

C A S E R E P O R T

The role of onco-aesthetic in breast cancer: A clinical report study

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Abstract. *Background:* Cancer, particularly breast cancer, may be associated with a premature aging phenotype. Breast cancer patients have an increased risk for depressive syndrome, anxiety disorders and low self-esteem. Aesthetic medicine procedures, particularly regarding facial rejuvenation, have been used in breast cancer survivors proving to be safe and effective, as well as important to the increase cancer patient's quality of life. *Aim:* To evaluate the impact of a hyaluronic acid (HA) hydration protocol on skin properties and characteristics, reduction of fine lines, wrinkles, and acne scars of a breast cancer patient under active surveillance. Furthermore, to determine the impact of the results achieved on the patient's self-esteem. *Method:* The developed HA hydration protocol included four fortnightly sessions and two subsequent monthly sessions. In each session, 3 mL of NCTF® 135 HA were injected in the papillary dermis, on the middle and lower third of the face, through cannula vectorization; prior treatment photographs were taken; and a skin evaluation by Multi Skin Test Center MC 900® was made. The Rosenberg Self-Esteem Scale was applied at the beginning and at the end of the study. *Results:* The data demonstrated an increase in skin hydration (+41%) and elasticity (+28%); an increase in skin homogeneity, reducing fine lines, wrinkles, and acne scars. Rosenberg's Self-Esteem Scale showed equal pre- and post-protocol scores. *Discussion:* Breast cancer patients under active surveillance can benefit from aesthetic medicine procedures; cannula vectorization may be an alternative to juxta-periosteal procedures. The developed HA hydration protocol demonstrated to improve skin properties and characteristics, increasing skin hydration and elasticity, reducing signs of skin aging, restoring luminosity and homogeneity to the skin. An assessment of the patient's self-esteem can be a useful tool to evaluate the impact of aesthetic procedures on mental health, particularly in onco-aesthetics.

Key words: aesthetic medicine, antiaging, onco-aesthetic, self-esteem, deep hydration

Introduction

In the 21st century, features such as symmetry, harmony, clarity and skin homogeneity are what characterizes a more attractive and aesthetically acceptable appearance^{1,2}. Aesthetic Medicine (AM) aims to improve one's physical appearance and personal satisfaction, enhancing the correction of pathological

or non-pathological unaesthetic defects, using non-invasive to minimally invasive procedures³. Therefore, AM can be used against one of the most frequent pathologies and with the greatest implications for individual health and society today: cancer^{2,4}.

Observational data have shown that some cancer survivors developed chronic conditions such as frailty, sarcopenia, cardiac dysfunction, and mild or early

cognitive impairment when compared to similar individuals never diagnosed with cancer or exposed to cancer treatments⁵. Thus, physical, cognitive and psychosocial morbidities in those patients may be related to accelerated aging, resulting from oncogenic processes and related therapies, in addition to changes in their current stage of life⁵.

In Europe, breast cancer is the most frequent tumour in females, and accounts for one third of all new cancers among women⁶. Although current therapies are extremely effective, they could have side effects on non-tumor cells. Breast cancer and its therapies may be associated with an accelerated aging phenotype⁷. A cytotoxic treatment can potentiate the aging of non-tumor cells, such as telomere attrition, mitochondrial dysfunction, genomic instability and epigenetic alterations^{7,8}.

Skin aging is related to wrinkles, pigmented lesions, flaccidity and texture changes^{9,10}. There are several biological theories similar to those mentioned prior. Furthermore, mitochondrial dysfunction and the theory of free radicals are associated with skin aging^{11,12}.

Sex hormone synthesis significantly decreases with aging and menopause, leading to a decrease in skin hydration, more wrinkles, a reduction in the thickness of the epidermis, a decrease in collagen and increased flaccidity^{10,13}.

In addition to premature aging, breast cancer and its treatment are associated with traumatic and emotionally stressful events leading to an increased risk of psychiatric comorbidity, mainly anxiety spectrum disorders, depressive syndrome, and low self-esteem¹⁴.

Beyond fearing the recurrence of this disease, studies with cancer survivors highlighted consequent economic issues and concerns in their physical appearance¹⁵. In these patients, facial rejuvenation procedures with botulinum toxin and hyaluronic acid have been used safely and efficiently. According to the literature, no adverse events were reported from the use of botulinum toxin in post-chemotherapy patients. Furthermore, the use of hyaluronic acid as prevention for post-surgical adhesions and adverse effects of chemotherapy and radiotherapy seems to be well tolerated and safe^{16,17}.

Case presentation

A 40-year-old caucasian woman Fitzpatrick Skin Type II with breast cancer under active surveillance came to the aesthetic clinic concerned about the condition of her facial skin: she mentioned an increase in texture and acne scars associated with her cancer treatment process. The patient had a history of nodulocystic acne in her adolescent years, treated by a topical antibiotic, a locally advanced carcinoma of the right breast in October of 2017 (cT2N+axillaryM0), with positive Estrogen Receptors (ER) and negative Progesterone Receptors (PR), and positive Human Epidermal growth factor Receptor-2 (HER2). The patient was treated with neoadjuvant chemotherapy with Doxorubicin and Docetaxel, associated with a double blockade. The chemotherapy-induced side effects were fatigue, nausea, hair loss and oral aphthous ulcers. Skin toxicity was not reported. Chemotherapy was followed by a modified radical mastectomy and a tubal ligation in June 2018. An Anatomopathological study showed a residual invasive carcinoma, ductal and micropapillary type, grade 2, with a ductal carcinoma *in situ* of 6 cm; 5 metastasized ganglia in 18 excised (ypT1N2M0). The patient started hormone therapy with Tamoxifen in July 2018, ovarian suppression in September 2018 and adjuvant external radiotherapy between August and September 2018, in a total dose of 50Gy in 25Fr. There was no clinical, analytical or radiological evidence of recurrence in the last medical oncology appointment, in January 2021.

Materials and methods

The main goal of this study is to evaluate the skin hydration of the middle and lower third of the face, after injecting NCTF[®] 135 HA in the papillary dermis by cannula, in a breast cancer patient under active surveillance. It is also intended to assess the homogeneity of the skin, the reduction of fine lines, acne scars and wrinkles, and determine the degree of pigmentation, elasticity and erythema. The secondary aim was to determine the impact of the results achieved on the patient's self-esteem.

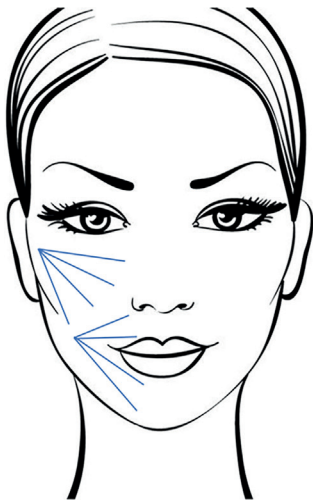


Figure 1. Cannula vectorization with NCTF® 135 HA.

Protocol included four fortnightly sessions and two subsequent monthly sessions. In each session, 3 mL of NCTF® 135 HA were applied, a formula marketed by Fillmed Laboratoires® that has a concentration of 5 mg/mL non-crosslinked free hyaluronic acid. The Vectors were designed as showed in Figure 1.

Photographs were taken as well as evaluation by Multi Skin Test Center MC 900® before the first treatment, two weeks after the first four treatments, and finally two weeks after the last treatment. The Rosenberg Self-Esteem Scale was applied at the beginning and at the end of the study. The study respected the Declaration of Helsinki. The patient signed an informed consent and authorized the sharing of data and photographic records.

Results

Probes from the Multi Skin Test Center MC 900® software were applied to four anatomical landmarks (Figure 2). Data are represented in Table 1 and Figure 3. Measurement point 1 was used as a control for the others. Before starting the protocol, according to the software used, the patient presented sufficient hydration at all measurement points, as well as white skin, moderate elasticity and low erythema. After four sessions there was an increase in hydration and elasticity of the middle and lower thirds of the face, which



Figure 2. Hydration, pigmentation, elasticity and erythema measurement points of the skin by Multi Skin Test Center MC 900® software.

were enhanced through two more protocol sessions. Finally, data revealed greater hydrated skin (+41%), with greater elasticity (+28%). There were no significant changes in pigmentation or erythema.

Comparing the photographic records between zero and eighteen weeks (two weeks after the last procedure) - Figure 4 - a significant and global improvement in skin texture and a reduction of fine lines is seen. There is also a slight to moderate reduction of nasolabial wrinkles and marionette lines, as well as an improvement in acne scars.

When applying the Rosenberg Self-Esteem Scale, a total score of twenty-seven points was found before and after the protocol. This score reveals that the patient has a good self-esteem.

During the study there were no adverse events. The patient maintained any previous ongoing cosmetic routines.

Discussion

Aesthetic procedures should be performed by specialized physicians capable of recognizing indications and contraindications, particularly in onco-aesthetics. Man Wu *et al* suggest that during an active disease,

Table 1. Measurement results by Multi Skin Test Center MC 900® software.

Parameter	Measuring point	0 treatment (%)	After 4 treatments (%)	After 6 treatments (%)	Final data (%)	Improvements in treated regions (%)
Hydration	1	58	59	60	+3%	-
	2	57	71	75	+32%	+41%
	3	52	68	71	+36%	
	4	51	75	80	+57%	
Pigmentation	1	11	11	10	-9%	-
	2	8	7	7	-13%	-3%
	3	9	11	10	+11%	
	4	11	11	10	-9%	
Elasticity	1	59	60	61	+3%	-
	2	57	66	69	+21%	+28%
	3	58	70	73	+26%	
	4	60	78	82	+37%	
Erythema	1	35	30	33	-6%	-
	2	32	25	29	-9%	-5%
	3	38	38	39	+3%	
	4	40	28	36	-10%	

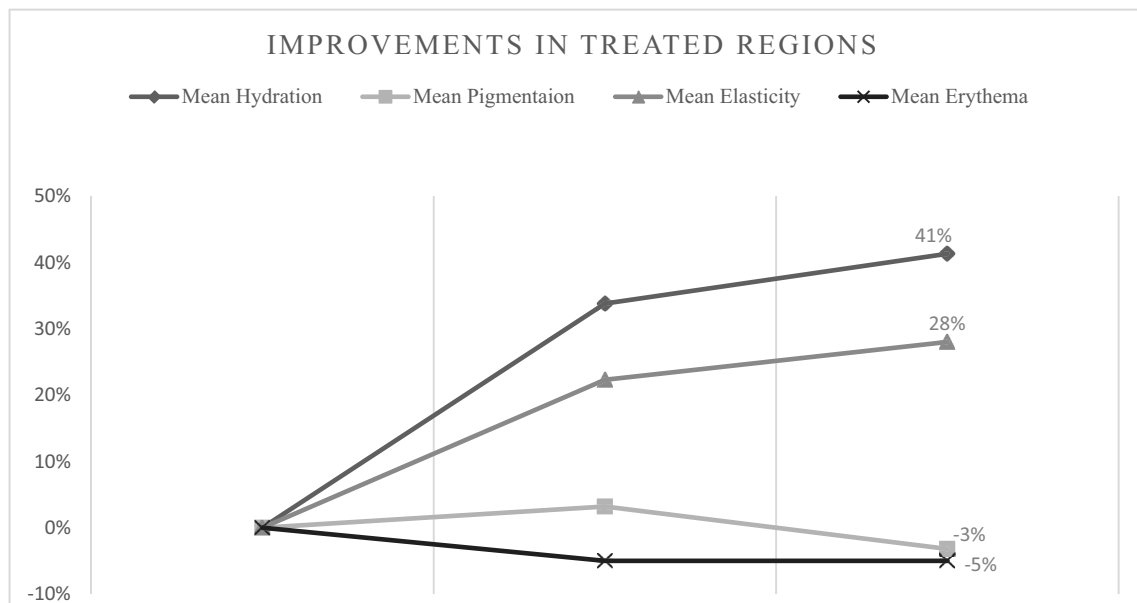


Figure 3. Improvement in treated regions by software Multi Skin Test Center MC 900®.

cancer cells may actively remodel their microenvironment via an autocrine/paracrine-like process, resulting in elevated low molecular weight hyaluronan (LMW-HA) levels. This process may facilitate cancer

metastasis by promoting the migration and invasion of cancer cells. However, the precise source and biological function of the elevated serum LMW-HA levels requires further exploration¹⁸. On the other hand, the



Figure 4. Before and two weeks after six treatments.

use of botulinum toxin and hyaluronic acid in cancer survivors proved to be safe and effective but this is not well established during an active disease or surveillance period. Post-chemotherapy use seems to be well tolerated and safe according other studies^{16,17}. Therefore, we would suggest that a cannula vectoring technique in the papillary dermis to inject non-crosslinked free hyaluronic acid associated with a polyrevitalizing complex could be a safe alternative to juxta-periosteal procedures in patients in a period of active surveillance.

A protocol that includes four fortnightly sessions and two sessions with a monthly interval allowed to obtain a more hydrated skin (+41%), with greater

elasticity (+28%) and homogeneity, reducing fine lines, wrinkles, and acne scars. There are no significant changes in skin pigmentation and erythema. The study was carried out without adverse events and was well tolerated. Further studies are needed in order to establish the safety and tolerability of these procedures, supporting evidence-based medicine.

In this case the patient scored equally on the Rosenberg Self-Esteem Scale; therefore, there was no significant impact on the patient's mental health. This fact can be explained by the good baseline self-esteem of the patient under study. However, this scale could be a useful tool in future analyses. It may be of particular interest in onco-aesthetics, given the susceptibility to depressive disorders and low self-esteem of these patients.

Conflicts of Interest: The authors declare that this study was supported by Fillmed Laboratoires®. There are no conflicts of interest.

References

1. Krueger N, Luebberding S, Sattler G, et al. The history of aesthetic medicine and surgery. *J Drugs Dermatol*. 2013; 12(7):737-742.
2. Lima A, Castro AF, Ayoub R. Emerging goals of aesthetic medicine in hiperpigmentary skin: an oncological perspective. *Aesthet Med*. 2020; 6(1):39-48.
3. Dayan S. Emerging Goals in Aesthetic Medicine. *JAMA Facial Plast Surg*. 2017; 19(5):367-368.
4. Costa DS, Mercieca-Bebber R, Rutherford C, Gabb L, King MT. The impact of cancer on psychological and social outcomes. *Australian Psychologist*. 2016; 51(2):89-99.
5. Guida JL, Ahles TA, Belsky D, et al. Measuring aging and identifying aging phenotypes in cancer survivors. *J Natl Cancer Inst*. 2019; 111(12):1245-1254.
6. Zielonke N, Kregting LM, Heijnsdijk EAM, et al. The potential of breast cancer screening in Europe. *Int J Cancer*. 2021; 148(2):406-418.
7. Chang L, Weiner LS, Hartman SH, et al. Breast cancer treatment and its effects on aging. *J Geriatr Oncol*. 2019; 10(2):346-355.
8. Sanoff HK, Deal AM, Krishnamurthy J, et al. Effect of cytotoxic chemotherapy on markers of molecular age in patients with breast cancer. *J Natl Cancer Inst*. 2014; 106(4):1-8.
9. Tobin DJ. Introduction to skin aging. *J Tissue Viability*. 2017; 26(1):37-46.
10. Mokos ZB, Curkovic D, Kostovic K, Ceovic R. Facial changes in the mature patient. *Clin Dermatol*. 2018; 36(2):152-158.

11. Thomas DR, Burkemper NM. Aging skin and wound healing. *Clin Geriatr Med.* 2013; 29(2):xi-xx.
12. Levine JM. Clinical aspects of aging skin: considerations for the wound care practitioner. *Adv Skin Wound Care.* 2020; 33(1):12-19.
13. Thornton MJ. Estrogens and aging skin. *Dermatoendocrinol.* 2013; 5(2):264-270.
14. Yektatalab S, Ghanbari E. The relationship between anxiety and self-esteem in women suffering from breast cancer. *J Midlife Health.* 2020; 11(3):126-132.
15. Carver CS, Smith RG, Petronis VM, Antoni MH. Quality of life among long-term survivors of breast cancer: different types of antecedents predict different classes of outcomes. *Psychooncology.* 2006; 15(9):749-758.
16. Shamban A. Safety and efficacy of facial rejuvenation with small gel particle hyaluronic acid with lidocaine and abobotulinumtoxin A in post-chemotherapy patients: a phase IV investigator-initiated study. *J Clin Aesthet Dermatol.* 2014; 7(1):31-36.
17. Tan A, Argenta P, Ramirez R, Bliss R, Geller M. The use of sodium hyaluronate-carboxymethylcellulose (HA-CMC) barrier in gynecologic malignancies: a retrospective review of outcomes. *Ann Surg Oncol.* 2009; 16(2):499-505.
18. Wu M, Cao M, He Y, et al. A novel role of low molecular weight hyaluronan in breast cancer metastasis. *FASEB J.* 2015; 29(4):1290-8.

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