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Answer to Cancer: A Review

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Abstract
Life-threatening diseases are one among the leading causes of death worldwide. Patients are treated by surgery, radiation and chemotherapy. Chemotherapeutic treatment is used to reduce tumour overload and abolish malignant cells. However, in most cases, resistance against chemotherapy develops. Therefore, there is a permanent need for new add on therapeutic strategies and chemotherapeutic combination regimens. The current review article is an attempt to highlight the most promising methods and summarize the recent cancer treatment and its control. Due to the large number of scientific articles and rapid developments in cancer research, the authors can address only a few selected goals; however, the review focuses on new and particularly important goals and approaches.

Keywords
Malignant, tumour, Immuno therapy, Biopsy, Carcinoma, Skin melanoma, Colorectal, Cell transfer therapy.

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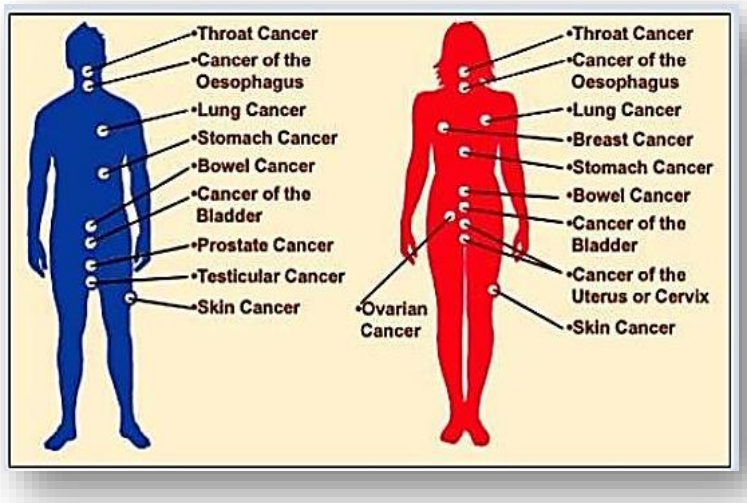
CANCER. . . IT'S HISTORY. [1]
Cancer is a term used to describe a large group of diseases characterized by cellular dysfunction. Healthy cells are "programmed to know what to do and when to do it. Cancer cells do not have this programming and therefore grow and replicate without control. They don't even provide physical function. These cells are now called neoplasms. This neoplastic mass often forms a group of cells called a tumour. Symptoms vary depending on the type of cancer. Some cancers show no symptoms and in case of many cancers, the cause is unknown. Treatment depends on the type of cancer and the stage of the cancer is in. The stage of any cancer depends on how much the tumour has grown and whether it has spread. The diagnosis of cancer is of great concern to the patient and loved one. There are support groups around the country to deal with this terrible disease.

The patient's prognosis depends on the type of cancer. Even with a single cancer, the results vary depending on the stage of the tumour and how fast the diagnosis is made. Although awareness about cancer has increased exponentially over the past century, it is not the only disease that has developed in the modern world. Cancer has afflicted people since ancient times. Since there are no treatments available to cure it, the cancer survivors are ineffective. A description of breast cancer symptoms is found in the Ancient Egyptian medical book, Edwin Smith Papyrus, dating back to 1800 BC. Some more types of cancers can be found in the writings of the fourth century BC Greek physician Hippocrates. Hippocrates named the disease as carcinomas because of a persistent symptom that would not leave the stump.
Carcinos in Greek, the name of the cancer, which has the same meaning in English in the aftermath of the

euphoria. English physician John Hill, 41, has identified cancer as a cause of the habit of inhaling tobacco. At that time, there was a cooking machine other than firewood. Chimneys were installed on ceilings to emit smoke emanating from the fire place. Some were in the profession of cleaning these chimneys. In 1775, British surgeon Percivali Port discovered that chimney cleaners were infected with cancer caused by the soot and smoke. In the eighteenth century, after the use of microscopes for medical examinations, English surgeon Campbell de Morgan discovered that cancer cells spread from the cancer tumour to other organs through the lymph nodes. He conducted extensive research on this in the period 1871 - 74. Almost a century later, US President Richard Nixon declared a 'war on cancer' in 1971. He devoted extensive funds to cancer research. As a result, cancer mortality rates have dropped by five percent over the next four and a half decades. The major parts of the body affected by cancer and the causes of cancer are shown in Figure.1, 2.

FIGURE 1: MAJOR PARTS OF THE BODY AFFECTED BY CANCER



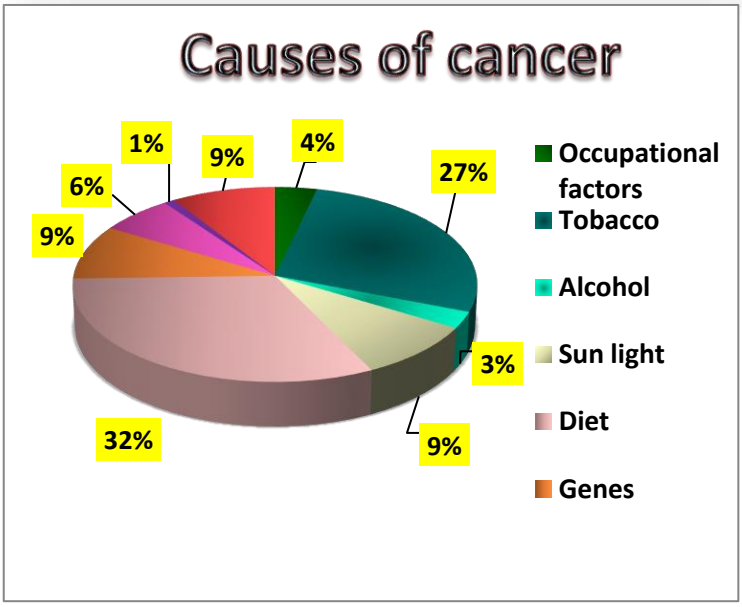


FIGURE. 2 MAJOR CAUSES OF CANCER.

MEDICAL FACTS

Despite medical advances, cancer remains a threat to humanity and cancer. According to the World Health Organization (WHO), 96 million people die each year due to cancer. In other words, one of the deadliest deaths worldwide is due to cancer! Another tragedy is that about 70 per cent of cancer deaths occur in backward, middle-class countries. Top Ten countries with the highest cancer deaths are shown in Table. no: 1 In the case of smallpox, which was completely

eradicated from the disease in four decades, the disease such as cancer was not yet been successful. [2]

TABLE NO: 1 STATISTICS OF CANCER

Country	Cancer deaths per million population
Mangolia	197.11
Armenia	196.12
Kazakhstan	195.42
Grenada	183.94
Hungary	179.91
Nugenia	174.8
Croatia	163.62
Saint Vincet	163.18
Slovakia	162.57
Tonga	159.19

- Cancer is a foremost cause of death worldwide and attributed for 7.4 million deaths (around 13% of all deaths) in 2019, graphically shown below Figure 03.

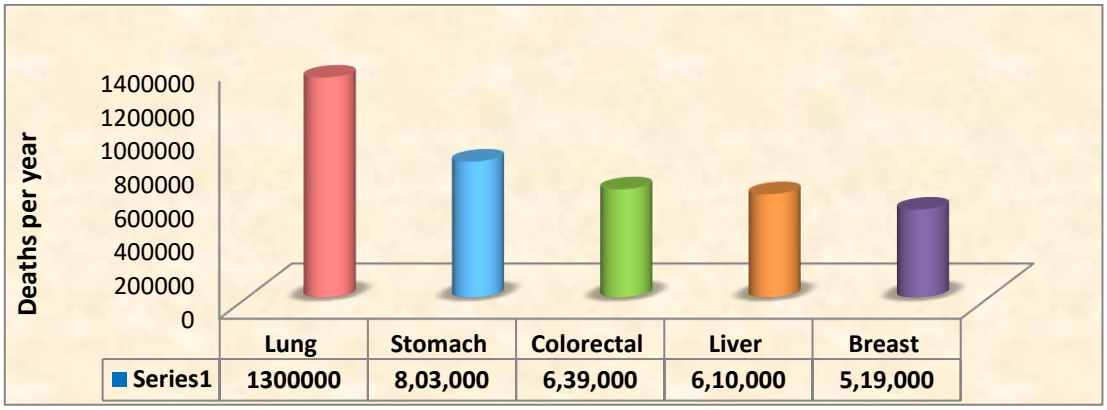


FIGURE. 3 GRAPHICAL REPRESENTATIONS OF DEATHS DUE TO CANCER TILL 2019.

More than 70% of all cancer deaths occurred in low- and middle-income countries. [3] Deaths from cancer worldwide are projected to continue rising, with an estimated 11.5 million deaths in 2030. The most frequently occurring cancers and their common symptoms are tabulated in table. 2.

TABLE NO. 2: SYMPTOMS OF DISCRETE VARIETIES OF CANCER

Site of cancer	Common symptoms
Breast	Lump in the breast, asymmetry, skin retraction, recent nipple retraction, blood stained nipple discharge, eczematous changes in areola
Cervix	Post-coital bleeding, excessive vaginal discharge
Colon and rectum	Change in bowel habits, unexplained weight loss, anaemia, blood in the stool
Oral cavity	White lesions (leukoplakia) or red lesions (erythroplakia), growth or ulceration in mouth
Naso-pharynx	Nosebleed, permanent blocked nose, deafness, nodes in upper part of the neck
Larynx	Persistent hoarseness of voice
Stomach	Upper abdominal pain, recent onset of indigestion, weight loss

Skin melanoma	Brown lesion that is growing with irregular borders or areas of patchy colouration that may itch or bleed
Other skin cancers	Lesion or sore on skin that does not heal
Urinary bladder	Pain, frequent and uneasy urination, blood in urine
Prostate	Difficulty (long time) in urination, frequent nocturnal urination
Testis	Swelling of one testicle

WIDE SPREAD CANCER IN INDIA

Cancer in India Cancer in India is expanding rapidly. According to the National Health Profile, between 2017 and 2018, the number of cases in India increased by 300 per cent in just one year. In India, there were 39,635 new cases of cancer in 2017. This number rose to 1: 60 lakhs for 2018. The total number of cancer patients in the country is 5 crores and by 2018, it has reached 60 crores. Experts say cancer cases in India are on the rise due to rising stress, Changes in lifestyle, sloppy lifestyle, population, rising obesity, changes in eating habits, tobacco products and alcohol consumption. Over the past few years, the National Health Initiative for Cancer Control and Prevention, the Ministry of Health of India, has seen a slight decline in cancer-related deaths in India. Internationally, cancer death rates are as good as India. According to statistics revealed last year, India ranks 164th in cancer death rate. There is an average of 72.21 deaths per lakh population in India. Cancer mortality can be greatly reduced if early detection of the disease can be done with regular medical examination. Scientists have been researching the creation of a universal cancer vaccine to prevent cancer in humans; there have also been reports that these findings have been somewhat successful.

MEDICAL PROGRESS IN TREATMENT OF CANCER [4]

The medical field has made great progress in treating cancer. Most cancers are treated by treatment. Still, cancer is not an affair, as millions of deaths are caused by cancer. Various medical tests, such as chemotherapy and radiotherapy for diagnosing cancer are all very cost-effective. People in affluent countries are most likely to survive by treating cancer and stroke. That is not the case in most backward countries and in developing countries like India. If someone in a common household in our country gets cancer by mistake, the family is financially vulnerable. Even if the assets have been treated, there is no guarantee that the patient will survive. Moreover, with all sorts of advanced cancer treatment centres confined to cities, in many areas, if someone is infected with cancer, they have to give up their lives. On the one hand, there have been rapid changes in the treatment methods of cancer over the past few years. Effective diagnostic techniques and improved treatment methods are available. Medical experts are hopeful that this will prevent many of the premature deaths caused by cancer. If these are made available to the general public, one can expect to find cancer in the near future.

RECENT ACHIEVEMENTS IN CANCER TREATMENT [5]

Recently, medical professionals have achieved some great success in treating cancer. As a result, certain types of cancer diagnostic testing techniques have become easier. Therapeutic techniques have become more effective. Here are some of the key achievements of medical professionals in the treatment of cancer.

- Timely diagnosis
- Efficacious treatment

Diagnosis:

Delay in diagnosis and incapability to access treatment contribute to cancer morbidity and mortality globally. Solutions must be oriented around an extensive health system response and service assimilation, computing high-impact and economic interventions. [6] Early diagnosis promotes cancer outcomes by providing the greatest likelihood of successful treatment, at lower cost and with less complex interferences. The principles to accomplish early diagnosis are relevant at all resource levels and encompass increasing cancer consciousness and health participation; enhancing accurate clinical evaluation, pathologic diagnosis and staging; and improving access to care. These schematic investments are particularly important where discrepancies are the most profound to provide access to cancer care for all. A cancer death is a tragedy to a family and community with tremendous reverberations. By employing adequate strategies to identify cancer early, lives can be saved and the personal, societal and economic costs of cancer care can be reduced.

1. Liquid biopsy

Biopsy is what most people know about cancer diagnostic tests. A small piece of tissue from a suspicious tumour is examined to confirm the absence of cancer. If the tissue in the piece is not dividing smoothly, the cancer is diagnosed and prompt treatment is initiated to cure the disease.

The biopsy tests available to date are 'solid' biopsy tests. Liquid biopsy has recently been developed by scientists. It is a test that allows early detection of DNA markers of cancer cell lines in a blood sample from the patient. Some types of breast cancers can be detected early by this. As a result, it is also possible to avoid deaths. Scientists have made significant advances in liquid biopsy testing techniques over the past few years. They are also assuring that it is a complete alternative to future 'solid biopsy' examinations.

Efficacious treatment: [7]

1. Immunotherapy

Although the idea of immunotherapy is two centuries old, it has only recently become operational, as American physician James A. Allinan and Japanese medical expert Tasaku Hontoku have proven in their research that it is possible to eradicate cancer cells by preventing immune system responses. Immunotherapy is the treatment of the immune system to fight cancer cells. In the early 18th century, German doctors Deb Bush and Frederick Filisen proposed the theory that cancer can be cured by preparing the immune system to fight cancer. American physician William Bicoli confirmed in 1909 that the theory was correct. This process, which is now being debated in theoretical debates, has only recently begun to become another breakthrough in cancer treatment. Experts say that cancer therapy can be more easily prevented by immunotherapy than chemotherapy and radiotherapy.

2. Aris health monark robotic platform

It is the latest invention for medical professionals to treat lung cancer. The Franciscan Health Cancer Centre in Indiana Police recently developed this robotic platform with the goal of making lung cancer surgeries more efficient. This makes bronchoscopic examinations more straightforward. More specifically, it can reach cancer cells and eradicate them. Lung cancer can be the top cause of life-threatening cancers. Prominent American Pulmonologist Dr. Faisal Khan hopes that about 81 per cent of lung cancer patients die from the disease, which could potentially prevent lung cancer EDU deaths. [8]

3. Adoptive Cell Transfer Therapy [9]

Adaptive Cell Transfer Therapy is the recently evolving rapid cancer therapy. Scientists have begun research almost fifty years ago with the idea of eliminating T-cells to the point where cancer cells are located. Immune cells can be collected from the patient's body or from the body of others and genetically modified to treat the cancer cells and injected into the infected parts of the patient's body. For decades, medical professionals have been working towards putting this technique into practice. The experiments were accelerated. As part of this trial, over 350 patients with leukaemia were successfully treated in 2010. Since then, the FDA has granted grants to companies such as the American Biopharma Juno Therapeutics, which have designed various methods of therapy for adaptive cell transfers. In the first four years, this method has only just begun to cure other forms of cancer, such as cervical cancer, breast cancer, lung cancer, in the form of transfusion since 2016, limited to leukaemia.

ENCYCLOPAEDIC CANCER CONTROL

Cancer is a group of inharmonious diseases that can affect almost any part of the body and has many anatomic and molecular subtypes, each requiring specific diagnostic and management strategies. Cancer control consists of core components – prevention, early diagnosis and screening, treatment, palliative care and survivorship care – that should be inscribed in detail by a national cancer control plan (NCCP), assessed through a robust monitoring mechanism that critically includes cancer registries found on integrated, people-centred care. Cancer control [10] is a complex undertaking that is successful only when the health system has capacity and capability in all the core domains and also when investments are effectively prioritized. While considering encyclopaedic cancer control, it is important to notice that strategies vary between cancer types; consequently, the health system requirements, impact and costs vary significantly based on the particular cancer and the services offered.

PREVENTION

Most of the cancers are caused by numerous leading behavioural and environmental risks that are potentially adaptable. Now a day's consumption of tobacco became the single largest preventable cause of cancer. It accounts for up to 1.5 million cancer deaths per year.

Key strategies: -

- Implementation of WHO Framework Convention for Tobacco Control.
- Promotion of healthy diet and physical activity.
- Eradicating harmful use of alcohol by means of national alcohol policies aimed at minimising overall level of alcohol consumption.
- Diminish exposure and endorse safeguard against infectious agents accompanying with cancer, as well as vaccination against Hepatitis B Virus and Human Papilloma Virus.
- Decrease exposure and enhance defensive actions, towards carcinogens in the environment and workplace, plus ionizing and non-ionizing radiation

1. Early detection

Premature recognition and treatment can significantly reduce the deaths due to cancer. The two components of early detection include:

- ***Early diagnosis:*** It is the cognizance of early signs and symptoms so as to facilitate diagnosis and treatment before the disease turn out to be advanced.

Key strategies: Early diagnosis programmes for most frequent cancer types that provide early signs and symptoms, for instance cervical, breast and oral cancers. This strategy is predominantly applicable in low resource settings where the main stream of patients gets diagnosed in very late stages.

- ***Screening:*** It is the methodical application of a screening test [11] in a seemingly asymptomatic population. It aims to figure out individuals with an abnormality evocative of a specific cancer or pre-cancer and refer them promptly for diagnosis and treatment.

Key strategies:

Programmes for recurrent cancer types having a screening test that is lucrative, economical, tolerable and handy to the majority of the population at risk. Examples of screening methods: Visual inspection with acetic acid for cervical cancer in low resource settings, Mammography screening for breast cancer in high-income settings, PAP test for cervical cancer in middle and high income settings.

Treatment

Treatment is the series of interventions, comprising psychosocial support, surgery, radiotherapy, chemotherapy that aims for curing the disease or prolonging life significantly while strengthening the patient's quality of life.

Key strategies:

Treatment of early detectable cancers: [12] Some of the most frequent cancer types, such as breast cancer, cervical cancer, oral cancer and colorectal cancer have larger cure rates when detected early and treated as per best practice.

Treatment of other cancers even though disseminated:

Leukaemia and lymphomas in children, and testicular seminoma, have high cure rates if appropriate treatment is made available.

PALLIATIVE CARE

Palliative care [13] is a crucial humanitarian necessity worldwide for people (adults and children) with cancer and other chronic fatal diseases. It is principally needed in places where a high fraction of patients exists in advanced stages and there is little chance of cure.

Relief from physical, psychosocial and spiritual problems can accomplish over 90% of advanced cancer patients can be done with palliative care.

Key strategies: Effective public health strategies, involving community, home-based care methodologies are necessary to give pain relief and palliative care for patients and their families in low resource settings.

Enriched access to oral morphine is required for the treatment of moderate to severe cancer pain, suffered by over 80% of cancer patients in final phase.

CARE TO BE TAKEN AFTER TREATMENT OF CANCER [14-16]

Appropriate care must be taken after recovering from treatment. Patients should consult the medical practitioner once in three months during the first year. And twice in the second year, later once in a year. According to the doctors the chances of recurrence will be low if not reversed for 5 years. Beyond the first recovery there are ways to improve long-term health. The recommendations for cancer survivors are no different from the recommendations for everyone who wants to improve his/her health.

CONCLUSION

The latest advances in cancer treatment have generated a whole new outlook on how to treat cancer. Some of the earlier treatments are still valuable however they have some drawbacks. For example, surgery and radiation are efficacious but they only treat one local area of the cancer. Chemotherapy can treat cancer cells that are spread all over the body but they have awfully toxic side effects. All of these treatments are still in use today and will most probably be in use for a while although they will not be the only kind of treatments. Even though, the new therapies were originally designed to treat one type of cancer they can be modified to attack other cancers. They are called target therapies as they attack the fundamental genetic defects that may lead to cancer. Therefore, these treatments are certainly molecular based. In the past, no one treatment has been able to successfully cure a patient. Ultimately, a great deal of research will be essential in order to advance these treatments to their full prospective.

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