

## ATTENTION DEFICIT HYPERACTIVITY DISORDER

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**Abstract:** Attention deficit hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by difficulty maintaining attention, hyperactivity, and impulsivity. Its prevalence among children reaches 5–15%, while in adults it remains at 6–7%. These disorders are caused by a complex interaction of genetic (up to 80%) and environmental factors. Pathogenesis includes disorders of the dopaminergic and noradrenergic systems — the prefrontal cortex and basal ganglia: this is ensured by the genes of dopamine transporters and receptors (DAT1, DRD4, etc.). Diagnosis is based on the DSM 5 criteria using scales (e.g., the Conners questionnaire). Treatment involves a multidisciplinary approach: psychostimulants (methylphenidate, amphetamines), non-steroidal drugs (atomoxetine, reboxetine), psychotherapeutic and behavioral methods. In adults, ADHD is associated with a higher risk of comorbid disorders, due to poor concentration and impulsivity, professional and social functioning suffers. The purpose of the article is to present the current state of knowledge about ADHD: pathogenesis, clinical features, diagnosis and therapy.

**Key words:** Attention deficit hyperactivity disorder, ADHD, Neuropsychiatric disorders, Attention deficit, Impulsivity, Hyperactivity, Methylphenidate, Atomoxetine, DSM-5, Behavioral therapy, ADHD diagnostics, ADHD in adults, Neurotransmitters (dopamine, norepinephrine), Genetic factors of ADHD, Comorbid disorders.

### Introduction

Attention deficit hyperactivity disorder (ADHD) is a common neurodevelopmental disorder that begins in childhood and often persists into adulthood. Prevalence among children is estimated at about 5%, and among adults - 2-3%, depending on the method of study and age.

#### History and relevance

The term "ADHD" officially entered clinical use with the publication of DSM-III in 1987, and its diagnostic criteria continued to evolve over time, including taking into account gender characteristics and changes in manifestation in women. For example, girls often exhibit more "internal" hyperactivity - daydreaming, distraction, while boys demonstrate more "external" hyperactivity, which previously led to underdiagnosis in girls.

The COVID 19 pandemic and the remote learning format have led to a significant increase in ADHD diagnostics in adults. Increased availability of information and self-monitoring of symptoms have encouraged many adults who remain undiagnosed to seek diagnosis.

#### Etiology and pathophysiology

ADHD is a multifactorial disorder caused by a complex interaction of genetic and environmental factors. Studies have shown that heritability is up to 80%, as evidenced by data from twins and family studies.

Pathophysiology is associated with dysfunction of the catecholamine neurotransmitter systems - dopamine and norepinephrine. They are critical for the functioning of the prefrontal cortex and striatal structures responsible for attention, executive functions and motivation. MRI studies reveal structural changes: decreased volume of the prefrontal cortex, basal ganglia, cerebellum, as well as white matter abnormalities in the frontostriatal tracts. Disturbances in other neurotransmitter systems (serotonin, GABA, glutamate) that affect impulsivity, motivation, motor and executive functions are also noted.

#### Clinical picture and diagnosis

Symptoms are characterized by attention deficit, hyperactivity, impulsivity. For diagnosis according to DSM 5 it is necessary:

at least 6 symptoms for children (<17 years), or 5 symptoms for adults;

severity of these symptoms for at least 6 months;

presence of symptoms in two or more life contexts (e.g., home and school or work);

onset of symptoms before age 12 (with possible exceptions).

Diagnostic tools include questionnaires (e.g., Conners scale), medical and educational history, observations.

#### Significance of the problem

ADHD has a significant impact on academic performance, social adaptation and professional functioning. In adults, it is closely associated with an increased risk of comorbid disorders, relationship difficulties, addiction, and inattention to time frames, which often leads to chronic dissatisfaction.

Attention deficit hyperactivity disorder (ADHD) is a complex neurodevelopmental disorder that is not limited to childhood, but often persists or manifests itself in adulthood. The average prevalence is about 5% in children and 2-3% in adults.

The key mechanism is a violation of neurotransmitter regulation, primarily dopamine and norepinephrine, with the involvement of the prefrontal cortex, striatum, cerebellum and frontostriatal pathways - the basis of attention, self-control and emotions. Genetic predisposition (heritability up to 80%) is combined with environmental influences - prenatal factors, developmental environment, stress.

The diagnosis of ADHD is based solely on clinical assessment (DSM 5), as biomarkers are not yet available. This requires a thorough history, behavioral observation, and analysis of symptoms in different contexts. If ADHD remains untreated, serious consequences are possible: decreased academic and professional performance, risk of addiction, mental health problems, and social adaptation. Early diagnosis and comprehensive treatment are the key to improving quality of life.

## Recommendations

Raise awareness of ADHD, especially among women and adults, where symptoms often remain undiagnosed.

Promote access to qualified diagnostics and therapy.

Continue research into neurobiological mechanisms (including modern genetic and neuroimaging methods).

Develop comprehensive treatment models that include drug therapy, behavioral support, and educational interventions.

Attention deficit hyperactivity disorder (ADHD) is a common neuropsychiatric disorder, most often diagnosed in childhood, but symptoms may persist into adulthood. Its prevalence among children is 5–15%, and in adults, 2–7%. The causes of ADHD are complex: they include both genetic determinants (up to 80%) and environmental factors — perinatal trauma, maternal smoking during pregnancy, low birth weight, etc. Pathophysiologically, the disease is associated with disturbances in neurotransmitter regulation — dopamine and norepinephrine; genetically important DAT1, DRD4, COMT. The clinical picture includes attention deficit, hyperactivity, impulsivity. In adults, the symptoms manifest themselves differently: hyperactivity is replaced by internal anxiety, but problems with concentration and organization remain. Diagnosis is based on DSM IV/V criteria, using assessment scales (Conners, observations of parents and teachers) and requires symptoms in different areas of life for at least 6 months. Treatment is complex: drug therapy (psychostimulants, atomoxetine, reboxetine), psychotherapy and behavioral correction. In adults, ADHD is accompanied by an increased risk of substance abuse and comorbidity

## Main section

### 1. Epidemiology

In children: 5–15%.

In adults: 2.58% — persistent, up to 6.76% symptomatic ADHD

### 2. Etiology and pathogenesis

Genetics: heritability up to 80%, dopamine system genes are involved (DAT1, DRD4, COMT).

Environment: maternal smoking, hypoxia, prematurity, environmental stress.

Neurophysiology: decreased volume of the prefrontal cortex, basal ganglia, cerebellum

### 3. Clinical picture

In children: excessive activity, irritability, learning and behavioral difficulties

In adolescents: hyperactivity turns into internal fussiness, problems with responsibility and self-organization persist

In adults: difficulties in the professional sphere, correlation with antisocial behavior and addiction

#### 4. Diagnostics

DSM IV/V criteria

Conners questionnaire - assessed by parents and a teacher, repeated after 6 months if necessary

Diagnosis requires the presence of symptoms in different environments and stability for at least 6 months

#### 5. Treatment

Psychostimulants: methylphenidate, amphetamines - effective in ~75% of children

Atomoxetine (not a psychostimulant): safer, stable symptom control in 6-8 weeks

Reboxetine: proven short-term and long-term effectiveness in children and adults

Behavioral therapy: mandatory support, regardless of medication

Approach in adults: multimodal, taking into account comorbidity and social consequences

#### Conclusion

Attention deficit hyperactivity disorder is a common neurodevelopmental disorder with onset in childhood and possible continuation into adulthood. The main cause is genetic factors (up to 80%), supplemented by environmental influences (perinatal hypoxia, maternal smoking, etc.). Pathophysiologically, the key role is played by disorders of the dopamine and noradrenergic systems, as well as structural changes in the brain - the prefrontal cortex, basal ganglia, cerebellum. Diagnosis is based on clinical criteria (DSM 5) and standardized questionnaires, while it requires observation of symptoms in different conditions and for a long time. Treatment should be comprehensive, including psychostimulants, alternative drugs (atomoxetine, reboxetine) and psychotherapeutic correction. In adults, ADHD manifestations lead to significant social and professional problems, requiring integrated treatment.

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