Chemotherapy Safety: To Boldly Go

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Objectives

• Describe why extra safety measures are needed with chemotherapy

• Recognize common oral chemotherapy medications and understand oral chemotherapy safety precautions

• Describe the role of the pharmacy technician in maintaining chemotherapy safety
Safety

- Highly prevalent in today’s society
- Key component of good healthcare
- Self-explanatory?
Chemotherapy: Changing Times

• **Initial Meaning:** chemical treatment of disease
  – Antibiotics
  – Painkillers

• **Current Meaning:** antineoplastic agents
  – Individual drugs
  – Regimens
Chemotherapy Concepts

• Anti-neoplastic?

• Target: rapidly dividing cells

• Types of Chemotherapy
  – Cell Cycle Specific
  – Cell Cycle Non-specific
Goals of Chemotherapy

DESTROY CANCER
“Hazardous Drug”

• NIOSH/ASHP Definition:

1. Carcinogenicity
2. Teratogenicity/Developmental Toxicity
3. Reproductive Toxicity
4. Organ Toxicity at low doses
5. Genotoxicity
Chemotherapy Concerns

Can I get chemo into my system by mixing IVs or counting pills?

Will I be hurt if chemo splashes on me?

What are the long-term risks of working with chemo every day?

If I am pregnant, can chemo harm my baby?

What will happen if I stuck with a needle used to prepare chemo?

Can the chemo I am exposed to cause cancer?
Chemotherapy Safety

• ASCO/ONS Chemotherapy Standards
  – Multi-disciplinary focus
  – Address safe use of chemotherapy
    • Ordering/Prescribing
    • Preparation
    • Administration

• USP <797>
  – Pharmacy-specific focus
  – Governs preparation of sterile products
    • IV medications
    • Chemotherapy
Chemotherapy Safety Roles

• **Physician**
  – Assess patient
  – Diagnose type of disease
  – Determine appropriate chemotherapy

• **Pharmacist**
  – Review physician orders; serve as double-check
  – Educate and counsel patients
  – Serve as drug information resource
Chemotherapy Safety Roles

• **Pharmacy Technician**
  – Prepare chemotherapy and pre-meds
  – Serve as double-check for pharmacist
  – Maintain sterility of compounded preparations

• **Nurse**
  – Administer medications
  – Assess patient for response and reactions
  – Serve as double check to physician & pharmacist
Chemotherapy Safety Roles

• **Patient**
  – Consent to treatments, if desired
  – Play active role in understanding treatment
  – Ask questions
Forms of Chemotherapy

• Intravenous (IV)
• Oral (PO)
• Intrathecal (IT)
• Intra-arterial
• Intra-cavitary
INTRAVENOUS CHEMOTHERAPY
IV Chemotherapy

• Most commonly used form of chemotherapy

• Regimens for wide variety of cancers

• Extra safety precautions are paramount
  – Special equipment
  – Hazardous drugs
Preparing IV Chemotherapy

• Sterile Compounding Hood
  – Vertical airflow
  – Negative pressure

• Personal Protective Equipment (PPE)
  – Gloves
  – Gowns
  – Eye protection
  – Chemotherapy-specific
Sterile Compounding Hoods

- Laminar Flow
- Compounding non-hazardous sterile preparations
- Not for use with chemotherapy
Sterile Compounding Hoods

- Vertical-flow
- Compounding hazardous sterile preparations
- For use with chemotherapy
Personal Protective Equipment

Chemotherapy specific products

1. **Gloves**  ➔ no permeability
   - Chemotherapy can permeate standard gloves
   - Double gloving recommended (NIOSH)

2. **Gown**  ➔ low permeability material

3. **Goggles**
ASCO/ONS Labeling Requirements

- Chemotherapy is labeled immediately upon preparation with:
  - 2 patient identifiers
  - Full generic name
  - Route
  - Total dose to be given
  - Total volume
  - Date and time of preparation
  - Date and time of expiration if not for immediate use
IV Chemotherapy Trivia

Common Drugs
- Cisplatin
- Vincristine
- Paclitaxel
- Rituximab
- Cyclophosphamide

Which drug...
- Is fatal if given intrathecally?
- Requires special tubing and IV bags?
- Causes hypersensitivity reactions?
- Is absorbed through the skin?
- Cannot be mixed in D5W?
ORAL CHEMOTHERAPY
Oral Chemotherapy

• Rapidly growing area of cancer treatments
  – 25% of developmental chemotherapies
  – Ease of use

• Used in treatment of:
  – Brain Cancer
  – Lung Cancer
  – Colon Cancer
  – Breast Cancer
Oral Chemotherapy Safety

• **Misconception of Safety**
  – Familiarity with oral medications
  – Self-administration

• **Ease of Exposure**
  – Tablets/Capsules
  – Storage
Oral Chemotherapy Precautions

• Handling
  – Use gloves
  – Wash hands before and after gloving

• Counting
  – Hand counting only
  – DO NOT use automatic counting machines
  – Wash counting trays, etc after use

• Storage
  – Separate from non-chemotherapy agents
  – Follow manufacturer’s instructions
Common Oral Chemotherapy Agents

- Xeloda® → Capecitabine (Colon/Breast)
- Temodar® → Temozolomide (Brain)
- Tarceva® → Erlotinib (Lung)
- Zytiga® → Abiraterone (Prostate)
- Gleevec® → Imatinib (Lung)
Five Rights

- Right Drug
- Right Patient
- Right Dose
- Right Route
- Right Time
Review Questions

• Which of the following medication(s) requires oral chemotherapy safety precautions?
  
i. Lisinopril (Prinivil)
ii. Imatinib (Gleevec)
iii. Cyclophosphamide (Cytoxan)
iv. Temozolomide (Temodar)

A. I only
B. III only
C. II,III,IV
D. II and IV
E. I,II,III,IV
Review Questions

• What type of hood is used to prepare IV chemotherapy?
  
  A. Laminar-Flow hood
  B. Vertical-Flow hood
  C. Monk’s hood
  D. Biologic Safety Cabinet
Review Questions

• In which of the following situations should a technician intervene and question a prescription for chemotherapy?

A. When the dose is unusually large
B. If the usual pre-medications for an IV chemotherapy are missing
C. If the medication is new or unfamiliar
D. All of the above
References


