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Treating Trauma: What you need to know to save a life

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Understanding what to do in different trauma scenarios could mean the difference between life and death. Trauma is generally divided into penetrating or blunt trauma. Penetrating trauma refers to gunshot wounds, stab wounds, and injury from projectiles. Blunt trauma can result from assaults, motor vehicle accidents, falls, explosions, and other force mechanisms.

When no physician or other healthcare practitioner is available, you may have no choice but to treat the injured person yourself until professional help can be summoned. Whatever the cause of trauma, there are a few basic rules you need to know. The first is the A, B, C, D, E method of remembering the essentials of delivering first aid.

A is for Airway. Make sure the victim's mouth and breathing passage are unobstructed. In an unconscious patient, the tongue is the most common cause of obstruction. Simply lifting the chin and properly positioning the victim can allow them to breathe. Avoid tilting the head in case there's a spinal cord injury. A clear breathing passage is vital, because if it's blocked, the victim's heart will eventually stop beating without oxygen.

B is for Breathing. Make sure the patient is actively breathing, and that the chest is rising and falling symmetrically with each breath. For example, if someone is stabbed in the chest and one



A recent study concluded that patients treated at a trauma center have a 25 percent higher rate of survival.

Photography: René Perez

side of their chest has no breath sounds and does not rise and fall, there is usually a serious problem, such as a lung collapse.

C is for Circulation. Assess the victim's circulation. Take their pulse at the wrist, neck, or groin, and take their blood pressure if you have a blood pressure cuff. If you can feel a pulse at the carotid artery on either side of the neck, it means the blood pressure is at least 60.

D is for Disability (i.e., neurological deficit). For example, a victim shot in the neck or back may not be moving their arms or legs. This usually means that the spinal cord has been injured, so the patient should not be moved.

E is for Exposure. If you overlook a gunshot or stab wound, the consequences can be fatal. It's particularly easy to miss a gunshot wound in the armpit or between the buttocks. Fully expose the victim and check everywhere to ensure that you haven't missed anything.

The "Golden Hour"

The "golden hour" refers to the idea that the odds of survival improve when critically injured victims are managed by a specialized medical team as rapidly as possible. The term is not meant to denote exactly 60 minutes, but rather to impart a sense of urgency to seek appropriate medical care. In an urban setting, you should know where the trauma center nearest your home or business is located, and learn the best and fastest routes in advance. Don't assume that any emergency room can treat a trauma; treatment requires the experience and expertise of a specialized team.

How to Control Bleeding

There are five areas of the body where people can bleed heavily, potentially causing a life-threatening condition known as shock: the chest, abdomen, pelvis, long bones (e.g., femur), and from an open wound. The best way to stop ongoing blood loss is to apply direct manual pressure to the bleeding wound. This simple technique will almost always stop the bleeding. Press with whatever amount of force it takes for the bleeding to slow down and, hopefully, stop. If direct pressure doesn't work, compressing the nearest artery feeding that area often works. This is why it's important to learn the basic anatomical path of the major blood vessels, so that you know where to press and occlude them. If these steps don't work, a tourniquet may be needed.

Tourniquets

If you do need to place a tourniquet, it should be broad and tight. Whatever type of tourniquet you use, place it as far down as possible and not over a joint space (as the artery dives deep here and can't be

compressed by the bone). In addition, a tourniquet should not be applied over exposed muscle without skin (to avoid slipping). It should be evaluated and removed as soon as possible and converted to a pressure bandage if possible. Tourniquets are very successful at controlling extremity bleeding, but muscle can be deprived of circulation for only 4 to 6 hours. After that, the muscles and nerves typically die, requiring amputation of the limb. A standard blood pressure cuff makes the best tourniquet, since almost everyone knows how to apply it and it can be removed easily. Generally, you have to pump up the pressure number to twice the blood pressure. So if the blood pressure is 120/80, you'll need to pump it up to at least 220–240.

GUNSHOT WOUNDS

Gunshot wounds, with the exception of shotgun wounds, appear relatively small and unimpressive. But the internal damage they cause can be quite significant. Never underestimate the size of a gunshot wound, and never assume that a bullet travels in a straight line. In short, don't focus on the entry wound itself.

The basic treatment of gunshot wounds depends on the area(s) struck. Generally, gunshot wounds should be covered by a dry dressing or a transparent dressing if available. If the wound is bleeding, apply direct manual pressure.

Gunshot Wound to Head

Gunshot wounds to the head are typically fatal if the bullet crosses both of the brain hemispheres or hits the brain stem, which is responsible for control of the vital signs. In the field, there is no real treatment for this. The key is to elevate the head, place the victim in an upright position, and rapidly transport him or her to a trauma center with neurosurgical capabilities.

Gunshot Wound to Face and Neck

Since the face and neck have excellent circulation, bleeding is often heavy there. In addition, the airway can become obstructed by blood, teeth, and swelling. Apply direct manual pressure to a bleeding wound and leave the victim in the upright position. Direct pressure should be as strong as required to stop the bleeding. Avoid pressing over a large area because you can compromise blood flow to the brain or shift the trachea, causing an airway obstruction.

Gunshot Wound to Chest and Back

Gunshot wounds to the chest can damage the heart, lungs, and major blood vessels. If not treated immediately, these injuries can be fatal. Apply direct manual pressure to a bleeding wound, but realize that

it may be hard to compress chest bleeding because the structures that are bleeding are protected by the bony rib cage.

Gunshot Wound to Abdomen

Gunshot wounds to the abdomen can cause bowel damage as well as significant bleeding. For an actively bleeding wound, apply direct manual pressure with a dry dressing. For internal bleeding, it may be difficult to compress the source of the bleeding.

Gunshot Wound to Arms and Legs

Gunshot wounds to the arms or legs can cause heavy bleeding if a blood vessel is struck. Apply direct manual pressure to initially control bleeding. An injured blood vessel can either bleed externally or sometimes clot and block blood flow to the remainder of the extremity. Both require emergency surgery. Apply enough direct manual pressure to stop the bleeding. If this fails, a tourniquet may be needed.

As important as it is to aid others, you should also protect yourself. You should be trained in Basic Life Support/CPR and be familiar with life-saving medical supplies.

For a related article on Bellevue's trauma surgeons, featured in *NYU Physician* magazine, visit www.med.nyu.edu

For a profile of Dr. Maurizio A. Miglietta, visit www.med.nyu.edu/miglietta_profile.html