

Lifesaving Education: May is Stop the Bleed Awareness Month Part 1

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Stop the Bleed is a program initiated by the American College of Surgeons. It was instituted to raise awareness about lifesaving techniques for severe bleeding. The program offers free classes for the public as well as print resources on their website. National EMS Week is concurrent with the 7th annual Stop the Bleed Day and runs from May 19-25. National Stop the Bleed Day is May 23. To commemorate this month and our heroes in EMS, we want to provide important information about bleeding control.

This is a two-part series. First, we'll discuss the circulatory system, shock, and the different kinds of bleeding you might encounter. I'll also discuss mindset and an approach to treatment in a bleeding scenario. In part two we'll discuss specific treatments for various situations. Put another way, part one will deal with theory and philosophy and part two will delve into technical practice.

The Circulatory System

A brief, and highly simplified, overview of the circulatory system will be helpful.

The heart is a circulation pump that delivers oxygen-rich blood from the lungs to the rest of the body. It does this via a highway system of vessels. High-pressure arteries carry oxygenated blood from the heart throughout the body. These arteries branch into tiny vessels called capillaries where gas exchange takes place. Blood delivers oxygen to tissues, and then waste and deoxygenated blood return to the heart through low-pressure veins.

An average adult has around 5 liters of blood in their body. The body responds to bleeding first by clotting at the site of injury. The clot stops blood flow in smaller injuries and is assisted by direct pressure, and when larger injuries occur, muscular blood vessels constrict to restrict blood flow. Sometimes vessels are too large for the body to stop the flow and the patient continues to bleed. In these situations, a patient can bleed out within a very short period. The least pressing issue to deal with in this scenario is infection. Any time the skin is broken pathogens can enter the body and infection can set in. Infection is serious but it's a problem that can be dealt with in a hospital setting. Hypovolemic shock is an immediate, life-threatening issue and must be dealt with quickly.

Shock

Hypovolemic shock is the body's response to a major loss of blood. In this context, hypo means less than or below normal. Volemic is speaking of volume. When someone loses a certain amount of blood then hypovolemic shock sets in. According to Cleveland Clinic, there are 4 stages of shock:

- Stage 1- A person can lose up to 15% of their blood and continue to maintain normal body function.
- Stage 2- Up to about 30% blood loss or 1.5 liters. The heart rate goes up, and the breathing rate increases.
- Stage 3- Blood pressure drops dramatically due to 30-40% blood loss. The heart rate and breathing get much faster because less oxygenated blood is available.
- Stage 4- Considered when there is more than 40% blood loss and is life-threatening.

What occurs during hypovolemic shock is that eventually blood flow is redirected from the extremities to the core. The blood begins to stop flowing to body parts that aren't vital for life. Instead, flow concentrates in the brain and vital organs.

Shock isn't difficult to recognize, but it's important to know that not all bleeding is visible. Someone can have internal injuries with no visible blood. Internal injuries usually require surgical treatment and are only dealt with in the field by treating for shock.

For shock resulting from external bleeding, the evidence will be clearly visible. Imagine pouring a full 2-liter bottle of Big Red on the floor. Shock caused by external blood loss is dramatic. A patient in shock will present as weak with a fast, thready pulse and rapid, shallow breathing. The skin will likely be cold, clammy, and the patient will look pale. They will sweat profusely and progress into confusion. They may describe a feeling of terrible fear or imminent doom. They might also become combative and difficult to manage.

What Kind of Bleeding is This?

The first thing you should do is stop the bleeding. To do that you have to assess what kind of bleeding is taking place. There are 3 kinds of visible bleeding, Capillary, Venous, and Arterial. All have different characteristics. They all allow different rates of blood loss and happen at different speeds. All three can be serious, but venous and arterial blood are usually much more dangerous.

Capillary Bleed - Capillary vessels are the smallest vessels in the human body. They are the junction between arteries and veins and are small enough to allow gas exchange between tissues. Some only allow a single blood cell through the skin at a time. Capillary bleeding is usually caused by blunt force trauma or a scrape. Blood tends to seep through the opening in the skin. The bleeding is not usually serious, and the greatest threat is infection.

Venous Bleed - Venous blood is darker in color. This deoxygenated blood is returning to the heart and tends to flow steadily. Large, severed veins can easily be life-threatening, but unlike arteries, veins are not pressurized. Direct pressure and a pressure dressing are usually enough to stop venous blood flow. You can visualize the difference in veins and arteries by a simple comparison. Imagine veins as a water hose and arteries as a pressure washer. Venous blood has already passed the capillaries and is returning to the heart. Arterial blood is highly pressurized. The heart is pumping blood into arteries to reach the rest of the body.

Arterial Bleed - Arterial blood flow is bright red because it's freshly oxygenated. It tends to spurt with each heartbeat. Because of the high-pressure arterial blood flow can empty the body extremely quickly. Severed arteries are more difficult to control and can become life-threatening in seconds. Often a tourniquet or a hemostatic bandage is the only way to stop arterial bleeding. Other options will be discussed in the second article.

Mindset and Approach to Bleeding

Aside from specific methods, different mindsets should apply to different bleeding scenarios. For example, cleanliness and infection control are the greatest concerns for capillary bleeding. Proper PPE (Personal Protective Equipment) should be used in every situation. There should be no rush or anxiety. Every precaution toward cleanliness should be taken.

Venous bleeding can be extremely dangerous, but most likely it will be easy to control. PPE should be used except in the most severe cases. Many times, the patient can apply direct pressure while you put on gloves. Remember, PPE is PERSONAL protective equipment. Keeping an injury clean is vital, but that isn't the point of wearing gloves. They are designed to protect the caregiver from pathogens. In this case, they are there to protect you from blood-borne illnesses. If possible, apply PPE early, especially if you are treating strangers. With that said, there are rare times when there is little

opportunity to don gloves. A major arterial bleed has the potential to become life-threatening in mere seconds. Certain vessels, when severed, resemble pulsing hoses. The time required to put on gloves may be critical.

I'm speaking to grown men and women who are willing and hopefully trained to render first aid. You may need to apply immediate direct pressure on a wound to keep someone from bleeding out. You will be taking a chance either way. You may contract an illness without proper use of gloves, or the patient may pass the point of no return while you put them on. There might not be a good option...

If you're the type to take control and render first aid, then it's a question to ponder beforehand. If you carry gear a good habit to develop is to immediately apply PPE as soon as you hear the call for help, enroute. That way you're ready for anything you encounter, be it a scraped knee or a severed femoral artery.

In cases of severe arterial bleeding, there is no concern for infection. That must be addressed later. Speed is the key. Also know, speed is not the key to speed. Haste is the killer of speed. Calm efficiency is what you're looking for. In severe and dramatic cases like an arterial bleed or a gunshot wound, little maxims are useful. I've found it soothing to repeat them internally as I work. "Slow is smooth, and smooth is fast. Slow is smooth, and smooth is fast."

For people who aren't accustomed to emergency medicine, the scene can be revolting. Fear for a stranger's well-being can cause someone to have tunnel vision or freeze up. Fear for a loved one can cause someone to panic and lose control of themselves. Even seasoned professionals can find value in a saying like "Slow is smooth, and smooth is fast." When treating a severe injury, the *first* pulse you check should be your own.

One last word about mindset is that a calm demeanor is some of the best medicine for a patient. Appearing calm and entirely in control is going to give the patient confidence. When a patient is confident then they too become calmer and less erratic. They might assist rather than hinder. Remember, your patient is terrified and panicking. They have probably never seen this much blood, and it's coming out of them. Calming the patient with a cool, confident demeanor and maybe even a little smile may save their life by making your job easier.

You don't *have to be* calm on the inside, but if you ***appear calm*** to your patient then their outcome will probably be better.

Moving Forward

When you consider the world we live in, it's easy to see that first aid training and reliable information are important. Invest time in the free training. Our blog has a wealth of knowledge. We share it for free so you can be prepared when the time for action comes. Once you have the proper training and the mindset to be on the spot, willing and ready to help someone in need then you're going to need some first-aid equipment.

Whether you intend to render aid in a vehicle accident or at a concert, or you simply want to have a reliable, effective kit to keep at home...we've got you covered. Browse through our blog and take advantage of all the free training here and on other platforms. You never know when you'll be the first responder!