

Cancer: A Small Review

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Abstract

Cancer (malignant neoplasm) is a class of diseases in which a group of cell display uncontrolled growth through division beyond normal limits, invasion that intrudes upon and destroys adjacent tissues, and sometimes metastasis, which spreads the cells to other locations in the body via lymph or blood. These malignant properties of cancers differentiate them from tumors, which are self-limited, and do not invade or metastasize. This paper includes an overall view on classification, sign and symptoms, treatment and prevention.

Keywords: Cancer; Malignant properties; Benign tumors

Introduction

Cancers are primarily an environmental disease with 90% of cases due to lifestyle and environmental factors and 10% due to heredity. Common factors leading to cancer death include: tobacco, diet and obesity, infections, radiation, stress, lack of physical activity, and environmental pollutants. These factors cause abnormalities in the genetic material of cells. These abnormalities in cancer typically affect oncogenes and tumor suppressor genes. The Diagnosis procedure of the disease requires the examination of a biopsy specimen, although the initial indication of malignancy can be symptomatic or radiographic. Most cancers can be treated and this may include chemotherapy and radiotherapy or surgery. The prognosis is most influenced by the type of cancer and the extent of disease. While cancer can affect people of all ages the risk typically increases with age.

Cancers are classified by the type of cell that resembles the tumor and, therefore, the tissue presumed to be the origin of the tumor. These are the histology and the location, respectively. Examples include:

- Carcinoma: Tumors derived from epithelial cells. This group represents the most common cancers, including the common forms of breast, prostate, lung and colon cancer.
- Sarcoma: Tumors derived from connective tissue cells.

- Lymphoma and leukemia: Malignancies derived from hematopoietic cells
- Germ cell tumor: Tumors derived from totipotent cells. In adults most often found in the testicle and ovary; in fetuses, babies, and young children most often found on the body midline, particularly at the tip of the tailbone; in horses most often found at the poll.
- Blastoma: which resembles an immature or embryonic tissue. Many of these tumors are most common in children.

Signs and symptoms

Local symptoms: unusual lumps or swelling i.e tumor, hemorrhage (bleeding), pain, ulceration. Compression of surrounding tissues may cause jaundice (yellowing the eyes and skin).

- Symptoms of metastasis (i.e spreading): It includes enlarged lymph nodes, cough and hemoptysis, hepatomegaly (enlarged liver), bone pain, fracture of affected bones and neurological symptoms.
- Systemic symptoms: It includes weight loss, poor appetite, fatigue and cachexia, excessive sweating, anemia and specific paraneoplastic phenomena, i.e. thrombosis or hormonal changes.

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Types of cancer

There are various types of cancers depending upon the different organs of human body or on different cells/ tissues. Biliary tree cancers, Bladder cancer, Bowel (colorectal) cancer, Brain (and spinal cord) tumours, Breast cancer, Cervical cancer, Oral cancer, Kidney cancer, Leukaemia, Liver cancer, Lung cancer, Lymphoma, Mesothelioma, Myeloma, Neuroblastoma, Oesophageal cancer, Ovarian cancer, Pancreatic cancer, Prostate cancer, Sarcoma, Skin cancer, Melanoma, Stomach cancer, Testicular cancer, uterine or endometrial cancer.

Causes

Cancers can be caused due to environmental factors, genetics. The causes also include everything from natural sunlight which can lead to skin cancer, industrial pollution, viruses, as well as behavioral life style of a person. Most environmental causes such as naturally occurring radiation, are not controllable. Common factors that lead to cancer death include: tobacco, diet and obesity, infections, radiation, stress, lack of physical activity, Chemicals and environmental pollutants. Cancer pathogenesis is DNA mutations that impact cell growth and metastasis. Substances that cause DNA mutations are known as mutagens, and mutagens that cause cancers are known as carcinogens. Tobacco smoking is associated with many forms of cancer, and causes 90% of lung cancer.

- Many mutagens are also carcinogens, but some carcinogens are not mutagens. For example: Alcohol, which is an example of a chemical carcinogen but not a mutagen. These type of chemicals promote cancers through stimulating the rate of cell division. Faster rates of replication results less time for repair enzymes to repair damaged DNA during DNA replication, which increases the chance of a mutation [1-3].
- Tobacco smoke contains over 50 known carcinogens, which includes nitrosamines and polycyclic aromatic hydrocarbons. Lung cancer death rates in the United States have mirrored smoking patterns, with increases in smoking followed by dramatic increases in lung cancer death rates.

The ionizing radiation such as radon gas, can cause cancer, as well as exposure to ultraviolet radiation from the sun can lead to melanoma and other skin cancer too. It is estimated that 0.4% of current cancers in the United States are due to CTs performed in the past and that this may increase to high. Non-ionizing radio frequency radiation from mobile phones and

other similar RF sources are also cause of cancer, but it is negligible as compare to other radiation.

Some cancers can be caused by infection. This is especially true in animals such as birds, but also in humans, with viruses responsible for up to 20% of human cancers worldwide. These include human papilloma virus, human polyoma viruses, Epstein-Barr virus (B-cell lympho proliferative disease and nasopharyngeal carcinoma), Kaposi's sarcoma herpes virus (Kaposi's Sarcoma and primary effusion lymphomas), hepatitis B and hepatitis C viruses (hepatocellular carcinoma), and Human T-cell leukemia virus-1 (T-cell leukemia's). Bacterial infection may also increase the risk of cancer, as seen in *Helicobacter pylori* induced gastric carcinoma.

The mode of virally induced tumors can be divided into two, acutely transforming or slowly transforming. In acutely transforming viruses, the virus carries viral-oncogene (v-onc) which is over active in nature, and the infected cell is transformed as soon as v-onc is expressed. In contrast, in slowly transforming viruses, the virus genome is inserted near a proto-oncogene in the host genome. The viral promoter or other transcription regulation elements then cause over expression of that proto-oncogene. This induces uncontrolled cell division. Because the site of insertion is not specific to proto-oncogene and the chance of insertion near any proto-oncogene is low, slowly transforming viruses will cause tumors much longer after infection than the acutely transforming viruses.

Hepatitis viruses can induce a chronic viral infection that leads to liver cancer. Worldwide, liver cancer is one of the most common, and most deadly, cancers due to a huge burden of viral hepatitis transmission and disease.

Treatment

- Alternative therapies
- Chemotherapy
- Gene therapy
- Immunotherapy
- Quality of life

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