Epidemiology, types and diagnosis of cancer in modern era

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INTRODUCTION

What is cancer? The general question asked. Cancer is a disease in which certain cells in the body start growing uncontrolledly and spread to other parts of the body. Cancer can start from almost anywhere in the human body, which is made up of trillions of cells. Normally, human cells grow and reproduce through a process called cell division in order to create new cells when the body needs them. When cells are aging or have become damaged, they die, and new cells take their place. Sometimes, this orderly process breaks down, and the invalid or damaged cells grow and multiply. These cells can form tumors, which are the lumps of tissues. The tumor may be malignant or non- cancerous i.e. benign tumor.

CAUSES OF CANCER

Cancer is a genetic disease that has been related to change in the genes which control how our cells work, how they grow and divide. The genetic changes due to which cancer may occur are:

- Errors occurring during cell division.
- The DNA damage caused by harmful chemicals in the environment, such as chemicals, tobacco smoke, and UV rays from the sun.
- Genetic.

The body is usually destroys the cells with damaged DNA before they turn into cancer cells. However, the ability of the body to do this declines with the age. This is one of the reasons why there is a greater risk of developing cancer later in life than young age

TYPES OF CANCERS

There are more than 100 different types of cancers. The cancer types are usually named for the organs or tissues in which tumors are formed. For example, lung cancer starts in the lung, and brain cancer starts in the brain. Cancer can be described by the type of cell in which it is made, such as epithelial or squamous cell carcinoma.

- Carcinoma is the most common type of cancer. They are formed by epithelial cells that cover the outer and inner surfaces of the body. There are many different types of epithelial cells, which tend to have a columnar shape, when viewed under a microscope. Tumors that start in different types of epithelial cells have specific names like adenocarcinoma, basal cell carcinoma, squamous cell carcinoma or transitional cell carcinoma.
- Sarcoma are cancerous tumors that arise in the bone and soft tissues, such as muscle, fat, blood vessels, lymph vessels, and fibrous tissues.
- Leukemia is the cancer that begins in the blood and bone marrow. This form of cancer does not form solid tumors. Instead, large numbers of abnormal white blood cells (leukemia cells and leukemia blast cells) build up in the blood and in the bone marrow, crowding over the normal cells in the blood. Low level of normal blood cells can make it harder for the body to deliver oxygen to the tissues, control bleeding, or fight infections.

- Lymphoma is a cancer that begins in lymphocytes (T-cells or range of cells). They are the disease-fighting white blood cells that are part of the immune system. In the case of lymphoma, abnormal lymphocytes build up in lymph nodes, and lymph vessels, as well as in other organs of the body

BREAST CANCERS

About 1 in 8 U.S. women (about 12.4%) will develop invasive breast cancer over the course of her lifetime. In 2018, an estimated 266,120 new cases of invasive breast cancer are expected to be diagnosed in women in the U.S., along with 63,960 new cases of non-invasive (in situ) breast cancer. Detection of early invasive breast cancer is important, as patient survival is high when the cancer is 2 cm or smaller. Radiologists' mission is to be able to detect breast cancer when it is very small, which is important in reducing breast cancer mortality. Women with invasive cancers of 1cm or smaller have a 95% chance of survival at 10 years, while those with invasive cancers 1–2 cm and 2–5 cm in size have, respectively, 85% and 60% survival at 10 years. Recently reported by International Agency for Research on Cancer (IARC), rapid societal and economic transitions herald an epidemiological shift in the incidence, with more low income countries projected for an increased burden of breast cancer. On the basis of gene expression profiling, breast cancers are classified into four major subtypes: luminal A, luminal B, HER2+ and basal-like which incidentally also form the basis for breast cancer therapy, responsiveness and patient outcome. Endocrine therapies that target the estrogen and estrogen receptor (ER) signaling pathways are the cornerstone of breast cancer treatment for the majority of patients. However, 25%–30% of breast tumors do not express ER and do not respond to existing endocrine therapies. Interestingly, breast tumors with amplification and overexpression of HER2 (the ERBB2 oncogene) respond well to anti-HER2 targeted therapies such as Trastuzumab which is becoming increasingly important in the treatment of HER2+ tumors of all stages. Though, the application of anti-hormonal and anti-HER2 targeted therapies led to dramatic improvements in the outcomes of patients with ER+ and HER2+ disease, a significant fraction of patients with ER+ or HER2+ tumors do not show a response to treatment or experience relapse and disease progression.

LUNG CANCER

Pancreatic cancer is one of the most lethal human cancers and is the fourth leading cause of cancer-related deaths in the United States. It is estimated that 38,460 of 45,220 people diagnosed with pancreatic cancer in the United States in 2013 will die of their disease, representing approximately 6% of total U.S. cancer deaths. The most common neoplasms of the exocrine pancreas are the ductal adenocarcinomas based on their cell of origin. Pancreatic cancer develops insidiously and the majority of patients have advanced disease at the time of diagnosis. About 70% of tumors develop in the head of the gland, a location that often leads to stricture of the intrapancreatic portion of the common bile duct and the development of jaundice. The early symptoms of pancreatic cancer are non-specific (epigastic and diffuse abdominal pain, bloating, flatulence, general malaise, diarrhea, vomiting, constipation) and can be easily missed. Late symptoms

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include localized abdominal pain, radiation to the back in cases of retroperitoneal infiltration, weight loss and jaundice. It can be diagnosed by MRI, biliary decompression, imaging evaluations or endoscopic ultrasonography.

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