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PREDICTIVE VALUE OF SERUM TRACE ELEMENTS FOR CHEMOTHERAPEUTIC EFFICACY IN GASTRIC AND COLON CANCER: A CROSS-SECTIONAL STUDY

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Abstract

Introduction: *Colorectal cancer remains a leading cause of cancer mortality worldwide, characterized by significant heterogeneity in therapeutic response. Essential trace elements, serve as critical cofactors in DNA repair mechanisms, apoptotic signaling, and drug transport. This study aimed to evaluate the predictive value of baseline serum levels of these elements regarding the clinical response to first-line chemotherapy in patients with colon cancer.*

Material and Methods: *This descriptive-analytical cross-sectional study was conducted at Imam Khomeini Hospital, Urmia University of Medical Sciences, Iran. A total of 30 patients with histologically confirmed colon cancer receiving standard platinum-based chemotherapy were enrolled. Pre-treatment serum concentrations of Zn, Cu, and Mg were quantified using colorimetric assays. Treatment response was evaluated upon completion of the regimen according to RECIST criteria. Associations between trace element levels and chemotherapy response (Complete Response vs. Non-Response) were analyzed using independent t-tests and multivariate logistic regression.*

***Results*:** *The cohort exhibited a mean age of 60.31 ±10.61 years and a distinct female predominance (63.3 %). A high rate of therapeutic resistance was observed, with 56.7 % of patients classified as non-responders. Patients achieving a Complete Response demonstrated significantly higher baseline serum Magnesium levels (2.07 ± 0.22 mg/dL) compared to non-responders (1.83 ± 0.36 mg/dL; P=0.047). Multivariate logistic regression identified serum Magnesium as a significant independent predictor, where higher levels reduced the likelihood of non-response (P=0.048). Serum Zinc and Copper levels did not show statistically significant associations with treatment outcomes in this cohort (P>0.05).*

Conclusion: *Baseline serum Magnesium levels are significantly associated with chemotherapy efficacy in colon cancer patients. These findings suggest that adequate magnesium status may facilitate optimal pharmacodynamic activity, potentially by modulating the cellular uptake of platinum-based agents. Routine assessment of serum Magnesium could serve as an accessible biomarker for stratifying patients at risk of chemoresistance.*

Keywords: *Colon Cancer, Magnesium, Trace Elements, Chemotherapy Response, Biomarkers*

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