Burns to breast reconstructions, both autologous and implant-based, have previously been described and are well reviewed. Decreased cutaneous sensation and thermoregulation after mastectomy with or without reconstruction predispose breast flaps to cutaneous insults. In addition, radiotherapy creates DNA mutations, microvascular damage, and fibroblast dysfunction leading to fibrosis. These factors can conspire to convert an innocuous exposure, such as a sun exposure, into a serious injury.

Previous descriptions of this unfortunate event in the literature have focused primarily on contact burns; however, cases of partial to full thickness burns after sun exposure have been described. We present the case of a previously irradiated prepectoral reconstruction that developed full-thickness necrosis after a brief, indirect sun exposure. Since recent literature is suggesting that prepectoral placement may be preferable in patients who are to undergo irradiation, we would like to present this case as a cautionary tale and suggest that similar patients be advised of the susceptibility of their reconstructions to minor thermal and ultraviolet injury.

CASE REPORT

We present the case of a 71-year-old, previously healthy, nonsmoking female who developed a right-sided breast cancer after previous lumpectomy and radiation 18 years prior in the same breast. She underwent 4 months of neoadjuvant chemotherapy, completed 3 weeks before her surgical delay and 5 weeks before mastectomy and reconstruction. A nipple delay was performed 2 weeks before mastectomy to facilitate a direct-to-implant reconstruction. After the right-sided nipple-sparing mastectomy, the breast was reconstructed with an anatomically shaped, textured, 400 cc silicone implant and completely covered with a large sheet of perforated acellular dermal matrix (ADM), in a prepectoral plane. A shaped implant was chosen for optimal symmetry with the contralateral breast, and a prepectoral plane was chosen to minimize postoperative discomfort, to avoid dissection of the irradiated breast can be a viable, long-term option.

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The breast flap vascularity was assessed intraoperatively using an indocyanine green fluorescence imaging system to ensure that a direct-to-implant reconstruction was feasible. The patient had an uneventful recovery.

Approximately 7 weeks after her reconstruction, she sat in the sun for less than 45 minutes with a black-colored camisole covering her reconstruction. She denied feeling excess contralateral breast warmth or burning yet developed blistering of the reconstructed breast the subsequent day, consistent with a superficial partial thickness injury (Fig. 1). This was treated with daily wound care consisting of hydrogel and hydrofera blue with the addition of aquaphor when the wound appeared to be drying. Despite this therapy, the wound progressed to a full-thickness injury (Fig. 2). Hyperbaric oxygen (HBO) therapy was initiated and continued for 40 treatments. She healed secondarily after 12 weeks, avoiding the need for surgical intervention, including debridement or explantation (Fig. 3).

DISCUSSION

Burns after breast reconstruction have been described in the plastic surgery literature, with sunburns (solar radiation), heating pads/hot water bottles (heat conduction), and hair dryers (heat convection), serving as the most frequent mechanisms of injury.1,2 Burns have been reported as early as a few days postoperatively to as late as 6 years after surgery. Only a small fraction of patients in the studies by Faulkner et al.1 and Jaeger et al.2 had documentation of preinjury irradiation. Many patients went on to heal without the need for surgical intervention. Our patient healed after conservative, nonoperative management, highlighting the role of HBO for wound healing in the context of irradiated wounds. It is well established that HBO can improve overall tissue quality by inducing angiogenesis, reducing tissue swelling, and improving white blood cell and fibroblast function.8–10 This patient also was able to reepithelialize over exposed ADM, suggesting that this scaffold can function as a substrate for incremental epithelial ingrowth.

What distinguishes our case from those previously described is that a brief exposure was able to create a full-thickness injury, with exposure of the underlying ADM. Given that this was a prepectoral reconstruction, the implant was millimeters from full exposure. Although only 1 patient, this case report highlights the potential precarity of an irradiated prepectoral reconstruction. Traditionally autologous reconstruction has often been recommended in the context of breast irradiation. While some have suggested that previous irradiation may be a relative contraindication to prepectoral reconstruction, others dispute this claim.6,11 Recently, prepectoral placement has been recommended in patients who are to receive irradiation to avoid postoperative pain and deformity.8 Therefore, we can expect to be seeing more irradiated prepectoral reconstructions in the future. We believe that the surgical
delay procedure, by optimizing blood flow at the time of the mastectomy, enabled us to avoid perioperative wound healing issues that may be encountered with prepectoral reconstruction after irradiation. Nonetheless, the irradiated prepectoral skin flaps may remain susceptible to minor injury, given the negative tissue changes created by radiotherapy. We advocate that irradiated prepectoral reconstruction patients be educated about the susceptibility of their breast flaps to even minor burn injury. In the future as longer term follow-up is available, prepectoral irradiated breast reconstructions may prove to be too delicate, but this remains to be proven.

**SUMMARY**

We present the case of a female patient who underwent prepectoral implant-based breast reconstruction after irradiation, who subsequently developed full-thickness injury to the mastectomy flap after brief sun exposure. While burns to the reconstructed breast have been described previously in the literature, what makes our case unique is the patient’s prepectoral location, utilizing ADM. This scaffold eventually served as the only layer preventing full implant exposure and eventually reepithelialized with daily wound care and HBO therapy. Irradiated prepectoral reconstruction patients should be educated about the susceptibility of their breast flaps to even minor burn injury and providers should maintain vigilance beyond the immediate postoperative period. It remains to be seen whether prepectoral reconstruction in an irradiated breast can be a viable, long-term option.

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