International Journal of Medical Toxicology & Forensic Medicine

January 2026, Volume 16, E51512

Case Report

Bupropion-Induced Cardiotoxicity in the Setting of Fluoxetine Therapy: A Case Study

Wala Sati[1]*, Sujood Abdelwakeel[1,2], Yagen Ismail[1], Tibyan Yahya[2], Mohammed Elrayah[3]

1. *Emergency Medicine and Medical Toxicology, Hamad Medical Corporation, Qatar.*
2. *Ahfad University for Women, Khartoum, Sudan.*
3. *Ministry of Health, Riyadh, Riyadh, Saudi Arabia.*

Citation Sati W, Abdelwakeel S, Ismail Y, Yahya T, Elrayah M. Bupropion-Induced Cardiotoxicity in the Setting of Fluoxetine Therapy: A Case Study. International Journal of Medical Toxicology and Forensic Medicine. 2026; 16:E451512.

https://doi.org/10.22037/ijmtfm.v16.51512

Article info:

Received: 28 Jan, 2026

First Revision: 11 Feb, 2026

Accepted: 28 Feb, 2026

Published: 01 Mar, 2026

Keywords:

Bupropion overdose, Bupropion cardiotoxicity, Fluoxetine, ECMO

ABSTRACT

Background and Aim: Bupropion, a monocyclic phenylethylamine antidepressant, is the only FDA-approved synthetic cathinone, commonly prescribed as monotherapy or adjunctive therapy for major depressive disorder, seasonal affective disorder, and smoking cessation.

Case Presentation: Although traditionally considered non-serotonergic, bupropion overdose has been associated with serotonin syndrome (SS), particularly when combined with other serotonergic agents like fluoxetine. Bupropion overdose may cause tachycardia, QRS widening, and QTc prolongation, but these effects are usually transient and resolve within a few days. Co-ingestion with other drugs can worsen toxicity. Sodium bicarbonate shows inconsistent benefit, and while most patients recover fully, severe cases can occasionally result in fatal arrhythmias. The management of bupropion toxicity encompasses administration of activated charcoal for recent ingestion, stabilization of cardiovascular and neurological function, and continuous cardiac monitoring due to the potential for arrhythmias and QT interval prolongation. Sodium bicarbonate may be considered in cases of QRS complex widening despite lack of evidence. Benzodiazepines represent the primary therapy for seizure activity and agitation. Supportive care measures—including intravenous fluid administration, correction of electrolyte imbalances, and temperature regulation—are crucial, especially in addressing delayed complications associated with extended-release bupropion formulations. This case describes a young woman with depression who overdosed on bupropion while taking fluoxetine. She developed recurrent seizures, QT prolongation, ventricular tachycardia, and cardiovascular collapse, ultimately requiring ECMO. Extubation failed on day four, and she died on day seven.

Conclusion: The case underscores the risk of severe complications from bupropion-fluoxetine toxicity, stressing the importance of close monitoring and prompt intervention.

*** Corresponding Author:**

Wala Sati, MD

Emergency Medicine and Medical Toxicology, Hamad Medical Corporation, Qatar.

E-mail: *walasati9@gmail.com*

Copyright © 2026 The Author(s);

This is an open access article distributed under the terms of the Creative Commons Attribution License (CC-By-NC: https://creativecommons.org/licenses/by-nc/4.0/legalcode.en), which permits use, distribution, and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

Introduction

Bupropion is the only FDA-approved synthetic cathinone. It increases norepinephrine in the locus coeruleus and dorsal raphe nucleus, enhancing serotonergic neuron activity. As a well-tolerated antidepressant, it is suitable for major depression and seasonal affective disorder, with efficacy comparable to other antidepressants. Bupropion can be used with SSRIs but should not be combined with monoamine oxidase inhibitors.

Bupropion overdose can cause cardiotoxic effects such as tachycardia, QRS widening, and QTc prolongation, although these rarely progress to life-threatening arrhythmia. Most patients recover fully within two to four days after ingestion. In some cases, co-ingestion with other medications, such as paroxetine, can worsen conduction abnormalities, including significant QRS and QTc prolongation or bundle-branch block. While sodium bicarbonate is often used in management, its effectiveness in improving conduction delays appears inconsistent, showing benefit in some cases but no significant improvement in others. Overall, bupropion-induced cardiotoxicity tends to be self-limiting, though severe cases can lead to serious arrhythmia or, rarely, fatal outcomes.

Seizures are the primary risk in overdose cases, though bupropion is generally safe. Despite its therapeutic use, bupropion exposure cases reported to the National Poison Data System (NPDS) rose by 75% between 2000 and 2013. Its effect on serotonin receptors is as debated as its mechanism itself. While it does not directly act on serotonin receptors, its influence on NE release appears to indirectly increase serotonergic neuron firing, potentially due to direct agonism without the regulatory feedback usually provided by 5-HT1A receptors. Therefore, while bupropion lacks direct serotonergic action, its indirect stimulation of serotonergic cells may underlie cases of serotonin toxicity (ST).

Case Presentation

This case involves a 26-year-old female with a history of major depressive disorder, who was undergoing pharmacological treatment with bupropion and fluoxetine prescribed by her psychiatrist. She had no significant medical history and was otherwise healthy, and weigh of 56 kg. She was brought to the emergency department (ED) after self-reporting ingestion of 20 tablets of Bupropion, each containing 300 mg in an extended-release formulation in a suicide attempt. Notably, she contacted emergency medical services (EMS) herself, seeking assistance around 4 hrs post-ingestion.

While en route to the hospital with EMS, the patient was initially alert and hemodynamically stable. Soon after, she experienced vomiting followed by a generalized tonic-clonic seizures. Upon initial evaluation in the emergency department, the patient appeared confused and in a postictal state. She exhibited signs of significant distress, including tachycardia (heart rate of 164 bpm) and tachypnoea (respiratory rate of 48 breaths per minute). Her initial blood pressure BP was stable at 121/76 mmHg, oxygen saturation was maintained at 98% on room air, and her body temperature was 36.8°C. Despite receiving two doses of intravenous (IV) lorazepam (4 mg each), the patient continued to experience recurrent seizures (A total of seven seizures) without regaining her consciousness between episodes, leading to a diagnosis of status epilepticus.

Her venous blood gas (VBG) analysis revealed metabolic acidosis with elevated lactate levels (Table 1). The initial electrocardiogram (ECG) revealed sinus tachycardia with narrow QRS complexes, characterised by prolonged QTc interval of 495 ms (Figure 1), which subsequently increased to 566 ms. Her condition rapidly deteriorated, and her BP dropped to 74/34. She developed non-sustained ventricular tachycardia (VT), progressing to sustained VT. She was treated with 2 g of intravenous magnesium sulfate; however, the arrhythmia persisted despite two attempts at synchronized cardioversion. Following the administration of 150 mEq of intravenous bicarbonate, her cardiac rhythm reverted to sinus tachycardia. Subsequently, she was intubated using fentanyl, propofol, and rocuronium for induction and maintained on continuous infusions of midazolam and fentanyl to ensure adequate sedation.

A left radial artery catheter was successfully placed

Table 1. VBG results.

Parameter	Result	Normal value
pH	7.206	7.320-7.420
PCO2	41 mmHg	41-51
PO2	57 mmHg	25-40
Na	143 mmol/L	135-145
K	3.6 mmol/L	3.5-5.0
Cl	107 mmol/L	96-110
Glucose	7.6 mmol/L	3.3-5.5
HCO3(st)	15.6 mmol/L	21.8-26.2
Lactate	9.70 mmol/L	0.50-2.20

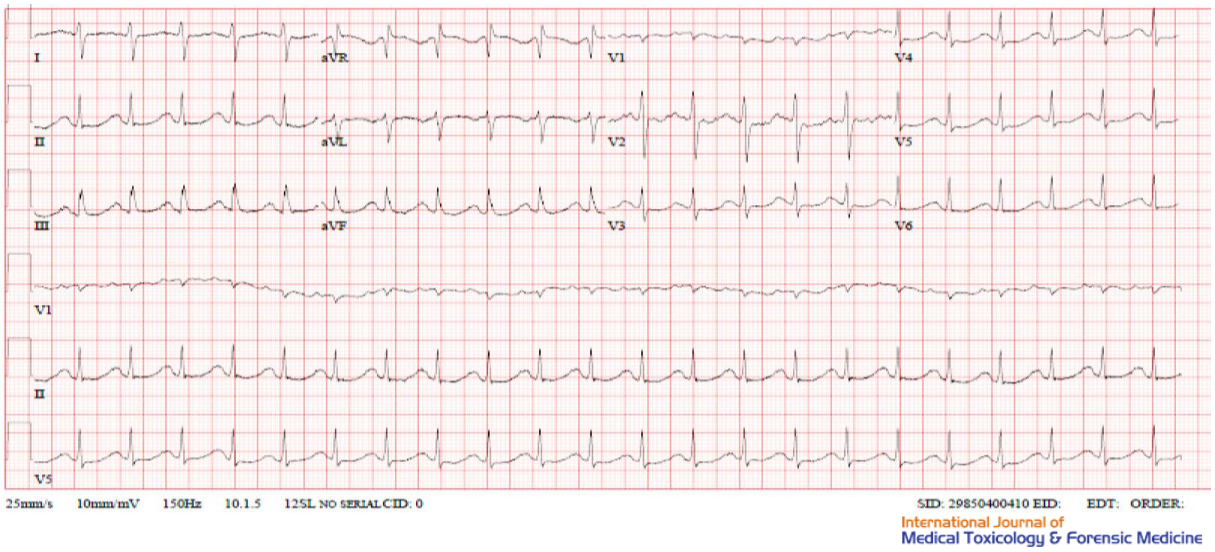

Figure 1. ECG showing sinus tachycardia with prolonged QTc of 495 ms.

for continuous hemodynamic monitoring. The toxicology team was consulted, and the patient was admitted to the intensive care unit (ICU) for further management.

Despite being supported with noradrenaline, her vital signs remained unstable, with persistent tachycardia (heart rate of 120 bpm) and blood pressure of 130/80 mmHg, while receiving noradrenaline at 0.25 mcg/kg/min and a sodium bicarbonate infusion. The ventilator settings were adjusted to volume-controlled continuous mandatory ventilation (VC-CMV) mode with a tidal volume of 400 ml, a respiratory rate of 20 bpm, PEEP of 5 cm H2O, and FiO2 of 40%. Overnight, the patient displayed signs of agitation and generalized body jerks, indicative of continued seizure activity. She also developed intermittent febrile spikes, with her C-reactive protein (CRP) rising to 102 mg/L (normal range <5). Given these findings, she was initiated on a Cisatracurium infusion in addition to her ongoing sedation and intravenous amoxicillin/clavulanic acid antibiotics while awaiting the results of her septic workup.

On the third day of admission, the patient was intermittently awake and restless but able to follow commands. Her repeated ECG revealed normalization of her QTc intervals. Based on her clinical status, she was extubated after tolerating spontaneous breathing mode and placed on nasal cannula oxygen. However, shortly afterwards, she became increasingly agitated and experienced an episode of apnoea, desaturation, worsening respiratory acidosis, and aggressive behaviour, necessitating re-intubation. Post-intubation chest X-ray revealed right pulmonary infiltrates suggestive of aspiration pneumonia and bilateral small pleural effusions (Figure 2).

The patient continued to experience spikes in fever, and her C-reactive protein (CRP) levels rose to 225 mg/L. Blood cultures were negative for bacterial growth, but her urine culture identified Escherichia coli, prompting escalation of antibiotics to Meropenem. Due to her fever and agitation, serotonin syndrome (SS) was suspected, and Cyproheptadine was initiated. A CT scan of the head, followed by an MRI, showed no abnormalities. Neurology consultation noted moderate diffuse slowing on EEG without active epileptic discharges, effectively ruling out seizures.

Elevated inflammatory markers remained present. Despite implementation of supportive interventions, the patient's clinical status continued to decline, with ongoing fever (Temperature 39°C), progressive renal impairment, increased C-reactive protein levels, and abnormal liver function tests. Notably, myoglobin concentrations demonstrated a decrease from 740 ng/mL at admission to 328 ng/mL (Table 2).

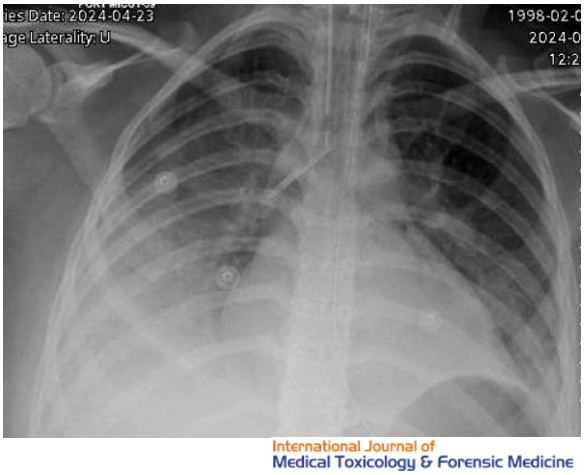

Figure 2. Post-intubation chest X-ray showing right pulmonary infiltrates suggestive of aspiration pneumonia and bilateral pleural effusions.

Table 2. Patient's blood results after deteriorating.

Detail	Value w/ unit	Normal range
WBC	11.5 x 10^9/L	4-10
Haemoglobin	9 g/dl	12- 15
Prothrombin Time	15.8 sec	9.4-12.5
Creatinine	90 umol/l	44 - 80
Potassium	3.3 mmol/l	3.5-5.3
CRP	329.6 mg/l	0.0 - 5
ALT	91 u/l	0 - 33
AST	167 u/l	0 - 32
ALP	163 u/l	35 - 104
CK	2,655 u/l	26 - 192
LDH	258 u/l	135 - 214
Myoglobin	328 ng/ml	25 - 58

International Journal of Medical Toxicology & Forensic Medicine

**WBC: White Blood Cells; CRP: C-Reactive Protein; ALT: Alanine Aminotransferase; AST: Aspartate Aminotransferase; CK: Creatine Kinase; LDH: Lactate Dehydrogenase, ALP: Alkaline Phosphatase.

Further evaluation with bedside ultrasonography showed minimal pleural effusion. Blood cultures subsequently grew Staphylococcus aureus, and Vancomycin was added to her treatment regimen as per the recommendations of the infectious disease (ID) team. Furosemide 40 mg IV was administered for fluid management. Despite these interventions, the patient's condition remained critical.

Seven days into her hospitalization, the patient's condition deteriorated significantly. She became critically unstable, requiring maximal mechanical ventilation settings and vasopressor support with norepinephrine and vasopressin at their highest doses. Despite these intensive measures, her condition worsened further, resulting in cardiac arrest with an initial rhythm of ventricular fibrillation (VF). Cardiopulmonary resuscitation (CPR) was promptly initiated, and veno-arterial extracorporeal membrane oxygenation (VA-ECMO) was activated. However, there was no noticeable improvement, and echocardiographic evaluation demonstrated a marked reduction in her cardiac function ultimately indicated that ECMO support would no longer be beneficial, leading to its discontinuation. Despite aggressive and comprehensive medical interventions, the patient succumbed to her illness.

Discussion

We report a case involving a young patient who developed Bupropion toxicity while undergoing therapy with Fluoxetine. The patient's clinical presentation was indicative of likely delayed sodium-channel blockade cardiotoxicity, evidenced by QTc prolongation on electrocardiogram and dysrhythmias. Although there were not sufficient obvious clinical signs of serotonin syndrome, the patient failed to respond to empiric treatment with Cyproheptadine.

Bupropion is a low molecular weight compound that has been used in the treatment of depression since 1989. The most recent formulation is the extended-release (XR) tablets, available in two dosages: 150 and 300 mg, for once-daily administration. The precise mechanism of action of bupropion remains partially understood. Most evidence suggested a norepinephrine (NE) and dopamine reuptake inhibitor. [1] Another hypothesis points to bupropion's potential to increase NE release through activation of the vesicular monoamine transporter-2 (VMAT-2), similarly to amphetamines, specifically in the locus coeruleus and dorsal raphe nucleus. Although controversial, there are concerns that bupropion may impact serotonergic activity and possibly induce serotonin toxicity (ST) [2].

Bupropion is rapidly absorbed when taken orally, reaching peak plasma levels within 2 hours. It exhibits a biphasic decline in plasma concentration, with an initial half-life of 1.5 hours followed by a secondary half-life of 14 hours. The drug undergoes extensive first-pass metabolism and maintains a consistent plasma clearance rate of approximately 2 L/hr/kg across doses ranging from 50 to 250 mg. A study published in the Journal of Addiction Medicine examined bupropion abuse cases reported to US poison centers. Over 14 years, 975 cases of intentional bupropion abuse were identified, accounting for 3.3% of all single-substance bupropion cases, with a 75% increase in abuse from 2000 to 2012, followed by a slight decline in 2013. Most cases involved adolescents and young adults (ages 13–29) [3]. Adverse effects at therapeutic doses are generally nonspecific and may include dry mouth, constipation, headache, nausea, agitation, insomnia, and weight loss. Seizures are a notable risk, particularly within the first six hours, and require close monitoring, especially with extended-release formulations, doses greater than 2500 mg, or in cases of stimulant co-ingestion [1]. The risk of seizures associated with bupropion is estimated to be approximately 0.1% for daily doses below 300 mg but rises to 0.4% at doses up to 450 mg daily. However, bupropion overdose is frequently linked to serious complications, including seizures, status epilepticus, life-threatening arrhythmias, and cardiogenic shock, several of which occurred in our patient [4]. Additionally, depending on the amount ingested, patients may experience a variety of nonspecific symptoms, ranging from agitation, increased stimulation, and hallucinations to rapid heartbeat and

tremors [2]. There is significant interest in augmentation therapy that combines bupropion with SSRIs to potentially enhance treatment efficacy and reduce the adverse effects associated with SSRIs, such as sexual dysfunction and SSRI-induced fatigue [5]. In a study of 266 cases of single-agent bupropion overdose, seizures were reported in 47.1%, tachycardia in 33.9%, agitation in 31.7%, toxic psychosis in 20.4%, and myoclonus/tremor/hyperreflexia in 19%. Treatment typically involved benzodiazepines in 69.2% of cases, with 5.9% of patients receiving a diagnosis of serotonin toxicity (ST) from a medical toxicologist [1]. Many cases required emergency treatment, with 36.9% managed in the emergency department and 27.3% in critical care. Outcomes ranged from major effects (11.4%) to moderate effects (48.2%), minor effects (24.5%), or no effect (15.5%), with four cases resulting in death [3].

Early cardiotoxic effects of bupropion have been reported as soon as 3 hours after ingestion. In a review of 116 cases, 3 patients developed supraventricular tachycardia, QRS widening, and QTc prolongation between 4–12 hours after ingestion, with recovery in 2–4 days. Based on prospective studies some authors have suggested that moderately prolonged QTc of greater than 440 ms is common in bupropion overdose, but this has been attributed to overcorrection for tachycardia using Bazett's formula. Tachycardia is reported as the most common clinical effect seen in bupropion toxicity in many observational studies. Studies on isolated guinea pig hearts show that bupropion causes cardiotoxicity by inhibiting the delayed rectifier potassium current (IKr), leading to QT prolongation, and by disrupting cardiac gap junctions, which widens the QRS complex. This mechanism differs from typical sodium channel blockade, explaining why sodium bicarbonate treatment may not correct QRS prolongation. Curry et al. previously reported two cases in which QRS widening resolved once bupropion levels returned to the therapeutic range. Both cardiac and neurological toxicities after bupropion overdose are known to have a delayed onset, likely due to the slow absorption of sustained-release (SR) or extended-release (XR) formulations in the gut [6].

A review of one case series and 14 case reports described bupropion overdose identified in 116 patients, only 3 patients exhibited cardiotoxicity following acute ingestion, and 2 of these patients also ingested other medications. All patients developed tachycardia and conduction abnormalities, including QRS widening and QTc prolongation, though none progressed to life-threatening arrhythmias. However, all patients fully recovered, with cardiotoxic effects resolving within two to four days after ingestion. In one reported case, a 36-year-old female patient ingested 4.5 grams of bupropion in conjunction with 60 milligrams of paroxetine, reflecting a co-ingestion pattern consistent with the scenario described here. Twelve hours post-ingestion, she exhibited tachycardia, hypotension, notable prolongation of QRS (166 ms) and QTc (587 ms), as well as left bundle-branch block. Despite treatment with activated charcoal and sodium bicarbonate infusion, there was no immediate improvement in conduction delays. A response that was observed in our patient after using sodium bicarbonate boluses despite the absence of supporting of evidence [7].

A study described a case exhibiting events and progression comparable to those observed in our case, a 24-year-old woman with a history of depression was brought to the emergency department unresponsive. Her initial ECG showed a sinus rhythm at 94 bpm with a QRS duration of 85 ms and QT/QTc intervals of 411/515 ms. She experienced three brief (5–10 second) tonic–clonic seizures, after which repeat ECGs showed QRS widening to 114 ms. The patient was treated with 1 g of calcium gluconate, 1 g of magnesium sulfate, 50 mEq of sodium bicarbonate, and 1 mg of lorazepam. Despite these interventions, her condition deteriorated to pulseless ventricular tachycardia, and resuscitation efforts were unsuccessful, resulting in her death [8].

A retrospective cohort study across 10 hospitals (2010–2022) evaluated the effect of sodium bicarbonate on QRS duration in bupropion overdose patients with pre-treatment QRS >100 ms. Thirteen patients met inclusion criteria (median age 32 years; 54% male). Seizures occurred in six patients, ventricular tachycardia in one, and four required vasopressors. The median pre-bicarbonate QRS and QTc were 116 ms and 495 ms, respectively. Following bicarbonate administration (median dose 100 mEq) there were minimal changes observed in QTc, electrolytes, heart rate, and blood pressure, although alkalemia developed in most patients. Overall, sodium bicarbonate did not significantly reduce QRS duration in bupropion-induced cardiotoxicity [9].

In contrast, Fluoxetine is a selective serotonin reuptake inhibitor (SSRI), is generally associated with a lower risk of serious cardiotoxic or central nervous system complications in overdose cases and is primarily used to treat moderate depression in outpatients. By inhibiting serotonin reuptake, it enhances serotonin transmission and demonstrates efficacy comparable to tricyclic antidepressants (TCAs) [5]. However, it has a favourable side effect profile compared to TCAs, presenting fewer anticholinergic effects. It does not significantly affect cardiac function or cause orthostasis, making it relatively safe in overdose situations [10]. Fluoxetine can interact with various medications, notably increasing blood levels of certain antipsychotics and antidepressants such as lithium, tryptophan, and

monoamine oxidase inhibitors, which may lead to serious interactions that may occur, potentially leading to serotonin syndrome (SS) due to synergistic effects [5].

In a comprehensive review of SS cases in various healthcare settings, the Toxic Exposure Surveillance System (TESS) reported that SSRIs have led to significant toxic effects in over 8,000 cases, including more than 100 deaths. SS can result from the overstimulation of serotonin receptors by antidepressants, certain antimigraine medications, and other drugs that increase serotonin levels. Both drug and patient-specific factors can contribute to SS susceptibility [11]. The incidence of adverse drug reactions associated with SSRIs has risen as more serotonergic agents have become available. However, the true prevalence of SS and its related morbidity may remain underreported. This underdiagnosis can result from several factors: SSRIs are not the sole drug class involved; SS symptoms can range from mild to severe and are often nonspecific; diagnostic criteria are inconsistent; and many clinicians lack familiarity with SS. Additionally, the widespread use of multiple medications, or polypharmacy, has likely contributed to an increase in SS cases. While mild SS can occur with common combinations, such as St. John's wort or triptans with SSRIs or SNRIs, more severe cases often involve the concurrent use of MAOIs with other serotonergic agents [12]. In our case, this combination was observed when fluoxetine was co-administered with bupropion. A case described that SS precipitated by the combined effects of fentanyl and ondansetron in a patient already taking paroxetine, duloxetine, and bupropion. The interaction between these serotonergic agents likely increased serotonin levels, leading to SS symptoms. This case underscores the risk of SS when serotonergic drugs are combined, even with medications not traditionally associated with high serotonin toxicity risk, like ondansetron and fentanyl, in patients on multiple serotonergic medications [11].

SS following bupropion ingestion alone is rare and undocumented; bupropion is recognized for its potential to enhance serotonin levels and possibly lead to SS. In a reported case, a 15-year-old male presented with hallucinations, tonic-clonic seizures, and autonomic instability (tachycardia and hypertension) after bupropion ingestion. Upon examination, he exhibited hyperreflexia and clonus in his lower limbs – signs that were difficult to assess in our patient— but had normal tone and reflexes in his upper limbs. The patient showed improvement within 24 hours with intravenous fluids and lorazepam. His toxicology screen confirmed elevated bupropion and hydroxybupropion levels, supporting a diagnosis of SS from bupropion alone. This case, along with a few others in the literature, suggests that bupropion toxicity can produce symptoms consistent with SS even without other serotonergic agents [13].

A study addressed challenges in diagnosing serotonin toxicity (ST), particularly with Sternbach's criteria, by retrospectively analyzing data from 2,222 patients admitted for serotonergic overdoses at the Hunter Area Toxicology Service. Using a subset of selective serotonin reuptake inhibitor (SSRI) overdose cases, the researchers identified key predictive features of ST, such as clonus, agitation, diaphoresis, tremor, and hyperreflexia. For severe cases, hypertonicity and fever over 38°C were universally present. These seven features formed the basis of the Hunter Serotonin Toxicity Criteria, which proved more sensitive (84% vs. 75%) and specific (97% vs. 96%) than Sternbach's criteria, offering a simpler and more accurate diagnostic tool for ST [14]. Although these hallmark features were absent in our case, which reduced the likelihood of diagnosing SS, empiric treatment with Cyproheptadine was initiated due to the presence of fever spikes. However, this intervention did not produce any noticeable improvement in the patient's condition.

The use of extracorporeal membrane oxygenation (ECMO) in poisoned patients remains understudied, but it shows promise for those with poisoning-related cardiovascular failure. ECMO has been successfully used as a supportive therapy in cases of cardiovascular collapse caused by beta-blockers, calcium channel blockers, anti-arrhythmics, and antidepressants, particularly in pediatric and young adult patients. A case report of two patients who suffered severe bupropion toxicity resulting in refractory cardiogenic shock was successfully managed with veno-arterial ECMO (VA-ECMO). Both cases highlight the effectiveness of VA-ECMO in managing severe cardiogenic shock or cardiopulmonary failure caused by bupropion poisoning. A small study found that ECMO significantly improves survival in toxicology patients with severe poison-induced shock, with an 86% survival rate compared to 48% without ECMO. While intravenous fat emulsion (ILE) has shown potential in treating bupropion poisoning, it was not used in our patient, and it is reportedly causing ECMO complications, such as oxygenator thrombosis. [15] However, our patient did not respond positively to ECMO, emphasizing the unpredictable nature of bupropion overdose outcomes and the limitations of current treatment options in some instances.

Conclusion

In conclusion, this case highlights the critical importance of comprehensive assessment and

management of patients and emphasizes the severe and often unpredictable nature of bupropion overdose, particularly in the context of refractory cardiogenic shock and a patient on concurrent SSRI therapy. Despite the use of advanced resuscitation measures, including extracorporeal membrane oxygenation (ECMO), the patient's condition remained unresponsive, ultimately resulting in her death. This tragic outcome underscores the limitations of current treatment options for severe bupropion toxicity and the critical need for early recognition, aggressive supportive care, and further research into more effective interventions. It also serves as a reminder of the importance of vigilance in combining the treatment of Bupropion with other serotonergic drugs.

Large bupropion overdoses may result in significant cardiotoxicity, which can be delayed and therefore requires extended cardiac monitoring. The current knowledge of cardiotoxic effects stemming from bupropion overdose is limited, primarily due to insufficient data. Publication bias and incomplete case reporting likely contribute to an underestimation of the actual incidence and diversity of clinical outcomes. As a result, it is not yet possible to draw definitive conclusions regarding the complete profile of bupropion toxicity or to identify specific risk factors for uncommon complications such as cardiotoxicity.

Conflicts of Interest

The authors report there are no competing interests to declare.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

References

[1] Rau KS, Birdsall E, Hanson JE, Johnson-Davis KL, Carroll FI, Wilkins DG, et al. Bupropion increases striatal vesicular monoamine transport. Neuropharmacology. 2005;49(6):820–30. [DOI: 10.1016/j.neuropharm.2005.05.008]

[2] Stassinos GL, Klein-Schwartz W. Bupropion “abuse” reported to US poison centers. J Addict Med. 2016;10(5):357–62. [DOI: 10.1097/ADM.0000000000000249]

[3] Murray B, Carpenter J, Dunkley C, Moran TP, Kiernan EA, Rianprakaisang T, et al. Single-agent bupropion exposures: clinical characteristics and an atypical cause of serotonin toxicity. J Med Toxicol. 2020;16:12–6. [DOI: 10.1007/s13181-019-00749-4]

[4] Alberter AA, Chambers AJ, Wills BK. Bupropion toxicity. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2023. [Link]

[5] Sohel AJ, Shutter MC, Molla M. Continuing education activity. National Center for Biotechnological Information; 2025 [cited 2025 Jul 20]. [Link]

[6] Al-Abri SA, Orengo JP, Hayashi S, Thoren KL, Benowitz NL, Olson KR. Delayed bupropion cardiotoxicity associated with elevated serum concentrations of bupropion but not hydroxybupropion. Clin Toxicol (Phila). 2013;51(10):1230–4. [DOI: 10.3109/15563650.2013.849349]

[7] Druteika D, Zed PJ. Cardiotoxicity following bupropion overdose. Ann Pharmacother. 2002;36(11):1791–5. [DOI: 10.1345/aph.1A317]

[8] Lung D, Yeh K, Kiang C. Delayed, fatal cardiotoxicity associated with bupropion and citalopram overdose. J Clin Psychopharmacol. 2012;32(3):431–4. [DOI: 10.1097/JCP.0b013e3182576b8e]

[9] Simpson M, Johnson L, Goldfine C. Sodium bicarbonate treatment for QRS widening in bupropion overdoses. Clin Toxicol (Phila). 2023;61(6):436–44. [DOI: 10.1080/15563650.2023.2210300]

[10] Gram LF. Fluoxetine. N Engl J Med. 1994;331(20):1354–61. [DOI: 10.1056/NEJM199411173312006]

[11] Gollapudy S, Kumar V, Dhamee MS. A case of serotonin syndrome precipitated by fentanyl and ondansetron in a patient receiving paroxetine, duloxetine, and bupropion. J Clin Anesth. 2012;24(3):251–2. [DOI: 10.1016/j.jclinane.2011.04.017]

[12] Brown CH. Drug-induced serotonin syndrome. US Pharm. 2010;35(11):HS-16–HS-21. [Link]

[13] Thorpe EL, Pizon AF, Lynch MJ, Boyer J. Bupropion induced serotonin syndrome: a case report. J Med Toxicol. 2010;6:168–71. [DOI: 10.1007/s13181-010-0084-8]

[14] Dunkley EJC, Isbister GK, Sibbritt D, Dawson AH, Whyte IM. The Hunter Serotonin Toxicity

Criteria: simple and accurate diagnostic decision rules for serotonin toxicity. QJM. 2003;96(9):635–42. [DOI: 10.1093/qjmed/hcg109]

[15] Heise CW, Skolnik AB, Raschke RA, Owen-Reece H, Graeme KA. Two cases of refractory cardiogenic shock secondary to bupropion were successfully treated with veno-arterial extracorporeal membrane oxygenation. J Med Toxicol. 2016;12:301–4. [DOI: 10.1007/s13181-016-0539-7]