Section XII. MANAGEMENT OF THE CONVULSIVE AND/OR SEIZURE PATIENT

13-95. General

a. Convulsions and seizures can occur at any age and are associated with many diseases and disorders. They follow no single pattern or form. They usually last from a few seconds to several minutes, but may be even further prolonged. Loss of consciousness may or may not occur. Do not use the terms *convulsion* and *seizure* interchangeably.

b. Terminology.

- *Convulsion* is involuntary muscular contractions, usually accompanied by unconsciousness.
- *Seizure* is the entire activity, such as, muscular contractions, incontinence of bowel and bladder, and unconsciousness.
- *Aura* is a sensation that warns a person of an uncoming convulsion.
- *Clonic* is the alternate muscular contraction and relaxation in rapid succession.
- *Tonic* is muscle tension (stiffness or rigidity).

c. Causes.

- Head trauma.
- Epilepsy.
- Cerebral vascular accidents (strokes).
- Drug and alcohol withdrawal.
- High fever.
- Other psychologic and neurologic disorders.

13-96. Types of Convulsions/Seizures with Signs and Symptoms

a. Petit mal. Patient appears to be day dreaming (staring into space).

b. Focal (Jacksonian). Usually involves one part of the body in tonic-clonic twitching (arm or face). It may progress from fingers, toes, or face twitching on one side to involve one entire limb or side of the patient's body. It may progress rapidly to a generalized seizure.

c. Grand mal (generalized). In this type of seizure, there is a loss of consciousness and an intense tonic-clonic activity. The patient may have incontinence and tongue biting, along with mental confusion. These symptoms may be followed by drowsiness or coma.

d. Status epilepticus. A series of convulsions without intervening periods of consciousness and is a medical emergency. Repeated convulsions (if uncontrolled) can lead to aspiration, anoxia (absence or lack of oxygen), brain damage, fractures of the long bones or spine, trauma to the head, and injury to the tongue (due to biting).

13-97. Treatment for Convulsive and/or Seizure Patients

The primary purpose of caring for a convulsive and/or seizure patient is to prevent him from injuring himself. Expedient actions and evacuation to an MTF are crucial to the patient's health and welfare.

a. Maintain the patient's airway.

(1) Loosen his clothing at the neck.

CAUTION

Patient may have excessive mucous and other secretions. Close observation is necessary to prevent aspiration and suffocation.

(2) Remove his dentures (if applicable) or other loose objects from his mouth.

WARNING

Do not forcibly open the patient's jaw if his teeth are clenched. To do so may cause injury to the teeth and gums.

(3) Insert a padded tongue blade between his back teeth (if jaw is relaxed) or an oropharyngeal airway (J-tube) to prevent him from biting his tongue and to assist in maintaining an open airway.

(4) Look for a medical warning tag.

CAUTION

Do not elevate his head since it may cause the tongue to fall back into the throat and obstruct the airway.

NOTE

Patient will not swallow his tongue.

(5) Turn his head slightly to one side, if possible.

b. Prevent injury to the patient.

(1) Remove or pad objects that may cause injury to the patient while he is thrashing about on the ground or floor.

(2) Do not restrain his limbs during the seizure as this can cause muscle injuries and long bone fractures.

c. Closely observe and accurately record all aspects of seizure activity.

(1) How long did the seizure last? (Be as accurate as possible.)

(2) Was there evidence of cyanosis, breathing difficulty, or a temporary absence of breathing?

(3) What was the level of consciousness (before, during, and after the seizure)?

(4) Was the seizure preceded by aura?

(5) Which muscles were involved and where did it start?

(6) What type of contractions (tonic, clonic, or both)?

(7) Was there bowel/bladder incontinence?

(8) Does the patient have a previous history of seizures, head trauma, or drug/alcohol abuse?

NOTE

In Jacksonian seizures, motor symptoms begin in a hand or foot and move up the extremity, or spread from a corner of the mouth.

d. After the convulsive state of the seizure—

(1) Place the patient on his side.

(2) Continue to maintain the airway.

(3) Have suction equipment nearby, if available.

(4) Observe for periods of temporary cessation of breathing.

(5) Place the patient in a quiet, reassuring atmosphere to minimize agitation and combativeness when he begins to wake up. Sudden loud noises may cause another seizure.

e. Record the patient's actions and the treatment given.

f. Evacuate the patient. The patient must be seen by a physician for follow-up care to determine the cause of the seizure.Evacuate the patient on a litter and administer oxygen en route, if available.

Section XIII. ABDOMINAL AILMENTS AND INJURIES

13-98. General

a. The term "acute abdomen" is used to indicate the presence of any one of a wide variety of abdominal disorders. An acute abdomen requires definitive care and usually surgical intervention. Severe pain is present in an acute abdomen.

b. The primary concerns in the acute abdomen is to *recognize the situation*, perform life-saving measures, and evacuate the patient. It is not important that the aidman be able to make a differential diagnosis.

c. The more common acute abdominal conditions are described in Table 13-3.

13-99. Signs and Symptoms of an Acute Abdomen

- *Abdominal pain.* Which quadrant is it in and is it localized or diffused (Figure 13-98)? If localized, it may give a clue as to the organ involved.

- *Abdominal tenderness.* Tenderness may be minimal or such that the patient may "guard" his abdomen by tightening his stomach muscles and will not allow his abdomen to be touched.

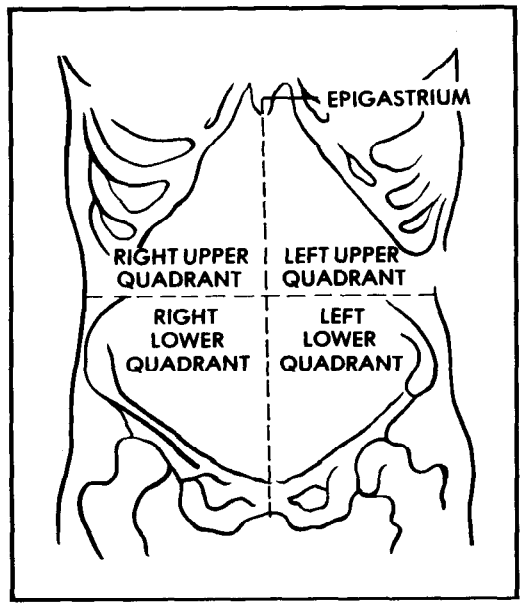

Figure 13-98. Quadrants of the abdomen.

- *Patient position.* The patient does not want to move because it hurts to do so. The position of the patient is an important clue. In some diseases, the patient is comfortable in only one position. For example, with appendicitis the patient may draw up his right knee or both knees. A specific position helps to relax the muscles adjacent to the inflamed organ and lessen the pain.

- *Rapid, shallow breathing.* If breathing is painful, severe peritonitis may exist. However, increased respiration with any acute pain is common.

- *Tachycardia.*

- *Low blood pressure.*

- *A tense, often distended (enlarged or swollen) abdomen.*

- *Vomiting.* Vomiting is not uncommon with an acute abdomen; it may be bloody or even fecal in nature.

13-100. Treatment for an Acute Abdomen

a. Gently palpate his abdomen (Figure 13-99) for signs of—

(1) Rigidity (stiffness) of the abdominal wall.

(2) Pulsating (throbbing) masses (lumps or enlarged organs).

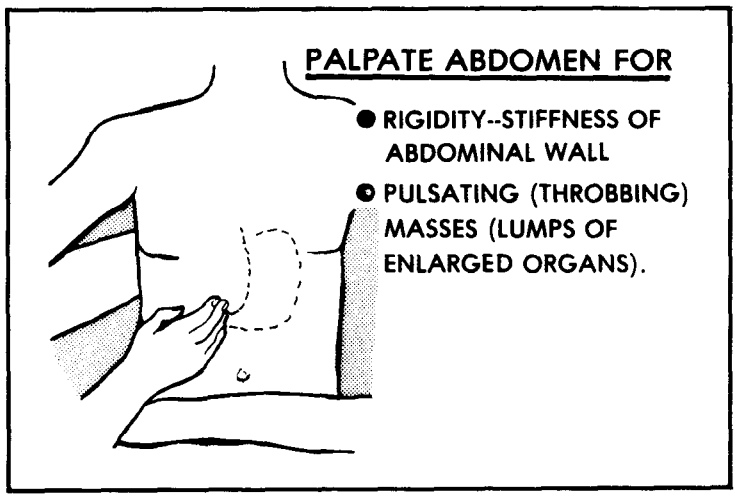

Figure 13-99. Palpate the abdomen.

CAUTIONS

1. Occasionally, an organ within the abdomen will be enlarged and very fragile. Palpating can cause rupturing of an aortic aneurysm (an out-pouching of the artery wall) and laceration (tearing) of the spleen.

2. Do not give pain medication to the patient. Pain medication will conceal the signs and symptoms prolonging the time required to diagnose the cause.

b. Check his vital signs.

c. Initiate intravenous infusion.

d. Treat for shock, if indicated.

CAUTION

Do not give the patient anything to eat or drink. This may further complicate his condition and cause vomiting. The patient may also require immediate surgery. Food in the stomach and intestines may cause complications during surgery (vomiting and aspiration of stomach contents).

e. Obtain a patient history. Inquire about—

(1) *Location of the pain.* Certain organs, like the stomach, give reasonably good localization of pain. In diseases of other organs, the patient may have pain anywhere in the abdomen.

(2) *Radiation of the pain.* Certain types of abdominal pain have typical areas of radiation. The pain of pancreatitis often radiates straight through to the back. Pain from an inflamed gallbladder may radiate around the right side to the scapula (shoulder blade).

(3) *Quality of the pain.* Cramping or intermittent pain suggests involvement of hollow organs.

- Colic—hollow organ.
- Burning—as with excessive acid.
- Boring—as with pancreatitis.
- Sharp—as with perforated organs.
- Pulling—as with ischemic bowel.

(4) *Duration of the pain.*

- Since onset—if more than 6 hours—pathological.
- Constant or intermittent.

(5) *Intensity of the pain (mild or severe).*

- Awakes patient from sleep.
- Causes patient to pass out.

(6) *Nature of onset of the pain.*

- If pain is rapid in onset—moderately at first and becoming rapidly worse, consider acute pancreatitis or strangulation of the small bowel.
- Gradual.

(7) *Presence or absence of vomiting.*

(8) Change in bowel habits or the stools.

- Constipation or diarrhea.
- Bloody or tarry (black) stools.
- Stool morphology (shape)—cylindrical or ribbon.
- Rectal bleeding.

f. Record the treatment given.

g. Evacuate the patient. When in doubt about the patient's condition or diagnosis, evacuate him as quickly and gently as possible.

13-101. Open Abdominal Injuries

a. The presence of an open abdominal injury can be a shocking discovery in the evaluation of a casualty. He is not in immediate danger if there is no profuse internal bleeding or perforated (punctured) organs. Severe abdominal wounds with perforated organs or heavy bleeding require complicated and prolonged treatment procedures to improve life expectancy. Triage would, therefore, require a priority of EXPECTANT in *a mass casualty situation.*

b. The most important concern in the initial treatment of abdominal injuries is shock caused by internal bleeding. Bleeding may be present initially or may develop later. The presence or absence of bleeding or the size of the wound are not safe indicators of the internal damage.

13-102. Treatment for an Open Abdominal Injury

a. Survey the patient.

CAUTION

Do not give the patient anything by mouth due to possible vomiting and aspiration. Fluids given by mouth can cause damaged internal organs to leak and result in further intra-abdominal contamination.

(1) If the patient is thirsty, use a wet gauze to moisten his lips.

(2) Place the patient on his back, unless other wounds prevent it, to keep the internal organs inside the wound.

(3) Turn the patient's head to one side to keep the airway clear, should vomiting occur.

CAUTION

When an open abdominal wound has arterial bleeding, the vessel(s) must be occluded (tied or clamped) to prevent shock or possible death. This is done ONLY by more highly trained medical personnel.

b. Apply a field dressing.

(1) Flex the patient's knees to relax the abdominal muscles and any internal pressure. This is usually the most comfortable position for bandaging and transporting the patient.

CAUTION

Do not attempt to replace protruding internal organs since this can cause further injury. Carefully place the organs on or near the wound before applying the dressing and to prevent further contamination. If a foreign object is protruding from the abdomen, treat the patient as for other impalement injuries.

(2) Only sterile field dressings are used to cover open abdominal wounds. The dressings must be large enough to cover the entire mass of extruded organs or area of the wound (Figure 13-100).

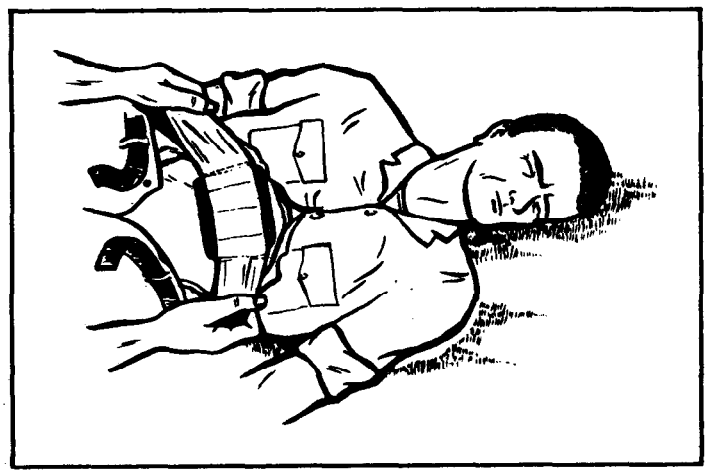

Figure 13-100. Field dressing placed on the wound.

(3) If the plastic wrapper is large enough to extend well beyond the protruding bowel, place the sterile side directly over the wound with the dressing on top.

CAUTION

Do not moisten the dressing. A moist dressing will act as a wick for bacteria to enter. Do not apply pressure to abdominal wounds or exposed internal organs. This can cause further injury, such as ruptured intestines. To avoid pressure on the injury, tie the dressing (tails) loosely at the patient's side, not directly over the dressing.

(4) If more than one dressing is needed to cover a large wound, repeat the previous procedures. Do not tie the dressing knots over each other.

(5) Cover field dressings with cravats for added support and protection. Tie the cravat on the side opposite the dressing ties (Figure 13-101).

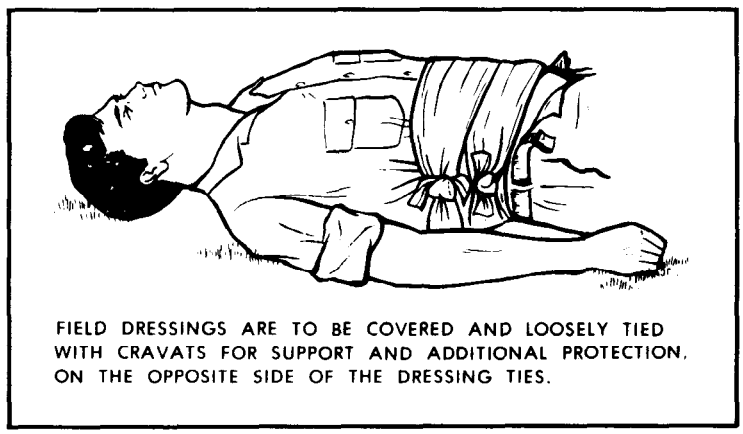

Figure 13-101. Cravats tied on the side opposite the dressing.

c. Insert a large bore IV and infuse lactated Ringer's solution.

NOTE

The IV is started at a rate of 10 milliliters per hour and is increased if signs of shock develop. If available, MAST trousers should be applied to treat shock. *DO NOT* inflate the abdominal section if internal organs are protruding from the wound.

d. Record treatment.

e. Evacuate the patient.

- If evacuation to the MTF is delayed, the patient must be monitored frequently (every 15 minutes or less, if possible) for signs of shock.

- Evacuate the patient with his knees flexed.

Section XIV. IRRIGATION OF THE EAR

13-103. General

a. Irrigation of the ear is the flushing of the external ear canal with a gentle stream of solution. The ear may be irrigated to—

- Cleanse the external auditory canal.
- Soften and remove impacted wax (cerumen).
- Apply heat to the tissues of the ear canal.
- Apply antiseptics or medications.

b. Never use irrigation procedures to remove foreign objects such as beans or corn. Moisture causes vegetable matter to swell. Irrigations are not used if a patient's eardrum is punctured. The additional irritation can cause middle ear infection by transmitting debris or discharge from the external canal to the middle ear.

13-104. Treatment for an Obstructed Ear

a. Verify the need for irrigation of the ear.

b. Perform patient care handwash.

c. Gather the necessary equipment.

(1) Collect the irrigating syringe, protective drapes, otoscope set, emesis basin, irrigating solution, and at least two 4- by 4-inch sponges.

NOTE

There are three general types of syringes used to irrigate the ear: a rubber bulb syringe, an asepto syringe, and a metal Pomeroy syringe (Figure 13-102). Common solutions used to irrigate the ear include tap water, normal saline, hydrogen peroxide and water mix, or a solution of bicarbonate of soda and water. The hydrogen peroxide and water mix is often used to soften and remove impacted ear wax.

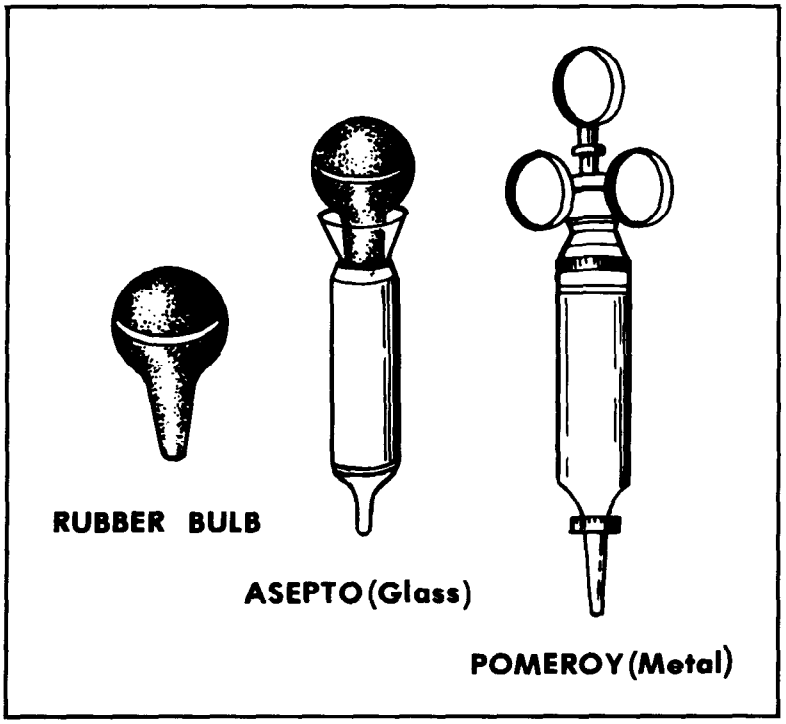

Figure 13-102. General types of syringes.

(2) Use the otoscope to see the external ear canal. It comes equipped with specula of differing sizes. The speculum is an instrument used to expose the interior passage of a body cavity (in this case, the ear).

(3) When viewing the external ear canal with the otoscope, use the largest speculum that will fit comfortable into the meatus (opening) of the ear in order to see the largest portion of the external ear. Before and after use, cleanse the speculum with alcohol.

d. Warm and test the irrigating solution. Warm the irrigating solution and test the temperature by allowing a small amount of the fluid to run on the inner part of your wrist. If the solution feels hot, wait until it cools. It may be necessary to prepare the irrigating solution. Request supervisor's assistance if solution mixing is necessary. Mixing solutions may be warmed by placing the container of solution in a pan of warm water. The irrigating solution should be about body temperature (95^{o} to 105^{o}F). Solutions that are warmer or cooler than the body temperature feel uncomfortable for the patient and may cause tissue injury, nausea, or dizziness.

e. Explain the irrigation procedure. Tell the patient what is to be done and ask for his cooperation and assistance. He may feel some discomfort when the solution is introduced into the ear, but he must remain as still as possible. If he moves, the syringe may damage the ear canal or tympanic membrane.

f. Insert an otoscope speculum into the external ear canal.

(1) Tip the patient's head toward the shoulder opposite the ear to be irrigated.

(2) Straighten the external ear canal by gently pulling the auricle upward and backward (Figure 13-103).

Figure 13-103. Straightening the external ear canal.

(3) Turn on the otoscope light and gently insert the speculum just inside the opening of the ear (Figure 13-104).

(4) Look into the ear canal through the lens of the otoscope.

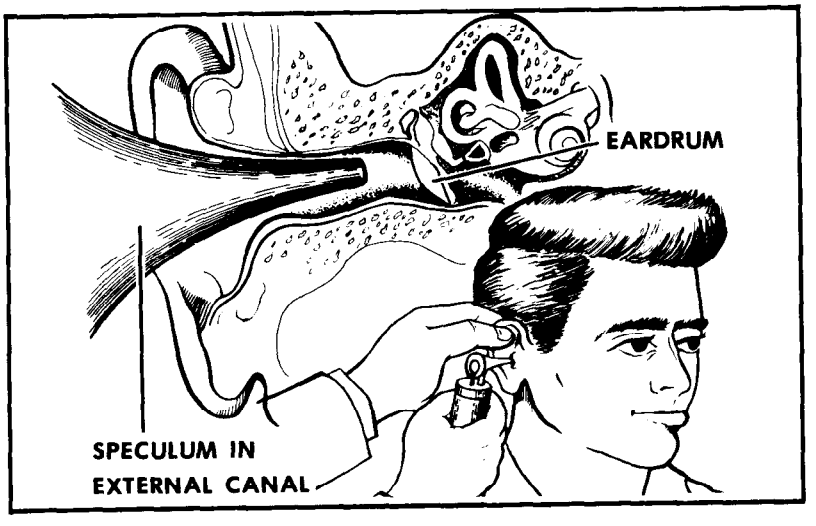

Figure 13-104. Speculum inserted in the ear opening.

NOTES

1. Ask the patient if he has had a history of draining ears or if he has ever had a perforation (puncture) of the eardrum or other complications from a previous irrigation. If the answer is yes, check with your supervisor before irrigating the patient's ears.

2. The inner two-thirds of the external meatus (opening) is sensitive to pressure. To avoid causing the patient any pain, insert the speculum gently and not too far into the ear canal.

g. Observe the external ear canal and tympanic membrane. Check the external ear canal for redness, swelling, drainage, or foreign bodies. Also check for bulging or perforation of the tympanic membrane in addition to the color.

NOTES

1. The external ear canal is normally clear, with small amounts of wax. If redness, swelling, or discharge are present, do not irrigate the ear, but report it to your supervisor.

2. A normal, healthy tympanic membrane is slightly cone-shaped, shiny, translucent, and pearly gray in color. When disease is present, the eardrum changes color. If a blue, yellow, amber, red, or pink color is observed, it usually indicates disease or infection and the ear should not be irrigated.

3. An outward bulging of the eardrum indicates the presence of pus or fluid in the middle ear. Do not irrigate the ear.

h. Reposition the patient, if necessary. Place the patient in a sitting or lying position, if necessary. Tilt his head slightly *toward the side to be irrigated.*

CAUTION

Do not turn the patient's head toward the unaffected side. This interferes with the return of the irrigating solution.

i. Drape the patient. Place a protective drape (towel) under the affected ear, covering the shoulder and upper arm.

j. Place one of the sponges in the irrigating solution, wring out excess solution, and clean any debris from the external ear and meatus of the ear canal.

NOTE

Cotton swabs can be used for cleansing the auricle (external ear) area only. This will prevent carrying any debris or discharge deeper into the ear canal when the speculum is inserted.

CAUTION

Do not insert the cotton swab too far into the ear. This could rupture the tympanic membrane.

k. Fill the irrigating syringe.

(1) Grasp the syringe bulb end or plunger.

(2) Depress the bulb or plunger of the irrigating syringe.

(3) Place the tip of the syringe into the solution.

(4) Release the bulb or pull back the plunger to fill the syringe.

l. Test the flow of the solution from the syringe. Discharge a small amount of solution back into the container. This will expel the air and aid in determining the amount of pressure required to make a steady, gentle stream. If necessary, fill and refill the syringe several times to obtain a"feel" for a smooth operation prior to irrigation.

m. Position the emesis basin. Place the emesis basin just below the ear on the affected side. Press the basin firmly against the patient's neck (Figure 13-105). Instruct him to hold the basin in place.

n. Straighten the ear canal. Gently grasp the auricle of the affected ear and gently pull up and backward.

o. Irrigate the patient's ear.

(1) Place the tip of the irrigation syringe just inside the meatus of the ear with the tip directed toward the roof of the ear canal (Figure 13-106). Directing the angle of the flow toward the roof of the ear canal prevents injuring the eardrum and forcing any material or debris into the canal. A circular current is set up with fluid flowing in along the top and out the bottom of the canal.

(2) Depress the bulb or plunger of the irrigating syringe.

(3) Direct a slow, steady stream of irrigating solution against the roof of the ear canal.

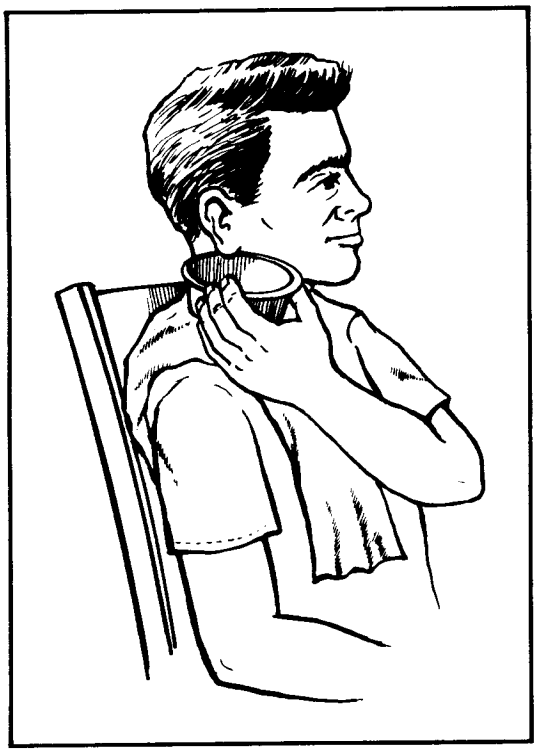

Figure 13-105. Basin placed below the ear.

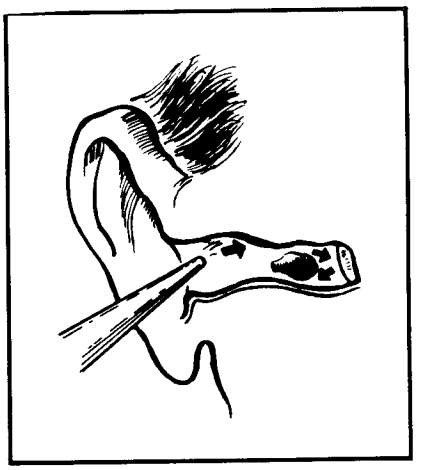

Figure 13-106. Irrigation syringe placed inside the ear.

CAUTION

Never completely block the ear canal with the irrigating syringe. If space is not left around the syringe tip, the solution will not be able to return and pressure in the canal will result.

p. Repeat steps *k.* through *o.* above until the irrigating solution returns free of wax and debris.

NOTE

If the physician or supervisor has not specified the amount of solution to be used, only use 500 cc's. This is sufficient for cleaning the canal. If no material comes out with the return flow from the ear, repeat the procedure or notify the physician.

q. Dry the external ear. Remove the emesis basin and wipe any solution from the external ear with a 4- by 4-inch sponge.

r. Have the patient keep his head tilted toward the affected side for a few minutes. This will allow any remaining solution to drain out of the ear.

s. Remove the drape.

t. Dispose of and/or clean and store the equipment used.

u. Perform patient care handwash.

v. Report and record the irrigation procedure. Include the date and time of irrigation, kind and amount of solution used, and nature of the return flow. EXAMPLE: 21 Mar 84, 1500: Right ear irrigated with 500 cc's warm tap water. Returning solution contained brown wax particles. John Doe, PFC, 91A10.

Section XV. MANAGEMENT OF EYE INJURIES

13-105. General

a. Emergency medical care for eye injuries is extremely important to the patient, especially on the battlefield. The eye injury may not only cause severe pain, but loss of orientation due to loss of or decreased sight. The patient with an eye injury may have total or at least partial loss of one of his senses. He must constantly be reassured that what is being done for him is to save his eyesight.

b. Even though only one eye is injured, both eyes must be bandaged. Since both eyes move together, any movement of the uninjured eye will cause the same movement of the injured eye. This involuntary movement can cause further damage to the injured eye.

13-106. Irrigating the Eyes

Eye irrigation is washing the eye surface or conjunctival sac with a gentle stream of liquid. The conjunctiva (mucous membrane) lines the eyelids and surrounds the eyeball. Irrigations are given for various forms of conjunctivitis (inflammation of the conjunctiva), for cleansing, to combat infection, or for treating chemical injuries to the eyes.

13-107. Procedure for Irrigating the Eyes

a. Verify the requirement for irrigation.

(1) Check the doctor's orders. Follow the supervisor's directive or the local SOP.

(2) Be sure you have the correct type and proper concentration of the irrigating solution.

(3) Make sure you know which eye requires treatment.

NOTE

Right eye—O.D. (oculus dexter);

Left eye—O.S. (oculus sinister);

Both eyes—O.U. (oculus uterque).

b. Verify the patient. Ask the patient his name. Check his identification band, if available.

c. Inform the patient. Tell him of the need for the eye irrigation. Explain the procedure.

d. Position the patient.

(1) If the patient is in bed or on a litter, have him lie on his back with his head turned slightly to the side to be irrigated.

(2) If he is sitting up, have him tilt his head slightly backward and to the side that is to be irrigated. Support his head while irrigating the eye.

e. Protect the patient from splash. Cover him with a waterproof cover and/or towel in areas that may be splashed by the solution.

NOTE

When irrigations are used for any type of conjunctival infection (pink eye), take every precaution possible to control the spread of the disease to health care providers, to other patients, or to the uninfected eye. A waterproof transparent protective dressing (Buller's shield) is recommended to protect the noninvolved eye of the patient. You may protect your eyes by wearing glasses or goggles.

f. Position the "catch" basin.

(1) Place an emesis basin next to the affected side of the face in a position to catch the outflow. If a basin is not available, have the patient hold a towel or sponge near the eye to catch the fluid.

(2) Show the patient how to hold the basin to the side of the face to receive the irrigating solution.

g. Position the light. If necessary, position the light so that you can see. However, do not shine the light directly into the patient's eye(s).

h. Perform patient care handwash.

i. Clean the eyelids. Before irrigation, carefully clean the eyelids with sterile water. Remove any secretions or particles that may be adhering to the lashes and that could be carried into the lacrimal area (the tear gland area).

MOIST HEAT is of great value in cleaning discharge and crusts from the eyelids. A gauze sponge soaked in comfortably warm water and squeezed free of excess water can be placed OVER THE CLOSED EYE for several minutes. This helps loosen and remove adherent crusts and matter. A small piece of moist cotton or gauze may then be used to remove any remaining debris.

j. Separate the eyelids. Separate the eyelids very gently by placing the thumb and index finger of your nondominant hand on the cheek and brow (just below and above the eyelids) and apply gentle tension to open the lids.

CAUTION

NEVER PUT PRESSURE ON THE EYEBALL. Pressure on the eye must be avoided. The eye is not rigid and is very sensitive to any pressure.

k. Irrigate the eye.

(1) Make sure that the prescribed irrigation solution is at body temperature. Direct the flow of the fluid gently from the INNER CANTHUS to the OUTER CANTHUS along the conjunctival sac (Figure 13-107). Instruct the patient to look down. Having the patient look down exposes the upper part of the eye for irrigation. Instruct the patient to look up. Having the patient look up exposes the conjunctiva in the lower part of the eye for irrigation.

(2) Use only that pressure (force) of the liquid stream that is required to maintain a steady flow. The amount of solution varies with the desired effect.

(3) Do not touch the eye during irrigation. You must avoid contamination of the solution or irrigator and possible injury to the eye.

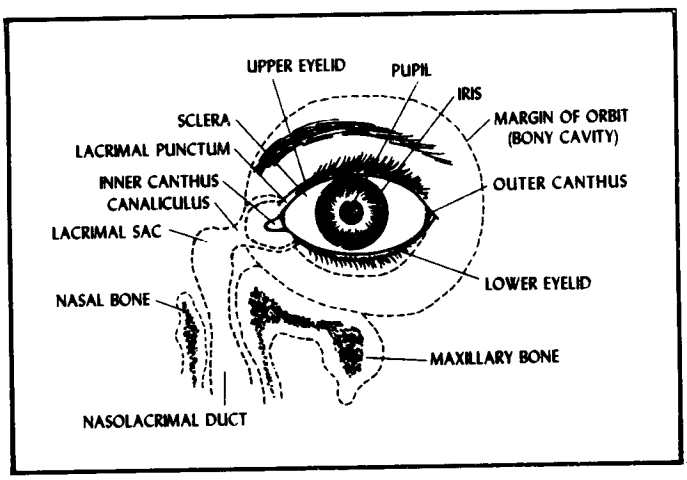

Figure 13-107. The eye.

l. Dry the eyelids. Gently pat the eyes after the sac has been thoroughly flushed.

m. Perform patient care handwash.

n. Record the treatment given. Record the kind and amount of fluid that was used and the effect on the patient.

13-108. Foreign Bodies in the Eye

Pieces of dirt and debris, particles of rust, or similar small objects can blow or fall into the eyes. The material usually sits on the surface of the eyeball or becomes stuck between the eyelid and eyeball. Often, if the patient closes his eyes for a few moments, the tears will move the object to the corner of the eye where it can be removed. Most other objects can be safely removed by gently washing them out with water. Other objects can be removed by gently wiping them away with a slightly moistened cotton swab or the edge of a clean handkerchief.

13-109. Treatment for Foreign Bodies in the Eye

a. Locate the foreign body.

CAUTION

If there is any evidence of damage to the eyeball, or if any object is suspected of sticking into the eyeball, **STOP.** Make no attempt at treatment. You may cause additional tissue damage. Put a light bandage on both eyes and evacuate the patient to an MTF.

(1) Method one.

- Pull down on the lower eyelid.
- Have the patient look up while you look for the foreign object.
- Next, have him look to one side, then the other while you look for the foreign object.
- Pull the upper eyelid up.
- Have the patient look down while you look for the foreign object.

(2) Method two.

- Ask the patient to look down.
- Grasp the eyelash of the upper eyelid with your thumb and index finger.
- Gently pull the lid away from the eyeball.

- Place a cotton-tipped applicator horizontally along the center of the outer surface of the upper eyelid.
- Pull the eyelid forward and upward, causing it to roll or fold back over the applicator. The under surface of the lid should be exposed.
- Look for the foreign object.
- Release the upper eyelid and pull the lower eyelid down.
- Have the patient look up.
- Look for the foreign object.

b. Remove the located foreign object.

(1) Gently wipe away or pick up the object with a slightly moistened cotton swab or the edge of a clean handkerchief or other soft cloth material.

OR

(2) Gently wash the object out by allowing water to flow from the inner canthus to the outer canthus of the eye (Figure 13-107). Use the thumb and index finger to keep the eye open. (Refer to paragraph 13-107, Procedures for Irrigating the Eyes.)

CAUTION

Do not apply excessive pressure on the eyeball. If required, pressure should be applied on the bony area surrounding the eye.

NOTES

1. If any foreign body cannot be removed easily by one of these methods, bandage the eye and evacuate the patient.
2. If the patient is having pain or if there is a loss of vision, bandage both eyes and evacuate.

c. Obtain a patient history.

(1) Determine the source and type of the foreign body. The type of foreign body will influence the amount of tissue destruction and the time necessary for healing. Particles of copper or brass are usually more irritating then iron or steel.

CAUTION

Never attempt to judge the seriousness of an eye injury by its external appearance. Superficial injuries are often more painful than deep penetrating ones.

(2) Were the particles high velocity or wind blown? High velocity particles are more likely to penetrate or perforate the cornea. Wind blow particles are more likely to only embed themselves superficially.

(3) What is the duration and/or time of onset of discomfort?

(4) Have any ointments or irrigation solutions been applied?

(5) Is there any history of previous injuries to the eye?

d. Record the treatment given.

e. Evacuate the patient, if necessary.

13-110. Lacerations, Contusions, and Extrusions of the Eye

Tissue damage to the area surrounding the eye or to the eyeball itself is classified as—

- *Lacerations.* Torn, ragged or mangled wounds of the tissue around the eye or to the eyeball.

- *Contusions.* Bruises of the tissue around the eye or bruises of the eyeball.

- *Extrusions.* The eyeball is pushed or forced out of its socket.

13-111. Examine Patient for Eye Injuries

a. Survey the patient.

b. Position the patient.

- Remove the patient's headgear.

- Place the conscious patient in a sitting position.

OR

- Place the unconscious patient on his back with his head higher than the rest of his body.

NOTES

1. Make the patient as comfortable as possible without causing him further injury. A sitting position helps control pain and bleeding.

2. Make sure that the unconscious patient's airway is clear. A small article of clothing rolled up and placed under the neck will hold the head in a position to keep the airway clear.

c. Check the patient's eyes for—

- Foreign objects protruding from the eye.
- Swelling or lacerations of the eyeball.
- Bloodshot sclera.
- Bleeding surrounding the eye or from the eyeball.

NOTE

During the examination, ask the patient if he is wearing contact lenses. If he is, record this information. Never force the eyelid open to check for contact lenses.

d. Determine the injury category.

- Laceration or contusion (injury to the tissue surrounding the eye(s)).
- Injury to the eyeball(s).
- Injury to the eye(s) with protruding object(s).
- An extruded or avulsed eyeball.

NOTE

An avulsed eye is one that is torn from the socket. It is also called an extruded eyeball or an enucleation.

13-112. Treatment for Lacerations, Contusions, and Extrusions of the Eye

a. Treat an injury to the tissue surrounding the eye(s) (Figure 13-108A), if applicable.

(1) Cover the injured eye with an eye pad or other small sterile dressing to keep it clean or to control bleeding (Figure 13-108B). Unlike other bleeding wounds, do not put pressure on eye wounds because this can cause

more damage. If the eyelid is injured with no injury to the eyeball, a dressing and bandage is placed over the wound. Handle torn eyelids very carefully to prevent further injury.

(2) Place a first aid field dressing over the eye pad. Gauze or other bandaging materials may be used.

(3) Secure the dressing.

(a) Wrap one tail over the top of the head (Figure 13-108C).

(b) Let the other tail hang free under the ear on the injured side (Figure 13-108D).

(c) Cross the tails under the ear on the injured side, then pass one under the chin (Figure 13-108E) and the other one over the head.

(d) Tie them on the opposite side from the injury (Figure 13-108F).

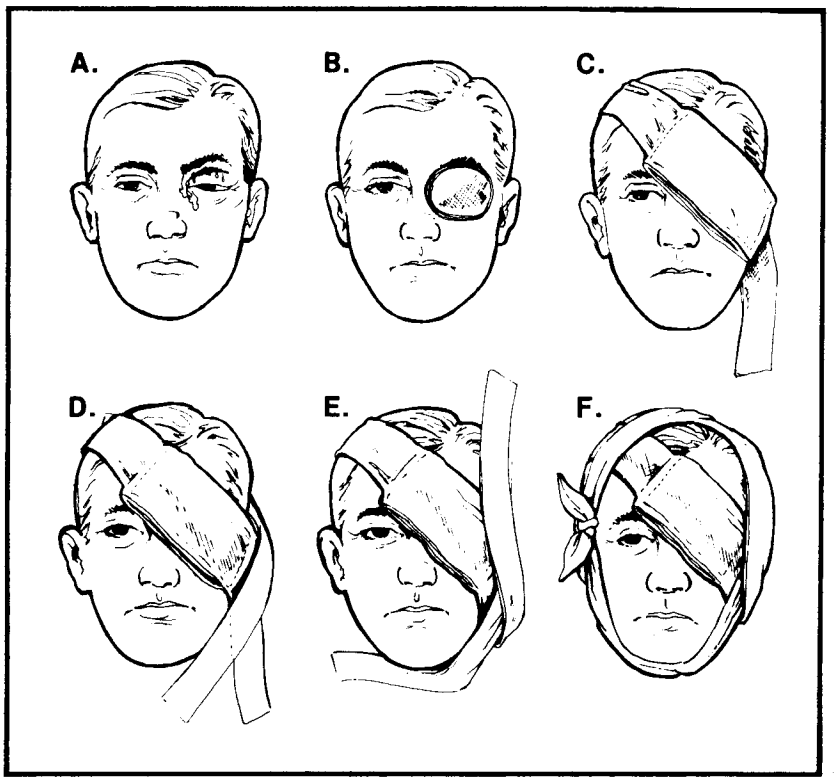

Figure 13-108. Injury to tissue surrounding the eye(s).

NOTES

1. Make sure that the tail under the chin does not slip down on the neck and interfere with the patient's breathing.

2. If the injury is to the tissue around the eye and not the eyeball, only bandage the injured eye.

3. Do not cover the nose, mouth, or ears with the dressing.

b. Treat an injury to the eyeball, if applicable.

(1) Follow procedure in *a*.

(2) Additionally, cover both eyes with pads and dressings.

NOTES

1. Bleeding may not be present.

2. Do not apply pressure to the eyeball. If the jelly-like vitreous humor fluid is squeezed from the eyeball, it cannot be replaced nor can the body replace it by natural regeneration. Loss of the fluid will result in blindness.

3. In hazardous surroundings you may leave the uninjured eye uncovered long enough to insure the patient's safe exit from the area.

(3) Tell the patient not to squeeze his eyelids together. Squeezing them together can exert pressure on the eyeball and cause further damage.

c. Treat an avulsed or extruded eyeball.

CAUTIONS

1. Do not attempt to replace the eyeball into its socket. Replacement must only be done by a physician under sterile conditions. To replace the eyeball under other than sterile conditions can increase the injury.

2. Detachment of the retina may result from such an injury if the patient is not kept quiet and on his back.

(1) Cut a hole in several layers of bulky dressing material, then moisten the material.

(2) Place the dressing so that the protruding eyeball is surrounded by the dressing (Figure 13-109). The dressing should be built up higher than the eyeball. A paper cup or cone-shaped thin cardboard can be use to cover the eye without placing pressure on it (Figure 13-110).

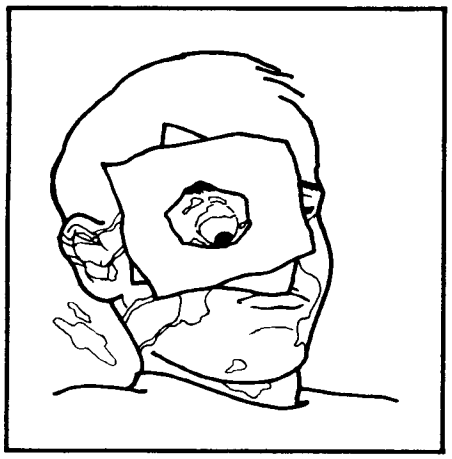

Figure 13-109. Dressing around protruding eyeball.

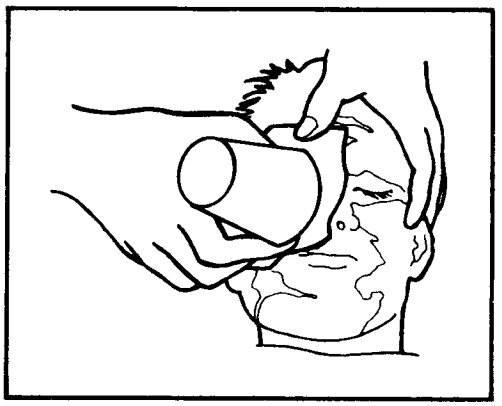

Figure 13-110. Placing a paper cup over protuding eye.

(3) Place a first aid dressing over the eye and built-up, moistened dressing.

(4) Bandage both eyes (Figure 13-111).

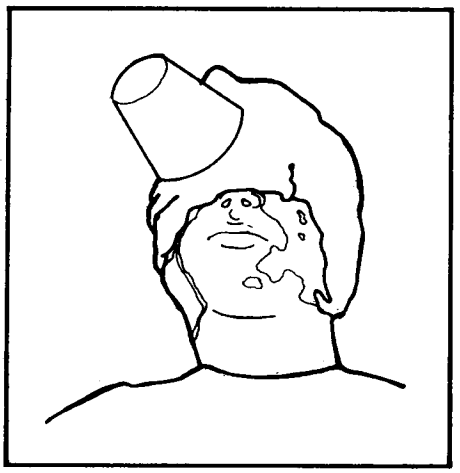

Figure 13-111. Both eyes bandaged with paper cup in place.

d. Record the treatment given.

e. Evacuate the patient. If the patient wears glasses, evacuate them with him even if they are broken. Always evacuate patients with avulsed or extruded eyes on a litter. They must remain on their back.

13-113. Burns of the Eyes

a. Three major types of burns that can affect the eye are: chemical, radiant energy (intensely bright light), and thermal. The correct initial emergency treatment applied to injured eyes will not only help relieve pain but will also help prevent further injury and possible loss of vision.

b. Chemical burns can cause severe eye injury and require immediate emergency treatment. Acid and alkali chemicals will eat into eye tissues if they are not flushed out immediately.

c. Radiant energy injuries are caused by bright visible light (electric welder arcs or laser sources), ultraviolet, infrared, or other forms of light energy that are not visible (including microwaves and radar waves) There are no specific immediate first aid treatment for these burns.

d. Thermal (heat) burns are given the same initial treatment as other burns of the face. No dressing is applied since burned eyelids swell and further protect the eyes underneath.

13-114. Treatment for Other Problems in Patient with Burns to the Eyes

a. Check for and treat any life-threatening conditions, such as, difficult breathing, heart failure, or severe bleeding.

b. Reassure the patient that medical aid will be provided.

(1) When the eyes are burned or injured, individuals are easily frightened and are fearful of losing their sight.

(2) Never try to cheer a patient with a favorable prognosis since it could be incorrect.

13-115. Signs and Symptoms of Chemical Burns of the Eyes

- Pain.
- Redness of the sclera and/or conjunctiva.
- Watering or tearing.
- Possible erosion of the corneal surface caused by long exposure to chemicals.

13-116. Treatment for Chemical Burns of the Eyes

a. Flush the eyes immediately with large amounts of water for 20 minutes.

b. Gently hold the patient's eyes open with your fingertips and pour large amounts of water directly into the eyes (Figure 13-112).

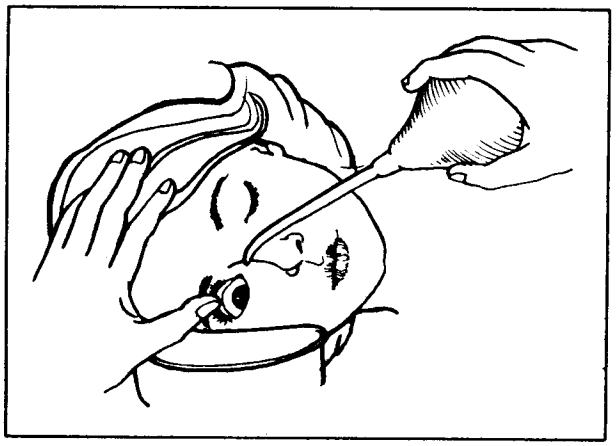

Figure 13-112. Flushing the patient's eye with water.

NOTE

The pain may make it very difficult for the patient to keep his eyes open.

c. If possible, use sterile water to flush the eyes. If it is not available, use potable (approved for drinking) water.

d. If water is not available, use an intravenous solution (saline solution, Ringer's lactate) with tubing.

e. Chemicals (particularly alkalis) tend to stick to the eye and may not be flushed easily. Continue flushing with water if alkali particles are in the eye.

f. If only one eye is involved, lean the head toward the injured side for flushing. Insure that no chemicals enter the uninjured eye.

g. Cover the eyes. Follow procedure outlined in paragraph 13-112.

NOTE

If eye burns are caused by petroleum products, flush the eyes with large amounts of water. Petroleum products such as gasoline, kerosene, jet fuel, or oil do not have a specific treatment. These products are very irritating and painful, but eye damage does not often result from a short exposure. Flushing the eyes with water provides relief and helps the patient feel more comfortable.

13-117. Signs and Symptoms of Radiant Energy Burns of the Eyes

The effects of radiant eye burns from electric welding processes often do not appear until several hours after exposure. Common symptoms are:

- Gritty feeling, as if something is in the eyes.
- Severe pain in the eyes.
- Inability to tolerate light.
- Watering or tearing of the eyes.

NOTE

Recovery and pain relief from these burns will usually take place within two to three days.

13-118. Treatment for Radiant Energy Burns of the Eyes

No specific treatment is recommended, although bandaging of the eyes often makes the patient more comfortable.

13-119. Signs and Symptoms of Laser Eye Injuries

- Pain is not usually present.
- Immediate decrease in vision caused by injury to the retina (inner back portion of the eyeball that is sensitive to light).

13-120. Treatment for Laser Eye Injuries

Immediate first aid is not usually required. Bandaging the eye may make the patient more comfortable and protect his eyes from further injury by exposure to other bright lights or sunlight.

13-121. Signs and Symptoms of Thermal Eye Injuries

- Charred or swollen eyelids.
- Singed eyelashes.
- Pain or irritation.

13-122. Treatment for Thermal Eye Injuries

a. Remove the patient from source of danger (fire or extreme heat) immediately.

b. If patient's clothing is on fire, roll him on the ground to extinguish the fire and minimize the chance of further burns.

c. Thermal burns of the eyes and eyelids are treated as burns of the face. No dressing should be used.

NOTE

Treatment for burned eyelids requires specialized care.

d. Protect patient from exposure to direct sunlight. Prolonged exposure can result in further tissue injury.

e. Record the treatment given.

f. Evacuate the patient.

Section XVI. APPLICATION OF RESTRAINING DEVICES

13-123. General

Restraints are employed to immobilize a patient and to prevent him from harming himself or others. The patient's response to being restrained is rarely submissive. In many instances, he views the application of restraints as a personal, physical assault; he is frightened and responds by becoming combative. He is fearful of what is happening and is trying to protect his freedom.

13-124. Principles for the Application of Restraining Devices

a. Do not attempt to apply restraining devices alone. There must be an adequate number of personnel available to safely and efficiently restrain the patient.

b. The ankles and wrists must be padded before applying the restraints. Padding prevents chafing or cutting the skin.

c. Restraints should fit snugly to prevent escape, but should not restrict circulation or impair breathing. To check the tightness, insert two fingers under the restraining straps. If the fingers can be comfortably inserted, the restraining strap is snug and should not restrict circulation or impair breathing.

d. Restraints must be placed so as not to cause injury or interfere with therapeutic treatment. However, the restraint must prevent the patient from removing therapeutic devices.

e. When ankle restraints are applied, wrist restraints must also be applied. The wrist restraints will prevent the patient from using his hands to place himself in a position to hang from his ankles or to release the ankle restraints.

f. Never restrain a patient on a portable commode or rocking chair. Both can be tipped over.

g. Do not attach the straps to the bed side rails. If the side rails are lowered, the patient could be injured.

h. Do not restrain a depressed patient or one having an altered level of consciousness on his back with his limbs at his side. Place these patients in a prone position prior to applying the restraints. Placement in a prone position prevents aspiration should the patient vomit.

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NOTE

Aspiration and suffocation are potential dangers because the patient may have difficulty handling his secretions or emesis.

i. Check the patient at least once every half-hour for signs of distress. The patient needs to know that you are concerned about his physical and emotional needs and that he is not being punished. The patient needs to know that he has not been abandoned and that the restraints are a therapeutic tool used to help him.

j. Release the restraints one at a time and change the patient's position at least once every 2 hours. Release avoids excessive stiffening of muscles. Exercise each limb through its normal range of motion.

k. A restraint key must accompany the patient. Whenever a patient is placed in a locked restraint, all personnel must carry a key. In the event of a medical or environmental emergency, the restraint can be quickly unlocked.

l. A restrained patient should be in a comfortable position. The head of the bed or litter may be elevated so that the patient can see his environment. This will assist in the patient's reorientation and decrease his confusion.

13-125. Prepare to Apply the Restraints

a. Check the doctor's orders or the Therapeutic Documentation Care Plan (Nonmedications). Verify restraints or follow your supervisor's directive indicating that the patient is to be restrained and the type of restraining equipment to be employed.

NOTE

In a field environment the need for restraints may be your own decision, especially in the absence of a senior medical specialist or physician.

b. Obtain the necessary equipment. Gather prescribed type of restraining equipment and necessary padding. Improvised restraining materials may be used. The common improvised materials used are abdominal (ABD) pads, washcloths, gauze sponges, sponge rubber, roller gauze, and elastic bandages.

c. Identify the patient. Ask the patient to identify himself. Verify his name by checking his bedcard and identification band.

d. Explain the procedure. Speak in a quiet, calm, reassuring voice to explain to the patient why the restraints are being applied and to gain his cooperation. It may be necessary to repeat the explanation at frequent intervals, especially if the patient has been medicated with mind-altering drugs or is confused. It is essential that the patient's family and friends understand as well.

NOTE

If the patient is agitated or combative, keep the restraints out of his vision until he is in a position to be restrained.

e. Provide privacy. Place a screen/curtain around the patient's bed or close the patient's room door. Provide privacy to avoid upsetting other patients or causing embarrassment to the patient being restrained.

13-126. Apply the Restraints

Apply wrist and ankle restraints. Use wrist and ankle restraints when it is necessary to restrict movement of the limbs. They may be used for a patient who is potentially harmful to himself or to others, to prevent the patient from removing tubes or other appliances, or to immobilize a part while a procedure is being done. These restraints may be leather, linen, or improvised from other materials.

NOTE

Disposable and reusable linen may be used as wrist and ankle restraints, but only if the purpose is to limit movement. They are not a secure method of restraining violent patients.

a. Apply an adjustable limb holder.

(1) Clean the skin of the wrists and ankles and powder it.

(2) Pad the limb with an ABD pad. Some cloth restraints are prepadded with soft flannel or cotton which eliminates the need to apply additional padding.

(3) Position the restraint over the limb and bring the strap, which is sewn at the taped end, through the slot in the broad end (Figure 13-113).

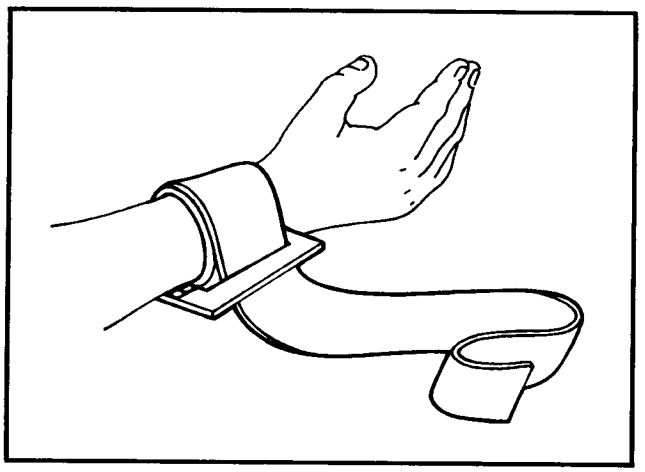

Figure 13-113. Limbholder or wrist restraint.

(4) Pull the strap snug enough to restrict free movement of the extremity and tie the strap to the bedframe.

CAUTION

Do not tie restraints with a square knot. The square knot will be difficult to release quickly in the event of an emergency. The bowknot is easily untied. It should be placed where the patient cannot untie it.

(5) Repeat the above steps to restrain the other three limbs.

b. Apply improvised restraint.

(1) Clean the skin of the wrists and ankles and powder it.

(2) Pad the limb with any soft cloth, such as towel, clothing, gauze, compresses, or clean handkerchief.

(3) Secure the restraining material to the limb with a clove hitch (Figure 13-114).

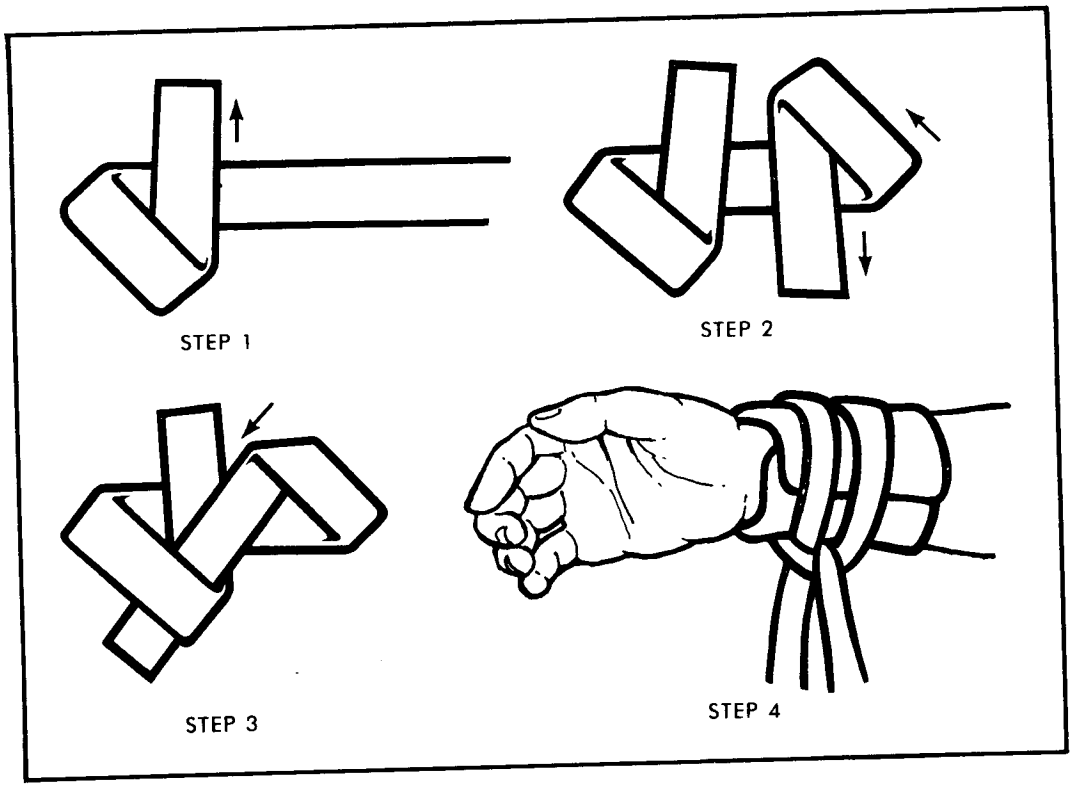

Figure 13-114. Improvised restraint.

(4) Pull the knot to fit the limb snugly and tie both free ends to the bedframe.

(5) Repeat the steps above for the other three limbs.

c. Apply mitt restraints.

(1) Place the patient's hand in a naturally flexed position.

(2) Place soft rolled dressing or a washcloth in the patient's hand and close the hand. The soft material allows unrestricted circulation and minimal strain to the muscles.

(3) Wrap the entire hand snugly with Kerlix bandage.

NOTE

Commercially prepared mitts may be used if available.

d. Apply restraint using a sheet and a litter.

NOTE

This restraint is extremely uncomfortable and it should only be used as a temporary restraint.

(1) Unfold a sheet and stretch it lengthwise, while holding at opposite corners. Twirl the sheet into a tight roll.

(2) Place the patient in a prone position on the litter with his head turned to one side.

(3) Place middle of the roll diagonally across the patient's upper back and shoulder.

(4) Bring both ends of the sheet under the litter. Cross the ends under the litter. Bring one end up over the shoulder and the other end over the upper back. Snugly tie the ends in the middle of the upper back.

(5) Secure one wrist to the litter, parallel to his thigh, using a wrist restraint.

(6) Secure the other wrist, overhead, to the nearest litter-carrying handle, using a wrist restraint.

NOTE

This position will prevent the patient from pushing himself up from the litter. It will also keep his arms and hands within the confines of the litter.

d. Apply restraint using a sheet and bed.

(1) Fold a sheet in half, lengthwise.

(2) Tuck approximately 2 feet of one end of the sheet under one side of the mattress, level with the patient's chest. Make sure there is enough sheet under the mattress to prevent it from being easily pulled from under the mattress.

(3) Bring the other end of the sheet under the patient's arms, over his chest. Tuck the free end of the sheet snugly under the other side of the mattress. Make the restraint snug enough to prevent the patient from wiggling free.

NOTE

Sheets may also be applied in the same manner across the patient's abdomen, legs, knees, and ankles, if further restriction is desired.

e. Apply field-expedient restraints. Under field conditions, standard restraining devices may not be available. Nevertheless, violent patients must be restrained, utilizing materials commonly carried by the soldier in the field. Field-expedient restraints may be improvised from such items as two litters, rifle slings, web belts, bandoleers, and cravats. Replace field-expedient restraints with regular restraints as soon as possible. Do not use field-expedient restraints for long periods of time. With any field-expedient restraint, follow the same considerations as in applying regular restraints.

(1) Mixed equipment. Mixed equipment can consist of rifle slings, web belts, bandoleers, cravats, and ropes. Apply mixed equipment restraints as shown in Figure 13-115.

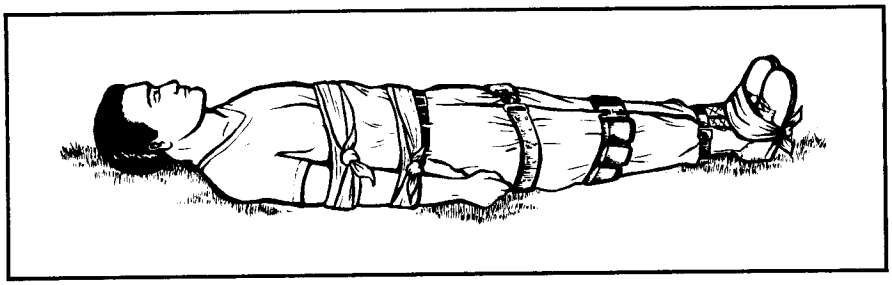

Figure 13-115. Mixed equipment restraint.

(2) Double litters with litter straps.

(a) Place the patient on a litter in the prone position with his head turned to one side.

(b) Place his hands along his thighs and secure them to the litter. This prevents the patient from pushing himself off the litter.

(c) Place another litter, carrying side down, on top of the patient.

(d) Bind the litters together with two or more litter straps. Place the straps buckles in a position which cannot be loosened by the patient (Figure 13-116).

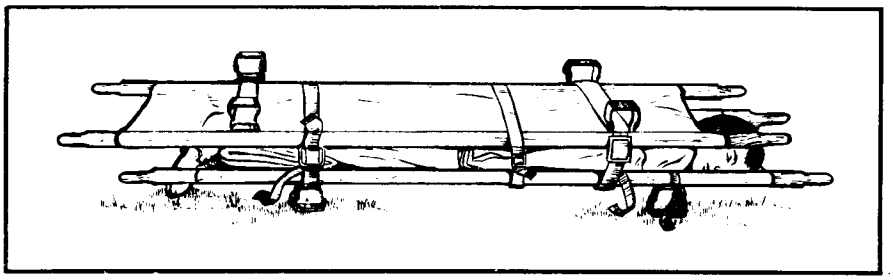

Figure 13-116. Double litter restraint.

f. Record and report action taken. Make sure the date and time the restraint was applied, type of restraint applied, the reason for application, and the patient's tolerance of the procedure are noted.

g. Evacuate the patient.

13-127. The Hazards of Restraints

a. Tissue damage under the restraint.

b. Damage to other parts of the body. Shoulder dislocations are especially problematic if the patient is combative during the application of the restraints or has a grand mal seizure while restrained.

c. Pressure areas may develop if the patient is kept restrained for long periods of time and/or does not have frequent position changes.

d. Nerve damage may occur if restraints are applied too tightly or if they become too constrictive after application.

e. Injury or death to the restrained individual due to fire or other occurrences. This is especially true if the restraints are tied in knots rather than bows or if all staff members fail to keep a restraint key easily accessible.

f. Inability to effectively resuscitate a cardiac arrest patient. The time required to remove the restraints and place a patient in a supine position may spell the difference between life and death.

Section XVII. MEDICAL EMERGENCIES

13-128. General

Most of the medical emergencies that you will see in the field have been previously discussed in other sections of this chapter. This section presents those emergencies which are more rarely encountered but still require action on your part. In many instances you will not be able to provide definitive medical care, but instead will stabilize the casualty as an interim measure.

13-129. Diabetic Emergencies

Diabetes mellitus is a disease that occurs when the pancreas cannot secrete enough insulin to control blood glucose levels. Insulin is a hormone produced by beta cells in the islets of Langerhans of the pancreas. When blood glucose rises, the beta cells release more insulin into the bloodstream, which increases glucose transport into muscle and fat cells. Insulin also promotes the synthesis of glycogen, large fat molecules, and protein. Many diabetics take insulin shots to compensate for their insulin deficiency. However, regulating the amount of glucose in the blood requires a delicate balance, and the insulin dose taken may be either too high or too low. When diabetics take too little or too much insulin, their blood sugar level becomes either too high (hyperglycemia) or too low (hypoglycemia).

13-130. Diabetic Ketoacidosis

a. Diabetic ketoacidosis occurs when the blood sugar level becomes too high—either because the insulin dose is too small or has been neglected. Ketoacidosis is often preceipitated by stress, such as that caused by infection. When serum insulin is low, glucose cannot enter the muscle and fat cells and accumulates in the blood. When insulin levels fall, glycogen breakdown increases; this forms more glucose, which enters the bloodstream, further increasing the blood glucose levels.

b. The increased number of glucose molecules in the blood increases the blood's osmotic pressure. In addition, the kidneys, which normally reabsorb all glucose, begin to excrete glucose into the urine, increasing the osmotic pressure in the urine. Because the kidneys can only concentrate urine to a certain osmotic pressure, they must excrete more water with the excess glucose. Therefore, increased blood glucose produces osmotic diuresis (increased urine output).

c. If the diabetic does not drink enough water to match the increased water excretion, he becomes dehydrated. Dehydration may be so severe that it produces hypovolemic shock. When insulin levels decrease, fat breakdown increases to provide an alternate energy source for cells that no longer receives glucose. Fat breakdown products are acids, which are called wither ketoacids or ketone bodies.

d. When more ketoacids are produced than the kidney can excrete, they accumulate and produce metabolic acidosis. The lungs attempt to compensate for the metabolic acidosis by increasing the rate and depth of respiration to blow off more carbon dioxide and return the pH to normal (7.4).

e. When the kidneys excrete ketoacids, they also excrete potassium. Serum potassium levels do not fall, however, because potassium leaves the cells (where most body potassium is found) when the body becomes acidotic. In fact, serum potassium may actually rise. However, dangerously low serum potassium levels may occur later when ketoacidosis is corrected; this condition occurs because potassium reenters the cells when the pH returns to normal.

f. The patient in diabetic ketoacidosis has a characteristic fruity-smelling breath due to the presence of acetone, a ketone body. Diabetic ketoacidosis usually progresses slowly, over 12 to 48 hours, with the patient gradually becoming comatose.

13-131. Signs and Symptoms of Diabetic Ketoacidosis

- Polyuria (excessive urine output) due to osmotic diuresis.
- Polydipsia (excessive thirst) due to dehydration.
- Polyphagia (excessive hunger), probably due to the body's inefficient use of nutrients.
- Nausea and vomiting, the latter worsening with dehydration.
- Tachycardia (rapid heart rate).
- Deep, rapid respirations (Kussmaul's breathing), in an attempt to blow off excess acids by carbon dioxide elimination.
- Warm, dry skin and dry mucous membranes, reflecting dehydration.
- A fruity odor on the breath due to acetone.
- Occasional fever, abdominal pain, and falling blood pressure.

13-132. Treatment for Diabetic Ketoacidosis

Treatment for ketoacidosis in the field depends on the diagnosis. It is safer to assume the patient in a coma is suffering from hypoglycemia than hyperglycemia. If, however, the patient's history and physical exam are consistent with ketoacidosis, start treatment aimed at hydration and supporting vital functions by administering 25 to 50 cc's of 50 percent glucose intravenously. To treat suspected ketoacidosis, you should—

(1) Maintain an open airway. Administer oxygen in comatose patients. Be alert for vomiting and have suction equipment ready.

(2) Start an IV, draw blood for serum glucose determination, and administer 1 liter of normal saline at a TKO rate or a rate ordered by the physician. The patient in ketoacidosis is severely dehydrated, often to the point of shock, and needs fluid volume.

(3) Monitor cardiac rhythm (if cardiac monitoring equipment is available).

13-133. Hypoglycemic Reactions

Hypoglycemia in an insulin-dependent diabetic is often the result of having taken too much insulin, too little food. or both. The brain depends on a constant glucose supply for its function. If the glucose level falls very low, the brain is unable to function properly. This causes severe excitment and then depression or, in extreme cases, convulsions followed by coma. In contrast to ketoacidosis, hypoglycemia develops very rapidly. It should be suspected in any diabetic manifesting bizarre behavior, altered neurologic signs, or paranoia, hostility, or aggression.

13-134. Signs and Symptoms of Hypoglycemia

- A weak, rapid pulse.
- Cold, clammy, pale skin.
- Weakness and incoordination.
- Headache.
- Irritable, nervous, or bizarre behavior.
- In severe cases, seizures and coma.

13-135. Treatment for Hypoglycemic Reaction

a. Treat an unconscious patient as any other comatose patient, by establishing an airway and administering oxygen.

b. Start an IV, draw blood for lab tests, and administer 5 percent dextrose (D5W) at TKO rate. Then give 50 milliliters (ml) of 50 percent dextrose by IV push. If the coma is indeed caused by hypoglycemia, the patient will awaken dramatically.

OR

c. Give orange juice sweetened with sugar, cola, or candy instead of D5W IV if the patient is awake, alert, and able to swallow.

NOTES

1. Diabetics are not the only patients who are prone to hypoglycemia. Alcoholics, patients who have ingested certain poisons, and others may develop the same syndrome. Therefore, you should not discount the possibility of hypoglycemia in any comatose patient. This is particularly true with an auto accident victim when there appears to be no real reason for the patient to be in a coma.
2. Any patient in a coma of unknown cause should receive glucose.

13-136. Poisoning

a. Poisoning is mainly a pediatric problem. Of the 1,000,000 poisonings reported in the United States each year, about 75 percent occur in children under 5, and most are caused by household products. Suicidal and homicidal attempts account for most adult poisonings.

b. It is beyond the scope of this manual to provide a list of all poisons. Detailed information can be obtained from all local poison control centers. In any case of poisoning, your supporting MTF should provide the specific antidotes for each agent.

c. Poisons can enter the body through ingestion, inhalation, surface absorption, or injection. Ingested poisons usually remain in the stomach a short time and the stomach absorbs only small amounts. Most absorption takes place after the poison passes into the small intestine. You should suspect poisoning in any patient who presents a sudden onset of unexplained illness, especially an illness characterized by abdominal pain, nausea, vomiting, or CNS problems. Thus management is aimed at trying to rid the body of the poison before it reaches the intestines.

d. In order to treat a poisoned patient, you must take a patient history, including answers to the following questions:

- What was ingested? The poison container and all its remaining contents, the plant, or a sample of what was ingested should be collected for the MTF. If a plant was ingested, find out what part of the plant (root, leaves, stems, flower, fruit) was actually swallowed. If the patient has vomited, send a sample of the vomitus in a clean, closed container to the MTF.

- When was the substance taken? Decisions about gastric lavage will depend on how much time has passed.

- How much of the substance was taken?

- Has the patient or a bystander tried to induce vomiting? Has anything been given as an antidote?

- Does the patient have a psychiatric history?

e. Look for signs characteristic of poisoning by a specific substance. Note the skin color. For example, flushed, red skin is indicative of carbon monoxide poisoning. Also check the patient's breath for the presence of petroleum products, alcohol, or other suggestive odors.

13-137. Treatment for Poisoning

a. Maintain the airway. The sleepy or comatose patient is in constant danger of asphyxiation and/or aspiration.

b. As a general rule, if the patient has ingested a poison within the past 3 to 6 hours, the stomach should be emptied, but there are important exceptions. *Never induce vomiting in—*

- Stuporous or comatose patients.

- Patients with seizures.

- Pregnant patients.
- Patients with possible acute myocardial infarction.
- Patients who have ingested corrosives (strong acids or alkalis).
- Patients who have ingested petroleum products (kerosene, gasoline, lighter fluid, furniture polish).

c. When in doubt, call for instructions.

d. For practically all other ingested poisons, you should promptly empty the patient's stomach. Vomiting is the most effective way to empty the stomach of ingested poisons. Empty the patient's stomach by—

(1) Giving syrup of Ipecac—15 cc with 2 to 3 glasses of water to a child over 1 year old, and 30 cc with 2 to 3 glasses of water to an adult.

(2) Placing the patient facedown, with his head lower than his hips, to reduce the possibility of aspiration.

(3) Repeating the dose of Ipecac once if vomiting does not occur within 20 minutes.

(4) Giving activated charcoal after vomiting stops. Make a slurry by mixing at least 2 tablespoons of activated charcoal in water just before administration.

NOTE

Do not mix the activated charcoal with syrup of Ipecac, because the charcoal will inactivate the syrup if Ipecac. Avoid activated charcoal in suspected cyanide poisoning.

(5) Performing gastric lavage if vomiting cannot be induced. The same contraindications that apply to inducing vomiting also apply to lavage. To perform gastric lavage—

- Pass a large nasogastric tube into the stomach (use the oral route for younger children).
- Position the patient on his left side, with his face down, to increase drainage and minimize aspiration.
- Aspirate the tube with a large syringe before beginning lavage. Save the contents.
- Instill saline (20 ml for small children, 50 ml for older children or adults) into the stomach through the nasogastric tube. Aspirate the tube and save the first aspirate for laboratory analysis.

● Repeat lavage until the fluid is clear. At this time, give activated charcoal (at least 3 tablespoons in tap water) through the nasogastric tube, which can then be pinched off and withdrawn. *Never pass a nasogastric tube in a stuporous or comatrose patient unless the airway has first been secured with a cuffed endotracheal tube.* Likewise, never pass a nasogastric tube in a patient who has ingested a substance like acid or lye.

(6) Start an IV with D5W at TKO rate. Draw blood for laboratory studies.

(7) Treat for shock, if necessary.

(8) Record treatment.

(9) Evacuate patient.

13-138. Treatment for Specific Poisonous Ingestions

a. For strong acids, such as toilet bowl cleaners, rust removers, and phenol, you should—

(1) *Never induce vomiting.*

(2) Give milk of magnesia, milk, egg white, or flour in water in an attempt to neutralize and dilute the acid.

(3) Start an IV with D5W at a TKO rate.

b. For strong alkalis, such as drain cleaner, washing soda, ammonia, and household bleach, you should—

(1) *Never induce vomiting.*

(2) Give diluted citrus fruit juice or equal parts of vinegar and water. Fifty ml of olive oil may ease the pain.

(3) Start an IV with D5W at a TKO rate.

c. For petroleum products, such as kerosene, lighter fluid, gasoline, furniture polish, and turpentine, you should—

(1) *Never induce vomiting* unless the patient drank a very large volume (more than 50 ml) of kerosene or gasoline. In these cases, potential toxicity to the brain and heart requires elimination of the poison.

(2) Protect the airway.

(3) Perform gastric lavage through a nasogastric tube.

(4) Give 100 percent oxygen with good humidification, if available.

(5) Start an IV with D5W at TKO rate.

(6) Monitor cardiac rhythm (if possible).

(7) Anticipate massive secretions and have suction ready, if available.

d. For methyl alcohol (methanol, wood alcohol), you should—

(1) Induce vomiting if the patient is conscious and give 1 ounce of 80 proof whiskey every hour (the dose must be reduced in children). Ethanol—the alcohol one normally drinks—inhibits methanol metabolism.

(2) Start an IV with D5W at a TKO rate.

(3) Monitor cardiac rhythm (if possible).

(4) Administer oxygen, if available.

OR

(5) Treat an unconscious patient as any other comatose patients.

13-139. Carbon Monoxide Inhalation

a. Carbon monoxide causes more poisoning deaths than any other substance. It is produced during the incomplete burning of organic fuels, most commonly in automobiles or home heating devices. Because home heating devices produce carbon monoxide, this poisoning occurs more frequently in the winter when it accumulates because a flue or ventilating system is blocked. However, at least half of all successful adult suicides are caused by carbon monoxide poisoning, and these may occur at any time of the year. An automobile in a small closed garage can produce a lethal concentration of carbon monoxide in 15 to 30 minutes. Carbon monoxide is a colorless, odorless, tasteless gas. These characteristics make its detection in the air difficult and thus increase the hazard. Usually the victim does not realize what is happening until it is too late.

b. Carbon monoxide binds to hemoglobin in red blood cells and displaces oxygen, preventing the transportation of oxygen to the tissues by the red blood cells. The result is suffocation at the cellular level. The level of carbon monoxide in the blood does not need to be high for poisoning to occur because this gas has an affinity for hemoglobin that is 200 times stonger than oxygen. Because the blood's ability to deliver oxygen is reduced, any condition that increases the need for oxygen—such as fever or physical exertion—increases the severity of carbon monoxide poisoning. Carbon monoxide poisoning is more severe in children, since their resting metabolic rate is higher than that of adults.

c. The warning symptoms of carbon monoxide poisoning include a sense of pressure in the head and a roaring in the ears. With acute poisoning, the patient is confused and unable to think clearly. The patient appears drunk, often vomits, and becomes incontinent; convulsions and coma then follow.

d. Examination of such patients reveals a bounding pulse, dilated pupils, and cyanosis or pallor. Cherry-red lips, although classically described, is rarely seen. In the comatose patient, rales—indicating pulmonary edema—may be heard. Symptoms vary greatly between individuals with the same carbon monoxide exposure. You should consider carbon monoxide poisoning whenever you are confronted with a group of people with different symptoms who are sharing accommodations when the symptoms started.

13-140. Treatment of Carbon Monoxide Poisoning

a. Provide maximal oxygenation. To accomplish this, you should—

(1) Remove the patient from the exposure site.

(2) Give him 100 percent oxygen by mask.

(3) Support respirations with a bag-valve mask if there is respiratory depression.

b. Record treatment.

c. Evacuate the patient. Move the patient rapidly to an MTF where high oxygen concentrations can be delivered more effectively.

13-141. Absorbed Poisons

a. Poisons, such as organic phosphate and cyanide, can also be absorbed through the skin. Treatment for absorbed poisons involves removing the substance from the skin. Flush the area with a copious stream of water. If dry lime is the poison, brush off the excess before flushing. Flush phenol off with alcohol in which it is soluble, rather than water, if large quantities of alcohol are available; if not, use water.

b. Do not waste time removing contaminated clothing or shoes until the patient has been flushed with water for several minutes; then remove his contaminated clothing and continue flushing. Do not use specific antidotes until the skin has been irrigated with copious amounts of water. After repeated flushing and removal of contaminated clothing, wash areas exposed to acids with soap and water. Wash areas exposed to alkalis with diluted lemon juice or vinegar.

13-142. Overdose

a. Obtaining a history from a patient who has taken an overdose is similar to taking a history from a poisoned patient. You should ask the following questions:

- What was taken? The bottle and its contents should be brought to the MTF. Its label may help identify the drug, and the number of pills remaining may give a clue to how much was ingested.
- When was it taken?

- How much was taken?
- Was anything else taken (other drugs or alcohol)?
- What has the patient or bystanders done to try to correct the situation? Has vomiting been induced? Street resuscitation procedures are frequently as dangerous as the overdose itself, and exactly what has been done for the patient is very important. The most common form of street resuscitation is "stimulation"—cold showers, and vigorous slapping. Check for broken teeth, blood in the mouth, or other signs of injury. If the patient has a barbiturate overdose, his friends may have tried to reverse this by giving him speed (Methedrine or Dexedrine). There is also a myth prevalent on the streets that salt or milk given intravenously will reverse an overdose. In fact, salt may cause pulmonary edema, and milk can induce pneumonia. All of these street remedies will complicate the situation; therefore, you should learn as much as possible about what has been done.

13-143. Treatment for an Overdosed Patient

a. Maintain an airway.

b. Administer oxygen, if available.

c. Induce vomiting if the drug was taken by mouth. There are, however, important exceptions. *Never induce vomiting in—*

- Stuporous or comatose patients.
- Patients who have ingested phenothiazines (including Thorazine, used as tranquilizers). Phenothiazines prevent vomiting, so the patient will end up with a stomach dangerously full of syrup of Ipecac and water if attempts are made to induce vomiting.

d. Start an IV with D5W at TKO rate.

e. Monitor cardiac rhythm (if possible).

f. Record treatment.

g. Evacuate patient.

13-144. Narcotics Overdose

a. The narcotic drugs include heroin, morphine, Dilaudid, methadone, codeine, Demerol, and Darvon. When narcotics are taken in excess, they cause marked respiratory depression. This is shown initially by slow, deep breathing that leads rapidly to apnea. Narcotic overdose also causes hypotension, stupor, and coma. The pupils characteristically become pinpointed, but this sign may be masked if the patient has overdosed on a combination of drugs.

b. You should suspect a narcotic overdose in any young patient found in an unexplained coma, especially when there are needle tracks along the veins of the arms or elsewhere. Cigarette burns on the chest are also seen among these patients; burns occur when the patient "nods out" (loses consciousness) while smoking.

c. Heroin overdose tends to occur in small epidemics. Heroin is sold on the street in an impure form. When a more concentrated supply of the drug reaches the street, users can miscalculate their doses and take more than they had intended.

13-145. Treatment for Narcotic Overdose

a. Maintain an airway.

b. Administer oxygen. Assist ventilation as needed.

c. Start an IV with D5W at TKO rate.

d. Record treatment.

e. Evacuate patient.

13-146. Sedative/Depressant Drugs Overdose

a. Barbiturates are among the most abused drugs. They are used in more drug-related suicide attempts than any other drug.

b. The chronic barbiturate abuser is characteristically lethargic, disheveled, and frequently nods off to sleep. The barbiturate abuser may be taking enormous doses to maintain a habit; therefore, a reduction in daily doses can lead to a dangerous state of withdrawal.

c. Diagnosing acute barbiturate poisoning may be difficult. A patient contemplating suicide may have large supplies of several drugs. It may be difficult to determine which drug(s) a comatose patient has taken. Patients may attempt suicide with barbiturates while consuming large amounts of alcohol. The odor of alcohol on the patient's breath can further confuse the diagnosis. You will often have to rely on circumstantial evidence such as empty medicine bottles, the characteristic color of tablets in the mouth, or gastric contents to diagnose barbiturate overdose.

d. Acute barbiturate poisoning mainly affects the CNS and the cardiovascular system. Signs and symptoms of moderate overdose resemble those of alcohol intoxication.

e. In severe overdose, the patient is deeply comatose. His pupils may be constricted early in the course, but later become fixed and dilated. (It is important for you to remember this sign during resuscitation efforts, because fixed and dilated pupils do not have the same significance in barbiturate overdose as in ordinary cardiac arrest.) Respiration is affected early and becomes very shallow, resulting in hypoventilation. Cheyne-Stokes breathing can occur. Aspiration and pneumonia are also common. Blood pressure falls and the patient may develop a shock syndrome, with weak, rapid pulse, and cold, clammy skin.

13-147. Treatment of Barbiturate Overdose

a. Maintain an airway.

b. Administer oxygen. Assist ventilation as required.

c. Start an IV with normal saline or D5W and administer at a rate to maintain blood pressure. If the patient is in shock, the MAST may be helpful.

d. Monitor cardiac rhythm (if possible).

e. Avoid giving stimulants. Stimulants increase the complications following barbiturate overdose.

f. Record treatment.

g. Evacuate patient.

13-148. Amphetamine Overdose

a. Amphetamines—such as Dexedrine and Methedrine—are frequently abused. These drugs stimulate the CNS and produce wakefulness.

b. The amphetamine abuser who has taken large quantities of the drug over a period of time displays excitement, loss of appetite, tachycardia, hypertension, sweating, dilated pupils, and tremors. He may demonstrate frank amphetamine psychosis as well, with paranoia and hallucinations. He may also be violent and you should be prepared for this reaction.

c. In most cases, the drug will wear off and the user will "crash." The patient will then go into a prolonged sleep, followed by a period of extreme hunger and depression. Field treatment of these patients consists primarily of reassuring them. If the patient is agitated, you should first ensure your own safety and then attempt to calm him down.

13-149. Treatment for Amphetamine Overdose

a. Determine whether the patient is violent and summon assistance if needed.

b. Talk to frightened or agitated patients calmly and reassuringly.

c. Provide the patient with a place to "crash." The hospital is often not a very good place for this. A quiet room in the house of a reliable friend where concerned people will be available to reassure the patient may be better. Consult the physician to help decide whether to bring the patient to the MTF.

d. Determine whether hospitalization will be necessary. If his blood pressure is significantly elevated, if arrhythmias are present, or if he is entirely out of control, hospitalization is required. Use assistance, if needed, to bring the patient to the MTF.

13-150. Overdose and Toxic Reaction to Hallucinogens

The symptoms of LSD intoxication includes excitement, panic, hallucinations (usually visual), unusual body sensations, and often psychotic reactions. Most authorities now advocate the "talking down" approach in dealing with these patients, avoiding drugs as much as possible. You should try to get the patient to a quiet place, away from crowds and noise. An emergency room is far from ideal in this respect. It is often better if you can arrange to have the patient looked after by a responsible friend. It is especially important that you deal with the patient in a calm, understanding manner.

13-151. Aspirin Overdose

a. Aspirin (salicylate) intoxication is primarily a pediatric problem and is one of the most frequent overdoses in children. Adults can also overdose on aspirin, either accidentally or in suicide attempts.

b. Salicylate is an acid and causes metabolic acidosis. The patient tries to compensate for the metabolic acidosis, with its excess carbon dioxide, by hyperventilating. As time passes, however, the patient tires and respirations become shallower.

13-152. Signs and Symptoms of Salicylate Intoxication

- Hyperpnea, tachypnea (deep and rapid respirations).
- Fever and sweating.
- Vomiting.
- Dehydration, sometimes so severe that it causes shock.
- Convulsions.
- Coma.

13-153. Treatment for Aspirin Overdose

a. Induce vomiting with syrup of Ipecac, if the patient is conscious.

b. After vomiting stops, give at least 2 tablespoons of activated charcoal mixed as a slurry in water.

c. Start an IV with D5W at a TKO rate.

d. If the patient's temperature is elevated above 104^{o}F, sponge his body with cool water.

e. Record treatment.

f. Evacuate patient.

13-154. Massive Gastrointestinal Bleeding

a. Massive gastrointestinal (GI) bleeding refers to bleeding that is severe enough to cause hypovolemic shock. Bleeding may occur from any part of the GI tract. Massive bleeding, however, most frequently occurs from the duodenum, stomach, or esophagus.

b. Massive GI bleeding is most often caused by a duodenal peptic ulcer. Other frequent causes of massive GI bleeding are a gastric peptic ulcer, gastritis, and esophageal varices (enlarged and twisted veins in the esophagus).

c. In peptic ulcer disease, digestive enzymes and gastric acid destroy a small area of the stomach or esophagus lining. If the damaged area includes the wall of a vein or artery, there is massive bleeding.

d. A duodenal peptic ulcer causes massive GI bleeding more frequently than does a gastric peptic ulcer. The typical duodenal ulcer patient is a male, over 33, who works under emotional and physical stress.

e. Gastric peptic ulcer is also more frequent in males, but is not related to stress. Gastric ulcers most often occur past the age of 40. They may be benign or may be caused by gastric cancer.

f. Acute gastritis is an acute inflammation of the superficial layer of the stomach lining. The disorder may be caused by viral or bacterial infection or by ingestion of alcohol or aspirin. Acute gastritis following alcohol or aspirin ingestion can cause massive GI bleeding. Aspirin and alcohol, however, also cause peptic ulcers to bleed. Therefore, a patient with a history of ingesting either drug does not always indicate acute gastritis.

13-155. Signs and Symptoms of Massive Gastrointestinal Bleeding

a. The symptoms of massive GI bleeding include those of hypovolemic shock. In addition, massive GI bleeding produces hematemesis (vomiting blood) and/or melena (black, tarry stools). Vomited blood may be bright red if it is fresh or may resemble coffee grounds if it has been partly digested.

b. Other signs and symptoms can indicate the cause of GI bleeding. The ulcer patient may be taking antacids; the acute gastritis patient may have recently ingested aspirin or alcohol. The patient with bleeding esophageal varices usually has symptoms of cirrhosis of the liver. These include liver and spleen enlargement, ascites (fluid in the peritoneal cavity), and dilated abdominal wall veins.

13-156. Treatment of Massive Gastrointestinal Bleeding

a. Administer oxygen.

b. Take vital signs.

c. Apply and inflate the MAST.

d. Start two or more IV's with large-bore catheters. Then rapidly infuse lactated Ringer's solution to maintain blood pressure.

e. If ordered by the physician, insert a nasogastric tube to aspirate blood present in the stomach.

f. Maintain the patient in a shock position with his feet elevated.

g. Keep the patient warm.

h. Monitor the patient's blood pressure, pulse, and state of consciousness.

i. Record treatment.

j. Evacuate patient.

13-157. Genitourinary Problems

a. It is rarely useful to distinguish the different possible causes of genitourinary problems in the field.

b. The genitourinary system includes the kidneys, ureters, bladder, urethra, and the reproductive organs. All of these organs are subject to trauma or disease. Nontraumatic emergencies involving these organs include inflammation, infection, and obstruction. EXAMPLE: The passage of a renal stone, which causes excruciating flank pain—is one of the most severe forms of pain a person can experience. Treatment in the field is not feasible.

13-158. Patient History—Respiratory Problems

a. Much can be learned from a few well-chosen questions. In taking a history from a patient with respiratory problems, you need to explore the patient's chief complaint in greater depth. In most cases the complaint will be dyspnea. But some patients may have serious respiratory problems without dyspnea, especially if their respiration has been depressed by drugs or trauma. Therefore, you must be alert for respiratory problems, even if the patient does not complain of shortness of breath. Assuming that the chief complaint, however, is dyspnea, obtain answers to these questions:

- How long has the dyspnea been present? Is the problem longstanding or of recent onset?
- Was the onset gradual or rapid?
- Is the dyspnea made better or worse by any position?
- Has the patient been coughing? If so, is the cough productive? What does the sputum look like?
- Is there associated pain? If so, what is its nature?
- Has the patient suffered any medical problems in the past? If so, when?
- What medications does the patient take regularly?

b. Observations made during history taking can provide valuable information on the patient's condition. When taking a history, you must also answer these questions:

- Is the patient anxious, uncomfortable, or in distress?

- Does dyspnea make it difficult for the patient to speak? Does he need to stop to catch his breath when answering questions?

- Does questioning easily distract the patient from symptoms?

- Are his answers to your questions coherent and appropriate, or does he answer in a confused and disoriented fashion?

- What position does the patient naturally assume?

c. In making such observations, you are performing the first step of the assessment of the patient's general appearance and mental status. Thus, you can note, for example, that the patient in severe respiratory distress is frightened and intensely uncomfortable, is usually sitting upright, is gasping or laboring to breathe, and is confused or disoriented.

d. After completing the primary survey, take the patient's vital signs. Carefully observe his respirations. Are his respirations abnormally rapid (tachypnea) or unusually deep (hyperpnea)? Is there an abnormal respiratory pattern?

e. The secondary survey of the respiratory system should begin with examination. Look for the following signs of respiratory distress:

- The nostrils opening wide on inspiration.

- The Adam's apple pulled upward on inspiration.

- Retraction of the intercostal muscles: the patient retracts these muscles on inspiration.

- The patient is using his neck and diaphragm muscles exclusively on expiration.

- Cyanosis is an unreliable sign; however, severe hypoxia may be present without cyanosis.

f. Next, observe the chest wall. Has its diameter increased (barrel chest)? Does the chest move symmetrically during respiration? During expiration, does any area bulge (flail)? Is the trachea in the midline, or does it deviate toward one side? Is the chest wall deformed or discolored?

g. After observing the patient, auscultate his chest. Firmly apply the stethoscope to the patient's chest and listen, both anteriorly and posteriorly, to at least one respiratory cycle at each apex and each base. Certain abnormal sounds detectable on auscultation of the lungs characterize different respiratory problems:

- Snoring is a familiar sound, occurring when the upper airway is partially obstructed by the base of the tongue.

- Stridor is a harsh, high-pitched sound heard on inspiration that is characteristic of tight upper-airway obstruction, as in laryngeal edema. The "seal bark" of the child with croup is an example of stridor.

- Wheezing is a whistling sound heard diffusely in asthma.

- Rhonchi are rattling noises in the throat or bronchi, often due to partial obstruction of the larger airways by mucous.

- Rales are fine, moist sounds, sometimes crackling or bubbling in quality, associated with fluid in the smaller airways (pulmonary edema, pneumonia).

h. Determine if breath sounds are equal on both sides of the chest.

i. Palpate the chest following auscultation. Feel the chest wall of the trauma victim for tenderness and instability over the ribs. Also palpate for subcutaneous emphysema (air in the subcutaneous tissues) which can be felt as a crackling sensation under the fingertips. Symmetry of breathing can be assessed by placing your thumbs on the xiphoid and spreading your hands over the anterior chest wall. If breathing is normal, the hands move symmetrically as the patient breathes.

j. The patient with respiratory problems is not immune to abnormalities elsewhere. Therefore, complete a head-to-toe survey.

13-159. Epiglottitis

A patient's upper airway can become obstructed by swelling of its tissues. Epiglottitis leads to marked swelling of the epiglottis and pain on swallowing and may cause complete airway obstruction.

13-160. Obstructive Airway Diseases

In obstructive airway diseases there is generalized obstruction to airflow within the lungs. The most common diseases are emphysema, chronic bronchitis, and asthma. These conditions are often classified together as chronic obstructive pulmonary disease (COPD) or chronic obstructive lung disease (COLD).

13-161. Emphysema

a. Emphysema is a pulmonary condition in which the air space beyond the terminal bronchioles is increased in size because of the destruction of the alveloar walls. Destruction of the alveolar walls also weakens the walls of the small bronchioles, lengthening expiration. Because alveolar walls are destroyed, the lungs hold more air.

b. When the ratio of air to tissue is increased characteristic physical signs become evident. Because air is a poorer carrier of sound than is tissue, breath sounds decrease in emphysema. When an overinflated lung is located between the chest wall and the heart, it is harder to hear heart sounds and to feel the impulse at the heart apex.

c. Emphysema leads to three potentially fatal complications: right ventricular heart failure, acute respiratory infection, and cardiac arrhythmias. Often, the patient with emphysema is thin, complains of increasing shortness of breath on exertion, and of progressive limitation of physical activity. Usually, coughing is not prominent and, when it occurs, produces only small amounts of whitish-gray, mucus-like sputum. Patients with emphysema usually are not cyanotic. The patient with advanced emphysema has decreased chest movement, hypertrophied (enlarged) accessory respiratory muscles, and breathes with pursed lips. Clubbed fingers are another sign of advanced emphysema.

13-162. Chronic Bronchitis

a. Chronic bronchitis is long-continued form of a pulmonary condition with a tendency to recurrence after stages of inactivity. Sputum composed of mucous and pus is common. In chronic bronchitis, the mucous-secreting cells in the respiratory epithelium produce characteristically large amounts of sputum.

b. Chronic bronchitis infections produce scarring in the lungs. Thus, patients with chronic bronchitis may have decreased total lung capacity.

c. Invariably, patients with chronic bronchitis have been heavy cigarette smokers and, in their forties, usually begin suffering from severe respiratory problems. Before this, they may have had many respiratory tract infections. Even between acute infections, chronic bronchitis patients produce at least 10 ml of green or yellow sputum daily. Like patients with emphysema, chronic bronchitis patients have prolonged expiration, but they also have inspiratory airway obstruction. Coarse rales, rhonchi, and wheezes may be heard through both lung fields.

d. Because the overinflated lungs are not located between the heart and the chest wall, heart sounds are heard more easily in chronic bronchitis than in emphysema. Pure pulmonary emphysema and chronic bronchitis represent two extremes of a single problem. Both conditions can occur in the same patient, producing signs and symptoms between the two extremes.

13-163. Treatment for Emphysema and Chronic Bronchitis

a. Establish an airway.

b. Place the patient in a sitting or semisitting position.

c. Administer oxygen. Monitor the patient's respiratory rate and depth. Provide assisted ventilation should respirations become depressed.

d. Establish an IV line with 5 percent dextrose in water (D5W) to keep open rate.

e. Administer aminophylline if ordered by the physician by adding 250 mg of aminophylline to a 250-ml bag of D5W, at a rate of 100 ml per hour.

f. Monitor vital signs and level of consciousness.

g. Encourage the patient to cough up any secretions.

h. Record treatment.

i. Evacuate patient, if necessary.

13-164. Bronchial Asthma

a. Bronchial asthma is characterized by an increased reaction to some stimuli of the trachea, bronchi, and bronchioles, with widespread narrowing of the airways (bronchospasm).

b. An acute asthma attack reflects airway obstruction due to bronchospasm, swelling of the mucous membranes in the bronchial walls, and plugging of the bronchi by thick mucus secretions. The attack may be brought on by an allergic reaction to inhaled irritants, by respiratory infection, or by emotional stress (including battle stress). Narrowing of airways and increased amounts of thick sputum interfere with airflow, especially on expiration. Airway constriction and increased amounts of sputum result in progressive difficulty for moving air in and out.

c. In a typical acute asthmatic attack, the patient is found sitting up, often leaning forward, and fighting to breathe. He may be coughing spasmodically and unproductively. Use of accessory muscles for respiration is prominent, and the chest is relatively fixed in the inspiratory position. Wheezing is usually audible even without a stethoscope, but may be absent if the attack is severe and there is little air movement.

13-165. Treatment for Bronchial Asthma

a. Establish an airway.

b. Administer humidified oxygen. If available, a nebulizer unit attached inline to a bag-valve mask may be useful in such circumstances.

c. Establish an IV line with D5W at 100 cc's per hour rate.

d. Administer epinephrine (1:1000), 0.3 to 0.5 ml SQ, if ordered by the physician.

e. If ordered by a physician, administer aminophylline in a dose level of 250 ml to a 250-ml bag or bottle of D5W. Piggyback this infusion into the IV and run it at the rate specified by the physician.

f. Administer bronchodilators such as epinephrine, isoproterenol (Isuprel), and isoetharine (Bronkosol) by aerosol, if ordered by the physician.

g. Monitor vital signs and level of consciousness.

h. Record treatment.

i. Evacuate patient, if necessary.

NOTES

1. Status asthmaticus is a severe, prolonged asthmatic attack that cannot be broken with epinephrine; the condition is a serious medical emergency. Upon examination, the patient's chest will be greatly distended. The patient will fight desperately to move air through the obstructed airways and make prominent use of accessory muscles of respiration. The patient is usually exhausted and dehydrated. The treatment is similar to that used for the acute asthmatic attack, but there is greater urgency in starting therapy and getting the patient to an MTF.
2. When dealing with any asthmatic patient, maintain a calm, reassuring attitude to lessen the patient's anxiety associated with difficulty in breathing.

13-166. Pneumonia

a. Pneumonia is caused by bacteria, viruses, or fungi. The pneumonia patient usually reports several hours to several days of fever, weakness, and productive cough, and sometimes chest pain worsened by coughing. The illness can occur abruptly, with a shaking chill, or set in gradually, progressively weakening its victim. The elderly and those with chronic diseases are more prone to pneumonia than are younger, healthier persons.

b. The pneumonia patient is often feverish, coughing, and may exhibit minimal or marked respiratory distress, depending on the degree of congestion. Auscultation of the chest will reveal rales and rhonchi over the affected lung.

c. Definitive treatment of pneumonia requires hospitalization. In the field, not much can be done. Administer oxygen and evacuate the patient in a comfortable position.

13-167. Drowning

a. Approximately 6,500 people in the United States die each year by drowning, making it the fourth leading cause of accidental death. Among adults, alcohol intoxication is a factor in about one-third of the cases. When treating the near-drowning victim, keep these points in mind:

- As the victim goes under, water enters the mouth and nose, and he begins to cough and gasp, swallowing large amounts of water.

- A small amount of water is aspirated into the larynx and trachea, setting off laryngeal muscles (laryngospasm) spasms. In 10 percent of the victims, laryngospasms seal off the airway and temporarily protects it from further aspiration. In the other 90 percent, water enters the lower airways and the laryngospasm offers no protection.

- Laryngospasm or aspirated water leads to asphyxia.

- If the victim aspirates fresh water, it rapidly crosses the alveolar membranes into the bloodstream. If the victim aspirates salt water, fluid is drawn into the alveoli from the bloodstream, causing serious pulmonary edema. Pulmonary edema mechanically obstructs gas exchange across the pulmonary membranes. Therefore, greater hypoxia occurs with salt water aspiration than with fresh water aspiration.

- Near drownings in cold water (less than 70°F) are of interest because the cold prolongs survival time. Many patients have been resuscitated without residual neurologic problems after immersions of 4 to 45 minutes. In general, successful resuscitations are related to age, water temperature, duration of immersion, and water cleanliness. The younger the patient, the colder and cleaner the water, and the shorter the time of immersion, the better the chances are for successful resuscitation.

b. Two physiologic mechanisms may account for the long survival times of near drownings in cold water. The first is the relatively rapid onset of hypothermia in patients in cardiopulmonary arrest who are submerged in cold water. The cold exerts a protective effect on the brain and other tissues, decreasing the rate of cellular degeneration that results from anoxia at normal body temperatures. The second is the mammalian diving reflex, in which the body redistributes blood flow from nonessential tissues to vital organs. The diving reflex occurs when the face is immersed in cold water. It is particularly strong in infants and children, which may help to explain the greater success of resuscitation in young patients.

13-168. Treatment for Near-Drowning Patients

a. Whether near drowning occurs in fresh water or in salt water, initial resuscitation involves cardiopulmonary resuscitation. First, try to reach the victim without endangering yourself. (An unqualified swimmer should not try to rescue a drowning victim because the rescue attempt may lead to two drowning victims.) After reaching the victim, establish an airway and begin ventilation—even before he is removed from the water. Do not waste time trying to remove water from his lungs early in resuscitation. If the near drowning occurred in fresh water, the water will have already been absorbed through the lungs. Even in salt water near drownings, laryngospasm may have protected the lower airway from aspiration. When dealing with a swimming pool near drowning, assume that he is the victim of a diving accident. Protect his cervical spine while giving mouth-to-mouth resuscitation and removing him from the water.

b. After removing the patient from the water, determine whether a pulse is present. Begin closed chest compression if it is needed. Protect the airway from aspiration during vomiting, which usually occurs during resuscitation from near drowning. Supplemental oxygen in the highest possible concentration should be administered as soon as possible. Carry out suctioning as needed.

c. Even if it appears that the patient has recovered at the scene, transport him to the hospital. Delayed death can occur in near drowning due to pulmonary edema and aspiration pneumonia. The patient should receive 100 percent oxygen during transport and be given resuscitation if necessary.