



**For the Patient: CNMODPCV**

Other names: Modified PCV chemotherapy of brain tumours using procarbazine, lomustine and vincristine

**CN = Central Nervous System**

**MOD =MODified**

**P = Procarbazine**

**C = Lomustine (also known as CCNU, CeeNU®)**

**V = Vincristine**

**ABOUT THIS MEDICATION:**

**What are these drugs used for?**

- Procarbazine, lomustine and vincristine are drugs given to treat certain cancers of the brain or central nervous system.

**How do these drugs work?**

- Procarbazine, lomustine and vincristine work by interfering with dividing cells and preventing an increase in the number of cancer cells.

**INTENDED BENEFITS:**

- This therapy is being given to destroy and/or limit the growth of cancer cells in your body. This treatment may improve your current symptoms, and delay the onset of new symptoms.
- It may take a number of treatments before your doctor can judge whether or not this treatment is helping.

**TREATMENT SUMMARY:**

**How are these drugs given?**

- Your treatment plan consists of a number of chemotherapy cycles. Each cycle is usually **6** weeks (42 days). For each cycle, you will be given intravenous injections as well as medications that you take by mouth.
- Vincristine is a clear liquid given directly into the vein (IV).
  - You will receive it at the clinic by a chemotherapy nurse on the first day of treatment (Day 1) and 3 weeks later (Day 22). Each IV treatment will last about 30 minutes.
- Lomustine is a capsule taken by mouth.
  - You will be given the capsules to take at home at bedtime on Day 1 only.
- Procarbazine is a capsule taken by mouth.
  - You will be given the capsules to take at home once a day on Days 2 to 15.
- Your first treatment will take longer as the nurse will review the IV medication with you, and the pharmacist will review the two medications you will be taking home with you.
- You will need to take anti-nausea medications to help prevent nausea and vomiting. The anti-nausea prescription is filled at your drugstore.
- The cycle is repeated 4 to 6 times.

The calendar below shows how the treatment is given for a 6-week (42-day) cycle.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
<i>Vincristine</i>	✓	No Vincristine					
<i>Lomustine</i>	✓	No Lomustine					
<i>Procarbazine</i>	No Procarbazine	✓	✓	✓	✓	✓	✓
	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14
<i>Vincristine</i>	No Vincristine						
<i>Lomustine</i>	No Lomustine						
<i>Procarbazine</i>	✓	✓	✓	✓	✓	✓	✓
	Day 15	Day 16	Day 17	Day 18	Day 19	Day 20	Day 21
<i>Vincristine</i>	No Vincristine						
<i>Lomustine</i>	No Lomustine						
<i>Procarbazine</i>	✓	No Procarbazine					
	Day 22	Day 23	Day 24	Day 25	Day 26	Day 27	Day 28
<i>Vincristine</i>	✓	No Vincristine					
<i>Lomustine</i>	No Lomustine						
<i>Procarbazine</i>	No Procarbazine						
	Day 29	Day 30	Day 31	Day 32	Day 33	Day 34	Day 35
<i>No treatment</i>							
	Day 36	Day 37	Day 38	Day 39	Day 40	Day 41	Day 42
<i>No treatment</i>							

Cotrimoxazole DS (SEPTRA DS®) may be given once a day, on Mondays, Wednesday and Fridays if you are on dexamethasone. It is used to prevent pneumonia.

**Treatment is continued as long as you are benefiting from it and not having too many side effects.**

#### What will happen when I get my drugs?

- Blood tests are done on or before Day 1 and Day 22 of each cycle.
- A CT scan or MRI is done every second cycle
- The dose and timing of your chemotherapy may be changed based on your blood counts and/or other side effects.

## SIDE EFFECTS AND WHAT TO DO ABOUT THEM

Unexpected and unlikely side effects can occur with any drug treatment. The ones listed below are particularly important for you to be aware of as they are directly related to the common actions of the drugs in your treatment plan. Your doctor will review the risks of treatment and possible side effects with you before starting treatment. The chemotherapy nurse will review possible side effects of the IV drug and how to manage those side effects with you on the day you receive your first treatment. The pharmacist will review the two medications you will be taking home with you, discuss dietary restrictions and how to manage any side effects on the day you first pick up your medication.

SERIOUS SIDE EFFECTS DURING TREATMENT	MANAGEMENT
Vincristine <b>burns</b> if it leaks under the skin.	Tell your nurse or doctor <b><i>immediately</i></b> if you feel burning, stinging or any other change while the drug is being given.
<b>Nausea</b> and <b>vomiting</b> may occur after your lomustine dose and during procarbazine treatment. This usually improves within a few days as your body adjusts to the daily procarbazine.	You will be given a prescription for antinausea drug(s) to take before your chemotherapy treatment and/or at home. <b>It is easier to prevent nausea than treat it once it has occurred</b> , so follow directions closely. <ul style="list-style-type: none"> <li>• Drink plenty of fluids.</li> <li>• Eat and drink often in small amounts.</li> <li>• Try the ideas in <i>Food Choices to Help Control Nausea</i>.*</li> </ul>
<b>Sore mouth</b> may sometimes occur a few days after treatment. Mouth sores can occur on the tongue, the sides of the mouth, or in the throat. <b>Mouth sores or bleeding gums can lead to an infection.</b>	<ul style="list-style-type: none"> <li>• Brush your teeth gently after eating and at bedtime with a very soft toothbrush. If your gums bleed, use gauze instead of a brush. Use baking soda instead of toothpaste.</li> <li>• Make a mouthwash with ½ teaspoon baking soda or salt in 1 cup warm water and rinse several times a day.</li> <li>• Try soft, bland foods like puddings, milkshakes and cream soups.</li> <li>• Avoid spicy, crunchy or acidic food, and very hot or cold foods.</li> <li>• Try the ideas in <i>Food Ideas for a Sore Mouth during Chemotherapy</i>.*</li> </ul>

SERIOUS SIDE EFFECTS DURING TREATMENT	MANAGEMENT
<p>Your <b>white blood cells</b> may decrease 2-4 weeks after your treatment. They usually return to normal 6 weeks after your last treatment. White blood cells protect your body by fighting bacteria (germs) that cause infection. When they are low, <b>you are at greater risk of having an infection.</b></p>	<p>To help prevent infection:</p> <ul style="list-style-type: none"> <li>• Wash your hands often and always after using the bathroom.</li> <li>• Avoid crowds and people who are sick.</li> <li>• Contact your doctor <b>immediately</b> at the first sign of an infection such as fever (over 100°F or 38°C by an oral thermometer), chills, cough, or burning when you pass urine. Your chemotherapy may need to be stopped.</li> </ul>
<p>Your <b>platelets</b> may decrease 2-4 weeks after your treatment. They usually return to normal 6 weeks after your last treatment. Platelets help to make your blood clot when you hurt yourself. <b>You may bruise or bleed more easily than usual.</b></p>	<p>To help prevent bleeding problems:</p> <ul style="list-style-type: none"> <li>• Try not to bruise, cut, or burn yourself.</li> <li>• Clean your nose by blowing gently. Do not pick your nose.</li> <li>• Avoid constipation.</li> <li>• Brush your teeth gently with a soft toothbrush as your gums may bleed more easily. Maintain good oral hygiene.</li> <li>• Some medications such as ASA (e.g., ASPIRIN®) or ibuprofen (e.g., ADVIL®) may increase your risk of bleeding.</li> <li>• Do not stop taking any medication that has been prescribed by your doctor (e.g., <b>ASA for your heart</b>).</li> <li>• For minor pain, try acetaminophen (e.g., TYLENOL®) first, to a maximum of 4 g (4000 mg) per day, but occasional use of ibuprofen may be acceptable.</li> </ul>
<p><b>Numbness or tingling of the fingers or toes</b> may occur. This will slowly return to normal once your treatments are over. This may take several months.</p>	<ul style="list-style-type: none"> <li>• Be careful when handling items that are sharp, hot or cold.</li> <li>• Tell your doctor at your next visit, especially if you have trouble with buttons, writing or picking up small objects.</li> </ul>

OTHER SIDE EFFECTS DURING TREATMENT	MANAGEMENT
<b>Pain or tenderness</b> may occur where the needle was placed	Apply warm compresses or soak in warm water for 15-20 minutes several times a day.
<b>Constipation</b> often occurs and may be severe.	<ul style="list-style-type: none"> <li>• <b>To prevent constipation:</b></li> <li>• Exercise if you can.</li> <li>• Use stool softeners and laxatives to prevent constipation</li> <li>• Please see the <i>Suggestions for Dealing with Constipation</i> pamphlet</li> <li>• Avoid <b>bulk-forming laxatives</b></li> </ul> <p><b>To treat constipation:</b></p> <ul style="list-style-type: none"> <li>• Drink plenty of fluids (8 cups a day).</li> <li>• Try ideas in <i>Suggestions for Dealing with Constipation</i>.</li> <li>• Avoid <b>bulk-forming laxatives</b></li> </ul>
<b>Headache, jaw pain and/or muscle pain</b> may occur	For minor pain, take acetaminophen (e.g., <b>TYLENOL®</b> ).
<b>Loss of appetite</b> and <b>weight loss</b> sometimes occur, and may persist after discontinuation of lomustine.	Try the ideas in <i>Food Ideas to Help with Decreased Appetite</i> .*
Your <b>skin may darken</b> in some areas such as your hands, elbows, and knees.	This will slowly return to normal once you stop treatment with procarbazine.
Your <b>skin may sunburn</b> more easily than usual.	<ul style="list-style-type: none"> <li>• Refer to <i>Your Medication Sun Sensitivity and Sunscreens*</i> or the <i>BC Health Guide</i> for more information.</li> <li>• After sun exposure, if you have a severe sunburn or skin reaction such as itching, rash, or swelling, contact your doctor.</li> </ul>
<b>Hair loss or hair thinning sometimes occurs</b> with vincristine. Your hair will grow back once you stop treatment with vincristine. Colour and texture may change.	<ul style="list-style-type: none"> <li>• Use a gentle shampoo and soft brush.</li> <li>• Care should be taken with use of hair spray, bleaches, dyes and perms.</li> </ul>

**\*Please ask your chemotherapy nurse, pharmacist or dietician for a copy**

## **INSTRUCTIONS FOR THE PATIENT**

- Tell your doctor if you have ever had an unusual or **allergic reaction** to procarbazine, lomustine or vincristine before taking them.
- For **lomustine**, you may be given capsules of more than one strength to make the right dose. There may be two or more different types and colours of capsules in the container given to you by the pharmacist. Unless your doctor gives you other directions, **take** all the capsules as a single dose at bedtime, on an empty stomach, with a glass of water.
- For **procarbazine**, you will be given a number of capsules to make up the right dose. Take these capsules with food or on an empty stomach all at once at bedtime, unless you are told otherwise by your doctor.
- It is important to **take** lomustine and procarbazine exactly as directed by your doctor.
- If you **vomit** the dose of lomustine or procarbazine, or if you **miss a dose** of procarbazine, call your doctor during office hours for advice. You will be told whether you need to take another dose.
- Other drugs may **interact** with lomustine, procarbazine and vincristine. See section titled **Medication Interactions**. Check with your doctor or pharmacist before you start taking any new drugs.
- **Avoid drinking alcohol** while taking procarbazine. You may experience flushing, headache, nausea and vomiting, and/or dizziness if you drink alcohol while taking procarbazine. You may also experience a rise in blood pressure with certain alcoholic beverages such as red wines, vermouth, and tap/draft beer. Use caution with non-alcoholic beverages.
- Certain **foods** interact with procarbazine. See section titled **Food Interactions**.
- Lomustine and procarbazine may cause **sterility** in men and **menopause** in women. If you plan to have children, discuss this with your doctor before being treated with procarbazine.
- Lomustine and procarbazine may damage sperm and may harm the baby if used during pregnancy. It is best to use **birth control** while being treated with procarbazine. Tell your doctor right away if you or your partner becomes pregnant. Do not breast feed during treatment.
- **Store** lomustine and procarbazine capsules out of the reach of children, at room temperature, away from heat, light, and moisture.
- **Tell** doctors, dentists, and other health professionals that you are being treated with lomustine, procarbazine and vincristine before you receive any treatment from them.

### **Medication Interactions**

Other drugs such as cough and cold products, allergy and weight reducing remedies, certain antidepressants (e.g., amitriptyline, phenelzine), anticonvulsants (e.g., carbamazepine) as well as alcohol and certain foods may **interact** with procarbazine. There are also many drugs that may interact with vincristine. Some antifungal drugs (e.g., fluconazole), certain antibiotics (e.g., erythromycin, ciprofloxacin), anticonvulsants (e.g., phenytoin, verapamil, carbamazepine), cyclosporine, digoxin, isoniazid, nifedipine, can all interact with vincristine. Tell your doctor if you are taking these or any other drugs as your dose may need to be changed. Check with your doctor or pharmacist before you start or stop taking any other drugs.

## Food Interactions

- **Avoid certain foods** which contain tyramine as they may interact with procarbazine. These foods may cause headache, flushing, fast or uneven heartbeat, nausea and vomiting, or a significant rise in blood pressure. Eat only **fresh** foods, especially if they have meat, fish, or poultry in them. Avoid foods that are aged, spoiled, fermented, or pickled. Avoid the following products in these food categories while taking procarbazine:
  - **Milk products:** Any outdated or non-pasteurized dairy products, all cheeses other than cream cheese, cottage cheese, or ricotta cheese.
  - **Grains:** any containing cheese
  - **Meat, fish, poultry:** dry fermented sausages (e.g., salami, pepperoni), smoked or pickled fish, non-fresh meat and poultry, any leftover food containing meat, fish, or poultry
  - **Fruits and vegetables:** any overripe, spoiled or fermented fruit or vegetable, fava or broad beans, overripe avocado, sauerkraut
  - **Soups:** any containing meat extracts or cheese
  - **Fats and oils:** gravies and sauces containing meat extracts
  - **Other:** tofu and soy products, protein dietary supplements, meat extracts (e.g., BOVRIL®, OXO®, MARMITE®), yeast extracts (e.g., MARMITE®, VEGEMITE®, brewers yeast)
  - **Avoid drinking alcohol** while taking procarbazine

For further information, talk to your **dietitian or pharmacist**.

- Follow the drug, alcohol, and food warnings for **a further week** after you stop taking procarbazine.

## THE FOLLOWING INFORMATION IS VERY IMPORTANT

### STOP TAKING LOMUSTINE OR PROCARBAZINE (OR BOTH) AND SEE YOUR DOCTOR OR GET EMERGENCY HELP IMMEDIATELY IF YOU HAVE:

- Signs of **serious high blood pressure** such as severe chest pain, enlarged pupils, fast or slow heartbeat, severe headache, eyes sensitive to light, increased sweating, clammy skin, or stiff and sore neck.
- Signs of an **infection** such as fever (over 100°F or 38°C by an oral thermometer), shaking chills; severe sore throat, productive cough (coughing up thick or green sputum); cloudy or foul smelling urine; painful, tender, or swollen red skin wounds or sores.
- Signs of **bleeding problems** such as black, tarry stools; blood in urine; pinpoint red spots on skin; extensive bruising.
- Signs of a **blood clot** such as tenderness or hardness over a vein, calf swelling and tenderness, sudden onset of cough, chest pain, or shortness of breath.
- Signs of an **allergic reaction** (rare) soon after a treatment including dizziness, fast heart beat, face swelling, or breathing problems.
- Signs of **heart problems** such as fast or uneven heartbeat, chest pain, or chest pressure.
- **Seizures or loss of consciousness.**
- Repeated **vomiting** and cannot keep fluids or medications down.

**SEE YOUR DOCTOR AS SOON AS POSSIBLE (DURING OFFICE HOURS) IF YOU HAVE:**

- Signs of **lung problems** such as shortness of breath, wheezing or coughing.
- Signs of **kidney problems** such as lower back or side pain, swelling of feet or lower legs.
- Signs of **liver problems** such as yellow eyes or skin, white or clay-coloured stools.
- Signs of **anemia** such as unusual tiredness or weakness.
- **Skin rash or itching.**
- **Changes in eyesight.**
- Ringing in your ears or **hearing problems.**
- Signs of **gout** such as joint pain.
- **Dizziness, confusion, or trouble walking.**
- Signs of **bladder problems** such as increase or decrease in urination, painful burning sensation, presence of blood, or abdominal pain.
- Chronic **cough** or **shortness of breath.**
- Increased **sore throat or mouth** that makes it difficult to swallow comfortably.

**CHECK WITH YOUR DOCTOR IF ANY OF THE FOLLOWING CONTINUE OR BOTHER YOU:**

- Uncontrolled nausea, vomiting, weight loss, constipation, or diarrhea.
- Headache or pain not controlled with acetaminophen (e.g., **TYLENOL®**).
- Numbness or tingling in feet or hands.
- Easy bruising or minor bleeding.
- Redness, swelling, pain, or sores on your lips, tongue, mouth, or throat.
- Swelling of hands, feet, or lower legs.
- Trouble sleeping.
- Decreased appetite or weight loss.
- Skin rash or itching.
- Redness, swelling, pain or sores where the needle was placed.

**If you experience symptoms or changes in your body that have not been described above but worry you, or if any symptoms are severe, contact:**

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**at telephone number:** \_\_\_\_\_