

By Lawrence E. Heiskell, MD

Stop The Bleeding!

Expedient methods to clot the wound when only seconds count!



TW TIP: Before heading out on a mission, have every operator insert their tourniquet in the same pocket of their uniform so that the first responder can find it quickly.

Each year, there are more than 70 million emergency department visits for bleeding. Bleeding, or acute hemorrhage in medical terms, is a leading cause of death in trauma cases. Under certain tactical situations, immediate evacuation of gunshot wound victims may be an option. Effective and

immediate early hemorrhage control is paramount to saving lives.

The Clotting Mechanism

The coagulation of human blood is a complex biological process, and a full description is beyond the scope of this article. When a blood vessel is severed or

damaged, the body reacts to try and stop the bleeding by spasm of the blood vessel, formation of a platelet plug and subsequent formation of a blood clot.

If the blood flow is under pressure, such as in a femoral artery wound, the normal clotting mechanism fails to stop the bleeding and the victim can bleed to death within a few minutes. Bleeding in the chest, pelvis and abdomen is impossible to detect in the field and can result in a large amount of blood loss. Once the blood loss exceeds about 40 percent of the total blood volume, which is about 5 liters, an irreversible shock state begins and the victim dies.

Hemostatic Bandages

There currently are several blood-clotting hemostatic bandages on the market. Each has a different mechanism to stop the bleeding. Readers are strongly urged to carefully conduct their own investigation to determine what is best for their agency, team and level of training.

The HemCon Bandage is composed of Chitosan, which is a biodegradable, nontoxic, complex carbohydrate of chitin, found in the exoskeletons of shellfish.

QuikClot is composed of granular

zeolite and is derived from volcanic rocks. When this material is placed into a bleeding wound, it absorbs the water molecules in the blood and creates a high platelet concentration, to promote clotting.

The RDH or Rapid Deployment Hemostat Bandage is derived from single-cell algae and the mechanism of the material is to act as a catalytic surface that accelerates the normal clotting process. TraumaDEX is a wound-dressing agent material naturally synthesized from potato starch. The particles accelerate natural blood clotting by concentrating blood solids such as platelets and red blood cells.

The Emergency Bandage, Trauma Wound Dressing is an improved version of the time-honored battlefield dressing. This sterile, non-adherent bandage applies pressure to any site, is easily wrapped, secured and can act as a tourniquet in cases of severe bleeding. The beauty of this product is that the bandage can be applied to the head, armpit or groin for control of hemorrhage in these difficult areas.

The M.A.T. (Mechanical Advantage Tourniquet) is well designed and can be rapidly applied to any extremity with one hand. The M.A.T. is the only device that meets all of the DoD's required and desired features in self-applied tourniquets. With its easy, fast and secure one-handed operation, blood flow can be stopped in less than 10 seconds.

Discussion

All of the hemostatic dressings are supposed to work in seconds, according

WARRIOR WEAR ITS PANTS (Internal Tourniquet System)

BlackHawk Products Group of Norfolk, Virginia has drawn attention to its line with the introduction of the Warrior Wear ITS (Internal Tourniquet System) pants. The original concept was developed by Keith Rose, MD, an instructor at the International School of Tactical Medicine, who took it to BlackHawk, where it went from concept to the real deal. BlackHawk's designers have increased the practical function of the pants by incorporating four separate tourniquets into the pants. In the past, tourniquets were viewed as separate pieces of equipment that must be carried by the individual or in a medical bag, on

the assumption they would be accessible when needed. BlackHawk has changed how we should view the use and application of tourniquets.

With this new system, the tourniquets do not need to be carried by the individual. The tourniquets are instead sewn

into the garment and anatomically placed over the major arteries and around the limbs. Because of their design and application, activation can be performed with one hand in a few seconds. Most tactical operators wear drop-leg holsters or other attachments that need to be removed prior to application of conventional tourniquets. The integrated tourniquet system spares this process and can be applied easily within six seconds. Swift application means survival, as the femoral artery can bleed at rates of over a liter a minute.

The Warrior Wear ITS pants have four tourni-

quets: one high on each thigh over the femoral artery and over each calf area. The lower leg tourniquet can be adjusted for height placement by simply pulling the pants leg up higher before activating it. To ensure maximal tissue survival, the tourniquet should be placed 2 inches above the wound and no higher.

To expose the tourniquet, simply lift the flap covering the tourniquet, pull the running end of the fire-retardant nylon strap to a snug fit, then turn the windlass to tighten the tourniquet, and then lock it into place. BlackHawk officially introduced the new life-saving ITS pants at the 2008 SHOT Show in Las Vegas. For further info visit blackhawk.com



Jeff Rose

to claims made by the manufacturers. The questions one must ask are, do they really work and what should be considered for purchase and distribution to tactical medics?

Unfortunately, there are conflicting reports in the medical literature regarding what bandage is the most effective. Unlike drugs that require years of testing and approval by the FDA, the manufacturers of hemostatic dressings are not required by law to conduct extensive research to support their claims. There are very few scientific, objective, controlled studies in the medical literature to support the claims made by some of the companies. It stands to reason, that if the bleeding is under high pressure or very brisk, none of these prod-



Uniforms of the future may all feature a tourniquet built into the clothing. This will lighten the load for tactical medics.

ucts will work. You'll need to apply direct pressure to the wound or to a pressure point between the heart and the wound. If you then get the bleeding slowed with a pressure point, you might be able to get the wound dry enough to apply the hemostatic dressing into the wound and hopefully it will work. After the dressing is complete, the tourniquet or pressure point may be released.

The one thing we do know is that the time-honored method of direct pressure and a tourniquet application for bleeding really works. It seems prudent that a medic will use the simplest and easiest technique in the field for hemorrhage control. At the International School of Tactical Medicine we recommend that agencies proceed with caution before spending valuable resources on the new blood-clotting agents until further studies are done, and stick with old-fashioned direct pressure and tourniquets. 