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Case Report

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Lemborexant overdose: A case report

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ABSTRACT

Rationale: Advances in sleep research have introduced medications like lemborexant, a dual orexin receptor antagonist. While effective for regulating sleep, overdoses are a concern, especially in suicide attempts. However, limited data exist on lemborexant overdose, prompting this case report to elucidate its clinical course.

Patient's Concern: A 91-year-old Japanese woman with multiple comorbidities, including insomnia and chronic kidney disease, was admitted after ingesting 315 mg of lemborexant in a suicide attempt.

Diagnosis: Lemborexant overdose.

Interventions: Supportive care with 500 mL of Ringer's acetate solution at the emergency room.

Outcomes: She gradually regained full consciousness with no residual deficits. Due to persistent suicidal ideation, she was transferred to a psychiatric hospital after seven days of supportive care.

Lessons: A review of four lemborexant overdose cases managed at our hospital revealed that overdoses primarily induce altered consciousness and are unlikely to cause organ dysfunction. Supportive care is generally sufficient for management. However, given the limited data, further case accumulation is needed to enhance clinical understanding.

KEYWORDS: Lemborexant; Overdose; Poisoning; Suicidal attempt

1. Introduction

As a result of advances in sleep research in the 21st century, various sleep medications have been developed, including lemborexant, a dual orexin receptor antagonist[1]. Lemborexant is a drug structurally and pharmacologically distinct from benzodiazepines and non-benzodiazepine Z-drugs (*e.g.*, zolpidem) and does not act on gamma-aminobutylic acid (GABA) receptors. As a result, lemborexant has the advantage of treating insomnia without a high risk of drug abuse[2]. Furthermore, it is a highly safe medication due to its low risk of next-morning residual effects or memory impairment, even when used in elderly patients[3].

While sleep medications are useful for regulating sleep, they are also problematic when overdosed for suicidal attempts. Still, data on lemborexant overdose is limited, with only a single autopsy case reported[4]. In this case of a 50-year-old man with schizophrenia, they estimated that respiratory arrest occurred as a result of excessive sedation caused by lemborexant, but data on its overdose remains insufficient. Thus, we present a case with lemborexant overdose in our hospital to elucidate the clinical course of lemborexant overdose.

2. Case report

The patient agreed to the publication of the case report. Patient

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data were anonymized in this report.

A 91-year-old Japanese woman with angina pectoris, lipid abnormalities, chronic kidney disease, overactive bladder, and insomnia was admitted to our hospital due to disturbance of consciousness. She had deliberately ingested 315 mg of lemborexant 12 hours prior in a suicide attempt and collapsed 2 hours before arrival, but denied ingesting other drugs. Her regular medications included aspirin 100 mg/day, esomeprazole 20 mg/day, carvedilol 10 mg/day, rosuvastatin 5 mg/day, vadadustat 35 mg, vibegron 50 mg/day, olopatadine 10 mg/day, and lemborexant 5 mg/day.

On arrival, her consciousness level was E1V4M6 on Glasgow Coma Scale, and her vital signs were as follows: body temperature 36.5℃, blood pressure 141/62 mmHg, heart rate 66 bpm, SpO_2 100% on room air, and respiratory rate 14/min. Physical abnormalities revealed no abnormalities, including abnormal pupils or sweating. Blood tests showed hemoglobin of 11.0 g/dL and creatinine of 1.92 mg/dL, with no other notable abnormalities. Chest radiography and a 12-lead electrocardiogram did not reveal any significant abnormalities. During observation in the emergency department for several hours, she gradually regained consciousness and became communicative. However, residual consciousness impairment and the presence of suicidal thoughts necessitated hospitalization and continued monitoring.

On the following day of admission, she fully awakened, and her consciousness improved to E4V5M6 on Glasgow Coma Scale. Additionally, her creatinine levels remained stable, and other blood test results, including liver enzymes and electrolytes, did not show any abnormalities. As psychiatric treatment was required for her suicidal ideation, she was transferred to a psychiatric hospital on the 7th day of admission without any residual deficits.

3. Discussion

Currently, suicidal attempts using sleep medications are prevalent worldwide. For example, there were an estimated 7000 overdose deaths related to anxiety and sleep medications in the United States in 2013[5]. Furthermore, sleep medications are major drugs associated with substance dependence in Japan[6,7]. These problems are not limited to benzodiazepines; the number of deaths from non-benzodiazepine and gabapentin overdoses tripled from 2000 to 2018 in the United States[8]. These medications include non-benzodiazepine GABA receptor agonists, commonly known as Z-drugs.

While cases of GABA receptor agonist overdose are common, those of orexin antagonist overdose, including lemborexant overdose, have rarely been reported. To understand signs, symptoms, and prognosis, we reviewed cases of lemborexant overdose managed in our hospital from January 2020 to September

Table 1. Summary of lemborexant overdose cases admitted to our hospital.

Variables	Case 1	Case 2*	Case 3	Case 4†
Basic information				
Age, years	60	32	37	91
Sex	Male	Male	Male	Female
BMI, kg/m^2	21.3	29.3	27.8	19.4
Medication status				
Underlying conditions	Alcohol use disorder, insomnia	Depression, insomnia	Depression insomnia	Angina pectoris, dyslipidemia, insomnia
Dose of lemborexant, mg	50	205	165	315
Suicidal ideation	Y	Y	N	Y
Clinical course				
Symptoms	Disturbance of consciousness	Disturbance of consciousness	Disturbance of consciousness	Disturbance of consciousness
GCS on admission	E1V1M1	E1V1M1	E3V5M6	E1V4M6
Acute liver injury	N	N	N	N
Acute kidney injury	N	N	N	N
ECG abnormalities	N	N	N	N
Outcomes				
Length of hospital stay, days	3	9	2	7
Clinical outcomes	Transfer to psychiatric institutes	Discharge	Discharge	Transfer to psychiatric institutes

* Case 2 was suspected of taking valproic acid at the same time.

† Case 4 is the case discussed in this case discussion.

BMI: body mass index, is calculated as weight in kilograms divided by height in meters squared; ECG: electrocardiogram; GCS: Glasgow Coma Scale; Y: present; N: not present.

2023. During this period, there were a total of four cases, all involving overdoses solely of lemborexant, except one case where concomitant administration with valproic acid was suspected (Table 1). Based on the course of the four cases we reviewed, we conclude that lemborexant overdose primarily induces altered consciousness and is less likely to result in organ dysfunction. Therefore, supportive care may be sufficient for managing lemborexant overdose. However, given the limited number of cases, further accumulation of cases is warranted to deepen our understanding of this phenomenon.

Conflict of interest statement

The authors report no conflict of interest.

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Authors' contributions

DKa: data collection, interpretation of data, original draft preparation and writing. HI: conception, design of the work, data collection, review and editing of the manuscript. DKo: substantively revised manuscript and supervision.

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