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Comprehensive evaluation of radiation oncology, Medical and Nursing care treatments in women with breast cancer based on sonographic and radiological points

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Abstract

Breast tissue is dense in young people, and with age, fat tissue gradually replaces dense breast tissue. Despite the severe prognosis and high morbidity and mortality, the patient's prognosis will be better if diagnosed early. Early diagnosis of breast cancer is the ultimate goal of radiology and the role of radiologist is very crucial in this stage. The aim of the present study is to comprehensively evaluate radiation oncology treatments in women with breast cancer based on ultrasound and radiology points.

Materials and methods: The present study was a clinical trial that was conducted on 50 people with breast cancer. People were divided into two intervention and control groups. In the control group, oncology radiation therapy with ultrasound and radiology was used. Other available treatment methods were used in the intervention group. In order to blind the study, the attending physician was not aware of the division of subjects into two intervention and control groups. SPSS version 16 software was used for data analysis. A significance level of 0.05 was considered.

Conclusion: Ultrasound is the first and best diagnostic method. Ultrasound is the first and best diagnostic imaging method for examining palpable breast masses. Mammography and ultrasound are two complementary diagnostic methods, and mammography can help in investigating microcalcifications and asymmetric densities and confusion of the natural system of breast tissue, which are difficult to detect in ultrasound due to increased echogenicity and non-uniform appearance of the breast parenchyma. Suspicious or lacking a specific profile for benign or possibly benign lesions should be biopsied and histologically examined. If there is a palpable mass or other suspicious clinical signs and mammography and ultrasound are negative, it is necessary to perform a biopsy of the target area to rule out malignancy. Mammography and ultrasound are two complementary diagnostic methods, and mammography can help in investigating microcalcifications and asymmetric densities and confusion of the natural system of breast tissue, which are difficult to detect in ultrasound due to increased echogenicity and non-uniform appearance of the breast parenchyma. Suspicious or lacking a specific profile for benign or possibly benign lesions should be biopsied and histologically examined. If there is a palpable mass or other suspicious clinical symptoms and mammography and ultrasound are negative, it is necessary to perform a biopsy from the target area to rule out malignancy.

Introduction

Breast tissue is dense in young people, and with age, fat tissue gradually replaces dense breast tissue. Despite the severe prognosis and high morbidity and mortality, the patient's prognosis will be better if diagnosed early. Early diagnosis of breast cancer is the ultimate goal of radiology and the role of the radiologist is very crucial at this stage (1). Screening with mammography has caused a 22% reduction in the mortality of women over 50 years old and a 15% reduction in the mortality of women aged 40-49 (2).

Breast cancer is the most common type of malignant cancer in women in the whole world and the second most deadly cancer among women after lung cancer (3). The incidence of breast cancer in the world in 2018 was reported as 1.2 million people per year. (4).According to the latest researches, the incidence of breast cancer in Iran has increased from 13 cases in 1990 to 44 cases per 100,000 people in 2016. (5) Cancer treatments such as chemotherapy and radiation therapy They can lead to many psychological and physical symptoms such as depression, anxiety, pain and sleep disorders. By expanding access to high-quality prevention services, early detection and treatment services to all women, the reduction in breast cancer mortality will accelerate (6). The scope of radiation therapy mainly covers the chest wall and lymph nodes in positions above and below the clavicle.Breast cancer is the most common cancer among women in the world (7). Although this cancer has a high prevalence in developed countries, 60% of deaths caused by breast cancer occur in developing countries (8).

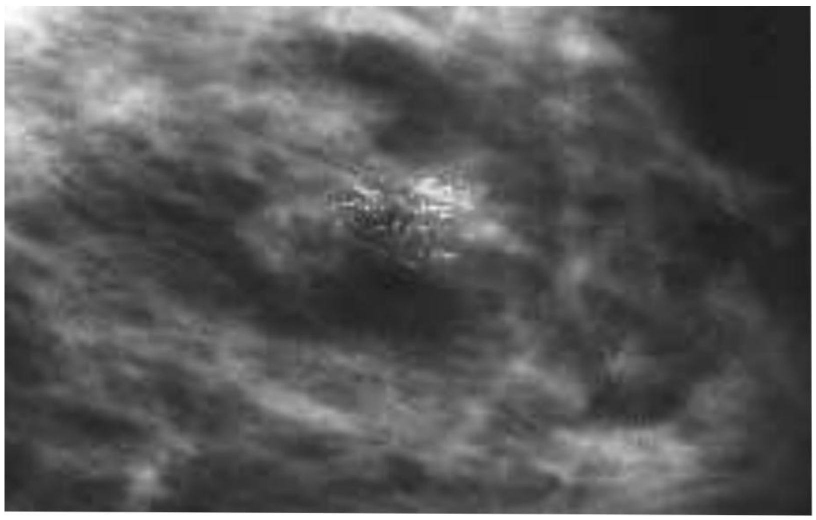

Fig 1.Pleomorphic microcalcifications in breast tissue related to microcalcifications that are highly suspicious of malignancy

Today, due to effective screening and the combination of different treatment methods, such as surgery, radiation therapy, and hormone therapy, breast cancer mortality has decreased in developed countries (9). Radiation therapy has a vital role in the treatment of breast cancer and it has been reported in several articles that this treatment method improves the survival rate and leads to the reduction of local recurrence (10). In a number of cases, high-energy rays (ie 18 mV) are used for breast cancer patients (11), various radiation therapy methods have been developed, such as three-dimensional adaptive method and tomotherapy. The method that is usually used in radiation therapy centers is the three-dimensional adaptive method for radiation therapy of the whole breast (12). In the three-dimensional adaptive radiation therapy method, two opposite tangential beams are used by radiation compensators to achieve the appropriate dose (13). Although there have been many advances in the treatment of various types of cancer in recent years, the diagnosis of cancer still causes a lot of stress to patients and their family members. Radiation therapy is one of the effective treatments for cancer as well as tumor control. Normally, in the radiation therapy of patients with breast cancer, a dose of 50 (Gray) is prescribed in 25 sessions and during five weeks (14). The disadvantages of this treatment schedule can be the long treatment time, the increase in the cost of treatment due to the number of sessions and the increase in the waiting time of the patients. Especially in countries with less equipment and a large number of patients (15). In order to solve these limitations, hypofraction treatment table has been proposed. In this technique, the number of treatment sessions is less, but a higher dose is given to the patient in each session compared to the usual technique (16). In general, in this new radiation therapy regimen, a dose of about 45 Gy is given to the patient in 15-16 sessions. According to the mentioned points, the present study was conducted with the aim of comprehensive evaluation of radiation oncology treatments in women with breast cancer based on ultrasound and radiology points.

Method

In a randomized, double-blind clinical trial, 50 women with breast cancer with stages I to III according to the AJCC system were selected by census method in the medical training center affiliated to Tehran University of Medical Sciences in 1402. This trial has been registered in the Iran Clinical Trial Registration Center (IRCT). The patients were allocated to two treatment groups, the intervention group and the placebo control group, using the four-way randomization block method. The sample size in this study with alpha of 0.05, power of 95%, the data related to the mean and standard deviation of the IL6 value related to the study of Alexandros et al. (30) will be analyzed using the following formula in each group of 25 people. In this study, the average difference in the two groups (4.31-6.91) and the common standard deviation between the two groups is 3.7. Despite the lack of patient information (blind), consent was obtained from the patients. Radiation oncology methods were used in the intervention group. Other available treatment methods were used in the control group. The blinding method of the study was done in a double-blind manner. In this way, the doctor who diagnosed the treatment method did not know about the intervention and control groups. Then, 4 weeks after the completion of the last adjuvant treatment session, the patients were evaluated by the BFI4 questionnaire by a person unaware of the treatment methods. Finally, the data related to each patient, including age, gender, severity of fatigue, type of adjuvant treatment method, were recorded in the questionnaire. The outcome of the treatment was fatigue caused by chemotherapy, and the patients in both groups were evaluated once before the intervention and the second time 4 weeks after the completion of the last adjuvant treatment session with the BFI questionnaire. BFI questionnaire consisting of 10 questions was used to evaluate patients' fatigue. The answers to the questions were measured with a scale numbered from 0 to 10. A score of zero indicates the best state and no fatigue, and a score of 10 indicates the worst state of fatigue. Finally, the overall fatigue of the patient was obtained by summing the scores of questions 2-10 (9 questions) and dividing it by The result of zero means no fatigue, 1 to 9.3 indicates mild fatigue, 4 to 9.6 indicates moderate fatigue, 7 to 9.9 indicates severe fatigue, and the number 10 means very severe fatigue.

Inclusion and exclusion criteria of breast cancer according to the pathology report of stages III, at least 18 years old under chemotherapy and radiation therapy as adjuvant, not suffering from untreated hypercalcemia, not pregnant or breastfeeding and from the criteria Exclusion criteria were the incidence of nausea and vomiting, the death of patients and their non-referral for the second follow-up.

SPSS version 16 software was used for data analysis. In order to compare the intensity of fatigue between the intervention group and the control quantitatively, according to the normality of the data distribution, T-test was used, and Fisher's exact test and Chi-square were used qualitatively. The data were analyzed at the confidence level of 95 and the significance level was considered less than 0.05.

Data analysis method SPSS version 16 software was used for data analysis. In order to quantitatively compare the intensity of fatigue between the intervention and control groups, considering the normality of data distribution, T-test was used. Also, to investigate the relationship between the adjuvant variables and the absence of severe fatigue with the intervention, Fisher's exact test was used in the presence of zero (structural and chi square). If the significance level is less than the assumed first type error of 0.05, it means that there is a statistically significant effect of the corresponding variable on the average fatigue score. The data were analyzed at the confidence level of 95, and the significance level is less than 0.05was taken.

Discuss

For breast radiation therapy, the usual dose cutting table is generally used. In this method, a dose equivalent to 45 to 50 Gy is given to the patient in the form of 1.8 to 2 Gy in each session and during five weeks. Another dose fractionation method used in radiation therapy is the hypofractionation dose fractionation technique, which leads to a reduction in treatment time (two to 3.5 weeks). Healthy and tumoral tissue were examined. The results of this study show the same level of tumor control and healthy tissue damage in different treatment regimens. In a study, a comparison was made between mammography and ultrasound in the evaluation of breast masses, and it was stated that the use of each Two ultrasound mammography methods together have a higher sensitivity than performing one method alone, especially in lactating, pregnant and young women. They also stated that considering that density is the limiting factor of mammography, ultrasound increases the diagnostic sensitivity (11). In another study that It was performed on 2809 patients who had increased density in at least one quadrant of the breast, the accuracy of mammography was 78 and ultrasound was 90, and it was stated that the supplementary screening method is more useful in increasing the rate of breast cancer detection (10). In a recent study, one of the cases was investigated. It was multifocal multicentric cancer (MMBC) in which only one asymmetric density was seen in mammography, but at least 3 hypoechoic foci were seen in complementary ultrasound.

Table 1. The average received dose of different organs according to Gary

organ	Method		P value
	Tomotherapy	3D-CRT	
PTV	51± 0/64	50 ± 0/11	0/531

left lung	8/7 ± 1/50	9/33 ± 0/22	0/611
Heart	3/12 ± 2/17	4/50 ± 0/12	0/690
right lung	0/42 ± 0/10	6/7 ± 0/70	0/544
right breast	0/18 ± 0/05	2/18	0/511
spinal cord	0/15 ± 0/02	0/18 ± 0/02	0/781

In 2008, in a study conducted on 97 pathologically confirmed MMBC patients, the sensitivity of digital mammography was 6.85 and ultrasound was 2.91. It was reported that most of the cases not diagnosed by mammography were related to dense breast(6).

In a study conducted by VT Yang et al., 45% of lymph node neopathy was observed in mammography and 88% in ultrasound (5). In the present study, 30% of regional lymph nodes were observed in mammography and 60% in ultrasound, which is similar to the aforementioned studies. Is consistent.

In a study conducted by Wendy Berg et al., it was stated that in addition to mammography, a suitable auxiliary screening technique should be used, and this study recommended MRI for high-risk women and ultrasound for women with moderate risk (8).

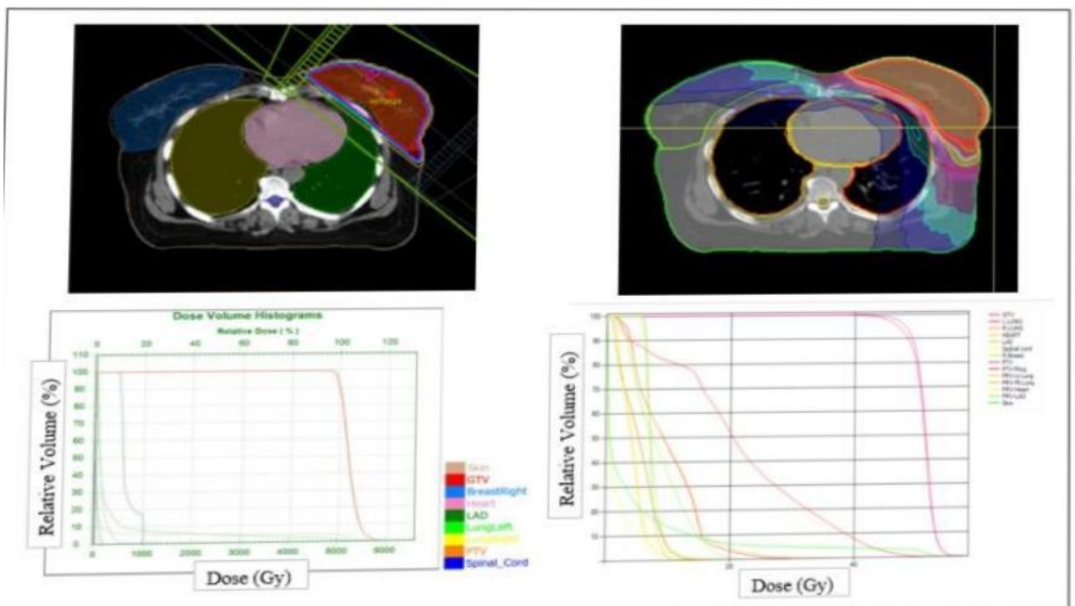

fig 2.The figure on the right is related to tomotherapy and the figure on the left is related to the three-dimensional adaptive method

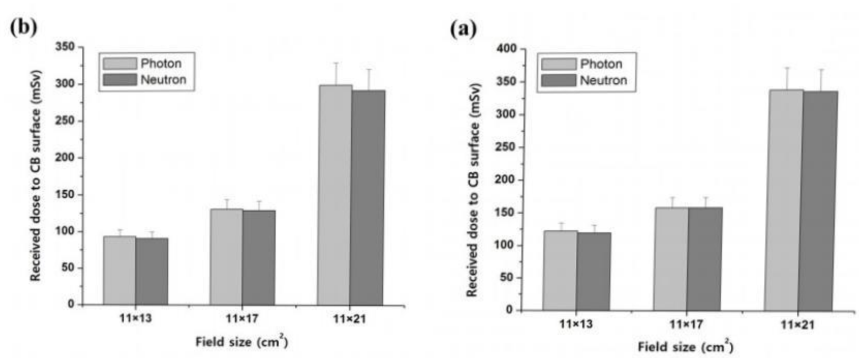

fig 3.Amounts of photon and neutron doses reached to the breast surface

The results of the present study show that the age of breast cancer incidence in patients has decreased, despite the screening program, most of the breast cancer patients still come in the lump stage, and while the purpose of screening is early detection of cancer in the microcalcification stage, our patients with a large mass (medium size) 29 mm) are referred to, while years before the formation of the mass, the process of progression towards cancer has been formed. Also, despite extensive training in the field of bloody discharge as a symptom of breast cancer, there was no bloody discharge in any of our patients.

Conclusion

Ultrasound is the first and best diagnostic imaging method for examining palpable breast masses. Mammography and ultrasound are two complementary diagnostic methods, and mammography can help in investigating microcalcifications and asymmetric densities and confusion of the natural system of breast tissue, which are difficult to detect in ultrasound due to increased echogenicity and non-uniform appearance of the breast parenchyma. Suspicious or lacking a specific profile for benign or possibly benign lesions should be biopsied and histologically examined. If there is a palpable mass or other suspicious clinical symptoms and mammography and ultrasound are negative, it is necessary to perform a biopsy from the target area to rule out malignancy.

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