

CASE REPORT**Internet Gaming Disorder and Psychotic Disturbance
in Adolescent: A Case Report**

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Abstract

The revolution of internet has brought a significant impact in computer and communications. However, the advancement of technology has led to the occurrence of problematic internet usage which recently addressed as internet addiction. Awareness on this phenomenon should be raise in view of its high prevalence and the mental health effect to our child and adolescent population. We illustrated a case of Mr. AH a 16 years old, adolescent boy who presented with first onset psychotic disturbance, preceded by abrupt internet withdrawal. He has been playing internet games as early as 4 years old, subsequently increased in frequency and amount of time spent on it. This has led to poor academic performances, and impairment in his social functioning. He was not able to stop his gaming behavior and there were 2 episodes of abrupt withdrawal which has resulted in the manifestation of withdrawal symptoms (first episode by low mood and the second episode by anxiousness, agitation and irritability) and followed by psychotic disturbances; hallucinations and disorganized behaviour. Mental state examination revealed a cooperative, but a highly distractible adolescent with hallucinatory behaviour. His speech was minimal, otherwise relevant and coherent. Other systems review was normal. Blood investigations were within normal parameters and drug screening was negative. CT brain is reported to have significant abnormalities. Treatment with antipsychotics was initiated, which has made him resumed school and remained in remission for 4 months at the time of this report was done. Internet gaming disorder may be a potential precipitant of psychosis in the vulnerable group. This phenomenon should be seen as equally heavy as substance use disorder knowing its impact on mental health.

Keywords: Internet Gaming Disorder, Psychosis, Adolescent

Introduction

The revolution of internet has brought a significant impact in computer and communications [1]. It facilitates as world-wide broadcasting capability, information dissem-

ination and a medium for collaboration and interaction between individuals [2]. However, the advancement of technology has led to the occurrence of problematic internet usage which recently addressed as internet addiction [3]. DSM V has proposed the criteria

for internet gaming disorder as persistent and recurrent use of the internet to engage in games, often with other players, leading to clinically significant impairment or distress within 12 months provided that at least 5 criteria are met. The nine criteria that must be taken into account are preoccupation with internet games, withdrawal symptoms such as irritability, anxiety, or sadness are shown when Internet gaming is taken away, tolerance, unsuccessful attempts to control the participation in internet games, loss of interests in previous hobbies and entertainment, continued excessive use of internet games despite knowledge of psychosocial problems, deceived family members, therapists, or others regarding the amount of internet gaming, use of internet games to escape or relieve a negative mood, jeopardizing or losing a significant relationship, job, or educational or career opportunity because of participation in internet games [4]. Awareness on this phenomenon should be raised in view of its high prevalence and the mental health effect to our child and adolescent population namely; depression, anger problems and anxiety disorders [5, 6].

Case

We illustrated a case of Mr. AH a 16 years old, adolescent boy who presented with first onset psychotic disturbance, preceded by abrupt internet withdrawal. Mr. AH is a developmentally normal adolescent boy, born in a family without any history of psychiatric illness. As early as 4 years old, Mr. AH has started to spend his time with internet gaming. He used to play variety themes of internet gaming. Initially, he spent about 2-4 hours per gaming session with the frequency of 2-3 days a week. He recalled being scolded by parents for this behaviour, but it didn't change his habit to any extent. He had continued playing internet games with increased frequency of gaming to daily until 14 years

old when his father decided to place him in a hostel without any access to the internet. Soon after he was placed in hostel, he developed constant depressive mood, difficulty to focus, insomnia and perceptual disturbances within one week. These symptoms continued for 8 months and resolved gradually after Mr. AH resumed the internet gaming. No medical advice sought for this episode. Mr. AH continued playing internet games in a frequency of 3-4 hours daily for 8 subsequent months and he was asymptomatic during this period. However, Mr. AH increased the time-spent with games after the end of year exam, about 12 to 14 hours a day. He started putting off other social activities like going out with friends as well as his participation in extracurricular activities. Mr. AH even has deceived family member regarding the amount of time spent on his internet gaming. Consequently, his academic performance deteriorated and hence, led the father to disallow all access to computer and internet. Following that abrupt withdrawal of gaming, Mr. AH developed severe anxiety, agitation and irritability. He was not able to concentrate and sleep. He started refusing school and isolated himself in the room. He was observed to have disorganized behaviour; pacing around the room, smiling and talking to himself. He admitted to hearing a clear, unfamiliar female voice through both ears. Besides that, he also experienced seeing a huge black image resembling one of the internet game's character, occasionally. This perception was so real that he needed to perform self-defence act against it. Due to the escalation of symptoms, he was brought to medical attention.

Mental state examination revealed a cooperative, but a highly distractible adolescent with hallucinatory behaviour. His speech was minimal, otherwise relevant and coherent. Other systems review was normal. Blood investigations were within normal

parameters and drug screening was negative. CT brain is reported to have no significant abnormalities.

Treatment with antipsychotic; olanzapine 5mg ON was initiated which has led to symptoms remission within 4 weeks. Unfortunately, Mr. AH discontinued the treatment by himself due to 'feeling well'. He was maintaining well until 10 months later when he started to engage in internet games again. He reported having difficulty in stopping himself once started playing the games. His condition was so severe that he needs assistance with basic needs; meal and hygiene. At this time, psychotic symptoms recurred and Olanzapine 5mg daily, was reinitiated. He showed rapid improvement while on antipsychotic but gained 18kg within 1 year. The excessive drowsiness secondary to Olanzapine also causes significant difficulty to go to school. Hence, a switch from Olanzapine to Aripiprazole was made, which he tolerated well. He resumed school and remained in remission for 4 months at the time of this report was done.

Discussions

Mr. AH has fulfilled the internet gaming disorder as proposed in DSM V criteria. It is described by persistent and recurrent use of internet to engage in games for more than 12 months, that leads to clinically significant impairment indicated by preoccupation with internet games, withdrawal symptoms, tolerance, unsuccessful attempts to control the participation internet games, loss of interest in other aspects of his life, use of internet gaming to reduce his feeling of helplessness and anxiety and he also has jeopardized significant relationship with other siblings and parents due to the participation in the internet gaming [4]. Psychosis in adolescent group has been illustrated as impairment in the ability to differentiate between reality

and false perceptions or beliefs which encompasses positive symptoms such as hallucinations, delusions, disorganized speech and negative symptoms. Both internet gaming disorder and early onset psychosis reported almost similar prevalence; 1% and 1.16% respectively [7, 8].

There are significant brain activities related to addictive behavior; reward, motivation, and memory, as well as cognitive control [9]. The neurobiological basis of behavior addiction is best explained by impulsivity (inability to stop initiating action) and compulsivity (inability to terminate the ongoing action) that explains about the failure of the control response [10, 11]. Impulsivity will lead to rewarding behavior, which will cause an individual to be addicted to certain behavior and this is mapped onto a prefrontal ventral striatum reward circuit [12, 13]. This rewarding behavior will eventually become a habit that is difficult to resist, and such behavior regarded as compulsivity which is mapped onto a prefrontal dorsal motor inhibition circuit [11, 13]. Behaviors start out as impulses in the ventral loop of reward and motivation, however, over time, some of these behavior migrates dorsally due to a cascade of neuroadaptation and neuroplasticity [11, 13]. The spirals of information from one neuronal loop to another also appear to involve regulatory input from hippocampus (memory formation), amygdala (emotion) and other areas of frontal cortex [14, 15]. The final common pathway of reinforcement and reward in the brain has been postulated to be mesolimbic dopaminergic pathway and its neurotransmitter dopamine, which usually triggered to be released upon impulsive gaming behavior [16, 13]. Craving is explained by stronger synapses in the ventral tegmental area, reduction of glutamate in the nucleus accumbens, and increased activity in the amygdala and hippocampus [17]. With this, tolerance will de-

velop gradually, reducing the natural reward which will result in a reward system deficiency and activation of the anti-reward system [18]. Withdrawal symptoms are resulted from lack of dopamine in the mesocortical dopaminergic pathway and to overcome these, renewed engagement in the addictive behaviour ensues, which eventually continues the compulsion [9].

A study based on Positron Emission Tomography (PET) scan on a patient with schizophrenia reveals consistent findings which shows a difference in the dopamine content in the prefrontal cortex, anterior cingulate gyrus, and hippocampus and it also shows a higher density of D2 receptors in the striatum and neural brain dysconnectivity [19]. In relation to the above findings, PET scan of an individual with internet gaming disorder showed a significant decrease in glucose metabolism was observed in the prefrontal, temporal, and limbic systems with dysregulation of D2 receptors was observed in the striatum. This finding was correlated to years of overuse. A low level of D2 receptors in the striatum was significantly associated with decreased glucose metabolism in the orbitofrontal cortex [20].

Conclusion

Internet gaming disorder may be a potential precipitant of psychosis in the vulnerable group. This phenomenon should be seen as equally heavy as substance use disorder knowing its impact on mental health.

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