Does Co-Ingestion with Benzodiazepines Reduce the Rate of Seizures in Overdose? A Review of the Toxicology Investigators Consortium Database

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Background: While benzodiazepines are first line treatments for seizures and serotonin toxicity, they are also common co-ingestants in overdose.

Objective: Determine if co-ingestion of benzodiazepines decreases the rate of seizures or serotonin toxicity in common epileptogenic and serotonergic overdoses.

Methods: We queried the ToxIC database for ingestions of TCA's, bupropion, citalopram, and venlafaxine. Cases were separated according to presence or absence of benzodiazepine co-ingestion, and clinical features were compared.

Results: In bupropion overdose, co-ingestion of benzodiazepines was associated with lower rates of seizures (OR 0.19, CI 0.07–0.47) and tachycardia (OR 0.33, CI 0.14–0.77), but higher rates of CNS (OR 3.6, CI 2.16–6.11) and respiratory depression (OR 3.4, CI 1.68–6.87). In citalopram overdose, co-ingestion of benzodiazepines was associated with lower rates of seizures (OR 0.32, CI 0.15–0.68), serotonin toxicity (OR 0.40, CI 0.21–0.77), tachycardia (OR 0.26, CI 0.11–0.60), and hyperreflexia/myoclonus (OR 0.30, CI 0.16–0.57), but higher rates of CNS depression (OR 3.06, CI 2.06–4.54). In venlafaxine overdose, coingestion of benzodiazepines was associated with lower rates of seizures (OR 0.18, CI 0.04–0.76) and tachycardia (OR 0.14, CI 0.04–0.46), but higher rates of CNS depression (OR 2.66, CI 1.65–4.30). In TCA overdose, co-ingestion of benzodiazepines was only associated with lower rate of tachycardia (OR 0.28, CI 0.12–0.65) and agitation (OR 0.31, CI 0.15–0.65), but not increased rates of CNS depression.

Discussion: This study demonstrates co-ingestion of benzodiazepines may decrease rates of seizures in several common epileptogenic overdoses. However, in most overdoses, benzodiazepine co-ingestion also increased rates of CNS depression. Additionally, concomitant benzodiazepine ingestion in citalopram overdose seems to have no effect on serotonin toxicity.

Conclusion: Benzodiazepine co-ingestion may offer some protection against seizures in select overdoses but may increase rates of CNS depression.