

## BACKGROUND

Chemotherapy-induced alopecia (CIA) is a common adverse event of various breast cancer protocols. It causes impairment in quality of life, with a negative impact on self-image.<sup>1</sup> Some patients refuse chemotherapy in reason of alopecia.<sup>2</sup>

Several studies have been developed in the attempt to prevent CIA. Currently, scalp cooling is the method that presents the greatest chances of success.<sup>3</sup> Around 50% of women with breast cancer show satisfactory hair preservation with scalp cooling during chemotherapy.<sup>4</sup>

It has commonly been assumed that the mechanism of hair preservation with scalp cooling is due to the vasoconstriction caused by low temperatures (between 18-24°C, subcutaneous), reduction of hair follicle metabolism and decreased absorption of chemotherapy in hair follicle cells.<sup>4</sup>

Scalp cooling is generally considered successful when hair loss is less than 50% (alopecia grade 0 or 1 by CTCAE v4.0), a rate in which no wig or scarf is normally required.<sup>4</sup> Several factors interfere in the success of the procedure: correct cap adjustment on patients head, the lowest temperature reached on hair scalp, type of chemotherapy regimen (combination of drugs, dose) and patient characteristics.<sup>5</sup>

In clinical practice, the most common limiting factors for the use of scalp cooling are the pain caused by cooling and the cold sensation. The hair loss that occurs throughout the sessions can bring high level of anxiety, with withdrawal of the procedure.

## OBJECTIVES

- To assess the efficacy of scalp cooling in preventing CIA among women receiving chemotherapy for breast cancer;
- To evaluate the causes of scalp cooling withdrawal and the adverse events of the procedure.

## METHODS

The data of breast cancer patients from Oncoclínicas Group was collected from July/2015 to March/2017. All patients were eligible for scalp cooling procedure. Cooling started 30 minutes before infusion of the chemotherapy and was maintained throughout the infusion of the treatment and extended for 90 minutes after infusion finished. Degree of hair loss was rated by nursing assessment using CTCAE v4.0 scale in grade zero (without alopecia), 1 (< 50%) or 2 (>50%), by digital photographs and clinical assessment. Assessments were made before each chemotherapy treatment and at a follow up visit between 3 weeks and 3 months after the completion of chemotherapy. Success was defined when there was G0 or G1 alopecia at the end of treatment, and failure when finished with G2 alopecia or for patient withdrawal due to alopecia.

## RESULTS

330 patients were included. All were female with an average age of 49.5y (24-89y). 283 had localized breast cancer and 47 had metastatic disease. 188 patients (57.0%) completed all treatment with scalp cryotherapy.

72 patients (21.8%) withdrew from cryotherapy due to alopecia of any degree, 51 patients (15.4%) gave up cryotherapy because of complaints unrelated to alopecia and 19 patients (5.8%) had their treatment interrupted due to external factors (disease progression, change of chemotherapy regimen, among others). Among patients who completed chemotherapy (n = 188), the degree of alopecia at the end was: G0 = 27; G1 = 138; G2 = 23. Thus, the overall success rate with cryotherapy was 63.5%. Chemotherapy protocols initiated with doxorubicin and cyclophosphamide, followed by taxanes, had a success rate of 50%. The combination of docetaxel and cyclophosphamide showed success of 71.9%. In addition to alopecia, headache and cold sensation were common reasons for cryotherapy withdrawal.

Figure 1. Treatment outcomes of patients submitted to chemotherapy with scalp cooling

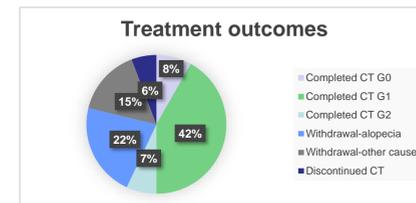


Table 1. Scalp cooling: chemotherapy regimens and success rate

Chemotherapy (CT) regimen / alopecia	Completed CT G0	Completed CT G1	Completed CT G2	Withdrawal SC G1	Withdrawal SC G2	Success rate
AC		2		1	1	50.00%
AC/taxanes*	6	51	5	25	27	50.00%
AC non sequential (DAC, FAC)	1	1	1			66.70%
Docetaxel*	3	19	2	2	1	81.50%
Docetaxel and cyclophosphamide*	6	40	11	3	4	71.90%
EC at 2nd part of CT		1				100.00%
EC at 1st part of CT		1		1	1	0.00%
Paclitaxel*	6	13		1	4	79.20%
No AC (CMF, GEM/CIS)	2	1				100.00%
AC at 2nd part of CT*	3	10	3	1		76.50%
Total	27	138	23	34	38	63.50%

\*AntiHER2, platins and bevacizumab were not considered as relevant for alopecia

Figure 2. Patients with successful scalp cooling and respective chemotherapy regimen



Figure 3. Alopecia G2 – scalp cooling withdrawal



Figure 4. Treatment outcomes of patients that completed chemotherapy with scalp cooling

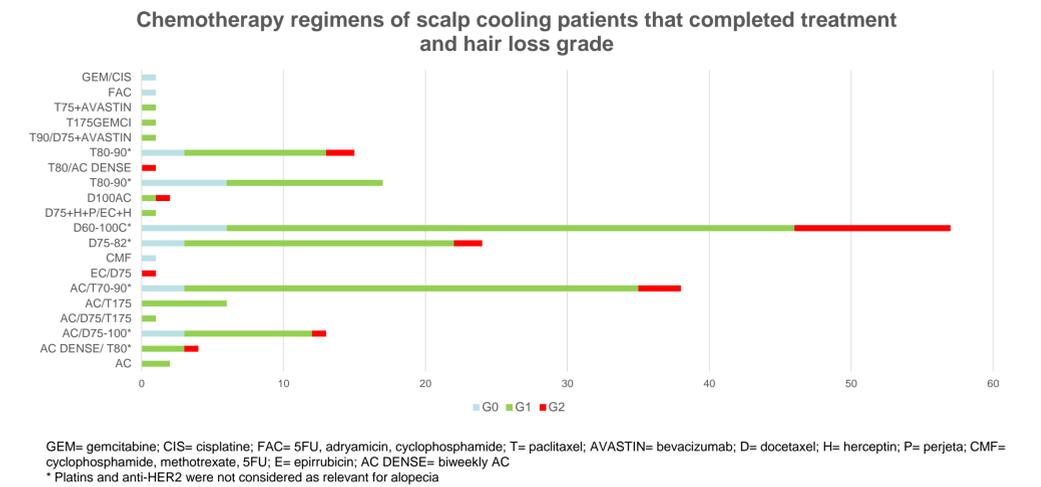
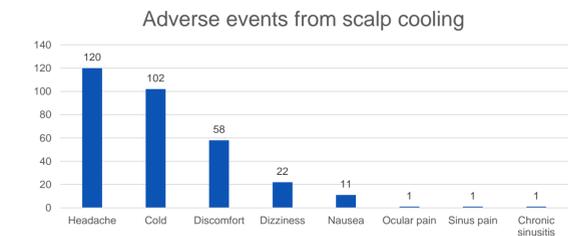


Figure 5. Adverse events reported by patients during sessions of scalp cooling treatment



## CONCLUSIONS

Scalp cooling appears to be effective in preventing CIA among breast cancer patients who underwent chemotherapy. Studies involving a psychological approach for the expectation and experience of alopecia with cryotherapy and better management of pain are necessary to increase adherence to treatment.

## REFERENCES

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