Bioinformatics-guided Disproportionality Analysis of Sevoflurane-Induced Nephrogenic Diabetes Insipidus using the FDA Adverse Event Reporting System (FAERS) Database.

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Abstract

C. Abstract AIM: Sevoflurane is an ether-based inhalational anesthetic that induces and maintains general anesthesia. Our study aimed to detect sevoflurane-induced nephrogenic diabetes insipidus using Data Mining Algorithms (DMAs) and molecular docking. The FAERS database was analyzed using OpenVigil 2.1 for disproportionality analysis. Methods: We analyzed FAERS data from 2004 to 2022 to determine the incidence of nephrogenic diabetes insipidus associated with sevoflurane. Reporting Odds Ratios (RORs) and Proportional Odds Ratios (PRRs) with 95% confidence intervals were calculated. We also used molecular docking with AutoDock Vina to examine sevoflurane's binding affinity to relevant receptors. Results: A total of 554 nephrogenic diabetes insipidus cases were reported in FAERS, of which 2.5% (14 cases) were associated with sevoflurane. Positive signals were observed for sevoflurane with reporting odds ratios (ROR) of 76.012 (95% CI: 44.67-129.35) and proportional odds ratios (PRR) of 75.72 (Chi-sq: 934.688). Of the 14 cases, 50% required hospitalization, 14% resulted in death, and the remaining cases were categorized as other outcomes. Molecular docking analysis showed that sevoflurane exhibited high binding affinity towards AQP2 (4NEF) and AVRP2 (6U1N) with docking scores of -4.9 and -5.3, respectively. Conclusion: Sevoflurane use is significantly associated with the incidence of nephrogenic diabetes insipidus. Healthcare professionals should be cautious when using this medication and report any adverse events to regulatory agencies. Further research is needed to validate these findings and identify risk factors while performing statistical adjustments to prevent false-positives. Clinical monitoring is crucial to validate potential adverse effects of Sevoflurane.

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