Clinical Guidelines for

Delayed or Prolonged Transport

IV. Wounds

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Need

Conventional EMS guidelines recommend that wounds be managed by control of bleeding only. Impaled objects are stabilized and transported in position. This approach generally is appropriate for the conventional EMS context of rapid transport. Wounds and impaled objects are best transported quickly to definitive treatment in a hospital.

Wounds often develop significant infection, however, unless they are cleansed early. Early treatment of high-risk wounds is important, especially to control serious infection if evacuation is prolonged.

Stabilization of impaled objects can be impossible or impractical under some field conditions. Impaled objects that cannot be stabilized effectively and safely can cause significant patient packaging problems and can cause serious tissue damage during transport. This problem is magnified if transport is prolonged, especially in extreme environments during prolonged evacuation over difficult terrain.

Summary of Clinical Principles

1. After initial bleeding is controlled, some well-established, simple, and safe wound management principles can be applied in the field to help control infection.

2. Selected impaled objects generally should be removed in the field if:

    a) they cannot be stabilized effectively; and

    b) the patient cannot be packaged effectively or safely transported. The objective of field treatment is to cause the least tissue damage. Under these conditions, impaled objects

should be removed only if removal is simple, safe and easy.

3. Wound closure in the field by sutures or adhesive strips is not recommended as an EMS procedure. Wounds that generally do require evacuation to physician care for closure include:

a) cosmetic wounds;

b) wide, gaping wounds; and

c) wounds that involve injury to underlying structures.

4. Evacuation to physician care for wound closure is based on the following principles:

a) Wounds of the distal extremities (e.g., hands, feet) are best treated by early primary closure within six hours;

b) Wounds of the head and trunk generally can be treated by early primary closure up to 24 hours;

c) Wounds that cannot be closed within the time criteria for early primary closure (and most high-risk wounds) can be treated by delayed primary closure on about the fourth day after injury. If evacuation for early primary closure is impractical or impossible, the wound should be treated in the field as a high-risk wound during prolonged evacuation for delayed primary closure.

5. Field providers in special situations need guidelines for tetanus and rabies prevention and for the use of antibiotics that are based on well-established clinical principles.

6. Specific local clinical standards and field protocols are determined by local EMS physicians. The following Model Clinical Guidelines have been developed to assist EMS physicians in the development of local standards for the specialized context of delayed/prolonged transport. Protocols can be written and modified as necessary to reflect regional standards and physician preference**. The EMS provider is referred to local field protocols and is advised to act according to local clinical standards** for specific treatment procedures.

Definitions

1. *open wounds*-injury that extends through the full thickness of skin:

a) lacerations;

b) avulsions;

c) amputations; and

d) puncture wounds.

2. *shallow wounds*-injury that disrupts skin but does not extend through full thickness:

a) abrasions; and

b) minor superficial burns.

3. *high-risk wounds*-wounds with high potential for infection:

a) bite wounds;

b) very dirty, contaminated wounds;

c) crushing, contused, ragged wounds;

d) wounds over injured bone, joint, or tendon; and

e) puncture wounds.

4. *wound infection*-increased bacterial growth and increased inflammation at the wound site.

5. *impaled object*-foreign body that extends through the skin into underlying tissues.

General Principles

1. Initial wound management in any context requires that bleeding be stopped by the use of direct pressure. Immobilization, elevation, and cold compresses also can be helpful to control bleeding.

2. If bleeding is easily controlled, wounds generally should be cleansed in the field to help control infection if transport time is greater than two hours.*

3. Antibacterial dressings generally are not used in routine wound treatment. They should be used, however, in the treatment of high-risk wounds and shallow wounds to help control infection if transport time is greater than two hours* and the patient is not allergic to the medication.

4. Some impaled objects should be removed in the field if removal is simple, safe, and easy. The objective is to minimize additional tissue damage during transport.

5. Wound closure in the field by sutures or adhesive strips is not recommended as an EMS procedure. Wounds that require evacuation to physician care for closure include:

a) Cosmetic wounds;

b) Wide, gaping wounds; and

c) Wounds that involve injury to underlying structures.

6. Evacuate to physician care for wound closure according to the following principles:

a) Wounds of the distal extremities (e.g., hands, feet) are best

evacuated and treated by early primary closure within six hours after injury;

b) Wounds of the head and trunk can be evacuated and treated by early primary closure up to 24 hours after injury; and

c) Wounds that cannot be closed within the time criteria for early primary closure (and most high-risk wounds) can be treated by delayed primary closure on about the fourth day after injury. If evacuation for early primary closure is impractical or impossible, the wound should be treated in the field as a high-risk wound during prolonged evacuation for delayed primary closure.

7. Evacuate to physician care for tetanus prevention according to the following principles:

a) Open wounds/shallow wounds:Tetanus booster is recommended within 10 years;

b) High-risk wounds: Tetanus booster is recommended within five years;

c) Tetanus immunization booster should be given as soon as possible after injury, although a delay of up to 48 hours is considered safe.

8. Evacuate to physician care for rabies prevention according to the following principles:

a) The animal can be observed for 10 days. If the animal remains healthy, no rabies immunization is required. If the animal develops clinical rabies, the patient then can begin the immunization series;

b) The animal can be killed and the head sent for exam. Immunization is given only if the exam is positive for rabies;

c) Immunization generally is begun if the bite is from a high-risk animal and the animal cannot be captured for observation or killed for examination. State Health Departments provide information and advice to physicians regarding risk status of the animal; and

d) Rabies immunization should be given by a physician as soon as possible after a positive risk for rabies is identified. A period of at least several days between the bite and initial immunization is considered safe.

Assessment

i) Principle attention in the assessment of wounds generally should be directed toward the

assessment of internal injuries in major body cavities and injury to underlying structures in the extremities.

ii) The effect of bleeding from multiple wounds is cumulative. Total blood loss equals losses from all external bleeding plus loss from internal bleeding. Assessment and management of blood loss is important, especially for prolonged patient management.

Treatment

1. *Open wounds*

a) Stop initial bleeding according to conventional clinical guidelines for rapid transport:

i) Direct pressure is effective if the wound is clearly seen and steady pressure is maintained for at least 15 minutes;

ii) Elevation and cold compresses also can be helpful to control initial bleeding;

iii) Immobilization helps protect the newly formed clot;

iv) Tourniquets can be used to control severe bleeding associated with amputations; and

v) Pressure points generally are not effective in the control of severe bleeding.

b) If bleeding is controlled easily, cleanse the wound if transport time is greater than two hours:*

i) Remove foreign material;

ii) Wash the skin around the wound with soap and clean water;

iii) Irrigate the wound with clean water; and

iv) Cover the wound with a dry sterile dressing.

2. *Shallow wounds*

a) Cleanse the wound if transport time is greater than twohours.* Use the procedure that is used for open wounds,

but wash the wound surface directly with soap and clean water.

b) Apply an antibacterial dressing** directly to the wound surface after cleansing. Do not use antibacterial dressings if the patient is allergic to the medication.

c) Cover the wound with a dry sterile dressing.

3. *High-risk wounds*

a) Stop bleeding.

b) Cleanse the wound as thoroughly as possible if transport time is greater than two hours.*

c) Apply dilute (1%) povidone-iodine solution** directly to the wound surface after cleansing if the patient is not allergic to the medication.

d) Cover the wound with a povidone-iodine dressing.

e) Immobilize the wound site to help control further bleeding and infection.

f) Evacuate to physician care for antibiotic treatment.***

4. *Wound infection*

a) Remove all foreign material from the wound.

b) Allow the wound to drain.

c) Cleanse the wound at least daily and apply dilute povidone-iodine dressings using the same procedure that is used for high-risk wounds.

d) Apply frequent hot soaks to the wound site. Thirty minute soaks done at least three times per day is optimal.

e) Immobilize the wound site to prevent spread of infection.

f) Evacuate to physician care for antibiotic treatment.***

5. *Impaled objects*

a) Impaled objects that cannot be effectively stabilized should be removed if removal is simple, safe and easy.

b) Impaled objects that prevent safe and effective patient packaging or transport should be removed if removal is simple, safe and easy.

* *alternate:* substitute time as determined by local EMS physician

** *alternate:* specific antibacterial dressing as determined by local EMS physician

*** Field use of antibiotics is determined by local licensing regulations and field protocols

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