EMTB Bleeding Control Drill

Instructor Guide

Session Reference: 1

Topic: Bleeding and Blood Loss

Level of Instruction: 3

Time Required: 3 hours

Materials:

- Chalkboard
- Cardiovascular system handouts
- Cardiovascular system visuals
- B/P cuff and stethoscope
- Assorted sterile dressings
- Assorted bandage materials

References:

- Emergency Care, 12th Edition, Brady Chapter 27
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PREPARATION:

Motivation:

Soft tissue injuries are among the most common injuries encountered in the field. An understanding of the underlying anatomy and physiology, quick recognition and rapid, efficient treatment are important to the successful recovery from these injuries.

Objective (SPO): 1-1

The student will be able to identify, from memory and without assistance, the components of blood, the vascular system and the effect of blood loss on the body.

Overview:

Review of the Vascular System Components and Functions

- Solid and Liquid Components of Blood
- Function of the Blood Supply
- Vascular System Anatomy and Physiology
- Effects of Blood Loss
- External Bleeding
- Internal Bleeding

SPO 1-1 The student will be able to identify, from memory and without assistance, the components of blood, the vascular system and the effects of blood loss on the body.

1-1 Describe the solid and liquid components of blood.

1-2 Describe the functions of the blood supply.

1-3 Describe the vascular system anatomy and physiology.

1-4 Describe the effects of blood loss on the body.

1-5 Identify the signs of external bleeding and demonstrate its control.

1-6 Identify the signs and symptoms of internal bleeding and demonstrate its treatment.

I. Components of Blood (1-1)

A. Solid Components

1. Red blood cells/erythrocytes
   a. comprise approximately 45% of blood volume
   b. comprise approximately 99% of all blood solids
   c. gives blood color
   d. produced in bone marrow
   e. combines with hemoglobin to carry oxygen to the cells

2. White blood cells/leukocytes
   a. destroys microorganisms (germs)
   b. produces antigens to help resist infections
   c. larger than red blood cells
   d. combine with platelets to make up approximately 1% of blood volume

3. Platelets/thrombocytes
   a. helps blood coagulate or clot
   b. smaller that red blood cells

B. Liquid Components

1. Plasma
    a. watery, salty fluid
    b. 92% is water
    c. 6 - 7% is protein
    d. remaining 1 - 2%
        1) electrolytes
        2) lipids
        3) enzymes
        4) clotting factors
        5) glucose
    e. comprise approximately 54% of the blood volume

II. Functions of Blood

A. Transportation of gasses
1. Oxygen
2. Carbon dioxide

B. Nutrition

C. Excretion

D. Protection
1. Antibodies

2. Leukocytes

E. Regulation

1. Hormones
2. Water
3. Salt
4. Enzymes
5. Chemicals
6. Body temperature

III. Vascular System (1-3)

A. Components

1. Arteries
    a. carry oxygenated blood away from the heart
        1) exception is pulmonary artery
    b. high pressure
    c. thick, muscular walls
    d. dilate/constrict depending on need for oxygen or nutrients
    e. major arteries
        1) aorta
        2) pulmonary
        3) carotid
        4) femoral
        5) posterior tibial
        6) dorsalis pedis

7) brachial
8) radial
9) ulnar

2. Arterioles
   a. smallest branches connecting the arteries to the capillaries

3. Capillaries
   a. smallest division of the vascular system
   b. all cellular exchanges occur at this level
      1) oxygen/carbon dioxide
      2) nutrients/waste products

4. Venules
   a. smallest branches connecting the capillaries to the veins

5. Veins
   a. carry oxygen depleted blood back to the heart
      1) exception is pulmonary vein
   b. much lower pressure than arteries
   c. contain one-way valves to prevent back flow
   d. major veins
      1) superior vena cava
      2) inferior vena cava

3) pulmonary

4) jugular

B. Vascular Structures

1. Tunica intima
   a. interior layer
   b. smooth to provide easy blood flow

2. Tunica media
   a. middle, muscular layer
   b. controls the vessel size

3. Tunica adventitia
   a. outer, fibrous layer
   b. maintains maximum vessel size

4. Lumen
   a. interior opening or diameter

IV. Effects of Blood Loss (1-4)

A. Physiological responses

1. Loss of blood volume
   a. body generally will not tolerate acute loss of 20% of volume

2. Loss of blood solids

3. Decreased oxygen level to the cells

4. Decreased waste elimination

5. Changes in vital signs
    a. increasing heart rate
    b. decreasing blood pressure

V. External Bleeding (1-5)

A. Types

1. Arterial
    a. bright red in color
    b. spurting

2. Venous
    a. dark maroon or blue in color
    b. steady flow

3. Capillary
    a. oozing

B. Control of External Bleeding

1. Direct pressure

2. Pressure dressing

3. Elevation - if no other injuries

4. Reinforce pressure dressing - if not controlled

5. Tourniquet - last resort

VI. Internal Bleeding (1-6)

A. Causes

1. Blunt trauma
    a. falls
    b. motor vehicle accidents
    c. auto-pedestrian collisions
    d. blast injuries

2. Penetrating trauma
    a. gunshot wounds
    b. stab wounds
    c. impaled objects

3. Medical history
    a. ulcers

B. Signs of Internal Bleeding

1. Surface injuries may indicate underlying injuries

2. Bruising, swelling or pain over vital organs

3. Painful, swollen or deformed extremities

4. Bleeding from body orifices

5. Tender, rigid or distended abdomen

6. Vomiting
   a. “coffee grounds”
   b. bright red
7. Dark, tarry stools or bright red blood in stool

8. Signs and symptoms of shock
   a. altered mental status
   b. pale, cool, clammy skin
   c. nausea and vomiting
   d. vital sign changes
      1) increased pulse
      2) increased respiration
      3) decreased blood pressure

9. Thirst

10. Dilated pupils

11. Cyanosis

C. Treatment of Internal Bleeding

1. Maintain airway, breathing and circulation

2. High concentration oxygen

3. Patient positioning
   a. supine with legs elevated 8 - 12 inches if no serious injuries

4. PASG

5. Splint fractures during transport

6. Maintain body temperature

7. Transport immediately

SUMMARY:

Review:

Review of the Vascular System Components and Functions

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Remotivation:

Assignment:

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EVALUATION: