Chapter 3

Drug Administration: Safety and Procedures

Learning Objectives

- Define standing orders, one-time orders, and as-needed (prn) orders
- Discuss six patient rights of drug administration
- Explain routes of enteral medications (oral, rectal, sublingual, buccal) and demonstrate proper procedure for each

Learning Objectives

- Explain routes of parenteral medications (intravenous, intramuscular, subcutaneous, intraosseous, transdermal/topical, inhalation, endotracheal tube) and demonstrate proper procedure for each
Introduction

- Medication in the field can significantly improve patient outcome
- Paramedics must be cognizant of rules regarding medication orders and guidelines regarding patient and provider safety

Medication Orders

- Requires an order from medical direction to administer medication
- Medical direction
  - Physicians direct and monitor care given in prehospital environment
  - Online medical direction
  - Offline medical direction

Medication Orders

- All medication orders follow standard form and include:
  - Name of drug
  - Dose
    - Quantity followed by a unit of measure
Medication Orders

- All medication orders follow standard form and include:
  - Route
    - Oral
    - Rectal
    - Sublingual
    - Buccal
    - Endotracheal
    - Intramuscular
    - Subcutaneous
    - Transdermal/topical
    - Inhalation
    - Intravenous
    - Intraosseous

Medication Orders

- All medication orders follow standard form and include:
  - Frequency
    - One-time order, as needed, or for a duration of time

Medication Orders

- Standing orders
  - Instructions for treatment
  - Usually specific to particular patient presentation
  - May or may not require consultation with medical direction
  - Most appropriate for life-threatening conditions that require immediate intervention
Medication Orders

- One-time orders
  - Occur when paramedic has consulted with medical direction and received order for immediate drug intervention
  - Cannot repeat order without again consulting medical direction

Medication Orders

- As-needed orders
  - prn orders
  - Typically given for specific patient condition or physiologic parameter for pain and abnormalities of:
    - BP
    - Heart rate
    - Blood sugar
  - Can be obtained from medical direction to treat condition if it develops

Medication Orders

- Communication with medical direction
  - When orders are received, communication must be concise and clear
    - Write order down
    - Repeat order back to physician
    - Physician then confirms
Issues

- Patient safety
  - Use six patient rights of drug administration
    - Right patient
    - Right drug
    - Right dose
    - Right route
    - Right time
    - Right documentation

Provider Safety

- First rule: ensure your safety

- Scene safety includes:
  - Positioning vehicle in area of high visibility
  - Waiting for police arrival for shooting/stabbing call

Provider Safety

- Must use personal protection equipment (PPE) and follow universal precautions
  - Reduces likelihood that provider will be infected by pathogen when exposed to infectious blood, body fluids, respiratory droplets
  - Prevents disease with no cure
Provider Safety

- Must use PPE and follow universal precautions
  - Universal precautions
    - Assume all blood, body fluids, and patient materials are contaminated
    - Gloves
    - Masks

Provider Safety

- Must use PPE and follow universal precautions
  - Universal precautions
    - Highest risk for blood contamination

Provider Safety

- Must use PPE and follow universal precautions
  - Universal precautions
    - Studies of paramedic compliance with universal precautions have alarming results
      - Most complied with the use of gloves
      - Sharps handled properly 37% of the time
      - Rate of appropriate use of additional protective devices was unacceptable
Enteral Drug Administration Procedures

- Enter bloodstream through GI tract

- Route given:
  - Orally
  - Rectally
  - Sublingually
  - Buccally

Enteral Drug Administration Procedures

- Administration of oral medications
  - Majority of prescribed medications are taken orally in solid form
    - Pill
    - Tablet
    - Capsule
    - Liquid
Enteral Drug Administration Procedures

Administration of oral medications
- Orders for oral medications are often described as “PO”
  - By mouth
- Equipment needed:
  - Medication
  - Medication cup
  - Gloves
  - Drinking water

Limitations:
- Not practical or safe for patients with altered or depressed level of consciousness
- Not rapidly available to body for treatment of life-threatening emergencies
- Require absorption in GI tract

Procedure
- Observe universal precautions
- Verify drug order
- Confirm right patient, right medication, right dose, right route, right time
- Confirm patient has no allergies to medication being given
- When possible, explain to patient what medication is being given and why
Enteral Drug Administration Procedures

**Administration of oral medications**
- **Procedure**
  - Open medication container and tap out prescribed number of pills into medication cup, patient's hand, or your gloved hand
  - Do not crush solid medication
  - Place patient in sitting position
  - Ask patient to swallow medication with 4 to 5 oz water
  - Record time of drug administration in PCR
  - Evaluate patient for desired effects of medication and any adverse effects

**Administration of rectal medications**
- Used when patient cannot tolerate oral medication because of nausea or vomiting
- Used for treatment of pediatric seizures
- Medications often have butter-like consistency
- At room temperature, but once placed in rectum, body temperature melts medication into liquid form

**Equipment needed:**
- Gloves
- Suppository or medication to be administered
- Lubricant, if time permits
Enteral Drug Administration Procedures

- Administration of rectal medications
  - Procedure
    - Observe universal precautions
    - Verify drug order
    - Confirm right patient, right medication, right dose, right route, right time
    - Confirm patient has no allergies to medication being given
    - When possible, explain to patient what medication is being given and why

Enteral Drug Administration Procedures

- Administration of rectal medications
  - Procedure
    - Help patient disrobe
    - Ask patient to lie on side and draw his or her knees up toward the chest
    - Remove suppository from its wrapper and hold it at the rectum
    - Gently hold pressure at anal sphincter for a few seconds while patient takes a slow, deep breath and gently bears down

Enteral Drug Administration Procedures

- Administration of rectal medications
  - Procedure
    - Advance suppository into rectum approximately 1 inch
    - Once suppository has been placed, keep patient on his or her side for approximately 20 min if possible
    - Record time of drug administration in the PCR
    - Evaluate patient for desired effects of medication and any adverse effects

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Enteral Drug Administration Procedures

- Administration of sublingual medications
  - Applied to mucous membranes
    - Can be rapidly absorbed and transported by the bloodstream
  - Equipment needed:
    - Medication
    - PPE

Procedure
- Observe universal precautions
- Verify drug order
- Confirm right patient, right medication, right dose, right route, right time
- Confirm patient has no allergies to medication being given
- When possible, explain to patient what medication is being given and why

- Instruct patient to lift tongue
- Place one tablet under the tongue and ask patient to close his or her mouth
- If patient uses nitroglycerin spray, spray once under tongue or in buccal membrane per protocol
- Take patient's BP within 2 min of administration
- Record time of administration in the PCR
- Reassess and record vital signs
- Evaluate patient for desired effects of medication and any adverse effects
Enteral Drug Administration Procedures

- Administration of buccal medications
  - Mucous membrane inside cheek
  - Safe only for conscious patients with intact gag reflex
  - Oral glucose medication administration
  - Equipment needed:
    - Medication
    - Gloves
    - Tongue depressor or other appropriate applicator
    - PPE

Enteral Drug Administration Procedures

- Administration of buccal medications
  - Oral glucose medication administration
    - Procedure
      - Observe universal precautions
      - Verify drug order
      - Confirm right patient, right medication, right dose, right route, right time
      - Confirm patient has no allergies to medication being given
      - When possible, explain to patient what medication is being given and why

Enteral Drug Administration Procedures

- Administration of buccal medications
  - Oral glucose medication administration
    - Procedure
      - Place medication between patient’s gum and cheek near location of molar teeth
      - Advise patient not to drink any fluids while medication is dissolving and being absorbed
      - Record time of drug administration in the PCR
      - Evaluate patient for desired effects of medication and any adverse effects
Enteral Drug Administration Procedures

Parenteral Drug Administration Procedures

- Most common route of drug administration used by paramedics
- Includes any route of drug administration other than absorption from the GI tract

Parenteral Drug Administration Procedures

- More effective route because medications given intravenously produce blood levels that are reliable and available almost immediately
- Limitation
  > Need for special training and equipment
Parenteral Drug Administration Procedures

- **Equipment**
  - **Syringes**
    - Used for injecting fluid into or withdrawing fluid from the body
    - Can be made of glass or plastic
    - Wide spectrum of sizes from 1 to 50 mL
    - Tip
    - Luer lock syringes
    - Barrel
    - Plunger

- **Equipment**
  - **Needles (sharps)**
    - Are a critical and a potentially dangerous tool
    - Hub
    - Shaft
    - Bevel
    - Have different gauges, determined by diameter
Parenteral Drug Administration Procedures

- Equipment
  - Needles (sharps)
    - Butterfly needles
      - Small, short needles with plastic tabs
      - Attached to the needle is a small piece of clear plastic tubing with IV connector
      - Used to withdraw blood or establish IV in children and adults with small veins
      - Needle is inserted into vein while wings of butterfly are held
      - Access to vein is confirmed by small return of blood into tubing
  
  - Many needles now contain plastic needle cover attached to hub of needle by a plastic syringe
    - Allow cover to be swung over needle
    - Once in place, this plastic cover cannot be removed
  
- Needle safety guidelines:
  - Never resheath needle
  - Never remove plastic needle sheath with your teeth
  - Do not let needles lie around
  - Once needle is used, it should be discarded immediately in appropriate sharps container
  - Ensure sharps containers are changed before they are full
  - Never stick needle and syringe in cushion of a cot or bench of ambulance
Parenteral Drug Administration Procedures

- Administration of intramuscular injections
  - Administers medication directly into muscle tissue and absorbed in general circulation
  - Several muscles are appropriate sites for injection
  - Size of needle depends on site of injection and size of muscle group
  - Needle is placed deep in muscle tissue
  - Needle accidentally placed into nerve can result in permanent pain and disability

Parenteral Drug Administration Procedures

- Administration of intramuscular injections
  - Deltoid muscle
    - At top of shoulder
    - Excellent choice for IM injection of emergency medications
    - In adults, deltoid can tolerate an injection volume of 2 mL
    - Appropriate area for IM injection is triangular area on lateral aspect
    - Radial nerve can be damaged from improper IM injection
Parenteral Drug Administration Procedures

- Administration of intramuscular injections
  - Thigh muscles
    - Proper place of injection: place 1 hand on upper thigh and 1 hand on lower thigh
    - Area between 2 hands on anterior surface of thigh – vastus lateralis
    - In adults, up to 5 mL can be injected
    - Preferred site for infants until deltoid becomes more developed

- Dorsogluteal injections
  - Hip injections
  - Upper outer quadrant of buttocks
  - Do not use in patients younger than 2 years or very thin and emaciated
  - Place patient on his side with knees flexed toward chest
  - Ask patient to rotate toes inward
  - Locate posterior iliac spine
  - Then locate greater trochanter of femur
  - Imagine line between 2 points
Parenteral Drug Administration Procedures

- Administration of intramuscular injections
  - Ventrogluteal injections
    - Preferred for children
    - Variation in sizes of muscles in children
    - Place patient on his or her side
    - Put your hand on side of hip with heel of your hand resting on greater trochanter
    - Thumb toward umbilicus
    - Index finger on anterior iliac spine tubercle
    - Middle finger on posterior iliac crest
    - With index finger, point to anterior iliac spine
    - Area of injection is the V formed by your hand
Parenteral Drug Administration Procedures

- Administration of intramuscular injections
  - Procedure
    - Observe universal precautions
    - Verify drug order
    - Confirm right patient, right medication, right dose, right route, right time
    - Confirm patient has no allergies to medication being given
    - When possible, explain to patient what medication is being given and why

- Equipment needed:
  - 21 gauge 1 ½ needle
  - Syringe with desired amount of drug
  - Alcohol wipe
  - Gloves
  - Sharps container
  - Adhesive bandage
  - PPE

- Determine appropriate muscle site for IM injection
- Identify landmarks for injection
- Prepare area for injection with alcohol
- Insert needle with rapid, dartlike motion
- Insert needle at a 90° angle to the surface of the skin
- Pull back on syringe to ensure that the tip of the needle is not in a blood vessel
- Inject medication
Parenteral Drug Administration Procedures

Administration of intramuscular injections

- Procedure
  - Remove needle
  - Immediately dispose needle and syringe in approved sharps container
  - Apply pressure to area
  - Record the of drug administration in PCR
  - Evaluate patient for desired effects of medication and any adverse effects

Some medications used in IM injections are irritating to soft tissues and can result in skin staining

- Hydroxyzine
- Should be injected by Z-track technique
Parenteral Drug Administration Procedures

- Administration of intramuscular injections
  - Intramuscular medication administration: Z-track technique
    - Procedure
      - Observe universal precautions
      - Verify drug order
      - Confirm right patient, right medication, right dose, right route, right time
      - Confirm patient has no allergies to medication being given
      - When possible, explain to patient what medication is being given and why

Procedure

- Determine appropriate muscle site for IM injection
- Identify landmarks for injection
- Prepare area for injection with alcohol
- Stretch skin to one side approximately 1 inch

Equipment needed:
- Medication
- Gloves
- Syringe
- Needle
- Alcohol prep
- Dressing
- Sharps container
- PPE
Administration of intramuscular injections

Intramuscular medication administration: Z-track technique

• Procedure
  ➢ Insert needle with a rapid, dartlike motion at a 90° angle to surface of the skin
  ➢ Pull back on syringe to ensure the tip of the needle is not in a blood vessel
  ➢ Inject medication slowly and wait approximately 5 seconds
  ➢ Remove needle and let skin slide back into place

• Immediately dispose of needle and syringe in approved sharps container
• Apply pressure to area
• Do not massage the area
• Record time of drug administration in the PCR
• Evaluate patient for desired effects of medication and any adverse effect
Parenteral Drug Administration Procedures

- Administration of intramuscular injections
- Intramuscular medication administration: Z-track technique
  - Administered just below epidermal layer of skin
  - Most often used for allergy and tuberculin testing
  - Local anesthetics

- Intradermal medication administration
  - Equipment needed:
    - Medication
    - Gloves
    - Syringes
    - Needle
    - Alcohol prep
    - Dressing
    - Sharps container
    - PPE

- Procedure
  - Observe universal precautions
  - Verify drug order
  - Confirm right patient, right medication, right dose, right route, right time
  - Confirm patient has no allergies to medication being given
  - When possible, explain to patient what medication is being given and why
Parenteral Drug Administration Procedures

- Administration of intramuscular injections
  - Intradermal medication administration
    - Procedure
      - Calculate dose, and withdraw appropriate amount of medication in a syringe (usually less than 0.5 mL)
      - Determine appropriate site for intradermal injection
      - Cleanse site with antiseptic wipe
      - Tell patient that he or she will feel brief discomfort during the injection
      - Retract skin below site and hold taut
      - Insert needle bevel up into skin at a 10° to 15° angle
  
- Administration of subcutaneous injections
  - Subcutaneous (Sub-Q) space
    - Tissue between dermis of skin and underlying muscle
    - Does not tolerate injection volume more than 2 mL
    - Dose is usually less than 0.5 mL
    - Does not have rich blood supply
    - Are quick and easy to perform
    - Small syringes and needles are used
Parenteral Drug Administration Procedures

- Administration of subcutaneous injections
  - Subcutaneous (Sub-Q) space
    - Small syringes and needles are used
    - Site of injection:
      - Upper arms
      - Upper back
      - Scapular region
      - Self-administration: usually abdomen and anterior thigh
  - Medications must be potent because volumes administered are small

Parenteral Drug Administration Procedures

- Equipment needed:
  - Medication
  - Gloves
  - Syringe
  - Needle
  - Alcohol prep
  - Dressing
  - Sharps container
  - PPE
**Parenteral Drug Administration Procedures**

**Administration of subcutaneous injections**

- **Procedure**
  - Observe universal precautions
  - Verify drug order
  - Confirm right patient, right medication, right dose, right route, right time
  - Confirm patient has no allergies to medication being given
  - When possible, explain to patient what medication is being given and why

- **Procedure**
  - Determine appropriate muscle site for Sub-Q injection
  - Draw medication into syringe
  - Prepare area for injection with alcohol
  - Hold skin at site of proposed Sub-Q injection flat with one hand
  - Insert needle at a 45° angle
  - Aspirate before injection except when injecting heparin

- **Procedure**
  - Inject medication
  - Remove needle
  - Immediately dispose needle and syringe in approved sharps container
  - Apply pressure to area
  - Record time of drug administration in the PCR
  - Evaluate patient for desired effects of the medication and any adverse effects
Administration of topical medications

Administered to skin for direct treatment of a skin condition or systemic absorption through skin and transportation through bloodstream.

- Most common: nitroglycerin ointment
- Administration sites:
  - Chest
  - Upper arm
  - Flank

Do not shave skin.

- Ointments and creams should be applied with a tongue depressor.
- Nitroglycerin is now supplied with small pieces of applicator paper.
- Topical patches are becoming popular.

Equipment needed:

- Medication
- Gloves
- Alcohol prep
- Template
- Adhesive dressing
Parenteral Drug Administration Procedures

- Administration of topical medications
  - Procedure
    - Observe universal precautions
    - Verify drug order
    - Confirm right patient, right medication, right dose, right route, right time
    - Confirm patient has no allergies to medication being given
    - When possible, explain to patient what medication is being given and why

- Administration of topical medications
  - Procedure
    - Clean skin with alcohol prep
    - Apply applicator with the nitroglycerin ointment to the skin, with ointment side facing down
    - Do not rub medication into skin
    - Record time of drug administration in the PCR
    - Evaluate patient for desired effects of the medication and any adverse effects
Parenteral Drug Administration Procedures

- Administration of medications through ET tube
  - In life-threatening emergencies patients may require medications immediately, before IV or IO access has been established
  - Can administer several drugs through ET tube if patient is intubated
  - Drug is immediately delivered to basic lung units, the alveoli, and rapidly absorbed by numerous blood vessels that cover each alveolus

- Medication should be 2 to 2.5 x dose of medication given intravenously
- Only appropriate until reliable IV or IO access has been established

- Equipment needed:
  - Medication
  - Gloves
  - Syringe
  - Normal saline or sterile water
Parenteral Drug Administration Procedures

- Administration of medications through ET tube
  - Procedure
    - Observe universal precautions
    - Verify drug order
    - Confirm right patient, right medication, right dose, right route, right time
    - Confirm patient has no allergies to medication being given
    - When possible, explain to patient what medication is being given and why

- Dilute medication in 10 mL of normal saline or sterile water for adult patients and 5 mL of normal saline for pediatric patients
- If possible, remove needle from syringe
- If cardiopulmonary resuscitation is in progress, hold compressions
- Ask another EMS provider to grasp ET tube firmly, and remove bag-mask

- Administer medication into ET tube
  - “Push” medication down the tube with 2 or 3 strong ventilations with bag-mask
  - Resume compressions if required
  - Continue to try to obtain IV line for additional medication if required
  - Record time of drug administration in the PCR
  - Evaluate patient for desired effects of the medication and any adverse effects
Questions?