OncoLink
Abramson Cancer Center of the University of Pennsylvania

Etoposide (Toposar®, VePesid®, Etopophos®,VP-16)

Pronounced: e-TOE-poe-side
Classification: Antineoplastic Agent

About Etoposide

Etoposide works by inhibiting DNA synthesis in cancer cells. Because DNA is essential for cells to grow and reproduce, etoposide slows or stops the growth of cancer cells in your body.

How to Take Etoposide

Etoposide is given by intravenous (into a vein) infusion, over a short period (30-60 minutes) or in a continuous infusion over 24 hours. It can also be given my mouth in the form of a capsule. The dosage and schedule is determined by the person's size, type of cancer, and mode of administration. It can be given alone or with other drugs.

Even when carefully and correctly administered by trained personnel, this drug may cause feeling of burning and pain. There is a risk that this drug may leak out of the vein at the injection site, resulting in tissue damage. If the area of injection becomes red, swollen, or painful at anytime during or after the injection, notify your doctor or nurse immediately. Do not apply anything to the site unless instructed by your doctor or nurse.

Possible Side Effects of Etoposide

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

Low White Blood Cell Count (Leukopenia or Neutropenia)

White blood cells (WBC) are important for fighting infection. While receiving treatment, your WBC count can 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), 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 doctor or nurse before scheduling dental appointments or procedures.
- Ask your doctor or nurse before you, or someone you live with, has any vaccinations.

For more suggestions, read the Neutropenia Tip Sheet.

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 doctor or nurse 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. Read the anemia tip sheet for more information.

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 doctor or nurse know if you have any excess bruising or bleeding, including nose bleeds, bleeding gums or blood in your urine or stool. If your platelet count becomes too low, you may receive a transfusion of platelets.

- Do not use a razor to shave (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™, Aleve™, Advil™, etc. as these can all increase the risk of bleeding. Unless your healthcare team tells you otherwise, you may take acetaminophen (Tylenol).
- Do not floss or use toothpicks and use a soft-bristle toothbrush to brush your teeth.

Read the thrombocytopenia tip sheet for more information.

Lowering of Blood Pressure

Blood pressure may drop while this medication is being infused. When receiving this medication through a vein, your nurse will be checking your blood pressure before and during the infusion. It may become necessary to stop the administration of this medication or slow down the infusion rate if your blood pressure drops.

Nausea and/or Vomiting

Take anti-nausea medications as prescribed. If you continue to have nausea or vomiting, notify your doctor or nurse so they can help you manage this side effect. 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 antacids, (e.g. milk of magnesia, calcium tablets such as Tums), saltines, or ginger ale to lessen symptoms. Read the Nausea & Vomiting Tip Sheet for more suggestions.

Call your doctor or nurse if you are unable to keep fluids down for more than 12 hours or if you feel lightheaded or dizzy at any time.

Sexual and Reproductive Changes

This drug can affect your reproductive system, resulting in the menstrual cycle or sperm production becoming irregular or stopping permanently. Women may experience menopausal effects including hot flashes and vaginal dryness - read more about coping with vaginal dryness. In addition, the desire for sex may decrease during treatment.

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 your sperm is affected. You may want to consider sperm banking or egg harvesting if you may wish to have a child in the future. Discuss these options with your oncology team. See OncoLink's section on sexuality for helpful tips for dealing with these side effects.

Loss or thinning of scalp and body hair (alopecia)

In rare cases hair may become thin, brittle, or fall out. The use of scarves, wigs, hats and hairpieces may help. You may want to use a soft hairbrush and a gentle or baby shampoo to avoid stress on your hair. Avoid hair dyes, perms, bleaches or hair spray. Hair generally starts to regrow soon after treatment is completed. Remember your hair helps keep you warm in cold weather, so a hat is particularly important in cold weather or to protect you from the sun.

Decrease in Appetite

Visit OncoLink's section on Nutrition for tips on dealing with this side effect. Ask your nurse about nutritional counseling services.

- 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 dislike foods or beverages that you liked before receiving chemotherapy. These symptoms can last up to several months.
- 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.
- Flavor meat or fish by marinating it in sweet juices, sweet and sour sauce or dressings. Use seasonings like basil, oregano or rosemary. Bacon, ham and onion can also add flavor to vegetables.

Other Side Effects

This medication can also cause a "radiation recall". This is redness, swelling or blistering of the skin in an area that was previously treated (even years ago) with radiation. The goal of "treatment" for radiation recall is to manage the symptoms until it heals. Topical steroids or anti-inflammatory agents or cool compresses may help. Avoid sun exposure and tight fitting clothes that would rub on the area.

There is a slight risk of developing leukemia or other type of cancer due to treatment with this medication. This is most often associated with repeated treatments or high doses.

Some patients report a metallic taste during the infusion that may continue after treatment. Learn more about coping with taste changes on OncoLink.

Doxorubicin (Adriamycin®, Rubex®)

Pronounced: DOX-oh-ROO-bi-sin
Classification: Anthracycline

About Doxorubicin

Doxorubicin interferes with the growth of cancer cells and slows their spread in the body by inhibiting DNA synthesis and causing the production of harmful free radicals.

How to Take Doxorubicin

Doxorubicin is given through intravenous (into a vein) infusion or injection. It can be given alone or with other drugs. The dosage and schedule is determined by the person's size, type of cancer, and mode of administration. This medication is red and may cause your urine to be red or orange for about 48 hours after the treatment. If this continues or you have pain or burning with urination, notify your doctor or nurse.

Even when carefully and correctly administered by trained personnel, this drug may cause feeling of burning and pain. There is a risk that this drug may leak out of the vein at the injection site, resulting in tissue damage that can be severe. If the area of injection becomes red, swollen, or painful at anytime during or after the injection, notify your doctor or nurse immediately. Do not apply anything to the site unless instructed by your doctor or nurse.

Possible Side Effects of Doxorubicin

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

Low White Blood Cell Count (Leukopenia or Neutropenia)

White blood cells (WBC) are important for fighting infection. While receiving treatment, your WBC count can 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), 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 doctor or nurse before scheduling dental appointments or procedures.
- Ask your doctor or nurse before you, or someone you live with, has any vaccinations.

For more suggestions, read the Neutropenia Tip Sheet.

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 doctor or nurse 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. Read theanemia tip sheet for more information.

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 doctor or nurse know if you have any excess bruising or bleeding, including nosebleeds, bleeding gums or blood in your urine or stool. If your platelet count becomes too low, you may receive a transfusion of platelets.

- Do not use a razor to shave (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®, Aleve®, Advil®, etc. as these can all increase the risk of bleeding. Unless your healthcare team tells you otherwise, you may take acetaminophen (Tylenol).
- Do not floss or use toothpicks and use a soft-bristle toothbrush to brush your teeth.

Read the thrombocytopenia tip sheet for more information.

Nausea and/or Vomiting

Take anti-nausea medications as prescribed. If you continue to have nausea or vomiting, notify your doctor or nurse so they can help you manage this side effect. 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 antacids, (e.g. milk of magnesia, calcium tablets such as Tums), saltines, or ginger ale to lessen symptoms. Read the Nausea & Vomiting Tip Sheet for more suggestions.

Call your doctor or nurse if you are unable to keep fluids down for more than 12 hours or if you feel lightheaded or dizzy at any time.

Mouth Ulcers (Sores)

Certain cancer treatments can cause sores or soreness in your mouth and/or throat. Notify your doctor or nurse if your mouth, tongue, inside of your cheek or throat becomes white, ulcerated or painful. Performing regular mouth care can help prevent or manage mouth sores. If mouth sores become painful, your doctor or nurse can recommend a pain reliever.

- Brush with a soft-bristle toothbrush or cotton swab twice a day.
- Avoid mouthwashes that contain alcohol. A baking soda and/or salt warm water mouth rinse (2 level teaspoons of baking soda or 1 level teaspoon salt in an eight ounce glass of warm water) is recommended 4 times daily.
- If your mouth becomes dry, eat moist foods, drink plenty of fluids (6-8 glasses), and suck on sugarless hard candy.

- Avoid smoking and chewing tobacco, drinking alcoholic beverages and citrus juices.

Read the mouth ulcer tip sheet for more information.

Nail and Skin Changes

Your fingernails/toenails may become dark, brittle or fall off. You may notice dry skin or changes in the color or tone of your skin. Your skin will be more sensitive to the sun, which can result in severe sunburn or rash. Sun sensitivity can last even after chemotherapy is completed. Avoid the sun between 10-2pm, when it is strongest. Wear sunscreen (at least SPF 15) everyday; wear sunglasses and long sleeves/pants to protect your skin. Keep your fingernails and toenails clean and dry. You may use nail polish, but do not wear fake nails. Notify your doctor or nurse if any nails fall off. For more suggestions, read the Nail and Skin Care Tip Sheet.

This medication can also cause a "radiation recall". This is redness, swelling or blistering of the skin in an area that was previously treated (even years ago) with radiation. The goal of "treatment" for radiation recall is to manage the symptoms until it heals. Topical steroids or anti-inflammatory agents or cool compresses may help. Avoid sun exposure and tight fitting clothes that would rub on the area.

Loss or Thinning of Scalp and Body Hair (Alopecia)

Your hair may become thin, brittle, or may fall out. This typically begins two to three weeks after treatment starts. This hair loss can be all body hair, including pubic, underarm, legs/arms, eyelashes, and nose hairs. The use of scarves, wigs, hats and hairpieces may help. Hair generally starts to regrow soon after treatment is completed. Remember your hair helps keep you warm in cold weather, so a hat is particularly important in cold weather or to protect you from the sun. Read more on alopecia.

Heart Damage

In rare cases, the heart muscle is weakened on this medication. It is important that you report immediately to your doctor or nurse any shortness of breath, cough, ankle swelling, chest pain, rapid or irregular heartbeats. Your doctor may order tests to check your heart function prior to receiving this drug or to evaluate your heart when symptoms develop.

Other Side Effects

Other less common side effects that have been reported include: decreased appetite, smell and taste changes, diarrhea and sexual/reproductive changes.

Vincristine (Oncovin®, Vincasar, VCR)

Facts about vincristine

- Vincristine is a member of the vinca alkaloids family of chemotherapy drugs. The drug works by interfering with cell division, which leaves the tumor unable to grow and spread. Vincristine was developed from the Madagascar periwinkle plant.
- Vincristine is used to treat many types of cancer including: various types of leukemias and sarcomas, neuroblastoma, multiple myeloma, Hodgkin's and non-Hodgkin's lymphomas, and lung, breast, cervical and colorectal cancers.

How to take vincristine

This medication is given through an IV (into a vein) by a trained professional. Vincristine is a vesicant, which means that if the medication leaks out of the vein, it can cause serious damage to the tissue. If you notice any swelling, redness or burning during the infusion, notify your nurse or doctor immediately. The actual dose is based on your body size.

How long should you take vincristine?

You can receive vincristine for as long as the cancer cells continue to respond to this therapy and you

are able to tolerate any side effects.

Side effects of vincristine

Some of the possible side effects and suggestions for dealing with them include:

Low White Blood Cell Count (leukopenia or neutropenia)

White blood cells are important for fighting infection. While receiving treatment you are at a higher risk of getting infections. You should wash your hands frequently and avoid large crowds or people who are sick (i.e.: those who have a cold, fever or cough) or large crowds. You should let your doctor or nurse know right away if you have a fever (temperature greater than 100.4 °), sore throat or cold, shortness of breath, cough, or a sore that doesn't heal. Washing hands, both yours and your visitors, is the best way to prevent the spread of infection.

Low Platelet Count (thrombocytopenia)

Platelets help your blood clot, so when the count is low you are at a higher risk of bleeding. You should avoid using a razor (you can use an electric razor with caution), playing contact sports, or taking aspirin or ibuprofen products (these can also increase the risk of bleeding). Let your doctor or nurse know if you have any bleeding, including nose bleeds or bleeding gums. If the count becomes too low, you may receive a transfusion of platelets.

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 doctor or nurse 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.

Loss or thinning of scalp and body hair (alopecia)

Your hair may become thin, brittle, or may fall out. This typically begins two to three weeks after treatment starts. This hair loss can be all body hair, including pubic, underarm, legs/arms, eyelashes, and nose hairs. The use of scarves, wigs, hats and hairpieces may help. Hair generally starts to regrow soon after treatment is completed. Remember your hair helps keep you warm in cold weather, so a hat is particularly important in cold weather or to protect you from the sun.

Mouth ulcers (sores)

Notify your doctor or nurse if your mouth, tongue, or inside of your cheek becomes white, ulcerated or painful. Brush with a soft-bristle toothbrush or cotton swab twice a day. Avoid mouthwashes that contain alcohol. A baking soda and/or salt warm water mouth rinse (2 level teaspoons of baking soda or 1 level teaspoon salt in an eight ounce glass of warm water) is recommended 4 times daily. If your mouth becomes dry, eat moist foods, drink plenty of fluids (at least 6-8 glasses), and suck on sugarless hard candy. Avoid drinking alcoholic beverages and citrus juices, smoking, and chewing tobacco. If mouth sores become painful, your doctor or nurse can recommend a pain reliever.

Fatigue

See OncoLink's section on fatigue for helpful tips on dealing with this side effect.

Constipation

Vincristine can cause serious constipation, abdominal pain and can even lead to a blockage or stoppage of the bowel (called paralytic ileus) if not treated promptly. There are several things you can do to prevent or relieve constipation. Include fiber in your diet (fruits and vegetables), drink 8-10 glasses of non-alcoholic fluids a day, and keep active. A stool softener once or twice a day may prevent constipation. If you do not have a bowel movement for 2-3 days, you should contact your

healthcare team for suggestions to relieve the constipation.

Neurotoxicity

This is a toxicity that affects the nerves. The most common affect is called peripheral neuropathy, which causes a numbness or tingling of the hands and feet, which can get progressively worse with subsequent doses. You should let your healthcare provider know if you experience numbness or tingling in the hands and feet, as they may need to change the doses of your medication. See OncoLink's section on peripheral neuropathy for tips on dealing with this side effect.

The vinca alkaloid chemotherapies are known to cause neuropathy. In rare cases, vincristine can also cause neurolo gic toxicity that presents as mental depression, headache, malaise, dizziness and seizures. The drug can cause toxicity of the cranial nerves, which affects the vocal cords (changes in voice), eyes (visual changes) or facial nerves (drooping of the face or mouth). If you notice any of these problems, notify your healthcare team right away.

Sexual and reproductive changes

The menstrual cycle or sperm production may become irregular or stop permanently. Women may experience menopausal effects including hot flashes and vaginal dryness. The desire for sex may decrease during treatment. 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. You may want to consider sperm banking or egg harvesting if you may wish to have a child in the future. See OncoLink's section on sexuality for helpful tips for dealing with these side effects.

Other side effects

Patients can develop severe pain in the jaw soon after the first treatment with vincristine. Your healthcare team can recommend a pain reliever for this problem, which will go away in time. Urinary retention can develop. If you notice you are unable to urinate, you should call your healthcare team right away or go to the emergency room to be evaluated. Some patients will have an allergic reaction to the medication during the infusion. Let your nurse know right away if you have any swelling, rash, lightheadedness, dizziness or difficulty breathing.

Cyclophosphamide (Cytoxan®, Neosar®, Endoxan®)

Pronounced: SYE-kloe-FOS-fa-mide
Classification: Alkylating Agent

About Cyclophosphamide

Cyclophosphamide exerts its anti-cancer affect by a process called alkylation. Alkylation damages the DNA of cells, which prevents them from dividing, and causes them to die. Since cancer cells, in general, divide faster and with less error correcting than healthy cells, cancer cells are more sensitive to this damage.

How to Take Cyclophosphamide

Cyclophosphamide can be given through intravenous (into a vein) infusion or taken orally (by mouth) as a pill. Oral doses should be taken whole (not crushed or broken) and with food to decrease nausea. The dosage and schedule is determined by the person's size, type of cancer, and mode of administration.

Possible Side Effects of Cyclophosphamide

There are a number of things you can do to manage the side effects of Cyclophosphamide. Talk to

your doctor or nurse about these recommendations. They can help you decide what will work best for you. These are some of the most common side effects:

Low White Blood Cell Count (Leukopenia or Neutropenia)

White blood cells (WBC) are important for fighting infection. While receiving treatment, your WBC count can 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), 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 doctor or nurse before scheduling dental appointments or procedures.
- Ask your doctor or nurse before you, or someone you live with, has any vaccinations.

For more suggestions, read the Neutropenia Tip Sheet.

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 doctor or nurse 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. Read theanemia tip sheet for more information.

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 doctor or nurse know if you have any excess bruising or bleeding, including nosebleeds, bleeding gums or blood in your urine or stool. If your platelet count becomes too low, you may receive a transfusion of platelets.

- Do not use a razor to shave (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®, Aleve®, Advil®, etc. as these can all increase the risk of bleeding. Unless your healthcare team tells you otherwise, you may take acetaminophen (Tylenol).
- Do not floss or use toothpicks and use a soft-bristle toothbrush to brush your teeth.

Read the thrombocytopenia tip sheet for more information.

Nausea and/or Vomiting

Take anti-nausea medications as prescribed. If you continue to have nausea or vomiting, notify your doctor or nurse so they can help you manage this side effect. 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 antacids, (e.g. milk of magnesia, calcium tablets such as Tums), saltines, or ginger ale to lessen symptoms. Read the Nausea & Vomiting Tip Sheet for more suggestions.

Call your doctor or nurse if you are unable to keep fluids down for more than 12 hours or if you feel lightheaded or dizzy at any time.

Mouth Ulcers (Sores)

Certain cancer treatments can cause sores or soreness in your mouth and/or throat. Notify your doctor or nurse if your mouth, tongue, inside of your cheek or throat becomes white, ulcerated or painful.

Performing regular mouth care can help prevent or manage mouth sores. If mouth sores become painful, your doctor or nurse can recommend a pain reliever.

- Brush with a soft-bristle toothbrush or cotton swab twice a day.
- Avoid mouthwashes that contain alcohol. A baking soda and/or salt warm water mouth rinse (2 level teaspoons of baking soda or 1 level teaspoon salt in an eight ounce glass of warm water) is recommended 4 times daily.
- If your mouth becomes dry, eat moist foods, drink plenty of fluids (6-8 glasses), and suck on sugarless hard candy.
- Avoid smoking and chewing tobacco, drinking alcoholic beverages and citrus juices.

Read the mouth ulcer tip sheet for more information.

Decrease in Appetite

Visit OncoLink's section on Nutrition for tips on dealing with this side effect. Ask your nurse about nutritional counseling services.

- 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 dislike foods or beverages that you liked before receiving chemotherapy. These symptoms can last up to several months.
- 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.
- Flavor meat or fish by marinating it in sweet juices, sweet and sour sauce or dressings. Use seasonings like basil, oregano or rosemary. Bacon, ham and onion can also add flavor to vegetables.

Heart Concerns

In rare cases, the heart muscle is weakened on this medication. It is important that you report immediately to your doctor or nurse any shortness of breath, cough, ankle swelling, chest pain, rapid or irregular heartbeats. Your doctor may order tests to check your heart function prior to receiving this drug or to evaluate your heart if symptoms develop.

Sexual and Reproductive Changes

This drug can affect your reproductive system, resulting in the menstrual cycle or sperm production becoming irregular or stopping permanently. Women may experience menopausal effects including hot flashes and vaginal dryness – read more aboutcoping with vaginal dryness. In addition, the desire for sex may decrease during treatment. See OncoLink's section on sexuality for helpful tips for dealing with these side effects.

Diarrhea

Your oncology team can recommend medications to relieve diarrhea. Also, try eating low-fiber, bland foods, such as white rice and boiled or baked chicken. Avoid raw fruits, vegetables, whole grain breads, cereals and seeds. Soluble fiber is found in some foods that absorbs fluid and can help relieve diarrhea. Foods high in soluble fiber include: applesauce, bananas (ripe), canned fruit, orange and grapefruit sections, boiled potatoes, white rice and products made with white flour, oatmeal, cream of rice, cream of wheat, and farina. Drink 8-10 glasses on non-alcoholic, un-caffeinated fluid a day to prevent dehydration. Read Low Fiber Diet for Diarrhea for more tips.

Taste and smell changes

You may experience a metallic taste or dislike foods or beverages that you liked before receiving chemotherapy. These symptoms can last up to several months. 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. Flavor meat or fish by marinating it in sweet juices, sweet and sour sauce or dressings. Use seasonings like basil, oregano or rosemary. Bacon, ham and onion can add flavor to vegetables. Ask your nurse about nutritional counseling services.

Loss or Thinning of Scalp and Body Hair (Alopecia)

Your hair may become thin, brittle, or may fall out. This typically begins two to three weeks after treatment starts. This hair loss can be all body hair, including pubic, underarm, legs/arms, eyelashes, and nose hairs. The use of scarves, wigs, hats and hairpieces may help. Hair generally starts to regrow soon after treatment is completed. Remember your hair helps keep you warm in cold weather, so a hat is particularly important in cold weather or to protect you from the sun. Read more on alopecia.

Bladder Irritation

Cyclophosphamide may irritate your bladder, cause blood in your urine or pain with urination. Drink at least 6 to 8 glasses of fluid/day to flush out your bladder. Let your doctor or nurse know if you have difficulty, pain, or bleeding during urination. When given in high doses, your doctor may give you a mediation to protect your bladder.

Other Concerns

Notify your healthcare team if you develop any of the following:

- Call your doctor or nurse if you have shortness of breath, cough or difficulty breathing.
- Call your doctor or nurse if you do not urinate for more than 12 hours, experience shortness of breath, unexpected weight gain or swelling in your hands, feet or legs.
- If during the infusion you develop a rash, itching, or difficulty breathing, call your nurse.
- You may experience nasal congestion for several days after treatment. Call your doctor or nurse if you experience sinus pain.

Secondary Malignancies

There is a slight risk of developing leukemia or other type of cancer due to treatment with this medication. This is most often associated with repeated treatments or high doses.

Prednisone (Sterapred®, Prednisone Intensol™)

Pronounced: PRED-nih-sone
Classification: Glucocorticoid

About Prednisone

Prednisone is a corticosteroid, similar to a hormone that is made naturally in your body. Corticosteroids (sometimes abbreviated as "steroids") are used to decrease inflammation, (swelling and/or redness) and thus are involved in the management of a number of diseases, including asthma, autoimmune disorders, reactions to medications, and gastrointestinal disorders (colitis), among others. Prednisone may be given to prevent a reaction to a medication, prevent or decrease nausea or be used in high doses to treat certain cancers.

How to Take Prednisone

Prednisone comes as a tablet to take by mouth. Prednisone is best taken with food, as it can irritate your stomach. Your doctor will probably tell you to take your dose(s) of prednisone at certain time(s) of day every day. Your personal dosing schedule will depend on what it is being used the medication is being used for.

Possible Side Effects of Prednisone

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

Increase in Appetite

Prednisone can cause people to be more hungry or thirsty than usual. Drink plenty of fluids and try to make your snacks healthy ones, since there may be quite a few of them!

Increase in Energy

Prednisone can give people an increase in energy. They may also develop insomnia, or difficulty sleeping. Taking the medication in the morning may help to prevent this.

Irritability or Change in Mood

Some patients report feeling irritable or noticing a change in their mood. If this becomes difficult to handle or if the patient expresses a desire to hurt himself, notify a healthcare provider right away.

Swelling

Patients may notice swelling in their hands and/or feet. Elevating the feet may help to lessen swelling in the feet and ankles. Avoid restrictive or tight clothing that may make it harder for the fluid to drain from the hands, feet, and ankles.

Nausea and Heartburn

Taking prednisone with food or milk is generally enough to prevent nausea and heartburn. If possible, take the medication when you can be upright (not lying down) for a few hours after the dose. Avoid things that worsen the symptoms, and try antacids (milk of magnesia and calcium tablets, like Tums), saltines, or ginger ale to lessen symptoms.

Increased Blood Sugar

Prednisone can increase your blood sugar. Diabetics should monitor their blood sugar closely and may require higher doses of insulin while taking prednisone.

Weakening of the Bones (Osteoporosis)

Long-term use can lead to early osteoporosis. Your doctor may have you get a bone density scan (dexa scan) to assess your bone health if you are on long- term therapy.

Other Side Effects

Prednisone can cause delayed wound healing, headaches, muscle weakness, and cataracts (after long-term use).

Rituximab (Rituxan®)

Pronounced: ri-TUX-i-mab
Classification: Monoclonal Antibody

About Rituximab

Rituximab is a synthetic (man made) antibody directed against a protein called CD20, found on the surface of normal and cancerous B-cells, which are part of the immune system. More than 95% of B-cell non-hodgkin's lymphomas (NHLs) express the CD20 target, making rituximab an affective therapy for these NHLs.

An antibody is a part of the immune system that "marks" things (such as germs, bacteria and, in this case, cancer cells) to be destroyed by the immune system. Once rituxan attaches itself to the B cells expressing CD20, it summons the body's immune system to attack and destroy those cells.

How to Take Rituximab

Rituximab is given by intravenous (into a vein) infusion. It may take several hours or longer to receive your first dose of rituximab. Depending on how you tolerate the medication, you may receive subsequent doses more quickly. The dosage and schedule is determined by the person's body size,

type of cancer, and treatment regimen.

You should not receive rituxan if you have an active infection or receive a vaccine containing a live virus while on therapy (including oral polio, smallpox, MMR, nasal flu, and chickenpox vaccines).

Possible Side Effects of Rituximab

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

Infusion and Allergic Reactions

Allergic or infusion reactions may occur during the treatment, typically within 30 minutes to 2 hours of beginning the first infusion. This is less common after the first treatment. You will be given diphenhydramine (Benadryl®) and acetaminophen (Tylenol®) before your treatment to reduce the chance of a reaction. During the infusion, if you experience difficulty breathing or swallowing, experience chest pain, cough or wheezing, swelling of lips or face, develop itching, rash or hives, lightheadedness, fever, chills, or shakes inform your nurse immediately. Additional medications may be given to alleviate your discomfort. Your infusion may be slowed or temporarily stopped.

Low White Blood Cell Count(Leukopenia or Neutropenia)

White blood cells (WBC) are important for fighting infection. While receiving treatment, your WBC count can 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°), 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 doctor or nurse before scheduling dental appointments or procedures.
- Ask your doctor or nurse before you, or someone you live with, has any vaccinations.

For more suggestions, read the Neutropenia Tip Sheet.

Nausea and/or Vomiting

Take anti-nausea medications as prescribed. If you continue to have nausea or vomiting, notify your doctor or nurse so they can help you manage this side effect. 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 antacids, (e.g. milk of magnesia, calcium tablets such as Tums), saltines, or ginger ale to lessen symptoms. Read the Nausea & Vomiting Tip Sheet for more suggestions.

Call your doctor or nurse if you are unable to keep fluids down for more than 12 hours or if you feel lightheaded or dizzy at any time.

Fatigue

While on cancer treatment 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 and see OncoLink's

section on fatigue for helpful tips on dealing with this side effect.

Flu-Like Symptoms

You may experience flu-like symptoms, including muscle and body aches, headache, fever and chills. Acetaminophen may help relieve these symptoms. However, fever can be a sign of an infection and should be reported to your healthcare provider.

Other Side Effects

Rare, but serious side effects include:

- Progressive Multifocal Leukoencephalopathy (PML) is a rare, serious brain infection caused by a virus. Report any of the following to your healthcare provider right away: confusion, loss of balance, difficulty walking or talking, weakness on one side of your body or any vision changes.
- Abnormal heart rhythm. Report any feelings of irregular heartbeats, chest pain or palpitations.
- Severe skin and mouth reactions have been reported. Notify your healthcare provider if you develop painful sores or blisters, on your skin, lips or inside your mouth, rash or peeling skin.
- Bowel perforation has also been reported. Notify your healthcare provider if you experience new or worsening abdominal pain, fever, vomiting or constipation for 3 days or more.

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