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A case of deprescription

Kamalakar Surineni*; Laura Dandridge; Ethan Scharf; Emilee Wells; Nolan Schrader; Maggie Ziegler

Department of Psychiatry, The University of Kansas School of Medicine, Wichita 1010 N Kansas, Wichita, KS-67214, USA.

***Corresponding Author: Kamalakar Surineni**

Department of Psychiatry, The University of Kansas School of Medicine, Wichita 1010 N Kansas, Wichita, KS-67214, USA.

Tel: +1(316)389-5658;

Email: KSMD99@outlook.com

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Abstract

Polypharmacy represents a significant and escalating public health concern, particularly within the geriatric population. It is commonly identified as the concurrent use of five or more medications daily, although definitions vary, including a range from 2 to 11 medications per day. Risk factors associated with polypharmacy include the management of various comorbidities under the care of multiple subspecialist physicians, experiencing chronic mental health conditions, and living in long-term care facilities- all of which were evident in this case report. In this specific case, a 66-year-old male presented with extrapyramidal symptoms (EPS) attributed to risperidone. EPS were inadvertently diagnosed as Parkinson disease, resulting in the inappropriate addition of carbidopa-levodopa to patient's treatment plan which further worsened patient's behaviors requiring in-patient admission. During the patient's hospitalization, efforts were made by physicians to reconcile and discontinue inappropriate medications leading significant improvement. This case emphasizes the insidious nature of polypharmacy and raises concerns as to the appropriate progression and limits on the use of multiple medications. As the incidence of polypharmacy increases, it is imperative for physicians to consider deprescribing as a therapeutic intervention. When approaching deprescribing, it is important to align with the patient's therapeutic goals. Point-of-care tools can serve as valuable resources in guiding medication discontinuation decisions and in educating patients about the need to reduce medication burden to reduce the risks of polypharmacy.

Introduction

Polypharmacy is a concept without a homogenized definition; it is frequently defined as the established use of five or more medications with the distinction of one being unnecessary or not indicated. Medications include over the counter, prescription and/or traditional and complementary medicines used by a patient [1,2]. Although a consensus on the exact parameters for this varies widely, it is defined quantitatively in a range of 2-11 medications, with some definitions being more specific to the prescribed medications alone or the duration [3]. Qualitative definitions also target the number of medications with at least one considered inappropriate for geriatric patients [4]. Among the myriads of patient risk factors for polypharmacy is the treatment of multiple medical conditions by separate subspecialist providers. Increased longevity and multimorbidity throughout the US with one of the highest medication rates per capita in the world. Other risk factors for polypharmacy include the age of the patient, residence in long term care facilities, and chronic psychiatric conditions. The rates of polypharmacy in the USA are estimated to be as high as 65% for adults aged 65 years and over [5], and polypharmacy appears to be an independent risk factor for mortality in elderly [6]. The issue of Polypharmacy is multifactorial relating in part to hospital Electronic Medical Records (EMR) with how previous diagnoses are conveyed to providers. A study by Park and Kim et all 2020 showed systems with full EMR adoption had higher rates of Polypharmacy defined as >6 medications [7]. Utilization of guidelines and criteria for inappropriate medications in populations vulnerable to

polypharmacy such as the BEERS criteria are valuable to understanding drug interactions and thus reduce potentially inappropriate medications (PIMs) [8,9]. For multiple comorbidities it is expected patients to have multiple medications, but providers should make every effort to minimize in-appropriate or duplicate prescriptions to add to the side effect burden. It is important that clinicians are aware of patient medical history and the side effect profile of medications before adding additional medications. The present case discusses antipsychotic medication-induced Parkinsonism which was inadvertently diagnosed as Parkinson Disease in an older male. Subsequently it was treated with carbidopa-levodopa and benztropine which further worsened patients' behavior. This required prolonged psychiatric inpatient hospitalization for worsened behaviors. Understanding the importance of medication evaluation and reference to the BEERS Criteria [9] for all medications in older patients. More thorough review of these guidelines, drug interactions, and common side effects can improve the care provided to patients with multiple comorbidities.

Case presentation

Patient is a 66-year-old male with a history of Major Neurocognitive Disorder (MNCD), bipolar I disorder, Post-Traumatic Stress Disorder (PTSD), Generalized Anxiety Disorder (GAD), epilepsy, and an inadvertently diagnosed Parkinson's disease was referred to acute inpatient psychiatric unit for progressively worsening agitation. His home medications include duloxetine 60 mg, mirtazapine 30 mg, divalproex sodium 1500 mg and Risperidone 1 mg three times daily, carbidopa-levodopa 25 mg/100 mg three times a day and benztropine 1 mg twice a day. During the initial evaluation on the psychiatric unit, patient was oriented to self and general place, was irritable but redirectable. Laboratory and diagnostic workup including urine analysis is within normal limits. Physical examination revealed cogwheel rigidity in upper extremities and bradykinesia. Per collateral history patient was on this drug regimen for the past two years, except was diagnosed with Parkinson's disease by a visiting physician at the facility and started him on carbidopa-levodopa and benztropine around one and half years ago, patient's behaviors continue to get worse since then and patient was in and out of the facility and hospital for behaviors. A possible drug induced parkinsonism and after discussing with patient's guardian risperidone was tapered from 1 mg three times daily to 0.5 mg twice daily, carbidopa-levodopa was discontinued, and benztropine was changed to an as-needed medication and later discontinued over the next two weeks. Patient showed significant improvement to his agitation, and total disappearance of Parkinson's symptoms. He started going to groups on the unit and was independent with his daily activities which was never the case in the past two years. Patient and family are very happy with progress and patient was later discharged on risperidone 0.5 mg twice a day, duloxetine 60 mg, mirtazapine 30 mg, divalproex sodium 1500 mg. He continues to do well on this regimen after discharge.

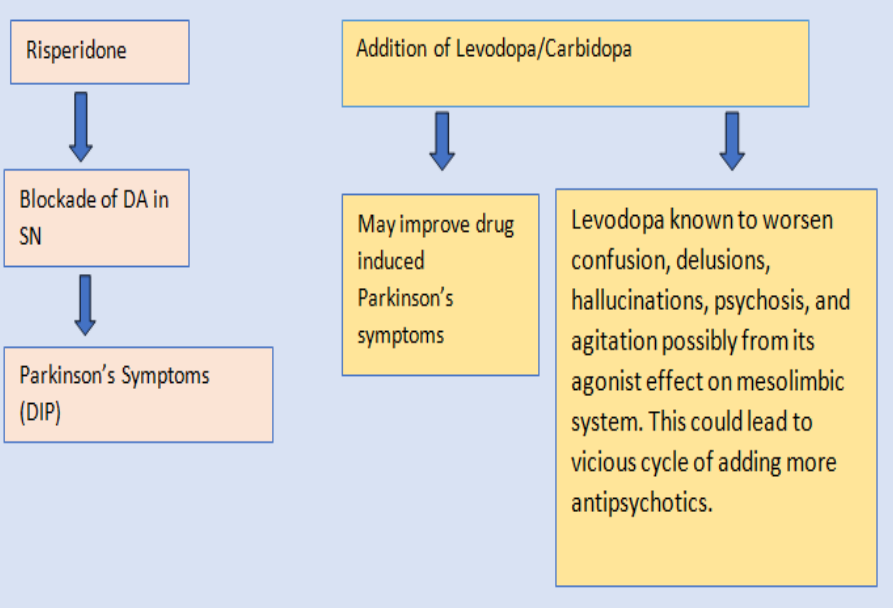

Figure 1: Schematic depiction of clinical scenario.
DA: Dopamine Receptor; DIP: Drug Induced Parkinsonism; SN: Substantia Nigra.

Discussion

This case report presents an example of polypharmacy as it pertains to a widely accepted definition: the use of five or more medications with the distinction of one being unnecessary or not indicated [1]. The patient was admitted with home medications including benztropine, carbidopa-levodopa, duloxetine, hydroxyzine, mirtazapine, risperidone, valproic acid. Careful review of this medication list through patient interview and collateral calls to the patient's guardian elicited opportunities to further investigate the indications for three medications in particular: carbidopa-levodopa, risperidone, and benztropine. Diagnoses at admission included Parkinson's Disease, treated with the carbidopa-levodopa and benztropine, and bipolar disorder treated with the antipsychotic medication risperidone. Parkinson's disease can be a challenge to diagnose and often misdiagnosed by even experienced clinicians. It is even more complicated in patients taking dopamine blocking drugs like neuroleptics as neuroleptics could produce Parkinson's symptoms by blocking nigrostriatal DA [10]. According a retrospec-

tive study of 354 PD patients 24 (6.8%) were actually ruled as Drug Induced Parkinsonism (DIP), and of the 24 only one was accurately diagnosed as DIP [11]. A detailed history might assist in appropriate diagnosis and when in doubt clinicians can try to adjust medications and see the clinical response. Anti-parkinsonism medications and antipsychotics exert their therapeutic effects largely through the modulation of dopamine in the central nervous system (Figure 1), however, their effects on dopamine oppose each other [12]. Levodopa is recognized as the "gold standard" for Parkinson's disease as it is the immediate precursor to dopamine and can cross the blood-brain barrier via facilitated transport, as opposed to the electrically charged dopamine [13]. Levodopa is commonly paired with carbidopa, which is a peripherally acting decarboxylase inhibitor that increases the bioavailability of levodopa in the central nervous system [13]. The pathophysiology of Parkinson's disease, which is characterized by the loss of dopaminergic neurons in the substantia nigra, causes movement problems such as rigidity, tremor, and slowness, and is targeted with levodopa-carbidopa [12]. Common levodopa side effects include headaches, nausea, and dizziness, as well as confusion, delusions, hallucinations, psychosis, and agitation in older adults [14]. Risperidone is a second-generation antipsychotic that antagonizes dopamine and 5-hydroxytryptamine receptors in the central nervous system. Indications for risperidone include schizophrenia and bipolar disorder, along with the management of psychotic and manic symptoms. Side effects of risperidone include hypotension and reflex tachycardia as well as extrapyramidal side effects (EPS), though the risk of EPS is higher in first generation antipsychotics [15]. The patient presented with agitation and bizarre activity as well as Parkinson's-like symptoms including cogwheel rigidity. Alterations to his home medications provided opportunities to observe the effects of these changes in the in-patient setting. After discontinuing patient's carbidopa-levodopa, he did not display any outbursts or behavior concerns, supporting the suspicion that his agitation at the time of admission was a side effect of this medication. Further, after lowering the dose of his risperidone during his stay, he did not exhibit any cogwheel rigidity or other extrapyramidal symptoms at the time of discharge. This timeline supports the suspicion that his cogwheel rigidity was a side effect of his higher dose of risperidone. His benztropine was changed to an as-needed basis and discontinued, further simplifying his medication list and reducing his potential for adverse effects. If available clinicians could use Dopamine Transporter (DAT) scan to differentiate Drug-Induced Parkinsonism (DIP) from Parkinson's Disease (PD) [16] but our facility does not have DAT scan and we are clinically able to rule out PD. When considering the causes of polypharmacy, it is necessary to examine the systemic issues that could lead to such cases. A cross-sectional assessment of compensation incentives for health system-affiliated physician organizations found that patient volume was the most common form of base compensation for physicians [17]. The study also found that increasing volume was the most commonly reported way for physicians to increase compensation [17]. Another study that observed 57 physicians across four specialties reported that physicians spend 49.2% of their time working on electronic medical records or desk work and only 27% of their time on direct clinical face time with patients. Physicians also commonly have another 1-2 hours of clerical work to complete outside of work hours [18]. Less time spent with patients may impact physician's abilities to elucidate important information concerning diagnoses and treatment. Incentives that do not hold patients' interest at the forefront as well as the growing obstacle of increased clerical work in medicine are two factors that could lead to suboptimal care and cases of polypharmacy. Adopting preventative strategies aimed at mitigating the occurrence of polypharmacy is critical in optimizing patient outcomes. Avoidance of high-risk drugs, deprescribing, implementation of screening tools, and prioritizing multidisciplinary communication have been discussed as approaches to reducing polypharmacy [1]. Health care providers should be aware of high-risk drugs that increase risk of adverse drug events in elderly populations. These drugs include anticholinergic medications, sedatives and anxiolytics, narcotics, certain blood pressure lowering medications, long-acting sulfonylureas, and dopamine-altering medications. Alternative therapies should be considered prior to initiating these drugs in elderly patients.

Conclusion

This case report brings attention to the adverse effects associated with polypharmacy, specifically in the elderly population. Key risks factors identified in this case include multiple medical comorbidities and multiple prescribing providers. In-appropriate polypharmacy can lead to drug-drug interactions, and severe side effects. To prevent such occurrences in the future it is crucial for healthcare providers to closely monitor and evaluate risk factors for polypharmacy as well as engage in the process of medication assessment and deprescription. Providers often encounter challenges in discontinuing or reconciling medications prescribed by other healthcare professionals, especially in patients who are under the care of multiple specialties. Situations such as these are commonly seen in the elderly population, hence their increased susceptibility to polypharmacy. Ultimately, all healthcare providers share the common objective of appropriately managing patient care to align with their goals of treatment. The challenge persists in devising effective strategies for managing polypharmacy, which involves assessing medication indications, weighing risks and benefits, and considering patient goals as foundational principles to guide clinical decisions. By prioritizing these foundational concepts in medical management, healthcare providers can mitigate the risk of prescribing excessive medications that may result in more harm than benefit to the patient.

Declarations

Author contributions: KS and LD conceived the outline of this paper and edited the manuscript. ES, EW, NS and MZ performed the literature review and wrote the introduction, discussion and conclusions. All authors read and approved the final version of the manuscript. KS supervised all aspects of this manuscript.

Data statement: Data presented in this narrative review is available as open access at the respective citations.

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