edema. Prior to radiation therapy 3, 12, 24, 36, and 48 months later, and evaluated as depicted in appendix 3.

Statistical methods

All statistical calculations was done using statistical package for the social science; SPSS Inc., Chicago, IL, USA version 22. Quantitative data were statistically described in terms of mean ± SD and median (range). Qualitative data were statistically described in terms of frequencies (number of cases) and relative frequencies (percentages) when appropriate. Friedman test was used for comparing categorical data overtime. Kaplan-Meier's method with log rank test was used for overall and progression free survival analysis. *P-value* is always 2 tailed set significant at 0.05 levels.

RESULTS AND DISCUSSION

Results

We evaluated 47 patients with pathologically established stage II and stage III infiltrating ductal carcinoma with node positive disease who received capecitabine concurrently with adjuvant radiation; 7 patients died during the follow-up period.

The demographic and clinical details of the study participants are shown in **Table (1**). With a mean age of 50.17± 12.32 years and a range of 50 (28 – 77) years old, 24 patients (51.1%) were under the age of 50 and 23 patients (48.9%) were aged ≥ 50 years old. . The majority of cases (87.2%) had PS grades 0, while six individuals (12.8%) have PS grade 1.

Right-sided BC affected 20 females (42.6%), while left-sided affected 27 females (57.4%). 39 patients (83% of the cases) had tumors grade II, while 4 cases (8.5% of the cases) had tumors grade I, and 4 cases (8.5% of the cases) had grade III. all of the cases under study had infiltrating ductal carcinoma. Regarding the tumor size (T), the most frequent T stage was T2 (28 Cases) (59.6%), followed by T3 (15 Cases) (31.9%) and T1 (4 Cases) (8.5%).

Table 1: Patients demographic and clinical characteristics.

Variable name	No.	%
Age (years)		
• Mean ± SD	50.17 ± 12.32	
• Median (range)	50 (28 – 77)	
Age group		
• <50 years	24	(51.1)
• ≥ 50 years	23	(48.9)
Performance status (PS)		
• PS 0	41	(87.2)
• PS 1	6	(12.8)
Laterality		
• Right	20	(42.6)
• Left	27	(57.4)
Tumor grade (G)		
• G I	4	(8.5)
• G II	39	(83.0)
• G III	4	(8.5)
Tumor stage (T)		
• T1	4	(8.5)
• T2	28	(59.6)
• T3	15	(31.9)
Nodal stage (N)		
• N1	26	(55.3)
• N2	21	(44.7)
TNM staging		
• Stage II	24	(51.1)
• Stage III	23	(48.9)
ER		
• Negative	12	(25.5)
• Positive	35	(74.5)
PR		
• Negative	13	(27.7)
• Positive	34	(72.3)
HER2/neu		
• Negative	41	(87.2)
• Positive	6	(12.8)

SD: standard deviation, **ER:** estrogen receptors, **PR:** progesterone receptors, **HER2/neu:** human epidermal growth factor receptor

Regarding the nodal stage (N), 26 individuals (55.3%) had N1, whereas the remaining cases (44.7%) had N2. Stage II tumor patients made up 51.1% of all cases (24 instances), whereas stage III tumor patients made up 23 cases (48.9%).Only 6 patients (12.8%) had HER2/ neu over expression, while 35 patients (74.5%) had positive estrogen receptors (ER) and 34 patients (72.3%) had positive progesterone receptors (PR).

The modified radical mastectomy (MRM) procedure was used to treat the majority of the individuals in the study 36 patients (76.6%); only 11 cases (23.4%) had BCS. Eight cases (17.0%) of the participants in the study received the FAC regimen, eleven cases (23.4%) were given the FEC regimen, and 28 cases (59.6%) were given the combined FEC and Taxotare regimen, as indicated in **Table (2)**.

Table 2 : Type of surgery and regiments of chemotherapy.

Variable name	No.	%
Surgery		
• BCS	11	(23.4)
• MRM	36	(76.6)
Regimen of previous CTH		
• FAC	8	(17.0)
• FEC	11	(23.4)
• FEC - Taxotare	28	(59.6)

BCS: breast conservative surgery; **MRM:** modified radical mastectomy; **CTH** chemotherapy, **FAC:** 5-fluorouracil, doxorubicin and cyclophosphamide, **FEC:** fluorouracil, epirubicin hydrochloride, and cyclophosphamide.

The incidence and severity of toxicity among the study group were evaluated at 3, 12, 24, 36, 48, and 60 months following the end of the treatment protocol, as shown in **Table (3)**. When it concerns to skin hyperpigmentation, our analyzed cases showed a considerable improvement from the start of the study to the end of the follow-up period (p= 0.001). All patients (100%) had G0 hyperpigmentation at the completion of the follow-up period, while 29 patients (61.7%) had G1 hyperpigmentation at 3 months and 12 months. At the end of the course of treatment, there were 12 patients (25.5%) with G1 lymphedema and 3 patients (6.3%) with G2 lymphedema. At the 60-month follow-up, there were only 3 patients (7.5%) with G2 lymphedema (p =0.226).

Skin fibrosis was noticed at the 24th follow-up month; 5 patients (11.6%) exhibited G1 skin fibrosis, which remained unchanged during the follow-up period (p= 0.001). At the 24th month of follow-up, only 4 patients (9.3%) had developed G1 telangiectasia. (p =0.001) In 3 patients (6.4%) at the third month of follow-up, radiation pneumonitis G1 developed and persisted over the course of the follow-up. (p =0.416) At the 24th month of follow-up, only one patient (2.3%) experienced a G1 cardiac episode. (p =0.416).

During the follow-up period, there were no cases of local recurrence. Regarding distant metastases, **Table (4)** shows that 3 patients (7.5%) developed lung metastases, 2 cases (5%) had liver metastases, and 1 case (2.5%) had bone metastases.

Table 3: Incidence and grades of radiation toxicity among the studied cohort group.

Follow up / Grade of toxicity	0-3months N= 47		12 months N= 47		24 months N= 43		36 months N= 40		48 months N= 40		60 months N =40		P value
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
Skin hyperpigmentation	29 (61.7)	0 (0.0)	29 (61.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	**<0.001**
Lymphedema	12 (25.5)	3 (6.3)	12 (25.5)	4 (8.5)	6 (13.9)	4 (9.3)	1 (2.5)	3 (7.5)	0 (0.0)	3 (7.5)	0 (0.0)	3 (7.5)	0.226
Skin fibrosis	0	0	0 (0.0)	0 (0.0)	5 (11.6)	0 (0.0)	5 (12.5)	0 (0.0)	5 (12.5)	0 (0.0)	5 (12.5)	0 (0.0)	**<0.001**
Telangiectasia	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	4 (9.3)	0 (0.0)	4 (10)	0 (0.0)	4 (10)	0 (0.0)	4 (10)	0 (0.0)	**0.001**
Radiation pneumonitis	3 (6.4)	0 (0.0)	3 (6.4)	0 (0.0)	3 (6.9)	0 (0.0)	3 (7.5)	0 (0.0)	3 (7.5)	0 (0.0)	3 (7.5)	0 (0.0)	0.416
Cardiac events	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.3)	0 (0.0)	1 (2.5)	0 (0.0)	1 (2.5)	0 (0.0)	1 (2.5)	0 (0.0)	0.416
Hand foot syndrome	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0.416

Table 4: Frequency of recurrence and distant metastasis among the studied cohort.

	N = 40	
Local recurrence		
• Negative	40	(100.0)
Distant metastasis		
• No metastasis	34	(85.0)
• Bone	1	(2.5)
• Lung	3	(7.5)
• Liver	2	(5.0)

As demonstrated through **Table (5) and Fig. (1)**; only tumor stage was found to affect the DFS of the study participants after 5 years of follow-up: DFS was 100.0% in patients with tumor stage II and 62.5% in patients with tumor stage III (p= 0.001). As showed in **Fig. (2**) after 5 years of follow-up, the OS rate was 85.1%, with four patients missing after 12 months and three dying after 24 months.

Table (5): disease free survival according to the clinic-pathological details of the studied breast cancer cases (n = 40).

DFS (5 years)		
	Estimate ± SE	**P value**
Age groups • < 50 years • ≥ 50 years	 77.3 ± 8.9% 94.4 ± 5.4%	0.143
Tumor grade • G 1 • G 2 • G 3	 100.0 ± 0.0% 87.9 ± 5.7% 33.3 ± 27.2%	0.058
T stage • T1+T2 • T3	 87.3 ± 5.9% 75.0 ± 15.3%	0.368
N stage • N1 • N2	92.3 ± 5.2% 71.4 ± 12.1%	0.085
Tumor stage • Stage 2 • Stage 3	 100.0 ± 0.0% 62.5 ± 12.1%	**0.001**
Estrogen receptor • Negative • Positive	 100.0 ± 0.0% 82.4 ± 6.5%	0.297
Progesterone receptor • Negative • Positive	 100.0 ± 0.0% 81.0 ± 7.0%	0.197
HER2/neu • Negative • Positive	 85.5 ± 6.0% 80.0 ± 17.9%	0.750

DFS: disease free survival, **SE:** standard error, **G:** grade, **T:** tumor size, **HER2/neu:** human epidermal growth factor receptor.

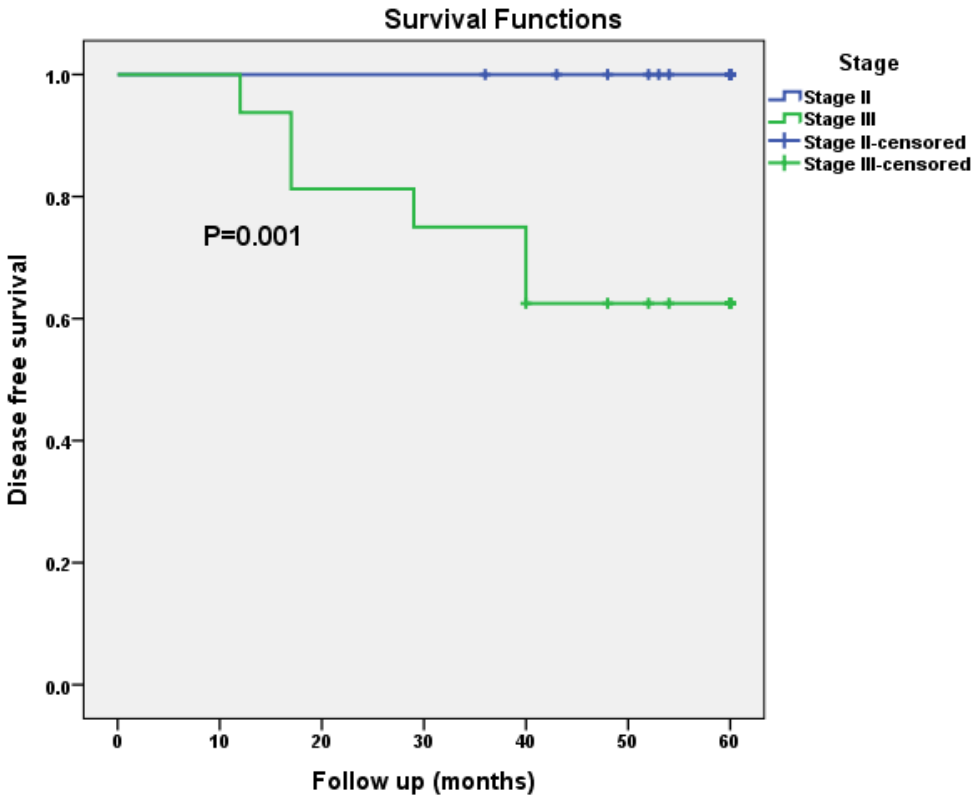

Fig. 1 : Disease free survival curve according to the tumor stage of the studied breast cancer cases.

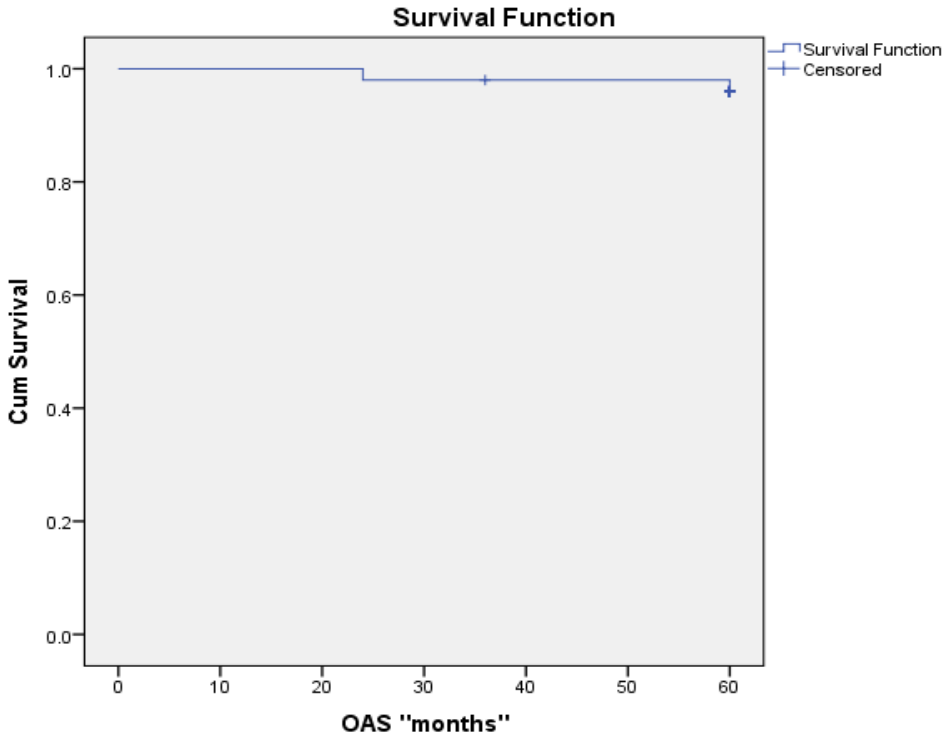

Fig. 2 : 5 years Over all survival curve in our study group.

Discussion

The most frequent type of cancer among women is BC. Globally, 2.3 million new cases of BC are expected to be diagnosed each year[21]. Patients who have had BCS have been recommended to have adjuvant radiation therapy. Numerous studies have shown that PMRT for patients who underwent MRM reduced LRR and enhanced DFS and OS[22]. Adding capecitabine as adjuvant therapy for early BC was assessed to provide a therapeutic benefit in recent years by multiple randomized clinical trials[23].

Our study was carried out to follow up the patients who got concurrent capecitabine with adjuvant RT and to detect the toxicity and efficacy of this treatment protocol. Several studies were conducted in BC to assess the safety and effectiveness of adding capecitabine to adjuvant radiation therapy. Patients in our study had a mean age of 50.1 years, which is similar to Panoff et al mean age of 50 years and Goyal et al's median age of (49.5 years)[19,24&25].

Our study comprised patients with performance status 0-1. 51% of cases had tumor stage II and 49% had stage III, and 77% of patients had MRM and the rest had BCS. This contradicts Alhanafy et al study, in which all patients underwent mastectomy, and patients with tumour stage III comprised 80% of all patients while 20% had stage II[26], as well as Panoff et al study, which included 20 patients, 10% of whom had tumor stage II, 80% had stage III, 10% had stage IV[19], and Sherry et al study, which had 50% of patients with tumor stage III, 31% had stage II, and 19% had stage I[25].

In our study, 25.5% of patients had G1 lymphedema at the start of the follow-up period, and 6.3% had G2, with remarkable improvement over the course of the follow-up period (92.5% of patients had G0 lymphedema). In contrast to Alhanafy et al study, where 8% of patients who received concurrent chemoradiation experienced G1 lymphedema and 2% experienced G2 lymphedema over the course of two years of follow-up, our study's incidence of lymphedema was higher due to nodal disease, axillary lymph node dissection in all patients, and patient noncompliance[26].

In our study, the majority of cases (74.5%) had HR that was positive, 12.8% of cases had HER2 overexpression, the majority of patients (83%) had tumor GII, and 57.4% of patients had left-sided BC. In our trial, capecitabine was administered at a dose of 825 mg/m^2 twice daily on the days when radiation was administered. While 31% of patients in Sherry et al study showed positive HR and 69% of patients were TNBC, there were no incidences of HER2/ neu overexpression. All patients had tumors of Grade III, and 37% of patients had right-sided BC compared to 63% of patients with left-sided BC. Each patient received 50 to 60 Gy of standard fractionation, and 1000–1500 mg/m^2 of capecitabine was administered every other week during RT[25].

In contrast to Sherry et al study, in which 4 individuals developed hand and foot syndrome (HFS), our investigation found no cases of HFS, which is consistent with Alhanafy et al[26]. This may be due to the high dose of capicitabine used in Sherry et al study[25]. In contrast to Alhanafy et al who reported skin hyperpigmentation G1-G2 in 28% of patients, significant improvement was seen at the end of follow-up at 5 years. The higher incidence of skin hyperpigmentation in our study is likely due to an increase in skin dose (boost), as 23.4% of our patients had BCS while in Alhanafy et al all patients underwent mastectomy[26].

In our study Skin fibrosis G1 was observed in 12.5 % of our patients and the DFS was 62.5 % in patients with tumor stage III, which is incompatible with Goyal et al in which the skin fibrosis was reported in 22.2% of cases, the 2 year distant recurrence free survival (DRFS) was 75%, this difference can be explained by longer follow up of our study.Goyal et al is a retrospective study evaluating the toxicity of combining capecitabine with RT in patients with high risk of LRR.Capecitabine was given at a dose 1000 mg po twice aday 2 cycles during RT and 4 cycles after finishing RT, RT was given in a dose of 45-50.4Gy in 1.8-2Gy daily fractions to the chest wall or breast and regional lymph nodes[24].

Skin fibrosis G1 was observed in 12.5% of our patients in our study, and the DFS was 62.5% in patients with tumor stage III, which is

inconsistent with Goyal et al[24], in which skin fibrosis was reported in 22.2% of cases, and the 2 year distant recurrence free survival (DRFS) was 75%; this difference can be explained by our study's longer follow up.

G1 radiation pneumonitis was observed in only three patients in our group, whereas only one patient acquired G1 radiation pneumonitis in Alhanafy et al study. This could be attributed to the supraclavicular field received by all of our patients (100%) and the longer follow-up of our investigation[26]. Telangectasia was G1 in only four patients in our cohort, and the majority of patients had good cosmetic outcomes; this is similar to the DeRose et al study, in which mean cosmesis scores at baseline were "good" according to physician assessment and "good" according to patient assessment[18]. Cardiac event G1 was recorded in one patient in our investigation, with no decrease in the left ventricular ejection fraction (LVEF) due to the patient's uncontrolled hypertension; no cardiac events were observed in Alhanafy et al[26].

In our study, no cases developed LRR during the follow-up period, and 6 patients developed distant metastases (15%), which is consistent with the results of Alhanafy et al in which 6 patients (12%) developed distant metastases (12%) and one patient developed LRR during the 2 year follow-up period[26], while in Panoff et al 4 patients (20%) developed distant metastases and no LRR was documented[24].

Retrospective study with a small patient population is one of the study's limitations.

Conclusion and recomendation

Concomitant capecitabine and adjuvant RT improve loco-regional control and DFS while being well tolerated, safe, and efficacious. Large prospective trials and extended follow-up are required.

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تاثير عقار الكابيسيتابين مع العلاج الإشعاعي المساعد في علاج مرضى سرطان الثدي المبكر (دراسة مرجعية)

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يعتبر سرطان الثدى هو اكثر انواع السرطان شيوعا لدى النساء فى جميع انحاء العالم وهو سبب رئيسى لوفيات السرطان فى النساء ،ويتوقع ان تكون نسبه الوفيات من سرطان الثدى ٤٣,٦٠٠ حالة وفاة فى السنة .

تزداد فرصة الإصابة بسرطان الثدى الى الضعف عند وجود قريب من الدرجه الاولى مصاب بالمرض وتمثل تلك الحالات اقل من ١٥% من الحالات المصابه بسرطان الثدى،بينما ٨٥% من الحالات تكون بسبب تغييرات جينية بسبب عوامل السن اكثر من التغيرات الجينيه الوراثية.

يتم علاج سرطان الثدي بعدة طرق، والتى تشمل التدخل الجراحي باستئصال الثدي أو استئصال الورم ذاته (وعلاج باقي الثدي بالعلاج الأشعاعي للقضاء علي بقية الخلايا التي قد تكون نشطة). والعلاج الاشعاعى والعلاج الكيماوى والهرمونى.

تلقى جلسات العلاج الإشعاعى بعد استئصال الورم ذاته على الجزء المتبقى من الثدى يعتبر ضرورة حتمية لمنع انتشار الورم ولتقليل فرصه ارتجاعه خلال عشر سنوات .

كما وجد أن تلقى جلسات العلاج الإشعاعى بعد الاستئصال الكامل للثدى ووجود انتشار بالغدد الليمفاوية يقلل من إحتمالية إرتجاع الورم ويقلل نسبة الوفيات بسبب المرض حتى مع تلقى العلاج الكيمائى.

بعض العقارات الكيميائيه تستخدم مع العلاج الاشعاعى لتحسن استجابه الورم للاشعاع مثل عقار الكابيسيتابين والتى أثبتت الدراسات الحديثة مدي فاعلية استخدام هذا العقار مع العلاج الاشعاعي بعد الاستئصال الكامل للثدي فى تقليل نسبه إرتجاع الورم .

فى هذه الدراسه المرجعية تم تقييم ومتابعه المرضى الذين تم تشخيصهم بسرطان الثدى المبكر بعد خضوعهم للجراحه وتلقيهم العلاج الكيمائى وقد تلقوا العلاج الاشعاعى المصاحب بالعلاج الكيمائى (الكابسيتابين) وتم تتبع مدى فاعليه وأمان اندماج العلاجين معا وقد تلقى المرضى العلاج الاشعاعى بجرعة ٤٢٤٠ سنتيجراى جلسة واحدة فى اليوم خمس جلسات اسبوعيا وتم اعطاء عقار الكابسيتابين بجرعة ٨٢٥ مجم /م٢ كل ١٢ ساعة مع العلاج الإشعاعى .

تم متابعة وتقييم المرضى بعد انتهاء فتره العلاج وتقييم المضاعفات الناتجة من العلاج وتاثيرها على الجلد والرئه والقلب ووتورم الذراع الليمفاوى وتم تقييم مدى السيطره على المرض المحليه . وبعد خمس اعوام من المتابعه وجد ان نسبه المرضى الخاليين من المرض ١٠٠ % لمرضى المرحله الثانيه و ٥و ٦٢% فى مرضى المرحله الثالثة ووجد ان نسبه الأثار الجانبية للعلاج من الدرجه الاولى والثانية فقط مع عدم حدوث مضاعفات خطيره .