A VERY COMPREHENSIVE

FAQ

TGCT Frequently Asked Questions

About TGCT, treatment, and everything else

TGCT Support

TGCT Support is a program of the Life Raft Group

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Here are the top asked questions in TGCT, from general TGCT knowledge to treatment and what to expect. Every patient is different, and considerations may be unique to you. Consult and discuss with your healthcare team what is right for you.

ABOUT TGCT

1. What causes TGCT?

TGCT occurs because some cells in the joint lining produce too much of a specific protein called colony stimulative factor 1 (CSF1). It is estimated that 2-16% of the tumor cells are abnormal, producing this protein in excess. The over production of this protein, CSF1, by the tumor cells recruits other tumor-promoting cells that incorporate into the tumor, leading to its development and growth.

2. What are the TGCT subtypes?

TGCT is a type of rare, locally aggressive, non-life threatening, tumor of a single joint, tendon sheath, or bursae. TGCT can occur in two distinct subtypes which dictate expectations and outcomes. TGCT subtypes are determined by magnetic resonance imaging (MRI) alone. Under a microscope, the subtypes are similar.

The localized form of TGCT is the most prevalent, with 85-90% of the TGCT diagnoses. It is typically a single or few, well-defined tumor(s) with a distinct border or generally encapsulated. Localized TGCT is often cured by surgery alone. Localized TGCT has a local recurrence rate of ~10% depending on the source.

Diffuse TGCT is less common, and more likely to recur. Diffuse TGCT occurs in part or all of the joint and has no distinct boundary. Patients often describe it as “gum in a carpet” where you cannot see where it stops and starts. Tumors may stay in the joint (intra-articular) or extend out of the joint (extra-articular), Diffuse TGCT has a 50% chance of coming back to the same joint after the first surgery, and 75% after the second and subsequent surgeries. This is referred to as the recurrence rate.

3. How do I know which TGCT subtype I have?

Magnetic resonance imaging (MRI) is the preferred approach to diagnose and characterize the subtype of TGCT. On MRI, localized TGCT presents as a single or few masses with distinct boundaries and diffuse TGCT presents in part or all of the joint and infiltrative into healthy tissue. It is difficult to see where diffuse TGCT starts and stops. Microscopically, the cells are identical.

4. What does it mean that TGCT is genetic?

In TGCT, something unusual happens inside the tumor cells that doesn’t occur in normal cells. A piece of one chromosome (which is like a package of genetic instructions) breaks off and attaches to a different chromosome. This swap, called a **translocation**, causes the cells to make too much of a protein called CSF1. The extra CSF1 can recruit immune cells to the joint, leading to inflammation and swelling. Treatments that block CSF1 don’t directly attack the tumor cells, but instead target the recruitment of cells being drawn in by this overproduction.

5. Is TGCT hereditary? Can it be passed down?

No, TGCT is not passed down nor inherited. The CSF1 abnormality driving growth and change of TGCT affects a minority of cells in the tumor and not the rest of the body.

6. Are there any risk factors for TGCT (dietary, occupational, genetic, lifestyle)?

TGCT occurs sporadically. There is no occupational, dietary, genetic, or lifestyle risk that has been identified to predispose anyone to getting this disease. TGCT cannot be passed down.

TGCT is likely spontaneous and multifaceted given that there are no known populations with higher/lower prevalence.

7. Do sex-based hormones (e.g., estrogen) affect TGCT growth or development?

Sex-based hormones are not identified to impact TGCT growth or development. Although some studies have identified higher prevalence of TGCT in females, it occurs frequently in both sexes. Unlike forms of breast cancer which are driven by estrogen, TGCT has not been shown to be driven by any sex-based hormone.

8. What separates TGCT from rheumatoid arthritis?

Tenosynovial Giant Cell Tumor (TGCT) and Rheumatoid Arthritis (RA) can appear similar in the joints they affect, but they are fundamentally different diseases. TGCT is a rare, benign but locally aggressive tumor of the synovium, caused by overexpression of CSF1 that attracts white blood cells and forms a mass. It affects a single joint, most often the knee, and presents with swelling, stiffness, pain, or mechanical symptoms like locking, but without whole-body (systemic) involvement. MRI often shows an iron-storage compound, hemosiderin, deposition. Different cells are involved in TGCT than RA.

In contrast, RA is a chronic whole-body autoimmune disease in which the immune system attacks joint tissue, causing joint pain and swelling in multiple joints, prolonged stiffness, and sometimes whole-body symptoms such as fatigue or issues with breathing and vision. Imaging in RA shows some similar findings with joint inflammation, bone erosions, and joint thickening. While TGCT is managed with surgery or targeted medications, RA requires lifelong immunosuppressive treatment with DMARDs and biologics. In short, TGCT is a single-joint tumor disease, whereas RA is a whole-body autoimmune arthritis.

9. What separates TGCT from sarcoma?

TGCT may put stress on local bones, tissue, and joints but does not spread. Whereas sarcomas can spread to healthy tissue in distant locations such as the lungs. There is no such thing as a good tumor; however, TGCT is rarely life-threatening, unlike sarcoma.

Sarcoma is a cancerous tumor that has a high risk of spreading and is life-threatening. TGCT is typically not life-threatening and does not spread. TGCT and sarcoma share some characteristics, such as, both can lead to severe functional impairment when left untreated. Joint deterioration can drastically impact quality of life in patients with TGCT. TGCT, especially the diffuse TGCT, can lack a distinct boundary making complete surgical resection difficult. Diffuse TGCT has high recurrence rates, and the surgical difficulties may contribute to the high recurrence rates.

10. Why is TGCT called sarcoma-like?

Tenosynovial Giant Cell Tumor (TGCT) and sarcomas can both affect a joint and soft tissues, but they differ greatly in nature and behavior. TGCT is not life threatening and is a benign tumor growth of the joint, tendon sheath, or bursa, driven by overproduction of CSF1, which recruits white blood cells to become part of the TGCT. It is locally aggressive and can damage the single joint affected, but it does not spread.

TGCT typically presents in a single joint, most often the knee or hip, with pain, swelling, stiffness, or range of motion impairment. In contrast, sarcomas are cancers that arise from connective tissues such as bone, muscle, or fat. They form solid, invasive masses that may be painless until advanced, and they carry a high risk of recurrence and spread, most commonly to the lungs. Biologically, TGCT and sarcomas are very different. TGCT shows benign giant cells and hemosiderin-stained (rusty orange from an iron storage compound called hemosiderin) white blood cells, whereas sarcomas display atypical and high growth activity. Treatment also reflects this difference: TGCT is managed with active surveillance, surgery or targeted medications, while sarcomas require large removal, often combined with traditional chemotherapy or radiation. In short, TGCT is a locally aggressive but has no risk to patients' lives and spread, while sarcoma is a cancerous, highly aggressive and prone to spread, and potentially life-threatening cancer.

11. Is there a correlation between growth of TGCT and symptoms?

There does not appear to be a clear correlation between TGCT growth and the presence of symptoms. Symptoms tend to come and go with intermittent flares and symptoms may change without changes in the disease. TGCT may also grow and change without impact to symptoms.

12. Does TGCT spread?

TGCT occurs in a single joint and will not spread to any other part of the body. However, TGCT can worsen which can cause damage to surrounding regions of the joint. Additionally, when one joint is impacted, patients often compensate, for example by limping, thus putting more stress on other joints, causing pain.

Unfortunately, misdiagnosis is common in TGCT. Approximately 50% of patients are misdiagnosed prior to receiving their accurate diagnosis. This may be due to the lack of familiarity with the condition. Similarly, patients may be misdiagnosed with TGCT in multiple locations. It is important to note that TGCT occurs in a single joint and is not likely to spread. Patients may have multiple conditions at the same time.

Patients may also experience pain in other areas of their body due to overcompensation.

Consider seeking out an expert from the TGCT Support specialists list to ensure you are receiving multidisciplinary care.

13. Is TGCT typically misdiagnosed?

Diagnosis can often be delayed, with one study showing a median of 16.9 months for D-TGCT diagnosis. Another study found that two third of patients were not diagnosed until after 2 years and 50% of patients were misdiagnosed prior. Misdiagnoses commonly include sprains, sports injuries, ganglion cysts, baker's cysts, rheumatoid arthritis, osteoarthritis, and sarcomas.

14. Should CSF1 translocations be tested for in my pathology?

TGCT is driven by a genetic abnormality leading to an overproduction of the protein, CSF1. That genetic abnormality is called a translocation which can be identified through extra testing of the tissue sample. Specifically, the translocation requires a specific test for structural changes and would be missed in typical panels that are usually used to look for cancer mutations. However, the imaging and traditional pathology is often conclusive of diagnosis without the need for testing of whether a patient has the CSF1 abnormality.

15. Does TGCT manifest differently in pediatrics and adults?

According to a recent large study comparing pediatric and adult patients with TGCT by TGCT Support, patients with TGCT have a similar delayed diagnostic journey, treatments and outcomes, burden of disease, and recurrence rate, regardless of age.

16. Are there any other abnormalities in my body because I have TGCT?

There are no other known drivers of the disease. Several abnormal pathways in TGCT are being investigated but these remain exclusive to the TGCT cells and do not occur in the whole body.

17. Why did the disease's name change to TGCT? What was it changed from?

In 2013, The World Health Organization reclassified giant cell tumor of the tendon sheath (GCT-TS), nodular tenosynovitis, pigmented villonodular synovitis (PVNS), and diffuse-type giant cell tumor as a single disease entity known as Tenosynovial Giant Cell Tumor (TGCT) with two subtypes. This change was in response to the fragmented care and lack of biological relevance of old naming. For instance, TGCT is not responsive to corticosteroids like a synovitis may be. The discovery of the genetic abnormality also changed the understanding that inflammation was secondary to the tumor growth and the disease was better treated under oncology.

18. Why do scan reports and pathology results still refer to PVNS?

The adoption of the newer naming has been limited depending on the location and subspecialty. There is an educational effort to transition healthcare systems to using TGCT, as it better reflects the biology of the disease.

19. Is TGCT an inflammatory disease? What is the inflammatory component?

Inflammation occurs secondary to the disease process caused by TGCT. TGCT is a tumor disease which recruits inflammatory cells and that can lead to joint swelling, local inflammation, and pain. However, TGCT is not identified as an autoimmune or inflammatory condition because this process occurs secondary to the tumor itself.

20. What cells make up TGCT?

There are hundreds of different types of cells in the body. Each cell type serves a specific and diverse function. The cells within a TGCT are just as diverse. Tumors can begin in almost any type of cells in the body. The type of cell defines the biology of the tumor, and the location can influence the treatment plan. The types of cells in these tumors include fibroblasts, monocytes, macrophages, and giant cells.

Fibroblasts: Fibroblasts are a type of cell that make up connective tissue, often in ligaments and tendons. They are found throughout the body as structural support for our organs.

Monocytes & Macrophages: Monocyte are a type of white blood cell that can function as a macrophage. A macrophage is a specialized white blood cell involved in the inflammatory response. These white blood cells remove dead cells, kill microorganisms (eg. like infections) and recruit other cells. A portion of the TGCT is made up of tumor cells while the rest of the tumor is made up of monocytes and macrophages that become part of the tumor.

TGCT promotes the growth and recruitment of these cells to become part of the tumor.

Multi-nucleated Giant Cells: These cells formed by the joining of monocytes and macrophages to become a single cell. These cells are often associated with the soft tissue and bone damage. These cells are large and mediate tissue repair and remodeling. However, in TGCT patients, only 2-16% of the tenosynovial giant cells have a genetic abnormality that provokes tumor growth.

21. Can providers tell the difference between inflammation and TGCT? How?

TGCT and inflammation looks different on MRI. For instance, the hemosiderin (an iron storage compound that gives TGCT its rusty color) gives TGCT a distinct appearance. However, hemosiderin or pigmentation may not always be present and is not required for diagnosis. There are other imaging findings that differentiate inflammation from TGCT. The imaging technique is important to detect these differences. Ensure you are seeing a TGCT expert and consult your doctor for different imaging techniques.

22. Are there any dietary or lifestyle changes that help TGCT?

No specific diet or lifestyle modifications have been identified as helpful for TGCT. However, patients modify activities based on their symptoms.

Many patients with TGCT change components of their diet and/or take supplements to improve overall health, well-being, and systemic inflammation. While anti-inflammatory diets and supplements can be used to aid in overall health, it is important to note that these changes may not impact the disease itself or symptoms associated with TGCT.

Patients with TGCT may struggle to remain active. Modifying movements to make them achievable may keep you active. Patients often find physical therapy helpful to find modifications that work for their unique situation.

TREATMENT FOR TGCT AND PROVIDERS

23. What is the difference between medical and orthopedic oncology?

Medical oncologists specialize in diagnosing and treating tumors with medications, including other soft tissue tumors like TGCT. An orthopedic oncologist is a medical doctor specializing in surgery to treat tumors. Orthopedic oncologists refer to medical oncologists for medications. These doctors should be part of the multidisciplinary team approach. Check out the TGCT Support specialists list to find a specialist near you.

24. What is the difference between an orthopedic oncologist and orthopedic surgeon?

An orthopedic oncologist is a medical doctor specializing in the surgical removal of tumors. They have specialized education for removing all types of tumors, benign and cancerous.

Generally, orthopedic surgeons fall into sports medicine, generalists, upper extremity, or lower extremity specializations. These surgeons are used to treating anatomical and mechanical injuries such as injuries related to sports and birth defects. These surgeons do not typically remove tumors.

It is important to have a multi-disciplinary team that includes an orthopedic oncologist and medical oncologist that specializes in soft tissue and sarcomas instead of a provider that specializes in the anatomical area of interest.

25. What type of provider should I see?

TGCT requires a multi-disciplinary treatment strategy that includes a team of healthcare providers familiar with musculoskeletal tumors, such as, an orthopedic oncologist, a medical oncologist, musculoskeletal radiologist, orthopedic surgeon, and physical therapist.

26. Who is the right doctor to treat this disease?

TGCT requires a multi-disciplinary treatment strategy that includes a team of healthcare providers familiar with musculoskeletal tumors, such as, an orthopedic oncologist, a medical oncologist, musculoskeletal radiologist, orthopedic surgeon, and physical therapist. A medical oncologist may not be necessary if a patient is not symptomatic and/or if a patient has disease that can be successfully surgically removed.

27. Do I always need an expert, or can I have care locally?

Many specialty centers offer telemedicine visits and will work with you for local care (e.g., labs and scans may be done at local centers). It is encouraged that your local provider consult with a specialty center to ensure you are getting expert guidance for your TGCT.

28. What is a MDT review?

A multidisciplinary team (MDT) review includes a panel of experts of multiple specialties that reviews patient cases. Each specialty provides their opinion, and a collaborative treatment plan is created.

29. When should I go to oncology?

TGCT is a tumor disease and TGCT often requires a multi-disciplinary treatment strategy that includes a team of healthcare providers, such as, an orthopedic oncologist, a medical oncologist, particularly for those with diffuse TGCT. Consider seeking a consultation from an orthopedic oncologist and assessing the addition of other providers as needed.

30. How often should I have scans?

The frequency of scans may depend on the patient, stage in their journey, symptoms, and stability of disease.

If a patient is newly out of surgery, scanning may be more frequent as symptoms change. In the case of a patient being stable for 3 years with no new symptoms, scans may be only done annually or based on symptoms.

31. Should I have contrast dye with those scans?

According to the consensus guideline, contrast dye is recommended. However, consult with your doctor for unique concerns to you.

32. Why do pathology reports specify subtype if MRI is used for subtyping?

Pathology reports commonly refer to “TGCT” as diffuse-type tenosynovial giant cell tumor by default. During pathology, the samples are cut up and looked at under a microscope. Features of the mass, such as the well-defined boundary, may be lost when the sample is cut up. Thus, subtype characterization is determined by MRI alone.

33. Can MRIs miss TGCT on the scan?

The MRI technique may impact whether TGCT is observed on scan. It is important to consult with a multidisciplinary team that is experienced in tumors to adequately assess and diagnose TGCT.

34. How early is too early to scan after surgery?

Follow-up MRI to identify residual disease post operation is often done between 3 and 6 months based on symptoms, institution, patient, and surgeon. Patients who are treated by orthopedic surgeons may not have follow-up until symptomatic relapse. According to the TGCT Support Registry, most follow-up is patient initiated due to symptoms.

35. Are x-rays useful to diagnose or monitor TGCT?

In daily life, the most common radiology technique is radiography. Radiography uses x-rays to view internal structures of the body, mostly skeletal. X-rays use a type of radiation known as electromagnetic waves which will produce an image on metal film. Soft tissue, such as skin and organs, cannot absorb the electromagnetic waves and allow the high energy to pass through them. Once the high energy waves reach bone and other solid structures, the radiation will be absorbed allowing an image of those regions. X-rays are the least expensive of the imaging techniques and generally the quickest. Degeneration, effusion, bone erosion, and the amount of joint space can be identified on x-ray, giving a quick snapshot of what may be going on internally. However, x-rays do not show soft tissue, therefore, tumors cannot be visualized using x-rays. In order to understand what is leading to the potential effusion, bone erosion, and damage to the joint space, an MRI must be used.

36. Are biopsies required (core-needle)?

A biopsy is a procedure where a tissue sample is removed from a patient. Upon removal of the tissue sample, the specimen can be studied under a microscope to determine the biology of the cells. Pathologists use biopsies to determine the behavior of the cell, the biology of the cell, and what type of disease the patient has. In the case of TGCT, biopsy is only necessary to confirm diagnosis when the diagnosis is unclear.

There are two main ways biopsies are done, core-needle biopsy or during a surgical procedure.

During core-needle biopsy, imaging such as a CT or ultrasound is used to guide the needle to a region of a tumor. Once the region the tumor is located, the surrounding region is numbed using a local analgesic and a thin needle is inserted into the tissue of interest allowing a small portion to be removed. Three unique locations of the tumor are commonly removed. This type of biopsy can be done in a hospital or at a doctor’s office. This is considered a minimally invasive biopsy, however, there is a small risk of infection and bleeding at the needle insertion site.

During surgery, a tissue sample can be removed allowing a pathologist to evaluate the tumor present. This is considered more invasive and generally is done in a hospital or outpatient facility. This may require the patient be fully sedated under general anesthetics. With the high accuracy of the core-needle biopsy, surgical biopsies are less common.

For those with small localized TGCT, surgical biopsies may remove the entire tumor (called an excisional biopsy).

37. When should biopsies be done?

Core-needle biopsies are often not necessary when the musculoskeletal-radiologist has a high degree of confidence in the diagnosis. Biopsy may be performed when a large or extensive surgery is expected, to initiate systemic therapies, or when there is question about the diagnosis.

It is noteworthy that some institutions, such as cancer centers, have institutional requirements that a biopsy is performed before extensive treatments. Orthopedic surgeons in sports medicine do not typically perform biopsies as they do not typically see patients with tumors. Consult with your healthcare team to determine if you would benefit from a biopsy.

38. When should the disease be treated?

In 2022, a global group of TGCT experts came together and created a consensus document of the treatments for localized and diffuse TGCT. The consensus found that patients should be treated based on symptoms, not radiographic appearance, and the preferred treatment for asymptomatic TGCT is active monitoring.

Surgical removal remains the most common treatment approach when a patient is symptomatic. There is no current consensus on the type of surgery or the technique that is best suited for TGCT patients. Each patient's disease should be evaluated on an individual basis with their healthcare provider. Additionally, when a patient has a high risk of surgical complications, lack of prospective benefit from surgery and a high chance of recurrence or has had prior recurrences, the patient may benefit from a medication.

There is no rush! It is important to note that while there is no standard treatment pathway for TGCT, surgery can be curative. Particularly, localized TGCT can be cured when complete removal of the tumor (complete resection) is possible. However, complete removal of tumor(s) in diffuse TGCT remains difficult and other treatment options, such as medications, may be considered. This is because diffuse TGCT can be aggressive and infiltrate the surrounding tissue inside and outside the affected joint, thus, it can be more difficult to treat. Treatment should be patient-centric and determined based on consultation with your healthcare team.

39. Should the disease be treated based on radiologic appearance or symptoms alone?

The preferred approach is to treat TGCT based on symptoms. Asymptomatic TGCT may be monitored by clinical assessment and MRI. TGCT can remain stagnant for long periods and research suggests that most patients will have no change in growth in the first year of their diagnosis. Additionally, TGCT may not result in joint deterioration and proactively treating TGCT may not provide benefit.

40. Is there a rush to treatment or can I monitor? What is the role of scanning during active surveillance?

TGCT is a slow-growing tumor and often remains stagnant for long periods. There is no rush to treatment and treatment decisions are based on symptoms. Active surveillance is the preferred approach for asymptomatic patients and MRIs may be conducted every 6-12 months, depending on the patient, symptoms, and stability of disease.

41. What are the treatment options?

Active Surveillance (also known as active monitoring) is the preferred approach for patients managing their symptoms or those asymptomatic. Research suggests that only a minority of patients who do not treat their disease for 1 year after diagnosis develop arthritis meaning it is safe to monitor TGCT when you are asymptomatic.

Surgery is often the first-line treatment for TGCT that is symptomatic and where the entire disease may be removed.

Systemic therapies (medications) were designed for patients with symptoms related to TGCT, and when surgery is unlikely to provide benefit or control disease. These medications may be used for patients with diffuse and recurrent TGCT.

42. How do you prevent joint degeneration related to TGCT?

Joint degeneration is based on many factors such as exercise, weight, genetics, and health history. TGCT may not increase joint degeneration for all patients. However, there are no known strategies which prevent degeneration. Many healthcare providers and patients note reducing high-impact activities such as running and jumping to reduce stress on the joint.

43. What are the types of surgery?

Open synovectomy- remove of the synovium (lining of the joint) either completely or partially, through an open large incision. This surgical technique is associated with a longer recovery period than the arthroscopic surgeries.

Arthroscopic synovectomy – surgical procedure to remove all or part of the synovium (joint lining) using a camera (called a scope), shaver, and other specialized instruments through 2 to 3 small incisions. This is sometimes called a “keyhole” surgery.

Combined approach - In difficult-to-access locations, such as the knee, a combined approach may be attempted. This surgical approach utilizes an open surgery for the back of the knee (posterior) to remove the tumor(s) and joint lining, while an arthroscopic surgery is done in the front (anterior) to remove the joint lining. With the use of the arthroscopic surgery in the front, this can reduce the recovery time and magnitude of the surgery. These two approaches may be done at the same time or weeks apart called a one-stage or two-staged approach.

Joint replacement- In research, only a minority of patients have joint degeneration when TGCT is monitored. However, TGCT can lead to extensive damage to the joint leading to secondary osteoarthrosis. A joint replacement may be required to improve function and reduce pain caused by the bone damage. This procedure removes the damage joint lining, cartilage, and bone while remaking a functional prosthetic out of metal, ceramic, or plastic material. It is important to note that tumors may recur following joint replacements and replacements only address the damage to the bone and joint. In research conducted by TGCT Support, patients with joint replacement had similar recurrence rates to patients with open approach surgeries. Therefore, the joint replacement is recommended only when the damage to the joint and bone is beyond repair and a replacement is warranted, rather than as a strategy to avoid recurrence. During a replacement, a synovectomy may be performed to remove the tumor(s).

Ankle fusion, also known as an ankle arthrodesis, is a procedure where the ankle is fused into a single piece. Fusions are used following advanced joint damage and bony erosion, predominantly in the ankle. Severity of bone involvement in TGCT of the ankle tends to be high, this is due to pressure erosion from swelling and growth in a narrow joint space. In these cases, an invasive surgery may be necessary. However, this approach does lead to irreversible structural and functional changes.

44. Which surgery option is the best?

Currently, there is no consensus on the most effective surgical approach that reduces recurrence rates, particularly for patients with diffuse TGCT. The recurrence rate for localized TGCT is around <10%, whereas the recurrence rate for diffuse TGCT is roughly around 50%.

Several studies have attempted to determine the effectiveness of arthroscopic surgery vs open surgery. For instance, several studies have shown no difference in recurrence rates among patients with diffuse TGCT treated with arthroscopic vs open synovectomy. Another study in 2013 showed that patients with TGCT of the knee, arthroscopic approach to the front and an open approach to the back had less recurrence rates than an all-arthroscopic or all-open surgery. In 2019, another study used a pooled database of patients and found that recurrence free survival was highest after an open surgery vs an arthroscopic surgery. Noteworthy, this study combined diffuse and localized TGCT patients, possibly leading to bias in the findings. Given the mixed results, there is no consensus on surgical approach recommended to reduce recurrence for TGCT.

Surgical technique should be based on individual characteristics, tumor size, and access to the tumor location. Please consult with your doctor to determine which is best for you.

45. What are the recurrence rates after surgery?

Recurrence rates are 9–14% for localized TGCT and 50-75% for diffuse TGCT after the first surgery. For diffuse TGCT, recurrence rate may increase following additional surgeries. We know from a small study that recurrence rates are nearly double if you are not treated at an academic specialty center (following first initial surgery, the recurrence rate of academic centers in this study were 44% compared to 92% for patients initially treated in a community center without an expert).

46. Does ablation reduce recurrence risks?

Ablation is the surgical technique of applying extreme cold or extreme heat to destroy the TGCT cells that may not be found during these surgical approaches. Ablation is used in combination with a synovectomy to attempt to ensure the tumor cells are dead. Cryoablation (also known as cryosynovectomy) is the use of extreme cold where a small needle is inserted into the tissue and a liquid nitrogen spray is added to freeze the tissue (4). There is no evidence to suggests this provides more benefit than surgery alone.

47. What should I do if the doctor knows they'll leave behind disease?

Surgery that guarantees residual TGCT will be present is suboptimal. In the scenario where TGCT cannot fully be removed by surgery alone, consider speaking to a medical oncologist and a multidisciplinary team for more options.

48. Are open surgeries always preferred?

Orthopedic oncologists often perform surgery through open approach while sports surgeons specialize in arthroscopic surgery. The surgical technique is often dependent on the surgeon you see. Orthopedic oncologists can assess the ideal removal technique and can refer to colleagues if an arthroscopic approach is preferred. There is a concern that shavers in arthroscopic surgery will spread TGCT around the joint. Thus, open approach surgeries may be the preferred approach for some patients.

Importantly, there is no current consensus on the type of surgery or the technique that is best suited for TGCT patients. Each patient's disease should be evaluated on an individual basis with their healthcare provider. Additionally, when a patient has a high risk of surgical complications, lack of prospective benefit from surgery and a high chance of recurrence or has had prior recurrences, the patient may benefit from a medication.

49. Is there benefit to repeat surgeries?

Following the first recurrence and after subsequent surgery, the local recurrence rate of diffuse TGCT can remain as high as 90% over 5 years. Due to the highly recurrent nature of diffuse TGCT, the benefit of repeat surgeries is controversial.

50. Is radiation a treatment for TGCT?

Radiation was historically used in the treatment of TGCT. However, most experts in the United States and globally recommend against the use of radiation since better alternatives exist. Evidence supporting efficacy is limited and the potential long-term complications are a key consideration. Radiation to a joint carries risks such as fibrosis (scarring of tissue that can further limit mobility), hemoarthrosis (bleeding into the joint), damage to surrounding cartilage and bone, and the development of a secondary malignancy years after treatment. Because TGCT is a benign disease, these risks are taken very seriously, and radiation is typically reserved for select cases where other options have been exhausted.

51. Are joint replacements curative?

Joint replacement is used to treat advanced, irreversible bone deterioration and joint damage. The procedure involves removing portions of bone and replacing them with hardware. Despite the name, a joint replacement does not fully remove the entire joint and is often performed together with a synovectomy, a surgical removal of the joint lining. Recurrence rates remain similar to other surgical approaches, and there are important long-term considerations. The presence of hardware can distort imaging, making future monitoring more difficult, and surgeons aim to minimize additional procedures to reduce the need for repeated entry into the joint. Anecdotally, there is a concern that recurrence of TGCT can undermine hardware and increase hardware failure rates. Thus, joint replacements are used to treat joint degeneration but not TGCT alone.

52. Is anyone too young for replacements? What does that mean?

Joint replacement is appropriate for patients with advanced, irreversible bone deterioration and is not limited by age. However, younger patients are more likely to need multiple revision surgeries over time, as increased activity and longer lifespan cause the hardware to wear out. In contrast, older patients typically require fewer revisions, since the implant is more likely to last for the remainder of their lifetime.

53. Can I have surgery again after joint replacements?

Surgery after joint replacements can increase fibrosis (scar tissue formation) and stiffness. Consult with a multidisciplinary care team for additional options for recurrence after joint replacement.

54. What are the complications related to joint replacements that are specific to TGCT?

Several surgeons have mentioned that there is an increased risk of hardware failure with any recurrence of tumors and that additional bone stock may be removed to better anchor the hardware, making the surgery incision larger. These considerations should be discussed with your orthopedic oncologist.

55. Is there anything I can do to prevent recurrence? Are there any dietary or lifestyle changes I can do to prevent recurrence?

There are no preventative strategies for TGCT. Because TGCT impacts quality of life, it is important to maintain the activities important to you.

56. Are there any supplements I can take that help my liver function while using medications?

Your liver is one of the most important organs in your body because it acts to process and filter toxins and nutrients. It is responsible for storing energy and vitamins, producing bile to breakdown fats, and helps support the immune system. There are no supplements which support the function of the liver.

Similarly, the kidneys are responsible for filtering blood, balance electrolytes, and removing waste. There are no supplements which improve this function but remaining hydrated ensures the kidneys can balance minerals and support kidney function.

57. Can orthopedic oncologists prescribe TGCT medications (also called systemic therapies)?

Orthopedic oncologists specialize in the surgical removal of tumors. Orthopedic oncologists typically refer patients to medical oncologists for considerations of systemic therapies. Medical oncologists are trained to use medications to treat patients with tumors. They are also specially trained to manage side effects related to medications.

58. What medications are available?

Several medications have been approved for symptomatic diffuse or recurrent TGCT in the United States. Pexidartinib (TURALIO) was approved in 2019 and vimseltinib (ROMVIMZA) was approved in 2025. There are several other medications available (i.e., imatinib and nilotinib) but are not approved for the specific use in TGCT. Clinical trials investigating more therapies for TGCT are currently underway. Global availability significantly varies. Consult with your medical oncologist for the right treatment plan for you.

59. How do the medications target TGCT?

TGCT is driven by overproduction of colony-stimulating factor 1 (CSF1), which recruits white blood cells to become part of the tumor. CSF1 inhibitors block the CSF1, halting the recruitment of white blood cells and shrinking the tumor.

60. What are their side effects? Do all medications have the same side effects (class-based side effects)?

Both of the approved medications work by directly targets CSF1 in TGCT and were made specifically for TGCT. Pexidartinib (TURALIO) and vimseltinib (ROMVIMZA) work by inhibiting CSF1 from signaling to TGCT and the surrounding cells. This disrupts the ability for the TGCT to recruit more cells, shrinking the tumor and halting the growth. Recently, it has been discovered that these treatments blocks CSF1 at the cell source, targeting the surrounding immune cells being recruited and not the tumor cells themselves.

Side effects are often due to the medication impacting other proteins too. Class-based side effects are side effects that are expected in all medications with a similar target and are due to the inhibition of the specific target. CSF1 inhibitors often accompany rash, itching, facial swelling, fatigue, and asymptomatic changes in laboratory values. The proportion of patients affected by each side effect may differ based on the medication and specific side effects novel to each medication exist (e.g., pigment changes to hair and skin).

61. If I have a side effect with one drug, will I have the same side effect with another drug?

Patients are unique and side effects produced by one drug may not be similar to the side effects produced by another drug in the same individual.

62. Are side effects temporary and reversible? How long does it take for them to go away?

Typically, side effects are temporary and reversible. Dependent on the medication and patient, some side effects may take weeks to months to dissipate following discontinuation.

63. Does pausing and restarting a systemic therapy with a medication reduce side effects after a drug break?

Restarting a medication after it was temporarily stopped, usually due to side effects, is also known as rechallenging. This approach allows patients to continue receiving the benefits of the drug while minimizing adverse effects. It can help because the body may have accumulation of the medication over time, so reintroducing the medication at a lower dose or more gradually can reduce side effects.

Rechallenging also avoids completely discontinuing an effective therapy and allows healthcare providers to monitor the patient's response, adjusting the dose or schedule as needed.

64. Are the medications considered a chemotherapy? Are they considered immunotherapy?

CSF1 inhibitors used to treat TGCT are neither traditional chemotherapy nor classic immunotherapy. These treatments are often referred to as targeted molecular therapies.

TGCT is driven by overproduction of colony-stimulating factor 1 (CSF1), which recruits white blood cells to become part of the tumor. CSF1 inhibitors block the CSF1, halting the recruitment of white blood cells and shrinking the tumor. Unlike chemotherapy, which targets rapidly dividing cells throughout the body due to their growth, CSF1 inhibitors are made specific to TGCT and are selective to the TGCT specifically. Unlike immunotherapy, which stimulates the immune system to attack cancer cells, CSF1 inhibitors work by modulating the tumor microenvironment rather than activating a broader immune response. These medications are best defined as targeted therapies.

65. Why do some medications cause whitening of hair and others don't?

Medications selectively target CSF1 in different ways to treat TGCT. The "tightness" of the binding, as well as how long the medication is bound to the target may change the effect. Pexidartinib (TURALIO) can cause changes in hair and skin color because it inhibits the CSF1, which is important not only for tumor growth but also for the normal function of melanocytes, the cells that produce pigment. By blocking CSF1, pexidartinib can disrupt the activity of pigment-holding cells, leading to reduced melanin production. This may result in hair becoming lighter or gray and can also cause changes in skin pigmentation, such as lightening or patchy areas.

66. What type of labs should I have for my organ function while receiving systemic therapies?

Organ function such as liver and kidneys may be checked prior to medication initiation. Blood is collected and laboratory tests can determine the status of a person's health. Repeat liver function tests are performed during treatment with CSF1 inhibitors. Specifically, AST, ALT, and bilirubin are assessed. The frequency of the laboratory testing differs based on the medication and the identified risk of liver injury.

67. Can I go off medication or will the disease return?

Currently, it is not well understood how long patients should remain on CSF1 inhibitors to achieve the maximal response. In a small study of patients that stopped a single CSF1 inhibitor, some patients did not experience a return of disease or symptoms. Despite some patients experiencing regrowth of their TGCT, symptoms did not become bothersome in all patients with regrowth.

More research is needed to determine which patients may experience regrowth of the tumor or a relapse of symptoms and to understand whether the duration of treatment influences these outcomes. In short, the optimal length of therapy and factors predicting sustained response after stopping treatment remain unclear.

68. Can I take TGCT medications before surgery to reduce recurrence risk?

It is unknown the optimal duration of medication treatment before or after surgery to reduce recurrence or whether these medications are effective at doing so. However, there is significant interest from the medical community in use of medications before and after surgery and whether that improves surgical outcomes.

69. Can medication reduce recurrence risks?

Currently, medications are not used to reduce recurrence rates in TGCT. Instead, TGCT is treated based on symptoms. This limits the exposure of patients to side effects of a medication when they may never have symptomatic relapse or disease recurrence.

70. Is anyone too young or too old for medications?

Approved medications are restricted to adult patients with symptomatic TGCT. However, pediatric patients are reported to use medications in the same dosing as adults. A recent large study of pediatric TGCT demonstrates the disease course, burden of disease, and treatment outcomes are similar among pediatric and adult patients. Pediatric patients used medications in similar proportions to adult patients with TGCT.

71. Do TGCT medications make you immunocompromised?

CSF1 inhibitors used to treat TGCT do not typically cause broad immunosuppression in the way that chemotherapy or classic immunosuppressive medications do. They work by selectively blocking CSF1, which primarily affects immune cells in the tumor microenvironment rather than the entire immune system. While the specific immune cell involved is part of the immune system, inhibiting its activity in this targeted way does not generally leave patients vulnerable to infections or other immune-related complications.

72. Should I still receive all vaccines?

Yes, in most cases, patients on a CSF1 inhibitor should continue to receive their routine vaccines. CSF1 inhibitors do not cause broad immunosuppression, so the immune system is able to respond to vaccines normally. It's important to discuss your vaccination schedule with your healthcare provider, who can ensure that vaccines are given safely and at the appropriate time while on treatment.

73. If I can go off, how long should I have treatment before going off?

There is currently no consensus on how long treatment with these medications should continue to achieve the best outcome. It is important to discuss with your medical oncologist when it may be appropriate to stop treatment, considering your tolerance of the medication and your individual treatment goals.

74. Can I take TGCT medications while pregnant?

Current guidelines for one of the approved medications used to treat TGCT recommend discontinuing the medication at least three months prior to attempting conception, as these medications can be toxic to a developing fetus. For personalized guidance and detailed instructions, patients should consult their medical oncologist.

75. Are there fertility concerns with medications? Which?

CSF1 inhibitors are toxic to a developing fetus, and their effects on male and female fertility are not well studied. Effective contraception is recommended during treatment and for a period afterward. Because of these risks, patients taking either medication should discuss family planning and the timing of conception with their medical oncologist before starting therapy. For patients who are concerned about future fertility, options such as egg or sperm harvesting may be considered before starting therapy.

LIFESTYLE AND FOLLOW-UP

76. Is TGCT considered a disability?

Having TGCT alone is not considered a disability. However, TGCT may be considered a disability if it significantly limits a person's ability to perform daily activities, work, or participate in social and activities of daily living. While TGCT is not life-threatening, it can cause chronic pain, reduced joint mobility, stiffness, and functional limitations. Whether it qualifies as a disability depends on the severity of symptoms and the impact on your daily life, and it may be recognized under disability programs or workplace accommodations if documented by a healthcare provider.

77. Can I live with this disease forever?

TGCT, particularly the diffuse subtype, can be a chronic condition, and many patients live with it for many years. While TGCT is not life-threatening, it can affect quality of life and physical function. TGCT and the treatments themselves can cause long-term complications and impacts on quality of life. However, patients often find treatment and management strategies that help them maintain comfort and stay active.

78. Should I avoid any activities such as squatting or jumping?

While some healthcare providers may suggest that patients with TGCT limit high-impact activities, there is no single approach that fits everyone. Many patients are able to return to normal exercise. Importantly, participating in high-impact activities does not affect disease growth or recurrence.

79. Can I still exercise?

Yes, many patients find that regular movement helps reduce stiffness and improve joint stability. Working with a physical therapist can help you adapt exercises to your individual needs and ensure they are safe and effective.

80. Does hormonal birth control impact TGCT?

There is currently no evidence that hormonal birth control affects TGCT growth. TGCT is driven by overexpression of CSF1 and the accumulation of white blood cells in the joint, which is unrelated to sex hormones. Patients taking hormonal contraceptives, such as birth control pills, patches, or implants, are not thought to have an increased risk of tumor growth or recurrence. Males and females are affected in similar proportions by TGCT, despite slight predilection in females.

81. Are there any supplements or dietary changes I can make to help the joint?

There is no specific supplement or diet that has been proven to treat TGCT or directly improve joint health. However, maintaining a balanced diet rich in fruits, vegetables, lean protein, and healthy fats can support overall joint and bone health.

82. Are there any ways to treat pain with diet or physical therapy?

Pain management can include several approaches: physical therapy is highly effective for improving joint function, reducing stiffness, and strengthening muscles around the joint, which can alleviate discomfort. In addition, some patients explore natural or lifestyle approaches, such as heat or cold therapy, gentle low-impact exercise (like swimming or cycling), and relaxation techniques, to help manage pain. Your healthcare team can help tailor a plan combining diet, supplements, therapy, and other strategies that are safe and appropriate for you.

83. Are there any modifications to my house that will help recovery?

Depending on which limb is affected by TGCT, simple household modifications can help patients maintain independence in daily activities. For example, someone recovering from knee surgery may benefit from a raised toilet seat to reduce bending. Other helpful adaptations include shower chairs, handrails, and rearranging household items to make them easier to reach. These adjustments can support a faster and safer recovery by allowing patients to perform tasks independently.

84. Is there any way I can manage the symptoms of TGCT such as swelling and pain?

Symptoms of TGCT usually includes stiffness, swelling, pain, and limitations in range of motion. Due to the chronic progression of TGCT in some patients, pain often persists. Pain management often refers to the use of analgesics, anti-inflammatories, and steroids to reduce swelling, inflammation, and overall pain. Research conducted by TGCT Support has shown that nearly 71% of patients have taken non-steroidal anti-inflammatory medications such as ibuprofen and naproxen and 60% of patients have taken over-the-counter analgesics such as acetaminophen to treat symptoms associated with TGCT.

Anti-inflammatory drugs come in over the counter and prescription forms. Majority of anti-inflammatory drugs prescribed will fall into a class called Non-Steroidal Anti-Inflammatories (NSAIDs). These drugs work by blocking a chemical that sends pain and inflammatory signals to the site of injury. Commonly used over-the-counter anti-inflammatory medications are Aleve (Naproxen), Advil or Motrin (ibuprofen), and Excedrin (aspirin). Prescription NSAIDs such as meloxicam are more powerful against inflammation and pain, however, carry more risks and require doctor consultation prior to use.

Nerve pain medication, also called GABA analogues, are available by prescription from a healthcare provider. These medications work by binding to signal sites in nerve cells and hinder pain associated with nerve damage. The most prescribed nerve pain medications are gabapentin, duloxetine (Cymbalta), and pregabalin (Lyrica). These drugs can aid in nerve damage and the pain associated.

Muscle relaxants are available by prescription from a healthcare provider. These medications work by reducing stiffness in muscles. This relaxation can reduce pain and discomfort. Some drugs in this family work directly on the muscles to lead to relaxation, other members of this medication family work on the brain, signaling the muscles to relax. Two of the most prescribed are baclofen and Flexeril (cyclobenzaprine). Baclofen works by reducing the transmission of messages between the spinal cord nerves and muscles. Flexeril primarily works at the brain stem and reduces the pain signaling sent to the brain.

Analgesics or pain medications are available in over the counter and prescription forms. The most used over-the-counter medication for pain is acetaminophen or paracetamol (Tylenol). These drugs work by blocking your brain from releasing signals telling your body that it's in pain. These drugs do not reduce swelling or inflammation like NSAIDs do. Prescription-strength pain medication, such as narcotics, work by attaching themselves to pain receptors in your brain and block the sensation of pain. However, a major challenge of treating chronic pain is that narcotics, while effective, are extremely addictive and tolerance builds over time. Due to the addictive features of these drugs, long-term use is not recommended.

Cannabidiol oil, often referred to as CBD oil, is extracted from the cannabis plant, then diluted into an oil with coconut or hemp seed oils. Although CBD oil is one of the main extracts from the marijuana plant, it does not create any intoxication like the other marijuana component, THC. The body produces endocannabinoids that bind to the cannabinoid receptors in the brain, relieving inflammation and pain. It is thought these CBD oils works by mimicking the brains signaling similar to endocannabinoids already present in the body. The full impact of CBD oil on pain remains unclear, although, some studies have been able to show that CBD and CBD-THC combinations can reduce pain in patients with multiple sclerosis and arthritis.

Additional approaches may also benefit symptoms such as icing, compression elevating, rest, and physical therapy. Consult with your doctor to develop a pain management plan.

85. Do steroids help in TGCT?

Cortisone steroids, called corticosteroids, are given as an injection to reduce inflammation. TGCT patients commonly report getting at least one of these injections at some point in their treatment journey with mixed anecdotal reviews on the effectiveness. Cortisone steroids resemble a hormone called cortisol. These steroids work to decrease inflammation by reducing the activity of the immune system and the production of collagen. The injection reduces collagen production in the joint and tendon it is locally administered to, calming the nerves, and reducing pain directly related to inflammation. The use of steroids in TGCT is decreasing in popularity with the shift in the literature that shows TGCT works as a tumor disease with an immune component rather than solely an immune disease. In the recent research by TGCT Support, cortisone injections were used in 25% of patients. This is because corticosteroids are thought to be uneffective for treating TGCT related symptoms. Additionally, cortisone injections have risk of infection and degeneration of connective tissue, please consult with your doctor about your risks.

86. Will this affect my ability to have children?

TGCT itself does not directly affect fertility or the ability to have children, because it is a localized tumor of the joints or tendon sheaths and does not involve the reproductive organs. However, certain treatments for TGCT, such as medications like CSF1 inhibitors, can be harmful to a developing fetus so patients are advised to use effective contraception during treatment and for a period afterward. Surgical treatment of joints usually does not affect fertility either.

87. Should I have continuity of care after recovery from an operation? How often should I go back to my doctor?

Yes, continuity of care after surgery for TGCT is important. Even though TGCT is not life-threatening, it can recur, especially in the diffuse subtype. Regular follow-up allows your healthcare team to monitor for any signs of recurrence, manage symptoms, and support rehabilitation.

The frequency of follow-up visits varies depending on the type of TGCT, the extent of surgery, and your recovery progress. Typically, patients are seen more frequently in the first year after surgery, often every 3 to 6 months, and then annually once the situation is stable. Your doctor will tailor a follow-up schedule based on your individual risk factors and recovery.

88. Is physical therapy helpful without surgery?

Yes, physical therapy can be helpful for patients with TGCT even if they have not had surgery. While it does not treat the tumor itself, physical therapy can help maintain or improve joint mobility, reduce stiffness, strengthen surrounding muscles, and improve overall function. It can also help manage pain and support daily activities, which can be especially important for patients with diffuse TGCT or those awaiting treatment. A physical therapist can tailor exercises to your specific joint involvement and limitations to keep you as active and independent as possible.

89. Is there anything I can do to improve joint stability?

There are several ways to improve joint stability, regardless of TGCT or not. Strengthening the muscles around the joint can provide better support and reduce strain, while balance exercises such as standing on one leg, using a balance board, or practicing gentle yoga can improve coordination and joint awareness. Low-impact activities like swimming, cycling, or using an elliptical help maintain strength and mobility without placing excessive stress on the joint. Working with a physical therapist allows for a personalized program tailored to your specific joint and limitations. Additionally, supportive devices such as braces, orthotics, or proper footwear can help stabilize the joint during activity. Together, these approaches can enhance stability, reduce the risk of injury, and support overall function.

90. Will I have a joint replacement early in life?

Having TGCT does not guarantee that you will need a joint replacement early in life. While TGCT may cause joint damage over time in some people, the need for joint replacement depends on several factors, including the severity of joint involvement, response to treatment, how well symptoms are managed, and patient characteristics such as joint health, weight, and activity level. Some patients maintain good joint function for many years and do not develop accelerated joint degeneration. Joint replacement is generally considered only when there is advanced, irreversible joint damage that significantly affects function or quality of life.

91. How often should my provider request scans to monitor my TGCT? Does this differ if I'm symptomatic or asymptomatic?

The frequency of scans to monitor TGCT depends on the type of TGCT, the extent of disease, symptom status, and your individual treatment plan. For many patients, scans are more frequent in the first year after diagnosis or surgery, often every 6 months to check for recurrence or progression. If the disease is stable or a patient is asymptomatic, the interval between scans may be extended to once a year. Your healthcare provider will tailor the schedule based on your risk of recurrence, symptoms, and any changes in your joint function.