

**IDENTIFICATION, ASSESMENT AND MANAGEMENT OF CHEMOTHERAPHY
INDUCED ADVERSE DRUG REACTIONS OF CANCER**

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Article Received on 02/02/2019

Article Revised on 23/02/2019

Article Accepted on 13/03/2019

ABSTRACT

Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body. A number of physical, chemical or biological agents are known to mutate and activate these proto-oncogenes into active and cancer causing oncogenes. Chemotherapy (chemo) usually refers to the use of medicines or drugs to treat cancer. Chemo can work throughout the whole body. This means chemo can kill cancer cells that have spread (metastasized) to parts of the body far away from the original (primary) tumour. ADRs may occur following a single dose or prolonged administration of a drug or result from the combination of two or more drugs. The side effects of chemotherapy can be unpleasant, but they must be measured against the treatment's ability to destroy cancer. ADRs mostly occurred in the age group of 41-50 years and some of the studies have found the most common age group to be between 50 and 70 years. The most common ADRs found to be were nausea and vomiting. However, ADRs of cancer chemotherapy is common, that can lead to disability and even death. Their prompt recognition, adequate and effective clinical management is mandatory in promoting patients safety.

KEYWORDS: Proto-Oncogenes, benign tumours, clinical management, spread (metastasized).**INTRODUCTION**

Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body. These contrast with benign tumours, which do not spread to other parts of the body.^[7] A number of physical, chemical or biological agents are known to mutate and activate these proto-oncogenes into active and cancer causing oncogenes. Due to altered gene activity, normal control mechanism is lost and the abnormal cell growth and cell division take place. The physical and chemical agents, which induce cancer growth, are called carcinogens and other agents which cause cancer includes the following:

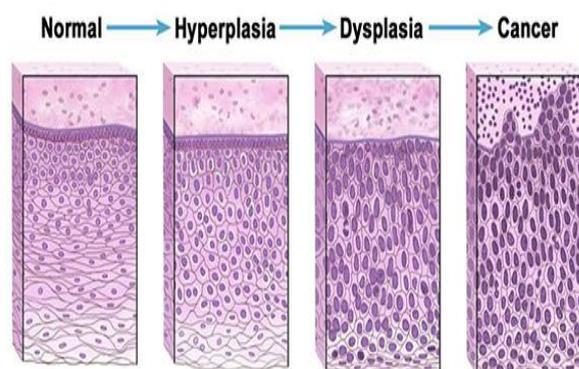
Ionising radiations like X-rays, gamma-rays and particulate radiations from radioactive substances are known to rupture DNA strands and induce mutations to cause cancers.^[2]

Physical irritants like certain foods, which cause continued abrasion of the linings of the intestinal tract, are also carcinogenic.

Chemical agents like caffeine, polycyclic hydrocarbons, heavy metallic ions etc. are also carcinogenic. Hormones like testosterone and estrogens are known to cause

prostate and breast cancer respectively. Chewing of beetles is known to cause mouth cancer.

Biological agents Cervix cancer is caused by viruses. Tumour causing viruses e.g. Epstein-Barr virus, Herpes simplex type-2 virus etc. are called oncoviruses.

© 2014 Terese Winslow LLC
U.S. Govt. has certain rights**Progression of Cell Multiplication in Cancer****Chemotherapy**

Chemotherapy (chemo) usually refers to the use of medicines or drugs to treat cancer. Chemo can work

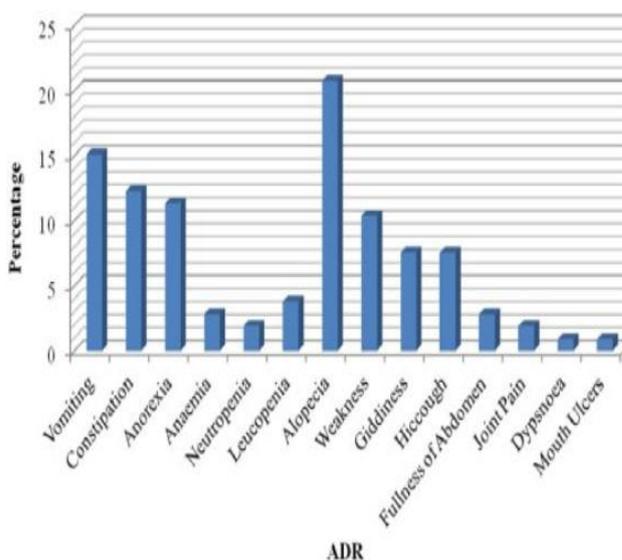
throughout the whole body.^[5] This means chemo can kill cancer cells that have spread (metastasized) to parts of the body far away from the original (primary) tumour. There are three main goals for chemotherapy (chemo) in cancer treatment are

1. Cure
2. Control
3. Palliation

An adverse drug reaction (ADR) is defined by World Health Organization (WHO) as 'any response to a drug which is noxious, unintended and occurs at doses used in man for prophylaxis, diagnosis or therapy. ADRs may occur following a single dose or prolonged administration of a drug or result from the combination of two or more drugs. ADRs associated with cancer chemotherapy warrant analysis on their severity and preventability. Most people have no serious long-term problems from chemotherapy.^[11] However, on some occasions, chemotherapy can cause permanent changes or damage to the heart, lungs, nerves, kidneys, reproductive or other organs. The side effects of chemotherapy can be unpleasant, but they must be measured against the treatment's ability to destroy cancer. Some of the more common side effects of chemotherapy are found to be

- Fatigue
- Nausea & Vomiting
- Pain

- Hair Loss
- Anemia
- Infection
- Blood Clotting Problems
- Mouth, Gum and Throat Problems
- Diarrhea and Constipation
- Joint pain
- dyspnoea



Chemotherapy Induced ADR'S

Organ system	Adverse drug reactions
Gastro-intestinal tract	Nausea, Vomiting, Diarrhea, Constipation, Abdominal Pain
Hematological and lymphatic	Aneamia, Neutropenia, Thrombocytopenia
Musculoskeletal&nutritional disorders	Muscular weakness Muscle cramps Weight loss
Respiratory system	Cough, Shortness of breath
Nervous Disorders	Numbness Tingling sensation
Skin and subcutaneous disorders	Rash Erythema Nail discolouration
Urinary tract	Urinary tract infections, Frequent urination, Burning micturition

The objectives of ADR monitoring include

1. Detection of unknown drug-related safety problems,
2. Identification, and quantification of risk factors associated with the use of drugs

3. Prevention of patients from being affected unnecessarily.

Suspected ADRs were also categorized as serious and nonserious. Serious ADR was defined as any ADR

which was fatal, life-threatening, permanently/significantly disabling, required initial hospitalization, or prolonged hospitalization, caused a congenital anomaly, required intervention to prevent permanent impairment or damage.^[8]

The common offending drugs causing ADRs either alone or in combination were cisplatin (19.6%), gemcitabine (17.3%) followed by 5-fluorouracil (5FU), methotrexate, paclitaxel, docetaxel, vinblastine, etoposide.

Assessment of Adrs

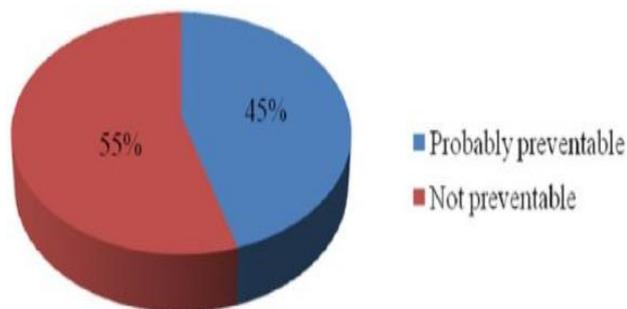
Most of the ADRs with these drugs are unreported due to unawareness of healthcare professionals, lack of time to report and a dearth of sufficient staff in the hospitals. Hence it is necessary to recognize the pattern of ADRs occurring with anticancer drugs so as to enhance the quality of life and to reduce the cost of ADR related hospitalization among cancer patients.

The demographic profile of the present study shows that majority of females (73.6%) were found to have ADRs as compared to males. This is consistent with other studies and the fact that women experience more adverse reactions to therapeutic drugs than men as a result of different pharmacokinetic and pharmacodynamic responses to drugs.^[2]

ADRs mostly occurred in the age group of 41-50 years, which is similar to that reported by other studies. Some of the studies have found the most common age group to be between 50 and 70 years. In agreement to other studies, the highest incidence (39.1%) of ADRs was seen in patients undergoing treatment for breast carcinoma.

Management of Adrs

Chemotherapy has dramatically changed the outcome of cancer patients. Despite this success, word of caution regarding toxicities of antineoplastic drugs deserves highlighting. It is vital to recognize these toxicities.^[14] Enhanced use of preventative measures and early detection of drug toxicity has the potential to contribute to reduce the severity of ADRs. The most common ADRs found to be were nausea and vomiting. It was observed that majority of patients had received antiemetic as preventive therapy accordingly for them the dose of antiemetic was increased.



For prevention of medications induced gastrointestinal irritation, pantoprazole: 20 - 40 mg, Omeprazole: 20 mg

and Rabeprazole: 20 mg was being used. Among these Pantoprazole 40mg was frequently used accounting for 76.2% of total prescriptions followed by Omeprazole (9.01%) and Rabeprazole (3.2%).

The medication given for the prevention of chemotherapy induced mucositis and stomatitis were povidone-iodine gargle (37.70%), chlorhexidine (33.61%), and benzydamine (18.8%).

CONCLUSION

Now a day's cancer is on the rise, and is known to cause significant impact on the health and socio-economics of a nation. Advancement in modern chemotherapy has changed the way cancer is controlled and has brought significant benefits to the patients. The success of chemotherapy comes with the word of caution regarding toxicities of antineoplastic drugs.^[9] However, ADRs of cancer chemotherapy is common, that can lead to disability and even death. Their prompt recognition, adequate and effective clinical management is mandatory in promoting patients safety.

REFERENCES

1. Anand P, Kunnumakkara AB, Sundaram C, Harikumar KB, Tharakan ST, Lai OS, et al. Cancer is a preventable disease that requires major lifestyle changes. *Pharm Res.*, 2008; 25(9): 2097-116.
2. Aagaard L, Strandell J, Melskens L, Petersen PS, Holme Hansen E. Global patterns of adverse drug reactions over a decade: Analyses of spontaneous reports to VigiBase™. *Drug Saf*, 2012; 35: 1171-82.
3. Boyle P, Ferlay J. Cancer incidence and mortality in Europe. *Ann Oncol*, 2005; 16: 481-488.
4. Chabner BA, Amrein PC, Druker BJ, Bruntan LL, Lazo JS, Parker KL. Goodman and Gilman's The Pharmacological Basis of Therapeutics. 11th ed. USA: McGraw-Hill Companies, Inc; Antineoplastic agents, 2006; 1315.
5. Hartwig SC, Siegel J, Schneider PJ. Preventability and severity assessment in reporting Adverse Drug Reactions. *Am J Hosp Pharm*, 1992; 49(9): 2229-32.
6. Poddar S, Sultana R. Pattern of adverse drug reactions due to cancer chemotherapy in tertiary care teaching hospital in Bangladesh. *Dhaka Univ J Pharm Sci.*, 2009; 8: 11-6.
7. WHO-UMC.org. The use of the WHO-UMC system for standardised case causality assessment. [Internet][Cited 2016 Oct 15]. Available from: <http://whoumc.org/Graphics /24734.pdf>.
8. Kalaiselvan V, Prasad T, Bisht A, Singh S, Singh GN. Adverse drug reactions reporting culture in Pharmacovigilance Programme of India. *Indian J Med Res.*, 2014; 140(4): 563-4.
9. Saini VK, Sewal RK, Ahmad Y, Medhi B. Prospective observational study of adverse drug reactions of anticancer drugs used in cancer treatment in a tertiary care hospital. *Indian J Pharm Sci.*, 2015; 77(6): 687-93.

10. Hettihewa LM, Sirisena B. Causality assessment and the severity of the adverse drug reactions actively detected in hospital in-patients in tertiary care hospital, srilanka. *Asian J Res Biol Pharm Sci.*, 2014; 2: 1-10.
11. Thapaliya K, A Shreestha, S Prajapati, R Subedi, S Giri. Study of a pattern of adverse drug reaction due to cancer chemotherapy and their management in hospitalized patient in B P Koirala memorial cancer hospital. *J Computer Med Communication*, 2014; 4: 24-8.
12. Gibson, R. and Keefe, D. Cancer chemotherapy-induced diarrhoea and constipation: mechanisms of damage and prevention strategies. *Support Care Cancer*, 2006; 14: 890–900.
13. Goyale, Y., Krunal, C., Rusva, A., Nisarg, D., Anil, P. and Maganlal, V. Pattern of adverse drug reactions due to cancer chemotherapy in tertiary care teaching hospital in Gujarat. *Int J Sci Res.*, 2014; 3: 333–335.
14. Naranjo, C., Busto, U., Sellers, E., Sandor, P., Ruiz, I., Roberts, E. et al. A method for estimating the probability of adverse drug reactions. *Clin Pharmacol Ther*, 1981; 30: 239–245.