## Mania Induced by Clarithromycin in a Geriatric Patient Taking Low-Dose Prednisone

**To the Editor:** Bipolar disorder is a chronic mood disorder characterized by episodes of mania, hypomania, and major depression. Bipolar disorder affects roughly 1% of the general population and 0.1% of the geriatric population. In certain clinical settings such as care homes and hospitals, however, the prevalence of geriatric bipolar disorder can be as high as 10%. Bipolar disorder may be divided into early onset bipolar and late-onset bipolar. Vasudev and Thomas[1] state that patients in the late-onset group are associated with higher medical and neurologic burden and often have a secondary cause of their presentation.

***Case report.*** Mr A, a 78-year-old man with no previous history of mood disorders, presented to the emergency department in June 2013 with a 3-week history of progressive mental decline characterized by disorganized thoughts, aggressive behavior, reduced sleep, impulsive spending, and grandiose religious delusions. Mr A's past medical history is significant for a remote pituitary adenoma surgery, for which he takes levothyroxine 100 μg per day and prednisone 5 mg per day. Three days prior to hospital admission, Mr A finished a 14-day course of clarithromycin 1 g per day. Mr A denied any use of alcohol or illicit drugs. On examination, Mr A was appropriately dressed and maintained good eye contact. He was found to have elevated mood, pressured speech, disorganized thoughts, and delusions of grandiosity and reference. He demonstrated poor insight and judgment. He denied homicidal and suicidal ideation. A complete hematologic and metabolic blood screen was negative except for a low thyroid-stimulating hormone level, with normal free $T_3$ and $T_4$ levels. Computed tomography and magnetic resonance imaging head scans showed nonaggressive-appearing enlargement of the sella with no significant mass effect or extension into the surrounding tissue, which is consistent with prior sella surgery. Mr A was hospitalized for 9 days and showed rapid clinical improvement within 1 week. He remained on his prior dose of levothyroxine and prednisone and was prescribed oral olanzapine, first at 2.5 mg per day for 6 days then at 7.5 mg per day for 2 days to manage his agitated behavior. Per *DSM-IV* criteria, Mr A was diagnosed with secondary mania possibly caused by the combination of prednisone and clarithromycin.

Prednisone is a corticosteroid that has been widely used in a variety of medical conditions and is associated with well-documented dose-dependent psychiatric side effects. Kenna et al[2] state that the prednisone-equivalent mean ± SD dose associated with psychiatric side effects is 63.6 ± 46.2 mg per day; however, in our case, Mr A's manic episode was associated with a prednisone dosage of as low as 5 mg per day.

Clarithromycin is a macrolide antibiotic commonly used in the treatment of community-acquired pneumonia. Prednisone[3] and clarithromycin are both metabolized by cytochrome P450 (CYP) 3A isozyme. Quinney et al[4] found that clarithromycin can reduce activity of CYP3A by 75%. This reduction in metabolism could theoretically increase the circulating level of prednisone to a level high enough to cause psychiatric symptoms.

The only published case of mania induced by prednisone and clarithromycin was described in 1998 by Finkenbine and Frye[5] in a 30-year-old woman taking 20–60 mg of prednisone a day. Similar to our case, the patient recovered quickly after discontinuing clarithromycin. Our case is unique, however, because it is the first described case of mania induced by clarithromycin in a geriatric patient on a low dose of prednisone of 5 mg a day. Our study findings caution prescribers to be alert to the possibility of prednisone-induced mania, even at very low doses of prednisone, in the elderly who have received a CYP3A inhibitor like clarithromycin.

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***Potential conflicts of interest:*** None reported.
***Funding/support:*** None reported.
***Published online:*** June 19, 2014.
*Prim Care Companion CNS Disord 2014;16(3):doi:10.4088/PCC.14l01626*