HIPEC Notes for Anesthesia

The notes below have been developed through meetings with the HIPEC implementation team, including surgery, anesthesia and nursing. It is intended to give you an outline of the day, and to specifically highlight all safety precautions for both the patient and yourself. Further questions can be addressed with Dr. Hebbard or Dr Govender.

Patient Preparation

- All patients are seen in PAC prior to the procedure. In addition, patients must be generally in good health (good performance status and lack of severe comorbidities) in order to qualify for the procedure. In the event that new information gives rise to a concern for patient fitness, please contact Dr Hebbard directly.

Day of Surgery, Anesthesia Preparation

- Patients will have lines and monitoring in keeping with other major cases at HSC, with the exception of no epidurals (see below).
- All patients should have a triple lumen CVP line inserted. One lumen will be reserved for IV chemo delivery (see ‘IV Chemo Delivery’).
- Patients will need an esophageal temperature probe and a bare hugger warming device.
- **Safety Note**: There is an increased risk of epidural catheter associated complications in these patients, as outlined in the articles attached. It is thought that the bleeding risk is associated with more extensive debulking cases, where excessive bleeding may result in DIC. The HSC will not be performing extensive debulking until we are more experienced in caring for these patients. The implementation team feels that cases at this time should not have an epidural catheter to avoid this risk. As the hospital becomes more familiar with these cases, the anesthesia leads may re-visit this item.

Time Out

- As per our usual procedure. Surgery will note any unique concerns for the patient. Nursing will confirm that the chemotherapy is in pharmacy, and any other HIPEC specific prep.
- 2 units of cross-matched blood should be called for, if not already in-house.
**OR Plan**

- The surgical team will start by performing an assessment of the resectability of the carcinomatosis. 15% of cases may be found to be unresectable at the time of OR, in which case some smaller palliative surgery may be performed but HIPEC will not be delivered. Pharmacy will be notified to prepare the chemo drugs only after we are certain to proceed.

- The majority of the day is debulking all visible tumour (3-6 hours). The time required is variable, according to the extent of the disease. The risk of intra-operative and post-operative complications is directly related to the extent of debulking (as opposed to the chemo delivery itself). The surgical team will communicate blood loss and other concerns if/when they arise.

- The OR room has no contact or special precautions during the debulking portion of the operation. Once the chemo arrives in the room, all non-essential equipment is removed, staff entry and exit are limited, and any new garbage will be disposed of in cytotoxic bins. Further instructions are below.

**IV Chemo Delivery**

- A dose of IV 5-flourouracil (5FU) is delivered prior to the intraperitoneal chemo. The drug is ordered and checked by the attending surgeon. The drug is then given by anesthesia with the responsible ordering surgeon being present.

- 5FU will be given through one port of the triple lumen CVP line. It is given by slow IV push over 2-5 minutes. It is compatible with saline but not ringers lactate. The drug will arrive from pharmacy already mixed and in a 20 mL luer-lock syringe.

- **Safety Note:** The anesthetist or ACA should wear a gown and nitrile gloves when handling the medication. A blue pad should be under the medication whenever it is laid down. A blue pad should be under the CVP port site during drug delivery, and a gauze should be around the luer lock itself-- to limit any contamination in the unlikely event of drug spillage.

**Intraperitoneal Chemo Delivery**

- Intraperitoneal chemotherapy is heated and then circulated through the abdomen via a specialized Belmont Pump. A perfusionist will run the pump.

- **Safety Note:** Approximately 1 hour prior to chemo delivery, turn off the bare hugger. Patient temperature will rise during the chemo delivery. In general, if the patient starts at about 36 degrees, a rise of about 2 degrees will be expected. In the very rare instance of excessive heating, the patient may need to be actively cooled or the chemo temporarily halted.
- **Safety Note:** The patient MUST be paralyzed for the duration of the intraperitoneal chemotherapy treatment. Coughing or movement during chemotherapy can lead to a major chemotherapy spill. After chemotherapy, the operative team will have at least 1 hour of work to perform so there should be adequate time for any paralysis to subside before extubation.

- **Safety Note:** Oxaliplatin is renally excreted. While systemic absorption is minimal, we recommend maintaining good urine output during the chemo instillation (0.5-1 mL/kg/hr).

- **Safety Note:** The chemo is delivered in 3 litres of D5W. Transient hyperglycemia may result. Blood glucose should be monitored at the completion of chemo delivery, and occasionally a single dose of insulin may be required.

**Cytotoxic Precautions**

- Once any chemotherapy is delivered, the patient will be under “cytotoxic precautions.” Interestingly, cytotoxic precautions should be used for any patient who has had any form of chemotherapy in the previous 48 hours. (ie. This information is also applicable if a patient enters the OR for an emergency procedure but has recently had IV or oral chemotherapy)

- **Safety Note:** Gowns, nitrile gloves, and eye protection are recommended once the chemo is in use and for 48 hours post-op. Shoe covers are also recommended in the OR and should be removed before leaving the room.

- Once chemo is in the room, non-essential equipment, and regular garbage bins are removed. All garbage will now be disposed of in cytotoxic red bins (including syringes, drugs, and anesthesia circuit).

- **Safety Note:** Please ensure you have adequate supplies and drugs on hand when cytotoxic precautions start. We would like to limit the traffic in and out of the room (to reduce the minute risk that unrecognized contamination is being carried on shoes throughout the OR).

- To run a blood gas, collect the sample and place in a bag with cytotoxic sticker (these supplies will be in a cart by the door). Call an ACA who will pick up the sample at the door and run it for you. For all other bloodwork, also see that samples are labeled with a cytotoxic sticker.

- **Safety Note:** The entire room, including anesthetistic machine, is to be washed 3 times in soap and water after the case, to neutralize any microscopic chemotherapy that may be on surfaces. The chemo CAN NOT be aerosolized, so there is not risk for air contamination.

- **Safety Note:** The patient will remain on cytotoxic precautions for 48 hours after chemo delivery. This is a region-wide policy for any patient receiving chemotherapy of any type. You must wear personal protective equipment (PPE) if you will potentially be in contact with blood or body
fluids. You DO NOT need to wear this equipment if you are merely speaking to the patient or bedside nurse post-operatively without direct bodily contact. PPE will be available at the bedside in PACU/A3SD/SICU.

**Post-operative Disposition**

- If a patient has had tumour stripped off their diaphragm, then chest tubes will be inserted at the end of the case. This specific sub-group of patients has a high rate of respiratory decompensation in the first hours post-op, so these patients should remain intubated and transferred to SICU. The average length of ventilation is one day, and most patients will be fine for extubation on post-op day #1. Only 10% of patients have diaphragmatic disease, and this is usually known pre-operatively.

- Unless there have been intra-operative difficulties, all other patients should be hemodynamically stable and extubatable at the end of the case. Patients will proceed to PACU and then A3SD, as per our current practice with complex cancer surgeries.

- **Safety Note:** Patients must remain in A3SD, SICU, or PACU until the 48 hour cytotoxic precautions are complete. Until the hospital is more familiar with these patients, it is advisable to limit nighttime and weekend transfers of locations – although it is understood that this may be necessary under times of severe bed shortages.

- Patients may third space fluid post-operatively in excess of what is expected for other major abdominal surgeries. While this may not occur with each case, do not alarmed if a patient requires high fluid volumes early on (similar to pancreatitis).

- Patients should have an APS consult even though they do not have an epidural, as pain issues may be in excess of what can be managed with a standard PCA (eg. May need ketamine or other adjuncts).

- Patients who experience complications from surgery are managed in the same way as any other complex cancer surgery patient. (eg. Ileus, venous thromboembolism, anastomotic leak, intraabdominal sepsis, pneumonia, etc).