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SKIN TOXICITY DURING HIPOFRACTIONATED BREAST IRRADIATION IN PATIENT WITH EARLY BREAST CANCER

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Abstract – **Radiotherapy is an important component in the treatment of breast cancer. (1) Many women with an early stage of breast cancer are candidates for a breast conservation therapy, which combines both conservative surgery and radiotharapy. (2) According to the data from some series, an estimated 90% of the patients treated with radiotherapy for breast cancer will develop a degree of radiation-induced dermatitis. (3) The severity of the skin reactions during and following the breast iradiation is influenced by both treatment-related and patient-related factors. The treatment - related factors include the fraction size (the dose delivered with each treatment), the total dose delivered, the volume of tissue treated, the type of radiation (4) and the addition of chemotherapy. (5) The patient-related factors include breast size, smoking, axillary lymphocele drainage before treatment, age, and infection of the surgical wound. (6) A hypofractionation radiotherapy is alternative for a standard fractionation radiotherapy for women with early stage of breast cancer after conservative surgery. The aim of the study was to analyse the acute skin reactions during a hipofractionated radiotherapy in patients with early breast cancer at our institution.**

Materials and methods: Twenty patients with early stage of breast cancer (Stadium I and II) and conservative surgery (quadrantectomy of breast with ipsilateral axillary dissection) were analysed. The patients were treated with 6MV x rays on LINAC, using tangentional fields with 2.65Gy per fraction and the total dose prescribed to targed volumen was 42,4 Gy. These patients were observed for acute skin toxicity during the second week and at the end of the treatment. We evaluated dryness, epilation, pigmentation, changes and eritema, dry desquamation (clinically characterized by scaling and pruritus) and moist desquamation (characterized by serious oozing and exposure of the dermis). By using the radiation therapy oncology group's (RTOG) toxicity criteria, we assessed the skin toxicity over and at the end of the breast irradiation course. Results: 17 patients had eritema gr I and 3 patients haven't had any skin reaction. There was no patient with great degree of eritema or mois desquamation. In this group of patients, the most frequent skin reaction was eritema gr I.

Conclution: **The hypofractionation radiotherapy of whole breast in the early stage of breast cancer provides a good quality of life because of the short duration of its treatment, its good tolerance of skin and the low grade of skin toxicity related to the treatment.**

Keywords – **skin toxicity, hypofractionated breast irradiation**

1. INTRODUCTION

Radiotherapy is a crucial component in the treatment of breast cancer, Over the past 30 years, several studies showing the survival equivalence of mastectomy and breast conservation (lumpectomy or quadrantectomy with breast radiation) in the treatment of early-stage breast cancer [1–4] have been conducted. We are now able to fully appreciate the impact that the local control has on the overall survival [5]. The recent studies suggest that improvements in local control of greater than 10% at 5 years will likely translate into a 5% improvement in overall survival at 15 years. As we look forward to new techniques for the treatment of breast cancer, we need to be certain that the impact of the local control is not compromised. We know that a whole-breast irradiation (WBI), often followed by a tumor bed boost, for the treatment of early-stage breast cancer is an effective treatment with limited toxicity. As new techniques are adopted, we must avoid compromising these excellent results. In order to preserve our gains in local control, cosmesis and quality of life,

guidelines have been proposed for a patient selection [6] when using some of the new techniques.

This study will focus on the hypofractionation radiotherapy, as one of these new techniques of radiation that are being used when breast-conserving surgery is chosen, and the skin toxicity during a hypofractionated breast irradiation.

1.1. Hypofractionation

Whole-breast irradiation using standard fractionation consisting of 45–50 Gy using daily fraction sizes of 1.8–2.0 Gy over 5 weeks with or without the addition of a tumor bed boost is the most commonly used regimen for early-stage of breast cancer following breast-conserving surgery. Higher daily fraction sizes (hypofractionation) could offer the advantage of shortening the overall treatment time, making breast preservation possible for a broader population, especially in places where there is poor access to radiation facilities. The concern over the larger fraction sizes is that there may be an increase in the long-term toxicity, potentially leading to an increase in fibrosis, pain and poor cosmetic outcomes.

Recently, there have been three prospective, randomized trials published comparing the standard fractionation with the hypofractionation in the treatment of early-stage of breast cancer [7, 8, 9].

When taking all three of these studies into consideration, it appears that accelerated, hypofractionated regimens for the early-stage of breast cancer should be considered as the standard treatment for many patients with early-stage of breast cancer. These regimens are more economical because they reduce the number of treatment days and have the potential to increase access to breast conservation for patients who may have difficulty getting to a radiation facility or committing to 6 weeks of daily treatment. It is still unclear whether patients with grade 3 tumors will achieve similar local control rates with the accelerated, hypofractionated course, and for the time being, the standard fractionation is probably best outside of a clinical trial setting. It is also unclear how to incorporate boost doses of radiation into the accelerated, hypofractionation regimens, and for now, patients who may benefit from a boost (e.g., young patients or those with close resection margins) should be treated with a standard fractionation, with the addition of a boost.

These skin reactions are categorized as early effects or late effects, depending on the time at which they present.

Early effects are those that occur within 90 days of the initiation of radiation. Those skin reactions occurring during the second to fourth week of therapy include dryness, epilation, pigmentation changes, and erythema [10]. During the third to sixth week of therapy a dry desquamation can develop [11]. The dry desquamation is clinically characterized by scaling and pruritus. Moist desquamation may occur following four to five weeks of therapy [10].

Late effects are those that present more than 90 days after the completion of radiotherapy, and are associated with injury to the dermis.The late effects of atrophy and fibrosis are directly related to a dermal fibroblast response to radiotherapy. Pigmentation changes can also occur as a late reaction. Telangiectasias can develop 6 months to multiple years following the completion of radiotherapy.

Dermal necrosis also can occur months to years following radiotherapy. Necrosis is associated with doses higher than those used to treat the breast [10]. This form of skin injury is related to microvascular changes that result in dermal ischemia [11].

2. MATERIALS AND METHODS

Twenty patients with early stage of breast cancer (Stadium I and II) and conservative surgery (quadrantectomy of breast with ipsilateral axillary dissection) were analysed.

Patients were analysed by stage of disease, tumor size, hormone receptor status, Her 2 status, additional treatment with chemotherapy or hormonotherapy, smoking, presence of seroma before treatment beginning, presence of skin infection or eritema before treatment beginning and breast size.

Patients were treated with 6MV x rays on LINAC, using tangentional fields with 2.65 Gy per fraction and the total dose prescribed to target volume was 42,4 Gy.

Patients were followed during the second week and at the end of the treatment and 6 weeks after treatment for acute skin toxicity. We evaluated dryness, epilation, pigmentation changes and eritema, dry desquamation clinically characterized by scaling and pruritus, moist desquamation characterized by serious oozing and exposure of the dermis.

By using the radiation therapy oncology group's (RTOG) toxicity criteria, we assessed the skin toxicity over and after the treatment.

3. RESULTS

In our group of patients, 10 patients (50%) were with stage I and 10 patients (50%) with stage II of breast cancer. The whole number of patients with tumor less then 2cm in diameter was 10 (50%) and 10 patients have tumor grater then 2 cm in diameter. 13 patients were hormone receptor positive and 7 patients were hormone receptor negative. 15 patients were Her 2 negative and 5 patients have Her 2 positive expression. All patients were non smokers. Two patients (10%) had seroma in the scar region and one patient (5%) had eritema of breast before starting

radiotherapy. None of the patients had large breast size.

Chemotherapy was added in the treatment of 7 patients, and 13 patients had no chemotherapy treatment. 13 patients had hormontherapy.

The evaluation of skin reactions show that 17 patients have eritema gr I and 3 patients haven't had any skin reaction. There was no patient with great degree of eritema or moist desquamation. The most frequent skin reaction in this group of patients was eritema gr I.

According to the data from some series, an estimated 90% of patients treated with radiotherapy for breast cancer will develop a degree of radiation-induced dermatitis.The severity of the skin reactions during and following breast iradiation is influenced by both treatment-related and patient-related factors.

The treatment -related factors include the fraction size (the dose delivered with each treatment), the total dose delivered, the volume of tissue treated, the type of radiation [12] and the addition of chemotherapy. [13] The patient-related factors include breast size, smoking, axillary lymphocele drainage before treatment, age, and infection of the surgical wound [14].

Generally, the external beam radiotherapy is a well-tolerated treatment. A clinical trial by Fisher et al [15], which prospectively assessed skin toxicity over the course of breast irradiation using Radiation Therapy Oncology Group (RTOG) toxicity criteria, found less than 3% of patients developed grade III toxicity.

In our study we confirmed that hypo fractionation radiotherapy of early breast cancer is well tolerated treatment. The most frequent skin reaction is eritema gr.1, and we don't have a patient who developed grade III toxicity.

4. CONCLUSION

The hypofractionation radiotherapy of whole breast in the early stage of breast cancer provides a good quality of life because of the short duration of its treatment, its good tolerance of skin and the low grade of skin toxicity related to the treatment.

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