





Objectives

- Review rates of unintentional death from exsanguination.
- Define and differentiate between the types of hemorrhage.
- Relate hemorrhage to signs and symptoms.
- Discuss current treatment strategies.

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Discuss objectives.



Introduction

- Avoiding preventable deaths by controlling external hemorrhage is an important EMS task.
- Internal bleeding is also of concern, but it will be addressed at a later time.

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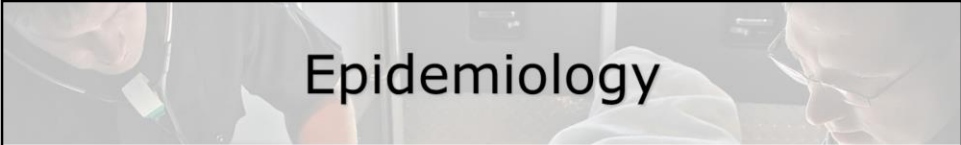
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Experience from recent military conflicts has consistently shown that bleeding from extremities is among the leading causes of preventable battlefield deaths.

Although it is always difficult to compare military and civilian medicine, avoiding preventable death by controlling external hemorrhage is an important lesson EMS should learn from the experience of military medics.

Although internal bleeding is an important subject, this topic focuses primarily on recognizing and treating external hemorrhage.



Epidemiology

- Per National Safety Council, unintentional injuries are the 5th leading cause of death in U.S.
- Bleeding to death may account for as many as 40% of those deaths, considering both internal and external bleeding.

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Review and apply epidemiology findings to likelihood and importance of EMT skills.

Pathophysiology

- Hypoperfusion, or shock, can be caused by pump, container, or fluid problems
- The most common reason for hypovolemic shock is blood loss
- Blood loss severity is influenced by location of vascular damage, type of vascular damage, and health of the patient

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External bleeding, depends greatly on the extent and location of the injury.

Damage to large vessels will typically create larger volumes of blood loss.

Furthermore, damage to the higher pressure arteries will result in a more rapid loss of blood.

Bleeding may also be associated with:

- Fractured bones
- Gastrointestinal tract disorders
- Abdominal or chest trauma
- Problems in the reproductive system

Pathophysiology

- Exsanguinating hemorrhage
 - Very specific and rare type of bleeding
 - Commonly associated with trauma
 - Patient may bleed to death within one minute
 - Progression through stages of shock will occur as more and more blood is lost

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Exsanguinating hemorrhage is a very specific and very rare classification of bleeding.

In this case, an artery or series of blood vessels has been damaged significantly enough to allow massive, life-threatening blood loss.

This type of bleeding is typically associated with trauma to the large blood vessels, such as the femoral and brachial arteries, and the hemorrhage exceeds what we normally consider “severe bleeding.”

In this case, the patient may bleed to death in less than one minute.

When this type of bleeding is identified, it must become the most important treatment priority.

Assessment Findings

- Primary assessment
 - Look for major bleeds
 - Check voids in the body
 - Bulky clothing
 - Change in mental status
 - Pulse quality and locations
 - Skin findings
- XABC

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External hemorrhage must be evaluated rapidly.

If you identify exsanguinating hemorrhage, you must act immediately!

In cases of exsanguinating hemorrhage, the traditional ABC model of the primary assessment now becomes XABC, with the X standing for “exsanguinating hemorrhage.”

In these rare instances, treating the massive bleeding is more important than even addressing airway concerns (although it would be best if both could be addressed simultaneously).

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Emergency Medical Care

- Spinal immobilization considerations
- Ensure adequacy of airway and breathing
- Circulation
 - Pulse, skin findings, bleeding control
 - Exsanguinating hemorrhage must be controlled immediately
 - Follow appropriate bleeding control progression

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Review and discuss slide.

Emergency Medical Care

- Bleeding control progression
 - Direct pressure
 - Dressings
 - Hemostatic agents
 - Splinting and position
 - Tourniquets

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Review the normal progression of external hemorrhage management.

The focus should be on “Care-Assess-Make Decision-Repeat”.

In other words:

- Provide care (e.g., direct pressure)
- Assess (e.g., is the care working?)
- Make Decision (e.g., is this care working how I WANT it to)
- Repeat (e.g., either continue with current care strategies, or go to next one)

Point being, don't keep doing something that is not working, hoping that at sometime it will work.

Figure 37-1 When treating external bleeding with direct pressure, apply gloved fingertip pressure over a dressing directly on the point of bleeding.

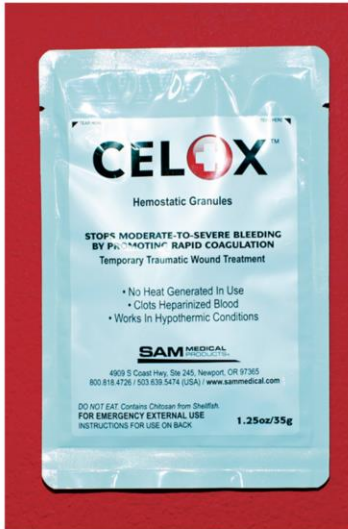


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Figure 37-2 Topical hemostatic agents, such as Celox™, are a recent development in wound care.



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Figure 37-3 Application of a hemostatic dressing.



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Emergency Medical Care

- Tourniquets
 - Once thought dangerous
 - Now known to be beneficial
 - Still last resort
 - Apply as instructed

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Remember that the idea of a tourniquet is to compress and occlude an artery.

In lower extremities, such as the tibia/fibula and radius/ulna, the major arteries run between the bones. As a result, occlusion of these arteries by a tourniquet is difficult. For this reason, some experts recommend that tourniquets should never be used distal to the elbow or the knee.

Always follow local protocol as to tourniquet location.

In general, tourniquets should be tightened until the bleeding stops and a distal pulse is lost in the extremity.

Figure 37-4 Example of a commercially available tourniquet



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Figure 37-5 Proper placement of a tourniquet is proximal to the wound, between the wound and the heart.



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Case Study

You are called to a residential address for a domestic dispute. After staging a block away and ensuring the PD has cleared the scene, you are brought in and presented with a male who is holding his left arm. You see blood dripping through his fingers, and he is swaying back and forth.

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Present case study.



Case Study

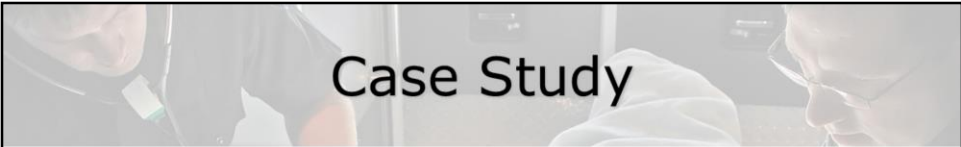
- Scene Size-Up
 - Standard precautions taken
 - Scene is safe, obvious struggle in room
 - Young male, 21 years old
 - Patient standing, but it looks like he may faint
 - No patient entry nor egress problems
 - No additional resources needed presently

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Present case study.



Case Study

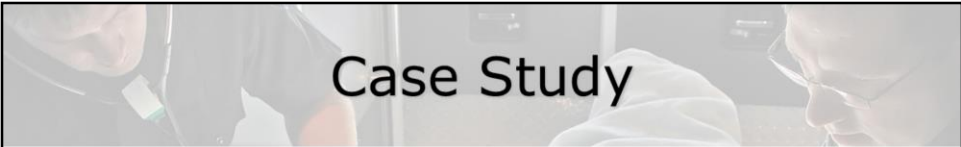
- Primary Assessment Findings
 - Patient responsive
 - Airway open and maintained by self
 - Breathing is rapid, breath sounds present
 - Carotid and radial pulses present, radial very weak
 - Peripheral skin cool, pale, sweaty
 - Patient has long and deep laceration to left forearm, bleeding profusely

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Discuss case presentation.



Case Study

- Is this patient a high or low priority? Why?
- What interventions should be provided at this time?

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This is an unstable patient.

Although the airway and ventilatory components are intact, the fact that the patient has a significant external bleed that is not controlled with their own applied direct pressure, makes this a high priority situation.

Interventions at this time would include first having the patient sit or lie down prior to them passing out.

Simultaneously the EMT should attempt to tamponade the bleed with their own direct pressure.



Case Study

- Given the mechanism, what would be the expected change in the patient's heart rate? Why?
- Why is the patient at risk for fainting or falling?

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Due to the fluid loss, the sympathetic nervous system would cause an increase in the heart rate and force of contraction to improve cardiac output in order to maintain perfusion pressure.

Due to the suspected blood loss, it becomes harder and harder for the body to maintain adequate perfusion pressures to the capillary beds of the body—and in this case especially the brain since the body is trying to pump blood “uphill” to the brain.



Case Study

- Medical History
 - Migraine headaches
- Medications
 - Some medication that he can't remember at this time
- Allergies
 - Demerol

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Discuss case study.



Case Study

- Pertinent Secondary Assessment Findings
 - Pupils dilated but reactive, membranes pale
 - Airway patent, breathing tachypneic
 - Peripheral perfusion now absent
 - Skin increasingly pale and diaphoretic

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Discuss case study.



Case Study

- Pertinent Secondary Assessment Findings
 - Patient's mental status still continuing to deteriorate
 - Extremity laceration still continuing to bleed
 - No other injury noted to body
 - B/P 72/palp, heart rate 124, respirations 20

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Discuss case study.



Case Study

- Is this patient's clinical status deteriorating, remaining the same, or improving?
- What clinical stage of shock would you say the patient is in?
- What would be the next step in bleeding management?

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Given the patient's elevations in the heart rate, deterioration in mental status, worsening skin findings, and no peripheral perfusion—the status of the patient is certainly deteriorating.

Given the mental status, heart rate, skin findings, and absent peripheral pulse—the patient is likely in the progressive stage of shock.

Without expedient and effective care, the amount of blood already lost may be enough to kill the patient.

The next step in bleeding control would be the application of dressings in conjunction with direct pressure by the EMT.



Case Study

- Should dressings and direct pressure fail, what other means are available for stopping the bleed?
- Describe normal components of tourniquet application according to location, width of band, and tightness.

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If dressings and direct pressure fail, the next step (according to the availability of the equipment), should include the use of hemostatic agents, providing splinting and positioning, and finally the application of a tourniquet.

When applying the tourniquet, consider the following:

- Location: consider placing it on the long bone proximal to the bleed on the arm
- Width of band: 1-2 inches wide. Narrower bands can cut into the soft-tissue of the arm.
- Tightness—tight enough to totally compress all blood vessels so that bleeding cessation will be achieved.



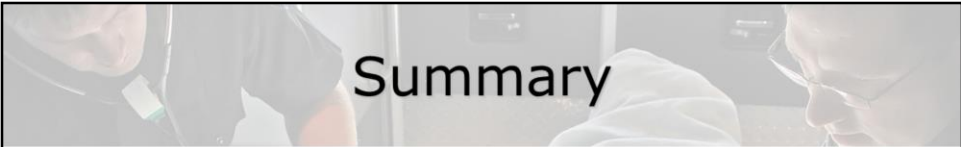
Case Study

- Care provided:
 - Patient placed supine, legs elevated
 - High-flow oxygen via NRB mask
 - Progressive management of bleed
 - ALS intercept started early
 - Transport to hospital initiated

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Summary

- Exsanguination can occur in minutes, literally, with large external bleeds.
- The primary survey is important to identify these injuries and provide appropriate treatment.
- Follow the recognized steps for bleeding management. This provides the best chance for the hemorrhage to stop.

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Review as appropriate.