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Breaking the prescribing cascade: a case of severe polypharmacy leading to recurrent hyperkalemia and hypotension in an older adult

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Abstract

Polypharmacy is a growing concern among older adults with multimorbidity. Regular medication reviews and adjusting therapy to the patient's current health status are crucial for improving patient safety and quality of care, as well as optimizing treatment. We present a case of an 86-year-old patient with chronic kidney disease, heart failure with preserved ejection fraction, diabetes and benign prostatic hyperplasia, hospitalized with severe hyperkalaemia, hypotension, and multiple falls. The patient's medication regimen consisted of sixteen drugs, including high-dose furosemide, torsemide, spironolactone, an ACE inhibitor and two alpha-1 blockers. The patient's condition was closely linked to the cumulative effects of drugs. Medication review and deprescribing reduced treatment to nine drugs and improved the patient's clinical status. This case highlights the need for tailored treatment plans and the importance of taking an umbrella view. Medication review and deprescribing can identify adverse drug reactions and optimize treatment in elderly patients with multiple comorbidities. (Gerontol Pol 2025; 33; 64-66) doi: 10.53139/GP.20263402

Keywords: *polypharmacy, adverse drug reactions, medication review, deprescribing, hyperkalaemia, hypotension*

Polypharmacy, defined as chronically taking five or more medications, is a growing concern among older adults. A key contributor is the prescribing cascade, where an adverse drug reaction (ADR) is mistaken for a new condition, leading to the use of unnecessary medications and further exacerbating polypharmacy [1]. This is common in long-term care, but regular interdisciplinary medication reviews can identify inappropriate prescriptions and improve outcomes in frail older adults [2]. Interrupting and preventing prescribing cascades are crucial, yet often overlooked, for improving medication safety and optimizing therapy. This patient exemplifies multiple instances of cumulative effect of polypharmacy and prescribing cascade.

A patient in his 80s presented to the emergency department with weakness, abdominal pain, diarrhea, oliguria, and multiple falls over three days. His medical history included chronic kidney disease (CKD), type 2 diabetes, heart failure with preserved ejection fraction (HFpEF) with ejection fraction around 50%, chronic obstructive pulmonary disease, a Dual-chamber, Dual-output, Dual-response (DDD) pacemaker for second-degreeatrioventricular block, and benign prostatic hyperplasia. On examination, he was hypotensive (98/51 mmHg) and had severe hyperkalemia (8.1 mEq/L). His medication regimen consisted of 16 drugs, including high-dose furosemide, torsemide, spironolactone, an ACE inhibitor (ACE-I), and three benign prostatic hyperplasia medications (finasteride and two alpha-1 blockers) (figure 1).

Spironolactone and ACE-I contributed to recurrent hyperkalemia, while escalating doses of furosemide were

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used in an attempt to correct the electrolyte imbalance. However, in combination with alpha-1 blockers, this led to volume depletion, hypotension and exacerbating CKD. Despite multiple previous hospitalizations, no medication adjustments had been made.

The patient was managed with intensive hydration, which corrected the electrolyte imbalance, and a medication review, which reduced the regimen from 16 to 9 drugs by discontinuin furosemide, alpha-1 blockers, spironolactone, and ACE-I (figure 1). At one-month

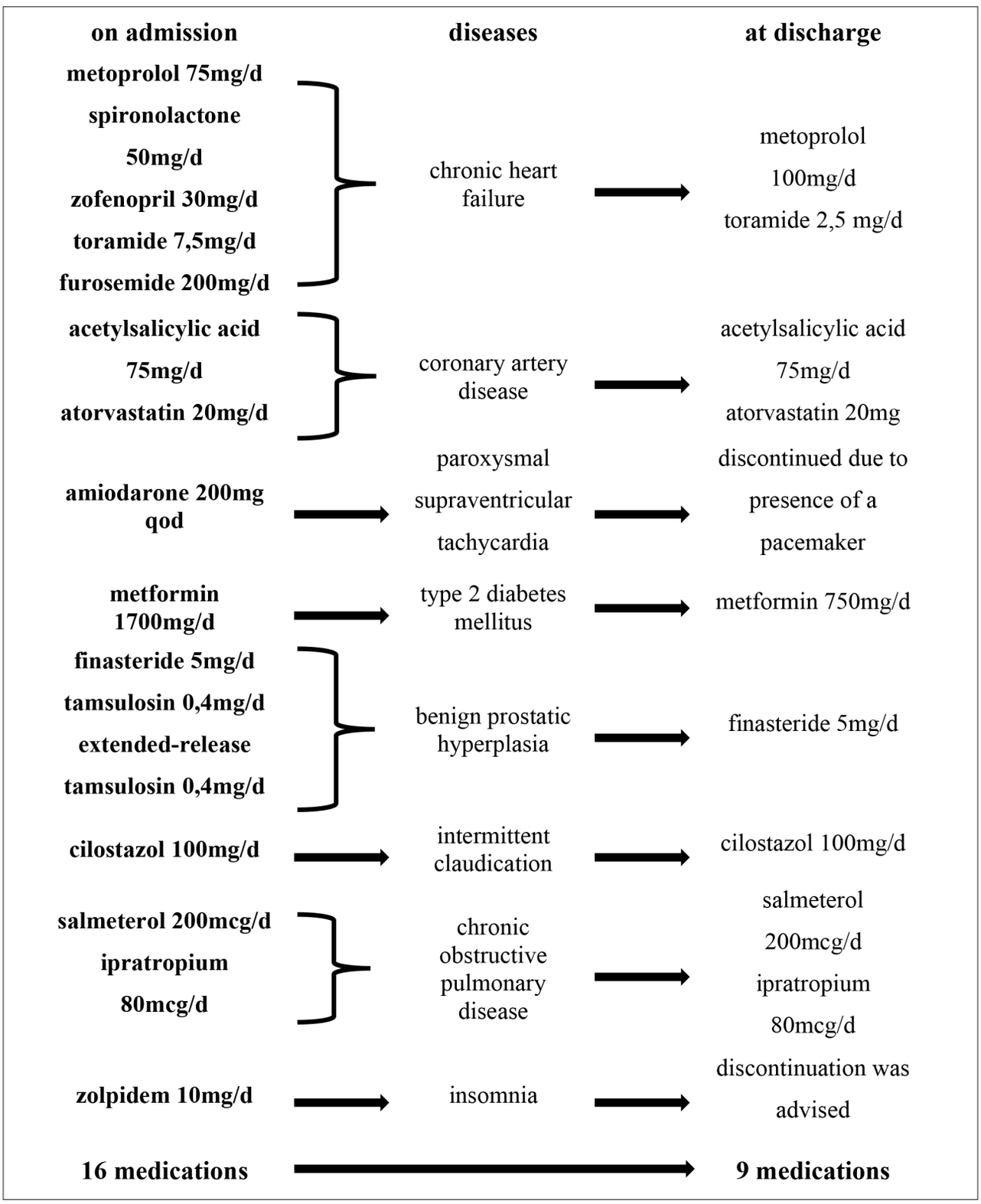

Figure 1. List of medications taken by the patient, along with corresponding diagnoses, before and after the medication review intervention

follow-up, his potassium levels stabilized in the normal range, and Glomerular Filtration Rate (GFR) function increased to 40, and his overall condition improved.

This case illustrates how polypharmacy and ADRs can complicate care in older adults, as well as highlights the need for tailored treatment plans. Despite multiple doctor's appointments, emergency department visits, and hospitalizations, no changes were made to the patient's medications, which resulted in repeated episodes of severe hyperkalemia, hypotension,

and falls. In elderly patients, it is important to take an umbrella view and look for underlying causes of new symptoms, such as electrolyte imbalances and hypotension, rather than treating each condition separately.

In the management of HFpEF, the 2022 AHA/ACC/HFSA guidelines give sodium-glucose co-transporter 2 (SGLT2) inhibitors a Class 2a recommendation, noting they can reduce heart failure hospitalizations and cardiovascular mortality. Mineralocorticoid receptor antagonists (MRAs) receive a Class 2b recommendation, meaning they may be considered in selected patients, particularly those with ejection fraction at the lower end of the preserved spectrum [3]. In contrast, the 2021 ESC guidelines do not recommend MRAs or ACE-I for HFpEF, citing a lack of clear outcome benefit [4]. However, the 2023 ESC update gives SGLT2 inhibitors a Class Ia recommendation, making them the only therapy broadly supported by both major guidelines [5].

This patient's hyperkalemia and hypotension were closely linked to his medications, specifically the cumulative effects of ACE-I, spironolactone, alpha-1 blockers, and high-dose diuretics. Comorbidities such as advanced CKD, a tendency for hypotension, and a higher risk of falls require careful consideration when following standard protocols. Given his history of heart failure, SGLT2 inhibitors should be considered, as they reduce heart failure-related hospitalizations and mortality, including in HFpEF. However, meta-analysis and reviews demonstrate that SGLT2 inhibitors significantly reduce both systolic and diastolic blood pressure; thus, the authors of the STOPP/START criteria indicate that prescribing them in systemic hypotension is inappropriate [6-8]. Moreover, this patient has a history of recurrent severe urinary infections leading to hospitalizations, which represents a contraindication, as the associated glycosuria may increase the risk of urinary tract infections and exacerbate retention.

This case demonstrates the importance of regular medication reviews and adjusting therapy to the patient's current health status, with a focus on deprescribing when appropriate to improve safety and quality of care. Medication review and deprescribing are essential to improving patient safety, preventing avoidable hospitalizations, and optimizing treatment in individuals with multiple comorbidities.

Conflict of interest
None

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