WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

A REVIEW ON CARDIOVASCULAR SIDE EFFECT OF CANCER THERAPY

Ravindra Sendhav*[1], Mrs. Ajra Shaikh[2], Dr. Revathi A Gupta[3]

Insitute Of Pharmacy, Dr. Apj Abdul Kalam University, Indore (Mp)

ABSTRACT :

The cardiotoxicity associated with anticancer therapies can result in considerable complications for patients undergoing treatment for various types of cancer. The extent of this toxicity is influenced by multiple factors, including the specific molecular target of the drug, both the immediate and cumulative dosages administered, the routes of administration, any pre-existing cardiac conditions, and the patient's demographic characteristics. Additionally, the toxicity may be influenced by current or prior treatments involving other antineoplastic agents. Cardiotoxic effects can manifest immediately during the drug administration process. Further investigation is necessary to enhance the ability to identify patients who are at heightened risk for developing cardiotoxicity. Moreover, it is essential to formulate management strategies and interventions aimed at mitigating cardiotoxic effects.

KEYWORDS: - Cancer, Abnormal Cell, Symptoms, Treatment,Chemotherapy

INTRODUCTION of CANCER:-

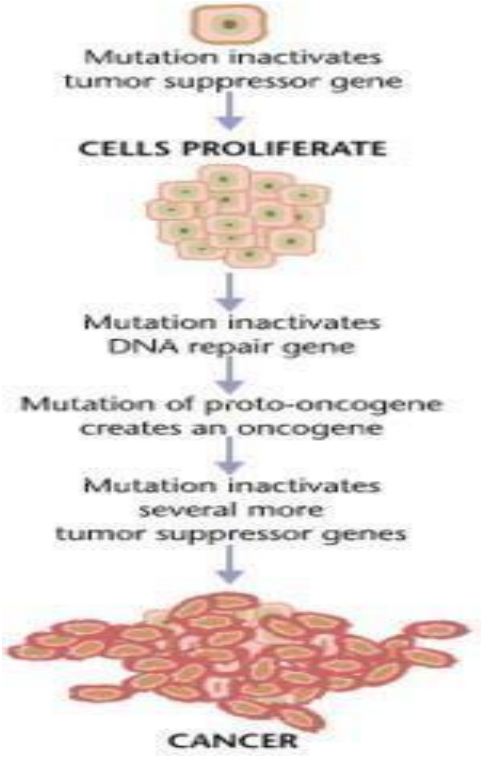
Cancer, often referred to as a malignant tumor or malignant neoplasm, encompasses a range of diseases characterized by uncontrolled cell proliferation that may invade or metastasize to different regions of the body. It is important to note that not all tumors are classified as cancerous; benign tumors, for instance, do not have the capacity to spread. Common signs and symptoms associated with cancer may include the emergence of a new lump, unusual bleeding, a persistent cough, unexplained weight loss, and alterations in bowel habits, among others.

DEFINITON: - Cancers represent a diverse group of diseases characterized by uncontrolled cellular proliferation, which can lead to the invasion of surrounding tissues or metastasis to distant sites within the organism. This category falls under the broader classification of neoplasms. A neoplasm, commonly referred to as a tumor, consists of a collection of cells that exhibit dysregulated growth patterns, often resulting in the formation of a distinct mass or lump, although they may also present as a more diffuse distribution throughout the affected area.

CAUSES:- The vast majority of cancer cases, approximately 90-95%, are attributed to environmental factors. The remaining 5-10% are linked to inherited genetic predispositions. In the context of cancer research, "environmental" encompasses all causes that are not genetically inherited, including lifestyle choices, economic conditions, and behavioral influences, rather than being limited to pollution alone.

Various environmental factors that play a significant role in cancer mortality encompass tobacco use (25-30%), dietary habits and obesity (30-35%), infections (15-20%), radiation exposure (both ionizing and non-ionizing, up to 10%), as well as stress, insufficient physical activity, and environmental contaminants.

PATHOPHYSIOLOGY:-



Cancers develop as a result of a series of mutations that alter the behavior of cells. Generally, the initial detection of cancer occurs through the appearance of signs or symptoms, or through various screening techniques. Nevertheless, these approaches do not yield a definitive diagnosis; a conclusive identification requires the examination of a tissue sample by a pathologist. Patients who are suspected of having cancer typically undergo a comprehensive set of medical assessments, which frequently include blood tests, X-rays, CT scans, and endoscopic examinations.

CLASSIFICATION

Cancers are classified by the types of cell that the tumor cells resemble and are therefore presumed to be origin of the tumor. These types include:

Carcinoma: Cancers originating from epithelial cells.

Sarcoma: Cancers that originate from connective tissues, such as bone, cartilage, adipose tissue, and nerve, develop from cells that are derived from mesenchymal cells located outside the bone marrow.

Lymphoma and leukemia: Two categories of cancer originate from hematopoietic cells, which are responsible for blood formation. These cells exit the bone marrow and typically undergo maturation in the lymph nodes and bloodstream, respectively. Among these, leukemia stands out as the most prevalent form of cancer in pediatric populations, representing approximately 30% of case

Germ cell tumor: Cancers originating from pluripotent cells typically manifest in the testicular or ovarian regions. (semiformal and dysgerminoma, respectively).

Blastula: Cancers derived from immature “precursor” cells or embryonic tissue.

BLADDER CANCER This type of cancer is identified in over 50,000 individuals annually in the United States, exhibiting a moderate mortality rate of 22%. It seems to be particularly influenced by dietary factors and environmental conditions.

ANATOMY: - The bladder functions as a sac-like structure responsible for the storage of urine produced by the kidneys. Malignant cells can develop within the epithelial cells that constitute the inner lining of this organ.

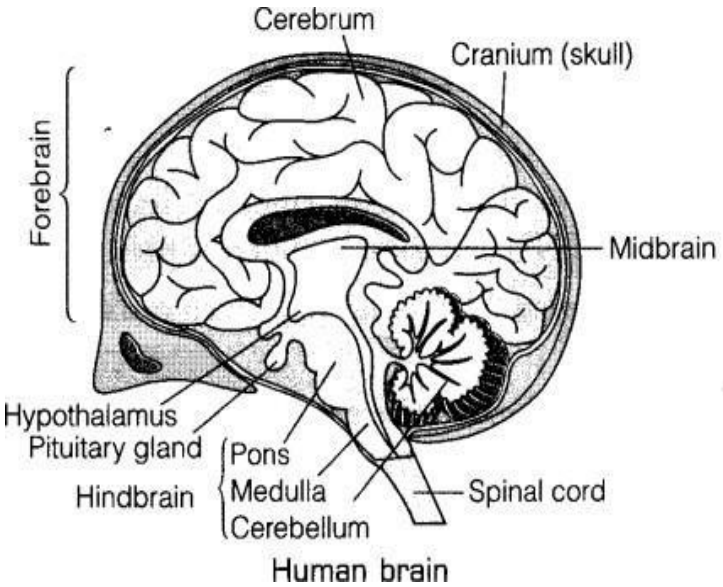
SYMPTOMS: - Common symptoms of bladder cancer include blood in the urine, pain during urination, and frequent urination, or feeling the need to urinate without results.

DIAGNOSIS:- Bladder cancer diagnosis involves a straightforward physical examination to identify any visible tumor formations. Additionally, a urine analysis is conducted to detect the presence of blood or cancerous cells. Imaging techniques, such as x-ray photography of the bladder, are employed, along with cystoscopy, a procedure in which a lighted instrument is introduced through the urethra to inspect the bladder's lining.

BRAIN TUMOR

Although relatively rare, brain tumors are diagnosed in about 20,000 people in North America every year. Damage to virtually any area of the brain will leave its mark. Even if the tumor is removed or destroyed, the patient is often left witha lifelong disability.

ANATOMY:-



Human brain

The brain is divided into three major regions: the cerebrum, the cerebellum, andthe brain stem.

SYMPTOMS:-

The impact of tumors on the brain is largely determined by their size and specific location. As tumors expand, they can exert pressure on adjacent tissues, leading to neuronal damage and disrupting the intricate contributes to brain injury, a phenomenon referred to as edema. Tumors may also obstruct the circulation of cerebrospinal fluid, resulting in its accumulation within the brain and giving rise to a condition termed hydrocephalus.connections between cells. Additionally, the presence of swelling and fluid accumulation around the tumors

DIAGNOSIS:-

Brain tumors are diagnosed primarily with a computed tomography (CT) Scan or with magnetic resonance imaging (MRI) A CT scan is a series of detailed pictures of the brain that are created by computer linked to an X-ray machine. A special dye may be used to enhance the likelihood of detecting a brain tumor.

LEUKEMIA

Each year, nearly 32000 adults and more than 2000 children's in the United States learn that they have leukemia, a cancer of blood cells.

ANATOMY

Leukemia is a malignancy that begins in the bone marrow, which is the soft, spongy tissue found within bones. It generally advances rapidly into the bloodstream, where it can spread to multiple areas of the body, such as the lymph nodes, spleen, liver, central nervous system, and other organs. This type of cancer is marked by the overproduction of abnormal white blood cells, impacting both the blood and the bone marrow.

DIAGNOSIS

The patient is being assessed for enlargement of the liver, spleen, and lymph nodes located in the axillary, inguinal, and cervical regions. A blood sample is analyzed microscopically to identify any atypical white blood cells.

LIST OF ANTI – CANCER DRUGS CYTOTOXIC AGENTS & ANTI TUMOR ANTIBIOTICS

- Bleomycin
- Daunorubicin
- Doxorubicin
- Epirubicin
- Idarubicin
- Mitomycin
- Mitoxantrone

PLANT ALKALOIDS/MICROTUBULE INHIBITORS

- Etoposide
- Docetaxel
- Irinotecan
- Paclitaxel
- Topotecan
- Vinblastine
- Vincristine
- Vinorelbine

DNA LINKING AGENTS

- Carboplatin
- Cisplatin
- Oxaliplatin
- Fulvestrant
- Goserelin
- Lanreotide
- Lenalidomide
- Letrozole

ALKYLATING AGENTS

- Bendamustine
- Busulfan
- Carmustine
- Chlorambucil

CYCLOPHOSPHAMIDE

- Dacarbazine
- Ifosfamide
- Melphalan
- Procarbazine
- Streptozocin
- Temozolomide

ANTI-METABOLITES

- Asparaginase
- Capecitabine
- Cytarabine
- 5-Fluoro Uracil
- Fludarabine
- Gemcitabine
- Methotrexate
- Pemetrexed

BIOLOGICAL AGENTS

- BCG
- Bevacizumab
- Cetuximab
- Denosumab
- Erlotinib
- Gefitinib
- Imatinib
- Interferon
- Ipilimumab

BISPHOSPHONATES

- Clodronate
- Ibandronic acid
- Pamidronate
- Zolendronic acid

HORMONES/OTHER

- Anastrozole
- Abiraterone
- Amifostine

CARDIOVASCULAR SIDE EFFECTS OF CANCER TREATMENT

- The side effects associated with cancer treatments, such as elevated blood pressure, irregular heart rhythms, and heart failure, may be induced or intensified by chemotherapy and radiation therapy. Additionally, these adverse effects can also arise from contemporary cancer treatment modalities, including targeted therapies and immunotherapy, which may influence the dosage or type of treatment administered.
- Affect your quality of life
- In rare cases, cause death
- Cardiomyopathy and congestive heart failure (CHF).
- Myocarditis is swelling of the heart that can affect the heartbeat.It can lead to other heart problems.
- Coronary artery disease is a blockage or scarring of the blood vessels ofthe heart.
- Arrhythmia is an irregular heartbeat.
- Damage to heart valves**,** which causes the valves to narrow and stiffen orleak.

VASCULAR EFFECTS

The predominant vascular effect associated with VSP inhibitors is systemic hypertension. The incidence of newly developed or poorly controlled hypertension has been documented as 24% for bevacizumab, 36% for pazopanib, 22% for sunitinib, and 23% for sorafenib. Among these patients, 7.0% required treatment for hypertension, which resulted in either a reduction in drug dosage or discontinuation of the medication.

MEDICAL USES

CHEMOTHARAPY

Chemotherapy is a medical treatment that employs potent chemicals to eliminate rapidly dividing cells within the body. This treatment is primarily utilized for cancer management, as cancer cells proliferate at a significantly faster rate than the majority of normal cells. A diverse array of chemotherapy agents exists, which can be administered individually or in combination to address various types of cancer.

AUTOIMMUNED DISORDERS

The immune system's blood cells play a crucial role in safeguarding the body from detrimental agents. Such agents encompass bacteria, viruses, toxins, cancerous cells, as well as foreign blood and tissue. These harmful substances are characterized by the presence of antigens. In response, the immune system generates antibodies that target these antigens, facilitating the elimination of these threats.

The goals of treatment are to:

- Control the autoimmune process
- Maintain your body's ability to fight disease
- Reduce symptoms
- Treatments will depend on your disease and symptoms. Types of treatments include:
- Blood transfusions if blood is affected
- Physical therapy to help with movement if the bones, joints, or muscles are affected

REFRENCES :

1. Hogendoorn PC et al. on behalf of the ESMO/EUROBONET Workinggroup bone sarcomas: ESMO clinical practice guidelines for diagnosis, treatments and follow up. Ann oncol.2010; 21(suppl 5):v204-13. Doi: 10.1093 / annonc/mdq223.
2. Ferrari S, et al. om behalf of the Italian and Scandinavian sarcoma groups neoadjuvant Chemotherapy with high dose ifosfamide , high dose methotrexate cisplatin, and doxorubicin for patient with localized osteosarcoma of the extremity ; a joint study by the Italian and Scandinavian sarcoma groups .J Clin Oncol . 2005; 23:8845.doi:10.1200/JCO.2004.00.5785.
3. Crews KR, et al. High dose methotrexate pharmacokinetics and outcomes of childrens and young adults with osteosarcoma. Cancer. 2004; 100:1724-33. Doi 10.1002/cncr.20152.
4. Janeway KA, Grier HE. Sequelae of osteosarcoma medical therapy a review of rare caute toxicities and late effects. Lancet oncol.2010; 11:670-8 doi 10.1016/S1470- 2045(10)700062-0.
5. Graf N, Winkler K Betlemovie M, Fuchs N Bode U Methotrexate pharmacokinetics and prognosis in osteosarcoma J clin oncol. 1994; 12:1443-51.
6. Lewis IJ, Weeden S, Machine D, Stark D, Craft AW. Received dose and doseintensity of chemotherapy and outcome in no metastatic extremity osteosarcoma. European osteosarcoma Intergroup. J Clin Oncol. 2000; 18:4028-37.
7. Bielack SS, et al. Prognostic factors in high-grade osteosarcoma of the extremities or trunk: an analysis of 1,702 patients treated on neoadjuvant cooperative osteosarcoma study group protocols' Clin Oncol.2002;20:776-90. doi: 10.1200/JCO.20.3.776.
8. Holmboe L, Andersen IS, Morkrid L, Slordal L, Hall KS. High dose methatrexate chemotherapy: pharmacokinetics, folate and toxicity in osteosarcoma patients. Br J Clin Pharmacology. 2012;73:106-14. doi:10.1111/j.1365-2125.2011.04054.x.
9. Smeland S, Muller C, Alvegard TA, et al. Scandinavian Sarcoma Group Osteosarcoma Study SSGVIII:prognostic factors for outcome and the role of replacement salvage chemotherapy for poor histological responders.Eur J Cancer.2003;39:488-94. doi: 10.1016/S0959-8049(02)00747-5
10. Smeland S, et al. Results of the Scandinavian Sarcoma Group XIV protocol for classical osteosarcoma: 63 patients with a minimum follow-up of 4 years. Acta Orthop.2011;82:211- doi: 10.3109/17453674.2011.566141.
11. Eisenhauer EA, et al. New response evaluation criteria in solid tumors:revised RECIST guideline (version 1.1) Eur J Cancer.2009;45:228-47. doi: 10.1016/j.ejca.2008.10.026
12. Huvos AG. Bone Tumors: Diagnosis Treatment, andPrognosis.2nd ed. London, U.K:W.B.Saunders;1991.
13. Chen AP, et al. grading dermatologic adverse events of cancer treatments:the Common Terminology Criteria for Adverse Events version 4.0.J Am Acad Dermatol.2012;67:1025-39. doi:10.1016/j.jaad.2012.02.010
14. Fuchs N, et al. Long-term results of the co-operative German-Austrian- Swiss oesteosarcoma study group's protocol COSS-86 of intensive.