

## Drug Preparation and Administration

Follow institutional policies for preparation and administration of hazardous medications when preparing or dispensing antineoplastic medications.

### ASPARAGINASE

#### Preparation

- Use asparaginase powder for reconstitution.
- Dilute to a concentration of 1,000 units/mL, 2,000 units/mL, 5,000 units/mL, or 10,000 units/mL, using SWFI or NS.
- Avoid extreme agitation of vial.
- Withdraw the volume required.
- Dispense
  - in a syringe.
  - diluted in 100 mL of NS or D5W for IV infusion: Not recommended.

#### Administration

- Intramuscular or subcutaneous: Preferred
- Intravenous
  - **Not recommended**
  - Increases the risk of severe hypersensitivity reactions
  - Infuse over at least 60 minutes
  - Should never be given as a rapid IV push injection

### BCG - Live

#### Preparation

- Use BCG powder for reconstitution.
- Available in:
  - 50 mg (TICE)
  - 81 mg (*TheraCys*)
  - 81 mg (*ImmunCys*)
- Draw up 2 mL to 5 mL of SWFI or NS and inject it into the vial.
- Rotate the vial gently to form a fine suspension.
- Avoid foaming, which may hinder withdrawing the proper dose.
- Withdraw the entire contents of the vial and dilute with 50 mL of NS.
- Do not filter product.
- Dispense in a 50 mL syringe or bag.
- The product should be used within 2 hours of mixing.

#### Administration

- Instill into the bladder by slow injection or gravity flow via a catheter
  - The solution is retained in the bladder for 2 hours.
  - The patient should be repositioned every 15 to 30 minutes.
  - Patients should void while seated to avoid splashing the urine.
  - For 6 hours after treatment, voided urine should be disinfected for 15 minutes with an equal volume of household bleach before flushing.

### BICALUTAMIDE

#### Preparation

- Use 50 mg tablets.
- Store at controlled room temperature (15°C to 30°C [59°F to 86°F]).

#### Administration

- Oral:
  - Once daily
  - With or without food
  - Should be taken at the same time each day

### BLEOMYCIN

#### Preparation

- Use bleomycin powder for reconstitution.
- Dilute to a concentration of 5 units/mL to 10 units/mL with BNS, NS, BWFI, or SWFI.
- Dispense in a syringe; **or**
- Dilute in 50 to 100 mL NS.

#### Administration

- Intravenous
  - Injection over 3 to 5 minutes
  - Short (15 to 60 minute) infusion
  - Intramuscular
  - Subcutaneous

### BORTEZOMIB

#### Preparation

- Use bortezomib powder for reconstitution.
- Dilute to a concentration of 1 mg/mL with NS.

**Administration**

- Intravenous
  - Rapid injection over 3 to 5 seconds

**CAPECITABINE****Preparation**

- Available as 150 and 500 mg tablets
- Tablets are unscored and film-coated.
- Breaking or cutting the tablets is difficult and not recommended.
- Store at controlled room temperature (15°C to 30°C [59°F to 86°F])

**Administration**

- Oral
  - Usually in 2 divided doses taken 12 hours apart.
- The dose is usually listed as the total daily dose, which is half the individual dose (eg, 2,000 mg/m<sup>2</sup>/day = 1,000 mg/m<sup>2</sup> twice a day).
- Care should be taken to ensure the intended daily dose is not taken twice a day.
- To minimize gastric irritation, capecitabine should be taken after meals with milk or a small snack.
- The manufacturer recommends taking it with water within 30 minutes after a meal.<sup>1</sup>

**CARBOPLATIN****Preparation**

- Use carboplatin injection 10 mg/mL or powder for reconstitution.
- Dilute the powder to a concentration of 10 mg/mL with SWFI, D5W, or NS.
- Dilute with 100 to 1,000 mL of D5W.
- Carboplatin is less stable in saline solutions, with up to 10% degradation within 24 hours.<sup>2</sup>
- If the drug is prepared in a saline diluent, the solution should be used within 8 hours.

**Administration**

- Intravenous
  - 30 to 60 minute infusion

**CARMUSTINE****Preparation**

- Use carmustine powder for reconstitution.
- Dilute with 3 mL absolute alcohol.
- Dilute to a concentration of 3.3 mg/mL to 20 mg/mL with SWFI, NS, or D5W.
- Dilute in 250 to 500 mL of D5W or NS.
- Dispense in a non-polyvinyl chloride (PVC) container.

- Carmustine is light-sensitive; protect from light immediately following preparation.

**Administration**

- Intravenous
  - 2-hour intravenous infusion
  - Infusion times less than 1 hour may cause venous irritation.
  - Use non-PVC tubing and infusion sets.

**CISPLATIN****Preparation**

- Use cisplatin injection 1 mg/mL.
- Dilute in 100 to 1,000 mL of NS or a saline/dextrose solution.
- To ensure stability, the infusion solution must have a final chloride concentration of at least 0.2%.

**Administration**

- Intravenous
  - 30 to 60 minute infusions are the most common.
  - Longer infusions, up to 24 hours, are occasionally used.

**CYCLOPHOSPHAMIDE****Preparation**

- Use cyclophosphamide powder for reconstitution.
- Dilute to a concentration of 20 mg/mL with SWFI, NS, or D5W.
- Dilute with 50 mL to 500 mL NS, D5W, or a saline/dextrose solution.

**Administration**

- Intravenous
  - Infusion over 10 to 60 minutes
  - Some institutions allow doses <1 g to be given as a slow IV injection.

**CYTARABINE****Preparation**

- Intravenous
  - Use cytarabine injection 20 mg/mL or 100 mg/mL or powder for reconstitution.
  - Dilute the powder to a concentration of 20 mg/mL or 100 mg/mL with the provided diluent, SWFI, NS, or D5W.
  - Dilute with 250 mL to 1000 mL of NS or D5W.
- Intrathecal
  - Use cytarabine hydrochloride powder for reconstitution.
  - Dilute the powder to a concentration of 20 to

100 mg/mL with preservative-free NS, D5W, or lactated Ringer's injection.

- Dilute with an unpreserved diluent to the desired volume (usually 5 to 10 mL) with NS, D5W, or lactated Ringer's injection.
- High dose and intrathecal dose solutions should be prepared using *unpreserved* diluents only.

#### **Administration**

- Intravenous
  - Short (1 to 3 hour) infusion
  - Continuous (24 hour) infusion
- Intrathecal injection

#### **DACARBAZINE**

##### **Preparation**

- Use dacarbazine, powder for reconstitution.
- Dilute the powder to a concentration of 10 to 20 mg/mL with SWFI, D5W, or NS.
- Dilute with 250 to 1,000 mL with D5W or NS.
- Dacarbazine is light-sensitive; protect from light immediately following preparation.

##### **Administration**

- Intravenous
  - 1 to several hour infusion
    - Central line: 1 to 2 hours
    - Peripheral line:
      - ♦ Infuse through a fast running D5W, NS, or a saline/dextrose solution.
      - ♦ Adjust the infusion rate to prevent, or minimize, pain during the infusion.

#### **DACTINOMYCIN**

##### **Preparation**

- Use dactinomycin powder for reconstitution.
- Dilute the powder to a concentration of 0.5 mg/mL (500 mcg/mL) with SWFI.
- Use of preservative-containing diluents during reconstitution results in a precipitate.
- Dispense in
  - syringe for IV injection.
  - 50 mL to 100 mL NS or D5W for infusion.

##### **Administration**

- Intravenous
  - IV injection over 1 to 5 minutes
  - Short (10 to 30 minute) infusion

#### **DAUNORUBICIN**

##### **Preparation**

- Use daunorubicin injection 5 mg/mL; or powder for reconstitution.

- Dilute the powder to a concentration of 5 mg/mL with SWFI, NS, or D5W.
- Dispense in
  - Syringe for IV injection over 3 to 5 minutes.
  - 50 mL to 100 mL NS or D5W for infusion.

##### **Administration**

- Intravenous
  - IV injection over 1 to 5 minutes
  - Short (10 to 30 minute) infusion

#### **DEXAMETHASONE**

##### **Preparation**

- Use
  - Tablets: 0.25, 0.5, 0.75, 1, 1.5, 2, 4, 6 mg
  - Oral solution: 0.5 mg/5 mL, 1 mg/mL
- Store at controlled room temperature (15°C to 30°C [30°F to 86°F])

##### **Administration**

- Oral
  - Usually as a single daily dose
  - The drug should be taken with food or after a meal.

#### **DOCETAXEL**

##### **Preparation**

- Use docetaxel injection 40 mg/mL.
- Use the provided diluent to make a 10 mg/mL solution.
- Caution should be exercised when preparing docetaxel:
  - The Institute for Safe Medication Practices (ISMP) has reported instances where, because the label on the diluent vial emphasizes the name of the active drug, the diluent was accidentally dispensed instead of the reconstituted drug.<sup>3</sup>
  - Errors in reconstitution of docetaxel related to overfill in the drug and diluent vials also have been reported.
    - The 20 and 80 mg vials contain 23.6 and 94.4 mg of docetaxel, respectively.
    - The diluent vials are also overfilled.
    - When reconstituted properly, the final solution contains 10 mg/mL of docetaxel.
    - The proper volume needed to obtain the required dose should be measured, rather than merely withdrawing the entire contents of the vial.<sup>4</sup>
- Dilute to a final concentration of 0.3 to 0.9 mg/mL with NS or D5W.
- Contact of undiluted docetaxel with plasticized equipment or devices is not recommended.

- Docetaxel solutions should be dispensed in glass, polypropylene, or polyolefin containers.

#### Administration

- Intravenous
  - Infusion over 1 hour
  - Administer through a non-PVC (low-sorbing) infusion set.

### DOXORUBICIN

#### Preparation

- Use doxorubicin injection 2 mg/mL or doxorubicin powder for reconstitution.
- Dilute the powder to a concentration of 2 mg/mL with NS.
- Intravenous
  - Dispense in
    - Syringe for IV injection.
    - 50 mL to 100 mL NS or D5W for infusion.
- Bladder irrigation
  - Dilute with to a concentration of 0.5 mg/mL to 2.25 mg/mL with NS.
  - Most common concentration: 1 mg/mL
  - Dispense in
    - Syringe; **or**
    - Dilute to a final volume of 50 to 100 mL with NS.
  - Containers should be clearly marked “For irrigation only” to avoid accidental intravenous administration.

#### Administration

- Intravenous
  - Injection over 3 to 5 minutes
  - Infusion
    - Short (15 to 60 minutes)
    - Continuous (24 hour)
- Bladder irrigation
  - Instill in the bladder by slow push or gravity flow through a catheter.
  - Solution is retained in the bladder for 1 to 2 hours, with the patient being repositioned every 15 to 30 minutes.

### DOXORUBICIN, LIPOSOMAL

#### Preparation

- Use liposomal doxorubicin injection (2 mg/mL).
- Dilute in 250 to 500 mL of D5W.
  - ≤ 90 mg: 250 mL
  - > 90 mg: 500 mL
- Do not
  - mix in NS.
  - filter.

- Preparations should be used within 24 hours of preparation.

#### Administration

- Intravenous
  - 30 to 60 minute infusion
  - **Or:**
    - Initial rate, 1 mg/minute
    - If no infusion-related adverse effects, increase rate to finish the infusion in 1 hour.

### EPIRUBICIN

#### Preparation

- Use epirubicin injection 2 mg/mL or powder for reconstitution.
- Dilute the powder to a concentration of 2 mg/mL with SWFI, NS, or D5W.
- Dispense in
  - syringe for IV injection.
  - 50 mL to 250 mL NS or D5W for infusion.

#### Administration

- Intravenous
  - Injection over 3 to 10 minutes
  - Short (15 to 20 minutes) infusion

### ESTRAMUSTINE

#### Preparation

- Use 140 mg capsule.
- Store in refrigerator (2°C to 8°C [35.6°F to 46.4°F]).

#### Administration

- Oral
  - On an empty stomach
  - Usually in 2 or 3 divided doses each day

### ETOPOSIDE

#### Preparation

- Use etoposide injection 20 mg/mL.
- Dilute in NS or D5W to a concentration of 0.2 mg/mL to 0.4 mg/mL.
- Concentrations >0.4 mg/mL are not stable and may precipitate during infusion.

#### Administration

- Intravenous
  - Infusion
    - Short (45 to 60 minutes)
    - Continuous (24 hour)
- Rapid injection or infusion (< 45 minutes) may cause profound hypotension.