Radiation-induced Breast Telangiectasias Treated with the Pulsed Dye Laser

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ABSTRACT

Background and objectives: Radiation dermatitis is a frequent sequela of adjuvant radiation therapy for breast cancer. Clinical manifestations include prominent telangiectasias that may be physically disfiguring and psychologically distressing for the patient. The objective of this study was to review cases of breast cancer patients with radiation-induced breast telangiectasias treated with the pulsed dye laser and assess clinical efficacy. The patient’s perception of treatment was also reviewed. Study design: A retrospective chart review of patients treated for radiation-induced telangiectasias was conducted at the Dermatology Division of Memorial Sloan-Kettering Cancer Center. Materials and methods: Pre- and post-clinical photos were used to assess clearance by two independent raters. Patient’s comments were assessed from visit notes and the treating physicians for the impact of treatment on the patient’s overall well-being. Results: All patients (n=11) experienced clinical improvement in the radiation-induced telangiectasias. The mean number of treatments was 4.3 (2–9) with an average fluence of 4.2 J/cm² (585 nm platform) and 7.8 J/cm² (595 nm) (4–8 J/cm²) used. The mean percent clearance was 72.7 percent (50–90%). Adverse effects were not encountered including those with breast implants or flap reconstruction. Patients reported an improvement in their well-being, including an improved sense of confidence. Limitations: Limitations include the small sample size, nonstandardized digital images, and nonsystematic collection of patient-reported outcomes. Conclusion: The pulsed dye laser is an efficacious treatment for radiation-induced breast telangiectasias. Multiple treatments are required for greater than 50-percent clearance and conservative treatment parameters are advised. Patients also reported an improved quality of life. (J Clin Aesthet Dermatol. 2014;7(12):34–37.)

Breast cancer is the leading cause of cancer-related deaths in women. For locally advanced breast carcinoma, breast-conserving surgical therapy followed by adjuvant radiation is the standard of care. Adjuvant radiation is also used after total mastectomy in certain clinical scenarios, such as multiple positive lymph nodes or positive post-mastectomy margins.¹

Radiation dermatitis is a frequent sequela of radiation therapy and presents in an acute and chronic form.² In the chronic form, telangiectasias are a prominent manifestation and may be physically disfiguring and psychologically distressing for some patients. Similar to a surgical scar, chronic radiation dermatitis may serve as a reminder to the patient of their cancer.

Laser treatment of vascular lesions, including telangiectasias, is well established. The pulsed dye laser (PDL) with wavelengths of 585 and 595 nm has been used for treatment of telangiectasias with a very low incidence of adverse effects.³

The authors sought to review their cases of radiation-induced telangiectasias in breast cancer patients treated with the PDL and assess clinical improvement, adverse events, and the patient perceptions of response.

MATERIALS AND METHODS

After Institutional Review Board (IRB)-approval, a retrospective chart review of breast cancer patients treated for radiation-induced telangiectasias with the PDL was conducted at the Dermatology Division at Memorial Sloan-Kettering Cancer Center (MSKCC). For each patient, age, breast cancer surgery, reconstruction type, radiation dose, history of radiation dermatitis, distribution of telangiectasias, and laser parameters were collected. Pre- and post-clinical photos were used to assess percent clearance of telangiectasias by two independent raters. Patient’s comments were also reviewed to assess for quality-of-life improvement.

RESULTS

Eleven breast cancer patients with radiation-induced telangiectasias were treated with the PDL. The mean age was 48 years. Breast cancer surgery and reconstruction,
radiation dose, and telangiectasia characteristics are highlighted in Table 1. The majority of patients received 5000 centigray (cGy) of radiation in 25 fractions to the chest wall. Three patients did not receive radiation therapy at the authors’ institution; therefore, treatment information was not available for review. Ten patients recalled skin changes immediately following radiation, ranging from erythema to desquamation of the overlying skin. Most reported developing telangiectasias within one to two years following radiation.

Laser treatment parameters and percent clinical improvement are shown in Table 2. Patients had laser treatment on average 3.9 years (range 2–6 years) after completing radiation. The 595 nm PDL was used on nine patients and the 585 nm on two patients. The mean number of treatments was 4.3 (2–9). Laser fluence averaged 4.2 (585 nm platform) and 7.8 (595 nm) J/cm² (4–8 J/cm²). A 10 mm spot size was used with pulse durations of 450 ms (585 nm) and 3 to 6 ms (595 nm). The lowest fluence possible was used to produce transient purpura. The mean percent clinical clearance was 72.7 percent (50–90%). Figure 1 shows a patient with a saline implant and diffuse, pink telangiectasias with an 80-percent clinical improvement after three laser treatments. In this population, adverse effects affecting the radiated skin or the reconstruction were not encountered.

On review of treatment effects on the patient’s overall well-being, all patients reported a clinical improvement from baseline. Some patients reported an improved sense of confidence and increased satisfaction with the aesthetic appearance. One patient commented that she was now able to change in front of her partner without embarrassment.

**DISCUSSION**

The treatment of locally advanced breast cancer is surgery followed by radiation. Common to radiation therapy is a range of skin toxicity including acute erythema to chronic pigmenetary alterations and cutaneous telangiectasias. Radiation-induced telangiectasia is a well-documented manifestation of late radiation damage and is reported to occur in 3 to 13 percent of patients. Telangiectasias are believed to develop due to the dilation of reduced or poorly supported vasculature in the skin. Due to their prominent appearance, telangiectasias have been associated with diminished body image. The Danish
randomized DBCG-82TM breast conservation trial showed skin telangiectasias and breast retraction were significantly associated with a less satisfactory cosmetic result and impaired body perception. Therefore, interventions to reduce the clinical appearance of telangiectasias may impact a patient’s overall well-being or quality of life.\(^6\)

The PDL is an effective laser for vascular lesions. The wavelength of 585nm and 595nm effectively targets the chromophore deoxyhemoglobin via the process of selective photothermolysis.\(^7\) In a randomized split-lesion trial by Nymann et al,\(^8\) the PDL was compared to the intense pulsed light (IPL) for breast telangiectasia after radiation. The PDL was superior to the IPL with a median vessel clearance of 90 percent versus 50 percent, respectively (\(p=0.01\)), and was associated with higher patient satisfaction.

The authors’ study highlights the effectiveness of the PDL (585nm and 595nm) in improving the appearance of radiation-induced breast telangiectasias. Significant clearance was noted with an average of four treatment sessions. The treatment parameters were determined based on the lowest fluence and pulse duration that would produce transient purpura; excessive fluences were avoided to minimize the risk of adverse effects. For the subsequent treatment sessions, the treatment parameters were modified depending on the degree of residual telangiectasias. Following treatment, patients reported purpuric areas resolved within a week; there were no significant adverse effects encountered. However, it is important to emphasize the study sample is small and a larger study is warranted to further delineate the risk of PDL on radiated skin. Post mastectomy radiation therapy (PMRT) has been shown to be associated with an increased risk of adverse effects with breast reconstruction, whether autologous or implant in nature. Barry et al\(^9\) conducted a literature review and reported that patients undergoing PMRT and breast reconstruction are more likely to suffer morbidity compared with patients not receiving PMRT (OR=4.2; 95% CI, 2.4–7.2). Autologous reconstruction was associated with less morbidity versus implant based (OR=0.21; 95% CI, 0.1–0.4).\(^9\) Complications include infection, capsular contraction, and implant loss. In a meta analysis, Lam et al\(^10\) calculated that the reconstruction failure rate (two-stage prosthetic breast reconstruction) was 18.6 percent with adjuvant radiation compared to 3.1 percent in controls (\(p<0.0001\)).\(^10\) The

<table>
<thead>
<tr>
<th>CASE #</th>
<th>INTERVAL TIME TO LASER TREATMENT</th>
<th>WAVELENGTH</th>
<th>SPOT SIZE</th>
<th>PULSE DURATION (ms)</th>
<th>AVERAGE FLUENCE (J/cm²)</th>
<th>NUMBER OF TREATMENTS</th>
<th>% CLINICAL IMPROVEMENT</th>
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<tr>
<td>1</td>
<td>3 years</td>
<td>585nm</td>
<td>10mm</td>
<td>450</td>
<td>4</td>
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<tr>
<td>2</td>
<td>3 years</td>
<td>595nm</td>
<td>10mm</td>
<td>6</td>
<td>8</td>
<td>3</td>
<td>80%</td>
</tr>
<tr>
<td>3</td>
<td>2 years</td>
<td>585nm</td>
<td>10mm</td>
<td>450</td>
<td>4.45</td>
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<td>4</td>
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<td>595nm</td>
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<td>3</td>
<td>7.9</td>
<td>5</td>
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</tr>
<tr>
<td>5</td>
<td>3 years</td>
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<td>6</td>
<td>8.3</td>
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<td>6</td>
<td>4 years</td>
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<td>7</td>
<td>5 years</td>
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<td>3 to 6</td>
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<tr>
<td>8</td>
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<td>595nm</td>
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<tr>
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<td>595nm</td>
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<td>90%</td>
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<tr>
<td>11</td>
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authors’ review only had four patients with implant reconstruction; therefore, further studies are needed to better delineate the effects of laser on implants and radiated skin and a conservative approach with treatment parameters is advised.

The authors’ study demonstrates the efficacy of PDL for radiation-induced telangiectasis and the positive impact it can have on a patient’s self-perception and quality of life. Akin to a surgical scar, the radiation-induced breast telangiectasias served as a constant reminder of their disease according to some patients. Some women stated that they were embarrassed by the telangiectasias, but were hesitant to seek treatment. The appearance of the telangiectasias may negatively impact patients’ quality of life, affecting clothing choices and, in a subset of patients, personal and sexual relationships. After the vessel appearance was improved, some patients noted feelings of increased self-esteem.

The limitations of this study include the retrospective nature of the review. The patient sample is also small and a larger study is needed to better define the risk on radiated skin and the long-term effects of the laser treatment on vessel recurrence. In addition, in the assessment of quality-of-life effects, the patient comments were not systematically collected and were subject to recall bias.

CONCLUSION

The PDL is an efficacious treatment for radiation-induced breast telangiectasias. In the study patients, the laser parameters did not lead to adverse effects and patients reported a positive impact on their self-confidence and self-esteem. However, due to the delicate nature of radiated and reconstructed tissue, a conservative treatment approach is recommended.

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REFERENCES