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Use of Sedatives and Psychotropic Drugs in Elderly Patients: A Case Report

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Abstract

Introduction: The use of sedatives in frail older adults represents a significant challenge in clinical and nursing practice due to age-related pharmacokinetic and pharmacodynamic changes that increase susceptibility to adverse drug reactions. Physiological alterations such as reduced hepatic metabolism, decreased renal clearance, altered protein binding, and increased blood-brain barrier permeability enhance drug accumulation and central nervous system sensitivity. Benzodiazepines and antihistamines with anticholinergic properties are widely recognized as potentially inappropriate medications in this population and are associated with an increased risk of delirium, hypotension, respiratory depression, falls, and cardiac arrhythmias, particularly in patients with cardiovascular and renal comorbidities.

Results: A 73-year-old institutionalized female patient with diabetes mellitus, systemic arterial hypertension, acute renal failure, and congestive heart failure developed severe psychomotor agitation during a night shift. She received intravenous diazepam 2 mg and intramuscular promethazine 12.5 mg for agitation control. Within two hours, she progressed to marked hypotension, respiratory depression, and hemodynamic instability, requiring flumazenil administration, intravenous fluid resuscitation, and norepinephrine infusion. Despite ventilatory support and continuous cardiac monitoring, the patient experienced two episodes of cardiac arrest due to ventricular fibrillation and underwent advanced cardiopulmonary resuscitation without return of spontaneous circulation.

Conclusion: This case underscores the importance of cautious prescribing, comprehensive risk–benefit assessment, strict monitoring, and prioritization of non-pharmacological strategies when managing agitation and delirium in frail older adults.

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Introduction

Nurses, doctors, and healthcare professionals often face the challenge of using sedatives and psychotropic drugs in elderly patients, a population vulnerable to serious adverse events. Physiological aging alters the pharmacokinetics and pharmacodynamics of these drugs, increasing risks such as respiratory depression, hypotension, and delirium. Globally, older adults represent 12% of the population but consume about 40% of prescribed psychotropic drugs, with benzodiazepines such as diazepam being common despite contraindications [1]. In the United States, excessive use of benzodiazepines in people over 65 is associated with 30% of falls and 20% of cases of hospital delirium [2]. In Brazil, the prevalence is alarming: 25-35% of elderly people institutionalized in long-term care facilities use psychotropic drugs regularly, often without periodic reassessment [3]. Polypharmacy, common in patients with comorbidities such as diabetes, hypertension, heart failure, and renal failure, potentiates interactions. The Beers Criteria, updated in 2019, classify diazepam and promethazine as potentially inappropriate due to their prolonged half-life and cumulative anticholinergic effects [1]. These drugs rapidly cross the blood-brain barrier due to their fat solubility, causing excessive sedation, but in older adults with reduced hepatic clearance and increased distribution volume, they lead to the accumulation of active metabolites [4]. The physiology of the elderly exacerbates these risks: a reduction in plasma albumin increases free drug fractions, while decreased renal function prolongs indirect elimination [4]. In heart failure, hepatic hypoperfusion reduces metabolism; promethazine causes peripheral vasodilation, precipitating hypotension [5]. STOPP/START criteria contraindicate combinations of benzodiazepines + anticholinergics, increasing mortality by 1.5-2 times [6]. WHO and NICE guidelines recommend initial non-pharmacological interventions [7]. In Brazil, the SUS 2023 audit revealed 15% of inappropriate prescriptions of sedatives in frail elderly patients [3]. Reports such as this highlight the need for rigorous monitoring and safe alternatives [1]. Mortality from adverse drug events accounts for 10-

20% of hospital deaths in the elderly [2]. This report aims to warn of the risks of the diazepam-promethazine combination, promoting adherence to STOPP/Beers criteria in nursing practice [1, 6].

Materials and Methods

This case report follows CARE guidelines adapted for nursing and medicine, a retrospective descriptive qualitative design of a single clinical experience [8]. Inclusion criteria: elderly patient over 70 years of age, admitted to a semi-intensive care unit with severe psychomotor agitation, concomitant use of intravenous/intramuscular sedatives/psychotropic drugs, cardiovascular/renal comorbidities, and death associated with adverse events [1]. Exclusion criteria: cases with a previous diagnosis of documented chronic delirium, previous use of strong opioids in the previous 24 hours, initial orotracheal intubation, or acute head trauma [2].

Research conducted through detailed analysis of clinical records during a shift in November 2024 at a hospital located in the city of Foz do Iguaçu in the state of Paraná, Brazil, collecting data on hemodynamic evolution, drug administration, and resuscitation protocols. Qualitative comparative analysis with literature using Beers 2019 and STOPP v2 criteria, focusing on elderly pathophysiology [1, 6]. Variables: age, weight, comorbidities, exact doses, administration times, and outcomes such as hemodynamic instability and cardiopulmonary arrest. Total anonymization maintained, replacing initials and omitting sensitive data. Limitations: single report without controls, subject to retrospective recall bias [8].

Results and Discussions

A 73-year-old female patient weighing 65 kg, from a long-term nursing home, diagnosed with diabetes mellitus, systemic arterial hypertension, acute renal failure, and congestive heart failure, used an indwelling urinary catheter and a nasoenteral tube for enteral nutrition. During the night shift, she presented with delirium and extreme agitation, pulling out venous accesses and invasive devices, including catheters.

Initial medical management: administration of 2 mg of intravenous diazepam over 5 minutes and 12.5 milligrams of intramuscular promethazine. After 2 hours, she developed hemodynamic instability, low blood pressure, and respiratory depression, receiving 0.2 mg of intravenous flumazenil. Systolic blood pressure remained at 90/80 mmHg, with infusion of 250 milliliters of 0.9% intravenous saline and norepinephrine 0.05 μg/kg/min. Considering a patient weighing 65 kg, the infusion rate corresponded to 3.25 μg/min (0.05×65).

Norepinephrine was administered by infusion pump at a dilution of 4 mg in 50 mL of 0.9% saline solution, resulting in a final concentration of 80 μg/mL. Considering the dose of 3.25 μg/min, the infusion rate was calculated to be 0.0406 mL/min, equivalent to 2.4 mL/h. Despite respiratory support via nasal catheter and continuous cardiac monitoring, the patient experienced two cardiac arrests. Cardio-Pulmonary Resuscitation (CPR) was initiated, with 100 chest compressions per minute, associated with ventilation every 6 seconds, without interruption. Ventricular fibrillation was identified, and defibrillation was performed with a biphasic shock of 200 J, administration of 1 mg of epinephrine intravenously every 5 minutes, and 300 mg of amiodarone in an intravenous bolus. The patient did not respond to resuscitation manoeuvres and died.

This case exemplifies the catastrophic risks of the diazepam-promethazine combination in a frail elderly woman with renal and cardiac insufficiency. Diazepam, a long-acting benzodiazepine, acts on GABA-A receptors by increasing chloride influx, hyperpolarizing neurons, and causing central sedation. In the elderly, reduced hepatic clearance and accumulation of active metabolites such as desmethyldiazepam prolong the effects, precipitating respiratory depression due to bulbar center suppression and hypotension due to vascular relaxation [1, 4]. Beers criteria contraindicate its use in patients with heart or kidney disease, recommending initial doses of less than 2 milligrams orally, never administered intravenously as this increases toxic plasma peaks [1].

Promethazine, a phenothiazine H1 antihistamine with strong anticholinergic action, blocks muscarinic receptors causing critical urinary retention with bladder catheterization, delirium, and hypotension due to alpha-1 adrenergic blockade. Metabolized hepatically, it accumulates in heart failure due to hypoperfusion, prolonging QT and arrhythmias [5]. An intramuscular dose of 12.5 mg is the limit for frail elderly patients, but synergistic association with diazepam amplifies GABAergic and anticholinergic depression, reducing respiratory drive by 50-70% [4]. Elderly physiology with a permeable blood-brain barrier and atrophied hippocampus exacerbates delirium [2].

Flumazenil, a competitive GABA-A antagonist, partially reversed the effects, but its short half-life allowed for rebound, requiring the alpha-1 agonist norepinephrine for vasoconstriction, correctly calculated at 2.4 milliliters per hour. Accurate calculation reflects good nursing practice, insufficient in the face of multiple organ damage [9]. Cardiac arrests due to ventricular fibrillation are related to prolonged hypoxia plus diabetic/renal hypokalemia; appropriate ACLS protocol with 100 compressions per minute, 10 ventilations per minute, 200J biphasic shock, epinephrine, and amiodarone [10].

Alternatives include dexmedetomidine sedation without respiratory depression or low-dose quetiapine, with non-pharmacological interventions such as reorientation and circadian light [7]. The ABCDEF protocol reduces delirium by 40% in randomized studies [11]. Limitations include the absence of serial blood gas analysis or serum drug levels. The case reinforces the prohibition of PIM associations in the elderly, prioritizing deprescribing and multiparametric monitoring for zero mortality due to iatrogenic sedation [1, 6].

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