CASE REPORT

Abdominal Aortic Tourniquet™ Use in Afghanistan

Submitted by a deployed physician
who has requested anonymity due to operational security issues.

ABSTRACT

The Abdominal Aortic Tourniquet™ was used recently used in Afghanistan to control severe hemorrhage in a casualty who had traumatic bilateral amputations of the lower extremities. Excerpts from the medical provider's account of the tactical evacuation phase of care are provided.

Keywords: Abdominal Aortic Tourniquet™, AAT, hemorrhage, amputations

Introduction

In accordance with current Tactical Combat Casualty Care Guidelines, the Abdominal Aortic Tourniquet™ (AAT; Compression Works LLC; compressionworks.net) (NSN 6515-01-616-4999) was used to control severe hemorrhage in a casualty who had traumatic bilateral amputations of the lower extremities (see Figure 1). Several Special Operations Forces (SOF) units from International Security Assistance Force (ISAF) member nations currently carry the AAT. A medical provider in charge of the evacuation of the casualty was given access to an AAT and followed the packaged instructions for use in applying it. Excerpts from the medical provider's account of the tactical evacuation phase of care follow.

Case Report

As the patient was brought to the door of the helicopter, it was noted that he was completely floppy and lifeless. As he was placed in the helicopter, a high-flow oxygen mask was applied with the end-tidal carbon dioxide (EtCO₂) monitoring device in place. There was minimal respiratory effort with only small CO₂ complexes showing on the monitor. The casualty had no palpable carotid pulse. Current-generation Combat Application Tourniquets (CATs) were placed around both thighs; his lower legs were mangled, and there was a pool of bright red blood on the stretcher between his legs. I asked the

Figure 1 The Abdominal Aortic Tourniquet is made by Compression Works LLC (compressionworks.net) and distributed exclusively in the United States by Speer Operational Technologies (speeroptech.com).
medic to check the perineum. This was reassessed several times in flight to ensure that hemorrhage was controlled. The medic was able to quickly achieve access via a sternal intraosseous (IO) line and began to give blood and fresh-frozen plasma (FFP). The second medical provider assisted with the decision to perform rapid sequence intubation (RSI) to protect and control the airway. I flushed the sternal IO line and then gave 150mg of succinylcholine.

Before RSI, the monitor showed a bradycardic broad complex rhythm that was taken to be agonal. This is usually a terminal rhythm that occurs before death. Direct laryngoscopy was performed with a size 8 endotracheal tube. The initial EtCO₂ at that time was 1.2kPa (for reference, normal is 4.5–6.0 kPa). The paramedic was transfusing blood, and patient was connected to the ventilator with a tube holder in place. Assessment of expansion of the chest appeared equal bilaterally. The flight medic placed another humeral IO line and commenced transfusion of FFP. At this stage, the patient was given 50mg rocuronium, 1g tranexamic acid, and 1g calcium chloride via the sternal IO line. At that time, EtCO₂ was 0.6kPa and falling despite transfusion. There was no clinical suspicion of pneumothorax. A pelvic fracture or pelvic hemorrhage could not be excluded, and the patient continued to deteriorate.

The patient was now in sinus tachycardia of greater than 120 with normal complexes and the EtCO₂ was still low. Despite continued transfusion, given the lack of a carotid pulse and a catastrophically low EtCO₂, The AAT was placed using the log roll as an opportunity to do this—as it was believed it was in the best clinical interest of the patient and served to avoid a second roll. The AAT was inflated; in doing so, the EtCO₂ rose immediately. By arrival at the treatment facility, 2 units of packed red blood cells (PRBCs) and 2 units of FFP had been transfused. While in transport, the AAT worked as expected and bled off at bladder pressures greater than 300mmHg. On the journey to the emergency department, another unit of PRBCs was transfused. The EtCO₂ continued to be about 5.4kPa at 12 respirations/min via manual ventilation, and the patient had a carotid pulse on arrival. The patient required no sedation, and care was transferred to the trauma team. The AAT was transitioned in the operating room for surgical hemorrhage control, and the patient survived. The patient underwent a through-the-knee amputation on one leg and an above-the-knee amputation on the other leg.

It is worth mentioning that there was no evidence of renal failure or ischemic bowel at any time in the first 48 hours following his surgery.

Disclosure
The author has nothing to disclose.