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Case Report

Can low-dose propranolol induce a manic syndrome? Case report of an unexpected side effect

Shahrbabaki ME, Estilaee F, Shahrbabaki AE. Can low-dose propranolol induce a manic syndrome? Case report of an unexpected side effect.

Objectives: Propranolol, the first discovered b-adrenergic receptor antagonist, has been prescribed by physicians in various fields for more than three decades. It has been applied for treating psychiatric disorders including schizophrenia, mania and anxiety disorders, as well as for controlling withdrawal symptoms or other side effects.
Methods: We describe the case of an 11-year-old boy with bipolar-I disorder comorbid with panic disorder who developed manic symptoms with a single dose of 10 mg of propranolol.
Results and Conclusion: Although depression is a better-known side effect of b-adrenergic antagonists, clinicians should take mania as a rare side effect into consideration as well.

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Introduction

Propranolol has been prescribed by physicians in various fields for more than three decades. Given that β-adrenergic receptors are present in various organs such as the heart, lungs and the central nervous system, it is assumed that their antagonists including propranolol may influence these organs, leading to a wide variety of applications and also side effects.

With regard to psychiatric disorders, β-adrenergic antagonists have a range of applications including treatment of post-traumatic stress disorder (1), acute stress disorder (2), akathisia both as a side effect of anti-psychotic medications and as a result of organic brain disorders such as encephalitis (3), migraine headache (4,5), anxiety disorders (6), withdrawal symptoms in alcohol and drug dependency (7,8), essential tremor (9) and many more other disorders.

Similarly, β-adrenergic antagonists have a wide range of side effects. Some of the most well-known side effects include exacerbating asthma, diabetes, congestive heart failure and hyperthyroidism, as well as other side effects such as nausea, vomiting, diarrhoea, constipation, agitation and confusion. Moreover, psychiatric side effects such as sleep disorders, nightmares, depression and anxiety have been reported to be related to these drugs, even when used in small doses (10). Auditory hallucination is another rare psychiatric side effect of these drugs (11). The most common mood syndrome that is perceived to be a side effect of β-adrenergic antagonists is depression. It occurs with the long-term use of lipophilic β-adrenergic antagonists and has also been reported to be due to topical administration (12). Depression as a side effect of these drugs might be melancholic and severe (13). This side effect should be taken into consideration particularly in patients with personal or family history of mood disorders (14).

To the best of our knowledge, a single case of mania because of discontinuing propranolol has been reported (15).

Here, we present the case of an adolescent with bipolar mood disorder (BMD) who experienced elation and manic syndrome owing to propranolol use unexpectedly.

Case report

The subject is an 11-year-old boy. He was diagnosed with ADHD 5 years ago and his symptoms have been under control since then. However, the patient's symptomatology has changed since the past 2 months. That is, he first expressed symptoms of irritability and aggression and then gradually became restless and was perceived as having an increased level of energy and agitation during the past month. He woke up early in the morning without feeling tired or sick. He also mentioned occasional physical complaints such as dizziness, headache and dyspnoea, which were paroxysmal and were accompanied by tachycardia, tachypnoea, nausea and worrying about losing control, which lasted for about 20 min.

The patient was admitted to the hospital for further evaluation. Disorders such as major depressive disorder, obsessive–compulsive disorder and conduct disorder were ruled out. The new symptoms were not considered as exacerbating ADHD symptoms. Instead, the patient was diagnosed as fulfilling the criteria for panic disorder + bipolar I disorder (most recent episode: mania).

The patient started taking 200 mg of sodium valproate twice daily and 1 mg of risperidone twice daily. Over the following 2–3 weeks, his symptoms were gradually relieved, and after 1 month the patient left the psychiatric ward symptom free.

At the 1-month follow-up, the patient was still without any symptoms but had mild tremor in the distal of his extremities, particularly his hands, which was attributed to the side effect of the drug. Therefore, 10 mg of propranolol was prescribed to be taken twice a day.

A week later, the patient returned, stating that he had encountered euphoria, restlessness, insomnia and increased energy after just two doses of propranolol. The patient and his family cited these symptoms as side effects of propranolol, as these symptoms had waned after drug discontinuation.

The situation was judged by physicians in a different way. The patient's symptoms were assumed to be caused by unidentified stressors such as excessive exercise or sleep deprivation. Hence, the patient and his family were reassured and he was advised to take propranolol again, but in a lower dose of 10 mg in the morning.

Interestingly, after taking a single dose of 10 mg of propranolol, the patient developed the same symptoms. The symptoms were relieved by discontinuing the medication. The patient was advised not to take propranolol anymore. Low doses of potent benzodiazepines were used to control tremor, which was a successful strategy.

Discussion

β-Blockers have had widespread application in psychiatry for a long time. Psychiatrists have used them for 40 years for treating psychiatric disorders including schizophrenia, mania and anxiety disorders, as well as for controlling withdrawal symptoms or other side effects of drug (16).

We aim to discuss the effect of β-blockers on the patient's mood. They have been shown to induce or exacerbate depression (12). On the other hand, pindolol, a β-adrenergic antagonist, is used for augmentation on treatment of resistant depression. These effects have been ascribed to its partial agonistic features. Some studies have shown pindolol to be effective (17), but some other studies assessed its efficacy to be lower than that of other augmentation methods (18). These are similar to confusing effects of antidepressants, which on discontinuation may lead to mania (19).

We report the case of an 11-year-old patient with the diagnosis of BMD + panic disorder, who developed symptoms of manic episode after taking low doses of propranolol. This phenomenon might be important in several aspects.

First, this side effect was contrary to the previous reports, and as propranolol is a non-selective β-adrenergic antagonist the receptor on which this effect depends is unclear. Second, other possible reports in the future may suggest such side effects as dose dependent or idiosyncratic.

If such side effects are reported more often, it might be suggested to prescribe this drug with more precaution in patients with mood disorders. In addition, it might show a new way to recognise the physiopathology of affective disorders.

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