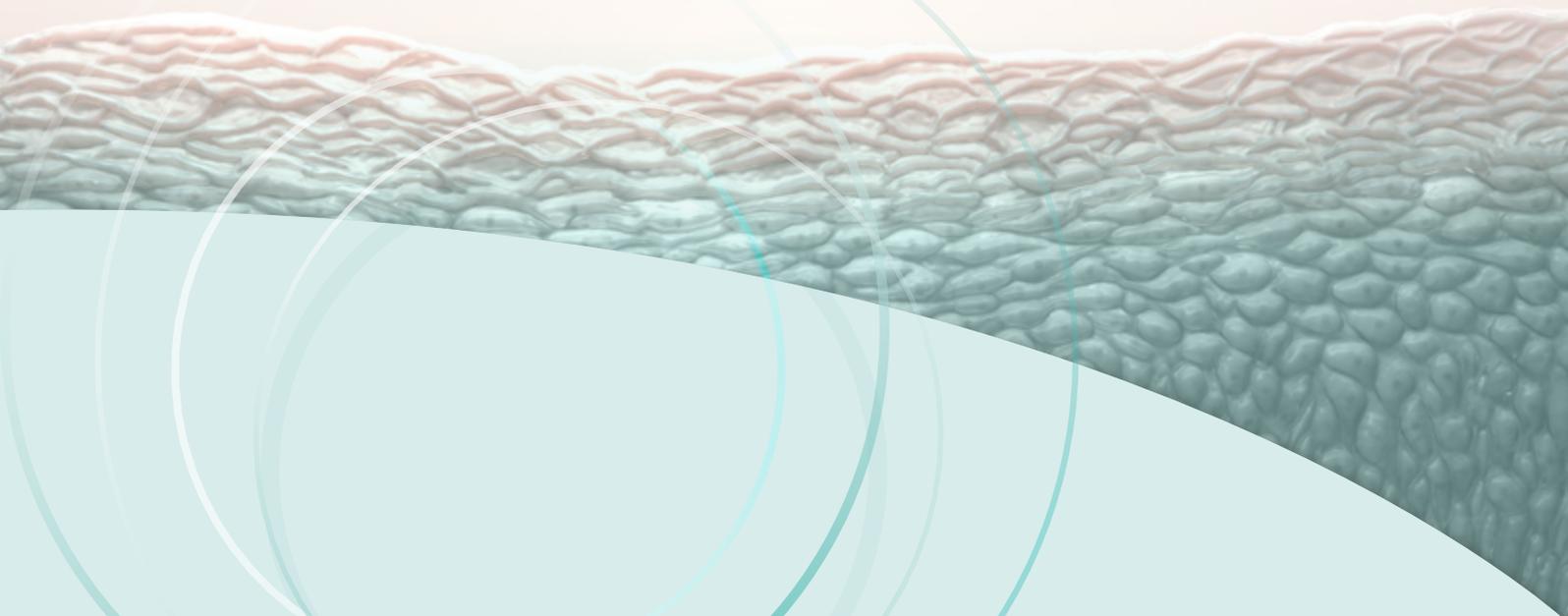


Information Leaflet for Patients

A detailed, 3D-rendered cross-section of human skin, showing the epidermis and dermis. The epidermis is the upper layer, characterized by its wavy, undulating surface. The dermis is the lower layer, composed of a dense network of collagen fibers and cells. The image is rendered in a soft, teal color palette. Overlaid on the skin image are several concentric, semi-transparent circles in shades of teal and light blue, creating a sense of depth and focus.

CANCER TREATMENT- RELATED HAIR LOSS

The aim of this leaflet

This leaflet is designed to help you understand more about cancer treatment-related hair loss (alopecia) and hair changes (colour, texture). It tells you about the condition, causes, prevention, and practical advice for managing hair loss and hair changes caused by cancer therapies.

CANCER TREATMENT- RELATED HAIR LOSS

What is cancer treatment-related hair loss?

Hair loss is a common side-effect of cancer treatment such as chemotherapy, targeted therapy, radiation therapy, immunotherapy, or surgery. These cancer treatments can damage the hair root cells that help hair grow back and maintain the hair cycle, texture, and colour. It can affect hair all over your body, including scalp, eyelashes, eyebrows, arms, legs, underarms, and pubic area.

Hair loss can differ from person to person, and so may vary in time of appearance and distribution. Depending on the cancer treatment you receive, you might lose all your hair or just patches of your hair, or notice changes in hair texture, colour or density. It might fall out slowly over time, or become dryer, thinner, or sometimes even thicker or curlier than before treatment. Hair usually grows back months after the end of cancer treatment, but sometimes, hair stays thin and sparse for longer than 6 months after the last treatment.

What does hair loss look like and what are the symptoms?

• **Chemotherapy-induced hair loss:** usually happens two weeks after the first or second intravenous chemotherapy, generally given in breast, ovary, hematologic, and gastric cancer patients, and before a stem cell (bone marrow) transplant. This hair loss may affect all body hair. Generally reversible, chemotherapy-induced hair loss can be total hair loss or just patches on the scalp and other areas including eyebrows, eyelashes, pubic and axillary hair.

When the hair loss persists for more than six months after the last chemotherapy cycle, this is called persistent chemotherapy-induced alopecia, and mainly affects breast cancer and bone marrow transplant survivors. Although it is quite uncommon, this persistent hair loss may look severe on the crown area, or complete hair thinning and poor hair density when compared with hair before starting chemotherapy.

• **These are the most common chemotherapeutic agents causing hair loss:**

- Platine derivatives: carboplatin and cisplatin
- Cyclophosphamide
- Doxorubicin
- Epirubicin
- Fluorouracil

- Gemcitabine
 - Idarubicin
 - Ifosfamide
 - Taxanes: docetaxel, paclitaxel
 - Combination of different chemotherapeutic agents (e.g. taxanes + doxorubicin)
- **Endocrine (hormonal) therapy-induced alopecia:** observed among breast cancer patients and survivors who receive endocrine therapy, also known as the “hormonal pill”. It generally happens within two to six months but it could be observed even years after the first dose of the endocrine therapy. Endocrine therapy can but does not usually cause complete hair loss as seen in chemotherapy-induced hair loss; however more often induces hair thinning on the crown area, and on the frontal hairline. This mild to moderate hair loss can significantly impact quality of life, especially because of its persistence throughout the treatment.

• **These are the most common endocrine (hormonal) therapies causing hair loss and hair thinning:**

- Anastrozole
- Letrozole
- Leuprolide
- Tamoxifen

- **Hair changes related to targeted therapies:**

cancer medications called targeted therapies are given in a range of cancers such as lung cancer, colon cancer, breast cancer, skin cancer, renal cell cancer and lymphomas. Hair loss in patients who receive these therapies is not usually seen as complete hair loss as described in patients who receive chemotherapy, but the hair may become lighter, thinner, curlier, or drier than usual. The eyelashes and eyebrows may become longer and thicker, and there might be unpleasant hair growth on the side of the face or cheeks, where you usually don't have thick hair.

- **These are the most common targeted therapies causing hair loss and hair changes:**

- Afatinib, erlotinib, cetuximab, panitumumab, osimertinib
- Ibrutinib, acalabrutinib
- Imatinib, nilotinib, dasatinib
- Sorafenib, regorafenib
- Trametinib, binimetinib, cobimetinib
- Vemurafenib, dabrafenib, encorafenib
- Vismodegib, sonidegib

- **Radiotherapy-induced hair loss:** patients who receive cranial radiotherapy for brain tumors or metastasis are at risk of developing scalp inflammation and temporary alopecia following the shape of the treated area. When the radiation is high or prolonged on the scalp, hair loss may be persistent, especially if redness, crusts, and pain occurred during radiotherapy; this is also known as persistent radiotherapy-induced hair loss.

How to manage hair loss?

Hair loss can be among the most impactful adverse reaction for some patients, especially for females. If there is any psychological impact from your hair loss, share this with cancer survivors and your health care team, as there are often tips and tricks to camouflage and cope with hair loss.

How to prevent hair loss?

There are no methods to prevent hair loss caused by most cancer therapies other than chemotherapy. The only way to prevent hair loss caused by chemotherapy is scalp cooling or scalp cryotherapy (effective in 50 to 60 of every 100 breast cancer patients). During this supportive care treatment, you wear a cold cap. The cold makes the blood vessels in the skin of your head narrower. This results in less blood flow and a reduction in the chemotherapy drug reaching your hair roots through the blood vessels. It prevents the chemotherapy from damaging the cells that help your hair grow. You wear the cap before, during, and for about an hour after the infusion of the chemotherapy. Scalp cooling is available using machines or using a loose cap that is kept in the freezer or on dry ice. Scalp cooling is not recommended if you have blood-related cancers. Most people can use it with few side effects. Common side effects include headaches and feeling cold.

What is practical advice for scalp cooling?

- Talk with your health care team to learn if scalp cooling is available and might work for you.
- The result of scalp cooling differs per type of chemotherapy and per patient. You do not know in advance whether it will have the desired results for you. It is advised to choose a wig before the chemotherapy begins.
- Do not stop scalp cooling immediately if the result is disappointing after the first cycle of chemotherapy. The result can usually be visible after the second chemotherapy session.
- If you usually colour, bleach or perm your hair, it is recommended that you do that before the start of the chemotherapy. The hair grows more slowly during chemotherapy; therefore, it takes longer before the new growth becomes visible.

CANCER TREATMENT- RELATED HAIR LOSS

General recommendations of hair and scalp care in patients treated for cancer

- Have a soft, smooth pillowcase (e.g., silk fabric)
- No specific restrictions exist on the frequency of hair/scalp washing but it is advisable to limit washing to two to three times per week
- Gently comb or brush hair before washing your hair
- Wash your hair gently, with warm water, use shampoo from the roots to the tips and use conditioner in the opposite direction
- Do not pile hair on the head because it increases tangling
- Pat your hair dry to prevent shaft damage/breakage
- Use delicate products (baby products / sensitive scalp products) to wash your scalp if it is bald, red or painful
- If you go outdoors always protect your scalp with sun protection or a hat/scarf/wig according to the severity of hair loss and scalp sensitivity
- Talk with your doctor before using any products that claim to help hair grow back

Styling procedures, hair dyes and hair straighteners/relaxers:

physical forces and the use of heat (including hair straighteners) and chemicals should be avoided during the first six months of cancer therapy if you notice hair changes, as these might have potential complications for the hair if not done correctly. Medium heat of the blow dryer is advisable whenever you need it. You may be able to use hair dyes if you regularly do it, whenever your hair is long enough, and your scalp is not dry, itchy, or irritated. Use your regular products. Going for natural/vegetable-based dye is usually safe. Some hair straighteners/relaxers may contain chemicals called endocrine disrupters that can interfere with patient's hormones, blocking or mimicking them. This can be a concern, especially in hormone-driven cancers like breast and ovarian cancer.

If your hair does not completely grow back six months after your last cancer treatment, or while you are taking hormonal therapy or targeted therapy you notice some scalp hair thinning or hair loss with no other symptoms, it could be treated with an over-the-counter medication called minoxidil, however we highly advice to visit your dermatologist for examination first. ■

