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Case Study

Toxicity Outcomes of Cisplatin-Based Chemotherapy in Cervical and Head & Neck Cancers; An Ambi-Spective Analysis

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ABSTRACT

Cancer is characterised by abnormal cell division, which can invade nearby tissues. It is a disease in which a group of irregular cells grows uncontrollably through cell division. All cancers/ tumours disrupt normal cell proliferation, and for each cell, there are a limited number of ways this disruption can occur. Cancer cells arise due to the imbalance in the body functions and they invade and infect the normal cells. The term "cancer" refers to a collection of illnesses rather than a single disease. Nearly eighty-five percent of these tumors occur in less populated regions. The majority of cervical lesions, both precancerous and cancerous, are caused by infections with strains of HPV that are considered high-risk or oncogenic. Cisplatin, cisplatinum used for various cancers in a similar mechanism of inhibiting tumor cell growth and development., cisplatin can be used as alone or along with chemoradiation therapy. The present ambi-spective comparative study was conducted to evaluate and compare the incidence and severity of cisplatin-induced toxicities among cervical cancer and head & neck cancer patients. A total of 276 patients receiving weekly cisplatin therapy were included in the study conducted at Durgabai Deshmukh Hospital and Research Centre, Hyderabad. Data were collected from patient case records, laboratory reports, and treatment charts. Statistical analysis was performed using appropriate comparative tests. [1,3]

INTRODUCTION

Cancer is characterized by uncontrolled abnormal cell proliferation capable of invading surrounding tissues and metastasizing to distant organs. Cervical cancer and head & neck squamous cell carcinoma (HNSCC) are among the major malignancies worldwide and contribute

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significantly to cancer-related morbidity and mortality. Cisplatin-based chemotherapy remains the standard treatment approach for both cancers, particularly in concurrent chemoradiation protocols. [1] Cisplatin exerts its anticancer activity by forming DNA cross-links, thereby inhibiting DNA replication and transcription, ultimately inducing apoptosis in rapidly dividing cells. Although highly effective, cisplatin therapy is frequently associated with dose-limiting toxicities including nephrotoxicity, neurotoxicity, ototoxicity, myelosuppression, nausea, vomiting, and electrolyte disturbances. These toxicities may reduce treatment adherence and compromise therapeutic efficacy. However, comparative data regarding toxicity profiles between cervical and head & neck cancer patients remain limited. [4-7]

MATERIALS AND METHODS

An ambi-spective, comparative, non-randomized study was conducted in the Department of Oncology at Durgabai Deshmukh Hospital and Research Centre, Renova, Hyderabad. The study duration was six months with a total sample size of 276 patients diagnosed with cervical cancer or head & neck cancer receiving cisplatin-based chemotherapy.

DOSAGE REGIMEN

- Standard dose regimen is 40mg/m2 Intravenous (IV) infusion once weekly along with radiotherapy.
- Maximum dose is 70mg/m2 and number of cycles are 5 – 6 [8,9]

Inclusion Criteria

- Patients aged ≥18 years
- Histopathologically confirmed cervical or head & neck cancer
- Patients receiving weekly cisplatin therapy
- Availability of laboratory and treatment records

Exclusion Criteria

- Pregnant or lactating women
- Patients with severe renal impairment, cardiovascular disease, or existing ototoxicity
- Patients unwilling to comply with study protocol

Data Collection

Patient demographic data, chemotherapy cycles, laboratory investigations, toxicity profiles, and treatment details were collected from patient case sheets and medical records. Toxicity assessment included nephrotoxicity, neurotoxicity, hepatotoxicity, ototoxicity, electrolyte imbalance, emetogenic response, and myelosuppression.

Statistical Analysis

Data were analyzed using Microsoft Excel and statistical software. Continuous variables were expressed as Mean ± SD, while categorical variables were represented as percentages. Statistical significance was determined using unpaired t-test, chi-square test, Fisher's exact test, or Mann–Whitney U-test, with $P<0.05$ considered significant.

RESULTS AND DISCUSSION

The study included 138 cervical cancer patients and 138 head & neck cancer patients receiving cisplatin therapy. The mean age of cervical cancer patients was 49.13 ± 12.06 years, whereas head & neck cancer patients had a significantly higher mean age of 52.54 ± 11.07 years ($P=0.015$).

Chemotherapy cycle distribution between the two groups showed no statistically significant difference ($P=0.580$), indicating comparable cumulative exposure to cisplatin. Gender distribution demonstrated a highly significant difference ($P<0.001$), with cervical cancer patients being exclusively female and head & neck cancer patients predominantly male.

The most frequently observed toxicities included:

- Severe nausea and vomiting (emetogenic toxicity)
- Nephrotoxicity with elevated creatinine levels
- Myelosuppression including anemia and neutropenia
- Electrolyte disturbances such as hypomagnesemia and hypokalemia
- Peripheral neuropathy and ototoxicity

Similar findings have been reported in previous studies comparing weekly cisplatin schedules in concurrent chemoradiation therapy in both cervical and head & neck cancers. Supportive care including hydration therapy, antiemetics, nutritional supplementation, and regular laboratory monitoring played a crucial role in minimizing toxicity-related complications.

CONCLUSION

This ambi-spective study explored the cisplatin effects in patients with cervical cancer compared to those with head & neck cancer in our centre. We analysed 276 case records including 138 cervical and 138 head & neck cancer patients treated with cisplatin-based chemoradiation. Cervical cancer patients were, on average, younger than head & neck cancer patients (P = 0.015), which matches the usual clinical observation that cervical cancer tends to present earlier in life, not the groups of cancers received a similar number of chemotherapy cycles(2^{nd} to 6^{th} cycles, P = 0.580), so differences in toxicity are more likely related to dose intensity and patient factors than to cycle count alone. When studied together, these observations highlight that cisplatin toxicity is shaped by more than just the drug itself. Age, gender, baseline organ function, comorbidities, lifestyle factors and the need to higher doses in certain tumour sites all influence how patients experience treatment. These results emphasise that cancer type, dose intensity and patient characteristics play a major role in shaping cisplatin toxicity. For head & neck cancer in particular, careful baseline assessment, cautious dose planning and close follow-up are essential to prevent serious treatment-related harm. For cervical cancer, the data support continued use of cisplatin-based regimens with routine monitoring and supportive care.

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