Cytoreduction Surgery with Heated Intraperitoneal Chemotherapy
Combined Cancer Surgery and Chemotherapy

What is Cytoreductive Surgery (CRS)?
CRS is a major surgery that removes most or all of the visible tumours 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 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 to see if the surgery can proceed. Often, more cancer is seen during the surgery than the scans show. A small percentage of the 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.

What is Hyperthermic Intraperitoneal Chemotherapy (HIPEC)?
The HIPEC procedure is designed to kill any remaining cancer cells after all 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° Celsius) directly into the abdomen. This is sometimes called a heated chemotherapy bath. Heated chemotherapy is continuously circulated throughout the abdomen for 30 to 90 minutes. The solution is then removed, the abdomen rinsed out, and the incision is closed. You may need additional intravenous chemotherapy treatments before and/or after your surgery.
**What is HIPEC used?**

- Heating the chemotherapy drugs allows them to better enter and kill cancer cells.
- Giving chemotherapy in the abdomen allows for a 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 intravenously.

**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 Chmeotherapy (EPIC)?**

You may require 4 to 5 days of additional intraperitoneal chemotherapy after the date of your surgery. If so, a tube is placed in your abdomen at the time of surgery and the drug is given through this tube. These additional requirements 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, anaesthesia and chemotherapy treatment. Your surgeon will discuss the specific risks with you.

In some cases the surgeons will need to create an ostomy (a surgical opening from either the colon or 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 to provide safe and effective surgery for you. If you do require an ostomy, specialized nurses called enterostomal therapists will teach you how to manage your ostomy well.

**Will I need a blood transfusion?**

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. It is possible for some patients to donate their own blood before their surgery (called Preoperative Autologous Blood Donation). For further information, contact The Canadian Blood Services Autologous Clinic at 604-707-3469.
What are the potential benefits?
The potential benefits are 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 surgery.

How long is the surgery and hospital stay?
The surgery and chemotherapy usually take 5 to 10 hours from start to finish. You will then go to the recovery room for a brief stay, or overnight, before going to a specialized surgical ward. Your length of stay in hospital is usually 2 to 3 weeks.

Will my fertility be affected?
In women, the reproductive organs may need to be removed if the cancer has spread there. This may include the ovaries, fallopian tubes and uterus. For younger women, this may lead to permanent sterility (no longer being able to have children).

For women who have not yet gone through menopause, removal of these organs can result in hot flashes and other symptoms of menopause. For women who have already gone through menopause, this surgery is unlikely to result in any change in hormone-related symptoms. It is unusual to remove the vagina as part of this surgery and most women return to sexual activity within 3 to 6 months after surgery.

For men, the reproductive organs are not usually affected by this surgery and most return to sexual activity within 3 to 6 months after surgery. If surgery on your bladder or rectum is required, the nerves needed to produce an erection can be affected and lead to erectile dysfunction. This dysfunction can usually be treated with medications.

Please discuss any concerns about your fertility or sexual function 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. Your decision to participate or not participate in research studies will not affect the high quality care you receive.

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 one or two surgeons
- 2 to 3 nurses
- 1 or 2 anesthesiologists
- A chemotherapy perfusion specialist (helps with giving you the chemotherapy)
Before and after your surgery, you will be cared for in clinics and nursing units with experience caring for patients undergoing CRS and HIPEC. These include:

- Pre-Admission clinic (PAC)
- Perioperative care centre (PCC)
- Post anaesthetic care unit (PACU) (also known as recovery room)
- Jim Pattison Pavilion Tower 8 or 9 – General Surgery
- Specialized nurses, dietitians, physiotherapists, occupational therapists, social workers, enterostomal specialists and respiratory therapists

I have more questions – what should I do?
This booklet contains information on many topics that are important to patients and their families. After reading this booklet, if you still have questions, please contact your surgeon’s office.

Getting Ready for Surgery

Pre-Admission Clinic
The hospital will contact you. An appointment will be made by the Pre-Admission Clinic to prepare you for your admission to hospital. This visit could include some or all of the following:

- Blood work
- X-rays
- ECG (electrocardiogram)
- Meeting with a nurse who will ask you about your health and give you information about how to prepare for your surgery
- Meeting with an anesthetist (the doctors who put you to sleep for surgery) to discuss plans for your anesthetic and pain control after surgery
- Meeting with an enterostomal therapy nurse to discuss the function and use of stomas (also called ostomies), and to mark your abdomen for the location of a possible stoma bag (if you need one)
- Meeting with a dietician to discuss your nutrition before and after surgery.

This visit will take place in the Pre-Admission Clinic. Clinic visits take 2 to 4 hours and usually occur 1 to 2 days before surgery.

Nutrition
Changes in nutrition can happen if there is pressure on the bowel, which can affect how you absorb your food. Mucin and tumors in the abdomen can also cause early fullness. If this happens, eat small amounts more often during the day and keep yourself hydrated. Choose nutrient-rich foods with more calories than usual or add nutrition shakes to your diet.
**Medications**
- You must NOT take aspirin or ibuprofen or other anti-inflammatory medication for 10 days before your surgery, unless otherwise advised by your surgeon.
- You should STOP taking any vitamins, herbal products, other complementary medicines, or other over-the-counter medications 1 week prior to surgery unless advised otherwise by your surgeon.
- The Pre-Admission clinic and/or your surgeon will advise you when to stop any prescription medications, such as blood thinners.

**Vaccinations**
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 need a series of vaccinations before your surgery. Whenever possible, any or all vaccinations should be given at least two weeks before the surgery. If that is not possible, they can be given after surgery. Your surgeon will give you more specific information about what vaccinations you should have.

**Bowel Cleansing**
Special preparation such as bowel cleansing may be needed the day before surgery. You will be given specific instructions about any bowel preparation that your surgeon has ordered.

**What to Bring With You**
- Provincial Health Care card
- Medical insurance information
- Photo identification
- Any advance 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
- Ear plugs

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

Please leave all valuables (wallet, cash, credit cards, and jewelry) at home.

There is internet access available on public-access computers on the main floor of the hospital at the CIBC Centre for Patients and Families. For a fee, public wireless (WiFi) is available through ‘FatPort’ that is accessible in specific areas in the hospital.
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 counseling before and after their surgery.

There are many resources 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.

Day of Surgery

You will be admitted to hospital on the day of your surgery. You will be told what time to come to the Admitting Department. When the admitting papers have been filled out you will go Perioperative Care Centre, where a nurse will prepare you for your surgery. You may have a family member or friend accompany you through this process, up 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 the time.

Your operation may take 5 to 10 hours or longer. During the operation, hospital staff will provide updates to a member of your family or a friend that you designate.
After Your Surgery – In Hospital

When you wake up after the surgery you will be in the recovery room. You will be closely watched 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 nursing 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 and you will have a small tube (catheter) 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 may 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.

First Night

After CRS and HIPEC, most patients are monitored in the recovery room over the first night after surgery. This is to allow close monitoring and treatment of the immediate effects of surgery. When you are well enough, you will be transferred to a “high observation” or “step down” bed on the nursing unit. After several days there, when you are well enough, you will be transferred to a regular nursing unit bed.

Pain

You may have pain from your incision, abdominal cramping, back pain and pain from any drainage tubes that are in place. Pain medication will be ordered for you. You can be given this medication by injection, by mouth (tablets), by a special intravenous pump called a PCA (Patient Controlled Anesthesia) pump, or an epidural pain pump. 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 your feel. It is important that you are comfortable so that you can get up and walk, change position in bed, and do your deep breathing and coughing exercises. 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. You will receive medication to help it.

You may wake up from surgery with a tube through your nose that drains your stomach (NG tube). This tube should prevent you from vomiting but you may still have nausea. If this happens, tell your nurse and you will be given 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
You incision will be closed with small metal clips (staples) or stitches. You will have a gauze dressing 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(s) to remove extra fluid from the abdomen and/or chest. These drains will be taken 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. Someone will walk with you until you are steady on your feet.
When you are in bed and awake, change your position (it is okay to lie on your side as well as your back) and move your legs around at least every hour. This also helps your blood flow.
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 will 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 nutrition support such as intravenous nutrition.
When you 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
Your bladder catheter will be removed 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 get up to the bathroom. You will be given a container to place in the toilet to collect the urine.

Blood Thinner Medicine
For 4 weeks after surgery, you are at high risk to develop blood clots in your legs and lungs. You will be given a blood thinner (anti-coagulant) to help prevent these blood clots. The medicine is injected under the skin at least once a day. You may need to keep taking the blood thinner for some time after you go home. If you have to keep having the injections once you go home, you or a support person will be shown 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

Diet and Nutrition

What to eat?

Within two to three weeks after surgery, many patients will be eating a full regular diet. However, your body will need more overall nutrition, especially total calories and protein calories, than before your surgery to help you heal better and reduce your risk of infection.

This surgery has a lot of protein losses. A protein choice should be added to every meal. Good examples of protein are meat, poultry, fish, eggs, dairy products, smooth nut butters such as almond or peanut butter, and tofu.

Abdominal surgery increases the chance of a bowel obstruction. A low fiber diet (also called a “low residue diet”) for 6 weeks after surgery can reduce the obstruction risk and lessen symptoms 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 a low fibre diet is needed.

Slower Stomach Emptying

Surgery and chemotherapy can contribute to a slower return of a normal functioning gut. Common symptoms are nausea, vomiting, abdominal pain, bloating, gas, and early fullness which often go away in a few weeks.

Eating smaller meals more often (every 2 to 3 hours) at regular times and enough fluids will strengthen your gut and lessen any symptoms. Try to focus on calorie dense foods like high calorie yogurt and soups. Limit your fluids to ½ cup (125 mL) with a meal or drink your fluids 30 to 45 minutes before or after meals, since fluids can fill you up quickly.

Losing Weight

Most patients loose some weight after surgery. It can take several months to gain this weight back. Nutrition shakes such as Ensure®, Boost®, Resource®, and Carnation® Instant Breakfast can add more calories and protein to your diet. Weighing yourself weekly after surgery 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 the 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

The stitches or staples on your incisions are usually removed before you are discharged from hospital. If not, you will be told when to have them taken out. You may be asked to return to see your surgeon, or to see your family doctor, for this procedure.

Hygiene

You may shower. If you have remaining stitches, clips, or drains, let the water run over these and do not scrub the area. If you have dressings, these may be removed prior to showering and then new dressings applied afterwards. Use care to prevent pulling your incision or falling.

Do not have a tub bath and do not go into a swimming pool, hot tub, lake or ocean until at least 4 weeks after all your incisions have healed and drains have been removed.
**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. That is, when you start to feel tired, stop whatever you are doing and rest. Do not climb the stairs too often 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.

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 lbs (4.5 kg) for the first 4 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 housework, cooking, laundry, grocery shopping, gardening, etc.) when you first go home. You should not do any heavy housework or lift anything over 10 lbs (4.5 kg) for the first 4 weeks after surgery. It takes this long for your incision(s) to heal completely.

**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 narcotic 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 you have had surgery of your sexual organs (uterus, vagina, penis, scrotum), your surgeon may ask you to wait longer.

**Going Back to Work**
Most people need to take at least 2-3 months off work to recover from surgery. If you require further intravenous chemotherapy after surgery, the time off work could be longer. Talk to your surgery team about when you can expect to go back to work.

**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 you will be given 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 2 to 4 weeks after discharge). See your family doctor, call your surgeon, or go to your nearest emergency room 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
- Rash
- 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
- Pain, swelling, or redness in the thigh or calf of your leg