

# Single-Agent Bupropion Overdose Presenting as Serotonin Syndrome: A Case Report and Literature Review

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## Background

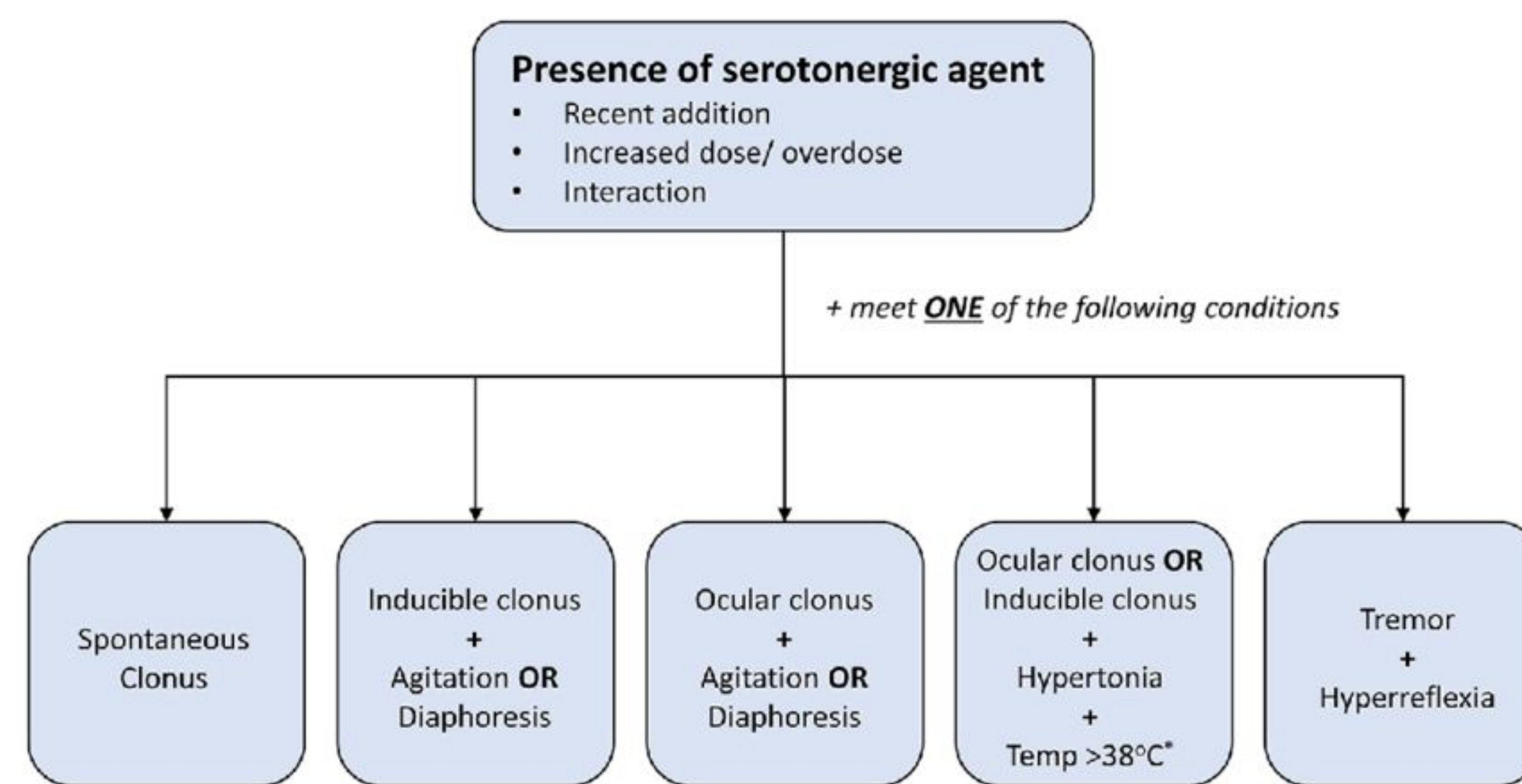
- Bupropion is a dopamine norepinephrine reuptake inhibitor (DNRI) known to work in the mesocorticolimbic pathway [1].
- Bupropion has indirect effects on serotonergic neurons through inducing increased norepinephrine release in the raphe nucleus and locus coeruleus [1].
- Overdose: tachycardia, tremor, hallucinations, seizures, and agitation [2].

## Case

19-year-old man with a history of major depressive disorder who presented to the emergency department reporting ingestion of 22 tablets of bupropion XL 150mg. EKG, CK, CMP, and CBC were unremarkable with a negative urine drug screen. At hour 9, the patient exhibited tachycardia, confusion, slurred speech, and agitation, followed by a tonic-clonic seizure aborted with a total of lorazepam 4mg. On follow-up exam at hour 17, the patient had tachycardia, confusion, agitation, dry lips and tongue, sustained clonus bilaterally, myoclonus, and 4+ reflexes with contralateral and ipsilateral spread, meeting Hunter Serotonin Toxicity Criteria. Bupropion and hydroxybupropion levels were drawn at hour 19, which later resulted with 152 ng/mL and >3000 ng/mL respectively. Agitation was managed with a total of diazepam 20mg (hospital-wide lorazepam shortage was ongoing). The following day, the patient was at baseline mentation with decreased clonus and hyperreflexia. He was medically cleared after a total of 1.9 days for further treatment at an inpatient psychiatric hospital.

## Literature Review and Discussion

	Formulation	Amount	Level bup/hydroxybup (hr collected)	Clonus	Agitation	Tremor	Hunters criteria	Seizure	Treatment	LOS
38 F	n/a	3000mg	n/a	sustained	yes	yes	yes	no	benzos	3.1d
22 F	n/a	1500mg	n/a	none	no	yes	yes	no	benzos	1.7d
47 M	n/a	6000mg	n/a	sustained	yes	no	yes	no	benzos	2.3d
21 F	n/a	4500mg	n/a	3-4 beats	yes	no	yes	yes	benzos	1.7d
23 F	n/a	900mg	n/a	2 beats	yes	yes	yes	no	benzos	1.5d
20 F	n/a	1500mg	n/a	Sustained, ocular	no	yes	yes	no	benzos	5.2d
14 M	Bupropion IR	2250mg	15/960 (72)	5-6 beats	yes	yes	yes	yes	benzos , cypro, intubation	4d
19 F	Bupropion XL	7950mg	967/3310 (14)	positive	yes	no	yes	yes	benzos , cypro, intubation	1.5d
15 M	Bupropion XL	3000mg	280/3100 (17)	positive	yes	no	yes	yes	benzos	1.5d



Hunter Serotonin Toxicity Criteria [5]

- There is little literature on single agent bupropion overdose resulting in serotonin syndrome.
- There were 3 articles located with a total of 9 patients who, in combination, presented with the following: 77.8% agitation, 88.9% clonus, 44.4% seizures, and 55.6% tremors [1, 3, 4].
- 100% of the cases met Hunter's Criteria.
- Treatment included cyproheptadine and benzodiazepines.

## Conclusions

- As bupropion is known by most psychiatrists as a pure DNRI, it is uncommon to consider that bupropion itself could cause serotonin toxicity in overdose. Psychiatrists need to be aware of this rare but possible complication in single agent overdose.

### Considerations in Single-Agent Bupropion Overdose with Serotonin Toxicity

- Diagnose using Hunter Serotonin Toxicity Criteria
- Pre-treat using benzodiazepines if there is suspicion
- Manage agitation with benzodiazepines
- Expect clinical improvements within 24 hours

## References

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