Health ONE EMS Emergency Medical Services

ARAPAHOE COMMUNITY COLLEGE

IV Approval Course Outline

I. Policies and Procedures

II. Overview of IV Therapy

- a. History
- b. Benefits

III. Medical Legal

- a. Scope of practice
- b. Colorado acts allowed
- c. Standard of care
- d. Protocols
- e. Standing orders
- f. Legalities
  - i. Omission
  - ii. Commission
  - iii. Consent
    1. Informed
    2. Expressed
    3. Implied
    4. Involuntary
  - iv. Assault
  - v. Battery
  - vi. Negligence
    1. Duty to act
    2. Breach of duty
    3. Actual damage
    4. Proximal cause
  - vii. Malfeasance
  - viii. Misfeasance
  - ix. Nonfeasance
  - x. Abandonment
- g. Patient refusal

IV. Documentation

- a. Importance
- b. Purpose
- c. Elements
- d. What to document
- e. Special situations

V. Infection Control

a. Pathogen
b. Routes of exposure
c. Blood borne pathogens
    i. HIV
    ii. Hepatitis
d. Other pathogens
    i. Tuberculosis
    ii. Meningitis
e. Personal protective equipment

VI. Vascular and Skin Anatomy and Physiology

a. Systemic circulation
b. Arterial system
c. Venous system
d. Blood
    i. Composition
    ii. Function
    iii. Hemoglobin and Hematocrit
    iv. Clotting
    v. Types
    vi. Transfusions
e. Properly placed catheter
f. Skin

VII. Fluids and Electrolytes

a. Total body water
    i. Function
    ii. Percentage
    iii. Compartments
    iv. Regulation and balance
b. Electrolytes
    i. Cations
    ii. Anions
    iii. Functions
c. Solutions
    i. Crystalloid
    ii. Colloid
    iii. Oxygen carrying
d. Tonicity
    i. Isotonic

ii. Hypotonic
iii. Hypertonic

e. Movement of Fluids
   i. Diffusion
   ii. Osmosis
f. IV Fluids
   i. Uses
   ii. Effects
   iii. Selection
   iv. Packaging
   v. Labeling
   vi. Inspection

VIII. Hypoperfusion (Shock)

a. Definition
b. Types
   i. Hypovolemic
   ii. Anaphylactic
   iii. Neurogenic
   iv. Septic
c. Body response
d. Presentation

IX. Site Selection and Preparation

a. Peripheral IV sites
b. Commonly used sites
   i. Hand
   ii. Forearm
   iii. Anticubital fossa
c. Uncommon sites
   i. Upper arm
   ii. Legs
d. Site selection criteria
   i. Trauma
   ii. Cardiac arrest
   iii. Medical patients
   iv. Burns
e. Site evaluation
   i. Vein assessment
   ii. Vein appearance
   iii. Vein “feel”
   iv. Vein direction

v. Valves and other elements
vi. Tendons
vii. Bifurcations
viii. Joints

f. Factors affecting vein size and condition
   i. Age
   ii. Hydration status
   iii. Underlying medical conditions
g. Venous distension
h. Site preparation
   i. Aseptic technique
   ii. Clean technique

X. IV Equipment

a. IV Catheters
   i. Style
   ii. Size
   iii. Use
b. Butterfly needles
   i. Size
   ii. Style
   iii. Use
c. Administration sets
   i. Size
   ii. Types
   iii. Use
d. Constricting bands
e. Fluids
   i. Is this a trauma patient?
   ii. Is this a medical patient
   iii. Does the patient need fluid replacement?
f. Site preparation
g. Securing devices
   i. Tape
   ii. Commercial devices

XI. IV Initiation

a. Patient preparation
   i. Assessment
   ii. Consent
   iii. Emotions

b. Infection control
    i. Provider
    ii. Patient
c. Gather and prepare supplies
d. Site selection and preparation
e. Venipuncture
    i. Catheter selection
    ii. Catheter preparation
    iii. Angle of insertion
    iv. Confirmation of placement
    v. Advancement of catheter
    vi. Needle disposal
f. Risks
    i. Air embolus
    ii. Catheter shear
    iii. Arterial puncture
g. Line attachment
h. Securing the line
i. Set the flow rate

XII. Fluid Administration

a. Monitor the patient
    i. Vitals
    ii. Breath sounds
b. IV patency
    i. Extravasation
    ii. Infiltration
    iii. Thrombus
    iv. Catheter against wall or valve
c. Monitor fluid flow
    i. Constricting band
    ii. Roller clamp closed
    iii. Drip chamber full
    iv. Bag position
    v. Kinked tubing
    vi. Compressed tubing
    vii. Equipment malfunction
d. Complications
    i. Pain
    ii. Local infection
    iii. Pulmonary edema
    iv. Fluid overload
    v. Thrombophlebitis

e. Reasons to discontinue the IV
    i. Infiltration
    ii. Pyrogenic reaction
    iii. Allergic reaction
    iv. Necrosis

XIII. Flow Rates

a. TKO / KVO
    i. Definition
    ii. Uses
    iii. Volume
b. Wide Open
    i. Definition
    ii. Uses
    iii. Volume
c. Bolus or Fluid Challenge
    i. Definition
    ii. Uses
    iii. Volume
d. Mathematical conversion
    i. Pounds to kilograms
    ii. Kilograms to grams
    iii. Grams to kilograms
    iv. Grams to micrograms
    v. Micrograms to grams
    vi. Milliliters to liters
    vii. Liters to milliliters
e. Fluid based on body weight
f. Fluid over time
g. Fluid based on body weight over time

XIV. Plebotomy

a. Definition
b. Uses
c. Considerations
d. Sites
e. Equipment
f. Patient preparation
    i. Allergies
    ii. Medications
    iii. Phobias
    iv. Consent

g. Venipuncture procedure
    i. Without an IV in place
    ii. With an IV in place
        1. Syringe
        2. Luer adapter
h. Blood collection
    i. Tubes
    ii. Order
    iii. Labeling
        1. Label all blood tubes with the following information:
        2. Patient's first and last name.
        3. Patient's age and sex.
        4. Date and time drawn.
        5. Name and EMS service of the person drawing the blood.
        6. May also employ a "blood band" (bracelet with stickers and identification numbers, along with the same information listed above. Attach this band to the patient's wrist, and then attach an ID sticker to each blood tube).
i. Termination
j. Aftercare
k. Documentation
l. Complications
    i. Inadvertent removal of IV catheter.
    ii. Damage to vein wall.
    iii. Hemolysis
    iv. Do not shake blood tubes too vigorously.

XV. Special Patient Considerations

a. Pediatric Patients
    i. Definition
    ii. Considerations
        1. Vein size
        2. Adipose tissue
        3. Immune system
        4. Organ development
    iii. Gaining access
        1. Assistance
        2. Explanation
        3. Site selection
        4. Catheter size
        5. Securing the IV
        6. Complications

b. Geriatric Patients
    i. Definition
    ii. Considerations
        1. Vein size
        2. Vein integrity
        3. Vein changes
            a. Elasticity
            b. Rolling veins
            c. Valves
            d. Thickness
            e. “Spider” veins
        4. Medical conditions
            a. Alzheimer’s
            b. Contractures
            c. COPD
            d. CHF
            e. Cancer
            f. Anticoagulants
            g.
        5. Skin changes
        6. Organ degradation
        7. Catheter size
c. Trauma patients
d. Critical patients

XVI. Special Procedures

a. Removing an IV
    i. Contact medical control
    ii. Remove the Catheter
        1. Use BSI precautions.
        2. Stop the IV flow by closing a clamp or the flow regulator.
        3. Remove any material securing the IV.
        4. Place a sterile gauze pad over the IV insertion site.
        5. Grasp the hub of the IV catheter and remove by pulling straight back.
        6. Be cautious of potential blood splatter.
        7. Apply direct pressure with the gauze until bleeding has stopped.
        8. Cover the site with a bandage and secure.
        9. Recheck the site frequently for sign of bleeding.
        10. Dispose of equipment properly.
b. Changing IV Tubing
    i. Use BSI precautions.
    ii. Prepare a new IV bag and administration tubing.

iii. Stop the IV flow by closing a clamp or the flow regulator.
iv. Remove any material securing the IV.
v. Changing IV Administration Tubing
vi. Occlude the vein by pressing downward over top of the vein where the tip of the catheter is estimated to lie, to prevent blood from flowing back through the catheter, as well as prevent air from entering the circulatory system.
vii. Carefully detach the IV tubing from the catheter hub.
viii. Insert the needle adapter of the new tubing into the catheter's hub.
ix. Open the slide clamp and/or regulator.
x. Administer several milliliters of IV fluid to ensure patency.
xi. Set the proper flow rate.
xii. Secure the new IV administration tubing to the patient.
xiii. Dispose of used equipment properly.

c. Changing an IV Bag
    i. Use BSI precautions.
    ii. Remove the protective cover over the administration set port on the new bag of IV fluid.
    iii. Stop the IV flow by closing the clamp.
    iv. Remove the IV tubing from the empty fluid bag.
    v. Insert the spike into the new IV bag.
    vi. Fill the drip chamber with IV fluid.
    vii. Move the slide clamp into the open position, and re-verify the drip rate is the desired one.
    viii. Dispose of old bag properly.
d. Saline Locks
    i. Beneficial procedure for patients not requiring fluid, or for whom the IV is being placed for precautionary reasons only.
    ii. Similar to an IV, but do not use administration tubing or an IV bag (hence no volume is infused).
    iii. Catheter insertion is the same.
    iv. Procedure uses short tubing with a clamp and a medication port.
    v. Materials Required
        1. IV catheter.
        2. Saline lock tubing.
        3. Syringe with 3 cc–5 cc sterile saline or commercial saline injection device.
        4. Tape or commercial securing device.
        5. Venous blood drawing equipment (as needed).
        6. Venous constricting band.
        7. Alcohol or betadine preparation.
    vi. Establishing a Saline Lock
        1. Use BSI precautions.

2. Attach the syringe containing the saline to the medication port of the saline lock tubing.
3. Flush the saline lock with the saline, leaving at least 2 ml in the syringe for use later.
4. Place an IV catheter as you would for a traditional IV.
5. Attach the saline lock tubing to the catheter hub.
6. Inject at least 2 ml of saline from the syringe into the lock.
7. Secure the catheter and saline lock.

XVII. Diabetic Emergencies

a. Prevalence
b. Implications
c. Blood glucose monitoring
    i. Indications
    ii. Procedure
    iii. Normal levels
d. Hypoglycemia
    i. Definition
    ii. Causes
    iii. Implications
    iv. Presentation
    v. Treatment
        1. Obtain a blood sample
        2. Oral glucose
        3. 50% Dextrose
            a. Class
            b. Indications
            c. Contraindications
            d. Effects
            e. Side effects
            f. Complications
            g. Dose
e. Hyperglycemia
    i. Definition
    ii. Causes
    iii. Implication
    iv. Presentation
    v. Treatment
f. Diabetic Ketoacidosis
    i. Definition
    ii. Causes
    iii. Implication
    iv. Presentation

v. Treatment

g. Non Ketotic Hyperosmolar Hyperglycemic Coma
   i. Definition
   ii. Causes
   iii. Implication
   iv. Presentation
   v. Treatment