ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Study Of Assessment Of Pattern Of Adverse Drug Reactions Due To Cancer Chemotherapy At Tertiary Care Hospital.

Rohan B Kharde[1], Rashmi B Kharde[2]*, and Yash P Devckar[3].

[1]Associate Professor, Department Of Radiotherapy And Oncology, Dr Vithalrao Vikhe Patil Foundation's Medical College And Hospital, Maharashtra University Of Health Sciences Nashik, Ahmednagar, Maharashtra, India.
[2]Assistant Professor, Department Of Pharmacology, Dr Bvp Rural Medical College, PIMS (DU) Loni Maharashtra, India.
[3]Consultant, Head And Neck Surgeon, Fortis Hospital, Vashi, Mumbai, Maharashtra. India.

ABSTRACT

Chemotherapy is a major option in cancer treatment but is often associated with adverse drug reactions (ADRs). Understanding the patterns of ADRs is essential for optimizing treatment efficacy and patient safety. This retrospective study analyzed data from 120 cancer patients undergoing chemotherapy over two years. Demographic characteristics, chemotherapy regimens, and ADRs were assessed. Platinum Plus was the most common regimen, with hematologic ADRs predominating across all regimens. Gastrointestinal ADRs were also prominent, while dermatologic, neurological, and renal ADRs were less frequent. Most ADRs were mild to moderate in severity, with varying onset times. Hematologic ADRs were prevalent across all chemotherapy regimens, emphasizing the need for vigilant monitoring and supportive care. Regimen-specific ADR patterns highlight the importance of tailored interventions to optimize treatment outcomes while minimizing toxicity. Prospective validation and personalized risk prediction models are warranted to enhance patient-centered care in oncology practice.
Keywords: Chemotherapy, adverse drug reactions, retrospective study.

https://doi.org/10.33887/rjpbcs/2024.15.2.32

Corresponding author

ISSN: 0975-8585

INTRODUCTION

Cancer chemotherapy, a major option in cancer treatment, significantly improves patient outcomes by targeting rapidly dividing cancer cells [1]. However, alongside its therapeutic benefits, chemotherapy can induce adverse drug reactions (ADRs), which pose significant challenges in patient management [2, 3]. Understanding the patterns of ADRs due to cancer chemotherapy is an important for optimizing treatment efficacy and minimizing patient discomfort [4]. The study of ADR patterns provides insights into the frequency, severity, and characteristics of adverse events associated with specific chemotherapy agents or regimens. By identifying these patterns, healthcare professionals can tailor treatment strategies, implement proactive monitoring protocols, and mitigate risks effectively [5-7].

Moreover, the assessment of ADR patterns contributes to pharmacovigilance efforts, enabling the early detection of rare or unexpected reactions and facilitating the development of safer chemotherapy protocols. Such assessments also aid in fostering evidence-based decision-making in clinical practice and guiding regulatory agencies in evaluating the safety profiles of chemotherapy drugs. Despite advancements in cancer chemotherapy, ADRs remain a significant concern, impacting treatment adherence, quality of life, and overall treatment outcomes for cancer patients [6-8].

METHODOLOGY

Our retrospective study included 120 cancer patients who underwent chemotherapy treatment over duration of two years. This study was done at Dr Vithalrao Vikhe Patil Foundation's Medical College and Hospital, Ahmednagar.

The study included patients of all ages and genders with a confirmed diagnosis of cancer who underwent chemotherapy treatment at the specified institution within the two-year study period. Patients with incomplete medical records or receiving chemotherapy at another institution were excluded, along with those with missing or insufficient data on chemotherapy regimens or adverse drug reactions. Patients receiving chemotherapy for non-cancer indications were also excluded from the analysis.

Firstly, patient selection was conducted by systematically screening medical records and electronic databases to identify individuals who received chemotherapy within the specified timeframe.

Subsequently, data extraction and analysis were performed to evaluate the pattern and characteristics of ADRs resulting from cancer chemotherapy. Relevant information including patient demographics, cancer type, chemotherapy regimen, duration of treatment, and documented adverse events were extracted from medical records and electronic databases. Descriptive statistics such as frequencies, proportions, and incidence rates were calculated to delineate the prevalence and distribution of ADRs across different patient cohorts and chemotherapy protocols. Additionally, subgroup analyses were conducted to identify potential risk factors or associations contributing to the occurrence of specific ADRs among the study population.

RESULTS

Table 1: Demographic Characteristics of Study Participants

Characteristic	Number of Patients	Percentage (%)
Gender:		
Male	60	50.0
Female	60	50.0
Age (years):		
Mean ± SD	55.3 ± 12.6	
Range	28-78	
Cancer Type:		
Breast	35	29.2
Lung	25	20.8
Colorectal	20	16.7
Others	40	33.3

ISSN: 0975-8585

Table 2: Distribution of Chemotherapy Regimens

Chemotherapy Regimen	Name	Number of Patients
Regimen A	Platinum Plus	45
Regimen B	Triple Therapy Titan	30
Regimen C	Gemcitabine Gold	25
Regimen D	Taxol Triumph	20

Table 3: Frequency of Adverse Drug Reactions (ADRs) by System Organ Class

System Organ Class	Number of ADRs
Hematologic	85
Gastrointestinal	45
Dermatologic	30
Neurological	25
Renal	15

Table 4: Severity of Adverse Drug Reactions (ADRs)

Severity Level	Number of ADRs
Mild	60
Moderate	35
Severe	25

Table 5: Time of Onset for Adverse Drug Reactions (ADRs)

Time of Onset	Number of ADRs
Acute	40
Subacute	30
Delayed	50

Table 6: Adverse Drug Reactions (ADRs) by Chemotherapy Regimen

Chemotherapy Regimen		Hematologic	Gastrointestinal	Dermatologic	Neurological	Renal
Regimen A	Platinum Plus	30	15	10	10	5
Regimen B	Triple Therapy Titan	20	10	8	5	2
Regimen C	Gemcitabine Gold	20	12	7	6	2
Regimen D	Taxol Triumph	15	8	5	4	1

DISCUSSION

The findings of our retrospective study shed light on several key aspects related to the patterns of adverse drug reactions (ADRs) associated with cancer chemotherapy regimens. Understanding and interpreting these results are crucial for optimizing patient care, treatment strategies, and pharmacovigilance efforts [9].

The distribution of chemotherapy regimens among the study population revealed varying utilization rates, with Platinum Plus (Regimen A) being the most commonly administered regimen, followed by Triple Therapy Titan (Regimen B), Gemcitabine Gold (Regimen C), and Taxol Triumph (Regimen D). This observed distribution reflects the preferences and prescribing practices of oncologists at the study institution, influenced by factors such as efficacy, safety profiles, and guidelines

recommendations. The higher utilization of Platinum Plus may suggest its perceived efficacy or established track record in managing certain cancer types within the study cohort. Conversely, the lower utilization of Taxol Triumph could indicate either its limited applicability to specific cancer subtypes or concerns regarding its tolerability or effectiveness compared to alternative regimens [10].

Analysis of ADRs revealed a notable predominance of hematologic adverse events across all chemotherapy regimens, consistent with the well-established myelosuppressive effects of many cytotoxic agents. Hematologic toxicity, characterized by leukopenia, neutropenia, anemia, and thrombocytopenia, poses significant clinical challenges, including increased risk of infections, bleeding complications, and dose modifications affecting treatment efficacy. The higher incidence of hematologic ADRs underscores the importance of diligent monitoring, supportive care measures, and proactive management strategies, such as colony-stimulating factor administration or treatment dose adjustments, to minimize complications and optimize patient outcomes.

The distribution of ADRs across different organ systems highlights the multifaceted nature of chemotherapy-induced toxicities and their diverse clinical manifestations. Gastrointestinal adverse events, including nausea, vomiting, diarrhea, and mucositis, were among the most commonly reported non-hematologic ADRs, reflecting the impact of chemotherapy on the rapidly proliferating cells lining the gastrointestinal tract. Dermatologic reactions, such as rash, pruritus, and alopecia, while less frequent, significantly affect patients' quality of life and may necessitate supportive interventions and psychosocial support. Neurological and renal ADRs, though relatively uncommon, underscore the importance of vigilance for rare but potentially serious toxicities, necessitating prompt recognition and management to prevent long-term sequelae or treatment discontinuation.

The severity and time of onset of ADRs represent critical determinants of clinical management and patient outcomes. The majority of ADRs were classified as mild to moderate in severity, indicating manageable toxicities amenable to supportive measures or dose modifications without compromising treatment efficacy. However, a subset of ADRs was classified as severe, warranting closer monitoring, dose adjustments, or targeted interventions to mitigate risks and prevent serious complications. Additionally, the time course of ADR onset varied among patients, with some reactions manifesting acutely during or shortly after chemotherapy administration, while others exhibited delayed onset days to weeks post-treatment initiation. This temporal variability underscores the importance of comprehensive patient education, symptom monitoring, and early intervention strategies to anticipate and manage ADRs throughout the treatment continuum effectively.

The association between specific chemotherapy regimens and the incidence of ADRs provides valuable insights into regimen-specific toxicity profiles and informs treatment selection and individualized risk assessments. Platinum-based regimens, such as Platinum Plus, exhibited a higher incidence of hematologic ADRs, consistent with their known myelosuppressive effects, while Taxane-based regimens, such as Taxol Triumph, demonstrated a propensity for dermatologic toxicities, including alopecia and nail changes. These observations underscore the need for personalized treatment approaches tailored to individual patient characteristics, including age, comorbidities, performance status, and pharmacogenetic factors, to optimize therapeutic outcomes while minimizing treatment-related morbidity.

Moreover, the identification of chemotherapy regimen-specific ADR patterns facilitates comparative effectiveness research and quality improvement initiatives aimed at optimizing treatment protocols, enhancing patient safety, and minimizing healthcare resource utilization. By leveraging real-world data and evidence-based practices, healthcare providers can refine treatment algorithms, develop risk stratification strategies, and implement proactive monitoring protocols to anticipate and mitigate ADRs effectively, thereby enhancing the overall quality of cancer care delivery.

CONCLUSION

In conclusion, this study provides valuable insights into the patterns of ADRs associated with cancer chemotherapy regimens, highlighting the multifactorial nature of treatment-related toxicities and the importance of tailored interventions to optimize patient outcomes. By elucidating regimen-specific ADR profiles and risk factors, healthcare providers can make informed treatment decisions, implement

proactive management strategies, and enhance patient safety and quality of life throughout the cancer care continuum.

REFERENCES

[1] Sharma A, Kumari KM, Manohar HD, Bairy KL, Thomas J. Pattern of adverse drug reactions due to cancer chemotherapy in a tertiary care hospital in South India. Perspect Clin Res 2015;6(2):109-15.

[2] Lakshyajeet Nath, Urmi Choudhury, Mangala Lahkar. A Study about the pattern of adverse effects of various oncology drugs in a Tertiary Care Hospital of North East India. Research Journal of Pharmacology and Pharmacodynamics 2022;14(4):208-2.

[3] Naranjo CA, Busto U, Sellers EM, Sandor P, Ruiz I, Roberts EA, et al. A method for estimating the probability of adverse drug reactions. Clin Pharmacol Ther 1981; 30:239–45.

[4] Wahlang JB, Laishram PD, Brahma DK, Sarkar C, Lahon J, Nongkynrih BS. Adverse drug reactions due to cancer chemotherapy in a tertiary care teaching hospital. Therapeutic Advances in Drug Safety 2017;8(2):61-66.

[5] Hartwig SC, Siegel J, Schneider PJ. Preventability and severity assessment in reporting adverse drug reactions. Am J Hosp Pharm 1992; 49:2229–32.

[6] Schumock GT, Thornton JP. Focusing on the preventability of adverse drug reactions. Hosp Pharm 1992; 27:538.

[7] Prasad A, Datta PP, Bhattacharya J, Pattanayak C, Chauhan AS, et al. Pattern of adverse drug reactions due to cancer chemotherapy in a tertiary care teaching hospital in Eastern India. J Pharmacovigilance 2013; 1:107.

[8] Mallik S, Palaian S, Ojha P, Mishra P. Pattern of adverse drug reactions due to cancer chemotherapy in a tertiary care teaching hospital in Nepal. Pak J Pharm Sci 2007; 20:214–8.

[9] Soldin OP, Chung SH, Mattison DR. Sex differences in drug disposition. J Biomed Biotechnol 2011; 2011:187103

[10] Gandhi M, Aweeka F, Greenblatt RM, Blaschke TF. Sex differences in pharmacokinetics and pharmacodynamics. Annu Rev Pharmacol Toxicol 2004; 44:499–523.