

A Descriptive Study to Analyze Chemotherapy-Induced Hair Loss and its Psychosocial Impact in Adults: Our Experience from a Tertiary Care Hospital

Abstract

Background: Hair loss is one of the most commonly reported and psychologically distressing adverse effects of chemotherapeutic agents. Studies on its impact on psychosocial aspect of cancer patients are lacking at present. **Objective:** To study the chemotherapeutic agents causing hair loss and its psychosocial implications in adults. **Materials and Methods:** Observational study was done for a period of 1 year, wherein all cancer patients, more than 18 years of age who developed hair loss while on chemotherapy were assessed for type of malignancy, details of chemotherapy protocol, their knowledge about chemotherapeutic agents induced hair loss, and its impact on their social life and patterns of adjustment to deal with it. A prevalidated closed-ended questionnaire was used as a data collection tool. **Results:** Out of 179 patients, 96 (53.6%) were males as against 80 (44.6%) females, and 49 (27.3%) patients were between 18 and 30 years of age. Carcinoma lung was the most common malignancy seen in 46 (25.6%) patients followed by rectosigmoid carcinoma in 41 (22.9%) patients. Combination of cyclophosphamide and doxorubicin was the most common combination resulting in hair loss in 49 (27.3%) cancer patients. A total of 101 (56.4%) patients felt that hair loss was the worst side effect of chemotherapy, while 29 (16.2%) had to continue because it was life-saving. A total of 129 (72%) patients said hair loss is affecting their social life; 37 (20.6%) patients were using hair accessories while 69 (38.5%) did not even attempt to hide hair loss as they were too occupied with fear of disease. **Conclusion:** Chemotherapy-induced hair loss is a common adverse effect in cancer patients undergoing treatment. A thorough counseling about it and methods to deal with it should be a part of management of the patients.

Keywords: Carcinoma, chemotherapy, counseling, cyclophosphamide, self-image

Introduction

Cancer is a leading cause of mortality and morbidity all over the world and at present, it is witnessing an exponential growth in the number of malignancies. Chemotherapy is used as an important component of multimodal approach in the management of various malignancies.^[1] Hair loss due to chemotherapeutic agents is one of the most common cutaneous adverse effects and is rated as one of the most distressing side effects of cancer therapy.^[2] The estimated incidence of chemotherapy-induced hair loss is 65%.^[3] Anagen effluvium is the most common form of hair loss associated with cancer therapy and is usually noticed within 1–2 weeks of starting the therapy and becomes more apparent in the next 4–8 weeks of therapy.^[4] Even though chemotherapy-induced hair loss is very

common and distressing side effect of the cancer treatment, we have very little insight and experience on its psychosocial impact on the patients.^[5] However, it is documented in the literature that chemotherapy-induced hair loss can result in anxiety, depression, a negative body image, lowered self-esteem, and a reduced sense of wellbeing.^[6,7] The present study was conducted to analyze the chemotherapeutic drugs causing hair loss, its impact on social life, and the adjustments done by the patients.

Materials and Methods

It was an observational study done over a period of 1 year in a tertiary care hospital in northern India. All cancer patients who developed hair loss while on chemotherapy and either self-reported or were referred to us by the treating oncologist were included.

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How to cite this article: Saraswat N, Chopra A, Sood A, Kamboj P, Kumar S. A descriptive study to analyze chemotherapy-induced hair loss and its psychosocial impact in adults: Our experience from a tertiary care hospital. Indian Dermatol Online J 2019;10:426-30.

Received: December, 2018. **Accepted:** January, 2019.

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Access this article online

Website: www.idoj.in

DOI: 10.4103/idoj.IDOJ_471_18

Quick Response Code:



Institutional Ethics Committee permission was taken and patients were briefed about the nature of the study. All the patients who were willing to participate in the study were included after obtaining written informed consent from them. Patients <18 years of age, who were terminally ill, had relapse of the disease, or were on radiotherapy or other drugs for various other nonmalignant illnesses were excluded from the study. Demographic details, types of malignancy, drug protocol, interval between the onset of hair loss, and initiation of chemotherapy were assessed. All the patients were given a prevalidated closed-ended questionnaire as a data collection tool. The data were analyzed and interpreted.

Results

A total of 179 patients were included in the study. Out of 179 patients, 96 (53.6%) were males as against 80 (44.6%) females; 49 (27.3%) patients were between 18 and 30 years; 47 (26.2%) between the age of 31 and 45 years; 39 (21.7%), 28 (15.6%), and 16 (8.9%) patients were between the age group of 46–55 years, 56–70 years, and above the age of 70 years, respectively [Figure 1]. Carcinoma lung was the most common malignancy seen in 46 (25.6%) patients followed by rectosigmoid carcinoma in 41 (22.9%). The details of type of malignancy, its frequency, and chemotherapy protocol are outlined in Table 1. A total of 96 (53.6%) patients said that they were counseled by the treating oncologists about the hair loss as a result of chemotherapy. Among the 96 patients, 31 (17.3%) were not counseled, 32 (17.8%) could not recollect any counseling, while 20 (11.1%) patients were counseled but not satisfied with it. A total of 101 (56.4%) patients felt that hair loss was the worst side effect of chemotherapy while 62 (34.6%) felt that hair fall is a temporary side effect and would subside once chemotherapy is stopped. The opinion of patients on hair loss, issues encountered by them due to loss of hairs, and the behavioral pattern adopted to adjust with it are detailed in Table 2.

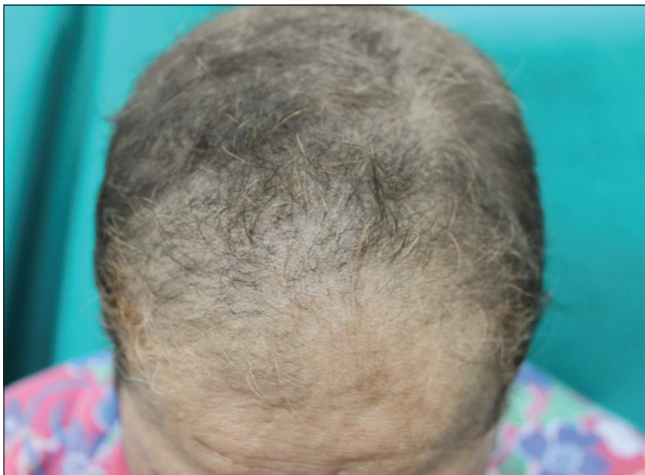


Figure 1: Hair loss due to combination of cyclophosphamide and doxorubicin

Discussion

Although newer chemotherapeutic agents have a specific target in the pathogenesis of malignancies like conventional anticancer agents, they have a narrow therapeutic index and are toxic to rapidly proliferating cells such as skin, hair, nails, bone marrow, and mucosa of gastrointestinal tract.^[8,9] Chemotherapeutic agents individually or in combination have a wide range of cutaneous adverse effects and are known to worsen the quality of life in these patients.

Chemotherapy-induced anagen effluvium is reported as the most common side effect of chemotherapeutic agents.^[10] Chiewchanvit *et al.* have found that 75.6% patients developed alopecia due to chemotherapeutic agents.^[11] Chemotherapy-induced hair loss is proposed to be a result of cessation of mitotic activity in hair matrix resulting in narrow and weakened portion of hair shaft known as Pohl-Pinkus constriction, which is prone to

Table 1: Demographic profile of patients and the drugs implicated in hair loss

Variables	Number of percentage patients	
Gender		
Male	96	53.6
Female	80	44.6
Age distribution		
18-30 yr	49	27.3
31-45 yr	47	26.2
46-55 yr	39	21.7
56-70 yr	28	15.6
>70 yr	16	8.9
Distribution of malignancies		
Carcinoma lung	46	25.6
Carcinoma rectosigmoid colon	41	22.9
Carcinoma breast	32	17.8
Carcinoma gall bladder	22	12.2
Hematological malignancies	19	10.6
Carcinoma cervix	14	7.8
Carcinoma ovary	5	2.7
Chemotherapeutic agents		
Cyclophosphamide + doxorubicin	49	27.3
Paclitaxel + carboplatin	41	22.9
Cyclophosphamide + doxorubicin + Vincristine	27	15
Vincristine + daunorubicin	19	10.6
Cyclophosphamide + doxorubicin + Docetaxel	15	8.3
Docetaxel + capecitabine	11	6.1
Cisplatin	9	5
Cisplatin + 5 FU	6	3.3
Carboplatin	2	1.1

Table 2: Prevalidated closed-ended questionnaire

Variables	Number of patients	Percentage
Counseled about chemotherapy-induced hair loss?		
Yes	96	53.6
No	31	17.3
Can't recollect	32	17.8
Not satisfied with counseling	20	11.1
Your opinion on hair loss		
It is a part of the treatment and I am fine with the side effects	19	10.6
Would have stopped therapy if it was not absolutely essential and life saving	29	16.2
I find it worse than the disease itself	21	11.7
It is the worst side effect of chemotherapy	101	56.4
It is a temporary side effect and would subside once chemotherapy is stopped	62	34.6
I want to discontinue the therapy due to hair loss but continuing it due to familial/peer pressure	59	32.9
I feel guilty to have started the treatment in the first place	26	14.5
Issues faced due to hair loss		
It is affecting my appearance/social life	129	72
Causing low self-esteem	105	58.6
I feel my spouse/friends/children are avoiding me due to hair loss	9	5
I feel more of a cancer patient due to hair loss	34	18.9
I feel ugly and don't want to see myself in mirror now	49	27.3
I have adjusted well with hair loss and I have no issues due it	23	12.8
Pattern of adjustment observed		
I use wig/hair accessories	37	20.6
I don't try to hide it as I am too occupied with the thought of disease and fear	69	38.5
I am comfortable with it after being counseled	29	16.2
I got my hairs shaved	44	24.5

fracture. All the shafts break at the same time when the thinned-out portion reaches the scalp surface.^[12,13]

Drugs such as doxorubicin, daunorubicin, docetaxel, and cyclophosphamide are commonly associated with hair loss.^[4] In the present study, out of 179 patients who had hair loss due to chemotherapy, 168 (94.4%) were on multiple drug combination as compared to 11 (6.1%) patients on single chemotherapeutic agents. Combination of cyclophosphamide and doxorubicin was the most common cause. Other drugs implicated in hair loss in our study were paclitaxel and carboplatin, cyclophosphamide, doxorubicin and vincristine, vincristine and daunorubicin, cisplatin, carboplatin, and a combination of cisplatin and 5 FU. Our findings are consistent with the observations by Pavey *et al.*, where paclitaxel and carboplatin, vincristine and daunorubicin, daunorubicin and cyclophosphamide, and paclitaxel and daunorubicin were the agents causing hair loss.^[14] Hair loss was noticed as early as after 5 days of first cycle to 2 weeks, which is same as observed by Hussein *et al.*^[15] The maximum appreciable hair loss was observed between 3 and 6 weeks after the therapy initiation, which is in accordance with observations by Yun and Kim.^[16]

In the present study, a total of 101 (56.4%) patients found that hair loss secondary to chemotherapy is the most traumatic side effect of undergoing treatment, while 29 (16.2%) claimed that they would have discontinued the treatment if it was not absolutely necessary and life-saving. A total of 26 (14.5%) were feeling guilty of starting the therapy which caused loss of hair. McGarvey *et al.* reported 58% patients rated alopecia as the most traumatic side effect of chemotherapy, while 8% considered not undergoing chemotherapy due to hair loss.^[6] Similar observations have been made in children who developed hair loss due to chemotherapy by Gunawan *et al.* where 46% children found hair loss a painful and traumatizing experience while 4% considered suspending chemotherapy due to hair loss. Six percent patients would refuse chemotherapy if cancer relapse occurs due to hair loss, while 8% were hesitant to restart chemotherapy because of past experience of hair fall due to cancer treatment.^[17] These findings suggest that hair loss due to chemotherapy has a consistently negative psychological impact in both adults and children alike.

In this study, 129 (72%) patients reported that their social life and appearance was affected due to hair fall, while 105 (58.6%) had low self-esteem due to hair loss. Although no study has been done to study the behavioral pattern in

adults with chemotherapy-induced hair loss, limited outdoor activity, restricted activities requiring engagement with people, and fear of type of reaction by general population have been reported in children.^[17] In the present study, 5% patients felt that they were avoided by their spouse, friends, or family members. It emphasizes the fact that hair loss is associated with loss of attractiveness and sexuality as found by Batchelor *et al.*^[12]

Some studies have established that social support is of utmost importance in patients to cope up with cancer and hair loss to avoid long-term depression.^[18,19] 34 (18.9%) patients felt that hair loss is a visible reminder of the disease and makes it obvious to the world that patient is undergoing chemotherapy. Our findings are consistent with the study by Rosman *et al.* where experiences of patients with chemotherapy-induced alopecia were studied.^[20]

Active strategies to hide hair loss has been observed in patients to cope up with it in earlier studies, similarly we had 37 (20.6%) patients who used hair accessories to hide the hair loss as compared to the other studies where 66% patients actively tried to hide the chemotherapy-induced hair loss.^[17] The use of hair accessories has been linked to the stigmatizing effect of hair loss associated with chemotherapy.^[21]

At present, no approved therapy exists to circumvent chemotherapy-induced hair loss. However, a number of agents have been under study to address the same. Scalp cooling therapy has shown encouraging results in preventing hair loss due to chemotherapy, while 2% minoxidil, on the other hand, results in accelerated hair growth post chemotherapy hair loss. Inhibition of cyclin-dependent kinase 2 (CDK2) is shown to reduce hair loss at the site of local application in 33–50% patients.^[22] Parathyroid hormone collagen binding domain of *Clostridium histolyticum* collagenase, an agonist fusion protein, results in rapid growth and re-pigmentation of hair post chemotherapy-induced hair loss.^[23] Cyclosporin has also shown to prevent alopecia by increasing the expression of IL-1 receptor.^[24] Apart from these agents, the other promising options include Imuvert, which is a biological response modifier produced by *Serratia marcescens*, topical calcitriol, subcutaneous/intradermal injection of geldanamycin or 17-demethoxygeldanamycin which has shown promising results in rodent models and yet to be tested in humans.^[25]

Although chemotherapy-induced hair loss remains a common adverse effect of cancer treatment, its psychological consequences are still poorly discussed. Despite the widely accepted opinion that the hair loss due to chemotherapy is distressing to the patients and their families and has a potential to alter the possibility of treatment completion, the data on the patient self-image, perception of society on the same, and strategies to minimize it are lacking. While changing the perception

of society can be one of the modalities to deal with it, providing pre-treatment information about the hair loss and teaching self-care to facilitate coping and adjustment with the loss of hair due to chemotherapy along with emotional support and counseling will have a long-lasting result in the treatment of cancer patients and would improve the possibility of treatment completion.^[26,27]

It is observed that almost all patients try to take active steps as it becomes noticeable. It is recommended to patients to camouflage by covering hair or wearing wig particularly in public.^[20,28] Shaving of scalp hair is also recommended as another method of gaining self-control apart from reducing the scalp itching and reducing the requirement to clean the shower.^[29] Role of social help groups in coping up with hair loss has not been studied but theoretically provides an excellent method to deal with the psychological issues encountered in these patients.

Conclusion

Despite the fact that the negative impact of chemotherapy-induced alopecia is well established in the literature, the data on patient experiences due to hair loss secondary to chemotherapy and quality of life is seriously lacking at present. Comprehensive communication between the oncologist and the patients, dermatologists and the patients would help them to cope up with this side effect and improve their compliance to treatment. A key role of a health care professional is to assist individuals to cope up with the illnesses.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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