Eur J Med Res (2007) 12: 320-322

Unilateral Keloid Formation after Bilateral Breast Surgery and Unilateral Radiation

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Abstract
Background: Keloid is a hypertrophic scar that may arise within 6 months after injury in susceptible individuals. Different therapies like surgical excision, intralesional steroid injections, local application of pressure, or postoperative irradiation with x-rays or electrons are reported. Although an immediate starting of therapy after surgery is usually recommended, delayed radiotherapy may also be effective.
Case Report: We report on a 48 year old women with a history of an invasive ductal carcinoma in the upper lateral quadrant of the left breast. A breast conserving tumor resection with axillary dissection was performed. An adapting reduction mammaplasty was carried out on the right breast for cosmetic reasons at the same time. 5 weeks after surgery, adjuvant radiotherapy was applied with a total dose of 59 Gy to the left breast. 10 weeks after surgery and by the end of radiotherapy, a keloid had developed on the right breast with reduction mammaplasty, but not on the left irradiated one. 8 months after initial surgery the patient's keloid formation on the right mamma was removed by surgical resection and a keloid prevention with postoperative radiotherapy with 20 Gy was performed.
Conclusion: Postoperative radiation of the scar prevented effectively keloid formation while simultaneously a hypertrophic scar developed in the non-irradiated scar.

Key words: Keloid prevention, postoperative irradiation

Introduction

A keloid is a hypertrophic scar that may arise within 6 months after injury in susceptible individuals. Dark skinned people are more prone to keloid development. Besides cosmetic impairment, keloids may entail discomfort, itching, and pain. Surgical excision alone is futile with recurrence rates of over 50% [25, 28, 30, 36]. A broad variety of treatments has been implied usually with surgery and adjuvant therapy. Keloids may be effectively prevented by intralesional steroid injections with or without cryotherapy and/or local application of pressure. However, high patient compliance is required [19, 34]. Experimental strategies, which have to be further evaluated, include intralesional injection of verapamil [19], 5-fluorouracil [8, 11], γ-interferon [11], bleomycin [7] or topical use of cyclosporine [5].

One of the first and well-accepeted procedure is the irradiation of the scar reducing recurrence rates significantly from 3-33% [1, 3, 6, 9, 13, 15-18, 22-24, 26, 29, 33].

Although an immediate starting of radiotherapy after surgery is usually recommended with success rates of 80% to 90% [12, 17, 26], our reported case reveals that delayed radiotherapy may also be possible.

Case Report

We report about a 48 year old female patient with a palpable mass in the upper lateral quadrant of the left breast. After biopsy revealed an invasive ductal carcinoma, breast conserving therapy with axillary dissection was performed. Final histopathologic evaluation of the resected specimen resulted in a $pT_2pN_0M_0G_1R_0$. An adapting reduction mammaplasty was performed on the right breast for cosmetic reasons at the same time. Five weeks after surgery, a five week radiotherapy was initiated with a total dose of 50 Gy to the left breast with opposed tangential fields using 8-Megavolt photons. Finally, the dose to the tumor bed was boosted by 9 Gy with 20 MEV high energy electrons (the green skin marks of the boost portal are visible in Fig. 2). The dose to the skin was approximately 40 Gy. No radiation therapy was administered to the right breast. At the end of radiotherapy, a keloid had developed on the right breast (Figs. 1, 3), but not on the left one (Fig. 2). 8 months after surgery, the keloid formation on the right breast was surgical removed and a postoperative radiotherapy for keloid prevention with 20 Gy was performed.

Discussion

Radiation therapy is the treatment of choice in advanced breast cancer with breast conservating surgery [10, 31, 32]. Reduction mammaplasty on the contralateral side is an option for cosmetic reason. In the present case, the patient developed a keloid on the not irradiated breast.

The treatment of keloids is mainly a cosmetic indication, therefore the recurrence rate is the only out-

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Fig. 1. Right breast 10 weeks after surgery: a keloid developed after reduction mammaplasty.

Fig. 2. The left breast was treated postoperatively with a dose to the skin of about 40 Gy. Keloid formation was effectively prevented.

Fig. 3. Right breast after initial surgery: the keloid was surgical removed nine months after initial surgery.

come measure. Though keloid is not a disease, many patients are psychologically affected by this scar formation. Little is known about the factors by which hypergranulation is influenced.

Radiation therapy is one option to reduce occurrence of keloid formation. Some dismiss radiotherapy in young people because of its potential carcinogen effect (e.g., radiation induced soft tissue sarcoma) [2]. Protocols in clinical settings include X-rays [17], electrons of a linac [21, 27], and brachytherapy [33, 35].

In most studies, the time interval between surgery and radiation therapy is less than 1 week following varying dose and fractionation schemes [13]. For surgeons, this short time interval is a risk factor for wound healing caused in a natural ambivalence between requested scar forming and inhibition of the hypergranulation by irradiation. In our case irradiation started 5 weeks postoperatively following oncological schedule. Despite this delay, keloid formation could be inhibited in contrast to the non irradiated area.

In many studies, postoperative immediate radiotherapy showed excellent results [4, 14, 20, 24], but this case demonstrates that postoperative radiotherapy may effictvely suppress keloid formation even with a delayed onset.

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Received: March 12, 2007 / Accepted: June 5, 2007

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