THE KOREAN SOCIETY OF NEPHROLOGY
APCN & KSN 2024
June 13(Thu) - 16(Sun), 2024 Coex, Seoul, Korea
Promoting Sustainable Kidney Health: The Asia-Pacific and Beyond

Abstract Submission No.: A-0958

Global risk of acute kidney injury and tubulointerstitial nephritis following anticancer drug administration, 1967-2023: long-term pharmacovigilance analysis

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Objectives : Various anticancer drugs are being used worldwide with the advancement of anticancer drugs. Anticancer agents may be nephrotoxic and the aim of this study was to analyze the global risk of renal adverse reactions based on different types of anticancer drugs.
Methods : Between December 1967 to July 2023, we analysed the association between different types of anticancer drugs and the risk of acute kidney injury (AKI) or tubulointerstitial nephritis (TIN) using the World Health Organization pharmacovigilance database. The effect size was assessed using the reporting odds ratio (ROR) through disproportionate Bayesian reporting method. The 306 anticancer drugs were classified into four groups: cytotoxic therapy, hormone therapy, immunotherapy, and targeted therapy.
Results : We identified 32,722 cases of AKI and 2,056 cases of TIN that were reported as renal adverse reactions related to anticancer drugs. Cytotoxic therapies consistently accounted for 13,925 cases, while AKI cases related to targeted therapies and immunotherapies increased to 14,236 and 3,816 cases, respectively, over three decades. The use of immunotherapy between 2015 and 2020 led to a significant increase in TIN, surpassing other categories of anticancer drugs. The highest disproportionality signal for AKI was associated with immunotherapies (ROR, 8.92; confidence interval [CI], 8.63–9.21, followed by cytotoxic therapies (ROR, 7.14; 95% CI, 7.01–7.26), targeted therapies (ROR, 5.83; 95% CI, 5.73–5.93), and hormone therapies (ROR, 2.59; 95% CI, 2.41–2.79). The analysis showed a significantly higher disproportionality signal for immunotherapies (ROR, 21.74; 95% CI, 20.39–23.18) in the case of TIN, followed by cytotoxic therapies (ROR, 2.60; 95% CI, 2.40–2.82), and targeted therapies (ROR, 1.54; 95% CI, 1.40–1.69).
Conclusions : AKI and TIN were observed significantly after administering anticancer drugs. It is crucial to note that renal adverse reactions were more prominent with immunotherapy, which is increasingly used, compared to other types of anticancer drugs.