



# TACTICAL FLUID RESUSCITATION



FMST 410



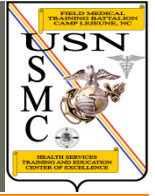
## IV OVERVIEW



- Terminology
- Indications and Contraindications
- Types of Fluids
- Equipment Required
- Procedural Steps
- Complications



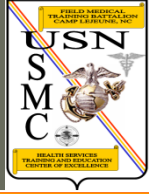
# IO OVERVIEW



- IO Supplies
- FAST1 Sequence
- FAST1 Complications
- Fluids
- FAST1 Removal



# LEARNING OBJECTIVES



Please Read Your

Terminal Learning Objectives

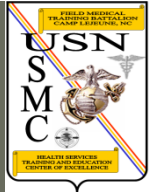
And

Enabling Learning Objectives





# TERMINOLOGY



- Homeostasis
  - a balance within the body between all the chemical reactions
- Electrolyte
  - an element that when melted or dissolved in a solvent, disassociates into ions and is able to carry an electrical current
- Crystalloids
  - IV solution consisting mostly of sodium chloride and other electrolytes; volume expander



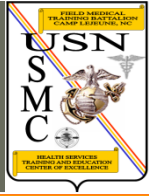
# TERMINOLOGY



- Colloids
  - Large molecules such as proteins; hypertonic volume expanders
- Body Fluid Compartments
  - spaces in the body where fluids are distributed
- Isotonic
  - solution that triggers the least amount of water movement

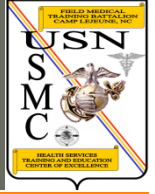


# TERMINOLOGY



- Hypotonic
  - solution that causes water to leave the vascular system and enter cells or surrounding tissues
- Hypertonic
  - solution that draws water from the surrounding cells and tissues back into the vascular system





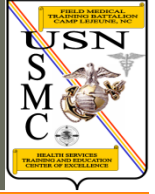
# INDICATIONS AND CONTRAINDICATIONS FOR PO FLUIDS



# PO FLUIDS



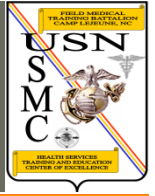
- Indications
  - Normal level of consciousness
  - Ability to swallow
- Contraindications
  - Decreased Level of consciousness



# INDICATIONS AND CONTRAINDICATIONS FOR IV THERAPY

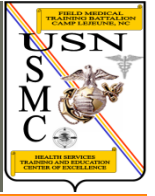


# INDICATIONS

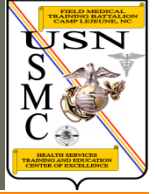


- Indications
  - Uncontrolled hemorrhage
  - Diarrhea or vomiting
  - Unable to tolerate fluids PO
  - To give IV meds
  - Burns
- Contraindication
  - Absence of signs and symptoms of above



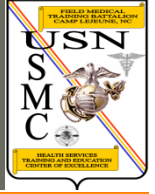


# TYPES OF IV SOLUTIONS



# TYPES OF IV SOLUTIONS

- Crystalloids
- Water and Glucose
- Colloids
- Whole Blood

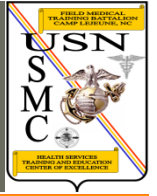


# TYPES OF IV SOLUTIONS

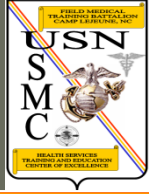
- CRYSTALLOIDS
  - Effective for short term volume replacement
  - Does NOT have oxygen carrying capacity
  - Does NOT contain proteins
  - After 1 hour administered, only 1/3 remains in cardiovascular system
  - Most common crystalloids
    - Normal Saline (NS)
    - Lactated Ringers (LR)



# CRYSTALLOIDS



- Indications
  - NS and LR are safe for most situations
  - Acceptable alternate to Hextend if not available
- Contraindications/Precautions
  - ALWAYS consider the risk of fluid volume overload
  - Excessive infusion may cause electrolyte imbalances



# TYPES OF IV SOLUTIONS

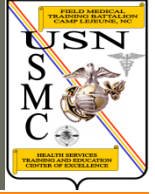
- WATER AND GLUCOSE SOLUTIONS
  - Hypotonic solutions
  - Most common concentrations:
    - D5W
    - D50W



# WATER AND GLUCOSE



- Indications
  - D5W – fluid replacement and caloric supplementation
  - D50W – for adults with hypoglycemic emergencies
- Contraindications
  - Do NOT use in head injuries
  - Do NOT use in massive tissue injuries
  - Will cause cellular swelling



# TYPES OF IV SOLUTIONS

- COLLOIDS AND PLASMA SUBSTITUTES
  - Hypertonic
  - Hextend (Fluid of choice for volume replacement in tactical situation)
  - Used to increase B/P
  - Possible increased bleeding time
  - Do NOT use more than 1000cc

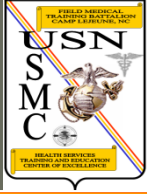


# TYPES OF IV SOLUTIONS

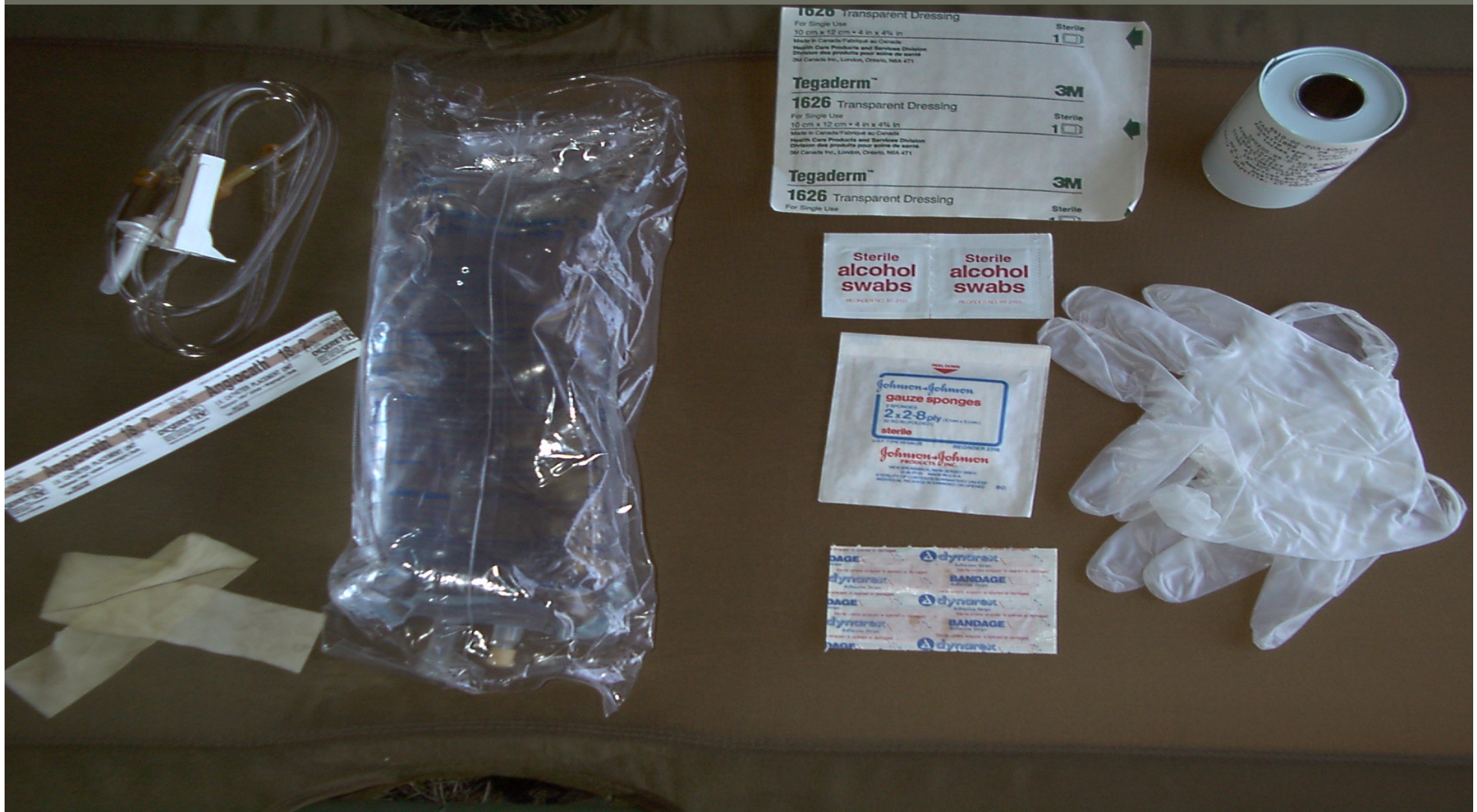


- WHOLE BLOOD
  - Not readily available in combat
  - MUST be ordered by a Medical Officer
  - Indications:
    - Acute massive blood loss

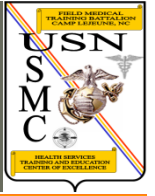




# IV THERAPY EQUIPMENT



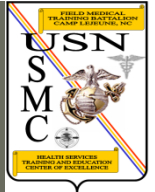




# PROCEDURAL STEPS

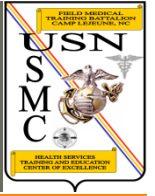


# PROCEDURAL STEPS



- Make your decision
- Assemble and check gear
- Prepare the administration set
- Prepare patient
- Select vein
- Insert IV
- Connect tubing
- Secure IV and start fluids







# COMPLICATIONS OF IV THERAPY

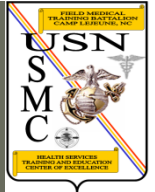
# INFILTRATION

- Escape of fluid from vein into tissue when catheter dislodges from the vein
- Symptoms
  - Edema
  - Localized pain or discomfort
  - Coolness to touch at the
  - Blanching of the site
  - IV flow slows or stops





# INFILTRATION



- Treatment
  - Discontinue IV
  - Select an alternate site
  - Apply a warm compress to the affected area
  - Elevate the limb
- Prevention
  - Secure the catheter properly
  - Limit movement of the limb





# PHLEBITIS

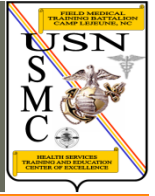


- Inflammation of a vein due to bacterial, chemical or mechanical irritation
- Symptoms
  - Pain along the course of the vein
  - Redness appears as a streak above vein and above the IV site
  - Warm to the touch
  - Vein feels hard or cordlike

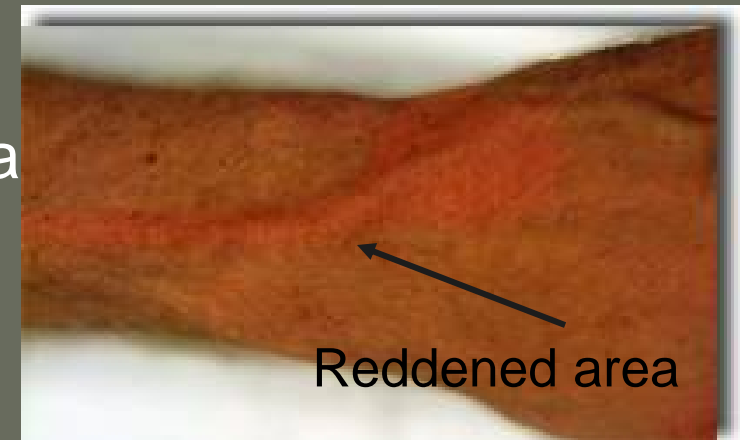




# PHLEBITIS

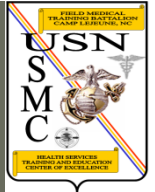


- Treatment
  - Discontinue IV
  - Warm compress to affected area
  - Antibiotics
- Prevention
  - Ensure aseptic technique
  - Place date/time when catheter was inserted on the tape
  - Rotate infusion sites based on local policies (usually every 72 hours)





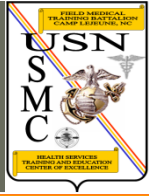
# NERVE DAMAGE



- Results from arm secured tightly, compressing nerves
- Symptoms
  - Numbness of fingers and hand
- Treatment
  - Reposition and loosen arm board
- Prevention
  - Ensure tape is not applied too tightly



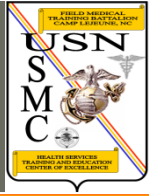
# CIRCULATORY OVERLOAD



- Increased fluid volume leading to heart failure and pulmonary edema.
- Results from infusing too much IV fluid too rapidly
- Symptoms
  - Headache
  - Venous distention
  - Dyspnea
  - Increased blood pressure
  - Cyanosis
  - Anxiety
  - Pulmonary Edema



# CIRCULATORY OVERLOAD



- Treatment
  - Slow down the flow rate
  - Place patient in high fowlers position (sitting position)
- Prevention
  - Monitor and control flow rate



# AIR EMBOLISM



- Air introduced into the blood through the IV tubing
- Symptoms
  - Cyanosis
  - Hypotension
  - Weak and rapid pulse
  - Shortness of breath
  - Tachypnea





# AIR EMBOLISM



- Treatment
  - Place patient on left side in Trendelenburg
  - Administer oxygen
  - Notify Medical Officer
  - Monitor vital signs
- Prevention
  - Flush IV line thoroughly to remove air prior to insertion
  - Monitor tubing during therapy
  - Avoid introducing air through a syringe or extension tubing



# SYSTEMIC INFECTION



- Caused by poor aseptic technique or contaminated equipment
- Symptoms
  - Sudden rise in temperature and pulse
  - Chills and shaking
  - Blood pressure changes

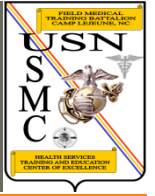


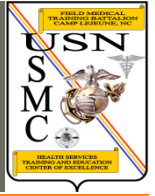


# SYSTEMIC INFECTION



- Treatment
  - Look for other sources of infection
  - DC IV and restart in other limb
  - Notify MO and anticipate antibiotic treatment
- Prevention
  - Ensure aseptic technique when starting IV
  - Place date/time when catheter was inserted
  - Rotate infusion sites based on local policies (usually every 72 hours)





# INTRAOSSSEOUS INFUSION



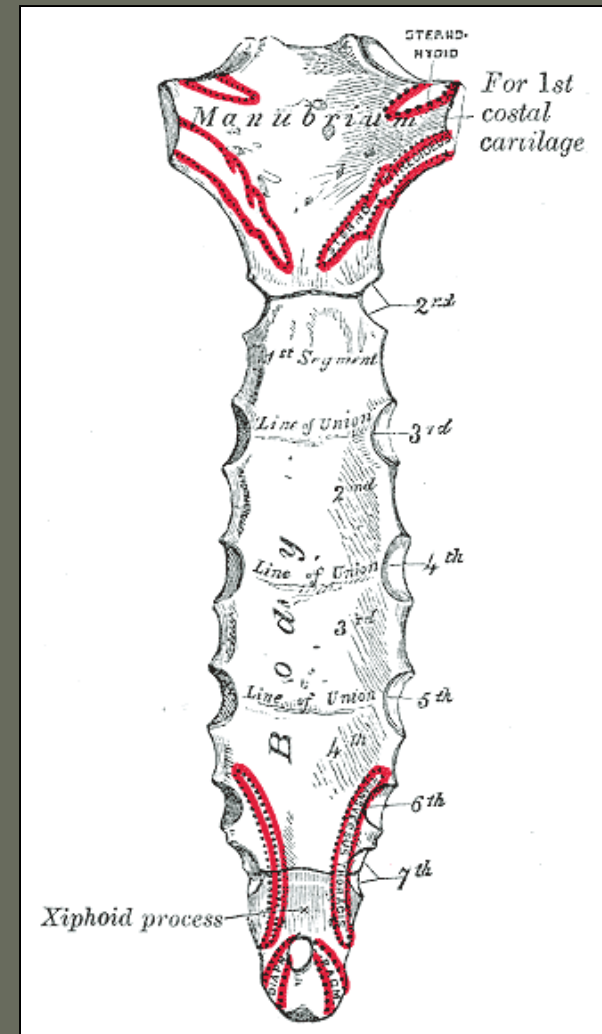
# IO INFUSION

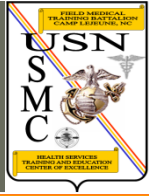


- Offers an alternate route for fluids
- Not meant to replace IV
- Used when IV access cannot be obtained
- Quick, reliable vascular access
- Fluids that can go IV can go IO

# ANATOMY

- Manubrium
- Body
- Xiphoid Process
- Jugular Notch





# IO SUPPLIES FAST1 KIT

# FAST1 COMPONENTS

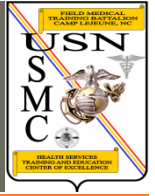
- First Access for Shock and Trauma (FAST1)



- Target/Strain Relief Patch
  - Match notch with sternal notch
  - Must be midline
  - Circular hole indicates target for IO



# FAST1 COMPONENTS

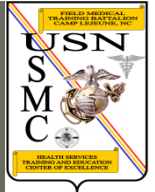


- Introducer
  - Hand held
  - NOT spring loaded
  - Depth control mechanism prevents over or under penetrating bone





# FAST1 COMPONENTS



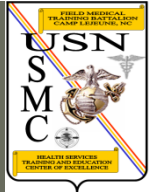
- Infusion Tube
  - Tube that sits inside the bone
  - Flexible



Quarter shown to illustrate size of tube



# FAST1 COMPONENTS

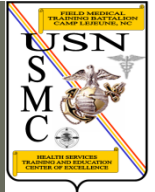


- Protector Dome
  - Fits over Target/Strain Relief Patch
  - Velcro fastened
  - Covers and protects





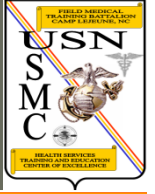
# FAST1 COMPONENTS



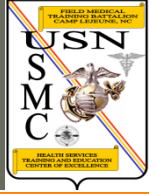
- Sharps Protection
  - Covered before use
  - Replace after use for additional protection
- Remover
  - Enables Infusion Tube to be removed







# PROCEDURAL STEPS FOR FAST1 INITIATION

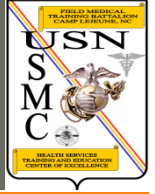


# FAST1 PROCEDURAL STEPS

- Use aseptic technique
- Align with jugular notch and verify midline
- Place Introducer over target area
- Press down using continuous pressure
- Pull Introducer straight back
- Connect tubing
- Place Dome over patch
- Start fluids
- Attach Remover package to patient

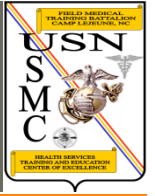


# FAST1 PROCEDURAL STEPS



- Do NOT pull back and re-push
- Do NOT use extreme force
- Insert Introducer perpendicular to sternum
- Ensure Remover package goes with casualty during TACEVAC

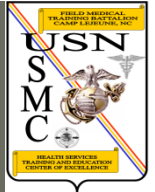




# POTENTIAL COMPLICATIONS OF FAST1 INSERTION



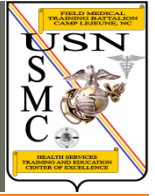
# COMPLICATIONS AND TREATMENT



- Sternal notch cannot be located
  - Abort procedure
- Patch incorrectly placed
  - Remove and reposition
- Patch will not stick
  - Shave or tape it down



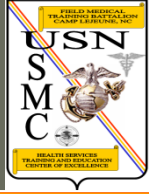
# COMPLICATIONS AND TREATMENT



- Introducer doesn't release
  - Re-attempt with new FAST1
- Introducer doesn't release with force
  - Check angle of insertion or the patient has hard bones
- Infusion tube falls out
  - Re-attempt with a new FAST1
-



# COMPLICATIONS AND TREATMENT



- Low or no flow through Infusion tube
  - Check for kinks, attempt to flush line
- Leakage at insertion site
  - Sometimes occurs and is acceptable

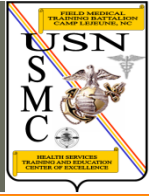




# HOW MUCH FLUID AND WHAT TYPE?



# HOW MUCH?



- Give 500 cc's of Hextend to shock casualty. If no improvement, give 500 cc more.
- Do NOT give more than 1000 cc

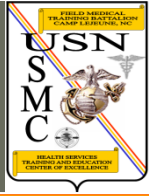


# WHAT TYPE?

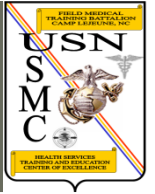


- Hextend is the fluid of choice in a tactical situation!
  - Thicker, stays in vascular system longer
  - Smaller, lighter, easier to carry
- No Hextend? Give LR or NS
- Minimal Fluid Resuscitation
  - Give enough fluid to return radial pulse





# DEMONSTRATION





# PRACTICAL APPLICATION





# TACTICAL FLUID RESUSCITATION

