Jordyn Sisovsky

Dr. Hoff

Foundations of cancer

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**Skin Cancer: Causes, Prevention and Future Projections**

**Abstract**

Cancer is a broad range of disease that is characterized by DNA damage leading to abnormal cell growth. The disease has troubled scientists for ages because the origin can be so hard to pinpoint and the cure seems impossible to find. Each organ in the body can develop its own form of cancer and unfortunately can spread cancer to other organs also known as metastasis. For the most part, cancers are treatable if caught in early stages. Skin cancer is one of the largest cases of cancers but has some of the lowest mortality rates. In this paper we will look at causes, preventions and future projections of skin cancer.

Skin is the largest organ of the human body, composed of three layers and multiple cell types. With so much surface area it's at a high risk of tears, cuts, bruising and diseases. Like all other organs in the body, the skin can also develop cancers. The layer of skin that the cancer originates from determines its type and severity. For the most part, all types of skin cancers are caused the same way and can be treated in a similar fashion. Preventing skin cancer through screenings and other preventative measures has become a main goal of oncologists. Through research and knowledge of other cancers, new treatments are constantly being developed, and through the success of these new treatments we can predict the future of skin cancer within populations.

Everyone has been told to put on sunscreen before spending time outside or to check the size of your moles, but for what reason? Skin cancer can be attributed to either sun exposure or genetics. Spending time in the sun with unprotected skin increases chances for sun burns which are caused by UV light damage to the skin. UV rays have the ability to be absorbed by the skin and damage DNA. When DNA is damaged the cell is not able to grow and replicate normal leading to cancerous growths. Similarly, if one spends time in a tanning bed, the UV bulbs produce the same effect and if one is going on a regular basis the chances are heightened. However, skin cancer is not always caused by the sun; genetics also play a role in the development of some skin cancer cases. If a spot on the skin is found to be cancer and the person does not regularly tan or has a family history of skin cancer, then their genetics are the villain in this situation. Melanoma has a 5-10% inherent rate from parent to offspring (Stanford Health Care). If a parent has skin cancer then their kids automatically have a risk too. Skin cancer also has the ability to metastasize. Since skin is on the surface of the body the cancer can seep in and metastasis on internal organs such as lymph nodes and bone (Mayo Clinic). With the chance of metastasis skin cancer should be taken seriously and treated quickly. Like most cancers, the origin of skin cancer can be hard to define, but can mostly be categorized as either sun damage or genetics.

An important part to fighting the rates of cancer is to be proactive in prevention. Healthcare preventatives are the measures individuals take to lower their chances of getting a disease. Healthcare workers also go to certain lengths to educate the public on what they can do to avoid diseases. As we discussed in the last paragraph, the sun and UV light are extremely harsh on skin so sunscreen was invented to counteract its harmful rays. By utilizing inorganic chemicals such as zinc oxide or titanium, the sunscreen is able to reflect the UV rays so that the skin does not absorb them. Health officials advise people to reapply sunscreen every two hours while being in the sun (Grifantini). Applying sunscreen is an easy and effective prevention that can save one's skin. Another preventative measure is regular skin screenings, which can be conducted at home or by a doctor. During a skin cancer screening, the skin is examined for any unusual dry areas, unusually shiny areas, bumps or dark spots. Skin cancer takes on many forms and looks different person-to-person so it is important for individuals to be familiar with their skin in order to recognize changes. If an area is identified, it can be biopsied to test the malignancy of the skin. Preventions for skin cancer are fairly simple, straightforward, and non-invasive and could potentially save a person's life.

Fortunately, scientists have developed ways to battle skin cancer. If a spot on the skin looks abnormal and a doctor is also suspicious of it, then a biopsy will be performed and the sample will be examined. If the sample tests positive for cancer, doctors may begin treatment. To begin, the stage of cancer needs to be found in order to determine how aggressive treatment needs to be. Typically, a biopsy of basal carcinoma will get the whole growth; however, for a melanoma biopsy an MRI may be needed to make sure the cancer did not metastasize to any internal organs (Mayo Clinic). One treatment is the Mohns surgery, where a doctor scrapes the skin away layer by layer, checking each layer under a microscope until no more cancerous cells are found. According to Johns Hopkins Medical Journal, this method is 99% effective (Johns Hopkins). If the cancer is too much to remove, another treatment is radiation therapy. Radiation therapy consists of high power energy beams directed at the site of infection. The radiation targets cancerous cells to kill but can also kill some normal human cells. Chemotherapy is another tool for skin cancer that cannot be removed fully through surgery. Chemotherapy can take form as a pill or a topical lotion. Both radiation therapy and chemotherapy are typically used for melanoma carcinomas (cancer.org). Effectiveness of treatment also depends on some factors such as age, general health, and the stage of the cancer. Through research, individuals now have several options for treating their skin cancer.

Based on trends of the past, scientists have been able to make predictions on what skin cancer's future looks like within different populations. Based on the rates of melanoma for 2011, incidents were 19.7 per 100,000, and the mortality rate was 2.7 per 100,000. Researchers predict that in the US this rate will increase continuously through the year 2030 if precautions are not taken by the public. (Guy et al). The results of this projection show how important prevention is and how public health officials should push for more awareness. Another study looked at the growing rates of people using tanning beds and tanning outside for dangerously long periods of time. The researchers also predicted that rates of cancers, specifically melanoma, will only increase by the year 2031 if no new measures are taken. (Whitemen et al). Statistically, people with fair skin are more at risk because of the length of time they spend in the sun to get darker. Without making Changes to individuals' personal lives the rate of cancer will continue to rise.

No one is exempt from the possibility of skin cancer. Genetics and the sun can both have an impact on a person's likeness to get skin cancer. Skin cancer has a few different forms, and each form can be treated in a similar manner with high success rates. Along with the continual development of existing treatments, new treatment options should only broaden in the future. To avoid being diagnosed at a late stage, individuals should conduct regular skin screenings in order to be familiar with their skin and be quick to notice any new changes or developments. However, with the constant rise in tanning, researchers can only predict an increase in skin cancer rates. Preventions, such as sunscreen, are an important way we can avoid getting skin cancer and lower the rates.

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