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Cancer Risk Factors Survey on the Development and Spread of the Disease, Early Diagnosis, and Detection with Better Chance of Recovery: A Review Article

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ABSTRACT

It is important to answer some questions about cancer disease. What is cancer? How does that happen? What can we do to prevent it? How is it diagnosed and treated? For the purpose of early treatment, it should be accompanied by the presence of awareness among people, which is the first step we can do. Then if it diagnosed, it should be monitored and treated as much as we can. Later, if the disease continues to progress and becomes uncontrolled, unfortunately will lead to premature death. Therefore, this disease is important to discover in an early stage because it can spread so fast and also it can arise at anywhere in the body and affect people in any age groups, socioeconomic classes and ethnicity.

A review Article Problem: Early detection of cancer often results in a better chance of cure. With this in mind, speaking with your doctor as soon as possible may be appropriate, and screening tests can save lives by detecting cancer early.

A review Article Objective: This article attempts to shed light on some changes that are not evident and do not raise the possibility of a specific type of cancer, as well as to direct clinicians to perform the necessary clinical examinations and laboratory testing to rule out or confirm a diagnosis. Physicians led to a certain type of cancer or its symptoms, although some other symptoms are more apparent and precise.

The method of the article: It is to rely on an analytical approach by reviewing sources, conducting research, collecting relevant information, international reports, and approved statistics to provide important recommendations and proposals for cancer diagnosis, and it includes a number of criteria such as the size of the cancer and whether it has spread to neighboring tissues or beyond, such as lymph nodes or other organs.

KEYWORDS: Cancer risk factors, Development and spread of disease, Diagnosis, Paraneoplastic syndrome

ARTICLE DETAILS

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1- INTRODUCTION

Cancer is an abnormal cell development that usually begins with a single aberrant cell. As a result of the lack of regular regulatory mechanisms, cells reproduce indefinitely. They infect nearby tissues and spread to other parts of the body, promoting the formation of new blood vessels from which cancer cells obtain nourishment (Singer, 2009). Tumor cells Malignant illness can originate in any tissue of the body. When cancer cells proliferate and multiply, they create a tumor, which invades and destroys neighboring normal tissue. A tumor is an abnormal growth or mass. Tumors can be malignant or benign. Cancer cells, in the form of a malignant tumor, can migrate from their original sites to other sections of the body (López, *et al*. 2003).

Blood tissues, hematopoietic tissues, leukemias, lymphomas, and solid tumors (a solid mass of cells) are all types of malignant neoplastic tissues. There are two forms of solid malignant tumors: carcinomas and sarcomas. Cancers can be classed according to their organ of origin. Where they first develop and the type of cell in which they appear - for example, squamous

cell carcinoma of the skin - are important factors (Ruggieri, *et al.* 2009).

Leukemias and lymphomas damage the blood, the tissues that produce blood, and immune system cells. Blood malignancies develop in blood-producing cells and cause an increase in the generation of normal blood cells in the bone marrow. Lymphoma cancer cells enlarge lymph nodes, resulting in huge lumps. Armpit, upper thigh, abdomen, and chest. Carcinoids are tumors that affect the cells lining the skin, lungs, digestive system, and internal organs. Skin, breast, colon, stomach, breast, prostate, and thyroid cancers are examples of cancers. Cancerous tumors arise more frequently in older adults than in younger people. Sarcomas are tumors that affect the mesoderm cells. Mesoderm cells are responsible for the formation of muscles, blood vessels, bones, and connective tissue. Sarcomas include leiomyosarcoma (cancer of the smooth muscle in the digestive tract wall) and osteosarcoma (bone cancer). Sarcoma strikes younger people more frequently than elderly persons (Li and Siegal, 2010).

1-1 Terminology for cancer

Within the context of this form of immunodeficiency, the following phrases are frequently used (Vanderschueren *et al.*, 2002). Aggressiveness is defined as the rate or speed with which the tumor grows and spreads. Non-cancerous tumors are called benign tumors. As a result, benign tumors do not infiltrate surrounding tissues or spread to distant locations via the circulation and lymphatic system (metastases). A benign tumor, on the other hand, may continue to develop and cause issues when it presses on neighboring tissue. The most harmful and widespread carcinogen is a substance that causes cancer.

Carcinoma *in situ* refers to cancer cells that have not yet infiltrated surrounding normal tissue or spread to other parts of the body.

The treatment goal is to completely remove the cancer and prevent it from recurring. Differentiation is the process by which cancer cells mature, stop growing, and develop normal biological functions, no longer resembling primitive cells that multiply rapidly. The degree to which cancer cells appear aberrant when inspected under a microscope. As the cells become more abnormal, the cancer becomes more aggressive. Cancer's ability to invade, spread, and kill surrounding tissue, malignant: The complex process by which normal cells turn into cancer cells, which permits them to infiltrate surrounding tissues and spread to other parts of the body. Cancer metastases are cancerous tumors that have migrated to a completely new region, while tumors are a broad word for any tumor, cancerous or noncancerous. Recurrence refers to the return of cancer cells after therapy, either at their primary location or with metastases, whereas recovery refers to the lack of any clear evidence of cancer following treatment, even if it still present in the body, as well as the amount to which the cancer has spread in the body. The body and survival rate are the percentage of patients who survive therapy in a certain time period. The five-year survival rate, for example, is the percentage of persons who live that long.

A tumor is an abnormal growth or mass, which is made up of a group of cells that form an aberrant mass of tissue. When a tumor is diagnosed, its benign or malignant nature is decided. Although benign tumors can be uncomfortable and even dangerous, they do not represent the same hazard as malignant tumors. Many genetic and environmental variables contribute to cancer risk. Cancer does not necessarily occur in all people who have been exposed to carcinogens or other risk factors, even if their family history indicates a high risk of acquiring cancer. Sometimes the elevated risk is caused by a single gene, and other times it is caused by numerous genes interacting with one another. Environmental variables that impact everyone in the family may alter this genetic connection and contribute to cancer (Vanderschueren, *et al.* 2002; Hoffmann, *et al.* 2010).

1-2 Genes and chromosomes

A chromosome that is extra or abnormal may raise the risk of developing the disease. People with the most prevalent form of Down syndrome, for example, have three copies of chromosome 21 rather than two, which increases the risk of acute leukemia by 12 to 20 times while decreasing the risk of other cancers. Cancer is caused by abnormalities (mutations) in critical genes. These genes encode proteins that regulate growth, cell division, and other basic cellular functions (Chamier, *et al.* 2010). Cancer-causing genetic changes are caused by the damaging effects of chemicals, sunshine, drugs, viruses, and other environmental factors. The following genetic disorders that cause cancer are inherited in some families:

Oncogenes: Tumor suppressor genes are altered or amplified variants of genes whose usual role is to inhibit cell proliferation. Among these cancers are HER2, which causes breast cancer, and EGFR, which causes some types of lung cancer. Some oncogenes can cause unregulated cell division, which can lead to cancer. The mechanism of transforming normal genes into malignant genes via mutations is yet unknown, however there are some factors that contribute to its development, such as X-ray imaging and sunshine. Toxins found in the workplace, the air, or in chemicals, such as toxins contained in tobacco smoke, and infectious agents such as certain viruses. Normally, tumor suppressor genes prevent cancer by encoding proteins that repair damaged DNA or restrict the proliferation of cancer cells, when a flaw in the DNA occurs, it disrupts the function of tumor suppressor genes, allowing the afflicted cells to divide and multiply indefinitely. Mutations in tumor suppressor genes acquired from one parent may account for a portion of breast cancer cases. They frequently arise at a young age and affect more than one family member (Geirnaerdt, *et al.* 1997).

The age: Wilms tumor, retinoblastoma, and neuroblastoma are malignancies that primarily afflict children. Cancers caused by suppressor gene mutations can be inherited or originate in utero. However, the vast majority of cancers are preventable. Adults, particularly the elderly, are more likely to get other malignancies. According to American statistics, more than 60% of cancers occur in persons over the age of 65. Cancer incidence

rises with age due to increased and sustained exposure to toxins and a weakened immune system.

Environmental factors: Many environmental variables contribute to an increased risk of cancer. Tobacco smoke contains several carcinogens, which increase the risk of cancer in the lungs, mouth, throat, esophagus, kidneys, and bladder substantially. Water and air pollution, such as asbestos, industrial waste, and cigarette smoke, raises the risk of cancer. Many chemicals are known to cause cancer, and many more are suspected of doing so as well. Asbestos, for example, can cause lung cancer and epithelial tumors. Moderate (pleural cancer) pesticide exposure is linked to an elevated risk of some malignancies (e.g., leukemia and non-Hodgkin lymphoma). The time lag between chemical exposure and cancer development can be many years. Radiation is a cancer risk factor. Skin cancer is caused by long-term exposure to UV radiation, primarily from sunshine. Ionizing radiation can cause cancer. X-ray imaging (including computed tomography) employs ionizing radiation. People who get a lot of tests have a slightly higher risk of cancer (Gelderblom, *et al.* 2008).

Exposure to the radioactive gas radon, which is emitted by the soil, raises the risk of developing lung cancer. Radon gas normally spreads swiftly through the atmosphere without causing any harm. However, when a building is built on radon-rich soil, radon gas can concentrate inside, causing levels in the air to grow to levels dangerous to building occupants. Radon gas is inhaled and may cause lung cancer. Smokers who are exposed to this gas are more likely to get lung cancer. Other compounds causing cancer have been explored by researchers, but more research is needed to make certain conclusions (Balke, *et al.* 2009).

Geographical location: Cancer risk varies by location, and the causes for these variances are frequently complex and poorly understood. Geographic heterogeneity in cancer risk is caused by a mix of genetic, nutritional, and environmental variables. For example, while the incidence of colon and breast cancer is low in Japan, when Japanese people relocate to the United States, their risk of colon and breast cancer rises to match that of the rest of the US population. In Japan, however, the prevalence of stomach cancer is extremely high. People who relocate from Japan to the United States had a lower incidence of stomach cancer, maybe due to a change in diet (Chamier, *et al.* 2010).

Diet: Dietary nutrients can raise the risk of developing cancer. A high-trans-fat diet, for example, as well as obesity, are linked to an increased risk of colon cancer, breast cancer, and probably prostate cancer. People who drink a lot of alcohol are more likely to get liver cancer, brain and neck cancer, and esophageal cancer. A diet high in smoked and pickled foods, as well as grilled meats, increases the chance of developing stomach cancer. Overweight and obese people are more likely to develop breast and endometrial cancers, as well as colon, kidney, and esophageal cancers.

Medicines and medical treatments: Some medications and medical procedures have been linked to an increased risk of cancer. For example, estrogen in oral contraceptives may marginally raise the risk of breast cancer in women who use them now or have used them in the last few years. They may be recommended to postmenopausal women hormonal therapy with a minor risk of breast cancer due to the hormones: estrogen and progestin (Ruggieri, *et al.* 2009).

Diethylstilbestrol (DES) It raises the risk of breast cancer in women who use it, as well as in their daughters who were exposed to its effects during the embryonic period. Diethylstilbestrol also raises the incidence of cervical and vaginal cancer in daughters of drug users. Tamoxifen (a breast cancer treatment) is increased. Endometrial carcinoma (cancer of the uterine lining) is more likely. Long-term usage of testosterone, danazol, or other male hormones (androgens) may increase the risk of liver cancer by a small amount. The combination of cancer chemotherapeutic medications (alkylating agents) and radiation therapy can raise the chance of cancer returning after a period of time (Puri, *et al.* 2014).

1-3 Some carcinogenic factors

Infection: There are various viruses known to cause cancer. HPV causes genital warts as well as cervical and vulvar cancer in women, as well as penile and anal cancer in women. Some kinds of mouth and throat cancer are also caused by HPV. Hepatitis B or C can result in liver cancer. Some viruses, such as HIV, are responsible for lymphomas and other types of blood malignancies. In Africa, for example, Epstein-Barr virus produces Burkitt's lymphoma, but in China, nasopharyngeal carcinoma is caused by bacteria (Kim *et al.* 2013). Helicobacter pylori, the causative agent of stomach ulcers, raises the risk of stomach cancer and lymphoma, and some parasites can cause cancer. Infection with Schistosoma haematobium can result in persistent inflammation and scarring of the bladder and bile duct.

Inflammatory disorders: Cancer risk is increased by inflammatory illnesses. These conditions include ulcerative colitis and Crohn's disease, both of which can lead to colon and bile duct cancer.

1-4 Development and spread of cancer

The intricate process by which normal cells grow into cancer cells is known as malignant transformation. This process has three stages: emergence, promotion, and spread.

Emergence: Pathogenesis is the initial stage of cancer formation in which cells' original genetic material alters (mutates) to become cancer cells. A change in a cell's genetic material might arise spontaneously, as a result of a genetic mutation, or as a result of external exposure to a carcinogen. Many chemicals, tobacco, viruses, radiation, and sunlight are all carcinogens. Cells' sensitivity to carcinogens, on the other hand, varies, not everyone who is exposed to a carcinogen gets cancer. Many factors influence the risk, including the quantity of exposure to

the carcinogen and if the person has a hereditary susceptibility (Han, *et al.* 2010).

Reinforcement: Cancer progression is the second and last stage. Triggers can include environmental factors or prescriptions such as sex hormones (such as testosterone, which is recommended to boost sexual desire and ability in older men). Carcinogens and enhancers do not, by themselves, cause cancer. Instead, enhancers allow already-developing cells to become malignant. Boosters have no effect on undeveloped cells. Some carcinogens are potent enough on their own to cause cancer. Ionizing radiation, such as that utilized in CT scans and produced by nuclear power plants and atomic bomb blasts, has been linked to a variety of cancers, including leukemia, thyroid cancer, breast cancer, and sarcoma (Zeifang, *et al.* 2004).

Spread: Cancer can invade local tissues or spread to distant tissues and organs. Cancer has the potential to spread via the lymphatic system. This form of spread is common in cancers. Breast cancer, for example, typically spreads initially to lymph nodes around the armpit. It then spreads to further away locations (Campanacci and Capanna, 1991).

1-5 Defenses against cancer

When a cell develops cancer, the immune system is frequently able to recognize it and destroy it before it can reproduce or spread. Cancer cells may be completely eliminated, and cancer does not appear in this case, but the risk of developing some types of cancer increases when the immune system changes or weakens, as in people with AIDS, people who take immune-suppressing medications, people suffering from autoimmune disorders, and the elderly, whose immune systems are less efficient than younger people. Skin cancer, kidney cancer, and lymphoma are the most prevalent cancers associated with a compromised immune system. Doctors are unsure why some other types of cancer, such as lung and breast cancer (Hillmann, *et al.* 2003).

Tumor antigens: An antigen is a foreign substance that the body's immune system identifies and targets. Antigens can be found on the surfaces of all cells, although the immune system rarely interacts with the person's own cells. Antigens emerge on the cell's surface when it becomes malignant. The immune system may detect these additional antigens, known as tumor antigens, and consume or destroy cancer cells. This is the technique by which the body kills aberrant cells, including cancer cells before they form a tumor. However, even when completely functional, the immune system may not always be able to eradicate all cancer cells. When cancer cells proliferate and produce a big mass of cancer cells, Tumor antigens have been identified in a variety of cancers, including melanoma, breast cancer, ovarian cancer, and liver cancer. Vaccines created from tumor antigens are being used to treat prostate cancer, and they may potentially be able to prevent or treat other types of cancer by boosting the immune system. Such vaccines are a very significant field of study. Blood testing can detect certain tumor antigens. These antigens are commonly referred to as tumor markers. Measuring the levels of certain of these tumor markers can help determine how well people are responding to treatment.

Immune checkpoints: Cancer can evade diagnosis even when the immune system is operating normally. The surface of normal cells carries proteins that notify circulating immune cells (T cells) that the cell carrying it is normal and should not be attacked, which is one reason why the immune system does not normally attack normal cells. These are known as checkpoint proteins. Cancer cells can sometimes develop the ability to manufacture one or more of these checkpoint proteins, allowing them to avoid attack. Checkpoint inhibitors, a newer type of cancer medicine, can block the signal, allowing the immune system to fight the malignancy.

1-6 Warning signs of cancer

Cancer can generate a variety of symptoms, some of which are mild while others are evident. Some symptoms, such as the existence of a painless lump in the breast, emerge at an early stage of cancer and are regarded vital warning indicators that necessitate a visit to the doctor for evaluation. Other symptoms, such as fever and weight loss, do not develop until the disease has spread and its functions are altered. Cancer can also be detected in the intestines, with the presence of blood in the stool and difficulties swallowing (Yuen *et al.* 2003). Because cancer is more treatable in its early stages than in later stages, it is critical to diagnose it early. Some symptoms are an early warning sign of cancer, and the person should be encouraged to seek medical attention. Fortunately, the majority of these symptoms are caused by minor ailments. Any cancer warning sign, however, should not be ignored. Some warning signals are broad, which means that some changes are not evident and do not lead to the suspicion of a specific form of cancer. The occurrence of these alterations, on the other hand, can prompt clinicians to do the required clinical examinations and laboratory tests to rule out or confirm the diagnosis, other symptoms, on the other hand, are more clear and precise, alerting doctors to a certain type or region of cancer (Ayvaz, *et al.* 2014). Possible warning signs of cancer include: Unexplained weight loss, fatigue, night sweats, loss of appetite, new and chronic discomfort, vision or hearing issues, frequent nausea or vomiting, blood in the urine, blood in the stool (either visible or detected by special tests) Recent changes in bowel habits (constipation or diarrhea), abnormal vaginal bleeding, especially after menopause, recurring fever, chronic cough, changes in the size or color of a skin mole, or changes in a cancer-resistant skin ulcer. Treatment for a skin growth or mark that grows or changes in appearance, a sore that does not heal, and swollen lymph nodes.

1-7 Cancer screening

Screening tests are used to determine the presence of a disease before symptoms develop. Screening tests are frequently inconclusive, and the results are confirmed or ruled out with other examinations and tests. Before deciding to do a screening

test, doctors consider criteria such as age, gender, family history, past medical history, and lifestyle. In this context, the Cancer Society supplies the widely used American Cancer Screening Guidelines. Other organizations have also created their own policies. Recommendations and guidelines may differ between civilizations, depending on their experts' evaluation of the strength and value of existing scientific data. Although screening tests can help save someone's life, they can sometimes produce erroneous results (Wafa, *et al.* 2014):

False positive results indicate the presence of cancer but are not the same as false negative results, which show no sign of cancer despite the fact that it is there. False positive results might create significant psychological stress and necessitate more costly or intrusive procedures. False negative findings might give a person a false sense of security that they have cancer. Because of these factors, just a few tests exist, and the tests are reliable enough for clinicians to employ on a regular basis. To identify cervical cancer in women, the Papanicolaou (Pap) smear and tests for high-risk subtypes of human papilloma virus (HPV) are employed, as is imaging. Mammography is one of the most popular screening tests for breast cancer, and both have been successful in lowering death rates from the disease (Sys, *et al.* 2002).

In men, measuring prostate-specific antigen (PSA) Its levels in the blood are used to detect prostate cancer. PSA values are frequently raised in afflicted individuals, but they may also be elevated in men who have benign non-cancerous enlargement. As a result, the biggest downside of utilizing the PSA test as a screening test is the high frequency of false positive results, which usually necessitate more invasive tests, such as a prostate biopsy, to confirm them. Doctors are now aware that not all prostate tumors diagnosed by biopsy are dangerous. Although different medical communities have varied views, it has not been determined if PSA testing should be used routinely to screen for prostate cancer. Men, on the other hand, should talk to their doctor about PSA testing because numerous tests can be used to identify colon cancer. People should consult their doctor about the test they intend to use. A popular screening test for colon cancer involves looking for blood in the stool that cannot be seen with the naked eye (occult blood). The presence of occult blood in the stool indicates that there is a problem somewhere in the digestive tract. Cancer may be the origin of the problem, but there are numerous other possibilities, including ulcers, hemorrhoids, diverticula (small spaces in the colon wall), and aberrant blood vessels in the intestinal walls, all of which can cause leaking. There is some blood in the feces. Furthermore, taking aspirin, another nonsteroidal anti-inflammatory medicine (NSAID), or even eating red meat may result in transitory positive test findings. Another test is performed to detect the presence of acid. The source of colon cancer is abnormal nuclear DNA in the feces. Outpatient clinic tests for colon cancer include sigmoidoscopy, colonoscopy, and a form of computed tomography of the colon (CT colonography) (Yuen, *et al.* 2005).

Lung cancer screening with pulmonary CT is offered for patients who smoke or have smoked in the previous 15 years. You should talk to your doctor about the benefits and dangers of lung cancer screening. A routine self-examination to check for indications of cancer is occasionally advised. With the exception of testicular cancer, home screening using self-exams has not been proved to be useful in identifying cancer; therefore, even if people perform home examinations, it is equally crucial to follow screening test recommendations. Some screening tests may be carried out. It is possible to check for blood in the stool at home by placing a little sample of stool on a particular card and shipping it to a laboratory for processing. Tumor markers are chemicals produced into the bloodstream by some cancers. Initially, it was considered that assessing the amounts of these markers was an ideal technique to screen people who did not have cancer symptoms. However, tumor markers have been found to be present (to varying degrees) in the blood of persons who do not have cancer. hence, identifying tumor markers in a person's blood does not always imply that he has cancer, and hence their role in cancer screening is quite restricted (Chamier, *et al.* 2010).

1-8 Cancer symptoms

Cancer, as a small mass of cells, causes no symptoms at first, but as it grows and expands in size, its presence may impair neighboring tissue (see also Warning indications of cancer). Some tumors produce chemicals or cause immune responses that cause symptoms in areas of the body other than the malignancy (paraneoplastic syndromes). An unexpected result of a laboratory test performed for another purpose, such as the finding of anemia caused by colon cancer after a regular check of the blood cell count, can sometimes be the first indicator of infection. Cancer irritates or compresses adjacent tissue by growing into or pressing on it. Normally, this inflammation causes pain. Compression can impair tissue's ability to execute its regular functions. Bladder cancer or a malignant lymph node, for example, may result in pressure on the ureter, which connects the kidney to the bladder, in the belly, impeding urine flow. Lung cancer can impede airflow in one area of the lung, resulting in partial atelectasis and an increased risk of infection (Ayvaz, *et al.* 2014).

Cancer growth in a broad area, such as the wall of the large intestine or the lung cavity, may not cause symptoms until it becomes quite large. In contrast, cancer growth in a narrow location, such as the vocal cords, can cause symptoms (such as hoarseness) even when it is minor. If the cancer has spread (metastasized) to other sections of the body, the same local consequences of irritation and pressure occur but in a different location, thus symptoms may be extremely different. Cancers that damage the membrane covering the lungs (pleura) or the membrane covering the heart (pericardium) can cause fluid to build around these organs. Large fluid accumulations can impair breathing or blood flow by the heart (Geirnaerdt, *et al.* 1997).

Some complications of cancer include according (Kim, *et al.* 2012) :

The pain: Many cancers are initially painless, yet pain may be an early indicator of other cancers, such as brain tumors, which cause headaches, and cancers of the head, neck, and esophagus, which cause swallowing discomfort. They are frequently the earliest indications of cancer as it progresses. Mild at first, then gradually worsening until it reaches extreme agony as the cancer spreads. Pain might be caused by malignant pressure or degradation of nerves or other anatomical tissues. However, not all cancers induce excruciating agony. Similarly, the absence of discomfort does not imply that the cancer is not growing or spreading (Gelderblom, *et al.* 2008).

Bleeding: Because the cancer's blood arteries are frail, it may bleed mildly at first. malignancy cells may later develop into a nearby blood artery and cause bleeding when the malignancy grows and invades surrounding tissue. The bleeding could be minimal and unnoticed, or it could be apparent only with testing. This is common in the early stages of colon cancer. In late stages of cancer, bleeding may be more significant and life-threatening. As a result of any malignancy in the digestive tract, blood may occur in the stool. The same is true for urine, as blood might emerge as a result of any cancer in the urinary tract. Other forms of cancer may induce bleeding in internal organs. Coughing up blood might be caused by bleeding inside the lung (Kim, *et al.* 2012).

Blood clots: Certain malignancies release chemicals that promote clot formation, particularly in the veins of the legs (deep vein thrombosis). Blood clots in the legs can sometimes break off and move to the lungs, where they might cause mortality (pulmonary embolism). Excessive clotting is common in persons suffering from pancreatic cancer, lung cancer, various solid tumors, and brain tumors.

Weight loss and fatigue: Cancer patients typically experience weight loss and exhaustion, which may worsen as the disease advances. Some people lose weight while having a strong appetite. Other patients may experience a loss of appetite, nausea with eating, or difficulty swallowing. The patient could become extremely skinny. People with advanced cancer may experience significant weariness. When anemia arises, the person may feel weary and short of breath when performing any activity, no matter how light (Sys, *et al.* 2002).

Swollen lymph nodes: When cancer spreads throughout the body, it may first affect adjacent lymph nodes, which swell. Lymph nodes that are swollen are normally painless and can be solid or rubbery. The nodes may move freely, and if the malignancy is progressed, they may adhere to surrounding tissue or to one another.

Neuromuscular symptoms: Cancer can develop or press on nerves or the spinal cord, causing a variety of neuromuscular symptoms such as pain, weakness, or a change in feeling such as tingling, when cancer spreads to the brain, symptoms such as confusion, dizziness, headache, nausea, vision abnormalities, and seizures may occur. Neurological symptoms may also be present in paraneoplastic syndrome.

Respiratory symptoms: Cancer can compress or restrict the airways in the lungs, resulting in shortness of breath, coughing, or pneumonia. Shortness of breath can also develop when cancer creates massive pleural effusions, pulmonary hemorrhage, or anemia (López, *et al.* 2003)

1-9 Cancer diagnosis

Cancer is suspected based on a person's symptoms, clinical examination results, and sometimes screening test results (also known as diagnostic testing). The stage of cancer is determined when it is diagnosed. Cancer staging describes how far the cancer has progressed and covers a number of parameters such as the size of the disease and whether it has spread to surrounding or distant tissues such as lymph nodes or other organs include according to Liand Siegal, 2010 :

Imaging tests: When a doctor suspects cancer, he or she will usually request some form of imaging, such as an X-ray, ultrasonography, or CT scan. A person with a chronic cough and weight loss, for example, may request a chest X-ray. People who experience regular headaches and vision issues may require a CT scan or an MRI of the brain. Although these tests may reveal the presence of an abnormal mass, as well as its location and size, they are insufficient to demonstrate that the symptoms are caused by cancer.

Biopsy: Cancer is confirmed by taking a sample of the tumor via needle biopsy or surgery and then determining the presence of cancer cells in that sample via microscopic examination of samples from the suspected cancerous location. A tissue sample is typically used for evaluation. A biopsy is the process of obtaining a tissue sample. Biopsies can be performed by using a scalpel to remove a small piece of tissue, but the most usual method is to acquire the sample using a hollow needle. Ultrasound or CT X-rays are frequently used by doctors to guide the needle to the correct site. Because biopsies can be uncomfortable, a local anesthetic is frequently used to numb the area.

Tumor markers: If scan or imaging test results indicate the existence of cancer, monitoring blood levels of tumor markers (substances that some tumors leak into the circulation) may provide additional evidence to confirm or deny a cancer diagnosis. Tumor markers can be useful in evaluating therapy success and detecting cancer recurrence in some forms of cancer. Tumor marker levels fall after therapy and rise if the cancer returns. Some tumor markers cannot be tested in the blood, but they can be discovered in cancer cells. Histological analysis of a tumor biopsy can reveal these symptoms. Tumor markers such as HER2 and AGFR are detected in cancer cells.

Determine the stage of cancer: Staging tests assist evaluate the degree of cancer after it has been discovered, including its

location, size, growth in adjacent structures, and dissemination to other parts of the body. During cancer staging tests, patients may feel worried and irritable. stage, and you want to begin therapy right away. Identifying the stage, on the other hand, allows clinicians to select the most appropriate treatment and anticipate the trajectory of the disease. Imaging procedures, including as X-rays, CT scans, MRIs, bone scans, or positron emission tomography (PET), may be required for staging. The type of cancer influences the choice of staging test (s). CT scans are used to detect cancer in many different sections of the body, including the brain, lungs, and several organs in the abdomen, such as the adrenal glands, lymph nodes, liver, and spleen. Magnetic resonance imaging is especially useful in detecting brain, bone, and spinal cord malignancies. Biopsies are frequently required to confirm the presence of a tumor and assess its stage, and they may be performed in combination with the cancer's initial surgical treatment. For instance, during a laparotomy to remove colon cancer, the surgeon may take adjacent lymph nodes to screen for cancer spread. During breast cancer surgery, the surgeon biopsies or removes one of the lymph nodes in the first armpit, often known as the sentinel lymph node, to see if breast cancer has spread there. Evidence, in addition to original tumor features, aids in determining whether additional treatments are required. Clinical stage refers to staging that is primarily based on the results of the initial biopsy, physical examination, and radiograph. Pathological stage is used when the clinician depends on the outcomes of a surgical treatment or further biopsies, the clinical stage of a tumor may differ from the pathological or surgical stage. In addition to imaging studies, doctors frequently conduct blood tests to determine whether the cancer has spread to the liver, bones, or kidneys.

Determine the grade of cancer: Grading is a measure of how quickly a cancer grows or spreads aggressively; identifying the grade of a cancer can assist doctors assess the prognosis. The grade is established by evaluating the tissue sample obtained by biopsy, the grade is determined by how aberrant the cancer cells seem under scrutiny more aberrant the appearance under the microscope.

1-10 Paraneoplastic syndromes

When cancer generates atypical symptoms due to chemicals circulating in the bloodstream, paraneoplastic syndromes develop. These molecules can be tumor hormones or immune system antibodies, impacting the functions of many tissues and organs and generating symptoms in specific locations. away from the tumor. Many different organs and systems of the body can be affected by paraneoplastic syndromes, including the neurological system and the endocrine (hormonal) system, resulting in symptoms such as nerve system alterations, low blood sugar, diarrhea, or high blood sugar levels. (Hoffman *et al.*, 2010) Blood pressure. Around 20% of cancer patients are at risk of acquiring paraneoplastic syndrome. The following are the most common kinds of cancer associated with paraneoplastic syndrome: Lung cancer is the most frequent type of cancer, followed by kidney cancer, liver cancer, leukemia, lymphoma, breast cancer, ovarian cancer, brain cancer, stomach cancer, and pancreas cancer. Testing for the chemical circulating in the circulation that causes paraneoplastic illness is frequently used to make the diagnosis. The first step in treating paraneoplastic syndrome is to treat the symptoms. Finally, the best strategy to control paraneoplastic syndrome is to treat the underlying malignancy (Gelderblom, *et al.* 2008).

General paraneoplastic syndromes

Cancer patients frequently experience fever, night sweats, loss of appetite, and weight loss. The syndromes listed below are less prevalent.

Digestive tract syndromes: Some cancers may produce chemicals that cause watery diarrhea. Some intestinal cancers can expel a considerable amount of protein in the stool, resulting in low protein levels in the bloodstream.

Endocrine syndromes: Small cell lung carcinoma may leak a chemical that stimulates the adrenal gland to produce more cortisol, resulting in weakness, weight gain, and elevated blood pressure (Cushing's syndrome). In some persons, small cell lung cancer may secrete the hormone vasopressin, resulting in water retention, low sodium levels, weakness, mental confusion, and seizures. People with solid tumors or leukemia may have extremely high calcium levels in their blood (hypercalcemia syndrome). It can happen when the cancer secretes a hormone-like molecule comparable to parathyroid hormone into the bloodstream, causing calcium to be released. Of skeletons. High calcium levels are also possible if the cancer directly invades the bone, releasing calcium into the bloodstream. High quantity of calcium in the blood causes kidney failure and mental confusion, which can progress to a coma or death if not treated. It is detected and treated as soon as possible (Sys *et al.*, 2002). Excessive release of other hormones caused by carcinoid tumors in the pancreas can result in carcinoid syndrome, which includes face flushing, wheezing, diarrhea, and heart valve issues.

Neurological syndromes: Neuropathy is a malfunction of the peripheral nerves (nerves outside the brain and spinal cord) that causes weakness, sensation loss, and diminished reflexes. Subacute sensory neuropathy is an uncommon type of neuropathy that can emerge prior to the diagnosis of malignancy. It produces numbness, incoordination, and weakness. Another form of neurological condition that causes a broad loss of muscle power is Guillain-Barre syndrome. People with Hodgkin lymphoma are more likely to develop this condition. Subacute cerebellar degeneration occurs in women with breast cancer, ovarian cancer, and individuals with small cell lung cancer or other solid tumors only on rare occasions. The cerebellum may be destroyed by an autoimmune disease (where antibodies attack the body's own tissues). These symptoms include shaky walking, clumsy arm and leg movement, difficulty speaking, disorientation, and double vision. Before the cancer is identified,

symptoms may arise. Some children with neuroblastoma may experience involuntary eye movements (oculoclonus) and quick twitches of the arms and legs (myoclonus). Some persons with non-Hodgkin's lymphoma develop subacute neuropathy (Zeifang *et al*. 2004). The nerve cells in the spinal cord are damaged, causing weakness in the arms and legs. Antibodies directed against the tumor may cause a variety of atypical symptoms, including decreased mental function, disorientation, altered vision, and muscle weakness. Eaton-Lambert syndrome occurs in certain persons with small cell lung cancer. This illness is distinguished by significant muscular weakness caused by inadequate nerve activation. Subacute necrotizing myelopathy is an uncommon condition that causes fast loss of nerve cells in the spinal cord and consequent paralysis.

Skin syndromes : Itching is one of the most common skin symptoms among cancer patients. Facial flushing is another typical symptom.

Other syndromes : Dermatomyositis is a disorder that occurs when muscle inflammation is accompanied by skin irritation. Lung cancer patients may develop hypertrophic osteoarthropathy. This syndrome causes severe swelling in some joints and affects the form of the fingers and toes. Blood cells in cancer patients might have a variety of abnormalities. They may have a low red blood cell count, thrombocytosis, or some types of white blood cells. Kidney or liver cancer may cause the body to create an abnormally large number of red blood cells, but other forms may enter the bone marrow and disrupt the formation of blood cells such as red blood cells, white blood cells, and platelets (Hillmann, *et al.* 2003).

2- CONCLUSIONS AND RECOMMENDATIONS

Early detection of cancer often results in a better chance of cure. With this in mind, speaking with your doctor as soon as possible may be appropriate, and screening tests can save lives by detecting cancer early. Many medical organizations and patient advocacy groups publish cancer screening recommendations and guidelines depending on cancer risk factors and whether cancer can be diagnosed. In people with leukemia, physical examinations such as the presence of deformities, changes in skin color, or organ enlargement, as well as laboratory tests such as urine and blood tests, and a complete blood count, are used to detect the presence of an abnormal number or type of white blood cells. CT, bone scan, MRI, positron emission tomography, ultrasound, and X-ray are some imaging techniques used to check the bones and internal organs. A biopsy is the only way to confirm a cancer diagnosis. Cell samples are examined under a microscope in the laboratory by doctors. Normal cells appear homogenous, identical in size, and structured. Cancer cells seem less coordinated, of diverse sizes, and without a distinct organization. There are several phases of cancer. Knowing the stage of cancer once it has been diagnosed. Imaging tests, such as a bone scan or X-ray, are used to assess the stage of cancer. Whether it is of the body or not. Cancer stages are denoted by numbers 0 through 4, which are frequently represented as 0 through IV in Roman numerals. Higher figures imply that the cancer has progressed.

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