



Etiology

Uncontrolled hemorrhage in the trauma patient is a potentially life-threatening condition that can lead to increased morbidity and mortality. Traumatic external hemorrhage can result from large open wounds, lacerations, peripheral vascular injuries, or partial/complete amputations. Traumatic internal hemorrhage may occur secondary to blunt, compression, deceleration, penetrating, closed orthopedic or crush injuries. This can damage organs or bones leading to major hemorrhage (e.g. pelvis, femur, liver, kidney, spleen, heart etc.).

Simple and rapid interventions can be potentially lifesaving. Pre-hospital treatment is aimed at managing the traumatic hemorrhage through the following interventions:

- Pressure applied to the wound by either direct pressure or pressure dressings
- Tourniquets when pressure fails to control the hemorrhage on an extremity injury
- Hemostatic agents when direct pressure fails to control the hemorrhage of an open wound to the core or when tourniquets fail to control the hemorrhage on an extremity
- Appropriate fluid resuscitation

Interventions

Basic Bleeding Control

- a. Direct pressure
- b. Elevation
- c. Pressure dressings

The use of arterial pressure points is not recommended. If bleeding is not controlled by the use of direct pressure/pressure dressing, tourniquet use should be considered.

Pelvic Binding

For training information, please refer to the MFR training module for pelvic binding.

Pelvic binding is intended for pelvic fractures and is not intended for cases of suspected hip or proximal femur fracture.

Significant bleeding can occur as the unstable pelvic ring is surrounded by dense venous and arterial vasculature that are injured by the mobile pelvis. The bleeding extends into a relatively large retroperitoneal space. Pelvic binding is used in an attempt to control hemorrhage by stabilizing the pelvic ring to allow for clot formation and reducing the potential pelvic volume.

- a. The patient's clothing (especially items around the pelvis) needs to be removed binding as belts, buckles, or any items in pockets will cause pain and discomfort when compressed, preventing adequate tension upon the pelvis. The sheet must also be free of wrinkles to prevent discomfort
- b. Ensure the sheet fits snugly across the pelvis and is positioned across the greater trochanter bilaterally
- c. The pre-hospital method of binding a pelvis allows for easy access to femoral vessels, and perineum for initial in-hospital procedures and evaluation. After patient stabilization,

- hospitals and aeromedical/interfacility transfer teams may elect to change to the in-hospital binding method
- d. Commercially prepared pelvic binding devices are acceptable providing personnel are trained and familiar with their use

Tourniquets

For training information, please refer to the MFR training module for tourniquets.

Tourniquets are an easily applied temporary measure to gain control of an extremity hemorrhage that cannot be controlled with direct pressure techniques. It needs to be applied early (before the patient is in hypovolemic shock) to improve resuscitation efforts. Tourniquets are reserved for potential life or limb threatening bleeds.

- a. Must be placed over exposed skin at least 5 cm proximal to wound. Do not place over joints
- b. Tighten tourniquet until bleeding stops
- c. Document time and location of tourniquet directly on or adjacent to the tourniquet and in the PCR
- d. Leave uncovered and as it may loosen with patient movement and transport resulting in further bleeding
- e. Bleeding uncontrolled by a single tourniquet may require an additional tourniquet applied above first tourniquet
- f. Assess and document neurologic and functional status of affected limb q 15 minutes
- g. Distal pulses should not be palpable if tourniquet placed properly

Patient Safety Considerations

Never remove a tourniquet; inappropriate removal of a tourniquet may result in death due to hemorrhage or from the release of potassium and lactic acid from devitalized tissues back into circulation.

Hemostatic Agents

Some MFR agencies may have access to various hemostatic agents. If a hemostatic agent is available, it may be considered for life-threatening uncontrolled hemorrhage to areas of the body to which a tourniquet cannot be placed or after two tourniquets have failed to stop the hemorrhage.

To use a hemostatic agent:

- a. Pour the powder or pack the dressing directly into the wound
- b. Apply a pressure dressing or a regular dressing with direct pressure for at least 3 minutes
- c. If bleeding continues, remove the dressing and apply a second application of the hemostatic agent and work deeper into the source of bleeding re-applying a dressing and bandage
- d. If using a hemostatic dressing, press firmly into the wound and bandage securely
- e. Send the empty package with the patient to provide information to the receiving facility

Fluid Resuscitation

There is scientific evidence that aggressive fluid resuscitation in hemorrhagic shock may be harmful. This is based on increasing blood loss through dilution of clotting factors and platelets as well as increased cardiovascular hydrostatic pressure. The goal is to maintain adequate cerebral perfusion pressure.

Administer normal saline 500 mL IV/IO bolus prn to a total maximum of 2 L, titrate to systolic BP 90 mmHg, or presence of radial pulses.

Patient Experience Considerations

- Tourniquets can cause significant pain, ensure pain medication is given when appropriate

Epistaxis (Nosebleed)

Nosebleeds are quite common and are usually controlled with manual, external compression, and tend to be self-limited. Severe nosebleeds can be profuse, persistent, and life threatening. They are complicated by airway compromise and vomiting of swallowed blood. Anyone in close proximity must be aware that this patient they may be spitting up blood which could splatter. Bodily fluid precautions are required.

Management of Epistaxis

- Don adequate PPE on.
- Keep the patient sitting up and leaning slightly forward unless there are signs of shock
- If blood is flowing from the nostrils, pinch the entire soft part of the nose right under the nasal bone and hold for 10 minutes. Assess to see if the nose is still bleeding, then if the patient continues to bleed, maintain pressure until EMS arrives
- Instruct the patient not to swallow blood and have the patient spit his/her blood into a container
- Maintain a clear airway and carefully suction the mouth if required
- If signs of shock are present, keep the patient supine with his/her head or entire body turned to one side

Consider OLMC for management of an uncontrolled hemorrhage in the pediatric patient.