

Peritoneal Surface Malignancies



National Cancer
Centre Singapore
SingHealth



Tumours Arising from
the Peritoneum and Symptoms
Types of Treatment and Risk
Post Surgery Supportive Care

Peritoneal Surface Malignancies

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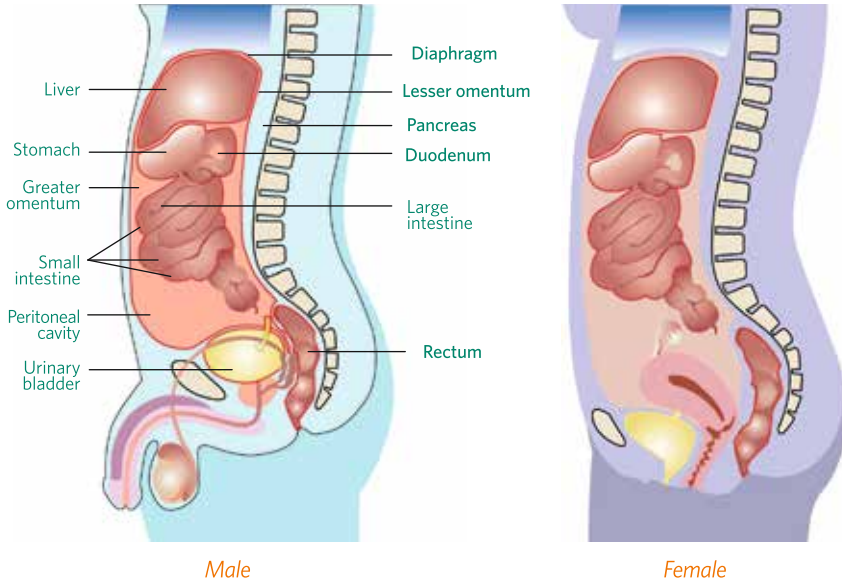
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Introduction

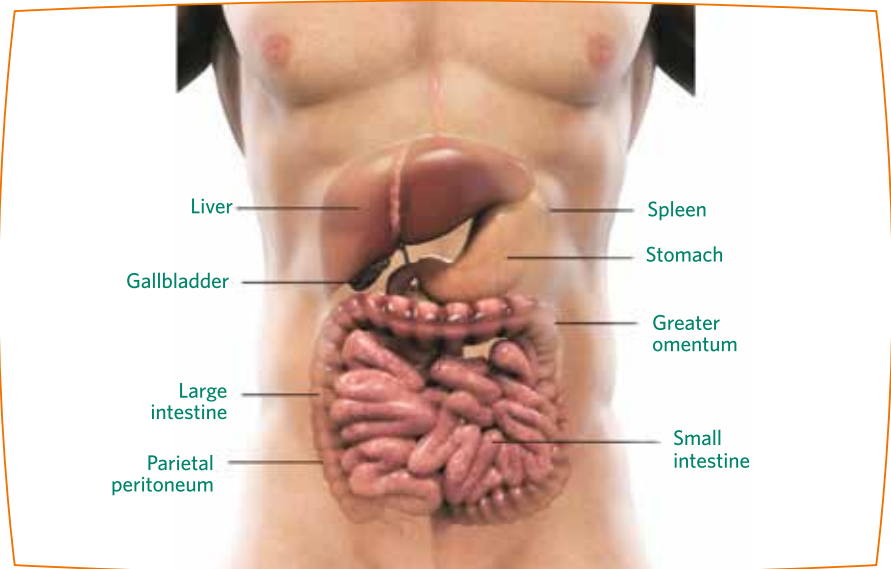
This booklet serves as a guide for potential patients who are considering undergoing cytoreductive surgery and hyperthermic intraperitoneal chemotherapy. It will help to explain the condition, possible symptoms, which patients are suitable for the surgery, what the surgery entails and the pre- and post-surgical care. We hope that this booklet answers your questions. If you have any further queries, please feel free to ask your surgeon or any members of our care team.

What are peritoneal surface malignancies?



The peritoneum is a thin membrane that lines the abdominal and pelvic cavities. It covers the external surface of most of the abdominal organs. The peritoneum supports the abdominal organs and serves as a conduit for their blood, lymph vessels and nerves.

Peritoneal surface malignancy refers to a wide variety of cancers that involve the peritoneum and may also involve other abdominal organs such as spleen, large and small intestines, stomach, the liver and the pelvic organs (e.g. uterus, ovaries, rectum, bladder). The tumours may arise from the lining itself or may spread to the lining from other organs.



Tumours that arise from the peritoneum

- Malignant Mesothelioma
- Primary Peritoneal Cancer

Tumours that may spread to the peritoneal lining

- Ovarian cancer
- Carcinoma of the appendix/Pseudomyxoma Peritonei (PMP)
- Gastrointestinal Cancers - Stomach, small bowel, large bowel
- Other Rare malignancies - Breast, Lung, Melanoma, Hepato-pancreatico-biliary (HPB)
 - PMP is a unique condition characterised by diffuse collections of mucinous material in the abdomen and pelvis and mucinous implants on the peritoneal surfaces. It is generally used to refer to a group of peritoneal tumours that are frequently associated with an appendiceal tumour.

What are the symptoms you might experience if you have peritoneal surface tumours?

You may experience some of the following.

- Abdominal pain
- Abdominal swelling or bloating
- Change in bowel habits, such as recurrent diarrhea or constipation
- Bleeding when passing motion or bleeding from the vagina
- Masses in the abdomen
- Unexplained weight loss

You might also not experience any symptoms. In certain cases, tumours are usually picked up when your doctor does blood tests or scans for other unrelated conditions.

Causes and Risk Factors

Risk factors for the development of peritoneal disease depends on the type of primary cancer that you have.

Primary Peritoneal Malignancies	
Mesothelioma	Asbestos exposure, Smoking
Primary Peritoneal Cancer	High estrogen exposure e.g family history of gynaecological malignancies
Peritoneal Metastases Secondary to other primaries	
Ovarian Cancer	Locally advanced primary disease
Stomach Cancer	Locally advanced & bulky gastric tumour
Colorectal Cancer	Locally advanced & bulky colon cancer
Appendiceal Cancer	Large/Untreated Mucocele of the appendix
Hepato-pancreatico-biliary (HPB)	Locally advanced primary disease

How is peritoneal surface malignancies diagnosed?

Peritoneal disease often present insidiously and may be picked up incidentally on computed tomography (CT) (especially if you are undergoing regular surveillance scans for your previous cancers)

Computed tomography (CT) & Magnetic Resonance Imaging (MRI) scans are useful to diagnose the presence of peritoneal disease and evaluate the extent of involvement of the peritoneum with disease. Tumour markers (a form of blood test) is also useful to point towards the type of peritoneal cancer you have.

In order to confirm that lesions seen on imaging are indeed cancer, you will have to undergo a procedure where we can send either fluid (ascites, if present) from your abdomen or biopsy tissue to the laboratory for examination. This is a procedure that can be performed under sedation and local anaesthesia and does not involve a surgery.

If a diagnosis cannot be made based on the cells/tissue collected then some patients have to undergo a small surgery (Diagnostic laparoscopy and biopsy) performed under a 'keyhole' technique with a small incision. This allows us to use a camera to take a look at the involvement of the peritoneum by cancer cells and subsequently take samples to confirm the diagnosis.

What is the treatment?

Treatment options are varied and depends again on the type of peritoneal cancer you have.

- (I) If you have low grade disease, e.g pseudomyxoma peritonei (PMP) then a surgery - Cytoreductive surgery (CRS), peritonectomy and hyperthermic intraperitoneal chemotherapy (HIPEC) will be curative. (Please see the description of the surgery on the next page.)
- (II) If you have 'high'grade disease e.g mesothelioma, primary peritoneal cancer, or peritoneal cancer due to spread from other primary tumours (can be gastrointestinal, gynaecological or others) - The best treatment option depends on the extent of your peritoneum involved by cancer cells. Both systemic chemotherapy or CRS and HIPEC or Pressurised Intraperitoneal Aerosolised Chemotherapy (PIPAC) or best supportive care are possible treatment options.

CRS & HIPEC

This surgery involves removal of the peritoneum, any involved organ and the introduction of heated chemotherapy drug directly into the abdominal cavity. This surgical procedure aims to remove all visible tumours completely with the intention of curing. The chemotherapy treats any microscopic tumour that may be present.

Once the surgical procedures are completed, hyperthermic intraperitoneal chemotherapy (HIPEC) is administered in the operating room. The chemotherapy drug is heated and maintained at a temperature of 42 degrees Celsius. HIPEC addresses the microscopic disease (tumour that is invisible to the eye) after CRS.

Heat is used to increase the effect of the chemotherapy by increasing the penetration of chemotherapy drug into the tissues and the efficacy of the chemotherapy drug in terms of toxicity.

Giving the chemotherapy during surgery has other benefits. It allows manual distribution of the drug and heat uniformly to all surfaces of the abdominal cavity. The majority of these patients will have had prior abdominal surgery to remove their primary cancers. During surgery, adhesions caused by previous surgery (scarring between peritoneal surfaces) are taken down and this ensures that the drug is uniformly distributed.

The chemotherapy is pumped in using a specialised pump to ensure constant flow of the heated chemotherapy solution into the abdominal cavity. This is done over 60 minutes after which the abdominal cavity is washed and the surgery is completed.

PIPAC

PIPAC is a new treatment modality that can be used for patients who are not suitable for CRS and HIPEC due to extensive involvement of the peritoneum by cancer cells such that they cannot be removed fully.

This treatment is useful if your cancer is not responding well to systemic chemotherapy. This mode of intra-peritoneal (IP) drug delivery that boosts to improve tissue distribution, enhance tissue uptake, better tolerance and repeatability via a minimally invasive approach.

PIPAC is performed via a key hole surgery and takes approximately one hour. During PIPAC, the chemotherapy agent will be aerosolised and administered into your abdomen. This surgery can be repeated for maximal treatment effect.

Preparing for Surgery

Upon confirmation of surgery, a date will be scheduled and you may need to go through some of the following procedures.

- Preoperative investigations including blood tests, electrocardiogram (ECG), x-rays and CT scans may be performed.
- Anaesthesia review. The anaesthetist will ensure that you are fit for surgery under general anaesthesia. They will review the investigation results that have been done for you and refer you to medical specialists if required. They will discuss the type of anaesthesia as well as the methods for pain management post operatively.
- You may be given vaccinations to prevent severe infections in the event that removal of your spleen is indicated during surgery.
- The day prior to the surgery, you may be required to take bowel preparation if there is a possibility of the bowel being resected.
- You will also be given an injection of blood thinner which will help to prevent blood clots in the leg.

Post Surgery Care

The surgery may last from 4 to 12 hours or even longer. The surgery duration depends on the extent of adhesions from prior surgeries, the extent of peritoneum being removed and the number of other organs requiring excision. You will be nursed in our surgical intensive care unit (SICU) or a high-dependency unit (HDU), and discharged to the general ward when stable. The average total hospital stay is 10 days.

When you first wake up from anaesthesia, you may still have a tube in your throat to assist with your breathing. You will notice intravenous lines in place in your arms and neck. These are necessary for fluid replacement, pain medication and nutrition. A nasogastric (NG) tube may be inserted through your nose into the stomach for

draining out the abdominal fluid. You may also have 2 to 4 abdominal catheters for drainage. During the surgery, chest tubes may be inserted, and a urinary catheter will also have been placed to assist us in monitoring your urine output.

Pain medications are usually administered via an intravenous line. It may be a continuous infusion or you may have a pump for Patient Controlled Analgesia (PCA). With a PCA, the painkillers will be given as required when you push a button for the medication.

The majority of patients stay in the SICU for one day before being transferred to the HDU. Your care will be coordinated by an intensive care physician and your surgeon.

Stomas

Some patients who undergo this operation will need a temporary stoma. This will be reversed after about 2 months, on discussion with your surgeon and medical oncologist. All patients will be seen by our specialist stoma nurse before and after the operation, who will give you more information about looking after a stoma.

Recovery

After your chemotherapy is completed, the chest tube is removed. The abdominal drains are removed once the output diminishes and the contents are clear. The urinary catheter are removed at the discretion of your surgeon.

The NG tube will remain until your bowel function returns and you are able to drink. Your oral intake will be progressed from fluids to foods as decided by your surgeon.

To prevent blood clots in the leg that may travel to the lungs and cause a blockage,

compression devices will be applied to your legs. This will be applied just before surgery and left on until you start walking. These may be tight and uncomfortable but are necessary to encourage blood circulation. An injection may also be given to you daily to prevent blood clots.

To prevent lung infections, your physiotherapist will work with you on deep breathing exercises. They will also supply you with a device (incentive spirometer) which you can use to continue to do the breathing exercises regularly.

Pain medication will be continued intravenously until you are able to take painkillers orally. The aim is for you to have minimal discomfort.

By the 2nd to 3rd day after surgery, we will encourage you to increase your activity. We will begin by helping you to sit out of your bed or on a chair before we progress to helping you walk with assistance then independently.

Post Surgery Complications

As with all surgical procedures, complications can occur. Some of these risks and complications are inherent in any operative procedures, especially when general anaesthesia is administered. Complications can cause a prolonged hospitalisation stay or discharge with significant home care needs. Every effort will be made to minimise the risk of having a complication; and to help you cope if a problem occurs. Your surgeon will speak to you more about these risks.

Some of the possible complications following this CRS and HIPEC are listed below. Selected complications are explained in detail below. More information will be given to you by your surgeon.

Early postoperative

- Anastomotic leak
- Postoperative bleeding
- Wound infection
- Intra-abdominal infection/collections
- Deep vein thrombosis (DVT)

- Chest infection
- Urinary tract infection
- Prolonged ileus
- Electrolyte disturbances
- Immunosuppression

Late postoperative complications

- Intra-abdominal infection/collections
- Entero-cutaneous fistula
- Intestinal obstruction
- Bladder and sexual dysfunction (pelvic dissection cases)
- Stoma-related complications

Anastomotic leak

An anastomotic leak can be a very serious complication after the operation that can lead to severe intra-abdominal infection. This may require prolonged hospitalisation for intravenous antibiotics or even further surgery. In our experience, the risk of an anastomotic leak is 5%. In rare instances, a leak can present with discharge of intestinal fluid from the operative wound or skin in the form of a fistula (an abnormal passage between two organs in the body or between an organ and the exterior of the body), which will delay recovery and might even require another surgery.

Postoperative bleeding

This can occur in 1-3% of patients and in severe cases might require a repeat surgery to stop the bleeding.

Wound infection

Wound infections occur in about 5% of patients. This complication may prolong the hospital stay and delay the healing of the wound. Occasionally your wound may need to be laid open to facilitate with cleaning. Antibiotics will also be given.

Intra-abdominal infections/collections

Infection within the abdomen can result in abscesses and collections. If these are small, a course of antibiotics is sufficient. However, larger fluid collections will require drainage under radiological guidance or by open surgery.

Chest infection

Chest infection can develop after any major surgery, especially after abdominal operations. This is especially so for patients with pre-existing lung disease, and in smokers. This can prolong the hospital stay as it requires intravenous antibiotics and chest physiotherapy. It is essential that you participate fully in your post-operative chest therapy to minimise the risk of a chest infection.

Bladder and sexual dysfunction

The risks of bladder and sexual dysfunction are increased when the surgery entails working within the pelvis. The problems include difficulty passing urine and impotence. The risk increases when radiation is given as part of treatment.

Stoma-related complications

Such complications are rare, but include prolapse (protrude excessively), retraction into the wound and parastomal hernias. This may be managed conservatively, with surgery only becoming necessary if the complications cause a lot of discomfort and it becomes difficult to apply the stoma bag onto the skin. Skin irritation around the stoma may arise, especially when the stoma bag is not properly applied. This can be managed with topical creams.

Follow Up

You will be seen by your surgeon and/or medical oncologist at the outpatient unit in the National Cancer Centre Singapore at approximately 1-2 weeks after the surgery, and at least every 3 months thereafter for 1 year. Subsequently, the frequency of your visits will decrease if you are well.

Systemic chemotherapy will be offered by your medical oncologist if you are suitable. CT scans of your body, along with blood tests may be done at each follow-up visit. Appointments with other medical practitioners may also be arranged for you.

Results

CRS & HIPEC

The major centres who perform CRS and HIPEC are mainly in the USA and Europe. To our knowledge, we have one of the largest experience in Asia. The risk of a major complication in these centres ranges from 10% to 45%, while the mortality rate ranges from 0% to 3.5%.

According to data from various centres around the world, the median 5-year survival for patients undergoing CRS and HIPEC for colorectal cancers, ovarian cancers and pseudomyxoma peritonei is 42%, 25.4% and 87% respectively.

Since 2001, the Department of Surgical Oncology at the National Cancer Centre Singapore, has performed more than 500 CRS and HIPEC procedures for peritoneal disease from colorectal, ovarian, appendiceal, pseudomyxoma peritonei, primary peritoneal and mesothelioma patients. In the recent years, our reported post-operative mortality and morbidity rates are 0% and < 10% respectively. Our department's 5-year survival rates for colorectal, ovarian and pseudomyxoma peritonei are 32.1%, 52.1% and 90%.

PIPAC

Since its introduction in 2012, PIPAC has been performed in 838 patients (mainly in European centres) and has been proven to be feasible and safe. Clinical response and improvements in quality of life have been reported. At present, several prospective randomised trials are currently underway in the Netherlands, Germany and Italy. If you were to undergo PIPAC treatment at the National Cancer Centre Singapore, you will be enrolled in our clinical trial.

Publications

1. Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy in Asian patients: 100 consecutive patients in a single institution. *Ann Surg Oncol* 2013 Sep; 20(9): 2968-74
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5. Surgical Management of Colorectal peritoneal metastasis: treatment and outcomes compared with hepatic metastases. *J Gastrointest Cancer* 2013 Jun; 44(2): 170-6
6. Quality of Life in Patients with Peritoneal Surface Malignancies after cytoreductive surgery and hyperthermic intraperitoneal chemotherapy. *Eur J Surg Oncol* 2014

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