The Bio-Effect of Chemic al Radiation on Healthy Cells in Cancer Patients

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ABSTRACT
The biological effect of chemical radiation on healthy cells in cancer patients, as chemotherapy works to kill cancer cells that multiply and spread at the highest speed, and this is a positive thing for cancer patients, but it causes negative effects on neighboring cells and also harms normal, healthy, and healthy cells that divide quickly, such as bone marrow cells., digestive system, and hair. This results in most of the side effects of chemotherapy, such as: decreased blood cell production, inflammation of the lining of the digestive system, hair loss, a significant decrease in immunity, general lethargy in the body, and hair loss.

Keywords : cancer, radiation, patient ,chemotherapy.

INTRODUCTION
Other uses of chemotherapy include autoimmune diseases, multiple sclerosis, poly-myositis, poly-myositis, lupus erythematosus, rheumatoid arthritis, and rejection of a new organ transplant (see Immunosuppression). Newer anti-cancer drugs deal directly with abnormal proteins inside cancer cells, which is called targeted therapy.

Biological Effect of Chemical Carcinogens
Exposure to certain substances has been linked to certain types of cancer. These substances are called “carcinogens.” Cigarette smoking, for example, causes 90% of lung cancer. It also causes cancer in the larynx, head, neck, stomach, bladder, kidneys, esophagus, and pancreas. Tobacco smoke contains more than fifty known carcinogens, including nitrosamines and polycyclic aromatic hydrocarbons. So tobacco is responsible for about one in five cancer deaths worldwide and about one in three in the developed world. Lung cancer death rates in the United States have mirrored smoking patterns, with increases in smoking followed by significant increases in lung cancer death rates, and more recently declines in smoking rates since the 1950s, followed by declines in lung cancer death rates in men since 1990. In Western Europe, 10% of cancers in males and 3% of cancers in females are due to alcohol consumption, especially cancer of the liver and gastrointestinal tract. Cancer from exposure to work-related substances may cause between 2 and 20% of cases, causing at least 200,000 deaths. Cancers such as lung cancer and mesothelioma can come from inhaling smoke smoke or asbestos fibers, or leukemia from exposure to benzene.

Chemical Causes of Cancer:
There are many types of cancerous glands and cancerous cells throughout the body, including skin and skin cancers, and non-melanoma skin cancers resulting from ultraviolet rays, most of which are from sunlight. Sources of ionizing radiation include medical imaging and radon gas. Ionizing radiation is not necessarily a strong mutagen. Radiation is a more potent source of

cancer when combined with other cancer-causing agents, such as radon and tobacco smoke. Residential exposure to radon gas, for example, has similar cancer risks as passive smoking. Radiation can cause cancer in most parts of the body, in all animals and at any age. Children are twice as likely to develop radiation-induced leukemia than adults. Exposure to radiation before birth has a tenfold effect.

The medical use of ionizing radiation is a small but growing source of radiation-induced cancers. Ionizing radiation can be used to treat other cancers, but in some cases this may lead to a second form of cancer. It is also used in some types of medical imaging. Prolonged exposure to ultraviolet rays from the sun can lead to skin cancer and other malignant tumors. Clear evidence indicates that UVB, especially non-ionizing medium wave UVB, is the cause of most cases of non-melanoma skin cancer, the most common form of cancer in the world.

Chemical Effect of Food on Cancer

Many nutritional recommendations have been proposed to reduce the risk of cancer, including taking amino acids to increase immunity, as well as vitamins and immune system boosters. The evidence that supports them is not final. The primary nutritional factors that increase the risk are obesity and alcohol intake. Diets low in fruits and vegetables and high in red meat may be factors, but studies are inconclusive. Systematic studies from 2014 found no relationship between fruits and vegetables and cancer. Another study suggested that coffee is linked to a lower risk of liver cancer. Studies have linked excessive consumption of red or processed meat to an increased risk of breast cancer, colon cancer, and pancreatic cancer, a phenomenon that may be caused by the presence of carcinogenic substances in meat cooked at high temperatures. In 2015, the International Agency for Research on Cancer reported that eating processed meats (such as bacon and sausages) and, to a lesser extent, red meat was linked to some types of cancer. In general, dietary recommendations for cancer prevention usually include focusing on vegetables, fruits, whole grains, and fish, and avoiding processed and red meats (beef, pork, lamb), animal fats, pickled foods, and refined carbohydrates. An Asian study found that strategies to prevent cancer in humans include increasing the consumption of functional foods such as whole grains (brown rice, barley, and buckwheat), some vegetables (bitter melon, garlic, onions, broccoli, and cabbage) and mushrooms. In addition, some drinks (green tea, coffee) may be protective

The Effect of Chemical Drugs and Serum on Cancer

NSAIDs reduce the risk of colorectal cancer. However, due to side effects on the heart and digestive system, they cause general harm when used for prevention :

1. Aspirin was found to reduce the risk of death from cancer by about 7%. COX-2 inhibitors may reduce the rate of polyp formation in people with familial adenomatous polyposis. However, it is associated with the same negative effects as NSAIDs.
2. Daily use of tamoxifen or raloxifene reduces the risk of breast cancer in high-risk women.
3. The benefit of a 5-alpha-reductase inhibitor such as finasteride is not clear.
4. Vitamin supplements do not appear to be effective in preventing cancer. While low blood levels of vitamin D are associated with an increased risk of cancer, it is unclear whether this relationship is causal or whether vitamin D supplements are protective. A 2014 reference study found that supplements had no significant effect on cancer risk. Another 2014 review concluded that vitamin D3 may reduce the risk of death from cancer (one fewer deaths in 150 people treated over 5 years), but concerns about data quality were noted.
5. Beta-carotene supplements increase rates of lung cancer in people at high risk. Folic acid supplements are ineffective in preventing colon cancer and may increase colonic polyps.

6. Selenium supplements have not been shown to reduce the risk of cancer.
7. Vaccines have been developed that prevent infection with some cancer-causing viruses. Such as the human papillomavirus vaccine (known as Gardasil and Cervarix), which reduces the risk of cervical cancer. The hepatitis B vaccine prevents infection with the hepatitis B virus and thus reduces the risk of liver cancer. HPV and hepatitis B vaccines are recommended where resources allow

The effect of X-rays in treating cancer cells

Radiation therapy for breast cancer uses high-energy X-rays, protons, or other particles to kill cancer cells. Fast-growing cells, such as cancer cells, are more susceptible to the effects of radiotherapy than normal cells. X-rays or particles do not cause pain and cannot be seen. You will not be radiant after the treatment, so it is okay to be around other people including children.

Radiation therapy for breast cancer can be delivered through:

External radiation: The device transmits radiation from outside your body to the breast. This is the most common type of radiation therapy used for breast cancer.

Internal radiation (internal radiotherapy): After cancer surgery, your doctor temporarily places a device to deliver radiation in your breast to the area that used to have cancer. It places a radioactive source inside the device for short periods of time during treatment.

Radiation therapy can be used to treat almost all stages of breast cancer. Radiation therapy is an effective way to reduce the chances of breast cancer recurring after surgery. It is also commonly used to relieve symptoms caused by cancer that has spread to other parts of the body (metastatic breast cancer).

Modern Techniques in Treating Cancer as Chemically Approach

The mechanics of radiation machines and new treatment techniques create extremely precise shaping of the target that receives the prescribed dose of radiation, such as three-dimensional conformal radiation therapy, intensity-modulated radiation therapy, and image-guided radiation therapy. These techniques allow radiotherapy to deliver a lower dose of radiation to healthy tissue and a higher dose to the tumor. Patients receiving radiation therapy do not experience any physical sensations during radiation exposure; It is very similar to exposure to X-rays. However, side effects do occur. In rapidly dividing tissues, such as the mucosa and skin, the initial reactions resemble “sunburn,” while in slowly dividing cells, for example those in the kidneys or blood vessels that support the brain and spinal cord, tolerance to radiation is reduced. If these cells are treated above a certain threshold, they are at risk of developing late effects that usually become apparent many months after treatment.

Chemical Effect of Ionizing Rays on Cancer Cells

We concluded from studying the changes that occur to the cell if it is exposed to ionizing radiation that ionization is basically a state of instability for the atom - which is the basis of the material medium - which in this case has lost one or more electrons to move from a state of moderation (charge is almost non-existent) to a state of ionization, i.e. Possessing a positive charge (this positive charge came from the atom losing one or more electrons) and the greater the atom’s loss of electrons, the greater its positive charge. The ionizing beam injects energy into the material as it penetrates it, like a microscopic bullet, until it is completely absorbed by the material and stops. Radiation breaks down the molecular bonds of matter in its path and changes the structure of matter. If the material is made up of long molecular chains, these

chains will be broken by radiation and new random bonds will form. In other words, radiation cuts long molecules in multiple places - like a welding spark - and reconnects them in various other ways. Living cells are generally composed of long chains of proteins, and some of these molecules can be broken down by exposure of the cell to radiation.

The broken pieces of molecules can reconnect with each other in different ways and the result is a new molecule. This new molecule cannot do the job of the original molecule, so it needs to repair itself. In other words, this defect in the molecular structures will accumulate in the cell. If this defect is in the DNA molecule, this will lead to changes in the metabolic processes in the cell. This can result in the formation of a cancer cell. Cells certainly have specific techniques they use to repair such dangers.

Evolution in the cells of living organisms enables them to scrutinize their molecules one by one, and they prefer to rebuild these destroyed molecules rather than repair them. In any case, the cell's ability to repair is limited. If this limit is exceeded, damaged molecules will begin to accumulate in the cell and will affect the remaining vital functions of the cell. Ionizing radiation can cause: breakage, stretching, adhesion or twisting of chromosomes. Broken chromosomes can reorganize, remain intact, or blend with other chromosomes. All of these events eventually lead to mutations or permanent cell death. Although all molecules can be destroyed by radiation, most of the targets of DNA molecules, which carry genetic information about cell division, are to grow again. Radiation can destroy or change a small part of the DNA molecule (one gene, for example) and can break one of several places in the helical shape of the DNA. The resulting damage can be repaired in most cases, but cell death or transformation can be seen in a few cases, and this transformation causes cancer. Dead cells are naturally eliminated by the organism. In any case, if the number of dead cells exceeds the maximum, this will lead to a disruption in the proper functions of the organism and may lead to death. Radiation can directly or indirectly affect DNA -molecules.

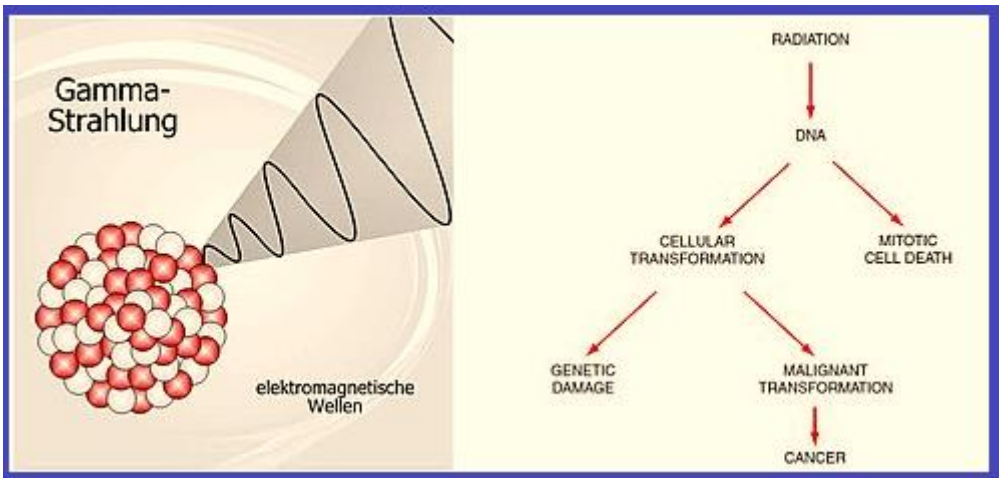

Fig. 1: Chemical Effect of Ionizing Rays on Cancer Cells

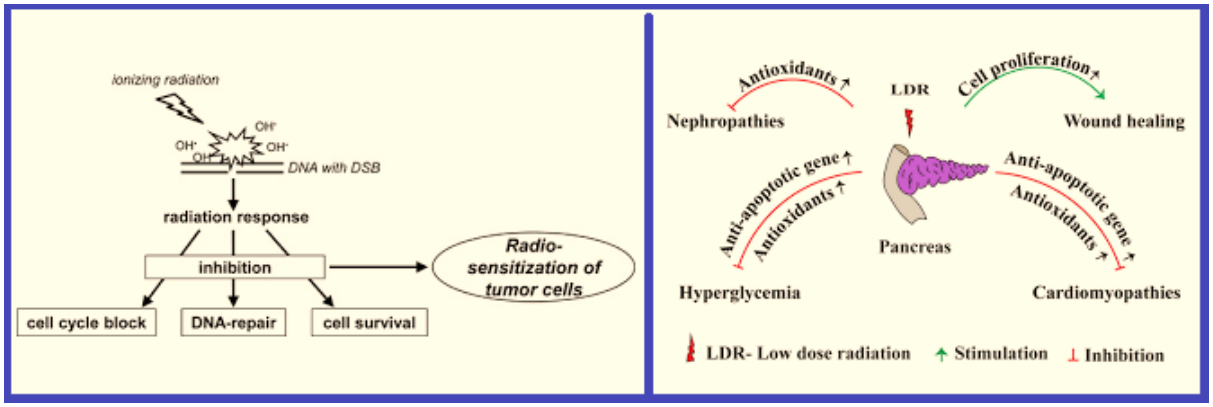

Fig. 2: Dose Effect of Ionizing Rays on Cancer Cells in Treatment

The direct beam affects DNA- molecules in the target tissue. The direct ionization of atoms in DNA molecules is the result of the absorption of energy through Compton interactions and the photoelectric effect. If the absorbed energy is sufficient to remove electrons from the molecule, the bonds will be broken, which subsequently leads to the breakage of one or both strands of DNA. The breakdown of one single strand can usually be repaired by the cell, while the breakdown of both strands generally results in a dead cell. One-quarter to one-third of the damage to large cellular molecules caused by radiation is by direct action. This means that most of the damage is due to the indirect effect of the rays.

Chemical Treatment of Cancer via Proton Radiation

Proton therapy is a type of radiation therapy used to treat cancer and malignant tumors. Fast protons are produced in a cyclotron or synchronous accelerator device and then directed to the tumor to kill cancer cells. This method is applied in particular to patients for whom X-rays are not sufficient to treat due to the depth of the tumor in the body or due to the sensitivity of an organ such as the brain. Proton therapy allows the concentration of the dose of protons entering the body, so that other body tissues are not damaged. Rapid proton therapy is one of the most widely used rapid particle therapy methods. There are also methods for treatment with heavy ions, such as carbon ions. Some patients may experience tumor lysis syndrome in case of large tumors such as large lymphomas. This is due to the rapid collapse of malignant cells. Although patients with large tumors are given preventative measures, this is a serious side effect that can cause death if left untreated. Less common side effects include pain, skin redness (erythema), dry skin, nail damage, dry mouth, water retention, and impotence. Some medications may cause allergies. Some patients reported feeling tired or experiencing non-specific neurological problems, such as an inability to concentrate; It is sometimes called cognitive impairment after the end of chemotherapy. Some patients also call it “chemo brain.”

Certain chemicals are associated with organ toxicity, such as: cardiovascular disease (doxorubicin), interstitial lung disease (bleomycin) and secondary tumors.

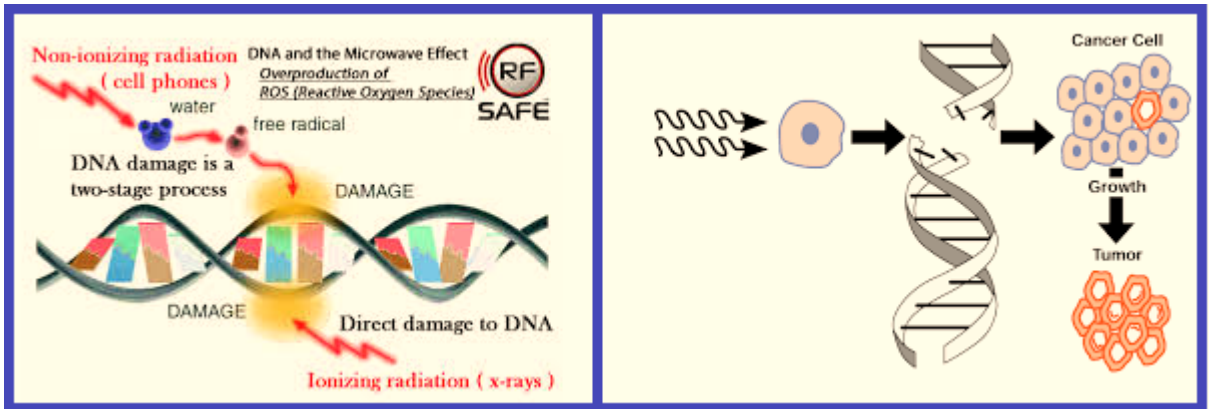

Fig. 3: Effect of Radiation on DNA- Molecule

CONCLUSION

Modern technology allows significant spatial sparing of vital organs. Radiobiological research is another important tool because it helps choose the best treatment plans. A comprehensive quality assurance program should be developed.

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