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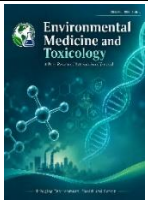

Safe" antipsychotic becomes a toxic exposure: Postoperative catatonia mistaken for delirium in an elderly patient

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Abstract

Background and Objectives: Antipsychotics such as haloperidol are widely prescribed for postoperative delirium in older adults, yet they can act as toxic exposures in vulnerable patients and precipitate malignant catatonia—a life-threatening neuropsychiatric syndrome with autonomic instability resembling sepsis. From a public health standpoint, this represents an underrecognized adverse drug reaction (ADR) with significant morbidity and mortality.

Case Presentation: A 67-year-old woman developed hypo-arousal and disorientation on the second postoperative day after hip fracture surgery and was initially treated as having delirium with low-dose haloperidol (0.5 mg twice daily). Instead of improving, she paradoxically deteriorated, developing negativism, resistance to passive eye opening, and progressive rigidity—findings consistent with antipsychotic-triggered catatonia. A lorazepam challenge (2 mg intramuscular) produced partial and fluctuating improvement, consistent with its role as a diagnostic and therapeutic antidote in catatonia. Escalation of scheduled lorazepam failed to consolidate recovery, and because of autonomic lability, the treatment plan shifted to ICU-monitored electroconvulsive therapy (ECT). The first session was ineffective, likely due to peri-ECT benzodiazepine exposure, but subsequent optimized treatments generated adequate seizures and clear clinical improvement.

Conclusion: This case illustrates how a common clinical exposure—antipsychotic administration—can produce a toxicological syndrome mislabeled as delirium. It highlights the need for public health awareness, pharmacovigilance, and toxicity-informed prescribing in elderly surgical patients. Recognizing antipsychotic non-response, performing a lorazepam challenge, and considering early ECT in high-risk elderly patients may be lifesaving and prevent prolonged morbidity.

Highlights

- Antipsychotics can act as CNS toxicants and unmask catatonia in elderly surgical patients.
- Paradoxical worsening on haloperidol should raise suspicion for drug-induced catatonia, not delirium.
- A lorazepam challenge is both diagnostic and therapeutic in catatonia and should not be delayed.
- ICU-monitored ECT is lifesaving in benzodiazepine-refractory malignant catatonia with autonomic instability.

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Introduction

Catatonia is a psychomotor syndrome with diverse medical and psychiatric etiologies [1–5]. In medical–surgical settings it is frequently underrecognized, partly because early presentations can mimic hypoactive delirium [6-9]. Postoperative older adults who are drowsy, disoriented, and fluctuating in their responsiveness are commonly managed under the framework of delirium, and antipsychotics such as haloperidol are often introduced for behavioral control [7]. From a medical toxicology perspective, however, antipsychotics are not benign agents. They can act as central nervous system toxicants, particularly in elderly patients with underlying neuropsychiatric vulnerability, and may unmask or exacerbate catatonia—a syndrome with autonomic features that can mimic sepsis or toxic encephalopathy [2,3,5,6,9-11]. In public health terms, the widespread off-label use of antipsychotics in older adults represents a preventable exposure associated with increased mortality, prolonged hospitalization, and functional decline [7,11,12].

However, in the presence of emerging motor signs and paradoxical worsening with antipsychotics, catatonia should be considered [2,3,5,6,9,10]. A simple lorazepam challenge can be both diagnostically and therapeutically informative [3,5,13], and electroconvulsive therapy (ECT) remains a life-saving option in benzodiazepine-refractory or medically unstable cases [3,12,14]. We present a stepwise diagnostic and therapeutic journey in an elderly woman initially labeled as having postoperative delirium, whose subsequent course revealed catatonia and required ICU-monitored ECT. The case is discussed with an emphasis on bedside differentiation between delirium and catatonia, the toxicological role of antipsychotics, and the public health implications of antipsychotic prescribing in vulnerable elderly populations [4-8,10-12,15].

Case Presentation

A 67-year-old woman with a history of major depressive disorder with psychotic features, previously treated successfully with a course of electroconvulsive therapy, was admitted for left hip fracture and underwent surgery without major intraoperative complications. On postoperative day 2, the orthopedic team noted a decrease in her level of alertness and new-onset disorientation to time and place, consistent with a hypoactive delirium presentation. She appeared drowsy, inconsistently followed commands, and intermittently misinterpreted environmental stimuli. Based on this clinical picture, postoperative delirium was diagnosed, and low-dose haloperidol (0.5 mg twice daily) was initiated [7].

Over the following 24–48 hours, instead of improving, her mental status deteriorated. She became progressively less responsive, made little or no eye contact, and showed minimal cooperation with examination. She refused oral intake. On physical examination, her pupils were equal and reactive to light, and there were no focal neurological deficits. Initial routine laboratory tests, including complete blood count, serum electrolytes, renal and liver function tests, and glucose, were non-revealing. Because of the unexpected clinical deterioration despite initiation of low-dose haloperidol, the psychiatric team re-evaluated her. On more detailed examination, she displayed mutism, negativism, resistance to passive eye opening, and later developed increased axial and limb rigidity. These emerging catatonic features, together with her prior affective disorder and ECT history, raised concern for catatonia rather than pure delirium. The diagnosis was based on clinical assessment consistent with DSM-5-TR criteria for catatonia and was further supported by the patient's response to lorazepam challenge and subsequent improvement following ECT [1–6,9,10].

A lorazepam challenge (2 mg intramuscular) was administered. Clinical reassessment was performed 30 minutes after administration. At that time, the patient demonstrated a clear but incomplete improvement in catatonic symptoms, characterized by increased eye opening, ability to follow simple commands, emergence of verbal responses, and improved interaction with the examiner. This improvement was sustained for approximately 3–4 hours but subsequently declined, with recurrent reduction in responsiveness and cooperation. Despite continuation and escalation of scheduled lorazepam, sustained recovery was not achieved [3,5,13]. Because the initial response to lorazepam was incomplete and not sustained, scheduled lorazepam was continued via a nasogastric tube due to limited availability of the parenteral formulation and was titrated upward over the following days. However, despite this approach, her level of consciousness and cooperation remained unstable.

A more extensive work-up was undertaken to exclude primary medical or neurological causes of her encephalopathy and autonomic changes. Targeted investigations included repeat complete blood count,

metabolic panel, calcium, magnesium, phosphate, thyroid function tests, vitamin B12 and folate, C-reactive protein, ammonia, urinalysis and urine culture, chest radiography, and blood cultures. These showed only a mild leukocytosis and modestly elevated inflammatory markers without a clear infectious source. Brain MRI demonstrated chronic small-vessel ischemic changes and an old lacunar infarct, but no acute lesion. Electroencephalography revealed diffuse background slowing without epileptiform discharges, and lumbar puncture findings were unremarkable [7,11]. Because of persistent hyporesponsiveness, limited oral intake, and autonomic instability manifested by fluctuating blood pressure and heart rate, she was transferred to the intensive care unit for closer monitoring and initiation of electroconvulsive therapy. [8,9,12,15]. The first ECT session did not produce an adequate therapeutic seizure, which was considered likely related to residual benzodiazepine exposure. ECT was performed using bilateral electrode placement under general anesthesia with propofol and neuromuscular relaxation with succinylcholine. Lorazepam was withheld during the peri-ECT period to minimize its potential anticonvulsant effect. Subsequent ECT sessions produced adequate seizures and were associated with clear clinical improvement [3,5,13-15]. In preparation for subsequent treatments, lorazepam was held in the peri-ECT period and anesthetic and stimulus parameters were adjusted [3, 14,15].

Following this adjustment in peri-ECT management, four subsequent bilateral ECT sessions produced adequate therapeutic seizures and were considered clinically effective. Across these four effective treatments, the patient's cognition and cooperation improved markedly. She became fully awake, oriented, and communicative, and her oral intake returned to baseline. Autonomic parameters stabilized. After completing the five-session ECT course, she was transferred back to the ward and ultimately discharged home in stable condition, with outpatient psychiatric follow-up arranged [3,10,12,14,15]. At follow-up visits two weeks and one month after discharge, the patient returned independently and remained fully alert, oriented, and communicative. No recurrence of catatonic symptoms was observed during follow-up. Lorazepam was not discontinued immediately after discharge and was gradually tapered under psychiatric supervision. Maintenance ECT was not administered.

Discussion

This case underscores a common diagnostic pitfall in general hospital and postoperative care: labeling all older adults with reduced responsiveness and confusion as having delirium without considering alternative diagnoses [7,9,10,14]. While delirium is indeed prevalent in this population, the presence of characteristic catatonic motor signs, lack of expected improvement following antipsychotic exposure, and a positive response to lorazepam should immediately prompt consideration of catatonia [2-6, 9,10].

In the early phase of this patient's course, the picture was consistent with delirium: decreased alertness, disorientation, and fluctuating engagement after orthopedic surgery [7]. The decision to start low-dose haloperidol (0.5 mg twice daily) was aligned with usual delirium management [7]. However, the subsequent decline in consciousness and cooperation after initiation of haloperidol represented a key turning point in the diagnostic process. Although the low dose of haloperidol used in this case does not allow a causal attribution of deterioration to the medication itself, the lack of improvement and continued clinical decline prompted reconsideration of the diagnosis and raised concern for an underlying catatonic process [3,6,9,10,12].

On closer re-examination, signs more typical of catatonia emerged: negativism, resistance to passive eye opening, and later rigidity. These features are not explained by delirium alone and should lead clinicians to screen for catatonia using structured bedside tools such as the Bush–Francis Catatonia Rating Scale [2,4,5,9,10,14]. The lorazepam challenge in this case, producing partial but clear improvement, further supported the diagnosis and is consistent with existing evidence on benzodiazepines as first-line treatment in catatonia [3,5, 13].

At the same time, the team appropriately broadened the differential to exclude medical mimics—especially sepsis, encephalitis, metabolic encephalopathy, and structural brain disease [7,8,11]. The work-up revealed only mild leukocytosis and elevated inflammatory markers, but repeated cultures, imaging, and cerebrospinal fluid studies did not identify an infectious or structural source: Importantly, the apparent sepsis-like autonomic instability improved in parallel with effective ECT rather than antibiotic interventions. This clinical course supported the diagnosis of severe catatonia with autonomic instability and raised concern for malignant catatonia [8,11,12].

In catatonia, benzodiazepines—particularly lorazepam—are first-line therapy [3,5,9,13]. A standard approach is to administer 1–2 mg intravenously or intramuscularly as a challenge and then continue scheduled dosing in responders [3,9,13]. In medically ill or postoperative patients, however, fluctuations in absorption (for example, with nasogastric administration) and coexisting organ dysfunction may limit the reliability of lorazepam alone [5,9,11,12]. In benzodiazepine-refractory or partially responsive cases, or when autonomic instability is present, ECT should be initiated without unnecessary delay [3,8-10,12,14,15].

This patient's experience with ECT also illustrates two practical points. First, residual benzodiazepine exposure can markedly attenuate seizure quality, leading to ineffective treatments; thus, holding or minimizing benzodiazepines before ECT sessions is crucial [3,13,14,15]. Second, ECT can be delivered safely in the ICU with appropriate anesthesia and monitoring, even in medically complex, postoperative elderly patients, and may be decisive in reversing sever catatonia with autonomic instability [3,8, ,9,10,12,13,15].

From a medical toxicology standpoint, this case represents an adverse drug reaction (ADR) in which a routinely prescribed antipsychotic acted as a central nervous system toxicant. The paradoxical deterioration under haloperidol is a recognized warning sign of antipsychotic-induced catatonia, and clinicians should consider drug-induced neurotoxicity in any elderly patient who worsens after antipsychotic initiation.

Overall, this case emphasizes the need for a broad differential diagnosis when evaluating postoperative mental status changes. Although delirium remains a common consideration, catatonia should be actively assessed when characteristic motor signs emerge or when the clinical course is atypical [4-10,12,15].

Table 1 Clinical timeline of the patient's course

Time point	Clinical events and finding	Management	Outcome
Admission	67-year-old woman admitted for left hip fracture and underwent surgery without major complications	Orthopedic surgical management	Stable postoperative course initially
Postoperative day 2	Reduced alertness, disorientation, drowsiness, inconsistent command following; diagnosed as postoperative delirium	Haloperidol 0.5 mg twice daily initiated	No improvement
Following 24-48 hours	Progressive reduction in responsiveness, mutism, poor cooperation, refusal of oral intake	Psychiatric reassessment	Catatonia considered
Catatonia assessment	Mutism, negativism, resistance to passive eye opening, psychomotor inhibition, rigidity	Lorazepam challenge 2 mg IM	Improvement within 30 minutes, lasting approximately 3–4 hours
Subsequent days	Fluctuating responsiveness despite scheduled lorazepam	Medical/neurological work-up; ICU transfer	Persistent symptoms with autonomic instability
ECT course	First ECT session without adequate therapeutic seizure, likely related to benzodiazepine exposure	Lorazepam withheld peri-ECT; bilateral ECT continued	Four subsequent effective sessions with clinical improvement
Post-ECT follow-up	Awake, oriented, communicative; oral intake restored	Discharged home	No recurrence of catatonic symptoms at 2-week and 1-month follow-up

Table 1 Clinical features distinguishing delirium from catatonia

Feature	Delirium	Catatonia
Level of consciousness	Fluctuating attention and awareness	May range from stupor to agitation
Attention	Typically, impaired	Often relatively preserved compared with delirium
Motor findings	Variable, nonspecific	Mutism, negativism, posturing, rigidity
Behavioral response	Inattention and disorganized thinking	Reduced initiation and abnormal motor behavior
Response to antipsychotics	May improve some symptoms	May be ineffective or worsen symptoms in some cases
Response to lorazepam	Usually limited	Often supports diagnosis
ECT role	Not routine treatment	Effective option in server or refractory cases

Limitations

This report has several limitations: First, as a single case report, the findings cannot establish causal relationships or be generalized to all postoperative patients with altered mental status. Second, although the diagnosis of catatonia was supported by clinical features, lorazepam response, and subsequent response to ECT, formal Bush–Francis Catatonia Rating Scale (BFCRS) scores were not prospectively recorded. Third, some technical details of ECT, including specific stimulus parameters and quantitative seizure duration measurements, were not available for retrospective reporting. Fourth, while the patient demonstrated clear clinical improvement and remained stable during one month of follow-up, longer-term outcomes and the need for maintenance ECT could not be evaluated. Additionally, documented fever, another proposed criterion for malignant catatonia, was not observed or recorded in this case. Finally, although autonomic instability raised concern for malignant catatonia, complete documentation of all proposed criteria, including serial creatine kinase measurements, was not available.

Conclusion

Elderly postoperative patients who present with apparent delirium and then worsen with antipsychotics may in fact be experiencing catatonia. In such cases, a stepwise diagnostic and therapeutic approach—recognizing emerging motor signs, performing a lorazepam challenge, ruling out medical mimics, and escalating promptly to ICU-monitored ECT when benzodiazepine response is limited—can be lifesaving and may prevent prolonged morbidity. Apparent autonomic instability suggestive of sepsis may, in some instances, reflect malignant catatonia rather than an infectious process.

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Authors' Contributions

S.E.S. contributed to the conception and design of the case report and supervised the clinical management. M.A. collected the clinical information, reviewed the literature, and drafted the manuscript. S.E.S. critically revised the manuscript. Both authors read and approved the final manuscript.

Data availability

The datasets used and/or analyzed during the current study available from the corresponding author on reasonable request.

Conflicts of interest

The authors declare that they have no competing or conflicting interests in conducting this study.

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Ethics approval and consent to participate

Written informed consent for publication of this case report and the accompanying clinical information was obtained from the patient. All identifying information has been removed to protect patient confidentiality.

References

[1] American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed, Text Revision (DSM-5-TR). Washington (DC): American Psychiatric Association; 2022.

[2] Bush G, Fink M, Petrides G, Dowling F, Francis A. Catatonia I: Rating scale and standardized examination. Acta Psychiatr Scand. 1996; 93(2): 129-136. doi:10.1111/j.1600-0447.1996.tb09814.x

[3] Oldham MA. The treatment of catatonia. Psychosomatics. 2018; 59(2): 123-135. doi:10.1016/j.psym.2017.10.009

[4] Walther S, Stegmayer K, Wilson JE, Heckers S. Structure and neural mechanisms of catatonia. Lancet Psychiatry. 2019; 6(7): 610-619. doi:10.1016/S2215-0366(18)30474-7

[5] Sienaert P, Dhossche DM, Vancampfort D, De Hert M, Gazdag G. Evidence-based consensus guidelines for the management of catatonia: recommendations from the British Association for Psychopharmacology. J Psychopharmacol. 2023; 37(6): 679-708. doi:10.1177/02698811231158232.

[6] Tachibana M, Ishizuka K, Inada T. Catatonia and delirium: Similarity and overlap of acute brain dysfunction. Front Psychiatry. 2022;13:876727. doi:10.3389/fpsyt.2022.876727

[7] Wilson JE, Mart MF, Cunningham C, Shehabi Y, Girard TD, MacLullich AMJ, et al. Delirium. Nat Rev Dis Primers. 2020; 6(1): 90. doi:10.1038/s41572-020-00223-4

[8] Connell J, Oldham M, Pandharipande PP, Dittus RS, Wilson A, Mart M, et al. Malignant catatonia: A review for the intensivist. J Intensive Care Med. 2023; 38(2): 137-150. doi:10.1177/08850666221114303

[9] Edinoff AN, Kaufman SE, Hollier JW, Virgen CG, Karam CA, Malone GW, Cornett EM, Kaye AM, Kaye AD. Catatonia: Clinical Overview of the Diagnosis, Treatment, and Clinical Challenges. Neurol Int. 2021; 13(4): 570-586. doi: 10.3390/neurolint13040057.

[10] Frey R, Heijnen WT, van Waarde JA, Sienaert P. Electroconvulsive therapy for catatonia across the lifespan: A narrative review. Schizophr Res. 2023; 257: 40-48. doi:10.1016/j.schres.2023.05.012

[11] Oldham MA. The probability that catatonia in the hospital has a medical cause and the relative proportions of its causes: A systematic review. Psychosomatics. 2018; 59(4): 333-340. doi:10.1016/j.psym.2018.04.002

[12] Walther S, Stegmayer K, Wilson JE, Heckers S. Structure and neural mechanisms of catatonia. Lancet Psychiatry. 2019; 6(7): 610-619. doi:10.1016/S2215-0366(18)30474-7

[13] Hirjak D, Northoff G, Fangerau H, Wolf RC, et al. Lorazepam in catatonia – past, present and future of a clinical success story. Pharmacol Psychiatry. 2023; 56(6): 257-270. doi:10.1055/a-2073-3327

[14] Grover S, Ghosh A, Ghormode D. Do patients of delirium have catatonic features? An exploratory study. Psychiatry Clin Neurosci. 2014; 68(8): 644-651. doi:10.1111/pcn.12168

[15] Beach SR, Gomez-Bernal F, Sienaert P, Fricchione GL, Alvarez J, et al. Electroconvulsive therapy for patients with medical and surgical comorbidity: Safety considerations. Gen Hosp Psychiatry. 2024; 84: 14-22. doi:10.1016/j.genhosppsych.2023.10.006