

Baclofen Poisoning in a Young Girl Resulted in Her Being Placed on the Organ Donation List: A Case Report

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ABSTRACT

Baclofen functions as a GABA-B receptor agonist and is utilized as a muscle relaxant. Acute baclofen poisoning can lead to significant central nervous system depression, which may occasionally be challenging to distinguish from brain death. Because of the complexities associated with the diagnosis and treatment of baclofen poisoning, we decided to document this case.

We present the case of an 18-year-old female who experienced acute poisoning due to an intentional overdose of baclofen. He was intubated and in a deep coma with no brainstem reflexes. Initial evaluations indicated brain death due to the lack of neurological responses. The patient received intensive supportive care and continuous monitoring. Over the following days, she showed gradual neurological improvement, eventually regaining consciousness and autonomic stability. After an extended hospital stay and a careful reduction of ventilation support, she achieved a full neurological recovery.

Baclofen toxicity may show severe symptoms of brain death, but with the support of the intensive care unit, the symptom may be completely reversible.

Introduction

Baclofen is a GABAB receptor agonist used in spasticity, such as multiple sclerosis and spinal cord injury [1]. There is a growing trend for the use of baclofen in younger populations, and as a result, its toxicity has increased. Over the course of a 13-year study, the New South Wales Poisons Information Centre (NSWPIC) documented 403 instances of baclofen toxicity. There was a notable 230% rise in annual exposure cases during this timeframe, with 71% of the affected individuals exhibiting symptoms and 77% necessitating hospitalization [2]. The therapeutic dose of baclofen in adults is between 15 and 80 mg per day, acute poisoning may arise from doses exceeding 200 mg [3-4]. Although the severity of baclofen poisoning symptoms can be misleading and may sometimes be mistaken for brain death, 90% of patients recover within three to seven days [4-6]. Baclofen poisoning can lead to the involvement of vital organs. Therefore, convulsions,

decreased level of consciousness, respiratory apnea, bradycardia, hypotension, hypothermia, and myosis are possible [7]. Routine toxicology screenings typically do not detect baclofen poisoning, making a comprehensive patient history essential. Evaluations should encompass mental status, pupillary reaction, reflexes, muscle tone, clonus, and EEG assessments. The management of baclofen poisoning primarily involves supportive care. The ABCDE method is essential for the assessment and management of baclofen poisoning (the acronym "ABCDE" encompasses the following elements: Airway, Breathing, Circulation, and Disability). Activated charcoal is most effective within 1-2 hours of baclofen ingestion. Hypotension can be treated with IV fluids and vasopressors, and bradycardia may respond to atropine [6, 8-9]. Dialysis-facilitated drug elimination Because of baclofen's low molecular weight (213 Da), low plasma protein binding (30%), and low volume distribution (0.7 L/kg) [7, 10]. Given the focus on the clinical symptoms associated with baclofen poisoning, we have chosen to present this case.

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Case Report

A young woman, aged 18, was intubated and displayed a diminished level of consciousness, was referred to our facility as a potential organ donor. Her pupils exhibited dilation, there was an absence of brainstem reflexes, and a Glasgow Coma Scale score of 3 was noted. Her vital signs were stable (blood pressure of 110/78 mmHg, heart rate of 71/min, oxygen saturation of 90%, and a body temperature of 37) (Table 1).

She was admitted to a different facility three days prior, where she was diagnosed with baclofen poisoning. During her treatment, she was administered activated charcoal and underwent a session of dialysis (Table 2).

She did not have a history of chronic illness; however, it was discovered that he had ingested over 750 mg of baclofen (her weight was recorded at 45 kg). Her blood pressure was stabilized and maintained with intravenous fluid administration (normal saline serum 0.9%) and albumin (human albumin) 20% vial (Table 3).

Table 1- Status of the patient upon arrival at our facility

Condition	Result
GCS	3
Body temperature	37 °C
Blood pressure	110/78

Table 2- Lab tests result and normal range

Bill.T (total bilirubin)	0.5	mg/dl	Up to 1.2
Bill.D (direct bilirubin)	0.2	mg/dl	≤ 0.4
Coagulation			
PTT	37	Sec	30-45
PT	13	Sec	11-15
INR	1	-	
CBC			
WBC count	9.23	*1000/Cumm	4.0-10.0
RBC	3.72	Mil/Cumm	4.1-5.1
Hb	9.8	g/dl	12-15
Hct	28.7	%	35-45
MCV	77.2	fl	80-100
MCH	26.3	pg	27-33
MCHC	31.52	g/dl	32-36
RDW-CV	17.5	fl	11.0-14.5
Biochemistry			
Na	140	mEq/L	135-145
K	3.3	mEq/L	3.5-5
Mg	2.7	mg/dl	1.9-2.5
Calcium	8.4	mg/dl	8.5-10.5
F.B.S	149	mg/dl	60-110
BUN	9	mg/dl	6-19
Creatinine	0.7	mg/dl	0.5-1.3
AST	21	U/L	<31
ALT	11	IU/L	<31
ALP	148	U/L	64-306
CPK	128	mcg/L	24-170
TG	67	mg/dl	<150
Cholestrol	136	mg/dl	<200

Table 3- ABG test result and normal range

ABG test	result	unit	Normal range
pH	7.52	-	7.35-7.45
PaO ₂	90	%	75-100
PaCO ₂	27	mmHg	35-45
HCO ₃	21	mEq/l	22-26

In addition, she received levetiracetam 1 gram, intravenous (IV) for seizure prophylaxis, morphine sulfate (3 mg, intramuscular (IM)) for acute pain, heparin

(5000 units, subcutaneous (SC)) to prevent deep vein thrombosis and pulmonary embolism, dexamethasone (8 mg, IV) to manage inflammation, pantoprazole (40mg,

IV) to prevent stress ulcers, ceftazidime (2 grams, IV) for pneumonia, and acetaminophen (1 gram, IV) for management of pain and fever. With close monitoring and supportive care in the ICU, within five days her condition gradually improved (her neurological status returned to baseline and her respiratory function normalized); she was weaned off the ventilator and transferred to the ward.

Discussion

The conversation about baclofen toxicity has intensified because of a notable rise in misuse and intentional use.

Overdoses, especially in recent years. Baclofen has become a drug of abuse with significant toxicity concerns, especially when taken in large quantities or in combination with other depressants like opioids or sedatives. Between 2014 and 2017, the United States witnessed a 43% rise in intentional overdoses related to suicide attempts, alongside a 35% increase in isolated baclofen exposures (Figure 1).

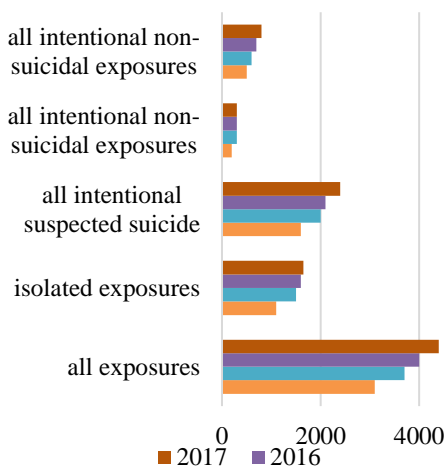


Figure 1- Baclofen exposures during the four-year period (2014-2017) in the United States

These statistics emphasize the urgent need for greater awareness and caution when prescribing baclofen, especially considering its potential for life-threatening overdoses [10]. The National Patient Register (NPR) has a report of baclofen toxicity from 2007 to 2012, including poisoning, self-harm, or suicide. In the cohort of patients experiencing severe poisoning (PSS 3, 46%), three individuals were solely users of baclofen, with an average dosage of 2000 mg (SD 500 mg). Meanwhile, eight patients combined baclofen with other substances, such as psychotropic medications or alcohol, with an average intake of 900 mg (SD 641 mg). All patients exhibited profound coma accompanied by respiratory depression. In addition, seizures and cardiovascular events were also noted. The National Patient Register (NPR) has a report of baclofen toxicity from 2007 to 2012, including poisoning, self-harm, or suicide. In the group of severely

poisoned patients (PSS 3, 46%), three patients were purely baclofen users (mean 2000 mg; SD 500 mg), and eight patients co-ingested other substances with baclofen, like psychotropic drugs or alcohol (mean 900 mg; SD 641 mg). All patients developed deep coma with respiratory depression. In addition, seizures and cardiovascular events were also noted, including mild hypotension, hypertension, and bradycardia [11] (Table 4).

Table 1- Baclofen exposure and toxicity rate During the four-year period (2014-2017) in the United States [12]

Variables	Isolated exposures (n=6169)
Admissions	
Admissions to critical care	2366 (38.3%)
Admissions to non-critical care	852 (13.8%)
Toxicity	
Major	764 (12.4%)
Moderate	2182 (35.4%)
Minor	14.15 (22.9%)
Death	17 (0.27%)

Supportive care is the main approach for managing baclofen overdose. For instance, a 15-year-old girl was admitted to the pediatric intensive care unit (PICU) for two days because of baclofen toxicity. During her treatment, her airway, breathing, and circulation were closely monitored, and she needed to be intubated. Additionally, intravenous fluids were provided to ensure her blood pressure remained stable. [6]. In some cases, baclofen toxicity requires more specialized treatments. An example involves a 19-year-old female who, following a suicide attempt with 500 mg of baclofen, faced rare complications such as pneumomediastinum. Her recovery necessitated the insertion of a chest tube and a treatment plan involving medications to address neurological and psychiatric symptoms. This case underscores the challenges in managing baclofen overdose, as the patient not only exhibited acute neurological symptoms but also experienced psychiatric issues, including mania, catatonia, and hallucinations, after her recovery. Patients who are renally impaired or those who have taken massive doses of ingested high doses may be offered hemodialysis. New studies indicated that albumin can be used in baclofen toxicity because it is highly bound to proteins (about 30% baclofen), and it might be beneficial in increasing the hemodynamic stability and be helpful in handling complications, such as hypotension or altered consciousness [7].

Conclusion

In conclusion, baclofen toxicity is becoming a significant public health issue, particularly as its use increases among younger individuals. This case, along with previous studies, highlights the serious dangers linked to high doses of baclofen, which can lead to severe neurological and respiratory depression and, in some

cases, may even be mistaken as brain death. The absence of specific toxicology tests for baclofen emphasizes the need for detailed clinical assessments and patient histories. Supportive care is the main approach to treatment. Prompt identification and thorough ICU management are vital, as demonstrated in our case, where the patient fully recovered. Ongoing monitoring of baclofen misuse and toxicity trends is crucial for developing effective prevention and intervention strategies.

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