Administration of Cancer Chemotherapy is a high-risk activity requiring additional knowledge and skill. Portions of this policy may only be performed by Registered Nurses with the post-entry level certification in the Administration of Cancer Chemotherapy.

For Safe Handling of Cytotoxic Medications, refer to CC 05-055 Safe Handling of Cytotoxic Drugs/Waste.

NOTE:
Sections with strikethroughs related to administration of intravenous systemic therapy for cancer have been replaced by NSHA CAN-ST-002 Administration of IV Systemic Therapy for Cancer.

Sections with strikethroughs related to administration of subcutaneous cancer chemotherapy have been replaced by NSHA MM-CP-001 Administration of Subcutaneous Cancer Systemic Therapy.

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SECTION 1 - GENERAL
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Cancer Care Nova Scotia (CCNS) is the provincial cancer program with a mandate to develop standards of cancer care across Nova Scotia. This policy is based on a provincial document endorsed by the Systemic Therapy program of Cancer Care Nova Scotia (October 2011). The document can be found on the Cancer Care Nova Scotia website www.cancercare.ns.ca.

SECTION 1 – GENERAL

POLICY

1. Portions of The Administration of Cancer Chemotherapy policy may only be performed by Registered Nurses with post-entry level certification in the Administration of Cancer Chemotherapy.

2. To administer cancer chemotherapy, the Registered Nurse (RN) must successfully complete an approved Post-Entry Level Certification (PELC) program. This RN will be designated as a Registered Nurse with Chemotherapy Certification (RNCC).

2.1. In Nova Scotia, an online learning program is offered by Cancer Care Nova Scotia consisting of 10 online, interactive modules followed by a preceptored clinical experience.

2.2. Registered Nurses certified in the administration of cancer chemotherapy (RNCC’s), are responsible for maintaining competency by performing an annual self-assessment using a competency assessment tool.

3. Chemotherapy given by oral, topical, subcutaneous or intramuscular routes may be administered by a RN, as described in the specific sections in this document.

4. Specialized chemotherapy procedures (e.g. intrathecal, intraperitoneal, intraoperative, intra-hepatic or intra-arterial infusions) may be administered by other health professionals, such as surgeons, internists, gastroenterologists or radiologists, according to specific policies & procedures.

DEFINITIONS

BCG: BCG (Bacillus Calmette – Guerin) is a live attenuated strain of mycobacterium bovis (the organism that causes tuberculosis). It is used for the treatment of superficial bladder cancer. The exact mechanism of action is not known but it is thought to produce a local inflammatory reaction as well as an immune response that is toxic to cancer cells.

Cancer Chemotherapy Regimen: A drug or combination of chemotherapy drugs, with predetermined relative or absolute doses, schedule of administration, and often with recommended supportive therapy (e.g. antiemetic, hydration).
<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemotherapy Administration Area</td>
<td>A dedicated space for cancer chemotherapy drug administration. The Chemotherapy Administration Area may include patient beds, stretchers and/or chairs designed for ambulatory IV therapy, chemotherapy waste receptacles, and other equipment appropriate for the drug administration activities performed in the area.</td>
</tr>
<tr>
<td>Chemotherapy Administration Unit</td>
<td>A facility (usually hospital) unit dedicated for the local preparation and delivery of chemotherapy. A Chemotherapy Administration Unit requires a Chemotherapy Administration Area, a dedicated drug preparation area (which may be located in the hospital pharmacy department), Registered Nurses with Chemotherapy Certification, and on-site medical supervision.</td>
</tr>
<tr>
<td>Chemotherapy Preparation Area</td>
<td>A designated area in the hospital designed for safe preparation of cancer chemotherapy drugs. This area may be located in the hospital pharmacy area, or adjacent to the chemotherapy administration unit. The area is not to be used for direct patient care. The Chemotherapy Preparation Area will include a designated room with the Biological Safety Cabinet and associated facilities (e.g. drug storage, refrigeration unit, drug preparation staging area).</td>
</tr>
<tr>
<td>Closed System Device</td>
<td>A drug transfer device which mechanically prohibits the transfer of environmental contaminants into the system and the escape of hazardous drug or vapour concentrations outside the system.</td>
</tr>
<tr>
<td>Continuous Infusion</td>
<td>A drug (or a combination of drugs admixed together) administered by an infusion for a period <em>greater than 8</em> hours’ duration.</td>
</tr>
<tr>
<td>Cytotoxic</td>
<td>A drug possessing a specific destructive action on certain cells. Used commonly in referring to antineoplastic drugs that selectively kill dividing cells. Cytotoxic drugs are associated with specific occupational risk concerns.</td>
</tr>
<tr>
<td>Decontamination</td>
<td>The process of the removal of all visible dust, soil, and other foreign material, usually done using water and detergents, or enzymatic products along with physical action such as brushing, in order to render an object safe for handling.</td>
</tr>
<tr>
<td>Intermittent Infusion</td>
<td>A drug administered by an infusion of <em>up to 8 hours</em> duration.</td>
</tr>
</tbody>
</table>
**Oncology Nurse:** A Registered Nurse who is experienced and skilled in the care of cancer patients and their families. Meets the practice standards and competencies for the Specialized Oncology Nurse, as determined by the Canadian Association of Nurses in Oncology (2006).

**Personal Protective Equipment (PPE):** Equipment designated for personnel to wear during administration of cancer chemotherapy, and other activities where physical exposure to cytotoxic agents and/or waste is a risk. PPE may include a gown, gloves, goggles/face shield and/or a mask.

**Registered Nurse with Chemotherapy Certification (RNCC):** A Registered Nurse who has successfully completed an approved Post-Entry Level Certification (PELC) program in the Administration of Cancer Chemotherapy.

**Systemic Therapy:** Systemic therapy includes cancer chemotherapy, hormone therapy, immunotherapy and supportive care drugs, and includes drugs given by any route, including oral. These drugs are also used for non-cancer treatment.

**GUIDING PRINCIPLES AND VALUES**

1. Cancer chemotherapy is systemic therapy to cure, control or palliate people with cancer. The most common routes to administer chemotherapy drugs are oral (po) and intravenous (IV), but some drugs may be given by intrathecal injection (IT- into the cerebrospinal fluid via the spinal cord), intraperitoneal injection (IP), subcutaneous injection (subcut), intramuscular injection (IM), or intravesicular instillation (into the bladder).

2. Handling cytotoxic chemotherapy agents is an area of occupational risk for hospital employees. Chemotherapy agents include cytotoxic (cell-killing) agents, which are known to be occupationally hazardous.

**SECTION 2 - ADMINISTRATION OF CANCER CHEMOTHERAPY**

**CHEMOTHERAPY INTRAVENOUS CANCER CHEMOTHERAPY DRUG ADMINISTRATION**

Sections with strikethroughs below related to administration of intravenous systemic therapy for cancer have been replaced by [NSHA CAN-ST-002 Administration of IV Systemic Therapy for Cancer](https://www.nsha.ca).
POLICY

1. The administration of intravenous cancer chemotherapy is a **post-entry level competency for Registered Nurses** which require the RN to complete an education program and be deemed competent in the following competencies:

   1.1. completing a pre-treatment nursing assessment;
   1.2. safe handling of cytotoxic drugs/waste;
   1.3. administration of infusional cancer chemotherapy;
   1.4. administration of IV direct cancer chemotherapy; and
   1.5. management of adverse effects.

2. An RN who successfully completes an approved Post-Entry Level Certification (PELC) program (offered by Cancer Care Nova Scotia) will be certified as a Registered Nurse with Chemotherapy Certification (RNCC).

   **Note:** Chemotherapy given orally or subcutaneously may be administered by an RN, as described in the policies for each specific category of Cancer Chemotherapy Administration.

3. The RNCC must also be competent in IV therapy initiation, care and maintenance of central venous access devices (CVAD), and the IV direct administration of drugs required for the management of hypersensitivity reactions.

4. The RNCC is to be knowledgeable of the procedures for managing anaphylaxis and a suspected extravasation.

5. All orders for cancer chemotherapy are to be verified by two oncology health professionals (e.g., oncology nurse(s), oncology pharmacist), performing the verification **independent from one another**.

   5.1. Chemotherapy order verification includes verifying the correct drug(s), dose(s), body surface area (BSA) calculations, creatinine clearance (as appropriate), infusion rate calculations (as appropriate), correct cycle/date(s), and review of appropriate lab tests.

   **5.2. Verification is to be documented.**

6. Any dose calculation which differs by 10% or more from the chemotherapy order, is to be clarified with the prescriber prior to drug administration.

7. An independent double check of all chemotherapy doses and programming of the infusion pump (for IV chemotherapy) is to be carried out prior to administration.

PROCEDURE

**Equipment — IV administration**

- IV administration sets (primary and secondary)
- Alcohol swabs
- Plastic backed absorbent pad
- Personal Protective Equipment (PPE)
- 2x2 gauze
- Equipment required for CVAD / IV initiation.

**Note:** A small gauge IV catheter #22-24 is recommended

1. When administering IV chemotherapy peripherally, the RN starts a new venous access for any IV site older than 2 hours.
   1.1. Use a short, small gauge (20-24), flexible IV cannula to administer IV chemotherapy peripherally to decrease vein trauma during insertion.
   1.2. Avoid the vessels of the hand or wrist, if possible. **Do not use the antecubital fossa for the administration of vesicant drugs.**

2. When administering a series of chemotherapy drugs, administer vesicants first, irritants second and non-irritants lastly.

3. In most cases, administer small volume infusions prior to large volume infusions.

   **Exception:** An established protocol that has a specific sequence, which requires a specific agent to be administered first due to pharmacokinetic reasons (i.e., clearance, synergism).

4. The RNCC determine if a chemotherapy drug is classified as a vesicant, irritant or non-irritant. Pharmacy labels medications as “Vesicant” or “Irritant” as appropriate for each drug.

5. Verify blood return and patency immediately prior to initiating any chemotherapy infusion. The frequency that blood return must be verified during administration is outlined below:
   5.1. For vesicants administered peripherally IV direct, blood return is assessed every 3 mLs
   5.2. For vesicants administered peripherally via a mini bag, blood return is assessed every 5 minutes
   5.3. For irritants administered peripherally, blood return is assessed at least once every hour
   5.4. For continuous chemotherapy infusions administered as an inpatient, blood return is assessed once per shift.

6. Administer all chemotherapy infusions as a secondary infusion, except in those cases where an ambulatory infusion pump (such as an Infusors®) is connected directly.
   6.1. Ensure the main IV line—attached to the indwelling IV catheter—is a non-chemotherapy containing solution. Administer all chemotherapy doses (infusional or IV direct) into the secondary line connection(s).
   6.2. Prime all IV tubing used to administer chemotherapy with a non-drug solution (normal saline/D5W), unless required by a clinical trial or specific protocol.
7. Prior to initiation of all chemotherapy infusions by an infusion pump, a second RNCC verifies:

7.1. That the intended infusion is going in the intended pump channel by tracing the line from the solution, through the pump, and to the insertion site.

7.2. That the infusion pump is programmed at the proper rate.

8. For chemotherapy agents with a known high risk of hypersensitivity reactions, the RNCC remains with the patient for the first 15 minutes of the infusion.

9. Pre-treatment Assessment and Teaching

9.1. Complete pre-treatment assessment. The assessment parameters include but are not limited to:

9.1.1. Height and current weight
9.1.2. Vital signs
9.1.3. History & physical and toxicity assessment
9.1.4. History of allergies and anaphylactic reactions
9.1.5. Performance status (e.g., ECOG)
9.1.6. Lab values (Profile with differential, LFT's, creatinine, etc.)
9.1.7. Assessment of the emotional, sexual, psychosocial and financial impact of the diagnosis and treatment on the patient and family
9.1.8. Assessment of the patient's understanding and learning needs

9.2. The Oncology Nurse educates the patient/family in collaboration with other oncology health professionals. Parameters of teaching plan include (but not limited to):

9.2.1. Description of chemotherapy treatment, including drugs, specific protocol, scheduling and administration.
9.2.2. Review of potential side effects (immediate, early and delayed). Management and self care practices to prevent/manage side effects, coping, psychosocial support.
9.2.3. Review of cytotoxic precautions.

10. Chemotherapy Verification

10.1. Prior to the administration of cancer chemotherapy, the RNCC:

10.1.1. Verifies that the consent has been obtained.
10.1.2. Confirms the initial BSA (if used to calculate the dose) or recalculates the BSA if weight has changed by greater than 10% from baseline.
10.1.3. Recalculates or verifies all doses, to confirm accuracy of calculations
10.1.4. Recalculates the creatinine clearance for Area Under the Curve (AUC) dosing with each cycle of chemotherapy (e.g., each dose of Carboplatin).
10.1.5. Verifies that the correct drug(s) have been ordered consistent with the cycle and week(s) as defined by the regimen. Compares with last treatment order.

10.1.6. Verifies that the dose or dosage range is appropriate for the patient and treatment plan using an approved reference.

10.1.7. Reviews lab results and other diagnostic test/procedures required by the regimen, and ensures these have also been reviewed by the physician.

10.1.8. Verifies with another RNCC (or registered nurse, pharmacist or physician, if another RNCC is not available) that the information on the chemotherapy drug label matches the information on the physician order and/or medication administration record (MAR).

10.1.8.1. Both RNs sign the MAR and the Systemic Therapy Nursing Verification Checklist (form CD1888MR).

10.1.9. Verifies that the full name and patient identification number on the chemotherapy drug label matches the full name and patient identification number on the patient’s identification armband.

11. Administration of Intravenous Cancer Chemotherapy

11.1. Implement safe handling practices, as outlined in CC 05-055 Safe Handling of Cytotoxic Drugs/Waste

11.2. Assess vital signs.

11.3. Ensure that a physician is accessible in case of an emergency.

11.4. Determine the sequence of the drugs to be infused; vesicants, then irritants, then non-irritants unless otherwise specified.

11.5. Review procedure for extravasation and hypersensitivity reactions (if appropriate).

11.6. Determine the method and route of infusion:

   **Method:** Administer chemotherapy drugs by intermittent or continuous infusion as a secondary (piggy-backed) IV or by direct IV push via the side arm of a free-flowing primary IV.

   **Route:** Administer Infusional chemotherapy via a peripheral IV or CVAD.

11.7. Perform hand hygiene, don PPE.

11.8. Initiate peripheral IV or CVAD access.

11.8.1. Use a clear dressing to ensure visualization of the access site at all times.

11.8.2. Ensure that the IV mainline solution is compatible with the chemotherapy agents to be given.

11.9. Administer pre-hydration and pre-medication as ordered.

11.10. Verify patient’s name, patient identification number, drug name and dose, route, time, infusion rate, and diluent solution.
11.11. Inspect all chemotherapy admixtures for expiry date, particulate matter, signs of incompatibility, degradation or contamination.

11.12. Verify blood return immediately prior to initiating chemotherapy.
   
   11.12.1. Determine the frequency that blood return verification is to be done based on the vesicant and irritant potential of the drugs (refer to Procedure #12 – Vesicants and Procedure #13 – Irritants).

   11.12.2. Infuse approximately 10-20 mL of IV fluid prior to chemotherapy to verify patency of the IV.

11.13. Connect chemotherapy as a secondary infusion.

   11.13.1. Prime all IV lines with a non-drug solution (normal saline/D5W). Do not prime any IV line with chemotherapy drug.

   11.13.2. If it is necessary to spike an IV bag containing chemotherapy, spike at waist level over a plastic backed absorbent pad.

   11.13.3. Ensure the spike connection to the bag is secure.

   11.13.4. Luer lock all connections and taped with waterproof tape if indicated (i.e., continuous infusion, restless patient, home chemotherapy).

11.14. The RNCC administering the chemotherapy programs the infusion pump at the prescribed rate.

11.15. A second RNCC verifies:

   11.15.1. that the intended infusion is going in the intended pump channel by tracing the line from the solution, through the pump, and to the insertion site.

   11.15.2. That the infusion pump is programmed at the proper rate.

11.16. Monitor the patient for chemotherapy induced hypersensitivity reactions as determined by the drug. Question the patient and assess for any local or systemic reactions and if present initiate interventions as outlined in the Algorithm for the Management of Hypersensitivity Reaction (Appendix 2).

11.17. Assess for signs and symptoms of infiltration/ extravasation throughout the infusion.

   11.17.1. The frequency of this monitoring depends on the drug and route of administration (refer to vesicant/irritant procedures below). Follow the Guidelines for the Management of Extravasation of Cancer Chemotherapy Agents – Refer to Appendix 1).

11.18. Following chemotherapy administration and/or between drugs, the IV line is flushed with a minimum of 50 mL of compatible solution, unless otherwise indicated.

11.19. At the end of the infusion(s) dispose of the IV chemotherapy administration set intact into the cytotoxic waste container. DO NOT DISCONNECT the IV bag from the tubing.
11.20. Document chemotherapy administration on the patient’s health record /MAR.

12. Administration of Vesicants

12.1. Refer to Procedure #1

12.2. Adhere to Procedure #11—Administration of Intravenous Cancer Chemotherapy.

12.3. Administer vesicant drugs peripherally either by intermittent infusion or IV direct—as per the physician’s order.

**Exception:** Vincristine must be given via minibag and not IV direct (to avoid any possibility of this drug being given accidentally as an intrathecal dose).

**Note:** If a vesicant requires administration by continuous infusion, administer via a central venous access device (CVAD) using an infusion pump.

*Vesicant Drugs via Peripheral Intermittent Infusion*

12.4. When administering vesicant drugs by intermittent peripheral infusion (mini bag), administer by gravity; **never** administer using an infusion pump.

12.4.1. The RNCC stays with the patient for the duration of the peripheral vesicant infusion to constantly monitor peripheral venous patency throughout the administration of the drug, regardless of which method is used (IV direct or mini-bag).

**Peripheral—Direct IV**

12.5. Scrub the lowest Y-port with an alcohol swab.

12.6. Place a 2 x 2 gauze under the injection port to absorb any droplets.

12.7. Insert the syringe containing the vesicant drug into the injection port. Open IV clamp on the mainline and ensure the IV is free flowing.

12.8. Verify blood return and patency immediately prior to initiating the vesicant injection.

12.9. Administer the vesicant drug at the prescribed rate of infusion.

12.9.1. The RNCC ensures the IV continues to flow freely and IV patency is verified **every 3mLs** by aspiration of blood return and assessment of the signs and symptoms of extravasation. (Follow the Guidelines for the Management of Extravasation of Cancer Chemotherapy Agents—Refer to Appendix 1).

12.10. Following chemotherapy administration and/or between drugs, flush the line through the injection port with 10 mLs of compatible IV solution and flush 50 mLs of IV solution through the mainline.

12.11. Once the procedure is completed, either saline lock, discontinue or continue IV, depending on the physician orders.

**Peripheral—Mini Bag**

12.12. For intermittent vesicant infusion via minibag, attach the secondary medication line to the medication port of the mainline IV.
12.13. Verify blood return and patency immediately prior to initiating the vesicant infusion.


**Note:** Vesicant drugs administered peripherally by mini bag must never be administered via an infusional pump.

12.15. The RNCC ensures the IV continues to flow freely and IV patency is verified **every 5 minutes** during infusion by aspiration of blood return and assessment of the signs and symptoms of extravasation. (Follow the Guidelines for the Management of Extravasation of Cancer Chemotherapy Agents—Refer to Appendix 1).

12.16. Following chemotherapy administration and/or between drugs, flush the mainline with a minimum of 50 mLs compatible IV solution.

**CVAD—Intermittent Vesicant Administration**

12.17. When vesicant drugs are infused via intermittent infusion either by IV direct injection method or mini bag infusion, through a CVAD, check blood return immediately prior to administration.

12.18. The RNCC monitors for the signs and symptoms of extravasation during the administration (Follow the Guidelines for the Management of Extravasation of Cancer Chemotherapy Agents—Refer to Appendix 1).

12.19. For IV direct injections via CVAD:

12.19.1. Scrub the lowest Y-port with an alcohol swab

12.19.2. Place a 2 x 2 gauze under the injection port to absorb any droplets.

12.19.3. Insert the syringe containing the vesicant drug into the injection port.

12.19.4. Open the clamp on the mainline IV and ensure the IV is free flowing.

12.19.5. Administer the vesicant drug at the prescribed rate of infusion.

**Note:** Blood return is not routinely checked during administration unless patency is questioned.

12.19.6. Following chemotherapy administration and/or between drugs, flush the line **through the injection port** with 10 mLs of compatible IV solution and flush with a minimum of 50 mLs of IV solution **through the mainline**.

12.19.7. Once the procedure is completed, either saline lock, heparin lock, discontinue or continue the IV, as per the physician's orders.

12.20. For mini bag infusions via CVAD:

12.20.1. Attach the secondary medication line to the medication port of the mainline IV.

12.20.2. Administer the vesicant drug at the prescribed rate of infusion by gravity drip.
**Note:** Blood return is not routinely checked during administration unless patency is questioned.

12.20.3. Following chemotherapy administration and/or between drugs, flush the mainline with 50 mLs of compatible IV solution.

**CVAD—Continuous Vesicant Administration:**

12.21. For continuous vesicant infusion via CVAD, attach the secondary medication line to the medication port of the mainline IV.

12.22. When vesicant drugs are administered by continuous infusion through a CVAD, check blood return prior to administration and:

   12.22.1. at least once per shift during the infusion for inpatients

   12.22.2. at each visit for outpatients.

12.23. Administer the vesicant drug at the prescribed hourly rate of infusion.

12.24. For continuous infusions of vesicants via a CVAD, monitor CVAD site and patient sensation at least once every hour (inpatients only). Follow the Guidelines for the Management of Extravasation of Cancer Chemotherapy Agents—Refer to Appendix 1.

12.25. Following chemotherapy administration and/or between drugs, the mainline is flushed with a minimum of 50 mLs compatible IV solution.

**13. Administration of Irritant Drugs**

13.1. Administer irritant drugs peripherally or via a CVAD as an intermittent or continuous infusion.

13.2. Administer irritant chemotherapy drugs using the same equipment and procedures as outlined previously in this section.

13.3. Verify blood return and patency immediately prior to initiating the irritant infusion and at least once every hour during the infusion.

**IV Direct:**

13.4. Scrub the lowest Y-port with an alcohol swab

13.5. Place a 2 x 2 gauze under the injection port to absorb any droplets.

13.6. Insert the syringe containing the irritant drug into the injection port.

13.7. Open the clamp on the mainline IV and ensure the IV is free flowing.

13.8. Administer the drug at the prescribed rate of infusion.

13.9. The RNCC ensures the IV continues to flow freely and IV patency is verified every 3 mLs by aspiration of blood return and assessment of the signs and symptoms of extravasation. (Follow the Guidelines for the Management of Extravasation of Cancer Chemotherapy Agents—Refer to Appendix 1).

13.10. Following chemotherapy administration and/or between drugs, flush the line through the injection port with 10 mLs of compatible IV solution and flush with a minimum of 50 mLs of IV solution through the mainline.
13.11. Once the procedure is completed, either saline lock, heparin lock, discontinue or continue the IV, as per the physician’s orders.

**Intermittent Peripheral Infusions**

13.12. Administer as a secondary infusion by attaching the secondary medication line to the medication port of the mainline IV.

13.13. Administer the drug at the prescribed rate of infusion.


13.15. Following chemotherapy administration and/or between drugs, flush the mainline with a minimum of 50 mLs of compatible IV solution.

**Continuous Infusion**

13.16. Administer via CVAD and an infusion pump (with the exception of designated regimens).

13.17. Monitor CVAD site and patient sensation at least once every hour (inpatients).

13.18. Check blood return at least once per shift (inpatient area).

**14. Non-Irritant Drugs**

14.1. Administer non-irritant chemotherapy drugs, as IV direct, intermittent IV infusions or as a continuous IV infusion through a peripheral IV or CVAD following the procedure outlined above.

14.2. Specific protocols may stipulate the administration of non-irritant drug without the use of a free-flowing IV using a pre-filled saline syringe to flush the IV line before and after drug administration (e.g., the administration of 5FU bolus).

**ADMINISTRATION OF CANCER CHEMOTHERAPY USING AN ELASTOMERIC INFUSION PUMP**

**DEFINITIONS**

**Elastomeric Infusion Pumps** *(Infusor® / Intermate®):*

- Non-electronic infusion pump designed for ambulatory infusions. The flow rate of an elastomeric infusion pump is influenced by:
  - temperature
  - diluent solution
  - catheter size
  - fill volume
  - height
PROCEDURE

Equipment

- PPE
- Plastic backed absorbent pad
- Alcohol swabs
- 2 x 10mL pre-filled normal saline syringes
- Elastomeric ambulatory infusion pump pre-filled with medication
- Carrying device / pouch
- Transparent dressing
- tape

NOTE:

- A closed system device (Spiros™) will be added to the infusor tubing by pharmacy. When the Spiros device is connected to a female luer connectors (i.e. central line), the fluid path opens and upon disconnect it automatically closes the system preventing spills and minimizing exposure.

- The elastomeric infusion pumps will arrive at the nursing unit with the line primed with the chemotherapy agent.

1. Complete pre-treatment assessment, teaching and order verification. (Refer to Intravenous Cancer Chemotherapy Drug Administration.)

2. To connect the elastomeric infusion device:

   2.1. Perform hand hygiene, don PPE.

   2.2. Verify the elastomeric infusion pump delivers correct hourly rate.

   2.3. Prior to removing the infusion pump from the sealed bag, inspect for leakage.

   2.4. Working over a plastic backed absorbent pad, remove the infusion pump from the sealed bag. Ensure the liquid has moved to the end of the tubing and the protector cap on top of the infusion pump is secure.

   2.5. Verify patency of IV / CVAD by checking for blood return. Flush with 20mL 0.9% sodium chloride using the turbulent flush technique.

   2.6. Working over a plastic backed absorbent pad, remove the cap from the end of the Spiros™.

   2.7. Attach the tubing of the ambulatory infusion pump to the adaptor on the central venous access device or IV. Secure luer lock connections tightly.

   2.8. Open clamp on the CVAD / IV.

   2.9. Secure the flow restrictor (Infusor device only) to the patient’s skin.

   2.10. Leaving the elastomeric infusion pump in a plastic bag, place the elastomeric infusion pump (Infusor / Intermate) in a carrying device.
Note: Should be carried at waist level.

2.11. Review patient teaching.

2.12. Ensure the patient has been notified of the return date/time for pump disconnect/change.


3. To disconnect the elastomeric infusion device:

3.1. Perform hand hygiene, don PPE.

3.2. Ensure the full dose of medication has been infused by the device over the correct infusion time

3.3. Clamp CVAD / IV.

3.4. Working over a plastic backed absorbent pad, disconnect elastomeric infusion pump tubing from the IV / CVAD.

3.5. Dispose of elastomeric infusion pump in a cytotoxic waste container.

3.6. Flush IV/CVAD. Continue or discontinue IV therapy according to orders.

3.7. Complete CVAD dressing/cap changes as required.


4. Provide education to all patients on the home management of an ambulatory elastomeric infusion pump including:

4.1. Key parts of the infusion pump (clamps, flow restrictor, elastomeric balloon)

4.2. Care at home including any activity restrictions

4.3. Routine checks to be performed on the pump

4.4. Actions to take if a problems arise

4.5. Follow up appointments

5. Provide a chemotherapy spill kit to all ambulatory patients receiving chemotherapy using an elastomeric infusion pump.

ADMINISTRATION OF SUBCUTANEOUS OR INTRAMUSCULAR CANCER CHEMOTHERAPY

NOTE: Sections with strikethroughs related to administration of subcutaneous cancer chemotherapy have been replaced by NSHA MM-CP-001 Administration of Subcutaneous Cancer Systemic Therapy.
POLICY
1. Subcutaneous and intramuscular cytotoxic cancer chemotherapy may only be administered by a Registered Nurse with Chemotherapy Certification (RNCC) or a Registered Nurse (RN) with additional knowledge and skills about cytotoxic precautions, management of expected toxicities and other care required by oncology patients.

2. Subcutaneous cytotoxic cancer chemotherapy doses may be self-administered in the home setting by the patient and/or family member with self-administration teaching.

3. Vesicants or irritant chemotherapy agents are not to be administered by subcutaneous or intramuscular route.

4. Safety precautions, as outlined in as outlined in CC 05-055 Safe Handling of Cytotoxic Drugs/Waste, are to be followed during the administration of all cytotoxic drugs to prevent undue exposure of the health care provider and the patient. Implement safe handling practices,

PROCEDURE – Subcutaneous or Intramuscular Injections

Equipment:
• PPE (nitrile gloves, chemo gown).

• Plastic backed absorbent pad

• Appropriate gauge and length of needle(s)
  ○ For subcutaneous injections, use a 26 gauge needle or higher, unless specified by manufacturer
  ○ For intramuscular injections, use 22-27 gauge needles of appropriate length (unless a lower gauge is required for the patient or as specified by manufacturer)

• Syringe containing chemotherapy

• Alcohol swab(s)

• Cytotoxic waste container

1. Pre-treatment Assessment and Teaching
   1.1. Complete pre-treatment nursing assessment, including but not limited to:
     1.1.1. Height and current weight
     1.1.2. Vital signs
     1.1.3. History & physical and toxicity assessment
     1.1.4. History of allergies and anaphylactic reactions. {Review procedure for hypersensitivity reactions (if appropriate)}
1.1.5. Performance status (e.g. ECOG)
1.1.6. Lab values (profile with differential, LFT’s, creatinine, etc.)
1.1.7. Assessment of the emotional, sexual, psychosocial and financial impact of the diagnosis and treatment on the patient and family
1.1.8. Assessment of the patient’s understanding and learning needs.

1.2. In collaboration with other oncology health professionals, educate the patient/family including but not limited to:

1.2.1. Description of chemotherapy treatment, including drugs, specific protocol, scheduling and administration.

1.2.2. Review of potential side effects (immediate, early and delayed), management and self care practices to prevent/manage side effects, coping, psychosocial support.

1.2.3. Review of cytotoxic precautions.

2. Chemotherapy Verification

2.1. Verify that the consent has been obtained.

2.2. Confirm the initial BSA (if used to calculate the dose) or recalculate the BSA if weight has changed by greater than 10% from baseline.

2.3. Recalculate or verify all doses, to confirm accuracy of calculations.

2.4. Verify that the correct drug(s) have been ordered consistent with the cycle and week(s) as defined by the regimen. Compare with last treatment order.

2.5. Verify that the dose or dosage range is appropriate for the patient and treatment plan using an approved reference.

2.6. Review lab results and other diagnostic test/procedures required by the regimen, and ensure these have also been reviewed by the physician.

2.7. Verify with another RNCC (or registered nurse, nurse practitioner, pharmacist or physician, if another RNCC is not available) that the information on the chemotherapy drug label matches the information on the physician order and/or MAR.

2.8. Check patient’s name, patient identification number, drug name and dose, route, time and diluent solution.

2.9. Both RNs sign the MAR and the Systemic Therapy Nursing Verification Checklist (CD1888MR).

2.10. Verify that the full name and patient identification number on the chemotherapy drug label matches the full name and patient identification number on the patient’s identification armband or equivalent personal identification on the patient.

3. Preparation and Administration

3.1. Pharmacy prepares subcutaneous and intramuscular cancer chemotherapy doses and places a protective cap on the end of the syringe.
3.2. Remove chemotherapy doses stored in the refrigerator 30 minutes prior to administration, to facilitate patient comfort.

3.3. When administering subcutaneous or intramuscular cancer chemotherapy, the Registered Nurse:

3.3.1. Performs hand hygiene. Don PPE.

3.3.2. Prepares work area by placing a plastic backed absorbent pad on the work surface; ensure cytotoxic sharps container is within easy reach for disposal of equipment.

3.3.3. Inspects sealed bag (containing the chemotherapy syringe) before opening to ensure there is no spillage within the bag. Inspect chemotherapy for particulate matter, signs of incompatibility, degradation or contamination.

3.3.4. Selects a suitable site for the injection. Rotate the site each time for repeated injections.

3.3.5. Prep skin with an alcohol swab; allow to dry.

3.3.6. Removes the chemotherapy syringe from the protective plastic bag onto a plastic backed absorbent pad.

3.3.7. Carefully remove the protective cap from the luer-lock syringe and attach the appropriate gauge needle (e.g. 26-gauge needle with a needle length of 8mm). Ensure needles for administration are secure, taking care to minimize risk of spillage on the skin.

Note: Do not expel air from syringes prior to administration

3.4. For subcutaneous injections, use a pinch technique. Administer the injection at a 45- or 90° angle. Aspiration is not required prior to the injection of the drug.

3.5. For intramuscular injections, administer the injection using Z track technique via ventrogluteal injection site (or as specified in manufacturers' recommendations).

Note: A platelet count greater than 50 x 10⁹ cells/L is recommended for intramuscular (IM) injections

3.6. Following injection, leave the needle in place for a few seconds then remove slowly to minimize drug leakage from the injection site.

3.7. Remove the syringe and needle. Do NOT recap the needle; ensure safety mechanism is engaged before disposal.

3.8. Dispose in the cytotoxic sharps container.

3.9. If needed, place gauze over site until bleeding or weeping of the agent has ceased.

3.10. Cover with occlusive dressing or bandage if necessary.

3.11. If further injections are required, rotate the site of administration and maintain record of administration sites.

3.12. Ensure all potentially contaminated materials are placed on the protective work
surface. Roll the plastic backed pad with contents, place in the appropriate cytotoxic waste container.

3.13. Remove PPE and discard into appropriate cytotoxic waste container.


3.15. Document medication administration and injection site.

ADMINISTRATION OF ORAL OR TOPICAL CANCER CHEMOTHERAPY AGENTS (INCLUDING NASOGASTRIC ADMINISTRATION)

Preparations may include oral cytotoxic drugs (tablet, capsules or liquid formulations) or the topical application of a cytotoxic drug.

POLICY

1. All prescriptions for oral or topical cytotoxic cancer treatment will be verified by at least one oncology health professional (e.g. Oncology Pharmacist, Oncology RN, Nurse Practitioner or another oncologist).

2. All oral and topical cancer chemotherapy doses are to be administered by a Registered Nurse with Chemotherapy Certification (RNCC) or a RN other than a RNCC if the RN is knowledgeable about cytotoxic precautions, management of expected toxicities and other care required by oncology patients.

PROCEDURE

1. Pre-treatment Assessment and Teaching

   1.1. Prior to the administration of each cycle of oral or topical chemotherapy, complete a pre-treatment nursing assessment including but not limited to:

      1.1.1. Height and current weight

      1.1.2. Vital signs

      1.1.3. History & Physical and toxicity assessment

      1.1.4. History of allergies and anaphylactic reactions

      1.1.5. Performance status (ECOG)

      1.1.6. Lab values as ordered on the specific Pre Printed Order (PPO)

      1.1.7. Assessment of the emotional, sexual, psychosocial and financial impact of the diagnosis and treatment on the patient and family

      1.1.8. Assessment of the patient’s understanding and learning needs

   1.2. In collaboration with oncology health professionals educate the patient/family including, but not limited to:

      1.2.1. Description of treatment, including drugs, specific protocol, scheduling and administration.
1.2.2. Review of potential side effects (immediate, early and delayed), management and self care practices to prevent/manage side effects, coping, psychosocial support.

1.2.3. Review of cytotoxic precautions (where appropriate).

2. Preparation and Handling

2.1. Pharmacy prepares all oral cytotoxic chemotherapy doses including the crushing or splitting of tablets, compounding of liquid oral doses, nasogastric and topical preparations.

Note: Doses for nasogastric administration and oral liquid doses will be prepared in oral syringe(s).

2.2. Handle cytotoxic tablets and capsules in a manner that avoids skin contact, spread of drug into the air and chemical cross contamination with other drugs. Ensure that all equipment used in the administration of these drugs is dedicated to this purpose and when necessary clearly labeled as such.

3. Chemotherapy Verification

3.1. Verify that the consent has been obtained.

3.2. Verify that the correct drug(s) have been ordered consistent with the cycle and week(s) as defined by the regimen. Compare with the last treatment order.

3.3. Verify that the dose or dosage range is appropriate for the patient and treatment plan using an approved reference.

3.4. Review lab results and other diagnostic test/procedures required by the regimen, and ensure these have also been reviewed by the physician.

3.5. Verify with another RN (or pharmacist or physician, if another RN is not available) that the information on the chemotherapy drug label matches the information on the physician order and/or medication administration record (MAR).

3.6. Check patient’s name, patient identification number, drug name and dose, route and time.

3.7. Both RNs (or the pharmacist or physician if the 2nd RN not available) sign the MAR and the Systemic Therapy Nursing Verification Checklist (CD1888MR).

3.8. Verify the full name and patient identification number on the chemotherapy drug label matches the full name and patient identification number on the patient’s identification armband or equivalent personal identification on the patient.

4. Oral Cancer Chemotherapy Administration

4.1. Ensure oral chemotherapy drugs are stored separately from other medications.

4.2. Administer pre-medications, if ordered.

4.3. When administering oral cancer chemotherapy (including liquid formulations), the Registered Nurse:

4.3.1. Prepares the work surface by placing a plastic-backed absorbent pad on a hard, flat surface.
4.3.2. Performs hand hygiene, dons PPE.

**Note:** Gloves must be worn when handling oral cancer chemotherapy drugs. If there is a risk of being sprayed or splashed with a liquid chemotherapy agent, additional PPE is worn.

4.3.3. Inspects all chemotherapy doses for expiry date, particulate matter, signs of incompatibility, degradation or contamination before administration.

4.3.4. Avoids touching the tablets/capsules directly.

4.3.5. Drops the dose into a medication cup.

4.3.6. If possible have the patient swallow medication whole.

4.3.7. Removes gloves and washes hands after handling chemotherapy drugs and equipment.

4.3.8. Disposes of all equipment used in the administration of medication (e.g. medication cups, syringes, gloves, etc.) in appropriate cytotoxic waste containers.

4.3.9. Implements cytotoxic precautions (inpatient unit) or teach cytotoxic precautions for ambulatory patients.

4.3.10. Documents chemotherapy administration on the patient’s health record/MAR.

5. **Nasogastric Administration**

5.1. When administering cancer chemotherapy drugs via a feeding tube the Registered Nurse:

5.1.1. Ensures the oral syringe containing chemotherapy drug is stored separately from other medications.

5.1.2. Performs hand hygiene, dons PPE.

**Note:** chemotherapy gloves, gown, face shield/goggles and mask should be worn to avoid splashing.

5.1.3. Inspects all chemotherapy doses for expiry date, particulate matter, signs of incompatibility, degradation or contamination before administration.

5.1.4. Ensures the tip of the syringe containing the drug fits the opening of the feeding tube administration port with a tight seal. A syringe tip adapter may be added if necessary.

5.1.5. Places a plastic backed absorbent pad under the oral syringe and under the feeding tube administration port.

5.1.6. Assesses patency and placement of the feeding tube, flushes as per CC 25-021 *Enteral Nutrition*.

5.1.7. Places gauze around feeding tube and oral syringe when administering the drug to catch any accidental spillage or droplets.

5.1.8. Administers the agent as ordered.
5.1.9. Removes the oral syringe holding gauze around disconnection site.
5.1.10. Flush feeding tube as per policy.
5.1.11. Remove PPE and wash hands.
5.1.12. Dispose of all equipment used in the administration of drugs (oral syringes, gloves, PPE, incontinent pad, etc) in appropriate cytotoxic waste containers.
5.1.13. Implement cytotoxic precautions.
5.1.15. Document chemotherapy administration on the patient’s health record/MAR.

6. **Topical Administration**

6.1. When administering topical cancer chemotherapy the Registered Nurse:

6.1.1. Ensures container(s) with topical chemotherapy drug is (are) stored separately from other medications, enclosed in a sealed plastic bag.

6.1.2. Performs hand hygiene, don PPE.

**Note:** Wear gloves when handling topical cancer chemotherapy drugs. If there is a risk of occupational exposure, additional PPE is worn.

6.1.3. Protect the work area with a plastic backed absorbent pad.

6.1.4. Apply the topical drug in a thin layer to the area to be treated with a sterile tongue blade or cotton tipped applicator at the frequency ordered; avoid contact with unaffected skin and mucous membranes of the eyes, nose and mouth.

6.1.5. Unless contraindicated, and if the drug is being applied to exposed skin, cover the treated area with an appropriate dressing to prevent exposure to other areas of the body, clothing or people.

6.1.6. If applicable, remove the drug completely at the end of the required contact time.

6.1.7. Remove PPE and wash hands.

6.1.8. Dispose of all equipment used in the administration of medication (medication cups, syringes, gloves, etc) in appropriate cytotoxic waste containers.

6.1.9. Document chemotherapy administration on the patient’s health record/MAR.

**INTRAVESICULAR ADMINISTRATION OF CHEMOTHERAPY**
POLICY

1. Intravesicular administration is to be performed by a urologist or a Registered Nurse with PELC certification for this procedure.

GUIDELINES

1. BCG is a live attenuated virus and should not be handled by employees with known immunological deficiency.

2. BCG is contraindicated within 14 days of TUR of bladder tumour, after a traumatic catheterization, in the presence of hematuria or urinary tract infection, and in acute febrile illness.

3. A pharmacist or an RN with PELC certification reconstitutes BCG by using a closed system device.

4. Pharmacy prepares cytotoxic chemotherapy agents used for bladder instillation such as mitomycin, epirubicin and interferon in syringes and handles using all cancer chemotherapy safe handling procedures.

PROCEDURE

EQUIPMENT

- PPE (Chemotherapy gown, N95 mask with face shield)
- Sterile gloves
- Cytotoxic waste container
- Chemotherapy drug
- Clave™ intravesical administration device
- Catheter tray including cleansing solution, lubricant, labelled specimen container
- #12 or #14 straight catheter
- Plastic backed absorbent pad

For BCG the following additional equipment is also required:

- Rubbing alcohol
- Closed system i.e. BCG reconstitution kit
- 50 mL normal saline
- 60 mL syringe (luer-lock)

1. **Pre-treatment Assessment and Teaching**

   1.1. Prior to the administration of each dose of BCG or other intravesicular chemotherapy, complete a pre-treatment nursing assessment, including but not limited to:

   1.1.1. Vital signs
1.1.2. History & Physical and toxicity assessment
1.1.3. History of allergies and anaphylactic reactions.
1.1.4. The patient’s response to previous treatments - especially with regards to hematuria, chills, elevated temperature, frequency and dysuria.

Note: Proceed only with a physician’s directive if flu-like symptoms were experienced following a previous instillation or are presently being experienced.

1.1.5. Performance status (e.g. ECOG)
1.1.6. Lab values as ordered on the Pre Printed Order (PPO)
1.1.7. Assessment of the emotional, sexual, psychosocial and financial impact of the diagnosis and treatment on the patient and family
1.1.8. Assessment of the patient’s understanding and learning needs

1.2. The Oncology RN educates the patient/family in collaboration with other oncology health professionals and includes (but not limited to) the following parameters:

12.1. Explanation of the procedure and provision of written teaching instruction for post procedure care at home.

12.2. Description of treatment, including drugs, specific protocol, scheduling and administration

12.3. Review of potential side effects (immediate, early and delayed), management and self care practices to prevent/manage side effects, coping, psychosocial support

12.4. Review of cytotoxic/tuberculocidal precautions

2. Chemotherapy Verification

2.1. Prior to the administration of cancer chemotherapy, the RN administering the intravesicular chemotherapy:

21.1. Verifies that the consent has been obtained.

21.2. Recalculates or verifies all doses, to confirm accuracy of calculations

21.3. Verifies that the correct drug(s) have been ordered consistent with the cycle and week(s) as defined by the regimen; compares with the last treatment order.

21.4. Verifies that the dose or dosage range is appropriate for the patient and treatment plan using an approved reference.

21.5. Reviews lab results and other diagnostic test/procedures required by the regimen, and ensures these have also been reviewed by the physician.

21.6. Verifies with another RN (or pharmacist or physician, if another RN is not available) that the information on the chemotherapy drug label matches
the information on the physician order and/or medication administration record (MAR):

2.1.6.1. Verifies the patient’s name, patient identification number, drug name and dose, route, time

**Note:** Both RNs (or the RN and either the pharmacist or physician if a second RN is not available) sign the MAR.

21.7. Inspects all chemotherapy admixtures for expiry date, particulate matter, signs of incompatibility, degradation or contamination before administration to the patient.

21.8. Verifies that the full name and patient identification number on the chemotherapy drug label matches the full name and patient identification number on the patient’s identification armband or equivalent personal identification on the patient.

3. Administration

The RN administering the intravesicular chemotherapy:

3.1. Ensures there is a written physician’s order and signed consent.

3.2. Prepares work area by placing a plastic backed absorbent pad on the work surface and under the patient. Ensure a cytotoxic waste container is within easy reach for disposal of equipment.

3.3. Assembles equipment.

3.4. Don PPE: gown, mask, goggles (including a face shield if danger of splashes or sprays), and sterile gloves.

3.5. Catheterize using a #12-14 straight catheter.

3.5.1. A Coudé tip catheter may be necessary if there is difficulty inserting straight catheter.

**Note:** Contact a physician if not familiar with the procedure for inserting a Coudé tip catheter.

3.6. Obtains urine for culture and sensitivity and assess for hematuria. Ensure the bladder is completely empty.

3.7. Leave the catheter in place. Add clave adaptor.

3.8. For BCG:

3.8.1. Pour 50 mL sterile normal saline into a sterile urine bottle and lay the bottle of BCG beside it. Place a plastic backed absorbent pad under the patient to protect the examination bed from contamination.

3.8.2. Open and arrange catheter tray dropping the BCG reconstitution kit onto sterile field as well as 60mL luer lock syringe. Draw up 50mL of sterile normal saline.

3.8.3. Reconstitute BCG in the following manner.
3.8.3.1. Using the BCG reconstitution kit, connect the 60mL syringe containing 50 mL of sterile normal saline.

3.8.3.2. Insert the bottle of BCG onto other end; 1 mL of normal saline will automatically enter BCG bottle.

3.8.3.3. Mix this solution then draw it back into syringe.

3.8.3.4. Instil 1 mL of the solution from the syringe back into the bottle, mix and draw back into syringe.

3.8.3.5. Turn the stopcock to the “off” position

3.8.4. Leaving the syringe and vial attached, place the BCG reconstitution kit on the sterile field with the BCG bottle far from the catheter tray.

3.8.5. Insert the catheter tip of the BCG reconstitution kit into catheter and slowly over three minutes instill the BCG into the bladder.

3.9. For chemotherapy:

3.9.1. Connect the syringe containing the chemotherapy to the clave adaptor on the catheter and slowly instil into the bladder.

3.10. Remove the catheter, unless otherwise ordered.

3.11. Dispose of the catheter, tray, supplies, gown, gloves, goggles and mask in the appropriate cytotoxic waste container.

3.12. Instruct the patient to hold solution for two hours.

Note: Some patients cannot hold for 2 hours so instruct to hold as long as they can up to 2 hours. Rotate patient position as per protocol orders.

3.13. Ensure the patient can verbalize the instructions regarding safe self-care post administration and how to access assistance if needed.

3.14. Document the procedure and patient tolerance; send urine culture to the lab.

3.15. After each patient, clean and disinfect the mixing area and treatment table/area

3.15.1.1. For BCG – disinfect area with 70% isopropyl alcohol wearing protective equipment (including mask). All work surfaces must be disinfected with a product that has a tuberculocidal claim.

3.15.1.2. In the event of a spill or incontinence of BCG, pour copious amounts of the tuberculocidal disinfectant on the area and let sit for 10-15 minutes. Clean the spill and area with detergent. Dispose of all materials in a cytotoxic waste container.
ADMINISTRATION OF CANCER CHEMOTHERAPY ON NON-ONCOLOGY UNITS

POLICY

1. Administration of oral, nasogastric, topical, intravesicular, subcutaneous, or intramuscular doses may be given on the non-oncology unit by a RN other than RNCCs if the RN is knowledgeable about cytotoxic precautions, management of expected toxicities and other care required by oncology patients.

2. Employees on the non-oncology units should be educated regarding cytotoxic precautions, management of expected toxicities, cleaning of equipment and patient care area(s), cytotoxic waste management, other occupational safety issues, and other care required by oncology patients after the chemotherapy administration.

PROCEDURE

1. If an oncology patient is to receive IV cancer chemotherapy on a nursing unit where nurses do not have certification for chemotherapy administration:
   1.1. Make all reasonable effort to transfer the patient to an oncology unit for chemotherapy administration and monitoring.
   1.2. If a bed is not available, the care team discusses with the manager the potential to switch patients in order to ensure the patient who most needs expert oncology nursing care is able to receive this in the most appropriate location.

   Note: Exceptions to moving or switching patient care location would include patients with needs for other nursing expertise and support greater than the need for expert oncology nursing care (e.g. ICU monitoring).

   1.3. When transfer to an oncology unit is not feasible, the managers / charge nurses of the oncology units identify an RNCC to go to that unit to administer the IV cancer chemotherapy

   1.4. For patients in long term care or continuing care facilities, the care teams discuss the most appropriate location for the patient to receive chemotherapy based on the individual patient’s needs.

REFERENCES


RELATED DOCUMENTS

Policies
CC 05-055 Safe Handling of Cytotoxic Drugs / Waste
CC 50-005 Intravesical Administration of Bacillus Calmette – Guerin (BCG)
MM 50-XXX Independent Double Check (pending)
MM 50-010 High Alert Medications
A-2 Ordering and Administration of Intrathecal Chemotherapy

Brochures
Cytotoxic Precautions: A Guide for Home QV85-0300
Cytotoxic Precautions During Your Hospital Stay QV85-0683

Appendices
Appendix 1 - Guidelines for the Management of Extravasation of Cancer Chemotherapy Agents
Appendix 2 - Guidelines for the Management of Hypersensitivity Reactions / Anaphylaxis With Cancer Chemotherapy Agents

* * *
APPENDIX 1

Date Approved By Oncology Therapy Subcommittee: January 23, 2013

Guidelines

1. Prior to administration of cancer chemotherapy, the RNCC is responsible to know the extravasation potential of each drug and must demonstrate knowledge regarding prevention, assessment and management of extravasation. A listing of vesicants and irritant drugs available for use in Nova Scotia can be found in the Systemic Therapy Manual (add link to CCNS manual).

2. Patients must be informed, prior to vesicant/irritant administration, of the risks and signs and symptoms of extravasation to report.

3. Vesicant drugs may be administered peripherally either by intermittent infusion or IV-direct. When administering vesicant drugs by intermittent peripheral infusion (mini bag), administer by gravity; never administer using an infusion pump.

4. If a vesicant requires administration by continuous infusion, administer via a central venous access device (CVAD) using an infusion pump.

5. The RNCC must stay with the patient for the duration of the peripheral vesicant infusion.

6. The RNCC will routinely assess all vascular access sites for infiltration and extravasation.

7. The RNCC will verify blood return and patency immediately prior to initiating any chemotherapy infusion. The frequency that blood return must be verified during administration is outlined below:
   a. For vesicants administered peripherally IV-direct, blood return is assessed every 3 mLs
   b. For vesicants administered peripherally via a mini bag, blood return is assessed every 5 minutes
   c. For irritants administered peripherally, blood return is assessed at least once every hour
   d. For continuous chemotherapy infusions administered as an inpatient, blood return is assessed once per shift.
**Definitions**

**Extravasation** — The inadvertent leakage of a drug or solution from a vein into subcutaneous tissue. Vesicant or irritant extravasations are capable of causing pain, necrosis and/or tissue damage.

**Flare Reaction** — Localized venous inflammatory response characterized by immediate, red blotches or streaks (histamine release phenomenon) or local wheals. Edema and/or pruritis may or may not occur. Symptoms typically subside with or without treatment 30-45 minutes after the infusion is stopped.

**Irritant** — An agent capable of causing pain, burning sensation, aching, with or without inflammation at the injection site or along the vein pathway. These drugs do not cause tissue damage or ulceration unless a large amount of drug is extravasated.

In some cases, the distinction between irritant and vesicant is not clear.

**Vesicant** — An agent capable of causing blistering, local or extensive tissue necrosis

Vesicants drugs can be divided into two categories:

**DNA binding Vesicants:** Vesicant drugs that when infiltrated, bind to the DNA in local tissue. The vesicant is then released from the dead cells and taken up by the adjacent healthy cells in a continuous cycle. The drugs have potential to cause extensive prolonged damage as the infiltrated drug is repeatedly released from dead cells into surrounding tissues. These lesions can become larger, deeper and more painful over time.

Examples include: anthracyclines, dactinomycin and mitomycin.

**Non-DNA binding Vesicants:** Vesicants drugs that do not bind to DNA. These drugs have an indirect effect on the cells and are more easily cleared from extravasation sites. The resultant tissue damage is less extensive and improves over time.

Examples include: paclitaxel and the plant alkaloids.
### Table 1 – Assessment of Extravasation

<table>
<thead>
<tr>
<th>Assessment Parameter</th>
<th>Extravasation</th>
<th>Venous Irritation</th>
<th>Flare Reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Immediate- Manifestations</td>
<td>Delayed- Manifestations</td>
<td>Aching and tightness along a peripheral vein, above the administration site.</td>
</tr>
<tr>
<td>Pain</td>
<td>Typically occurs and is described as burning, stinging, or a cool sensation at or around IV site. Note: Some patients do not experience pain.</td>
<td>Usually increases over time</td>
<td>No pain</td>
</tr>
<tr>
<td>Redness</td>
<td>Commonly occurs but is not always present at time of extravasation</td>
<td>Intensifies over time</td>
<td>The vein may appear reddened or darkened.</td>
</tr>
<tr>
<td>Blood Return</td>
<td>Loss of blood return or change in the quality of blood return</td>
<td>Blood return is present</td>
<td>Blood return is present</td>
</tr>
<tr>
<td>Swelling</td>
<td>Commonly occurs immediately</td>
<td>Increases over time</td>
<td>Swelling does not occur</td>
</tr>
<tr>
<td>Ulceration</td>
<td>Skin integrity is intact</td>
<td>Blistering and sloughing begin within 1-2 weeks, followed by tissue necrosis. May require surgical debridement or skin grafting.</td>
<td>Ulceration does not occur</td>
</tr>
<tr>
<td>Other</td>
<td>Change in the quality of infusion Peripheral IV: - fluid leaking at IV site - resistance with direct IV administration CVAD: - leaking around site - dull aching pain in shoulder/neck area - tingling, burning or warmth sensation in chest wall</td>
<td>Local tingling and sensory deficits</td>
<td>Possible resistance felt on injection</td>
</tr>
</tbody>
</table>

Urticaria
MANAGEMENT

Equipment

- 10mL syringes (2)
- 3mL syringe (3)
- 25g 5/8 needle (5)
- Sterile 2x2 gauze
- Sling
- Cold / hot packs
- Camera
- Consent to Medical Photograph (CD 0737MR)
- Antidote, if indicated
- Black indelible marker

Procedure

When an extravasation is suspected:

1. STOP INJECTING IMMEDIATELY.
2. STOP the administration of any IV fluids
3. Disconnect the IV tubing, leaving the IV cannula or non-coring huber needle in place.
4. Attach an empty 3mL syringe. Attempt to gently aspirate as much drug as possible.
5. Notify physician or nurse practitioner.
6. Determine if an antidote is indicated. Refer to table 3 (Add link).
7. If an antidote is not indicated, remove the IV or non-coring huber needle.
8. Elevate the extremity.
9. Obtain a color photograph of the site. Print the photo and place on the patient’s medical record or send it for scanning into the electronic file.
   Note: Consent to Medical Photography / Videography (CD 0737 MR) must be obtained.
10. Trace the affected area using black marker. Document measurements.
11. Apply hot or cold compress to site for 15-20 minutes 4-6 times / day for the next 24-48 hours. Refer to table 2 (Add link).
   Care must be taken to avoid tissue injury from excessive heat or cold.
12. Do not apply ointments or dressings
   a. Topical corticosteroids are no longer indicated. There use may lead to greater skin ulceration.
13. Provide patient education.
14. Document:
   - Name and volume of drug given
   - IV site location
• Needle type and size
• IV site appearance
• Measurements and photography of extravasation site
• Symptoms reported by patient
• Initial interventions
• Patient teaching
• Follow up care

15. Complete patient safety report.
16. Arrange follow up. It is recommended that follow up assessments occur 48 hours following then Day 5, 7 and 14. Continue weekly assessments if necessary.

Table 2—Application of Heat or Cold

<table>
<thead>
<tr>
<th>Drug Classification/Name</th>
<th>Heat or Cold</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthracyclines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daunorubicin</td>
<td><em>Ice</em> packs for 15-20 minutes at least 4 times a day for the first 24-48 hours</td>
<td>Cold causes vasoconstriction, which may decrease local dispersion, slow cellular uptake of drug, and possibly decrease the extent of injury.</td>
</tr>
<tr>
<td>Doxorubicin</td>
<td></td>
<td></td>
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<tr>
<td>Epirubicin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antitumor Antibiotics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mitomycin</td>
<td><em>Ice</em> packs for 15-20 minutes at least 4 times a day for the first 24-48 hours</td>
<td>Apply ice packs for 15-20 minutes at least 4 times a day for the first 24-48 hours</td>
</tr>
<tr>
<td>Dactinomycin</td>
<td></td>
<td></td>
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<tr>
<td>Amsacrine</td>
<td></td>
<td></td>
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<tr>
<td>Carmustine</td>
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<tr>
<td>Melphalan</td>
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<tr>
<td>Steptozocin</td>
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<tr>
<td>Taxanes</td>
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</tr>
<tr>
<td>Docetaxel</td>
<td><em>Ice</em> packs for 15-20 minutes at least 4 times a day for the first 24-48 hours</td>
<td>Apply ice packs for 15-20 minutes at least 4 times a day for the first 24-48 hours</td>
</tr>
<tr>
<td>Paclitaxel</td>
<td></td>
<td></td>
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<tr>
<td>Plant Alkaloids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vinblastine</td>
<td><em>Warm</em> packs for 15-20 minutes at least 4 times per day for the first 24-48 hours</td>
<td>Apply warm packs for 15-20 minutes at least 4 times per day for the first 24-48 hours</td>
</tr>
<tr>
<td>Vincristine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vinorelbine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxaliplatin</td>
<td><em>Warm</em> packs for 15-20 minutes at least 4 times per day for the first 24-48 hours</td>
<td>Apply warm packs for 15-20 minutes at least 4 times per day for the first 24-48 hours</td>
</tr>
</tbody>
</table>

NOTE: If the drug is a non-vesicant, application of a simple cold compress and elevation of the limb may be sufficient to limit the swelling, etc.
Use of an Antidote

The evidence supporting the use of different antidotes is inconclusive. Their use should be carefully considered. Most small extravasations do not result in serious problems without injection of antidotes, so that injection of specific antidotes should likely be restricted to larger extravasations (>1-2mL).

The use of any antidote requires a physician order.

Table 3 – Suggested Antidotes

<table>
<thead>
<tr>
<th>Extravasated Drug</th>
<th>Suggested Antidote</th>
<th>Proposed Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>daunorubicin</td>
<td>dimethylsulfoxide (DMSO) 99% topical solution, apply to an area twice that affected by the extravasation (4 drops per 10 cm² of skin surface), allow to air dry, do not cover, repeat qid for at least 7 days.</td>
<td>Dimethylsulfoxide (DMSO) is believed to scavenge free radicals, causing vasodilation, speeding up the removal of the drug from the tissue.</td>
</tr>
<tr>
<td>doxorubicin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>epirubicin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mitomycin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vinblastine</td>
<td>Administered by physician only. Hyaluronidase 1500 units dissolved in 1 mL water for injections or 0.9% sodium chloride injection, infiltrated into affected area (as soon as possible after extravasation) subcutaneously using a 25-g needle in a clockwise fashion in divided doses around the site (change needle with each injection).</td>
<td>Hyaluronidase (Hyalase®): Breaks down hyaluronic acid (&quot;cement&quot;) in connective/soft tissue, allowing for dispersion of the extravasated drug, thereby reducing the local concentration of the damaging agent and increasing its rate of absorption.</td>
</tr>
<tr>
<td>vinorelbine</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*adapted from BCCA Guidelines, 2012

Patient Education

In the event of an actual or suspected extravasation, patients should be instructed to:

1. Elevate the limb for 24-48 hours, after which the patient is encouraged to resume normal activity.
2. Monitor the site and report increased pain, swelling, redness or skin breakdown.
3. Keep the site clean and dry. A light non-occlusive dressing may be applied.
4. After showering or bathing, gently pat the area to dry. Do not rub.
5. Analgesics should be used, as required, for pain.
6. Do not expose the area to sunlight.
7. Avoid clothing that constricts the affected area.
8. Do not apply any creams or ointments unless instructed to do so by a physician or nurse.
9. Patients should be closely followed after a suspected extravasation. Areas of extensive blistering or ulceration, progressive induration or erythema, or persistent severe pain are indications for surgical assessment. Surgical intervention should not be delayed.

FOR THE PATIENT: Care of a Suspected Extravasation

A rare but known complication of chemotherapy is extravasation, or leaking of the chemotherapy drug out of the vein. There is a possibility that some of the chemotherapy you received today leaked out of your vein and under your skin. Some chemotherapy drugs can cause skin irritation, sores, or tissue injury.

A chemotherapy nurse will be calling you on a regular basis to monitor your condition.

Care of the area:

To minimize the discomfort and irritation it is important for you to follow the instructions below:

- Apply a cold-/warm compress to the area 15-20 minutes at least 4 times a day for the next 24-48 hours
- Elevate the arm on a pillow whenever possible for the next 24-48 hours.
- Keep the site clean and dry.
- After showering or bathing, gently pat the area to dry. Do not rub the area.
- Monitor the site and report increased pain, swelling, redness or skin breakdown.
- Pain medication may be used, as required, for pain.
- Do not expose the area to sunlight.
- Avoid tight clothing in the affected area.
Do not apply any creams or ointments unless instructed to do so by a doctor or nurse. You may apply dry gauze loosely over the area.

Call your Doctor or Nurse if you notice any changes at the site including increased pain, redness, blisters or swelling.

If you develop a fever, follow the instructions on the yellow fever card.

REFERENCES


APPENDIX 2

Guidelines for the Management of Hypersensitivity Reactions / Anaphylaxis With Cancer Chemotherapy Agents

Adapted From QEII Health Science Centre
Approved By Oncology Therapy Subcommittee (2004)

Anaphylaxis
- Syndrome elicited in a **hypersensitive** individual on subsequent exposure to a sensitizing antigen
- Ranges from **localized response** to **systemic response** which may lead to **anaphylactic shock** and **death**

<table>
<thead>
<tr>
<th>Hypersensitivity Drug Reactions</th>
<th>Mechanism of Action</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>Re-exposure to a particular antigen IgE mediated (immediate reaction)</td>
<td>Penicillin allergy; most chemotherapeutic agents</td>
</tr>
<tr>
<td>Type 2</td>
<td>Cytotoxic reactions Manifest as hemolytic anemia, thrombocytopenia and granulocytopenia</td>
<td>Transfusion reactions</td>
</tr>
<tr>
<td>Type 3</td>
<td>Immune complex-mediated reactions</td>
<td>Systemic lupus erythematosus; serum sickness</td>
</tr>
<tr>
<td>Type 4</td>
<td>Cell-mediated (delayed reactions)</td>
<td>Graft rejection; contact dermatitis</td>
</tr>
</tbody>
</table>

Discussion
- May have no correlation with the known pharmacologic properties of the drug
- May occur on first exposure or develop after subsequent administration (i.e. a number of previous cycles)
- Only occurs in a small percentage of patients
- May present with early or late onset of symptoms

Chemotherapeutic agents for which pre-medications are routinely used to prevent adverse reactions
- cetuximab
- docetaxel
- gemtuzumab
- panitumumab
- paclitaxel
- rituximab
- trastuzumab
- temsirolimus
- monoclonal antibodies (in general)
Chemotherapeutic agents for which pre-medications are not routinely used but which may require treatment for allergic reactions that can occur during infusion

- alemtuzumab
- asparaginase
- bevacizumab
- bleomycin
- carboplatin
- etoposide

- The patient should be closely monitored when receiving drugs with documented potential for hypersensitivity response. The Registered Nurse (RN) must remain with the patient for the first 15 minutes when administering these drugs. Most reactions become evident early on within seconds or minutes after exposure to an antigen.

### Recognition and Clinical Features

<table>
<thead>
<tr>
<th>Category</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutaneous</td>
<td>facial flushing; urticaria rash; hives; pruritis; angioedema</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>pain; headache; chills; tachycardia; hypotension; hypertension; arrhythmias; shock; syncope</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>abdominal bloating; cramps; vomiting; diarrhea</td>
</tr>
<tr>
<td>Respiratory</td>
<td>dyspnea; bronchospasm; laryngeal spasm; wheezing; chest tightness; rhinorrhea; nasal congestion</td>
</tr>
<tr>
<td>Others</td>
<td>agitation; back pain; diaphoresis; fecal or urinary incontinence; anxiety, feeling of impending doom, “just don’t feel right”</td>
</tr>
</tbody>
</table>


Physician assessment to determine severity of reaction plus treatment plan

No further interventions and continue with chemotherapeutic agents

Rechallenge at a later date after option of:
- pre-meds of:
  → Dexamethasone 20 mg IV or oral dexamethasone 20 mg po 6 and 12 hours pre (i.e. Paclitaxel) [at least a period of 30 minutes prior to start of chemotherapeutic agent]
  → Diphenhydramine 50 mg IV [at least a period of 30 minutes prior to start of chemotherapeutic agent]
  → Ranitidine 50 mg IV [at least a period of 30 minutes prior to start of chemotherapeutic agent]
- Decreased rate of infusion
- Increased volume of diluent
- Have emergency equipment available (e.g. Crash Cart, Epinephrine 1:10,000, bronchodilators such as Salbutamol Nebules)

Algorithm (Ordered on specific PPOs)

Hypersensitivity Reaction (may occur on first or subsequent exposure)

No

Continue cancer chemotherapy treatment as ordered.

Yes

Stop infusion

Notify physician STAT

Physician assessment to determine severity of reaction plus treatment plan

Action: Nurse Administering Chemotherapy
- Assess vitals immediately then q10 minutes until symptoms resolve
- Maintain IV access
- Ensure mainline IV running - wide open (vascular space expander - 0.9% NaCl preferred)
- Assess respiratory status, loosen clothing, consider paging Respiratory Department for O₂
- Position patient supine with feet elevated if respiration not compromised.
- Administer Diphenhydramine 50 mg over 2 minutes IV push then Hydrocortisone 100 mg IV push slowly over 1 minute
- Have emergency equipment available (e.g. Crash Cart, Epinephrine 1:10,000, bronchodilators such as Salbutamol Nebules)

No further problems

Pre-med next cycle

No further treatment

Reaction
Retreatment Discussion

- Careful consideration of the risk versus benefit
- Discussion between patient and physician
- May be successful in certain circumstances: interventions with pre-medications such as H₁ and H₂ antagonists and/or a variety of options including increasing fluid volumes or slowing infusion rates may allow for re-treatment
- Most frequent agents encountered are listed below

<table>
<thead>
<tr>
<th>Chemotherapeutic Agent</th>
<th>Patients at Greatest Risk of Hypersensitivity Reaction</th>
<th>Re-Treatment Possibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxanes* (Paclitaxel or Docetaxel)</td>
<td>Patients receiving 1ˢᵗ or 2ⁿᵈ dose</td>
<td>Yes, in virtually all patients</td>
</tr>
<tr>
<td>Platinum Compounds* (Carboplatin or Cisplatin)</td>
<td>Patients receiving multiple (more than 6) courses</td>
<td>Occasionally</td>
</tr>
<tr>
<td>Epipodophyllotoxins* (Etoposide or Teniposide)</td>
<td>Patients receiving multiple courses. Reactions with the first exposure may occur.</td>
<td>Very little data in the literature</td>
</tr>
<tr>
<td>Asparaginases* (Escherichia coli asparaginase, Erwinia asparaginase)</td>
<td>Patients receiving multiple courses; patients receiving re-induction chemotherapy</td>
<td>Possibility</td>
</tr>
<tr>
<td>Rituximab</td>
<td>Patients receiving 1ˢᵗ dose. Patients with a high number (greater than 25,000/mm³) of circulating malignant cells or high tumor-burden</td>
<td>Yes</td>
</tr>
<tr>
<td>Trastuzumab</td>
<td>Symptoms generally occur during an infusion but onset may be after completion of an infusion. Patients with symptomatic intrinsic lung disease or with extensive tumor involvement of the lungs resulting in dyspnea at rest, may be at greatest risk of severe reactions.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* Adapted from Prevention and Management of antineoplastic-induced hypersensitivity reactions. Drug Safety 2001; 24 (10): 776 (Table VII)