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Administration of methylphenidate improves hypersexual behaviour in a 22-year-old woman with attention deficit hyperactivity disorder: a case report

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Abstract

Background: Hypersexual behaviour is characterised by recurrent sexual fantasies, sexual urges and repeated sexual behaviours and is often associated with attention deficit hyperactivity disorder (ADHD). Although hypersexual behaviour is not an uncommon phenomenon, only few and controversial treatment options are known so far. To our best knowledge, this is the first report which describes the successful treatment of hypersexual behaviour with methylphenidate in an adult diagnosed with ADHD.

Methods: We report the case of a 22-year-old woman diagnosed with ADHD accompanied by recurrent depressive episodes with pronounced hypersexual behaviour. At first admission in our day clinic, the patient reported core symptoms of sustained tension, pronounced impulsivity as well as an uncontrollable sexual urge. The latter was experienced as stressful and unpleasant. As we suspected the diagnosis of ADHD in adulthood, we started a pharmacotherapy with methylphenidate. After the intake, we initially observed a reduction of restlessness and an improvement of concentration which was stable until her discharge.
In a follow-up after 15 weeks the patient additionally reported a reduction of her sexual impulses and a significant decrease of her sexual urge since the administration of methylphenidate. This improvement was substantiated by a significantly decreased score on the Hypersexual Behaviour Inventory scale.

Conclusion: Administration of methylphenidate might be an alternative pharmacological approach for the treatment of patients suffering from uncontrollable sexual urges and hypersexual behaviour. However, further research is needed to assess the broader efficacy of methylphenidate in the treatment of hypersexual behaviour in patients with and without ADHD.

Keywords

ADHD, Case report, Hypersexual behaviour, Methylphenidate, Nucleus accumbens, Ritalin

INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is a neurodevelopmental disorder with an estimated prevalence of 2.5% in adults (Mechler et al., 2022). Comorbidities with other mental disorders are frequent. For instance, despite partly contradictory symptoms (psychomotor acceleration versus retardation) 19% of adults diagnosed with ADHD also have a major depressive disorder (Lee and Goto, 2021). ADHD itself is characterised by symptoms such as inattention, hyperactivity and impulsivity as well as emotional dysregulation (Hertz et al., 2022).

In addition to these well-established symptoms, studies suggest that ADHD is also associated with hypersexual behaviour (Korchia et al., 2022). This is reinforced by an online survey (N = 139 ADHD cases, N = 76 controls) in which individuals with ADHD scored significantly higher on the Hypersexual Behaviour Inventory (HBI-19) than non-ADHD individuals. Thereby, hypersexual behaviour appears to be associated with symptoms such as emotional dysregulation and impulsivity, especially in women (Hertz et al., 2022).

A uniform definition of hypersexual behaviour is still debated. However, there is consensus that hypersexual behaviour comprises recurrent sexual fantasies, sexual urges and repeated sexual behaviours (Knight and Du, 2021; Malandain et al., 2020). The prevalence of hypersexual behaviour in

the general population is estimated to lie between 2% and 6% (Malandain et al., 2020).

While methylphenidate is still the medication of choice for the treatment of ADHD, only few studies have explored the effect of psychopharmacological medication for the treatment of hypersexual behaviour so far (Shellenberg et al., 2020). Previous psychopharmacological treatment approaches included, among others, selective serotonin reuptake inhibitors (SSRIs), Nefazodone, Topiramate and Naltrexone but not for methylphenidate (Malandain et al., 2020). In its main function methylphenidate blocks dopamine and norepinephrine reuptake-transporters which leads to an increase of dopamine and norepinephrine in the synaptic cleft (Shellenberg et al., 2020). With regard to hypersexual behaviour, it was long assumed that dopaminergic psychostimulants might rather increase than decrease the sexual drive (Schmid et al., 2015). This is supported by the observation that hypersexual behaviour is often associated with the administration of amphetamines for the treatment of Parkinson's disease with dopaminergic agonists (Hammes et al., 2019; Malandain et al., 2020; Schmid et al., 2015).

Contrary to these assumptions, we present in this report the case of a 22-year-old women diagnosed with ADHD whose hypersexual behaviour significantly decreased after treatment with methylphenidate. To our knowledge, this is the first case report which addresses the effect of methylphenidate on hypersexual behaviour in a patient with ADHD accompanied by recurrent depressive episodes.

CASE PRESENTATION

Patient information

We present the case of a 22-year-old, single, childless patient of European ancestry who grew up in a conflict-ridden parental home. Although her parents separated when she was 13 years old, she is still involved in ongoing parental conflicts. Her parents often triggered feelings of guilt by blaming her for their grievances (for example, "My bank account is empty and I will have to work more night shifts so you can go on the class trip.").

In general, she has developed the conviction that she will never be able to meet her parent's expectations. Her puberty started early, as she had to take growth hormones due to a growth stagnation between the ages of 4 and 13. She also experienced bullying and exclusion at school by classmates and teachers for approximately two years. This, however, improved after a change of school. Since her early youth she continuously felt restless and had an urge for excessive activity which meant she got involved in Judo and other sports as leisure activities. From her school days until today she has had problems sitting still or focusing and following the content of lessons, seminars or discussions. In order to satisfy her urge to move she often left the classroom pretending to go to the restroom. In the past, she had often lost things (for example, pens, toys, wallet, passport) or forgotten tasks (for example, homework or and appointments). Therefore, it was felt that trouble and challenges were inevitable. Although she is able to organise her daily life better under the usage of a personal organiser now, she still has difficulties such as keeping her flat tidy. She also has problems adjusting to new situations in her private and professional life.

At first admission in our day clinic, she reported the core symptoms of sustained tension, pronounced impulsivity and a low frustration tolerance with outbursts of anger. To regulate these, she beat herself, took three to five tablets of acetaminophen, engaged in risky driving and increased her sexual activity with changing partners, partly unprotected and at unusual places (for example, at the gym, backseat of a car). The sexual urge was experienced as emotionally stressful and unpleasant. She also suffered from frequent mood swings, inner restlessness with rumination and sleep disturbances, difficulties in attention and concentration, lack of self-esteem as well as latent suicidal tendencies. A first suicide was attempted at the age of 16 years by taking 44 pills of her anti-acne drug.

Therapeutic interventions and diagnostic assessment

Suspecting an impulse disorder, we initially started the treatment with a tension protocol followed by skill training based on the dialectical behavioural therapy. To alleviate inner tensions, we decided to administer 200mg of quetiapine (antipsychotic drug, retard releasing tablets) under which, however, a further deterioration of the patient's mental state was observed. Therefore, we stopped the administration of quetiapine immediately. Since the patient's history (for example, problems focusing and following tasks, forgetfulness, restlessness and excessive activity) and reported symptoms (for example, frequent mood swings, hot temper, low frustration tolerance with outburst of anger) suggested ADHD in adulthood,

we conducted the Wender-Reimherr-Interview (WRI) (Rösler et al., 2008a; Rösler et al., 2008b) for further differential diagnosis. The WRI is based on the UTAH-criteria and represents a disorder-specific interview for the assessment of ADHD in adulthood which comprises seven areas in total (Rösler et al., 2008a; Rösler et al., 2008b). Whereas the patient scored high on emotional over-reactivity, temper, affective lability and impulsivity the dimensions attention difficulties, hyperactivity/restlessness, disorganisation were within normal ranges. To gain insights into the extent of the reported hypersexual behaviour, the patient also completed the Hypersexual Behaviour Inventory (HBI-19) which represents a 3-factor measure (coping, control and consequences) for the assessment of hypersexual behaviour (Klein et al., 2014).

With a sum score of 86, the patient was well above the proposed cut-off score (≥ 53).

Despite the heterogeneous results of the WRI we decided to start the administration of methylphenidate (immediate release tablets) which was dosed up to 30mg per day. After the intake of methylphenidate which was tolerated well, the patient perceived a reduction of restlessness, impulsivity and an improvement of concentration. Taking into account the patients history, the reported symptoms, the WRI results, the positive effect of methylphenidate as well as our clinical impression we therefore diagnosed ADHD in adulthood. After 9-weeks of treatment we discharged the patient partially stabilised with the option of readmission.

Follow-up and outcomes

Due to worsening family conflicts and difficulties at work we readmitted the patient after consultation with the outpatient psychiatrist 15 weeks after the initial discharge. Since the daily intake of methylphenidate, she has noticed a reduction of inner tension. Although it was now easier for her to control emotional impulses, occasional outbursts still occurred in which she threw objects. Surprisingly, the patient reported a significant improvement in dealing with her sexual urges. According to her own statement, she was no longer helplessly subjected to her sexual impulses. We also observed a change in the HBI score from 86 to 34. In the 15 weeks prior to her readmission she had less sexual contacts and no longer felt an excessive sexual attraction to men which led to a noticeably improved quality of life. This was also in line with our clinical impression, as we noticed an improvement in mental health stability compared to first admission.

DISCUSSION

As our case suggests, dopaminergic psychostimulants do not seem to increase sexual drive in general. Although the available data regarding the impact of methylphenidate on hypersexual behaviour is scarce, our observation is in line with a study by Gomez and colleagues (Gomez et al., 2016), who demonstrated an effect of methylphenidate on the sexual behaviour of female rats. Compared to rats receiving saline, the methylphenidate-treated female rats showed significantly decreased interest in male stimuli during a partner-preference test (Gomez et al., 2016). This is also in line with the statement of our patient, whose extreme attraction to men has largely subsided since taking methylphenidate. Further evidence is provided by Ferahkaya and Bilgiç (Ferahkaya and Bilgiç, 2021), who observed a significant decrease in excessive masturbation in a 6-year-old boy with diagnosed autism and ADHD after the administration of methylphenidate.

Since methylphenidate blocks the dopamine transporters predominantly in the areas of the striatum and the nucleus accumbens (Shellenberg et al., 2020), a reduction in sexual urge might be attributable to an increase of dopamine in the synaptic cleft.

A first indication for this assumption is provided by Hammes and colleagues (Hammes et al., 2019), who showed that the development of impulsive-compulsive behaviour might be explained, at least partially, by a reduced dopamine synthesis capacity in the nucleus accumbens and a reduced functional connectivity between the rostral cingulate cortex – an area associated with impulse control – and the nucleus accumbens, an integral part of the brain's reward system (Hammes et al., 2019). Although the exact pharmacological mechanism is still unclear, this might be a first explanation how methylphenidate affects hypersexual behaviour through an increase of dopamine in the nucleus accumbens.

CONCLUSIONS

Despite our interesting finding, the question remains, whether our observation is transferable to other patients. It is possible that, methylphenidate only impacts hypersexual behaviour in patients

with a metabolism comparable to ADHD patients. In addition, we cannot exclude completely that symptoms of a depressive episode led to the reduction in libido which, however, was not clinically prominent. So, it is necessary to see whether our findings can also be observed in other ADHD patients and to examine the effect of methylphenidate on hypersexual behaviour in non-ADHD cases.

Altogether, these findings support the idea of methylphenidate as a potential drug therapy for hypersexual behaviour. However, further research is needed to assess the broader efficacy of methylphenidate in the treatment of hypersexual behaviour in patients with and without ADHD.

DECLARATIONS

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Availability of data and material: due to data protection law it is not possible to share clinical data and materials.

Ethical approval: the preparation of the case report was carried out in accordance with the Declaration of Helsinki.

Conflicts of interests: HG has received travel grants and speakers honoraria from Fresenius Medical Care, Neuraxpharm, Servier, and Janssen Cilag, as well as research funding from Fresenius Medical Care. All other coauthors have no conflicts to declare.

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Informed consent: Written informed consent was obtained from the participant involved in the case report.

Study registration: not available.

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