

Tactical Combat Casualty Care in the Assault on Punta Paitilla Airfield

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Casualties incurred during the assault on Punta Paitilla Airfield during Operation Just Cause were evaluated through reviews of records and interviews with the participants. There were eight initial casualties. One-half of all subsequent casualties were wounded trying to move to these men while still under effective hostile fire. Consistent with other studies, the most common cause of death was internal hemorrhage; the second most common was catastrophic brain injury. Rapid control of external exsanguination was the technique most likely to prevent death. Tourniquets were applied to three lower extremities for two casualties, without sequelae.

INTRODUCTION

Ongoing military actions in the global war on terrorism have produced and will continue to produce combat casualties. Initial aid is usually provided in settings that are sometimes hostile but always medically austere, and the nearest treatment facility may be minutes, hours, or days away, depending on the tactical situation. Three general environments have been envisioned for the early delivery of care (1) when under fire; (2) when in a field setting but not under fire; and (3) when evacuating casualties on a pre-planned transportation platform. This has been codified under the name of tactical combat casualty care (TC3).^{1,2}

As one of the initial actions of Operation Just Cause, 63 Sea, Air, and Land (SEAL) personnel crossed the beach shortly after midnight on the morning of December 20, 1989, to assault Punta Paitilla Airfield on the southern edge of Panama City, Panama. Their mission was to disable Manuel Noriega's personal aircraft and to deny use of the airfield to forces friendly to the dictator. Although this action occurred 15 years ago, the weapons and tactics were similar to those used today. The purpose of this article is to review the out-of-hospital care provided before casualty evacuation (CASEVAC) and to draw conclusions with relevancy to contemporary care of combat casualties.

METHODS

This study was a retrospective chart review that was enhanced by historical data solicited from participants in the engagement. From February 2000 to May 2004, information was gathered from meetings, telephone conversations, and electronic mail. No medical records were made on the battlefield, on the CASEVAC flight, at the joint casualty collection point, or on the aeromedical evacuation flight to the United States. Out-of-hospital medical information was gathered through multiple interviews with medical and nonmedical personnel who were in the field, physicians and surgeons who were at the joint casualty collection point, a corpsman who was on the aeromedical evacuation flight, and personnel who were at Wilford Hall Medical Center. Medical information concerning the three men who were killed in action (KIA) and the one who died of wounds was retrieved from the medical examiners' reports and an interview with a forensic pathologist at the Armed Forces Institute of Pathology. All of this information was supplemented by a review of after-action reports housed at SEAL Team 4.

OBSERVATIONS

The assault force on Punta Paitilla Airfield consisted of six SEAL squads of eight or nine men each, organized into three platoons. Five of the six squads had a dedicated corpsman. Two additional corpsmen were assigned to the 12-man command and control element. Corpsmen who completed training before 1987 did not have a formal training path. They acquired their field medical knowledge through the U.S. Marine Corps field medical course, civilian paramedic courses, and on-the-job training. Those who completed training after 1987 attended Special Forces Medical Aid Man Training, a 21-week course on the care of sick and injured patients in Special Operations settings that included the principles of Advanced Trauma Life Support. All members of the assault

Force were trained in basic first aid, including application of tourniquets and initiation of intravenous fluid administration.

For this mission, every man carried his own battle dressing, a tourniquet, a 500ml bag of lactated Ringer's (LR) solution, and two auto injectors for intramuscular administration of 10mg of morphine. Each corpsman carried a standard-issue, trauma backpack with first-aid supplies, especially pressure dressings and additional intravenous fluids. The medical plan on the airfield was for the corpsman to stop any bleeding with pressure dressings or tourniquets, to hydrate patients with LR solution, to provide analgesia with morphine, and to rapidly evacuate the casualties. With uncontested air superiority and the next echelon of care only eight miles away, at Howard Air Base, the corpsmen assumed CASEVAC to the joint casualty collection point would occur within minutes after wounding. Because of this expectation of rapid evacuation, the corpsmen did not carry antibiotics. The joint casualty collection point was manned by two forward surgical teams. Medical capabilities consisted of triage, advanced trauma life support, and resuscitative surgery. However, there was no postoperative or other holding capability, and the next echelon of care was at Wilford Hall Medical Center in San Antonio, Texas, 1,871 miles to the north.

After patrolling just over 1km from the beach, the lead squad was hit by enfilading small-arms fire from two hangars on its left flank at 1:05 a.m. The distance between forces was 15 to 60m, and no immediate cover was available for SEAL personnel. Gunmen in the hangars fired AK-47 rifles and possibly a heavy machine gun. Eight of nine men in the lead squad were wounded during the initial volley (Table I). The second SEAL squad returned fire with M-16 and M-60 rifles. The squad leader, seeing that the first squad had sustained casualties, directed his senior enlisted man and corpsman to assist them. The movement of these two men started a second volley of fire, leading to a ninth casualty (Table I). Movement of reinforcements from the following SEAL platoon created a third volley of intense fire, which led to three more casualties (Table I). Once the SEAL force had maneuvered effectively, all hostile fire on the airfield ceased by 1:17a.m.

No care was actually rendered while under effective hostile fire. Casualties 7 and 8 sustained additional wounds while lying on the exposed concrete tarmac. Casualties 4 and 5 reportedly returned fire despite significant wounds. Those who could walk attempted to move themselves and other casualties off the tarmac and into a grassy area behind the second squad's position. Casualty 3, with a relatively minor ankle

wound, successfully moved two other casualties onto the grass during the firefight. This location became an ad hoc casualty collection point, where the corpsmen treated the casualties once the incoming fire stopped.

Eventually, all except one of the 12 casualties arrived at this location. Three were KIA. Casualty 10 did not know, or did not admit, that he was wounded. No cardiopulmonary resuscitation was performed in the field. There were no reports of any airway compromise or respiratory distress among the others at the casualty collection point. Bleeding was mostly controlled with pressure dressings, but there were three exceptions. Casualty 4 had profuse hemorrhaging from his right lower extremity, with altered mental status. A tourniquet was placed on his right thigh above the knee, and then a pressure dressing was applied to the wound. Casualty 11, with high-velocity bullet wounds to both lower extremities and altered mental status, had bilateral tourniquets placed. Casualty 7, who was struck in the upper left thorax, had his wound packed with rolls of gauze, which successfully slowed the external hemorrhage. Intravenous access was attained for all eight casualties at the casualty collection point, and they all received aggressive resuscitation with LR solution, although data on the amounts of fluid infused were not available. At the casualty collection point, all casualties were inspected, and identified wounds were dressed. There were no long-bone fractures in this engagement. Despite antibiotics not being administered in the field, there were no wound infections. Current TC3 guidelines advise gatifloxacin (400mg) for patients able to take orally administered medications. Intramuscularly or intravenously administered cefotetan (2g) is the recommended alternative.³

An MH-60 Pave Hawk helicopter was dispatched for CASEVAC and arrived at 1:55 a.m. It departed 10 minutes later, with eight wounded men aboard, and arrived at the joint casualty collection point at 2:25 a.m. There was no report of care being delivered during the CASEVAC flight to Howard Air Base.

During this small-unit engagement on an airfield, these Special Forces personnel were subjected to effective hostile fire for 12 minutes, tactical field care was rendered for 48 minutes, and the CASEVAC flight lasted 20 minutes. The three men KIA were removed from the battle scene by a second MH-60 helicopter, at approximately 3:00 a.m. Casualty 10 was evacuated at approximately 11:00 a.m. that morning.

DISCUSSION

The Wound Data and Munitions Effectiveness Team (WDMET) study was conducted during the Vietnam War, from 1967 to 1969. That study documented

the circumstances of wounding, the wounding mechanisms, the characteristics of all wounds, any field care, and early clinical outcomes for nearly 8,000 casualties.⁴ From his review of those data, Bellamy⁵ concluded that ~70% of casualties who were KIA died within five minutes after wounding. He identified the leading cause of death (44%) as exsanguination and speculated that 20% of casualties appeared to die from extremity hemorrhage, which theoretically could have been controlled with basic first aid. Of those, approximately one-half were not under direct fire and could have been treated by a medic or corpsman.⁵ A recent study of WDMET data by McPherson and colleagues suggested that tension pneumothorax was the cause of death for 3 to 4% of fatally wounded combat casualties for whom chest X-rays were available (J.J. McPherson; D.S. Feigin; R.F. Bellamy; unpublished data).

In 2000, Mabry et al.⁶ reviewed the casualties from the Battle of Mogadishu. In that incident, the leading cause of death was exsanguination (6 of 18 deaths). Two Soldiers died from penetrating thoracic injuries and one exsanguinated from femoral hemorrhage that was too proximal to be controlled in the field. Three patients died of hemorrhage after reaching medical facilities. One had a gunshot wound to the abdomen, another had a nearly complete traumatic amputation at the left hip from a rocket-propelled grenade, and the third had a gunshot wound to the pelvis. Central nervous system injury, specifically gunshot wounds to the head, was the second leading cause of death (5 of 18 deaths); this was followed by multiple blunt-force trauma resulting from the two helicopter crashes (4 of 18 deaths). One patient died of thoracoabdominal wounds after being evacuated to Germany. The exact cause of death could not be determined for two Soldiers. The lack of more exsanguinating hemorrhage cases among this small set of casualties might have been attributable to the Soldiers wearing body armor, which protected the chest and upper abdomen and was not worn by casualties in previous studies.⁶

Bellamy⁵ identified exsanguinating external hemorrhage from an extremity and tension pneumothorax as potentially treatable threats to life. Any trained individual should be able to control extremity bleeding. Medics and corpsmen should be capable of performing needle thoracocentesis to relieve the excessive intrathoracic pressure present in tension pneumothorax. Severe internal hemorrhage and significant injury to the central nervous system cannot be directly managed in the field.

SEAL personnel KIA at Punta Paitilla Airfield suffered catastrophic wounds. Casualties 8 and 12 died as a result of internal exsanguination; casualty 9 died as a

result of a severe penetrating brain and spinal cord injury. Out-of-hospital casualty care could not have changed the outcomes for these men KIA.

The aspect of care that had the greatest positive impact in this engagement was control of external hemorrhage. Both Bellamy⁵ and Butler et al.¹ identified deaths attributable to hemorrhage from extremity wounds as preventable deaths. Casualties 4 and 11 had altered mental status resulting from extremity hemorrhage; therefore, it can be assumed that they lost at least one-third of their blood volume. Casualty 4 had a tourniquet placed on his right thigh, and casualty 11 had tourniquets placed on both lower extremities. Both casualties survived to reach definitive care, neither lost a limb, and both eventually returned to unlimited active duty. In each case, the person placing the tourniquet evaluated the casualty's bleeding as severe, made a life-over-limb decision, and placed the tourniquet. This likely avoided potential additional significant blood loss that might have occurred while it was being determined whether a pressure dressing was sufficient to control the hemorrhage. Pressure dressings were applied to the wounds after the tourniquets were placed. Casualty 4 received his tourniquet from a non-medical person, highlighting the importance of training as many people as possible in combat life-saving skills.

Insufficient data were available to determine any beneficial results from the administration of LR solution to any of the wounded. A modification of the TC3 approach recommended that casualties with controlled hemorrhage but residual altered mental status from a shock state attributable to hypovolemia should be resuscitated to the point of normal mental functioning.³ This was accomplished for casualties 4 and 11, but a cause-and-effect relationship between the treatment and the excellent outcomes could not be established.

The one aspect of TC3 that had the most negative impact on the overall health of the unit was movement under fire to assist or to extract casualties. In one study of 1,800 combat casualties, 7.5% were attributable to attempted recovery of wounded comrades (D.S. Sitler, unpublished data). In the WDMET database, Bellamy⁴ identified 6 of 34 casualties in one engagement who were wounded while trying to help others. At Punta Paitilla Airfield, casualties, 9 and 11 were injured while trying to assist the wounded. Reports indicated that both men were wounded while running in an upright position, in open terrain, with no cover or concealment. When and how to retrieve casualties caught in the open is an important aspect of care on the battlefield. It is a potential source of casualties that should be minimized with proper training and equipment.

One aspect of care that had minimal impact in this engagement was analgesia. The men had not trained with morphine autoinjectors before the operation, because they were controlled items. This inexperience led to men injecting themselves incorrectly and not adhering to the established tracking system when giving the medication. This eventually resulted in corpsmen deciding to stop its use. Even if they had continued providing it, intramuscular morphine is not well absorbed from muscle tissue by poorly perfusing casualties. It does not have initial effects until 15 to 30 minutes, and it does not reach its peak effect until 45 to 90 minutes. This results in delayed relief for the patient and the potential for creating a morphine depot in the muscle from multiple injections. This depot could be released when the patient becomes normovolemic.²

At the time of the firefight, the men had been in full combat gear in a tropical climate for >7 hours. After patrolling, fighting, and bleeding, it could be assumed that most casualties were hypovolemic. Experiences reported in World War II indicated that pain was poorly controlled among hypothermic and/or hypovolemic casualties, which frequently led to casualties receiving multiple injections of morphine with no analgesic effect.⁷ Once stabilized in a hospital, these patients often developed decreased respirations and constricted pupils resulting from the morphine depot being released from the injection site. One study of 225 casualties in Italy in early

1944 noted that, although pain is subjective and depends on the patient, casualties with penetrating abdominal wounds were far more likely to have severe pain requiring narcotics than were those with compound long-bone fractures, extensive peripheral soft-tissue wounds, or penetrating thoracic wounds.⁷

The TC3 guidelines recommend orally administered acetaminophen, orally administered rofecoxib (no longer available), or 5mg of intravenously administered morphine every 10 minutes as needed.³ A recently published study from Operation Iraqi Freedom suggested that oral transmucosal fentanyl citrate might be an effective alternative for patients who are hemodynamically stable with isolated, uncomplicated, orthopedic injuries or extremity wounds and who are not expected to return to duty.⁸

CONCLUSIONS

After reviewing the available information concerning the casualties at Punta Paitilla Airfield, it is our conclusion that control of extremity hemorrhage had the greatest positive impact on combat casualty care. Specifically, in this small sample, tourniquets saved lives with no sequelae.

Attempts to recover the wounded had the most negative impact, because additional casualties were created during the unsuccessful attempt while still under effective hostile fire. Combat medical personnel must be

TABLE I
LIST OF CASUALTIES

Casualty No.	Location of Wounds	Status	Treatment in Field
1	Right parietal head	WIA	Head dressing, IVF
2	(1) Back: entrance at L2 level; continued into abdomen; (2) left lower extremity	WIA	Abdominal dressing, extremity pressure dressing, IVF
3	Distal left lower extremity	WIA	Pressure dressing, IVF, IM morphine
4	Right lower extremity	WIA	Tourniquet, pressure dressing, IVF, IM morphine
5	(1) Left posterior shoulder; (2) left buttock	WIA	Pressure dressings, IVF, IM morphine
6	Right triceps	WIA	Pressure dressing, IVF, IM morphine
7	(1) Left posterior thorax; (2) fragment wound to left hand	DOW	Thoracic wound packed with gauze, IVF; hand wound not addressed in field
8	(1) Left anterior thorax: penetrated through second rib; perforated upper lobe of left lung, ascending aorta, and upper lobe of right lung; (2) left posterior thigh; (3) right anterior thigh; (4) left arm	KIA	NA
9	Left posterior head: entrance through occiput 5 inches from top of head; transected cervical spinal cord at C1-C2 level and exited out right neck 9 inches from top of head	KIA	NA
10	Right buttock	WIA	Identified 6 hours after battle, dressing applied
11	(1) Left lower extremity; (2) right lower extremity	WIA	Bilateral tourniquets, pressure dressings, IVF, IM morphine
12	Anterior abdomen: entrance 4 inches left of umbilicus; traveled left to right and front to back; perforated small bowel, severed right iliac artery, and fractured right iliac bone	KIA	NA

All wounds were gunshot wounds unless otherwise noted. WIA, wounded in action; DOW, died of wounds; IVF, intravenous fluids; IM, intramuscular; NA, not applicable.

trained in the best techniques to determine whether a casualty is worth the risk of recovering, as well as how to move to that casualty under fire, if appropriate. Exsanguinating external hemorrhage, particularly from the extremities, is the wound type most likely to benefit from early intervention. Although the risks of exposing additional personnel to injury are the same for most casualties in similar terrain, the potential gain may be greater for this category of wounds. In addition, nonmedical leaders must understand the risks and potential benefits of recovering the wounded in these scenarios, because combat medics and corpsmen frequently move in response to orders from their mission commanders. The analgesia provided to the casualties in this engagement appears to have neither controlled the pain nor harmed the patients. Unit medical officers should identify the most effective means of providing analgesia for their unit's mission and situation. No matter what analgesia is provided, personnel must be familiarized with it before they can be expected to use it properly.

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