Identifying Patient-Specific Risk Factors of Chemotherapy-Induced Nausea and Vomiting Using Electronic Medical Records

Cancer, the second major cause of death in the United States, requires chemotherapy for nearly every treatment plan. Chemotherapy-Induced Nausea and Vomiting (CINV) are dreaded side-effects of chemotherapy, threatening patients' wellbeing and willingness to undergo life-saving treatment. Despite recent improvements in CINV management, up to 62% of chemotherapy patients still experience CINV. Not all prevention guidelines consider patient-related risk factors. Consequently, physicians use their personal experiences for CINV treatment, leading to inconsistent management. Moreover, the predictors of CINV may vary based on the emetogenicity of the chemotherapy, yet few studies investigated this. Our aim is to improve CINV management and preventive treatment plans by identifying predictors based on patient-specific risk factors. Our single-center retrospective observational study used 6,124 chemotherapy events from the electronic medical records at the University of Missouri Ellis Fischel Cancer Center. The data for acute and delayed CINV were grouped into low, moderate, and high emetogenic chemotherapies (LEC, MEC, HEC). These six subgroups underwent univariate and multivariate analyses. The common risk factors were current smoker, lower alcohol use, anxiety, dehydration, prior chemotherapy, and prior CINV. Other factors were only significant for certain treatment emetogenicities; namely, female sex and lower age were only risk factors for LEC, while non-obese and non-Hispanic were risk factors for HEC. Having more comorbidities was a risk factor for MEC and HEC, while stages III and IV cancer cases were risk factors for LEC and MEC. Additionally, dehydration before chemotherapy was discovered as a previously unexplored predictor. Our study utilized the vast abundance of electronic medical records to find strong associations between patient-related factors and the risk of CINV. These associations allow clinicians to assess the risk of CINV for specific patients given their treatment emetogenicity, leading to more evidence-based and patient-specific clinical treatment, better life quality of patients, and reduced healthcare costs.