Cytoreductive Surgery (CRS) and Heated Intraperitoneal Chemotherapy (HIPEC)
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Welcome to the Southern Alberta Advanced Gastrointestinal Surgery Clinic

Your doctor has referred you to Tom Baker Cancer Centre for consultation and advice regarding your cancer. Today you will see doctors and nurses that are specialized in treating gastrointestinal cancers. Our team is committed to helping you with your cancer treatment.

The Advanced GI Malignancy Surgical Clinic Team includes:

- Dr. Walley Temple – Surgical Oncologist  
- Dr. Lloyd Mack – Surgical Oncologist  
- Dr. Antoine Bouchard-Fortier – Surgical Oncologist  
  403-944-5434  
- Natalie Jacox – Administrative Assistant for Dr. Mack  
  403-521-3169  
- Deborah Powers – Administrative Assistant for Dr. Temple  
  403-521-3914  
- Eyituoyo Abati – Registered Nurse  
  403-521-3176  
- Allison Fyfe – Nurse Practitioner, Surgical Oncology  
  403-521-3928  
- Celestina Martopullo – Psychosocial Oncologist  
  403-355-3224  
- Jenny Alvarado – Tumor Group Clerk  
  403-521-3615

The Southern Alberta Advanced Gastrointestinal Surgery Clinic is held every Tuesday morning at Tom Baker Cancer Centre.
Combined Cancer Surgery and Chemotherapy

What is Cytoreductive Surgery (CRS)?

CRS is a major surgery that removes most or all of the visible tumours from inside the abdomen, the lining inside the abdomen and any organs where the cancer may be growing. Organs that may need to be removed during surgery include:

- Spleen
- Gallbladder
- Female reproductive organs – ovaries, fallopian tubes and uterus
- Appendix
- Omentum (a layer of fat inside the abdomen)
- Parts of the small and large intestine

The Organs of the Abdomen
The extent of your surgery depends on how much the cancer has spread. The surgeon begins by making an incision down the centre of the abdomen and then looks inside the abdomen to see if the surgery can proceed. Often, more cancer is seen during surgery than the scans show. A small percentage of time, the surgeon is unable to continue with the surgery. If the abdominal tumours are on vital blood vessels or on organs that cannot safely be removed, then the surgery is not possible.

If the surgeon proceeds with the surgery, the surgical team removes all of the visible cancer tumours and then treats you with heated chemotherapy.

**Illustration of Cytoreductive Surgery**
What is Heated Intraperitoneal Chemotherapy (HIPEC)?

The HIPEC procedure is designed to kill any remaining cancer cells after all of the visible cancer is removed. The surgeon selects the chemotherapy drug for you based on your cancer type. The treatment team infuses a heated chemotherapy solution (40 to 42 degrees Celsius) directly into the abdomen. This is sometimes called a heated chemotherapy bath. Heated chemotherapy is continuously circulated throughout the abdomen for 60 minutes. The solution is removed and the incision is closed. You may need additional intravenous chemotherapy treatments before and/or after your surgery.

Why is HIPEC used?

- Heating the chemotherapy drugs allows them to better enter and kill cancer cells.
- Giving the chemotherapy in the abdomen allows for a much higher drug dosage, because it is not absorbed by the body the same way intravenous chemotherapy is absorbed.
- HIPEC has fewer side effects, such as hair loss, compared to chemotherapy given in the vein.

Illustration of Heated Intraperitoneal Chemotherapy (HIPEC)
What Conditions are Treated with Combined CRS and HIPEC?

These combined treatments of surgery and heated chemotherapy are for certain types of cancer that either start to grow in the abdomen or spread (metastasize) to the abdomen. These include:

- Colorectal cancer
- Appendix cancer
- Pseudomyxoma peritonei
- Peritoneal mesothelioma

What is Early Post-Operative Intraperitoneal Chemotherapy (EPIC)?

You may require 4 to 5 days of additional intraperitoneal chemotherapy after the date of their surgery. A tube is placed in your abdomen at the time of surgery and the drug is given through this tube. These additional treatments are given in the days immediately after surgery. The tube is removed after the chemotherapy is completed.

What are the potential risks?

As with any major medical procedure, there are risks and complications that can occur with this surgery, anesthesia and chemotherapy treatment. Your surgeon will discuss the specific risks with you.

In some cases the surgeon will need to create an ostomy (a surgical opening from either the colon or the small intestine to the outside of the abdominal wall). If so, you will then need to use a collection bag (temporary or permanent) because your stool will now pass out of the body through the ostomy opening rather than through your rectum. Your surgeon will avoid an ostomy if possible, but it may be necessary if the surgery needs to be extensive to remove the cancer tumours. If you do require an ostomy, specialized nurses called enterostomal therapists will teach you how to manage your ostomy well.
Depending on the amount of blood loss during surgery, you may require a blood transfusion. The treatment team will do whatever is possible to limit the amount of blood loss.

**What are the potential benefits?**
The potential benefits of cytoreductive surgery and heated chemotherapy are different for each type of cancer and each patient. Your surgeon will discuss your specific outcome expectations with you before the surgery.

**How long is the surgery and hospital stay?**
The surgery and chemotherapy usually takes 5 to 10 hours from start to finish. You may then go to the intensive care unit for a brief stay before going to your hospital room. Your length of stay in the hospital is usually 3 weeks.

**Will my fertility be affected?**
During surgery, the female reproductive organs may need to be removed if the cancer has spread to these organs. This may include the ovaries, fallopian tubes and uterus. For younger women this may lead to permanent sterility (no longer able to have children). Please discuss any concerns about fertility with your surgeon.

**Will I be involved in research studies?**
Research is an important method of improving care and survival in cancer patients. It is especially important in rare tumours like peritoneal cancer. We are an active research centre and will be asking for your permission to include you in ongoing research projects. We will give you more details when you meet with the members of your treatment team.

**Who is a part of the surgical team?**
A large team of specialized healthcare professionals will be involved in your care. In the operating room there will be:

- At least 1 or 2 surgeons
- 3 nurses
• 1 or 2 anesthetists
• A chemotherapy perfusion specialist (gives you the chemotherapy)
• Respiratory team (to help you breath well)

Before and after surgery, you will be cared for in clinics and nursing units with experience caring for patients undergoing CRS and HIPEC. These include:

• The outpatient advanced gastro-intestinal (GI) malignancy clinics
• Pre-admission clinic
• Intensive care unit
• Nursing unit 102
• Specialized nurses, dietitians, physiotherapists, occupational therapists, enterstomal therapists, and respiratory therapists will also participate in your care.

Left to right: Dr. Walley Temple, Dr. Lloyd Mack and patient, Ms. Caylee Dahl.

I have more questions – what should I do?
This booklet contains information on many topics that are important to patients and their families. It also contains a list of
useful and reliable on-line sources of help.

After reading this booklet, if you still have questions, please contact your surgeon’s office or the nurses who work in the advanced GI malignancy clinic.

What to Expect Before, During and After Surgery

Getting Ready for Surgery

Pre-Admission Clinic
The hospital will contact you, and the Pre-admission Clinic will make an appointment to prepare you for your admission to the hospital. This visit could include some or all of the following:

An interview with a nurse who will ask you about your health and give you information about how to prepare for your surgery

- Blood tests
- X-rays
- ECG (electrocardiogram)
• Assessment by an anesthetist (doctor who puts you to sleep for your surgery) or other specialist
• Assessment by an enterostomal therapy nurse to learn about stomas (the end of the ostomy opening) and have your abdomen marked for the possible location of a collection bag, if you need one.

This visit may be done by phone or in the Pre-Admission Clinic. Phone appointments take about 30 minutes. Clinic visits take 2 to 4 hours and usually occur the day before surgery.

**Nutrition**

Your bowel habits may change which can affect how your body absorbs your food. Mucus can also cause early fullness. These suggestions may help you feel better and get the food energy you need:

- Eat small amounts often during the day
- Drink lots of fluids to keep yourself hydrated
- The Alberta Health Services “Healthy Eating Guidelines” recommend 9-12 cups of fluid per day.
- Choose foods with lots of nutrients and more calories than usual or add nutrition shakes to your diet

(You may want to talk with a dietitian to get some specific suggestions for you; please call 403-521-3719).

**Bowel Cleansing**

You may need some special preparation before your surgery, such as bowel cleansing. If so, we will give you specific instructions about diet restrictions and the bowel preparation that your doctor has ordered.

**Medications**

You must not take Aspirin® or ibuprofen (such as Advil®) or other anti-inflammatory medications for 10 days before your surgery, unless your surgeon tells you to do so. If you take vitamins, herbal products, other complementary medicines, or other off-the-shelf medications, you should stop taking them 1 week prior to surgery. If you are unsure about taking any types of medications before your surgery, please ask your surgeon for advice.
**Immunizations**

Some patients have their spleen removed as part of their abdominal surgery. If this occurs, you will be at a higher risk of getting certain infections after surgery. To help prevent these infections, you may be given a series of immunizations before your surgery. Whenever possible, any or all immunizations should be given **at least 2 weeks** before your surgery. If that is not possible, they can be given after surgery. You will be given a separate handout with this information to take with you to the public health clinic.

**What do I need?**

If you are over 18 years of age and have never had these immunizations, you **must** book to get the following:

- **Pneumococcal Conjugate 13-valent**
- **Haemophilus Influenzae Type b Conjugate**
- **Meningococcal B**
- **Meningococcal Conjugate (Groups A, C, Y, W135)**

You may get all 4 vaccines on the same day. You will get them into different areas of your body and from separate syringes. You should **not** get the immunizations if you have a fever on the day of your appointment. Tell the nurse giving you the immunization if you have a history of any allergies. He or she will check to see if you are allergic to any of the ingredients in the vaccines.

**When and where do I get it?**

Get immunized at least two weeks before surgery, if possible. Book to have your first immunization doses as soon as possible at a community health centre in your area (call right away to be sure you get an appointment). If you need help to find a community health centre in your area, book, please contact:

- Health Link Alberta at 811 or
- Communicable Disease Unit (Calgary) at 403-955-6750
What else do I need to know?
It is best to get immunized before your surgery. If you did not get immunized before surgery, the doctor(s) and nurse(s) will talk to you about what to do while you are in hospital.

### Immunizations At A Glance

<table>
<thead>
<tr>
<th>Vaccine Name</th>
<th>First Dose</th>
<th>Second Dose</th>
<th>Future Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumococcal Conjugate 13-valent</td>
<td>at least 2 weeks before surgery</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Haemophilus Influenzae Type b Conjugate</td>
<td>at least 2 weeks before surgery</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Meningococcal B</td>
<td>at least 2 weeks before surgery</td>
<td>4 weeks after first dose</td>
<td>—</td>
</tr>
<tr>
<td>Meningococcal Conjugate (Groups A, C, Y, W135)</td>
<td>at least 2 weeks before surgery</td>
<td>8 weeks after first dose</td>
<td>booster every 5 years</td>
</tr>
<tr>
<td>Pneumococcal Polysaccharide</td>
<td>8 weeks after Pneumococcal Conjugate 13-valent</td>
<td>—</td>
<td>booster dose 5 years after first dose</td>
</tr>
</tbody>
</table>

### Questions?
If you have any questions, please call Dr. Lloyd Mack at 403-521-3169, Dr. Walley Temple at 403-521-3914, or Dr. Antoine Bouchard-Fortier at 403-944-5434.

For references, please see page 24, “Immunization References.”
What to Bring With You

- Provincial Health Care card
- Medical insurance information
- Photo identification
- Any personal directives you may have prepared
- Sleepwear, slippers, bathrobe
- Toothbrush, comb, hairbrush, deodorant, lip balm
- Glasses and case
- Dentures and container
- Journal or something to keep notes
- Reading materials

Please mark all items with your name. Although our healthcare professionals take every reasonable precaution with personal belongings, we cannot be responsible for loss or damage to personal items.

Please leave all valuables such as your wallet, cash, credit cards, and jewelry at home.

There is internet access available on public-access computers on the Main Floor of the hospital and wireless internet access in your hospital unit.
Day of Surgery

You will be admitted to hospital on the day of your surgery, so we will tell you what time to come to the Admitting Department. When the admitting papers have been filled out, you will go to another area, where a nurse will prepare you for your surgery. A porter will take you to the operating room when it’s time for your surgery. You may have a family member or friend stay with you through this process, until you go into the operating room. There may be some waiting time during this process. We suggest you bring a book, music, or something else calming to help pass this time.

Your operation may take 5 to 10 hours or longer. During the operation, hospital staff will provide regular updates to a family member or friends that you designate.

During the operation you may require a blood transfusion. Talk to your surgeon before the day of surgery if you have any concerns about this.
After Your Surgery – In Hospital

When you wake up after the surgery you will be in the recovery room or the intensive care unit. We will watch you closely until you are awake and your condition is stable. When you are well enough, the nurses and doctors will decide when you can be moved to the hospital unit.

It is common to feel sleepy for several hours after the surgery. In the first few hours or days after surgery, your throat may be sore from the tube that was used to carry air to your lungs while you were asleep.

• You may be given oxygen to breathe through small plastic prongs in your nose or a breathing mask.
• Your abdominal incisions will be covered with a dressing.
• You may have drainage tubes from your abdomen and/or chest that the nurses will check regularly.
• You will have an intravenous running.
• You will have a catheter (small tube) draining your bladder.
• Some patients have swelling of their face, arms and legs for some time (days to weeks) after surgery. This is normal and will get better with time.
• You will also have cloth stockings and/or special vinyl compression wraps (SCD stockings) on your legs. The
stockings promote good circulation in your legs and help prevent blood clots. You will wear these stockings until you are up and walking regularly.

**Intensive Care Unit**

Some patients go to the intensive care unit for a brief time (hours to days) after surgery. This is to allow close monitoring and treatment of the immediate effects of surgery. After you leave the intensive care unit, when you are well enough, we will transfer you to a “high observation” bed on the hospital unit. After several days there, when we see that you are ready, we will transfer you to a regular hospital unit bed.

**Pain**

You may have pain from your incision, abdominal cramping, back pain and pain from any drainage tubes that are in place. We will order pain medications for you. You can be given this medication by injection (needle), by mouth, by a special intravenous pump called a **patient controlled anesthesia** (PCA) pump, or an **epidural pain pump** which pumps medications into the area around your spinal cord. The anesthesiologist will discuss with you, before your surgery, what kind of pain medications are best for you.

Only you know where your pain is and how much discomfort you feel. It is important that you are comfortable so you can get up and walk and change position in bed. Do your deep breathing and coughing exercises, and ask for pain medication when you need it. Tell your surgeon or nurse if your medication does not keep you comfortable, or if you have concerns about taking it.

**Nausea**

You may feel sick to your stomach after surgery. This is a common side effect of anesthetic, some pain medications, and chemotherapy. Tell your nurse if you are having nausea. We will give you medication to help relieve it.

You may wake up from surgery with a tube (NG tube) through your nose that drains your stomach. This tube should prevent
you from vomiting, but you may still have nausea. If this happens, tell your nurse and we will give you medication to relieve it.

Some patients experience nausea days or weeks after their surgery – even after they have started to eat again. This is part of the recovery period from major surgery and you will receive medication to help control it.

**Incisions**

Your incision (surgical cut) will be closed with small metal clips (staples) or stitches. You will have a gauze dressing (bandage) over your staples/stitches. Most dressings are taken off after 24 to 48 hours and may not need to be replaced.

You may have a drain to remove extra fluid from your abdomen and/or chest. We will take these drains out when your surgeon decides they are no longer needed. The drain sites will heal within a few days after the drains are removed. Your nurses and doctors will check all incision and drain sites for signs of infection on a daily basis.

**Activity**

Soon after your surgery your nurse will help you to sit up, stand at the side of the bed, and walk a short distance. Taking short walks often after surgery will help you get your strength back and stimulate good blood flow. Ask someone to walk with you until you are steady on your feet.

When you are in bed and awake, change your position and move your legs around at least every hour. Moving helps your blood flow. It is okay to lie on your side as well as on your back.

To help keep your lungs clear after surgery and to make sure your body is getting enough oxygen, do deep breathing and coughing exercises **every hour while you are awake**. Your nurse will teach you how to do these exercises and may give you an incentive **spirometer** (a special deep breathing exercise device) for you to use.

You may find it more comfortable to support your incision when you cough. You can do this by holding your hands or a pillow against your abdomen.
Diet and Bowel Movements
After major abdominal surgery, your bowels will not start to work for 5 to 10 days, sometimes longer. During that time, you will not be able to eat or drink as you normally would. You will have intravenous (IV) fluids and may receive support such as intravenous nutrition.

When your bowels start to work, you may experience crampy abdominal pain. Mild heat, such as from a blanket, may help relieve gas pains. Taking short walks often will help you start passing gas and relieve this cramping pain. When your bowels start to work, they often produce air (farting/flatulence) and/or liquid stool (diarrhea). Once this process begins, you will be allowed to start oral nutrition, usually by drinking fluids. You will move on to a full diet when the surgeon or nurse feels that you are ready.

Urination
We will remove your bladder catheter (tube) when you are ready to start urinating again. Depending on the details of your surgery, this may be several days to weeks after your surgery. Some patients have trouble emptying their bladder after the catheter is taken out. Your nurse will want to measure your urine when you go to the bathroom. You will be given a container to place in the toilet to collect the urine.

Blood Thinner Medicine
We may give you an anti-coagulant (blood thinner) to prevent blood clots. The medicine is injected under your skin at least once a day. You may need to keep taking the blood thinner for some time after you go home. If you need to continue the injections once you go home, we will show you or a support person how to give the injection. The medication is expensive. If you do not have a drug plan, speak with your doctor or nurse if you have questions or concerns about paying for the medication.
After Your Surgery – Recovering at Home

Medications
You may require medications for pain, nausea, constipation, diarrhea, or other reasons when you are at home. Your surgeon and nurses will give you clear instructions on taking these medications.

Some patients require blood thinner medication, as a pill or injection, when they go home. If you require this type of medication, we will give you teaching sessions and clear instructions on how to take it.

Follow-up
Phone your surgeon’s office when you are discharged to arrange a follow-up visit, usually 4 to 6 weeks after you are discharged.

See your family doctor, call your surgeon, or go to your nearest emergency room right away if you develop any of the following:

- Chills or fever (temperature over 38.5°C or 101.3°F)
- Feeling short of breath or having pain in your chest
- Very bad pain in your abdomen
- An unexplained cough
- Headache and drowsiness
• Pain, swelling, or redness in the thigh or calf of your leg
• Very sore throat
• Redness, swelling, or new drainage from your incision
• Skin edges of your incision come apart
• Pain when passing urine or not able to empty your bladder
• Diarrhea or constipation
• Pain that does not go away with pain medication
• New or worse nausea and/or vomiting
• Rash

**Diet and Nutrition**

**What to eat?** Within 2 to 3 weeks after surgery, many patients will be eating a full regular diet. However, your body will need more overall nutrition, especially total calories and foods with protein than before your surgery. Eating enough of the right types of foods help you heal better and reduce your risk of infection.

This surgery causes a lot of protein losses. You should add a protein food to every meal. Good examples of protein are:

• Meat
• Poultry
• Fish
• Eggs
• Dairy products
• Nuts
• Nut butters, such as almond or peanut butter
• Tofu
• Legumes, such as beans or lentils

Surgery, including previous abdominal surgery, increases the chance of a bowel blockage. A low fiber diet for a few weeks after surgery could reduce the blockage risk and lessen symptoms that result from slower stomach emptying. Fibre is found in the skins, peels, nuts or seeds of your fruits, vegetables and grains. Ask your surgeon or dietitian if you need to follow a low fibre diet.
**Slower Stomach Emptying:** Surgery and chemotherapy may temporarily slow how fast your stomach processes food. Common symptoms are nausea, vomiting, abdominal pain, bloating, gas, and early fullness. These symptoms often go away in a few weeks.

Eating smaller meals more often (every 2 to 3 hours) at regular times and drinking enough fluids will strengthen your gut and lessen any symptoms. Fluids can also fill you up quickly, so limit your fluids to ½ cup (125 mL) with a meal, or drink your fluids 30 to 45 minutes before or after meals.

**If You Are Losing Weight:** Nutrition shakes such as Ensure®, Boost®, Resource®, and Carnation® Instant Breakfast can be a quick and easy way to add more nutrition. If you are losing weight, you must eat and drink more. Weighing yourself weekly after surgery to maintain your weight is a helpful way to see if you are getting enough nutrition.

**Special Requirements:** A small number of patients go home with additional nutrition being provided through a feeding tube into their stomach, or through a long-term intravenous line. The hospital may arrange homecare nursing services and the home enteral/parenteral nutrition program to provide nutrition support at home.

**Stitches or Staples**
We usually remove the stitches or staples on your incisions before you are discharged from the hospital. If not, we will tell you when to have them taken out. We may ask you to return to see your surgeon, or to see your family doctor, for this procedure.

**Hygiene**
You may shower. If you have remaining stitches or clips, let the water run over these and do not scrub the area. If you have dressings, you may remove them before showering and then apply new dressings afterwards. Use care to prevent pulling your incision or falling.

Do not have a bath in a tub, and do not go into a swimming pool, hot tub, lake or ocean until at least 4 weeks after all your incisions have healed.
Rest and Exercise
Both rest and exercise are important to your recovery. 
You will be tired for several weeks to months after your surgery. During this time, limit your activity to walking. Let the way you feel guide you – when you start to feel tired, stop whatever you are doing and rest. Limit the time number of times that you climb the stairs during a day, as it is tiring. Check with your surgeon before doing any strenuous activities (for example, an exercise program, vacuuming, sit-ups). You must usually wait 4 to 6 weeks after your surgery to do strenuous activities. 
Taking many rest periods throughout the day is more helpful than one long rest. Try to get at least 8 to 10 hours of sleep at night. 
Do not lift anything over 10 pounds (4.5 kg) for the first 6 weeks after surgery. It takes this long for your incision(s) to heal completely.

Daily Living Activities
Have someone help you with your daily activities, such as house work, cooking, laundry, grocery shopping, and gardening when you first go home. Remember, you should not do any heavy housework or lift anything, except something very light for the first 6 weeks after surgery since it takes this long for you to heal.

Driving the Car
You may have some discomfort after your surgery that could affect your concentration when driving and your ability to drive safely. Therefore, do not drive until you feel comfortable and are no longer taking medication for pain. This is usually at least 1 to 2 weeks after going home.

Sexual Intercourse
Ask your surgeon when it is all right to resume sexual intercourse. Usually, it is safe to resume within a few weeks after going home. If your surgery affected your sexual organs (uterus, vagina, penis, scrotum), your surgeon may ask you to wait longer.
**Going Back to Work**
Ask your surgeon when you may go back to work.

**Coping**
Your healthcare team understands that this is a stressful time for you and your family. Most people have many concerns about a cancer diagnosis and its treatment. Feelings of fear, anger, uncertainty and lack of control are common.

Finding an outlet for your emotions can be helpful. Expressing how you feel is an important step in coming to terms with your diagnosis. Some patients feel that keeping a journal or log of questions, information, thoughts and feelings is helpful. Many people benefit from professional counselling before and after their surgery. Please contact our Psychosocial Oncology group at 403-355-3207 for an appointment or pick up one of their brochures from the pamphlet racks.

There are many sources of help available to help you, and your family, cope with this stressful time. We encourage you to discuss your questions and concerns with your healthcare team.

**Reliable Information Sources**
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Immunization References


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