CONDITION

Varicella embryopathy

Varicella embryopathy is a group of birth differences caused by chickenpox infection during pregnancy.

WHAT IT IS
Birth condition caused by chickenpox infection during pregnancy

BODY SYSTEM
Skin, limbs, eyes, brain, nerves, and internal organs

MAIN SYMPTOMS
Skin scars, underdeveloped limbs, eye problems, neurological problems

WHAT CAUSES IT
Fetal varicella-zoster virus infection during early pregnancy

HOW IT IS DIAGNOSED
Maternal history, characteristic findings, ultrasound, and varicella testing

MAIN TREATMENT
Multidisciplinary supportive care and surgery when appropriate

CAN IT BE CURED?
No - existing birth differences cannot be reversed

IS IT AN EMERGENCY?
Sometimes - breathing trouble or a prolonged seizure

LONG-TERM OUTLOOK
Ranges from mild disability to severe, life-limiting complications

Overview

Varicella embryopathy is a group of birth differences that can develop when a fetus is affected by varicella-zoster virus during pregnancy. This is the virus that causes chickenpox.

"Embryopathy" means a condition caused by something that affects development before birth. The medical literature often describes this pattern of findings as congenital varicella syndrome.

The condition is uncommon. It is most strongly linked to a pregnant person developing chickenpox during the first or early second trimester. Infection later in the second trimester may also lead to fetal effects, but the risk appears to be lower. Most pregnancies affected by maternal chickenpox do not result in varicella embryopathy.

The virus may cross the placenta and interfere with developing skin, limbs, nerves, eyes, brain, or internal organs. The effects are different for each child. Some have changes affecting one part of the body, while others have several serious health and developmental needs.

Varicella embryopathy is different from neonatal chickenpox. Neonatal chickenpox happens when a baby becomes infected around the time of birth and develops an active infection during the newborn period.

Symptoms

The findings are often present at birth, although some problems become clearer as a child grows.

Characteristic skin changes include indented or thickened scars. They may follow a zigzag or band-like pattern along the skin supplied by a particular nerve. The skin around a scar may have less tissue than expected.

Possible limb and muscle changes include:

The brain and nervous system may also be affected. A baby may have a smaller-than-expected head, seizures, muscle weakness, abnormal muscle tone, or difficulty with feeding and swallowing. Developmental or learning differences may become apparent over time.

Eye problems can include an unusually small eye, clouding of the eye's lens, damage to the retina at the back of the eye, or inflammation and scarring inside the eye. These changes may reduce vision.

Some children have problems involving the nerves that control automatic body functions. This can affect the bladder or bowel. Less commonly, there may be structural differences in the digestive or urinary systems.

Poor growth before birth and low birth weight can also occur. No single finding proves that a child has varicella embryopathy, because several other conditions can cause similar changes.

- An arm, leg, hand, foot, finger, or toe that is smaller or underdeveloped
- Weak or poorly developed muscles
- Stiff joints or reduced movement
- Differences in bone development

Causes and risk factors

Varicella embryopathy is caused by fetal exposure to varicella-zoster virus after the pregnant person develops a primary chickenpox infection. A primary infection means the first time the person has had chickenpox.

The main risk factor is chickenpox during early pregnancy, particularly in the first and early second trimester. The condition does not develop after every maternal infection. Exposure to someone with chickenpox is also not the same as becoming infected.

People who have previously had chickenpox or received varicella vaccination are usually immune. A blood test can sometimes clarify immunity when the history is uncertain.

Shingles is caused by reactivation of varicella-zoster virus already in the body. Maternal shingles is not usually associated with varicella embryopathy because existing antibodies help limit spread through the bloodstream.

Varicella embryopathy is not inherited. Parents do not pass the condition to a child through their genes, and a child with the condition does not cause it to occur in future pregnancies.

Diagnosis

During pregnancy, chickenpox is usually diagnosed from the appearance of the rash and the person's symptoms. Testing fluid or cells from a skin blister with a polymerase chain reaction, or PCR, test can confirm varicella-zoster virus. PCR looks for the virus's genetic material.

If infection occurs during pregnancy, a maternal-fetal medicine specialist may arrange detailed ultrasound examinations. Enough time must pass after the infection for some fetal changes to become visible. Ultrasound may identify limb differences, poor growth, excess fluid in the brain, an unusually small head, or changes affecting internal organs.

Fetal MRI may provide more detail about the brain or other structures when an ultrasound raises concerns. MRI uses a strong magnetic field rather than X-rays.

PCR testing of amniotic fluid obtained through amniocentesis can show whether viral material is present. However, a positive result does not prove that the fetus has been harmed, and a negative result cannot answer every question. Amniocentesis also has procedure-related risks. Its timing and usefulness need individual discussion with a specialist.

After birth, diagnosis is based on the pregnancy history, the baby's pattern of physical findings, imaging, eye examinations, and laboratory evidence of varicella infection when available. Tests may also be needed to rule out genetic conditions or other infections that can cause similar findings.

Treatment and management

There is no treatment that can reverse structural changes that developed before birth. Care focuses on supporting the child's health, movement, development, communication, vision, feeding, and comfort.

The care team may include specialists in child development, neurology, eyes, bones and joints, rehabilitation, skin, and the digestive or urinary systems. The exact team reflects the child's needs.

Treatment may involve:

During pregnancy, antiviral medicine may be offered to treat maternal chickenpox, particularly when illness is significant. This protects the pregnant person's health but cannot reverse fetal changes that have already occurred. Evidence does not show that it reliably prevents varicella embryopathy.

When prenatal testing suggests possible fetal effects, specialists can explain the findings, their uncertainty, and the available pregnancy options. These discussions should be non-directive and allow time for the pregnant person and family to consider what matters to them.

- Physical and occupational therapy for strength, movement, and daily activities
- Feeding support, including help from speech and nutrition professionals
- Glasses, visual aids, or eye procedures when appropriate
- Medicines to control seizures or other specific symptoms
- Orthopaedic supports or surgery for selected limb and joint problems
- Treatment for bladder, bowel, skin, or growth concerns
- Developmental, educational, and communication support

Complications

Complications reflect which organs and nerves were affected before birth. They can include long-term difficulty with walking, hand use, vision, feeding, learning, or communication.

Neurological complications may include epilepsy, intellectual disability, weakness, or problems coordinating movement. Feeding and swallowing problems can affect nutrition and may allow food or liquid to enter the airway.

Bladder nerve problems can lead to incomplete emptying, urine infections, or kidney damage.

Bowel nerve problems may cause severe constipation or poor bowel control. Regular monitoring can identify these problems before they cause further harm.

Skin scars over areas with reduced tissue may be sensitive or vulnerable to injury. Limb differences can place extra strain on joints or the opposite side of the body.

Varicella-zoster virus remains inactive in nerve tissue after infection. Some affected children may later develop shingles, sometimes at a young age.

Severe effects involving the brain or several organs can be life-limiting. Other children have more focused physical differences and make progress with therapy, medical care, and appropriate support.

Prevention

Varicella embryopathy cannot be prevented after fetal developmental changes have occurred. However, preventing chickenpox during pregnancy can prevent the condition.

Before pregnancy, people who are unsure whether they are immune can discuss their chickenpox history, vaccination record, or immunity testing with a healthcare professional. Varicella vaccination can protect people who are not immune, but it is a live-virus vaccine and is not given during pregnancy. Pregnancy should be avoided for the interval advised after vaccination.

If a non-immune person is exposed to chickenpox while pregnant, prompt medical advice is important. Varicella-zoster immune globulin may be offered within a limited period after exposure. It provides temporary antibodies and can reduce the severity of maternal infection, but it has not been shown to eliminate the risk of fetal infection.

A person who remains non-immune can usually be vaccinated after pregnancy. This helps protect future pregnancies.

Living with it and what to expect

The birth differences caused by varicella embryopathy do not spread through the body over time. An underdeveloped limb or a scar does not turn into an active chickenpox infection. However, the practical effects of the condition can change as a child grows.

Some needs become clearer during infancy and childhood. For example, differences in movement may be more noticeable when a child begins sitting or walking. Learning, communication, vision, and bladder concerns may appear later. Growth can also change how

braces, mobility equipment, or surgical plans are managed.

Regular follow-up may include developmental reviews, vision checks, hearing assessment, growth monitoring, and evaluation of movement, feeding, bladder, or bowel function. Therapy and school support may be adjusted as goals change.

Children with limited physical differences may take part in school, play, relationships, and later work with suitable adaptations. Those with major brain or organ involvement may need lifelong help with personal care, mobility, communication, and medical decisions.

The condition itself is not contagious. A child is only infectious if they have active chickenpox or shingles lesions. Families can ask for advice if a new blistering rash appears, especially around pregnant people, newborns, or people with weakened immune systems.

When to get medical help

If you are pregnant and have been exposed to chickenpox or shingles, contact your maternity service or healthcare professional promptly. Do this even if you feel well, because preventive treatment is time-sensitive. Call ahead before attending a clinic if you have a blistering rash so that other vulnerable people can be protected.

Seek prompt assessment during pregnancy for a new widespread blistering rash, fever, or worsening illness.

Call emergency services for:

Routine follow-up is appropriate for slower changes, such as missed developmental milestones, worsening joint stiffness, feeding difficulties, possible vision problems, repeated constipation, or changes in urination. Report these changes rather than waiting for the next scheduled review if they are affecting health or daily life.

- Trouble breathing, blue or grey lips, severe chest pain, or collapse
- A seizure lasting several minutes or repeated seizures without recovery
- Severe confusion, unusual unresponsiveness, or difficulty waking
- A baby who is struggling to breathe or cannot safely swallow

Common questions

Can chickenpox during pregnancy always cause birth differences?

No. Most pregnancies affected by chickenpox do not result in varicella embryopathy. The risk

is most closely linked to primary infection during early pregnancy. An ultrasound and specialist assessment can provide more information, but no test can predict every outcome immediately after infection.

Can an ultrasound rule out varicella embryopathy?

A detailed ultrasound can detect many important structural changes, but it cannot rule out every possible effect. Some neurological, vision, or developmental problems may not be visible before birth. The timing of the scan also matters because changes may take time to appear.

Is varicella embryopathy genetic?

No. It results from fetal exposure to varicella-zoster virus, not from an inherited gene change. Having one affected pregnancy does not create an inherited risk in later pregnancies. Immunity to chickenpox is important for preventing another infection.

Can a child with varicella embryopathy spread chickenpox?

The condition itself is not contagious. A child could spread varicella-zoster virus if they later develop active chickenpox or shingles with uncovered, fluid-filled lesions. A clinician can advise when a new rash needs testing or precautions.

Will my child's condition get worse with age?

The original birth differences do not usually keep developing. Their effect may change as the child grows, and previously unrecognised needs may become clearer. Therapy, equipment, surgery, educational support, and regular monitoring can help manage these changes.

Is there a cure for varicella embryopathy?

There is no cure that reverses changes formed before birth. Treatment can still make a meaningful difference by controlling seizures, improving movement and feeding, supporting vision and communication, and treating specific organ problems.

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