

Prevention of chemotherapy-induced hair loss by scalp cooling

A Review of 53 Articles

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Background: Chemotherapy-induced temporary hair loss is one of the most common and distressing side-effects of cancer therapy. Scalp cooling to reduce hair loss is a controversial issue for many doctors and nurses. This may be due to inadequate knowledge.

Methods: This review from 53 publications and 3 personal communications focuses on the efficacy of the treatment, side-effects, possible disadvantages and the controversies in these areas.

Results: Scalp cooling has become an increasingly effective method to prevent hair loss, especially when anthracyclines or taxanes are used. There is a considerable variation in the success rates in the various studies. This remains unexplained, but cooling time, the chemotherapy used and the temperature seem to be influential. The majority of patients tolerate scalp cooling very well. Side effects in general are not serious and were not often a reason to stop cooling.

Conclusions: Scalp cooling is effective but not for all chemotherapy patients. Further psychological, clinical and biophysical research is needed to determine exact indications for cooling and to improve the effect, tolerance and cooling procedure. Multicentre trials should be carried out to gather this information.

Introduction: Since about 1970 many preventative measures have been tried to reduce chemotherapy-induced alopecia. Currently preventative measures focus on scalp cooling. This is done either by procedures in which the cooling agent (ice cap or gel cap) must be changed several times or by continuous cooling of the scalp by cooling machines.

Scalp Cooling Results: Between 1973 and 2003, 53 publications and three personal communications were found reporting scalp cooling results in more than one patient. Seven trials were randomised and 49 were non-randomised. The number of patients varied from 6 to 180. The type of treatment was both adjuvant and palliative. There was great variation in chemotherapeutic regimes and cooling methods. The latter varied from ice packs to gel caps or cooling machines. Methods used to evaluate hair loss also varied considerably.

Table 1. Results of randomised studies

Author	Year	No of cooled patients	No. of controls	Chemotherapy agents and doses (mg/m ²)	% patients with good ^a hair preservation (controls)	P-Value
Edelstyn	1977	40	37	D50, Vc2 ^b , F500, 4x po: M20+Ch40	50% (19%)	P<0.05
Giaccone	1988	19	16	Combinations including D30-70	37% (0%)	P<0.025
Kennedy	1983	10	9	D31-125 ^b , C300-800 ^b	10% (0%)	NS
Macduff	2003	15	15	E75, DT75	25 % (0%)	P=0.001-0.012 ^c
Parker	1987	6	6	C600, M40, F600,	100% (17%)	P<0.01
Ron	1997	19	16	C600, M40, F600	85% (63%)	P=0.014 ^d
Satterwhite	1984	12	13	D20-60 multiple combinations	75% (8%)	P=0.0009

^a WHO grade 0, 1, 2, unless to the opinion of the authors the hair preservation in a part of the patients with grade 2 is not good or if the authors mention 'good hair preservation', or 'no wig required'.

^b Doses not per m².

^c Depending on who rated hair loss: patients, nurses or experts.

^d P value calculated for the incidence of alopecia of any grade.

NS: not significant; p.o., orally

C, Cyclophosphamide; Ch, chlorambucil; Cp, cisplatin; D, doxorubicin; DT, Docetaxel; E, Epirubicin; F, 5 fluorourasil;

M, methotrexate; Vc, vincristine;

Results in non-randomised studies with historical controls: 13 out of 14 studies reported positive results for certain indications.

Results in non-randomised studies without historical controls: 31 out of 35 studies reported positive results.

Table 2, Results of studies before and since 1995.

Reference	No of Cases	% patients with good hair preservation ^a		
		Mean Value	Median Value	Scatter
Studies before 1995	1563	56	61	0 - 100
Studies since 1995	1047	73	81	25 - 100

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