CONDITION

Wolf hirschhorn syndrome

Wolf-Hirschhorn syndrome is a chromosome condition affecting growth, development, seizures, and several body systems.

WHAT IT IS
A chromosome condition affecting growth and development

BODY SYSTEM
Multiple systems, especially brain, growth, and facial development

MAIN SYMPTOMS
Developmental delay, seizures, poor growth, feeding difficulties

WHAT CAUSES IT
Missing genetic material from chromosome 4

HOW IT IS DIAGNOSED
Chromosomal microarray and chromosome testing

MAIN TREATMENT
Symptom control, nutritional support, therapies, and specialist care

CAN IT BE CURED?
No - the chromosome change is lifelong

IS IT AN EMERGENCY?
Sometimes - prolonged seizure or breathing difficulty

LONG-TERM OUTLOOK
Lifelong disability; health needs differ with associated problems

Overview

Wolf-Hirschhorn syndrome is a rare genetic condition caused by missing material from one copy of chromosome 4. Chromosomes are packages of DNA that contain the body's genetic instructions. The missing section is on the short arm of chromosome 4, so the condition is also called a 4p deletion syndrome.

The condition affects development before and after birth. Common features include slow growth, developmental and learning disabilities, low muscle tone, feeding difficulties, and seizures. It can also affect the heart, kidneys, bones, hearing, vision, and immune system.

The effects are not the same for everyone. They are influenced partly by the size and location of the chromosome deletion, but the chromosome result cannot predict every future ability or medical problem.

Wolf-Hirschhorn syndrome is lifelong. Treatment cannot replace the missing genetic material, but health problems can be treated and development can be supported.

Symptoms

Poor growth often begins during pregnancy and continues after birth. Children may remain shorter and lighter than other children of the same age. A small head size, called microcephaly, is also common.

Babies may have low muscle tone, known as hypotonia. This can make feeding, holding up the head, sitting, and other movements harder. Feeding problems may include a weak suck, tiring during feeds, reflux, or difficulty coordinating swallowing.

Development usually progresses more slowly. Sitting, walking, communication, and self-care skills may take longer to develop. Intellectual disability is usually present, although the level of support needed differs from person to person.

Seizures are an important feature. They often begin in infancy or early childhood and may be triggered by fever. Different types can occur, including brief staring episodes, stiffening, jerking movements, or seizures affecting the whole body.

Other possible features include:

Not everyone has all these features. A new symptom should not automatically be assumed to be part of the syndrome.

- Distinctive facial features, sometimes becoming less noticeable with age
- Cleft lip or palate
- Hearing or vision problems
- Curvature of the spine, abnormal foot position, or other bone differences
- Heart or kidney differences present from birth
- Repeated infections
- Delayed tooth development or other dental problems
- Undescended testicles or other genital differences

Causes and risk factors

Wolf-Hirschhorn syndrome results from a deletion on the short arm of chromosome 4. The

deletion removes several genes involved in early growth and development.

Most cases begin as a new chromosome change in the egg, sperm, or early embryo. This is called a de novo change. It is not caused by something a parent did during pregnancy.

In some families, the deletion results from a chromosome rearrangement called an unbalanced translocation. This means chromosome material has been gained or lost during reproduction. A parent may carry a balanced translocation, in which chromosome material is rearranged but no important material is missing or extra. The parent is usually healthy but may have a higher chance of a pregnancy with an unbalanced chromosome result.

The chance of the condition happening again therefore depends on how the deletion occurred. Testing the biological parents' chromosomes can help clarify this.

Diagnosis

The diagnosis is confirmed with genetic testing. A chromosomal microarray is commonly used because it can identify the missing chromosome 4 material and estimate the deletion's size.

Other chromosome tests may be needed. Fluorescence in situ hybridisation, or FISH, uses a labelled DNA probe to look for a specific chromosome region. A karyotype provides a broader picture of the chromosomes and may identify a translocation. Testing the biological parents can show whether a rearrangement was inherited or occurred for the first time.

During pregnancy, ultrasound may show poor growth or certain structural differences, but these findings do not confirm Wolf-Hirschhorn syndrome. Diagnostic testing can be performed on cells collected through chorionic villus sampling or amniocentesis. These procedures are different from prenatal screening tests, which only estimate the chance of some chromosome conditions.

After diagnosis, assessments are usually tailored to the person's needs. They may include evaluation of feeding and swallowing, seizures, hearing, vision, heart structure, kidney structure, growth, bones, and development.

Treatment and management

There is no treatment that restores the missing chromosome material. Care focuses on managing medical problems, supporting development, and making daily life safer and more comfortable.

Seizures are treated with anti-seizure medicine chosen according to the seizure type and the

person's medical history. Families may also receive a written seizure action plan explaining what a typical seizure looks like, when prescribed rescue medicine should be used, and when emergency help is needed.

Feeding support may involve a dietitian and a speech or feeding therapist. Food texture, feeding position, or calorie intake may need adjustment. If swallowing is unsafe or eating does not provide enough nutrition, tube feeding may be considered.

Physical therapy can support strength, posture, movement, and mobility. Occupational therapy can help with daily activities and adapted equipment. Speech and language therapy may address both swallowing and communication. Some people benefit from signs, picture boards, communication devices, or other alternatives to spoken language.

Other treatment is based on the organs affected. It may include hearing aids, glasses, dental care, treatment for reflux or constipation, or surgery for heart, palate, bone, kidney, or genital differences. Recurrent infections may lead to an assessment of immune function.

Regular follow-up often includes growth and nutrition checks, developmental review, seizure monitoring, and hearing and vision assessments. The exact schedule is based on age, known medical problems, and previous test results.

Complications

Swallowing difficulties can allow food or liquid to enter the airway. This is called aspiration and can contribute to chest infections. Poor intake, reflux, or increased nutritional needs can also make it difficult to gain weight.

Seizures may occur in clusters or last longer than usual. A prolonged seizure is called status epilepticus and requires urgent treatment. Fever and illness can make seizures more likely in some children.

Low muscle tone and limited movement may contribute to joint stiffness, spinal curvature, or reduced bone strength. Dental problems, hearing loss, and vision difficulties can further affect communication and learning if they are not recognised.

Complications from heart, kidney, immune, or airway differences depend on the specific abnormality. Early assessment helps the care team plan monitoring and treatment.

Prevention

Wolf-Hirschhorn syndrome usually cannot be prevented. A new chromosome deletion

happens by chance and is not linked to a parent's behaviour, diet, or routine activity.

Genetic counselling can explain the chromosome findings and the chance of the condition occurring in another pregnancy. If a parent carries a balanced chromosome rearrangement, options may include prenatal diagnostic testing or testing embryos created through in vitro fertilisation. These are personal reproductive choices, not guarantees of a particular outcome.

Living with it and what to expect

Wolf-Hirschhorn syndrome remains present throughout life. Growth and development are usually slower, but children can continue learning skills over many years. Progress may happen in small steps and may not follow standard developmental timelines.

Some people learn to walk independently, while others use braces, walkers, wheelchairs, or other mobility support. Spoken language may be limited, but facial expression, gestures, signs, pictures, and electronic devices can provide meaningful communication.

Seizures may become easier to control or less frequent with age for some people. Others continue to need long-term treatment. Anti-seizure medicine should not be changed or stopped without medical guidance.

Support needs often continue into adulthood. Daily life may include help with personal care, communication, mobility, education, and medical appointments. School and community services can focus on practical abilities, participation, comfort, and individual interests.

Long-term survival is influenced by the seriousness of associated problems, particularly heart differences, aspiration, infections, and difficult-to-control seizures. Many people survive into adulthood, but information about older adults remains limited. A person's own health history gives more useful guidance than the chromosome deletion alone.

When to get medical help

Arrange routine medical review for new or worsening feeding problems, poor weight gain, increased reflux, constipation, changes in hearing or vision, loss of a previously learned skill, or a change in seizure pattern.

Prompt assessment is also appropriate for repeated coughing or choking during meals, unusual sleepiness after feeds, frequent chest infections, or signs of dehydration such as much less urine than usual.

Seek emergency help for:

For a shorter seizure that stops on its own, follow the person's seizure action plan. Place them on their side when possible, protect them from injury, and do not put anything in their mouth.

- A first known seizure
- A seizure lasting five minutes or longer, unless the action plan says otherwise
- Repeated seizures without recovery between them
- Blue or grey lips, severe breathing difficulty, or choking that does not clear
- Unresponsiveness or an injury during a seizure
- A serious allergic reaction or other rapidly worsening illness

Common questions

Is Wolf-Hirschhorn syndrome inherited?

Most cases are caused by a new chromosome deletion and are not inherited from either parent. Some are linked to a balanced chromosome rearrangement in a parent. Parental chromosome testing helps distinguish between these possibilities.

What does a chromosome 4p deletion mean?

It means part of the short arm of one chromosome 4 is missing. Because this section contains several genes, the deletion can affect growth, brain development, and other organs. A larger deletion may be associated with more medical concerns, but size alone does not predict every outcome.

Will a child with Wolf-Hirschhorn syndrome walk or talk?

Some children learn to walk and use spoken words, while others need lifelong mobility and communication support. Developmental assessments over time provide more useful information than making an early prediction. Communication can include gestures, signs, pictures, or electronic devices.

Do the seizures eventually stop?

Seizures may become less frequent or easier to manage with age, but this is not certain. Some people continue to have seizures into adulthood. Regular review remains important even after a long seizure-free period.

Can Wolf-Hirschhorn syndrome be found before birth?

It can be diagnosed before birth through chromosome testing of a sample obtained by chorionic villus sampling or amniocentesis. Ultrasound or screening tests may raise concern but do not confirm the condition.

What is the life expectancy?

There is no single life-expectancy figure that applies to everyone. The outlook is affected by heart or airway problems, aspiration, infections, seizure control, and access to supportive care. Some people have died in childhood from serious complications, while others live into adulthood.

Sources

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