CONDITION

Wilms tumor

Wilms tumor is a kidney cancer that mainly affects young children.

WHAT IT IS
Childhood kidney cancer arising from immature kidney cells

BODY SYSTEM
Kidneys and urinary system

MAIN SYMPTOMS
Painless belly swelling, belly pain, blood in urine, fever

WHAT CAUSES IT
Usually unknown; sometimes genetic changes or syndromes

HOW IT IS DIAGNOSED
Imaging and laboratory examination of tumor tissue

MAIN TREATMENT
Surgery and chemotherapy, sometimes radiation therapy

CAN IT BE CURED?
Yes - most children respond well to treatment

IS IT AN EMERGENCY?
Sometimes - breathing trouble, severe pain, or heavy bleeding

LONG-TERM OUTLOOK
Often excellent; stage and tumor biology shape outlook

Overview

Wilms tumor, also written as Wilms' tumor, is a type of kidney cancer. It is also called nephroblastoma. It mainly develops in young children, although older children and adults can rarely be affected.

The kidneys are two organs near the back of the abdomen. They filter waste and extra water from the blood to make urine. Wilms tumor begins when immature kidney cells continue to grow instead of developing normally.

The tumor usually affects one kidney. Some children have tumors in both kidneys, either at the same time or at different times.

Wilms tumor matters because it can grow large before causing obvious symptoms. It can also spread, most often to the lungs, lymph nodes, or liver. However, treatment is often successful,

especially when the tumor has not spread and its cells have a more treatment-responsive appearance.

Care is usually coordinated by a specialist childhood cancer team. Treatment choices are based on the child's age and health, whether one or both kidneys are involved, how far the cancer has spread, and what the tumor cells look like under a microscope.

Symptoms

The most common sign is a swelling or lump in the abdomen. It may be noticed while bathing or dressing a child. The swelling is often painless and may make one side of the abdomen look larger.

Other possible symptoms include:

Some children develop high blood pressure because the kidney helps control blood pressure. High blood pressure may cause headaches, tiredness, or vision changes, but it often causes no symptoms.

These signs can have many causes other than cancer. A new abdominal lump, visible blood in the urine, or symptoms that do not settle should still be assessed promptly. Avoid repeatedly pressing on a suspected abdominal lump.

- Pain or discomfort in the abdomen
- Blood in the urine, which may look pink, red, or brown
- Fever without a clear explanation
- Reduced appetite, weight loss, or low energy
- Nausea, vomiting, or constipation
- Shortness of breath if cancer has spread to the lungs

Causes and risk factors

The exact cause of most Wilms tumors is not known. Nothing a parent did during pregnancy or childhood is known to cause an ordinary Wilms tumor.

The condition begins with changes in the genetic instructions that control cell growth and kidney development. In many children, these changes occur only in the tumor cells and are not inherited.

A small proportion of children have a genetic condition that increases their chance of

developing Wilms tumor. These include:

A family history of Wilms tumor can also increase risk, but most affected children do not have a family history.

Having a risk factor does not mean a child will develop the tumor. Children with a known genetic risk may be offered regular kidney ultrasound scans. This is screening for early detection, not a way to prevent the tumor.

- WAGR syndrome, which can affect the eyes, urinary and reproductive organs, and development
- Denys-Drash syndrome and related changes in the WT1 gene
- Beckwith-Wiedemann spectrum, which can cause increased growth and other physical features
- Hemihyperplasia, in which one side or part of the body grows larger than the other

Diagnosis

Assessment usually begins with questions about the child's symptoms and a careful physical examination. Blood pressure may be checked because a kidney tumor can raise it.

Tests may include:

Imaging can strongly suggest Wilms tumor, but tumor tissue must be examined in a laboratory to confirm its type. Depending on the treatment approach, tissue may be obtained during surgery to remove the kidney or through a biopsy before chemotherapy. A biopsy removes a small sample with a needle or operation. Not every child needs a biopsy before treatment.

The laboratory examines the tumor's histology, meaning how its cells look under a microscope. Most have what specialists call favorable histology. Some contain anaplasia, meaning the cells look very abnormal and may be less responsive to standard treatment.

The cancer is also assigned a stage. Staging describes whether it is limited to the kidney, has reached nearby tissues, has spread farther away, or affects both kidneys. Staging systems and the order of treatment can differ between specialist treatment groups.

- An abdominal ultrasound to show whether a mass comes from the kidney
- MRI or CT scans to define the tumor and examine nearby structures
- Chest imaging to look for spread to the lungs
- Blood tests to assess blood counts, kidney function, and general health

- Urine tests to check for blood and help rule out other conditions

Treatment and management

Wilms tumor treatment usually includes surgery and chemotherapy. Radiation therapy is used in selected cases. A childhood cancer team plans treatment using established protocols rather than treating each part separately.

Surgery often removes the affected kidney and nearby tissue. This operation is called a nephrectomy. Nearby lymph nodes may also be removed and tested because their results help determine the stage.

When both kidneys are affected, the team aims to remove the tumors while preserving as much working kidney tissue as possible. Chemotherapy may be given first to shrink the tumors. Kidney-sparing surgery may then be possible.

Chemotherapy uses medicines that travel through the bloodstream to destroy cancer cells. The number of medicines and length of treatment are based on the stage and histology. Possible short-term effects include nausea, tiredness, hair loss, mouth soreness, constipation, and a reduced ability to fight infection. The care team can provide medicines and practical support to reduce these effects.

Radiation therapy uses focused high-energy beams to damage cancer cells. It may be recommended when the tumor has certain higher-risk features, has spread, or cannot be fully removed. It is not needed for every child.

Supportive care is also important. This may include pain relief, nutrition support, treatment for infections, emotional support, and help with school. If fertility could be affected by planned treatment, the team may discuss preservation options when these are practical.

Complications

Wilms tumor can spread beyond the kidney. The lungs are the most common distant site, although the liver, lymph nodes, bones, or other areas can be involved.

A large tumor may bleed, rupture, or press on nearby organs. It may also interfere with kidney function or contribute to high blood pressure.

Treatment can cause complications during therapy. Chemotherapy may temporarily reduce infection-fighting white blood cells. Surgery carries risks such as bleeding, infection, or injury to nearby structures. Radiation can affect healthy tissue in the treated area.

Some effects appear months or years later. Depending on the treatment received, these may include reduced kidney function, high blood pressure, heart problems, differences in bone or tissue growth, fertility problems, or a small risk of another cancer. These risks are not the same for every child.

Long-term follow-up is used to find and manage these problems early. Most people can live with one healthy kidney, but ongoing blood pressure and kidney checks remain important.

Prevention

Wilms tumor usually cannot be prevented. There is no known diet, supplement, activity, or pregnancy-related action that reliably stops it from developing.

Children with certain genetic conditions or physical growth patterns may be offered regular kidney ultrasound screening. Screening cannot prevent a tumor, but it may find one when it is smaller and easier to treat.

Genetic assessment may be recommended when tumors affect both kidneys, there is a family history, or the child has features linked with a tumor-predisposition syndrome. Results can help guide screening for the child and, in some cases, close relatives.

Living with it and what to expect

Treatment commonly lasts for several months, although the schedule is different for each risk group. During this time, family routines may be shaped by hospital visits, blood tests, medicine schedules, and periods when infection risk is higher.

Children may have changes in appetite, energy, mood, sleep, and school attendance. Many can still play and take part in familiar activities when they feel well. The treatment team can advise which activities are suitable after surgery or while blood counts are low.

After treatment, follow-up appointments are more frequent at first. They become less frequent over time if recovery is going well. Follow-up may include examinations, blood pressure checks, kidney tests, and scans to look for recurrence.

If Wilms tumor returns, it most often does so within the first few years after treatment, although later recurrence is possible. Further treatment may include different chemotherapy, surgery, radiation, or a clinical trial.

Many children treated for Wilms tumor grow into adulthood and lead active lives. Their individual outlook is shaped by the stage, tumor histology, genetic features, response to

treatment, and whether the cancer returns. Survivors should keep a record of their treatment because future health checks may need to consider the medicines, surgery, and radiation they received.

When to get medical help

Arrange a prompt medical assessment if a child has:

Seek emergency care for severe or sudden abdominal pain, trouble breathing, collapse, heavy bleeding, or a child who is very unwell or difficult to wake.

During chemotherapy, a fever or signs of infection need urgent same-day advice because treatment can reduce the body's ability to fight infection. Follow the cancer team's instructions about temperature checks and which number to call. Do not wait for a routine appointment.

Routine follow-up after treatment is still important when a child feels well. These visits monitor recovery, kidney function, blood pressure, growth, and possible late treatment effects.

- A new lump or unexplained swelling in the abdomen
- Visible blood in the urine
- Persistent abdominal pain or swelling
- Unexplained fever, low energy, poor appetite, or weight loss
- Repeated headaches or vision changes that could suggest high blood pressure

Common questions

Is Wilms tumor curable?

Yes. Many children are cured with surgery and chemotherapy, with radiation added when needed. The chance of cure is influenced by the stage, the tumor's microscopic features, its response to treatment, and whether it has returned.

Is Wilms tumor inherited?

Usually not. Most children have no family history, and the relevant genetic changes are limited to the tumor. A minority have an inherited change or a genetic syndrome that raises their risk. Genetic assessment can clarify this when the child's features or family history suggest it.

Can adults get Wilms tumor?

Yes, but it is rare in adults. Because other kidney cancers are much more common in adulthood, careful laboratory examination is needed to confirm the diagnosis. Adult treatment

is usually planned with specialists experienced in both kidney cancer and Wilms tumor.

Can a child live normally with one kidney?

Most children with one healthy kidney can grow, attend school, exercise, and live active lives. They still need long-term checks of blood pressure, urine, and kidney function. The care team may give specific advice about hydration, medicines, and activities.

Can Wilms tumor come back after treatment?

It can return, either near the original kidney area or elsewhere, often in the lungs. Recurrence is more likely with certain stages and tumor features. Follow-up scans are intended to identify recurrence early, and further treatment may still be effective.

Does every abdominal lump mean Wilms tumor?

No. Constipation, an enlarged organ, a cyst, and other conditions can cause abdominal swelling. It is not possible to tell the cause by touch alone, so a new or persistent lump should be medically assessed rather than diagnosed at home.

Sources

- National Cancer Institute: Wilms Tumor and Other Childhood Kidney Tumors Treatment-Patient Version
- National Cancer Institute: Wilms Tumor and Other Childhood Kidney Tumors Treatment-Health Professional Version
- American Cancer Society: Wilms Tumor
- NHS: Wilms' tumour
- GeneReviews, NCBI Bookshelf: Wilms Tumor Predisposition
- National Cancer Institute: Late Effects of Treatment for Childhood Cancer