CONDITION

Soft tissue sarcoma

Soft tissue sarcoma is a group of cancers that begin in tissues such as muscle, fat, nerves, and blood vessels.

WHAT IT IS
Cancer arising in muscle, fat, nerves, or similar tissues

BODY SYSTEM
Muscles, connective tissues, nerves, and blood vessels

MAIN SYMPTOMS
Growing lump, swelling, pain, pressure symptoms

WHAT CAUSES IT
DNA changes, usually without a known cause

HOW IT IS DIAGNOSED
Imaging and biopsy examined by a specialist pathologist

MAIN TREATMENT
Surgery, radiotherapy, and selected drug treatments

CAN IT BE CURED?
Sometimes - localized tumors may be removed completely

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

LONG-TERM OUTLOOK
Strongly influenced by subtype, size, location, and spread

Overview

Soft tissue sarcoma is a group of cancers that begin in the body's soft tissues. These include muscle, fat, tendons, nerves, blood vessels, and the deeper layers of skin. Sarcomas can develop almost anywhere, but they commonly affect an arm, leg, or the area behind the abdominal organs, called the retroperitoneum.

There are many different subtypes. They can behave differently and may respond to different treatments. A specialist pathologist identifies the subtype by examining a tissue sample under a microscope and, when needed, testing its genes or proteins.

Soft tissue sarcoma is different from carcinoma, the more common type of cancer that starts in an organ or its lining. It is also different from bone sarcoma, although both are often managed by specialist sarcoma teams.

A lump is much more likely to have a non-cancerous cause than to be a sarcoma. Even so, a lump that is growing, deep, firm, or unusually large needs medical assessment. Earlier investigation can make treatment simpler if cancer is present.

Symptoms

The symptoms depend on where the sarcoma begins. A tumor in an arm or leg may first appear as a painless lump. It may become uncomfortable as it grows and presses on muscles, nerves, or joints.

Features that should be assessed include a lump that:

These features do not prove that a lump is cancer. Smaller or painful lumps can also have harmless causes, while some sarcomas do not have every typical feature.

A sarcoma inside the abdomen may grow for some time before causing symptoms. Possible signs include abdominal pain or swelling, feeling full after eating a small amount, constipation, vomiting, or unexplained weight loss.

A tumor in the chest may cause coughing, chest discomfort, or shortness of breath. Sarcoma in the head or neck can cause a visible swelling or symptoms related to swallowing, speech, or breathing.

- Is getting bigger
- Feels deep or fixed in place
- Is about 5 centimetres across or larger
- Returns after a previous lump was removed
- Causes increasing pain, numbness, or reduced movement

Causes and risk factors

Soft tissue sarcoma develops when DNA changes cause a soft tissue cell to grow and divide without normal control. In most people, it is not possible to identify why these changes happened.

Having a risk factor does not mean that you will develop sarcoma. Many people with sarcoma have no known risk factors.

Recognized risk factors include:

Most sarcomas are not inherited. An injury does not cause sarcoma, although an injury may

draw attention to a lump that was already present.

- Previous radiotherapy, with sarcoma developing in the treated area years later
- Certain uncommon inherited conditions, including Li-Fraumeni syndrome, neurofibromatosis type 1, and hereditary retinoblastoma
- Long-standing swelling caused by lymph fluid, known as lymphoedema
- Exposure to certain chemicals, although occupational links apply to only some exposures and sarcoma types
- Kaposi sarcoma infection with human herpesvirus 8, which is distinct from most other soft tissue sarcomas

Diagnosis

Assessment usually begins with questions about the lump or other symptoms and a physical examination. Imaging then helps show the size, depth, and location of the abnormal area.

Ultrasound is often used for a lump near the skin. Magnetic resonance imaging, or MRI, provides detailed pictures of soft tissues and is commonly used for tumors in an arm, leg, or pelvis. Computed tomography, or CT, is often used for tumors in the chest or abdomen.

A biopsy is needed to confirm the diagnosis. During a core needle biopsy, a clinician removes small cylinders of tissue using a hollow needle. The sample is examined by a pathologist with experience in sarcoma.

Whenever possible, the biopsy should be planned by the specialist team that would perform any later surgery. The position of the biopsy path can affect the operation.

Laboratory tests on the sample may look for particular proteins, chromosome changes, or gene changes. These findings can separate one subtype from another and may help guide treatment.

If sarcoma is confirmed, further scans check whether it has spread. The lungs are a common site of spread, so chest CT is often part of staging. "Stage" describes the tumor's size, local growth, and spread. "Grade" describes how abnormal the cells look and how likely they are to grow or spread quickly.

Treatment and management

Treatment is planned by a multidisciplinary sarcoma team. This may include surgeons, cancer specialists, radiologists, pathologists, specialist nurses, rehabilitation professionals, and other

clinicians. The plan is based on the subtype, grade, size, location, spread, and your general health and priorities.

Surgery is the main treatment for many localized soft tissue sarcomas. The aim is to remove the tumor with a rim of healthy-looking tissue around it, called a clear margin. For a tumor in an arm or leg, limb-sparing surgery is usually considered when it can remove the cancer safely while preserving useful function. Amputation is sometimes necessary but is not routine.

Radiotherapy uses high-energy radiation to damage cancer cells. It may be given before surgery to shrink or control the tumor, or after surgery to reduce the chance of cancer returning in that area. Its benefits and side effects differ according to the body area being treated.

Chemotherapy travels through the bloodstream and can reach cancer cells in different parts of the body. It is used for some high-risk, inoperable, or metastatic sarcomas, but not every subtype responds equally well. Metastatic means that cancer has spread to a distant part of the body.

Some sarcomas have molecular changes that can be treated with targeted medicines. These medicines interfere with a specific signal used by cancer cells. Immunotherapy helps the immune system recognize cancer and is useful in selected situations rather than for all soft tissue sarcomas.

When a sarcoma cannot be removed or has spread, treatment may aim to slow its growth, relieve symptoms, and protect quality of life. Surgery or focused radiotherapy may still help in selected cases. Palliative care can be provided alongside cancer treatment to manage pain, fatigue, nausea, anxiety, and other concerns.

Rehabilitation may include physiotherapy, occupational therapy, mobility support, or treatment for lymphoedema. Fertility preservation may be discussed before treatments that could affect fertility.

Complications

A growing sarcoma can press on nearby nerves, muscles, organs, or blood vessels. This may cause pain, weakness, numbness, reduced movement, swelling, bowel symptoms, or breathing problems.

Some sarcomas return near the original site after treatment. Others spread through the bloodstream, most often to the lungs, although patterns differ by subtype.

Treatment can also have lasting effects. These may include stiffness, weakness, lymphoedema, changes in sensation, wound problems, or reduced organ function.

Radiotherapy and drug treatments can cause additional short- or long-term effects. Your treatment team should explain those most relevant to the planned care.

Prevention

Most soft tissue sarcomas cannot be prevented because their cause is usually unknown.

People who need radiotherapy receive carefully planned treatment to limit exposure to nearby healthy tissue, but a small future risk cannot always be removed. The benefits of necessary radiotherapy generally outweigh this risk.

If your history suggests an inherited cancer condition, genetic counselling may help clarify risk for you and your relatives. This does not prevent an inherited gene change, but it can support appropriate monitoring and informed family planning.

Living with it and what to expect

The course of soft tissue sarcoma differs widely. A small, localized tumor that can be removed completely may never return. A large, high-grade tumor or one that has spread is harder to control. The exact subtype also matters.

Follow-up usually continues for several years. Appointments may include an examination of the treated area and scans of the original site or chest. The schedule is based on the sarcoma's subtype, grade, treatment, and time since treatment.

Recovery after surgery may take weeks or months. Function can continue to improve with rehabilitation, although some people have lasting stiffness, weakness, numbness, swelling, or changes in appearance. Returning to work, study, driving, exercise, and caring responsibilities may need to happen gradually.

Fear of recurrence is common, especially before scans or appointments. It may help to know which symptoms your team wants reported between visits and whom to contact. Psychological support, peer groups, and practical or financial advice can also be useful.

Many people return to usual activities after treatment, sometimes with adjustments. Others live with sarcoma as a long-term condition, moving between treatment and periods of monitoring. No single course applies to every subtype or stage.

When to get medical help

Arrange a routine appointment promptly if you notice a new lump that is growing, deep, firm, around 5 centimetres or larger, or has returned after removal. Persistent unexplained swelling, pain, abdominal fullness, or reduced movement also needs assessment.

If you have been treated for sarcoma, contact your follow-up team about a new lump, increasing pain, unexplained weight loss, a persistent cough, new breathlessness, or symptoms that do not settle. Do not wait for the next routine appointment if you have been advised to report them sooner.

Seek urgent medical care for:

Call emergency services for severe breathing difficulty, collapse, uncontrolled bleeding, or sudden chest pain. These symptoms can have several causes, but they need immediate assessment.

- Rapidly worsening swelling or severe pain
- A limb that becomes pale, cold, very swollen, or weak
- Repeated vomiting or inability to keep fluids down
- New shortness of breath or coughing up blood
- Heavy bleeding from a tumor or surgical wound

Common questions

Is every soft tissue lump a sarcoma?

No. Most soft tissue lumps are non-cancerous, such as fatty lumps called lipomas or fluid-filled cysts. Examination and imaging may be needed because appearance or touch alone cannot always identify the cause.

Does a sarcoma lump hurt?

It may be painless at first. Pain can develop as the tumor grows or presses on nearby structures. Pain does not show whether a lump is cancerous, so a growing or deep lump should still be checked.

Can soft tissue sarcoma be cured?

Sometimes. Cure is more likely when the tumor is localized and can be removed completely. Subtype, grade, size, location, treatment response, and whether it has spread all affect the outlook.

Where does soft tissue sarcoma spread?

Many subtypes spread through the bloodstream, often to the lungs. Some spread to other

organs or nearby lymph nodes. The pattern differs between subtypes, which is why staging and follow-up are tailored to the tumor.

Will I need chemotherapy?

Not everyone does. Surgery and radiotherapy are often central to treatment for localized sarcoma. Chemotherapy or other medicines may be offered for particular subtypes, higher-risk tumors, or cancer that cannot be removed or has spread.

Can a sarcoma come back after treatment?

Yes, although it does not return in everyone. Recurrence can happen near the original site or elsewhere in the body. Follow-up is intended to look for recurrence and address treatment effects.

Sources

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