

The Surgical Resuscitation Team: Surgical Trauma Support for U.S. Army Special Operations Forces

MAJ Kyle N. Remick, MD

ABSTRACT

Special Operations Forces need trauma surgical support that is flexible and rapidly mobile. Current operations in the Afghanistan Theater of Operations required the U.S. Army 772nd Forward Surgical Team (FST) to provide support for Special Operations missions and conventional missions on short-notice using its mobile Surgical Resuscitation Team (SRT). The 772nd FST's experience over a 15-month deployment validates the concept of and the requirement for the SRT. This paper provides a framework for planners to design and implement this capability for support of U.S. Army Special Operations Forces (ARSOF).

INTRODUCTION

Special Operations missions require an inherent flexibility in all aspects of command and control. Medical support also must be designed for ultimate flexibility and adaptability as well. In the recent overseas contingency operations in Afghanistan, conventional combat trauma surgical support planning has included the utilization of fixed, non-mobile surgical assets. This has led to the peering of "split" and "fixed" U.S. Army Forward Surgical Teams (FSTs), fixed-position U.S. Navy Forward Resuscitative Surgical Systems (FRSSs), and fixed-position U.S. Air Force surgical elements throughout the Afghanistan Theater of Operations. Combined Joint Special Operations Task Force-Afghanistan (CJSOTF-A) elements are forced to request surgical trauma support from the conventional system. Conventional units may be less responsive and less flexible than those needed to meet the rapidly-changing demands of the Special Operations environment. A contingency-based Surgical Resuscitation Team (SRT) is proposed to bridge the gap between trauma care by Special Operations medical personnel at the point of injury and the Role III theater hospitals. Furthermore, the SRT is proposed as a contingency surgical team for other remote operations not in the mature theaters of Iraq and Afghanistan.

The U.S. Army 772nd FST deployed to Afghanistan in July 2008. Prior to deployment, the team trained to perform its trauma surgical mission in both a fixed-location scenario and in a contingency-based mobile environment to provide maximal flexibility of support to combat commanders. During its 15 month

deployment, the 772nd FST provided mobile trauma surgical support to the Combined Joint Task Force (CJTF) and to CJSOTF-A on three separate occasions. These were the first mobile surgical support missions in GWOT since 2002 in Afghanistan and since the initial phases of the Iraq invasion in 2003. The following describes the combat application of the SRT in the Afghanistan Theater of Operations in support of both conventional and Special Operations missions and provides a framework for developing a U.S. Army Special Operations Forces (ARSOF) SRT.

THE SURGICAL RESUSCITATION TEAM (LIGHT)

The 772nd FST developed two contingency packages for trauma support. The SRT (Light) provided contingency support to a mixed conventional and unconventional assault force in the Ghazni region in September 2008. The team consists of eight personnel: one general surgeon, one certified registered nurse anesthetist (CRNA), one trauma registered nurse (RN), one 68D operating room technician, two 68WM6 licensed practical nurses (LPNs), and two 68W medics. It can be lightened by removing one or two 68W medics or LPNs based on mission assessment. It can also be augmented for a total of ten personnel with the addition of a second general surgeon and/or one orthopedic surgeon if needed. (Figure 1)

The purpose of this team is to augment an existing advanced trauma life support (ATLS)-level trauma capability. The team provides life and limb saving surgery (LLSS) in support of contingency operations. Two



Figure 1: SRT (Light) configuration

military-style, six-wheeled, off-road vehicles along with personal rucksacks are utilized to transport equipment. This allows the team to “combat load” equipment onto a CH-47 Chinook helicopter by backing the vehicles onto the aircraft at the departure site. (Figure 2) At the destination, the vehicles provide a rapid off-load capability by simply driving off the back ramp of the CH47. They can then move to the setup site within minutes. (Figure 3) This minimizes time on ground at the helicopter landing zone (LZ). One dedicated CH47 helicopter provides insertion capability for the entire SRT (Light) package.



Figure 2: Combat loading SRT vehicles on CH47



Figure 3: Combat Off-load of SRT vehicles and movement to setup site

The vehicles provide the advantage of rapidly and easily moving all equipment a few hundred meters from the LZ to the set up site. The SRT (Light) is placed adjacent and connected to the existing ATLS facility. A 210sq ft tent (14ft x 15ft) is erected within 10 minutes using four to six personnel. A 6kW generator is used to power the entire package to include lighting, temperature control unit, operating room equipment, and blood refrigerator/freezer. During cold-weather operations, a portable heater is used to keep the operating room suite at high temperatures for prevention of trauma patient hypothermia. The remainder of the essential operating equipment is established and checked for functionality. See Figure 4 for a basic equipment list. Overall, the SRT (Light) establishes operations to receive a surgical trauma within 30 minutes.

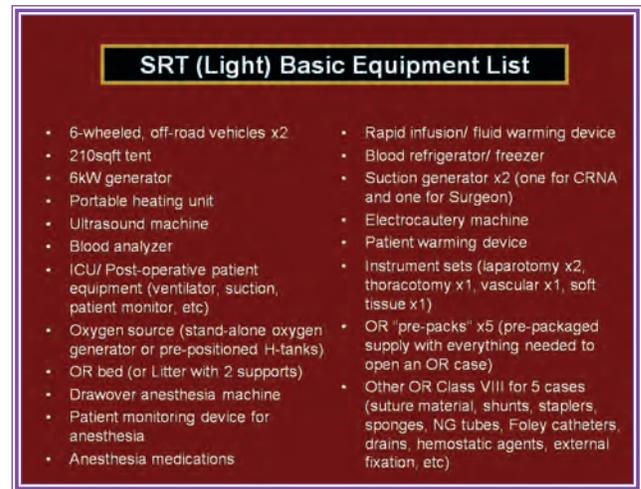


Figure 4: SRT (Light) basic equipment list

This team’s SRT (Light) package moved on short-notice from our fixed-facility at Forward Operating Base (FOB) Fenty, Jalalabad, Afghanistan to FOB Ghazni and rapidly established operations. The SRT (Light) established surgical trauma capabilities immediately adjacent to the Ghazni Battalion Aid Station (BAS). (Figure 5) Rapid integration training was



Figure 5: SRT (Light) at Ghazni

conducted with the existing medical personnel. A four-bed ATLS capability existed at the location, and this was used for initial trauma evaluations. The team planned to transfer combat casualties needing LLSS to the SRT (Light) operating room. Post-operative recovery was planned in the pre-existing BAS with augmentation by the team's LPN and CRNA and necessary additional equipment (e.g. ventilator, monitor, suction, post-operative medications, etc.). The team assisted in the ATLS evaluation of several trauma patients during this week-long mission, but the SRT (Light) operating room capability was not needed.

The SRT (Light) carries equipment and supplies to manage five LLSSs prior to needing re-supply. A patient not needing a LLSS is evaluated, stabilized, and sent onward to the Role III facility. Examples of injuries and wounds requiring LLSSs are penetrating abdominal injuries with hemodynamic instability, penetrating chest injuries with massive hemothorax, blunt torso trauma with hypotension or instability, penetrating neck injuries with hard signs of vascular injury, and groin and axillary injuries with arterial vascular injury not amenable to tourniquet control. Extremity injuries without vascular injury, extremity vascular injury controlled by a tourniquet (within the acceptable warm ischemia time), and blunt abdominal trauma with negative focused abdominal sonography for trauma (FAST) examination and hemodynamic stability should not require LLSSs and can be transported to the Role III facility for surgery. This enables maximal SRT (Light) resource utilization for ongoing operations.

A Special Operations SRT (Light) package might substitute 18Ds or Special Operations Combat Medics (SOCMs) for some of the team's personnel. This team may be utilized as a rapidly-responsive surgical package in support of remote locations already containing an ATLS-resuscitative capability. This team can augment the existing trauma team with LLSS capability for up to five LLSSs prior to requiring re-supply. Its post-operative holding capability is limited when additional patients are expected, so an adequate plan for rapid medical evacuation to higher care must be developed accordingly.

THE SURGICAL RESUSCITATION TEAM (HEAVY)

The SRT (Heavy) team provides a full trauma resuscitation and recovery area as well as an operating room for LLSSs. It consists of the same eight personnel as the SRT (Light), augmented with a second general surgeon and/or an orthopedic surgeon as dictated by the mission. (Figure 6) It should not be lightened as that would significantly decrease the team's full capability.

This team is also fully mobile using two six-wheeled, off-road vehicles and the equipment carried by eight personnel. It can be "combat loaded" onto a single, dedicated CH-47 Chinook. It can rapidly move



Figure 6: SRT (Heavy) Configuration

off of the LZ to the set up site. The SRT (Heavy) utilizes a 450sq ft tent (18ft x 25ft) with an internal wall divider panel. The divider is set so that one-third of the tent is the operating room and two-thirds of the tent is the trauma resuscitation and recovery area. (Figure 7) The tent and internal setup can be accomplished by an experienced team within 30 minutes.



Figure 7: SRT (Heavy) Internal Setup

The SRT (Heavy) provides two multi-functional beds in the front two-thirds of the tent. The equipment for these beds is designed and packed to provide initial trauma resuscitation for incoming patients and to transition to intensive care unit and recovery beds as patients come out of the operating room. The two multi-functional beds are designed with equipment and supplies for 20 initial trauma evaluations (10 trauma evaluations on each bed) before needing re-supply. The operating room section takes up the back one-third of the tent and is designed to handle up to five LLSSs prior to needing re-supply. (Figure 8) The SRT (Heavy) is designed to manage twenty trauma evaluations but only five LLSSs because most combat trauma patients do not require surgery and a portion of the remainder do not require immediate surgery at the SRT (Heavy). *The LLSS concept strives to*

SRT (Heavy) Basic Equipment List	
<ul style="list-style-type: none"> • 6-wheeled, off-road vehicles x2 • 450sqft tent with divider • 6kW generator • Portable heating unit • Multi-functional head-of-bed chest x2 (supply for 20 initial trauma evaluations and post-operative ICU care/ preparation for transfer) • Multi-functional patient equipment x2 (ventilator, suction, patient monitor, etc) • Oxygen source (stand-alone oxygen generator or pre-positioned H-tanks) • Cricothyroidotomy instrument set • ER thoracotomy instrument set • Litter x2 and supports x4 • Ultrasound machine • Blood analyzer • OR bed (or Litter with 2 supports) 	<ul style="list-style-type: none"> • Rapid infusion/ fluid warming device • Drawover anesthesia machine • Blood refrigerator/ freezer • Patient monitoring device for anesthesia • Anesthesia medications • Suction generator x2 (one for CRNA and one for Surgeon) • Electrocautery machine • Patient warming device • Instrument sets (laparotomy x2, thoracotomy/ sternotomy x1, vascular x1, soft tissue x1) • OR "pre-packs" x5 (pre-packaged supply to open one OR case) • Other OR Class VIII for 5 cases (suture, shunts, staplers, sponges, NG tubes, Foley catheters, drains, hemostatic agents, external fixation, etc)

Figure 8: SRT (Heavy) Basic Equipment List

conserve surgical trauma resources for the small percentage of patients that do need immediate LLSS.

This team's SRT (Heavy) package first proved itself in support of CJSOTF-A operations. On short-notice, the team deployed from Regional Command – East (RC-East) to Regional Command – West (RC-West). The SRT (Heavy) was augmented with a Special Operations Forces team of five personnel who provided security and communication for the remote mission. The team moved from Bagram in RC-East to Herat in RC-West via Air Force MC-130. (Figure 9) In Herat, the team planned and staged with the U.S. Marine Special Operations Command (MARSOC) ele-



Figure 9: MC-130 SRT (Heavy) Movement from Bagram to Herat

ment for movement to a remote location. A Spanish CH47 transported the team to a small outpost in a remote location in RC-West. (Figures 10 and 11)

The team co-located with the MARSOC element within the walls of a half-destroyed stone building. (Figure 12) The team provided trauma resuscitation and surgical support to the MARSOC element for its entire mission in the area which lasted

five weeks. During this time, the team performed six major trauma resuscitations and two major surgical procedures in the operating room.



Figure 10: SRT (Heavy) Offload of Spanish Chinook



Figure 11: SRT (Heavy) Move to Setup Site



Figure 12: SRT (Heavy) Tent Setup Site

One LLSS was performed on a MARSOC Marine with two gunshot wounds (GSWs) to the right upper extremity. His extremity was pulseless, and he was taken to the operating room for brachial artery ex-

ploration within the area of the GSW. Upon finding that his brachial artery was not injured, the team performed an upper and lower arm fasciotomy. His pulse returned immediately after the fasciotomy was performed, and his wounds were washed out, splinted, and dressed for transport. Spanish medical evacuation by “Puma” helicopter transported the Marine to Herat. (Figure 13) An Air Force MC-130 aircraft met the patient in Herat and transferred him to the Role III at Bagram Airfield. The patient arrived at the U.S. hospital six hours after injury for follow-on treatment and subsequently did well.



Figure 13: Spanish Puma Medical Evacuation Helicopter

The other operative intervention involved an elderly local female who was shot in the right arm. She was taken to the operating room for wound washout, splinting, and dressing. She was also evacuated by “Puma” helicopter to Herat where she received follow-on care by the Spanish Role IIB. The single patient requiring a non-surgical life-saving intervention (LSI) was an Afghan adult male who was shot in the head. He was noted to have a penetrating head injury, and was evaluated as an eight on the Glasgow Coma Scale (GCS). He was intubated, ventilated, and treated medically to minimize intracranial pressure until the medical evacuation “Puma” helicopter was able to transfer him to the Spanish Role IIB in Herat.

The SRT (Heavy) package was again utilized in January 2009. The team was tasked to establish a new FST location on short-notice at FOB Shank in RC-East. The area would be the site of an incoming Brigade Combat Team and required additional coverage for several weeks prior to arrival of a new FST into theater. The team deployed with similar personnel and equipment as in RC-West and set up adjacent to a Brigade Support Battalion Medical Company. (Figure 14) The team rapidly established the new FST site and performed initial trauma resuscitation for seven patients to include one major surgical procedure. (Figure 15) Additionally, one LSI patient (intubation and a chest tube thoracostomy) was resuscitated and further evacuated to the Role III.



Figure 14: SRT (Heavy) Setup at Shank



Figure 15: Operating Room at Shank

A Special Operations SRT (Heavy) package might substitute 18Ds or SOCMs for some of the team’s personnel. This team may be utilized as a rapidly-responsive trauma resuscitation and surgical package in support of remote locations without an existing trauma facility. Although it presents a slightly larger medical footprint than the SRT (Light), it is also self-contained for the treatment of the first twenty trauma patients and five LLSSs. Although more robust than the SRT (Light), this team’s post-operative holding capacity is still limited with ongoing operations, so an adequate plan for rapid medical evacuation to higher care must be planned accordingly. In contrast to medical support for conventional forces, the SRT (Heavy) may be all that is necessary to provide medical support for an entire Special Operations mission.

CONCLUSION

A U.S. ARSOF SRT may be useful to Special Operations Forces facing new and unique challenges in today’s contemporary operating environment. It is ideally suited to provide surgical trauma support in remote areas of a mature theater of operations and for support in other austere environments far removed

from civilian or military trauma facilities. The U.S. Army 772nd FST SRT experience validates this concept and provides a framework for planners to design and implement this capability in support of future ARSOF missions and other joint Special Operations missions.

ACKNOWLEDGMENTS

I would like to especially give credit and thanks to Sergeant First Class Dan Cozine, the 772nd FST's Detachment Sergeant, MAJ Todd Jackson, the team's chief nurse, and the rest of the team's Soldiers. Their organization and attention to detail allowed my ideas for a mobile surgical team to become a reality. Additionally, I would like to thank LTC(P) Mark McGrail, the CJTF-101 Surgeon for his support of the mobile surgical team mission at the command level. His advocacy for use of the SRT allowed this capability to become a reality in the combat zone.



MAJ Kyle N. Remick is currently the commander of the U.S. Army 772nd Forward Surgical Team. He is finishing a 15 month tour in Afghanistan in support of Operation Enduring Freedom, where his team performed three mobile surgical missions throughout RC-East and RC-West. He is a graduate of the United States Military Academy and the Uniformed Services University School of Medicine. He first deployed to Afghanistan as a Battalion Flight Surgeon for 2/160th Special Operations Aviation Regiment (Airborne) from October 2001 through February 2002 prior to completing a residency in General Surgery at William Beaumont Army Medical Center, El Paso, TX.

