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PHARMACOLOGICAL TREATMENT STRATEGIES FOR ADHD: A SYSTEMATIC REVIEW

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ABSTRACT

Introduction: Attention deficit hyperactivity disorder (ADHD) is one of the most commonly diagnosed neurodevelopmental disorders in children and adolescents. Various treatment methods are available for this condition, including pharmacological and non-pharmacological strategies. Pharmacotherapy is currently the most effective method of reducing the core symptoms of ADHD. The most commonly used medications include psychostimulants such as methylphenidate and amphetamines. Comparing the efficacy and safety of available medications is particularly important in order to select the appropriate treatment for individual.
Aim of the study: The aim of our study is to review the available literature on the pharmacological treatment of attention deficit hyperactivity disorder and to summarize current knowledge. We presented the mechanisms of action, clinical efficacy, and safety profile of individual drugs used in the pharmacotherapy of ADHD.
Methods and materials: We reviewed the literature available in the PubMed database using the following keywords: "ADHD treatment"; "Attention Deficit Hyperactivity Disorder treatment"; "Stimulants"; "Non-stimulants"; "Methylphenidate"; "Atomoxetine"; "ADHD"; "Bupropion"; 'Modafinil'; "α-agonists"; "Lisdexamphetamine (LDX)"; "Mixed Amphetamine Salts", "Clonidine"; "Viloxazine"; "Centanafadine"
Conclusion: Pharmacotherapy is the most effective method of reducing the core symptoms of ADHD. Psychostimulants are currently considered the most effective and most commonly used drugs for the treatment of attention deficit hyperactivity disorder. In cases of intolerance or contraindications to their use, non-stimulant medications are an alternative. New medications such as viloxazine and centanafadine also offer promising alternatives. Individualization of pharmacological treatment is crucial to achieve optimal results.

KEYWORDS

ADHD Treatment, Attention Deficit Hyperactivity Disorder Treatment, Stimulants, Non-Stimulants

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1. Introduction

Attention deficit hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by inattention, hyperactivity, and impulsivity (Spencer, Biederman, & Mick, 2007). The prevalence of the disorder is approximately 5% among children and adolescents (Polanczyk, de Lima, Horta, Biederman, & Rohde, 2007) and 2.5% in the adult population (Simon, Czobor, Bálint, Mészáros, & Bitter, 2009). Although the syndrome was originally described in children (Lahey et al., 1994), it is now known that up to 65% of children diagnosed with ADHD continue to exhibit symptoms in adulthood (Dulcan, 1997). ADHD is associated with numerous negative outcomes, as it significantly impairs daily functioning across multiple domains of life (Heidbreder, 2015). Children with ADHD tend to perform worse academically (Galéra, Melchior, Chastang, Bouvard, & Fombonne, 2009), experience more peer rejection (Grygiel, Humenny, Rębisz, Bajcar, & Świtaj, 2018), and face greater difficulties in social and family relationships (DuPaul, McGoey, Eckert, & VanBrakle, 2001). In adults, without appropriate treatment, ADHD is linked to a higher risk of unemployment, criminality, substance abuse, and more frequent suicide attempts (Kooij et al., 2010). Additionally, ADHD commonly co-occurs with other mental disorders, including anxiety and mood disorders, personality disorders, and substance use disorders (Mao, & Findling, 2014). The symptoms of these comorbidities partially overlap with those of ADHD, complicating diagnosis and treatment in adults (Kessler et al., 2006). The etiology of ADHD is multifactorial, though specific causes remain unclear. Dysregulation of dopaminergic and noradrenergic neurotransmission plays a significant role (Faraone, 2018). Treatment of ADHD involves several approaches, with pharmacotherapy being one of the main strategies. Research suggests that pharmacological treatment is more effective at alleviating ADHD symptoms than non-pharmacological methods („A 14-month randomized clinical trial of treatment strategies for attention-

deficit/hyperactivity disorder. The MTA Cooperative Group. Multimodal Treatment Study of Children with ADHD", 1999). Medications approved by the Food and Drug Administration (FDA) include psychostimulants and non-stimulants. Psychostimulants, such as amphetamines and methylphenidate, are currently considered first-line pharmacological treatments for individuals with ADHD („National Institute for Health and Care Excellence Attention deficit hyperactivity disorder: diagnosis and management", 2018).

2. Description of the State of Knowledge

PSYCHOSTIMULANTS (METHYLPHENIDATE, AMPHETAMINES)

The mechanism of action of stimulant drugs involves increasing dopamine and norepinephrine concentrations in the synaptic cleft of the prefrontal cortex (Faraone, 2018). Psychostimulants are regarded as the most effective pharmacological agents for ADHD. Their efficacy and safety in short-term treatment among children, adolescents, and adults have been confirmed by hundreds of clinical studies, summarized in numerous meta-analyses (Pringsheim, Hirsch, Gardner, & Gorman, 2015; Catalá-López et al., 2017; Liu, Zhang, Fang, & Qin, 2017; Riera et al., 2017). These drugs act more quickly and effectively than non-stimulant medications (Cortese et al., 2018).

METHYLPHENIDATE

Methylphenidate primarily inhibits the reuptake of dopamine and norepinephrine by blocking dopamine (DAT) and norepinephrine (NET) transporters, leading to increased concentrations of these monoamines in the synaptic cleft. Additionally, methylphenidate exhibits agonistic activity at the serotonin 5-HT1A receptor and influences the redistribution of the vesicular monoamine transporter (VMAT-2) (Faraone, 2018). SPECT studies in adult ADHD patients have shown that methylphenidate significantly reduces elevated dopamine transporter availability in the striatum (Krause, Dresel, Krause, Kung, & Tatsch, 2000), contributing to improved cognitive function and symptom reduction (Faraone, 2018; Cortese, 2020). A large meta-analysis of 133 randomized controlled trials revealed that methylphenidate has the best efficacy and safety profile for short-term ADHD treatment in children and adolescents, while amphetamines were found to be most effective in adults, with tolerability comparable to methylphenidate (Cortese et al., 2018). Studies suggest that methylphenidate treatment improves quality of life in both pediatric and adult ADHD populations (Coghill, 2010). In adults, methylphenidate is generally well tolerated, with most adverse effects being mild or moderate. Common side effects include decreased appetite, headache, dry mouth, and sleep disturbances (Spencer et al., 2007). A randomized, double-blind clinical trial involving 375 adults with ADHD evaluated the efficacy and safety of extended-release methylphenidate (PRC-063). Results showed that appetite reduction and weight loss correlated with drug dose, whereas insomnia incidence was independent of dosage (Weiss, Childress, & Donnelly, 2021). Methylphenidate also affects the cardiovascular system. Adverse cardiovascular effects appear more frequently in adults than in children (Ayme-Dietrich, Kaguelidou, Bertschy, & Chouchana, 2024). Adult patients typically experience small but statistically significant increases in blood pressure and heart rate during treatment (Spencer et al., 2005; Wilens et al., 2005; Biederman et al., 2006). In children, methylphenidate treatment also results in slight increases in blood pressure and heart rate, without significant electrocardiographic changes (Hammerness, Perrin, Shelley-Abrahamson, & Wilens, 2011). A study involving 70 ADHD patients demonstrated that long-term methylphenidate use does not adversely affect cardiac function as assessed by echocardiography (Tunca et al., 2025). Despite these physiological changes, meta-analyses have not conclusively linked psychostimulant use to increased risk of serious cardiovascular events such as sudden cardiac death, arrhythmias, stroke, or myocardial infarction (Liu, Feng, & Zhang, 2019). According to National Institute for Health and Care Excellence (NICE) guidelines, all patients on methylphenidate should undergo regular cardiovascular monitoring, including blood pressure and heart rate measurements before treatment initiation, after each dose adjustment, and at least biannually during therapy („National Institute for Health and Care Excellence Attention deficit hyperactivity disorder: diagnosis and management", 2018). Some studies suggest potential growth retardation in children taking stimulant medications (Poulton, 2005). However, a two-year study (ADDUCE: Attention Deficit Hyperactivity Disorder Drugs Use Chronic Effects), published in 2023, found no significant impact of long-term methylphenidate treatment on growth in children (Man et al., 2023). In addition to effects on physical development, stimulant use has been associated with increased risk of psychotic symptoms and tics, though these occurrences are rare, generally transient, and typically resolve upon drug discontinuation (Reiersen, 2018). Methylphenidate is available in various formulations differing in duration of action and drug-release mechanisms. Delayed- and extended-release (DR/ER) methylphenidate

was FDA-approved in 2018 for treating ADHD in children aged six years and older. It is the first stimulant approved for evening administration, with approximately 50% of the dose released 10–14 hours post-administration, enabling round-the-clock symptom control—particularly beneficial for patients experiencing severe morning symptoms before standard medications take effect (Gomeni, Komolova, Incledon, & Faraone, 2020). The efficacy of DR/ER methylphenidate was confirmed in a randomized, multicenter, placebo-controlled trial involving 161 children aged 6–12 years, demonstrating significant symptom reduction maintained throughout morning, afternoon, and evening (Pliszka et al, 2017). Short-term methylphenidate use is considered safe; however, long-term safety and efficacy data, particularly beyond two years of use, require further investigation (Groenman, Schweren, Dietrich, & Hoekstra, 2017).

AMPHETAMINES

The efficacy of amphetamines in ADHD treatment is well established. Meta-analyses in adult populations indicate that amphetamine-based medications are among the most effective for reducing ADHD symptoms, with tolerability comparable to methylphenidate (Cortese et al., 2018). Amphetamines act by inhibiting dopamine (DAT) and norepinephrine (NET) transporters, as well as inhibiting vesicular monoamine transporter (VMAT-2) activity and monoamine oxidase (MAO), further enhancing catecholamine availability (Faraone, 2018; Cortese, 2020). Clinically, this results in reduced hyperactivity and impulsivity and improved concentration and attention in ADHD patients (Arnsten, 2009). Various amphetamine formulations with differing release profiles are used in ADHD treatment (Steingard, Taskiran, Connor, Markowitz, & Stein, 2019). For example, extended-release oral amphetamine suspension (AMPH EROS) was evaluated in a randomized, double-blind trial involving children aged 6–12 years, showing high efficacy with therapeutic effects lasting from one to thirteen hours post-administration (Faraone et al., 2023). Lisdexamfetamine dimesylate (LDX), a prodrug of dextroamphetamine, has a more stable and controlled release profile, which reduces abuse potential and extends duration of action (Findling, 2008; Najib, 2009). Its efficacy and safety have been confirmed in numerous clinical trials involving children and adolescents (Biederman et al., 2007; Frampton, 2018; Findling et al., 2011) and adults (Maneeton et al., 2014; Frampton, 2016). A randomized, double-blind, phase III trial assessed LDX's effect on ADHD symptoms in children aged 6–12 years. Doses of 30 to 70 mg once daily significantly improved ADHD-RS-IV scores at all doses, with the greatest effect at 70 mg (Biederman, Krishnan, Zhang, McGough, & Findling, 2007). A 2013 study also demonstrated significant symptom reduction and improved overall functioning in children and adolescents treated with LDX versus placebo, with improvements on ADHD-RS-IV and CGI-I scales (Coghill et al., 2013). Further analysis showed superior efficacy of LDX compared to OROS methylphenidate in symptom reduction (Soutullo et al., 2013). A comparative study of LDX and atomoxetine found LDX to be more effective in treating children and adolescents with ADHD (Nagy et al., 2016). Long-term efficacy of LDX was demonstrated in adolescents aged 14–17 years, with significant symptom improvement and 87% showing clinical improvement on the CGI-I scale (Findling et al, 2013). Side effects during LDX treatment were typical of stimulants, common but generally mild in severity (Biederman, Krishnan, Zhang, McGough, & Findling, 2007; Findling et al., 2013). Another form of amphetamine derivatives are mixed amphetamine salts (MAS), which are a combination of stimulants such as amphetamine sulfate, amphetamine aspartate monohydrate, dextroamphetamine saccharin, and dextroamphetamine sulfate (Weisler, 2005). Amphetamine salts have been approved by the FDA for the treatment of attention deficit hyperactivity disorder (ADHD), and their efficacy has been confirmed by studies conducted in both adults (Frick, Yan, & Adler, 2020) and children (McGough et al., 2005). A clinical trial conducted in 2020 evaluating the effect of MAS on ADHD symptoms in adults over 6 weeks of treatment showed a significant reduction in symptoms compared to placebo regardless of the dose used. In addition, the preparation was well tolerated, causing only a slight increase in blood pressure and heart rate (Frick, Yan, & Adler, 2020). In the pediatric population, MAS XR has also been shown to be effective and well tolerated in long-term ADHD treatment, providing sustained improvement in symptoms (McGough et al., 2005). An alternative to traditional oral forms is the transdermal dextroamphetamine system (d-ATS). The efficacy of d-ATS in the treatment of children and adolescents with attention deficit hyperactivity disorder has been shown to be comparable to that of oral amphetamine and methylphenidate preparations. The drug is well tolerated. In a randomized clinical trial, minimal skin reactions were observed, and only 2% of patients experienced significant skin irritation as a result of using the drug (Cutler et al., 2023). Due to the frequent co-occurrence of ADHD with other mental disorders, such as substance use disorders, it is worth noting clinical observations suggesting that extended-release mixed amphetamine salts in high doses are effective in treating adults with ADHD and co-occurring cocaine addiction. In a double-blind, 13-week placebo-controlled clinical trial,

extended-release mixed amphetamine salts at doses of 60–80 mg/day reduced both ADHD symptoms and cocaine use in a group of patients (Levin et al., 2015). Attention deficit hyperactivity disorder very often co-occurs with bipolar disorder, and the symptoms of both disorders overlap. In some cases of co-occurring ADHD and bipolar disorder, treatment with amphetamine without concomitant mood stabilizers may be effective. Although this is not standard treatment, these results indicate a need for further research on the safety and efficacy of MAS in this patient group (Armstrong & Kapolowicz, 2023).

MODAFINIL

Modafinil is an alternative drug for the treatment of attention deficit hyperactivity disorder (ADHD), especially in situations where other drugs do not produce the desired therapeutic effect. Despite growing interest in its use in ADHD therapy, it has not yet been approved by the FDA for the treatment of this disorder. The mechanism of action of modafinil involves the inhibition of dopamine and norepinephrine reuptake through interaction with the dopamine transporter (DAT) (Wisor, 2013). A 2017 meta-analysis of five randomized, double-blind clinical trials showed that modafinil is more effective than placebo in the short-term treatment of ADHD symptoms in children and adolescents. The side effect profile mainly included decreased appetite and insomnia. The drug had no effect on heart rate or blood pressure. However, the results of these studies should be interpreted with caution due to the limited number of clinical trials included in the meta-analysis (Wang et al., 2017). In 2022, a randomized clinical trial was conducted to compare the efficacy of modafinil and long-acting methylphenidate in the treatment of symptoms of attention deficit hyperactivity disorder (ADHD) in children. The study involved 50 children aged 6 to 12 years. Participants were randomly assigned to two groups, each receiving one of the two study drugs, modafinil or long-acting methylphenidate, for 14 days. The results of the study showed that both drugs led to clinically significant improvements in symptoms of inattention and impulsivity. No statistically significant differences between the groups in terms of therapeutic efficacy were found (Zahed, Roozbakhsh, Davari Ashtiani, & Razjouyan, 2022). In adult patients, the results remain inconclusive. In 2014, a nine-week randomized, double-blind study was conducted involving 338 adult patients with ADHD. In this study, modafinil was no more effective than placebo in reducing ADHD symptoms (Arnold, Feifel, Earl, Yang, & Adler, 2014). Similar conclusions were presented in a meta-analysis published in Lancet Psychiatry in 2018, which summarized the effectiveness of drugs used to treat ADHD. In this analysis, modafinil was found to be more effective than placebo in children and adolescents, but did not show significant differences compared to placebo in adults (Cortese et al., 2018).

BUPROPION

The mechanism of action of bupropion is based on selective inhibition of dopamine and norepinephrine reuptake, which leads to an increase in their concentration in the synaptic cleft (Stahl et al., 2004). Reports on its effectiveness in the treatment of attention deficit hyperactivity disorder (ADHD) remain inconclusive. A literature review published in 2017 suggests that bupropion may be effective in alleviating ADHD symptoms, but the interpretation of these results should be cautious due to the limited number of studies (Verbeeck, Bekkering, Van den Noortgate, & Kramers, 2017; Ng 2017). A meta-analysis from the same year comparing the efficacy and safety of pharmacotherapy for ADHD showed that bupropion is ineffective and should not be used as a drug for the treatment of this disorder. In addition, among the preparations analyzed, bupropion had the second highest incidence of adverse effects (Li, Gao, He, Zhang, & Wang, 2017). Similar conclusions were drawn from an earlier meta-analysis from 2015, which evaluated bupropion as less effective in reducing ADHD symptoms compared to other drugs and placebo. Further studies are needed to better evaluate bupropion clinically (Stuhec, Munda, Svab, & Locatelli, 2015).

ATOMEXETINE

Atomoxetine, a selective presynaptic norepinephrine reuptake inhibitor, increases the amount of norepinephrine in the synaptic cleft of neurons, which activates α2-adrenergic receptors, resulting in an effect on ADHD symptoms. Despite the selective affinity of atomoxetine for the norepinephrine transporter (NET), an increase in dopamine levels in the prefrontal cortex has also been observed. This mechanism is explained by a non-specific effect on NET, which is present in large amounts in this area of the brain, causing an effect limited to a specific area of the brain (Clemow, & Bushe, 2015). The main indication for the use of atomoxetine is when treatment with psychostimulants is contraindicated or poorly tolerated by the patient. This drug is also used as first-line therapy in specific clinical cases, such as the co-occurrence of attention deficit hyperactivity disorder (ADHD) with bipolar disorder, where there is an increased risk of mood destabilization with the use

of stimulants. Atomoxetine is also recommended for the treatment of patients with concomitant psychoactive substance dependence and in cases of ADHD co-occurring with Tourette's syndrome, where psychostimulants may exacerbate tic symptoms or lead to drug abuse (Caye, Swanson, Coghill, & Rohde, 2019). A meta-analysis of 25 double-blind, randomized, placebo-controlled studies involving 3,928 children and adolescents with ADHD showed that atomoxetine significantly reduces the overall symptoms of the disorder, improving quality of life and functioning in children as assessed by their parents (Schwartz, & Correll, 2014). In a clinical trial involving adult patients, atomoxetine was administered at a dose of 80–100 mg daily for 24 weeks. Participants were then randomized to continue treatment or to a placebo group for an additional 6 months. Significant improvement in cognitive function was observed already in the first phase of the study, and this effect persisted in the placebo group for at least six months after the end of active treatment, correlating with improvements in inattention, impulsivity, and hyperactivity (Adler, Solanto, Escobar, Lipsius, & Upadhyaya, 2020). A randomized placebo-controlled study involving 416 participants showed that atomoxetine was significantly more effective than placebo in preventing the recurrence of ADHD symptoms. Relapse was defined as a return to 90% of the initial symptom severity. The percentage of patients who relapsed was 22.3% (65 of 292) in the atomoxetine-treated group and 37.9% (47 of 124) in the placebo group ($p = 0.002$) (Michelson et al., 2004). Although atomoxetine has a relatively favorable safety profile, its use in children and adolescents may be associated with an increased risk of suicidal thoughts. A pooled analysis of 12 placebo-controlled clinical trials involving over 2,200 patients (including 1,357 receiving atomoxetine and 851 receiving placebo) showed that 0.4% of patients receiving atomoxetine experienced suicidal thoughts, while no such cases were observed in the placebo group („Strattera® (atomoxetine hydrochloride) - Prescribing information”, 2020).

ALPHA-2-ADRENERGIC AGONIST (GUANFACINE, CLONIDINE)

Guanfacine acts as a selective α2A-adrenergic receptor agonist, enhancing the action of norepinephrine in the prefrontal cortex and reducing symptoms such as hyperactivity and attention deficit (Arnsten, & Pliszka, 2011). Clonidine, through its effect on alpha 2B and 2C adrenoreceptors, may cause greater sedation and affect blood pressure (Briars, & Todd, 2016). A meta-analysis of 12 out of 332 available randomized controlled trials involving a total of 2,653 participants confirmed the efficacy of guanfacine in improving overall symptoms and its safety in the treatment of ADHD. Its use should be considered especially in cases of stimulant failure or intolerance (Yu, Shen, & Tao, 2023). To evaluate the potential of guanfacine as an alternative to stimulant medications, a study was conducted involving 17 patients who met the DSM-IV diagnostic criteria for ADHD. The study was cross-over and included three two-week treatment periods: placebo, guanfacine, and dextroamphetamine, with four-day washout phases between them. The therapeutic effects and cognitive functions were assessed within the first four hours after dosing. The results showed significant improvement in attention and response inhibition during guanfacine therapy. (Taylor, & Russo, 2001). Despite satisfactory results in studies, the drug has some limitations for use due to side effects, in particular drowsiness, weight gain, and decreased blood pressure and heart rate. („Guanfacine for ADHD in children and adolescents”, 2016). Extended-release clonidine may be a beneficial therapeutic option in patients who experience adverse effects such as tics, sleep disturbances, or mood swings when using stimulants or atomoxetine. In such cases, clonidine may be used as an adjunctive treatment (Lee, & Kim, 2025). Although clonidine and guanfacine are α2-adrenergic receptor agonists and have a similar mechanism of action, guanfacine has been shown to have a significantly weaker pharmacological effect, approximately ten times weaker (Mechler, Banaschewski, Hohmann, & Häge, 2022).

VILOXAZINE

Viloxazine is a selective norepinephrine reuptake inhibitor used to treat attention deficit hyperactivity disorder in children (Edinoff et al., 2021). Extended-release (VER) viloxazine was approved in the United States on April 2, 2021, for the treatment of ADHD in pediatric patients aged 6 to 17 years (Lamb, 2021). To evaluate the efficacy and safety of extended-release viloxazine, a study was conducted involving 477 participants aged 6 to 11 years. It was a randomized, double-blind, controlled study that lasted 6 weeks. Patients were randomly assigned to groups receiving 100 mg and 200 mg of SPN-812 daily. A significant improvement in ADHD-RS-5 scores was observed in both groups receiving the drug compared to placebo as early as the first week of treatment. A significant improvement was also observed at the end of the study (EOS) on the CGI-I scale (Nasser et al., 2020). A study comprising 102 randomized controlled trials with a short follow-up period (7 weeks) compared the effects of medications used to treat ADHD on blood pressure, heart rate, and ECG parameters across children, adolescents, and adults. In children and adolescents, viloxazine was

associated with a mean increase in heart rate of 2.79 beats per minute, while in adults, the highest mean increase in heart rate was 5.8 beats per minute compared to placebo. The results of this meta-analysis showed that atomoxetine and viloxazine are associated with a greater increase in hemodynamic values compared to other drugs (Farhat et al., 2025). The efficacy of viloxazine in the treatment of ADHD is also supported by data collected in a retrospective, unblinded, open-label, single-arm analysis of patient records. A total of 50 patients received atomoxetine at a mean dose of 60 mg (up to 4 weeks), followed by a 5-day washout period, after which VER at a dose of 300 mg was introduced for treatment. It was found that extended-release viloxazine showed greater improvement in inattention, hyperactivity/impulsivity, and overall ADHD symptoms. Studies have shown that VER works faster than atomoxetine and is better tolerated by patients (Price, & Price, 2023).

CENTANAFADINE

Centanafadine is an inhibitor of norepinephrine, dopamine, and serotonin reuptake transporters. By acting on the three main neurotransmitter systems involved in behavioral and mood disorders, it is considered a stimulant with non-stimulatory properties. Centanafadine is well tolerated, making it highly promising for reducing ADHD symptoms. In addition, the dose titration period is short, allowing the desired therapeutic effect to be achieved within two weeks (Adler et al., 2022). In phase 3 clinical trials, it showed promising results and is therefore being considered for approval by the FDA (Lee, & Kim, 2025). The efficacy and tolerability of extended-release (SR) centanafadine in adults with ADHD were evaluated in two phase 2 studies. In the first study (phase 2a), the mean total ADHD-RS-IV score decreased by 21.41 during the first 4 weeks of treatment. In the second study (phase 2b), improvement in the ADHD-RS-IV score was observed as early as the first week of treatment compared to placebo. Centanafadine-SR was well tolerated at doses ≤ 400 mg (Wigal et al., 2020).

3. Summary

Pharmacotherapy remains the most effective method for treating attention deficit hyperactivity disorder (ADHD). An increasing number of treatment modalities are available, many of which effectively reduce the symptoms of the disorder. Due to the well-documented efficacy and safety of psychostimulants such as amphetamines and methylphenidate, these agents are considered first-line pharmacological treatments. Alternative therapeutic options include non-stimulant medications, such as atomoxetine, which are recommended in cases of contraindications or intolerance to psychostimulants. Non-stimulants should also be considered in the presence of certain comorbid conditions. Drug selection should be individualized, taking into account the patient's age, symptom severity, comorbidities, treatment tolerance, and safety considerations. The final treatment decision should be made by the physician in collaboration with the patient.

Disclosure

Author's contribution:

- Conceptualization: Paulina Klich, Paweł Grzesikowski
- Methodology: Kinga Bekier, Jakub Kubiak
- Software: Paweł Grzesikowski, Jan Górski
- Check: Jan Górski, Hanna Nowicka, Dominika Liszka
- Formal analysis: Paulina Klich, Kinga Bekier
- Investigation: Paulina Klich, Hanna Nowicka, Maria Joks
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- Writing - review and editing: Emmanuelle Ordon, Kamila Ostromecka
- Visualization: Jakub Kubiak, Dominika Liszka
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