



Fighting with Cancer: A Common Man's Dilemma

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Abstract

The impact of cancer diagnosis on the patient and the families is immense. The term cancer is quite frightening. It brings along a series of complicated thoughts about the disease, its course, treatment, associated difficulties, financial burden, social status, and existential issues. It traps the sufferers in a vicious loop of thoughts related to life, end of life, and thereafter. Another aspect that is mostly overlooked is the spiritual distress that comes along with the diagnosis of cancer. All these thoughts get amplified and increase psychological morbidity, which further gets compounded due to lack of knowledge and awareness about the disease and the ways to deal with it. This chapter broadly outlines the epidemiology and mechanism of the disease, types of cancer, various terminologies that are used, investigations that are undertaken, treatment options, and coping strategies during and beyond the process of disease and disability.

Keywords

Cancer types · Treatment options · Coping with cancer

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1.1 Cancer

Globally, cancer is the second largest killer after heart diseases. A few million people are diagnosed every year with cancer. The number varies with geographical regions, regional economy, gender, age, etc. Cancer is not a single entity. It includes a multitude of diseases. All the diseases clubbed under the term cancer have one characteristic in common: uncontrolled growth and accumulation of abnormal cells. Collection of these abnormal cells beyond a certain size is visible. Prompt medical attention is needed to tackle this abnormal growth, as the tumor affects normal activity of the organ where it occurred or may spread to a distant site. One abnormal cell (derived from a normal cell having undergone mutation in its genetic material) will divide into 2 abnormal cells, 2 will divide into 4 abnormal cells, 4–8 abnormal cells, and so on. Every normal cell is supposed to undergo programmed death (*apoptosis*), but an abnormal cell loses capability for programmed death. Some of the common cancers for males are prostate, lung, colon, rectum, urinary bladder, etc. For females, the common cancers are breast, lung and bronchus, colon and rectum, uterine, ovary, etc.

Every cell growth is not cancer. One group is called *benign tumor*. It grows in a locally confined area. The other group is called *malignant tumor*. It can invade surrounding tissues, enter into the vascular system, and spread to distant part of the body through a process known as *metastasis*. Benign tumor is rarely life-threatening, whereas malignant tumors are often life-threatening. Benign tumors usually grow slowly, whereas malignant tumors may grow rapidly. Benign tumors are well-differentiated. State of differentiation (the process of becoming different by growth or development) in malignant tumors is variable.

There are a few distinguishing terms connected with tissue growth: *hypertrophy*, *hyperplasia*, *dysplasia*, and *neoplasia*. In hypertrophy, cell size increases, but the organization remains normal. In hyperplasia, cell number increases, but the organization remains normal. In dysplasia, the growth is disorganized. In neoplasia, growth is disorganized, but there is net increase in the number of dividing cells.

1.2 Types and Terminologies

Tumors can arise from different tissues and organs. Depending on its origin and cell types, some conventions are followed to name them. As shown in Fig. 1.1, they are classified into three main categories: *carcinomas*, *sarcomas*, *lymphomas* and *leukemias*. Cancer arising in cells covering layers over external and internal body surfaces (called epithelial cells) is called carcinomas. This constitutes roughly about 90% of all human cancers. Sarcomas are cancers of the supporting tissues such as bone, cartilage, blood vessels, fat, fibrous tissue, and muscle. They are the rarest occurring human cancers, about 1% of the total. The remaining cancers originate from cells of lymphatic and blood system. *Lymphoma* refers to tumors of lymphocytes (WBC) that grow as solid masses of tissue. *Leukemias* are cancers of blood cells, which proliferate in the bloodstream.

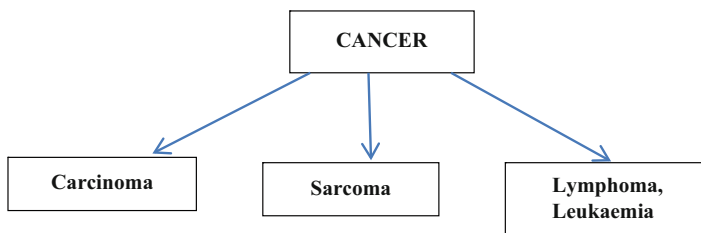


Fig. 1.1 Cancer types

Within each of these groups, individual cancers are named using prefixes that identify the involved cell type. For example, adenocarcinoma means carcinoma of the gland (adeno—meaning gland). Depending on the organ where it occurs, we may refer to the tumor as lung adenocarcinoma, colon adenocarcinoma, breast adenocarcinoma, colon adenocarcinoma, etc. If the tumor is benign, then these are referred to as *lung adenoma*, *colon adenoma*, *breast adenoma*, etc. There are a few exceptions to this nomenclature like melanomas are malignant tumors of pigmented cells, lymphomas are malignant tumors of lymphocytes, and myelomas are malignant tumors of the bone marrow cells.

Cells in a malignant tumor vary in appearance from those of benign tumor. When a sample is seen under a microscope, this difference provides the basis for cancer diagnosis. A doctor will usually cut a small piece of tissue from the suspected site of the tumor (e.g., fine needle aspiration cytology (FNAC)), which is examined by a competent pathologist to determine whether a tumor is present and whether it is benign or malignant, and the type of cell involved. This process is called *biopsy*. If the biopsy sample is collected by taking out a small bit of tissue from the tumor, it is called *incisional biopsy*, and if it is collected after taking out the whole tumor, it is called *excisional biopsy*. Pathologists assign some numerical grade to the tumor based on their microscopic appearance as there is variability among cancers, even if it involves the same cell type and organ.

When a tumor is ascertained to be malignant, oncologists decide the *staging* of malignancy through a scheme known as TNM system. T stands for tumor size, *N* for the number of lymph nodes positive for cancer cells, and M for metastasis, that is, has the cancer spread to other organs than the primary site of occurrence. The stages are generally 0, I, II, III, and IV. The more the value, the more advanced is the cancer. The treatment of cancer depends on the stage of the tumor. An advanced stage of the cancer tends toward more difficult case to provide remission.

1.3 Some Statistics

Though the world has seen major changes in the field of health care, cancer remains a leading cause of mortality, accounting for about 9.9 million deaths worldwide and 0.85 million deaths in 2020 in India (Sung et al. 2021; Chatterjee et al. 2016). It is

anticipated that there will be more than 20 million new cancer cases worldwide by 2025, with 80% of these cases in low- and middle-income countries (LMICs) (Bray et al. 2015).

Grossly, throughout lifetime a man has probability of 0.5 for developing cancer and a woman has probability of 0.333 for developing cancer. Men are mostly affected by prostate cancer and women by breast cancer (Eyre et al. 2002). Different cancers affecting male population may be put in a descending sequence: prostate cancer < lung and bronchus < colon and rectum < urinary bladder. For female population, the descending sequence would be breast cancer < lung and bronchus < colon and rectum < uterine.

1.4 Role of Various Physicians and Nursing Care and the Available Treatment Options

The goal of cancer treatment is to cure or palliate the disease and improve survival and quality of life of the patient. Useful treatments destroy all cancer cells, prevent recurrence of the primary cancer, and balance likelihood of cure versus side effects of the treatment. An oncologist (medical, surgical, or radiation oncologist) makes a treatment plan based on the tissue type, age and physical fitness of the patient, status of certain organs like kidney, heart, lung functions, and aggressiveness of the cancer. The aggressiveness is decided by the size of the malignant tumor, how far it has spread, what is the chance of its recurrence, etc. People who are fit and healthy are able to cope with various therapies better. Chemotherapeutic and radiotherapeutic treatments alter the turnover of these cancer cells, but these agents might also interfere with the cell cycle of normal cells, and this may lead to certain adverse effects. The oncologist may like to know the personal, emotional, and financial status, family liabilities, etc., for making personalized treatment plan. Most cancer treatments involve surgery, chemotherapy, and radiotherapy or some combination of it. Surgery and radiotherapy are local treatments confined to the primary site of tumor occurrence. Teaming up with palliative medicine and pain management teams along with clinical psychologist, social counselor, and physiotherapist gives a good support system for the patient.

1.4.1 Surgery

This is the first choice, and it attempts to remove cancerous cells with a clear margin of the removed cancerous lump(s). From late 1800 till 1970, surgery was quite radical. The intent was to be to remove the tumor with many of the surrounding tissues to achieve better clearance of the disease. Approximately 90% of breast cancer patients underwent radical mastectomy (removal of breast) until 1970. This radical mastectomy was advocated by William Stewart Halsted of Johns Hopkins University under the assumption that cancer spread outward from the original growth and not through bloodstream. It was learnt later that this radical approach

did not offer any extra advantage in terms of patient survival and so the conservative approaches in surgery were gradually adopted by many surgeons in various cancer centers.

Exploratory surgery to look for tumor growth inside the body has drastically reduced because of improved diagnostics techniques like computed tomography (CT scan), magnetic resonance imaging (MRI), ultrasonography (USG), and positron emission tomography (PET).

1.4.2 Chemotherapy

Chemotherapeutic agents are used to destroy cancer cells wherever they are in the body. For a particular patient, only a few are judiciously selected (a combination of drugs) by the attending medical oncologist. As the chemotherapeutic agents are introduced through the bloodstream, it quickly spreads in the body. There are several classes of chemodrugs such as *alkylating agents* like cyclophosphamide, *antimetabolites* like fluorouracil, *platinum drugs* like cisplatin, *mitotic inhibitors* like paclitaxel, and *antitumor antibiotics* like doxorubicin. These medicines are *cytotoxic* and targeted against rapidly growing cancer cells. It also damages cells that are not tumor-forming, if they are rapidly growing like in hair follicles, nails, bone marrow, lining of mouth, stomach, and intestines. These unintended destructions of normal cells are the *side effects of chemotherapy*, which may sometimes be serious in nature. Some of the common manifestations of this process are mucositis, hair fall, and low blood counts following chemotherapy. The challenge for the oncologist is to balance between the cancer-destroying capabilities of these drugs and their side effects.

When chemotherapy is used in the early stage of cancer, it may cause cessation of tumor growth, or it may limit the spread of cancer. It may also be used to shrink the size of the tumor before surgery. When the cancer is in an advanced stage, it may be used for purpose of palliation to reduce the symptoms of the patient and enhance quality of life. It may be used as the primary therapy **before** (*neoadjuvant*) other treatments like surgery or radiation therapy. It may also be used **after** (*adjuvant therapy*) surgery or radiation. Adjuvant chemotherapy targets stray cancer cells left in the body.

1.4.2.1 Radiotherapy

In this modality, X-rays or particulate radiation is used to kill the tumor cells. This modality can be used as the primary treatment or in combination with other modalities like surgery and chemotherapy. When it is used alone, it attempts to control the size of the tumor to reduce the pain or other palliative reasons. When it is used as an adjuvant treatment, it tries to destroy the remnant cancer cells, if any, after the primary treatment.

1.4.3 Cancer Pain Management and Palliative Care

A very important aspect of cancer care plan is the role of pain and palliative care services. Pain is a prominent symptom in majority of cancer patients. Other symptoms like nausea, vomiting, diarrhea, constipation, and sleepiness are mentioned elsewhere. Gradually, as the disease progresses and the symptom burden increases, the role of pain and palliative care team becomes more prominent as they focus on quality of life by providing optimal symptom control. The symptom could be any among the physical, psychological, social, and spiritual. The idea is to work around the concept of living well till we are alive and leaving well when the disease progresses and becomes refractory to treatment. Early and goal-based palliative care is the key. Good nursing care and maintenance of hygiene are important throughout the process of care.

1.5 Coping with Cancer Diagnosis and Treatments

Any sort of cancer diagnosis changes your thoughts, perceptions, and behavior. We suddenly realize that life is changed. We suddenly start realizing that there are many decisions to make, regarding the disease, its treatment, family issues, finances, etc. Moreover, the psychological and emotional burden of disease could be overwhelming. The natural response to cancer diagnosis is the negative thoughts and the ideas of death for many. The best way to deal with these thoughts is to gather information and work around our support systems. Information about the disease could be gathered from the authentic Internet sources, your own doctor, patient support groups, etc. We need to talk to the doctors and other members of the treating team, and talk to the family, friends, and children. Physical rehabilitation and psychological support play an important role throughout the cancer treatment to deal with day-to-day life issues and helps to adjust with the new way of life. Self-image, treatment-related physical and financial difficulties, relationships, and sexuality are important concerns. Whatever may be the prognosis, there are certain ways to deal with your thoughts, emotions, behaviors, and reactions to this disease and its treatment. Prioritizing quality of life is important.

1.6 Rays of Hope

It has become increasingly clear that cancer is a multifactorial complex illness, which involves various changes at the molecular and genetic levels. Thus, we need to assess and analyze the disease properly and accordingly target the molecule/structure/gene/cell sequence, etc., to get the desired response to treatment.

For example, based on PCR analysis of samples from colorectal premalignant polyp and carcinoma cell genomes, it is estimated that about 11,000 genomic alterations occur in a cancer cell. This large variation allows clonal heterogeneity seen in many cancer tissues. These tumor subpopulations interact with each other,

thereby affecting their growth rate, chemosensitivity, and metastatic phenotype (Miller et al. 1981). New and important insights into the complexity of tumor progression lead to the development of novel treatment strategies. Cancer in different individuals behave differently; therefore, personalized or precision medicine allows the treating team to tailor the cancer treatment according to individual needs. For this, the gene changes or mutations specific to the malignancy under consideration are targeted. This targeted therapy allows targeting genes, molecules, proteins, blood vessels, hormones, signal transduction inhibitors, immune cells, etc., that help in growth and proliferation of target cells. Basic idea is to stop the action of the key molecule in the growth of cancer cells. Since the targeted treatments are matched to individual tumor types, the outcomes are better. Targeted therapies are broadly divided into two categories: one that enters the cells and works from inside the cell and the other that is big enough not to enter the cells but targets the receptors on the cell surface like monoclonal antibodies. Some examples of these targeted therapies are signal transduction/kinase inhibitors (imatinib, cetuximab, lapatinib); mTOR inhibitors (sirolimus, everolimus); hedgehog pathway inhibitor (vismodegib); immune system targets (rituximab, ipilimumab); angiogenesis targets (bevacizumab); hormonal targets (anastrozole, tamoxifen, bicalutamide); proteasome targets (bortezomib, carfilzomib); histone deacetylase targets (romidepsin); folate targets (pralatrexate); retinoic acid receptor targets (tretinoin, isotretinoin); EGFR inhibitors (cetuximab); and HER2 inhibitors (trastuzumab).

In addition to advancement in chemotherapeutics, radiotherapeutic treatments have also become more focused and sophisticated and are delivered through better and advanced machineries. These radiotherapy advancements include treatments like IMRT (intensity-modulated radiation therapy) where the radiation beam is targeted at the diseased area, causing least damage to the nearby noncancer tissue. IGRT (image-guided radiation therapy) uses imaging like MRI or CT to focus the radiation beam over the disease area. SRS (stereotactic radiosurgery) similarly delivers focused radiation to remove the disease, while sparing the normal tissue as much as possible, and is specifically useful in tumors involving brain and spine. Proton therapy is a type of radiotherapy that uses positively charged particles called protons to destroy cancer cells.

Surgical treatments for cancer have also taken big leaps in terms of robotic surgeries where the surgeons insert cameras and equipments into the body through very small holes; sit at a console; and, with the help of a viewfinder, they work with robotic arms through hand and foot controls. This helps in reaching body parts, which may otherwise be hard to reach. This leads to more precise and better tissue resections, cleaner margins with healthy tissues, lesser tissue damage, and early recovery.

One more important aspect of cancer care that cannot be ignored is the palliative medicine and pain management services, without which the loop of cancer care remains incomplete. Most of the cancer patients present with pain as a major symptom. Other symptoms include nausea, vomiting, breathlessness, and delirium. Management of pain and other symptoms remains important throughout the cancer treatment. Various nonpharmacological, pharmacological, and interventional

strategies are available to manage these symptoms at various stages of the disease. Palliative and pain medicine are now gaining more and more attention and inclusion in cancer care. Cancer care sees a lot of transitions in process of care, and palliative medicine professionals help a lot during these transitions, especially the transition from hospital to hospice care.

Additionally, early and goal-based financial planning, which is a common need for all of us, becomes all the more important when it comes to disease like cancer where cost burden is significantly high. Asset allocation and rebalancing your expenses and funding, creating contingency funds, succession planning, etc., with the help of a financial/wealth planner who is exposed to and dealing with cancer care finances, are an indispensable element.

Integrative approach to cancer care, where different professionals from various fields and different hierarchies of healthcare integrate and work in cohesion, has contributed a lot to better care outcomes for the patients and their families.

1.7 Winning and Fighting Cancer

Many of the physicians have seen how the patients with the same age and illnesses undergoing similar treatment regimens have experienced different results. A lot of this depends on the will to live and fight that we can put up against the disease called cancer. This also stands true for other life-limiting illnesses. Patients and families with positive attitudes cope better with disease and the issues related to it and may respond better to treatments. Mindfulness and positivity are important elements in cancer combat. Positive attitudes and emotions help foster better adjustments to the stage and treatment of disease. It is important to understand that a patient is not alone and that he/she should not suffer in silence. Asking for and providing support to others, through physicians' own experiences, play an extremely important role. Diet, nutrition, physical exercises, rehabilitation, positive mental and physical health techniques, and strategies need to be followed. Existential and spiritual distress with anger at fate and God is a common occurrence and is manageable with relevant therapeutic medical and spiritual help. Friends, family, and finances are three important personal pillars apart from the possible treatments available for the disease.

1.8 Conclusion

Sir Francis Bacon published in his work, *Meditationes Sacrae* (1597), the saying: "knowledge itself is power," and this fits very rightly in the context of cancer care. Understanding the biology and stage of disease, knowing the various treatment options available at the relevant stages, and understanding systematic, logistical, and financial issues are the best possible way to self-help. With the advancements in the cancer treatments over the past two decades, the survival of people suffering from the disease has increased. Coping with the disease and its morbidities has also

become better due to a lot of information, which is now available through print, Internet, social media, and support groups. With so much of information available these days, it becomes important to rationalize the information and discuss it with your treating team to understand what suits you the best. Cancer can happen to anyone so blaming the self and complaining will not help the cause; instead, what helps us is to understand the problem and find out ways to deal with the situation we are facing. The authors of the chapter and the book wish positivity, recovery, and good health to everyone who is fighting the disease.

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