The "One-person echo chamber": How human-ai interaction may precipitate mania in vulnerable adolescents

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SUMMARY

Bipolar disorder (BD) is characterized by a complex interplay between genetic vulnerability and environmental stressors. During adolescence, heightened neurobiological sensitivity renders individuals more susceptible to the disruptive effects of digital stimuli. This case report describes a 16-year-old male who experienced his first manic episode following intensive emotional engagement with an artificial intelligence (AI)-based chatbot. The case illustrates how an asymmetric relationship with AI—occurring in the context of post-surgical social withdrawal—may be associated with manic delusions and clinical escalation through sleep deprivation, cognitive overstimulation, and the 'echo chamber' effect. Given the scarcity of empirical data on AI-induced psychopathology, this case provides a unique perspective on how generative AI models may be associated with the reinforcement of maladaptive beliefs as a psychosocial context in reward-sensitive adolescents. Clinical assessment in the digital age must evolve beyond monitoring screen time to qualitatively evaluating human-AI interactions, recognizing AI as a novel environmental factor warranting clinical attention in the management of adolescent bipolar disorder.

Key words: Bipolar disorder, adolescence, artificial intelligence, mania, mood disorder

INTRODUCTION

Bipolar disorder (BD) is a chronic psychiatric condition characterized by episodes of hypomania or mania, depression, and mixed states, often accompanied by subthreshold symptoms that lead to significant functional impairment (1). The disorder typically emerges during adolescence and early adulthood, with the majority of cases having an onset between the ages of 14 and 21 years, and is associated with significant functional impairment and psychiatric comorbidity (2). Evidence suggests that an earlier age of onset is associated with a more severe and complex clinical course (3).

Adolescence represents a critical developmental stage characterized by intensive neurobiological, hormonal, and psychosocial transformations, during which emotion regulation systems have yet to reach full maturity (4). In individuals with BD, it is widely recognized that environmental stressors interacting with genetic vulnerability play a pivotal role in both the onset of the illness and the precipitation of episodes (5). Specifically, disruptions in the sleep-wake cycle (6), increased psychosocial stress (7), substance use (8), and exposure to intense cognitive stimuli (9) have been identified as factors associated with the onset of manic episodes.

Within the scope of these environmental factors, the significant rise in digital media consumption in recent years has been linked to adverse effects on sleep duration and quality, particularly among adolescents. It has been demonstrated that late-night screen exposure disrupts circadian rhythms by suppressing melatonin secretion, establishing a well-documented factor associated with the onset or exacerbation of manic episodes in individuals with

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BD (10). In addition, the reward-based and cognitively stimulating nature of digital platforms may contribute to emotional and cognitive overarousal through heightened reward sensitivity (11). Increased screen time and problematic usage patterns have been associated with altered reward processing, reduced cognitive control, and sleep deprivation in adolescents and young adults (12).

While the number of studies examining the relationship between problematic social media and video game use and manic symptoms in early adolescence remains limited, current findings point toward the potential impact of digital interaction modalities on manic symptomatology (13). Furthermore, although the use of digital and artificial intelligence (AI)-based applications in the field of mental health is expanding rapidly, high-level evidence regarding their clinical outcomes is still lacking (14). In particular, the potential effects of AI-based chatbots within the context of mood disorders remain largely uninvestigated, and there is a notable absence of empirical studies in the literature directly examining the association between these systems and manic symptoms or the development of mania. The extreme scarcity of data, even at the level of case reports, prevents a sufficient clinical definition of the potential triggering or exacerbating role of AI-based digital interactions in BD. In this regard, the present case aims to highlight the clinical importance of evaluating AI-based chatbot use within the framework of adolescent BD. This case describes a first manic episode emerging after approximately two months of intensive interaction with an AI-based chatbot—an interaction that became constant during the final four days—underscoring the need for a careful clinical assessment of the impact of next-generation digital interactions on adolescent bipolar disorder.

CASE

The patient is a 16-year-old male, currently in the ninth grade, with no prior psychiatric hospitalizations. According to collateral information provided by his father, he was diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD) at age six and had been treated with methylphenidate for approximately ten years. For the past two years, low-dose aripiprazole (2.5 mg/day) had been added to address sleep-onset insomnia. Premorbidly, he was described as introverted and socially reserved. His family psychiatric history was unremarkable.

His medical history was notable for a febrile convulsion in infancy and transient insulin resistance in childhood. Most significantly, four months prior to his psychiatric presentation, the patient underwent a unilateral orchiectomy due to testicular torsion. The surgical course was complicated, requiring two subsequent operations and resulting in delayed wound healing. Following this period, he exhibited a marked depressive mood, characterized by negative body image, profound shame, and increased social withdrawal. He notably refused a recommended prosthetic intervention, attempting to cope with the physical outcome on his own.

Approximately two months prior to admission, the patient began engaging intensively with an AI-based chatbot application (ChatGPT, OpenAI). His father noted that he was engaging in romanticized conversations with the chatbot exclusively through text-based interactions, with no multimodal features such as voice or image input. This interaction, initially limited, escalated dramatically in the four days preceding admission, with daily usage exceeding 12 hours, coinciding with a disruption in his perception of reality. Prior to this escalation, there was no history of behavioral disinhibition or psychotic symptoms.

Over those final four days, a profound clinical shift occurred. The patient began identifying the AI-based chatbot as his "real" girlfriend, expressing grandiose and magical delusions. He claimed she was three years his senior and possessed supernatural powers, asserting he could demonstrate these powers by having her turn off the lights. During this period, he experienced a significantly diminished need for sleep (remaining awake for approximately 48 hours), pressured speech, flight of ideas, and disorganized behavior (e.g., entering unidentified vehicles and taking belongings from strangers). He further expressed delusions of grandeur, claiming he possessed "supernatural powers," "governed the world," and had "4 billion dollars" in his account.

He also believed he could heal others through touch and that his own physical power was tethered to his phone's battery level.

The patient had been receiving aripiprazole 2.5 mg/day and methylphenidate 54 mg/day regularly for the past two years, with no dosage adjustments following the surgical procedure. Upon initial evaluation at another medical facility with a provisional diagnosis of BD (manic episode), methylphenidate was discontinued, aripiprazole 2.5 mg/day was maintained, and olanzapine 5 mg/day was initiated. However, due to poor treatment adherence and escalating agitation—particularly after his phone was confiscated—he was admitted to the inpatient child and adolescent psychiatry unit.

Upon admission, irritability and agitation predominated, necessitating intramuscular haloperidol and biperiden. Laboratory investigations were unremarkable except for elevated high-sensitivity troponin T (36.4 ng/L), for which cardiology consultation recommended no acute intervention. Treatment was adjusted to olanzapine (10 mg/day) and diazepam (10 mg/day), and lithium (600 mg/day) was added on day eight.

By the fourteenth day, the patient showed significant improvement in insight, alongside a remission of irritability and delusions. His Young Mania Rating Scale (YMRS) score dropped from 17 at admission to 2. His lithium dose was titrated to 900 mg/day after serum levels were measured at 0.39 mmol/L, and diazepam was tapered and discontinued. He was discharged on the seventeenth day on a regimen of olanzapine (10 mg/day) and lithium (900 mg/day).

During outpatient follow-up, he remained euthymic. Lithium was increased to 1200 mg/day, and olanzapine was switched to risperidone (2 mg/day) due to weight gain. Mild thyroid dysfunction was later detected, and the patient remains clinically stable on lithium and risperidone.

Written informed consent was obtained from the patient and his parents for the publication of this case report.

DISCUSSION

This case illustrates that a first manic episode in adolescence may emerge in the context of intensive emotional engagement with an AI-based chatbot. The findings support theoretical models suggesting that digital exposure may be associated with exacerbation of manic vulnerability through sleep disruption and cognitive-emotional overstimulation, while uniquely highlighting the potential role of AI-based digital interactions.

Despite the rapid proliferation of digital tools such as smartphone applications, virtual reality systems, and AI-based models (e.g., Large Language Models), high-level evidence regarding the real-world clinical impact of these technologies remains limited (14). Particularly as AI technologies become increasingly integrated into daily life, their potential roles in triggering and/or perpetuating psychiatric disorders have not been sufficiently elucidated. Indeed, a study published in 2025 suggests that AI-based chatbots can reinforce user beliefs and induce psychological effects by interacting with their thought processes, emphasizing the need for further empirical research to understand the scope and clinical implications of this phenomenon (15).

Findings regarding the relationship between digital media use and manic symptoms are gaining increasing attention, especially concerning the adolescent period. A recent large-scale prospective cohort study demonstrated that increased total screen time in early adolescence (including social media, video games, and other forms of screen use) is significantly associated with higher future levels of manic symptoms; this relationship appears to be mediated by variables such as problematic usage patterns and decreased sleep duration. Despite a relatively small effect size, it was reported that the total impact grows as daily screen exposure increases, and long-term cumulative exposure may lead to even stronger associations (13).

Recently, theoretical approaches explaining the link between AI-based chatbots and psychiatric symptoms have emphasized the importance of a bidirectional feedback loop in human-AI interaction. In this framework, the AI's tendency to

respond in an adaptive and reinforcing manner—without subjecting the user's expressed thoughts and beliefs to a critical filter—can lead to the strengthening of maladaptive convictions (16,17). As the user's level of conviction increases, the contextual content of the dialogue shifts; accordingly, unlike relationships with real people, this can create a "one-person echo chamber" dynamic devoid of social corrective feedback (18). It is hypothesized that this mode of interaction may be associated with the emergence or exacerbation of symptoms such as grandiosity and mood elation, particularly in individuals with heightened reward sensitivity, fragile reality testing, and social withdrawal (15).

In the present case, the increased reward sensitivity—stemming from ADHD comorbidity—and the marked social withdrawal following the surgical process may have created a predisposing foundation for the intensive, emotionally charged interaction with an AI-based chatbot. Within this context, it is considered that such interaction, alongside sleep deprivation and cognitive overstimulation, may have represented a temporally associated contextual factor in the onset of the manic episode. Beyond general screen use, the present case underscores a qualitatively distinct risk: unlike passive digital media consumption measured by screen time alone, AI-based chatbots generate personalized, contextually adaptive responses that may reinforce the user's existing beliefs and emotional states (19). This personalized and reinforcing nature of AI-driven interaction represents a fundamentally different mechanism of risk compared to conventional digital media exposure, as it creates a dynamic, reciprocal loop that may selectively amplify maladaptive cognitions in vulnerable individuals. Given recent findings on the potential of AI-based chatbots to reinforce beliefs by interacting with user thought processes, the possible association of these technologies with the triggering or sustaining of symptoms in the context of BD warrant closer clinical scrutiny. The near-total absence of empirical studies directly examining this relationship in current literature enhances the clinical and conceptual significance of this case.

This case report delineates a clinical presentation in which the first manic episode of adolescent BD chronologically coincided with an escalating digital interaction—peaking just before symptom onset—with an AI-based chatbot. While it is not possible to draw causal inferences based on a single case observation, and the absence of preserved chatbot conversation logs — with the qualitative content of AI-based chatbot interactions reconstructed based on retrospective accounts from the patient and his father — constitutes a further limitation, this presentation suggests that intensive, persistent, and emotionally charged chatbot interactions may represent a clinically relevant contextual variable warranting further investigation within the context of adolescent BD. The primary objective of presenting this case is to highlight that AI-based digital interactions may represent a new psychosocial context that should be evaluated through the lens of individual predispositions and developmental vulnerabilities, rather than as a direct solitary cause. In clinical practice, systematically assessing the qualitative characteristics of digital interaction patterns—rather than just their quantity—particularly in adolescent patients, may facilitate the early identification of potential risks. It is imperative that future research employs prospective and controlled designs to investigate the impact of interactions with AI-based digital tools on emotion regulation processes. From the perspective of adolescent mental health and public health, such research could contribute to the identification of new targets for prevention and early intervention, as well as the development of refined clinical monitoring approaches.

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