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RWD62

Signal Detection and Bioinformatics Analysis of Amitriptyline: A Pharmacovigilance Study Using FAERS

Mr. Manoj Kumar G B*, Dr. E Maheswari
Department of Pharmacy Practice, Faculty of pharmacy,
MS Ramaiah University Of Applied Sciences, Bangaluru, Karnataka, India-560054

INTRODUCTION

Amitriptyline is a widely prescribed tricyclic antidepressant utilized for managing depression, neuropathic pain, and migraines. Despite its therapeutic benefits, there are concerns regarding its safety profile, particularly in relation to rare adverse effects. This study leverages the FDA Adverse Event Reporting System (FAERS) to identify potential new signals associated with amitriptyline, focusing on cerebral microhemorrhage.

OBJECTIVE

•To detect and analyze adverse drug reactions (ADRs) related to amitriptyline using the FAERS database.

•To perform a disproportionality analysis to identify significant signals of adverse effects.

•To explore the molecular interactions of amitriptyline with proteins associated with identified side effects.

METHOD

•Data Source: FAERS database was utilized to extract reports related to amitriptyline from its introduction in 1961 to June 2024.

•Analysis Techniques: Disproportionality analysis was conducted using the Open Vigil 2 database.

•Reporting Odds Ratio (ROR) and Proportional Reporting Ratio (PRR) were calculated to assess the strength of the association between amitriptyline and adverse effects.

•A positive signal was defined by PRR ≥ 1, ROR - 1.96SE > 1, and chi-square > 4.

•Bioinformatics Analysis: Identified proteins linked to cerebral microhemorrhage were analyzed for binding affinities with amitriptyline using various bioinformatics tools.

RESULTS

1. Data collected from FAERS

- A total of 18,665 reports related to amitriptyline were identified in the FAERS database.
- From 1969 to 2024, 131 cases of cerebral microhemorrhage were reported, with **5** cases directly linked to amitriptyline.

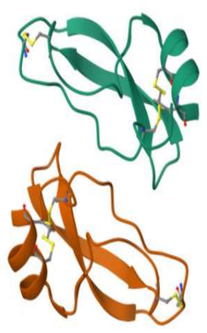
2. Disproportionality Analysis

- The calculated PRR was 25.915 (95% CI: 4.26-25.45),RRR was 26.73 and the ROR was 25.452 (95% CI: 4.26-25.46), indicating a strong association.
- The chi-squared value was 5.71, demonstrating a significant difference between observed and expected cases.

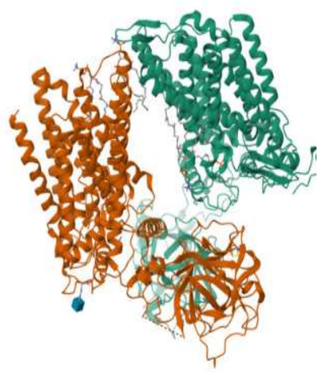
3. Gene and Pathway Analysis

- Proteins associated with cerebral microhemorrhage

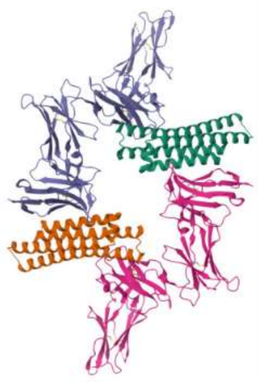
A. 1AAP



B. 6P25

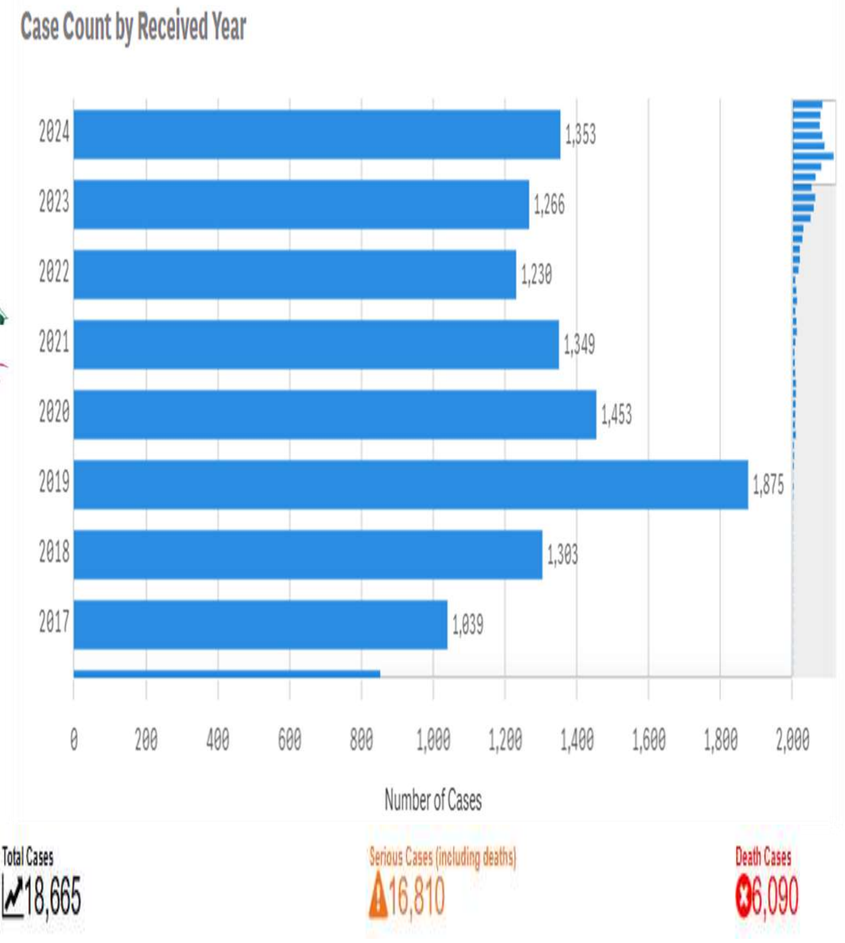


C. 8GRX



4. Molecular Docking:-

Gene Protein	Binding affinity
1AAP	-6.1
6P25	-7.8
8GRX	-7.2



CONCLUSIONS

- This pharmacovigilance study confirms that amitriptyline may be associated with cerebral microhemorrhage.
- The findings underscore the necessity for healthcare professionals to monitor patients closely for this potential risk.
- Further research is to be carried out to elucidate the underlying mechanisms and establish a definitive causal relationship.

REFERENCES

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CONTACT INFORMATION

Mail : Manumahaveer2602@gmail.com Ph.no: +91 9036479906
Maheswarieswar@gmail.com