

INTRAVENOUS CANCER TREATMENT EDUCATION



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DOXORUBIN & CYCLOSPHAMIDE (AC)

Name of the regimen and cancer drugs

Your care team may refer to your treatment as “AC”. AC consists of 2 different anti-cancer therapies.

- A: Doxorubicin (DOK soh ROO bih sin); Hydroxydaunomycin, Adriamycin®
- C: Cyclophosphamide (syeh kloh FOS fuh mide); Cytosan®

Common uses

AC regimen is most commonly used for breast cancer but may be used for other treatments.

Treatment schedule

Your treatment will be given into your vein through an intravenous (IV) line. This may be into a short, flexible temporary catheter in your arm, or through a central venous catheter. A central venous catheter, or central line is a long, flexible IV tube that empties into a very large vein next to the heart. Talk with your care team to see which will be best for you and your treatment.

Each AC treatment is repeated every 21 days (3 weeks). This is known as one cycle. Your treatment may be given for a set number of cycles until it stops working or you have side effects which stop you from continuing treatment. This treatment is typically given for a total of 4 cycles.

- Doxorubicin IV on Day 1
- Cyclophosphamide IV on Day 1

Drug	DAY	1	2	3	4	5	6	7	8	9	...	21	Cycle 2 Day 1
Doxorubicin													
Cyclophosphamide													

Other medications

Other medications may be ordered for you to prevent or treat certain side effects. These include:

	Instructions:
Growth factors	<p>Growth factors, like filgrastim, pegfilgrastim, and others, are medications used to treat neutropenia and prevent infections. Neutropenia is a condition where there are lower-than-normal white blood cells caused by some type of chemotherapy. Growth factors help the bone marrow to make more white blood cells.</p> <hr/> <hr/> <hr/> <hr/>
Anti-nausea and other medications	<p>You will receive medications to prevent nausea and other side effects just before your chemotherapy. You may get prescriptions for other medications to take at home, as below:</p> <hr/> <hr/> <hr/> <hr/>

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Possible drug interactions

- ❑ AC may interact with other drugs you are taking. Please inform your care providers of all prescription medicine, over-the-counter medications, vitamins, and herbal products that you take.
- ❑ Talk with your care provider or pharmacist before taking new medications, supplements, or receiving any vaccines.

Common Side Effects

Common side effects that have been known to happen in patients receiving AC are listed in the left side of this table. In some instances, the side effects may be reported less often but are still important to discuss. This table does not list all the known side effects for this therapy, only the ones that are experienced most often. Not every patient experiences every known side effect of a drug; even if you are taking the same drug as another patient, you may experience different side effects. Options to help manage any side effects that do occur are included on the right side of this table. These should be discussed with your care provider. If you experience any side effect you cannot manage or that is not listed here, contact your care provider.

Possible Side Effect	Management
Decreased white blood cells (WBCs) and increased risk for infection (neutropenia)	<p>Your WBCs should be monitored by a simple blood test. When your WBCs are low, you are at a greater risk of having an infection. Take the following precautions to protect yourself from infection.</p> <ul style="list-style-type: none">• Wash your hands often, especially before eating and after using the bathroom.• Avoid crowds and people with fevers, flu, or other infection.• Bathe often for good personal hygiene. <p>Contact your care team if you experience any signs or symptoms of an infection such as:</p> <ul style="list-style-type: none">• Fever (temperature more than 100.4°F or 38°C)• Chills• Sore throat• Burning when peeing• Tiredness that is worse than normal• A sore that becomes red, is draining, or does not heal. <p>Check with your care team before taking any medicine for a fever or chills.</p>

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Possible Side Effect	Management
<p>Decreased hemoglobin, part of the red blood cells that carry iron and oxygen</p>	<p>Your hemoglobin should be checked by a simple blood test. When your hemoglobin is low, you may notice that you get tired or fatigued more easily.</p> <ul style="list-style-type: none"> • Try to get 7 to 8 hours of sleep per night • Avoid operating heavy machinery if you feel too tired • Find a balance between “work” and “rest” • Stay as active as possible, but know that it is okay to rest as needed, too • You might notice that you are more pale than usual <p>Let your care team know right away if you have:</p> <ul style="list-style-type: none"> • Shortness of breath • Dizziness • Fast or abnormal heartbeat
<p>Decreased platelet count and increased risk of bleeding</p>	<p>Your platelets should be monitored by a simple blood test. When they are low, you may bruise or bleed more easily than usual.</p> <ul style="list-style-type: none"> • Use caution to avoid bruises, cuts, or burns. • Blow your nose gently and do not pick your nose • Brush your teeth gently with a soft toothbrush and maintain good oral hygiene • When shaving use an electric razor instead of razor blades • Use a nail file instead of a nail clippers <p>Call your care team if you have bleeding that won’t stop. Examples include:</p> <ul style="list-style-type: none"> • A bloody nose that bleeds for more than 5 minutes despite pressure • A cut that continues to ooze despite pressure • Gums that bleed a lot when you floss or brush <p>Seek medical help right away if you have any severe headaches, blood in your urine or stool, coughing up blood, or bleeding that you cannot stop or lasts a long time.</p> <p>You may need to take a break or “hold” your medication for medical or dental procedures. Talk to your care team or dentist before any scheduled procedures.</p>
<p>Change in the color of urine</p>	<p>It is normal to have red or orange-colored urine for 1 to 2 days after the infusion of doxorubicin. Tell your care team if it does not stop in a few days, or if you see what looks like blood or blood clots in your urine.</p>
<p>Fatigue</p>	<p>You may be more tired than usual or have less energy.</p> <ul style="list-style-type: none"> • Stay as active as possible, but know it is okay to rest as needed. • Try to do some activity every day. Plan your activities, and do them at a time of day when you feel a bit more energetic. • Avoid operating heavy machinery if you feel too tired.

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Possible Side Effect	Management
<p>Hair loss (alopecia)</p>	<ul style="list-style-type: none"> Your hair will likely grow back after treatment is over. Some people choose to wear scarves, caps, or wigs. A short haircut prior to treatment may help with stress of hair loss. Partial or complete hair loss is likely, usually 1-2 weeks after start of therapy. This hair loss can be all body hair. Hair will grow back after treatment is completed, although the color and/or texture may be different It may take 3 to 6 months after therapy is completed to resume normal hair growth Be sure to keep your head covered to protect it from the sun during the summer and cold during the winter. If not covering your scalp during the summer months, be sure to use sunscreen when spending time outdoors.
<p>Mouth irritation or sores (stomatitis)</p>	<p>Practice good mouth care.</p> <ul style="list-style-type: none"> Rinse your mouth often Brush your teeth with a soft toothbrush or cotton swab after meals Use a mild non-alcohol mouth rinse at least 4 times a day (after eating and at bedtime). One example is a mixture of 1/8 teaspoon of salt and 1/4 teaspoon of baking soda in 8 ounces of warm (not hot) water If you have sores in your mouth, avoid using tobacco products, alcohol, and mouthwashes that contain alcohol <p>Call your care team if you experience pain or sores in your mouth or throat.</p>
<p>Nausea</p>	<ul style="list-style-type: none"> Eat and drink slowly Drink 8-10 glasses of water/fluid each day unless your care provider has instructed you to limit your fluid intake Eat small, frequent meals throughout the day rather than a few large meals Eat bland foods; avoid spicy, fried, and greasy foods Avoid vigorous exercise immediately after eating Don't lay down immediately after eating Avoid strong odors <p>Let your provider know if you experience nausea or vomiting. Your provider may prescribe medication to help with nausea or vomiting.</p>
<p>Renal/bladder toxicity</p>	<p>Cyclophosphamide may be harmful to your kidneys and bladder. Speak to your care team to know when you need to have laboratory tests done to monitor them.</p> <p>Increase fluid intake to at least 2 Liters per day on day of treatment with Cyclophosphamide and for 2 days afterwards.</p>

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Rare but serious side effects

Tell your care provider if you experience any symptoms of these problems:

- Doxorubicin is a vesicant. If it leaks outside of the IV, it can cause severe damage to your skin. Notify your nurse right away if you feel any pain, aching, burning, itching, swelling, or redness at the site of your IV.
- Doxorubicin may affect your heart's ability to pump blood. You should receive a test to measure your heart function before treatment begins – this is usually called an echocardiogram (ECHO) or multigated acquisition (MUGA) scan. Tell your healthcare provider right away if you experience new or worsening shortness of breath, chest pain, irregular heartbeat, or swelling of your ankles or legs.
- Cyclophosphamide can cause irritation of the bladder walls, leading to blood in the urine. It can be prevented by drinking plenty of fluids (8-10 eight ounce) glasses per day and emptying bladder frequently, especially before bed.
- Cyclophosphamide may cause harm to your lungs. Inform your care team of any new or worsening difficulty breathing, cough, shortness of breath, chest pain, or fever. Your provider may stop treatment if your lungs are affected.
- A secondary cancer can rarely occur months or years after treatment. Your care team will check your blood cell counts even after treatment is done to monitor for this side effect.

If you experience ANY new, worsening, or uncontrolled side effects, call your care team immediately.

(INSTITUTIONAL CONTACT INFO)

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Handling body fluids and waste

Some of the drugs you receive may be present in urine, stool, sweat, or vomit for many days after treatment. Many cancer drugs are toxic, your bodily waste may also be toxic and can be dangerous to come into contact with. Once you have started AC, follow the instructions below for at least seven days after your treatment. This is to keep you, your loved ones, and the environment as safe as possible.

- Pregnant women should avoid touching anything that may be soiled with body fluids from the patient.
- Toilet and septic systems
 - You may use the same toilet, septic tank, and/or sewer that you usually use. If you have a low-flow toilet, close the lid and flush twice to ensure that all waste has been discarded.
- If the toilet or toilet seat becomes soiled with urine, stool, or vomit, clean the surface after every use before other people use the toilet.
- Wash hands with soap and water after using the toilet for at least 20 seconds.
- If you need a bedpan, be sure your caregiver knows to wear gloves to assist with cleanup and to wash the bedpan with soap and water every day.
- If you do not have good control of bladder or bowels, use a disposable pad with a plastic back, a diaper, or a sheet to absorb body waste.
- Wash any skin that has been exposed to body waste with soap and water.
- Linens or clothing that are soiled with body fluids or body waste should be washed separately from other linens and clothing. If you do not have a washer, place the soiled linens in a plastic bag until they can be washed.
- Wash hands with soap and water after touching linens or clothing that may be soiled with body fluids.

Intimacy, sexual activity, contraception, and fertility

This treatment may cause changes that can affect intimacy and sexuality, including desire and body image. Maintaining physical closeness and/or intimacy with loved ones can be continued during treatment. Holding hands, hugging, and kissing can be done safely. It is recommended that you talk to your care team about any restrictions or questions you may have.

Some treatments can influence the ability to have children, also known as fertility. If you're interested in preserving fertility, talk to your care team before treatment. Ask your healthcare provider to determine when it is safe to become pregnant after your treatment. Patients of reproductive ability should not become pregnant or get their partners pregnant while receiving. Some of the drugs you receive may be present in semen and vaginal secretion for many days after treatment. You should use barrier devices, such as condoms, during sexual activity to limit exposure to body fluids.

- Talk to your care team about birth control. Not all options may be right for your treatment or cancer. Effective contraception could include one or more of the following: barrier methods (e.g. condoms), hormone methods (e.g. birth control pills), or surgery.
- Tell your care team if you become pregnant or plan to breastfeed.

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Additional resources

Doxorubicin (Adriamycin): https://www.accessdata.fda.gov/drugsatfda_docs/label/2012/062921s0221bl.pdf

Cyclophosphamide (Cytosan): https://www.accessdata.fda.gov/drugsatfda_docs/label/2020/212501s0001bl.pdf

Additional instructions

Updated – January 4, 2022

Important notice: The Association of Community Cancer Centers (ACCC), Hematology/Oncology Pharmacy Association (HOPA), National Community Oncology Dispensing Association, Inc. (NCODA), and Oncology Nursing Society (ONS) have collaborated in gathering information for and developing this patient education guide. This guide represents a brief summary of the therapy derived from information provided by the drug manufacturer and other resources. This guide does not cover all existing information related to the possible uses, directions, doses, precautions, warnings, interactions, adverse effects, or risks associated with this therapy and should not substitute for the advice of a qualified healthcare professional. Provision of this guide is for informational purposes only and does not constitute or imply endorsement, recommendation, or favoring of this therapy by ACCC, HOPA, NCODA, or ONS, who assume no liability for and cannot ensure the accuracy of the information presented. The collaborators are not making any representations with respect to the medications whatsoever, and any and all decisions, with respect to such medications, are at the sole risk of the individual receiving therapy. All decisions related to receiving this therapy should be made with the guidance and under the direction of a qualified healthcare professional.

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