Tisagenlecleucel (Kymriah®)

Pronounced: tis-a-jen-lek-LOO-sel

Classification: CAR-T Immunotherapy

About Tisagenlecleucel (Kymriah®)

This medication is a CD19-directed genetically-modified autologous (self-directed) T cell immunotherapy cancer treatment. T cells, a component of your immune system, are removed from your body through an IV line by a process called leukapheresis. In a lab, they add a chimeric antigen receptor (CAR) to your T cells. These T cells are infused back into your body. CAR gives the T cells the ability to identify, attack and kill cancer cells.

How to Take Tisagenlecleucel (Kymriah®)

Tisagenlecleucel is given through an intravenous (IV) infusion and your dose will be personalized to you. You may be given chemotherapy in the days prior to infusion to prepare your body for treatment with tisagenlecleucel. Before the tisagenlecleucel infusion, you will be given pre-medications including acetaminophen (Tylenol) and an H1 antihistamine such as diphenhydramine (Benadryl). You will need to be closely monitored after receiving this medication and may be restricted to stay within a certain distance of the treatment facility that infused this medication for several weeks after the dose has been given.

Viruses in your body may reactivate after treatment with this mediation. It is standard to be tested for hepatitis b, hepatitis c, and HIV prior to receiving tisagenlecleucel. You should ask your care provider prior to receiving any vaccines.

Tisagenlecleucel is available only through a restricted program under a Risk Evaluation and Mitigation Strategy (REMS) called the KYMRIAH REMS. This ensures that the facility where you are receiving this medication is qualified to administer the medication and has the required supportive medications available to treat side effects if you should need them.

You should not drive or operate heavy machinery for at least 8 weeks after the medication is given. This medication can cause side effects that can affect your ability to do these tasks.

You should not donate blood, tissue, cells, or organs after receiving this medication.

Possible Side Effects

There are a number of things you can do to manage the side effects of tisagenlecleucel. Talk to your care team about these recommendations. They can help you decide what will work best for you. These are some of the most common or important side effects:

Cytokine Release Syndrome

After receiving tisagenlecleucel, large numbers of white blood cells are activated and release inflammatory cytokines which can lead to cytokine release syndrome, sometimes severe cases are referred to as cytokine storms. Signs include high fever, lower than normal blood pressure, difficulty breathing, severe nausea and vomiting, severe diarrhea, chills/shaking, severe muscle and joint pain, and bleeding. This serious side effect can happen up until 4 weeks after the infusion. You should call your provider immediately if you have any signs or symptoms of cytokine release syndrome so that appropriate treatment can be given.

Neurologic Toxicities
This medication may cause serious neurologic issues. These side effects are usually seen within the first 8 weeks after infusion and include headache, seizure, personality changes, anxiety, disorientation, confusion, agitation, and tremors. Notify your care provider immediately if you are experiencing any of these changes.

**Infection and Low White Blood Cell Count (Leukopenia or Neutropenia)**

This medication may cause life-threatening infections, with or without a decrease in white blood cell counts.

White blood cells (WBC) are important for fighting infection. While receiving treatment, your WBC count may drop, putting you at a higher risk of getting an infection. You should let your doctor or nurse know right away if you have a fever (temperature greater than 100.4°F/38°C), sore throat or cold, shortness of breath, cough, burning with urination, or a sore that doesn't heal.

**Tips to preventing infection:**

- **Washing hands**, both yours and your visitors, is the best way to prevent the spread of infection.
- Avoid large crowds and people who are sick (i.e.: those who have a cold, fever, or cough or live with someone with these symptoms).
- When working in your yard, wear protective clothing including long pants and gloves.
- Do not handle pet waste.
- Keep all cuts or scratches clean.
- Shower or bath daily and perform frequent mouth care.
- Do not cut cuticles or ingrown nails. You may wear nail polish, but not fake nails.
- Ask your oncology care team before scheduling dental appointments or procedures.
- Ask your oncology care team before you, or someone you live with has any vaccinations.

**Hypogammaglobulinemia**

This medication can cause lowered levels of immunoglobulin. Your levels will be monitored and immunoglobulin will be administered as needed. While your levels are low, you are at an increased risk of getting an infection. Be sure to follow the recommendations above to decrease the chance of an infection. You should not receive any vaccines without talking with your oncology team first.

**Decrease in Appetite**

Nutrition is an important part of your care. Cancer treatment can affect your appetite and, in some cases, the side effects of treatment can make eating difficult. Ask your oncology care team about nutritional counseling services at your treatment center to help with food choices.

- Try to eat five or six small meals or snacks throughout the day, instead of 3 larger meals.
- If you are not eating enough, nutritional supplements may help.
- You may experience a metallic taste or find that food has no taste at all. You may dislike foods or beverages that you liked before receiving cancer treatment. These symptoms can last for several months or longer after treatment ends.
- Avoid any food that you think smells or tastes bad. If red meat is a problem, eat chicken, turkey, eggs, dairy products, and fish without a strong smell. Sometimes cold food has less of an odor.
- Add extra flavor to meat or fish by marinating it in sweet juices, sweet and sour sauce, or dressings. Use seasonings like basil, oregano, or rosemary to add flavor. Bacon, ham, and onion can add flavor to vegetables.

**Tachycardia**

This medication can cause increased heart rate, also called tachycardia. You may feel like your heart is racing, chest pain, lightheaded, or short of breath. Call your care provider if you are experiencing any of these side effects.

**Nausea and/or Vomiting**

Talk to your oncology care team so they can prescribe medications to help you manage nausea and vomiting. In addition, dietary changes may help. Avoid things that may worsen the symptoms, such as heavy or greasy /fatty, spicy or acidic foods (lemons, tomatoes, oranges). Try saltines or ginger ale to lessen symptoms.
Call your oncology care team if you are unable to keep fluids down for more than 12 hours or if you feel lightheaded or dizzy at any time.

**Fatigue**

**Fatigue** is very common during cancer treatment and is an overwhelming feeling of exhaustion that is not usually relieved by rest. While on cancer treatment, and for a period after, you may need to adjust your schedule to manage fatigue. Plan times to rest during the day and conserve energy for more important activities. Exercise can help combat fatigue; a simple daily walk with a friend can help. Talk to your healthcare team for helpful tips on dealing with this side effect.

**Kidney Problems**

This medication can cause kidney problems, including an increased creatinine level, which your oncology care team may monitor for using blood tests. Notify your healthcare provider if you notice decreased urine output, blood in the urine, swelling in the ankles, or loss of appetite.

**Low Platelet Count (Thrombocytopenia)**

Platelets help your blood clot, so when the count is low you are at a higher risk of bleeding. Let your oncology care team know if you have any excess bruising or bleeding, including nose bleeds, bleeding gums, or blood in your urine or stool. If the platelet count becomes too low, you may receive a transfusion of platelets.

- Do not use a razor (an electric razor is fine).
- Avoid contact sports and activities that can result in injury or bleeding.
- Do not take aspirin (salicylic acid), non-steroidal, anti-inflammatory medications (NSAIDs) such as Motrin/Advil (ibuprofen), Aleve (naproxen), Celebrex (celecoxib), etc. as these can all increase the risk of bleeding. Please consult with your healthcare team regarding the use of these agents and all over-the-counter medications/supplements while on therapy.
- Do not floss or use toothpicks and use a soft-bristle toothbrush to brush your teeth.

**Less common, but important side effects can include:**

- **Allergic Reactions:** In some cases, patients can have an allergic reaction to this medication. Signs of a reaction can include shortness of breath or difficulty breathing, chest pain, rash, flushing or itching, or a decrease in blood pressure. If you notice any changes in how you feel during the infusion, let your nurse know immediately.
- **Secondary Cancers:** A secondary cancer is one that develops as a result of cancer treatment for another cancer. This is quite rare, but you should be aware of the risk. In most cases, a secondary cancer related to chemotherapy is a blood cancer (leukemia, lymphoma). This can occur years after treatment. This is most often associated with repeated treatments or high doses. Your provider will monitor your labs closely. Consider having a complete blood count with differential checked annually by your healthcare provider if you received high-risk therapies.
- **Low Red Blood Cell Count (Anemia):** Your red blood cells are responsible for carrying oxygen to the tissues in your body. When the red cell count is low, you may feel tired or weak. You should let your oncology care team know if you experience any shortness of breath, difficulty breathing, or pain in your chest. If the count gets too low, you may receive a blood transfusion.

**Reproductive Concerns**

Exposure of an unborn child to this medication could cause birth defects, so you should not become pregnant or father a child while on this medication. Effective birth control is necessary during treatment. Even if your menstrual cycle stops or you believe you are not producing sperm, you could still be fertile and conceive. You should consult with your healthcare team before breastfeeding while receiving this medication.

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