

Combat Casualties in Afghanistan Cared for by a Single Forward Surgical Team during the Initial Phases of Operation Enduring Freedom

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Background: The 274th Forward Surgical Team (FST) was the first FST deployed to Bagram, Afghanistan, to provide surgical care for combat casualties during the initial phases of Operation Enduring Freedom. This is an analysis of the distribution, cause, and severity of wounds for combat casualties and the surgical procedures they required. **Methods:** A prospective database was maintained for combat casualties cared for by the 274th FST. The database included demographic data, vital status, mechanism of injury, distribution and severity of wounds, and surgical care provided. **Results:** The FST cared for 224 combat casualties, including 153 U.S. soldiers, 19 coalition soldiers, 32 Afghan militia forces soldiers, and 20 detainees. Fragments were the most common mechanism of injury (49%), and the extremity was the most common location of injury (58%), whereas gunshot wounds were the most common cause of death (57%). There were few significant head, chest, or abdominal wounds (13%). The FST treated 103 surgical cases (73 with combat wounds), including neurosurgical, thoracic, general, orthopedic, and vascular cases, with a total of 180 procedures. **Conclusions:** The distribution, cause, and severity of wounds were similar to those in the Persian Gulf War, despite the obvious differences between these conflicts. The use of modern technologies, such as compact, portable, ultrasound and digital X-ray systems, expanded the capabilities of the FST. Even low-intensity conflicts can produce significant numbers of combat casualties, and the FST must be manned, trained, equipped, and supplied to treat a wide variety of combat wounds.

Introduction

Shortly before 9 a.m. on Tuesday, September 11, 2001, the first of two jetliners crashed into the north tower of the World Trade Center in New York City; a second plane hit the south tower just minutes later. Approximately 1 hour later, a third commercial plane hit the Pentagon and, as with the two previous crashes, it wreaked havoc in a chaotic scene of death, bloodshed, and vast destruction. Operation Enduring Freedom (OEF) began on October 7, 2001, in response to these attacks, after they were determined to be the work of Osama bin Laden and his al-Qaida terrorist network headquartered in Afghanistan.

Diplomatic overtures failed to convince the ruling Taliban regime to remit bin Laden to Western authorities. Therefore, OEF was initiated with the bombing of known terrorist training camps within Afghanistan and the simultaneous insertion of U.S. Special Operations forces into the country. The latter had the mission of organizing the anti-Taliban elements within the

country to overthrow the regime and to seek out and destroy the al-Qaida network. The initial phases of OEF resulted in the fall of three Taliban strongholds, Mazar-e-Sharif, Kabul, and finally Kandahar, by early December 2001. At that time, the Taliban capitulated governmental control, and an interim government was established under Prime Minister Hamid Karzai on December 21, 2001.

At that time, international peacekeepers were deployed to Kabul, and a significant number of U.S. conventional armed forces were moved into Afghanistan and centered at two places within the country, namely, Bagram Air Base, north of Kabul, and Kandahar, in the south. The purpose of the troops was to continue the search-and-destroy mission for al-Qaida terrorists and Osama bin Laden. The largest combat operation of OEF, Operation Anaconda, was staged out of Bagram on March 1, 2002, and included a multinational force in conjunction with the Afghan militia forces (AMF). The operation was aimed at destroying the largest known concentration of Taliban and al-Qaida terrorists in the Shah-e-kot mountains in southeastern Afghanistan.

Given the small number of U.S. soldiers and the low-intensity nature of the conflict in the early phases of OEF, only two forward surgical teams (FSTs) were initially deployed to provide surgical and advanced trauma support. The FST is highly mobile, setting up in three tents, and has the doctrinal mission of providing far-forward lifesaving surgical procedures. A FST consists of 20 individuals operating a two-bed operating room manned by four surgeons and two anesthesiologists, an Advanced Trauma Life Support section, and a four-bed intensive care unit. The 274th FST was initially deployed to Uzbekistan and was moved to Bagram, Afghanistan, after the fall of Kabul. The 250th FST was initially deployed to Oman and was moved to Kandahar after the fall of that city.

The following account details the experience of the 274th FST deployed in support of OEF from October 14, 2001 to May 8, 2002. During the 7 months of service in the theater of operations, the FST cared for ~90% of the U.S. combat casualties. The following analyses describe the wounding patterns, mechanisms, and severity of wounds treated and the surgical procedures performed in the FST. This information demonstrates the impact of body armor and shows the types of combat casualties most likely to be encountered by other FSTs in future low-intensity conflicts.

Methods

From October 2001 to May 2002, the senior surgeon of the 274th FST prospectively entered data on all combat casualties

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presenting to the team in an electronic database. The data fields included demographic information, date of injury, tactical situation, mechanism of injury, location and severity of injury, care provided, surgical procedures performed, and evacuation status. Also, an electronic database of all surgical procedures performed by the FST, including noncombat trauma and non-trauma cases, was maintained. The prospective database was retrospectively queried to determine the numbers and percentages of soldiers injured and killed during this period in Afghanistan. The mechanisms, distribution, and severity of injuries were analyzed.

This analysis was performed in two stages. First, the numbers were analyzed for all combat casualties treated at the FST to demonstrate the complete experience of the FST, which treated not only U.S. casualties but also coalition partners, as well as AMF soldiers and detainees. Second, to make more generalized statements regarding the wounding patterns and mechanisms, only U.S. and coalition casualties were analyzed; the total number of casualties (denominators) was firm, because the FST was the only receiving site for casualties in that area of operation. The total number of AMF casualties was unknown, as was the total number of enemy dead and wounded; therefore, these casualties were not included in the wounding pattern analyses. Because only the most severely wounded AMF soldiers and detainees were brought to the FST, their inclusion could potentially bias the results.

The surgical procedures performed at the FST were also evaluated and analyzed, based on major/minor, trauma/non-trauma, and procedure performed. For these analyses, all procedures were used, including those performed for AMF soldiers and detainees, because this accurately reflects what was, and may be in the future, encountered by the FST in a low-intensity conflict.

Results

Total Number of Combat Casualties Treated by the FST

The total number of combat casualties treated by the 274th FST between October 2001 and May 2002 was 224 (Table I). This total includes injuries sustained not only by U.S. forces but also by coalition partners, the majority of which were British forces. The FST also cared for AMF soldiers who were seriously injured, as well as enemy detainees in need of surgical attention. However, 68% of the combat-related casualties cared for at the FST were U.S. soldiers.

TABLE I
ALL COMBAT CASUALTIES TREATED BY THE 274TH FST DURING OEF

	No.				Total
	KIA	WIA	D	NBI	
U.S.	14	108	14	17	153
Coalition	0	4	4	11	19
AMF	2	30	0	0	32
Enemy	0	20	0	0	20
Total	16	162	18	28	224

KIA, killed in action; WIA, wounded in action; D, disease; NBI, nonbattle injury.

Casualties were categorized according to status with the standard terms killed in action, wounded in action, disease, and nonbattle injury. The latter are terms that are often used for a total conflict, but in this analysis the numbers given are for combat-related casualties only. All disease or nonbattle injury casualties required air evacuation from active combat operations. The disease category casualties mostly suffered from acute mountain sickness (AMS) related to Operation Anaconda, which occurred primarily at elevations of 10,000 feet. Most nonbattle injuries were orthopedic injuries associated with the rough terrain of the Shah-e-kot mountains.

Mechanisms of Injury for All Combat-Related Casualties

The mechanisms of injury for the 224 combat-related casualties are given in Figure 1A. The largest number of soldiers were injured by fragments (49%) (Fig. 1B). A significant number of casualties resulted from three different aircraft crashes. All of these casualties were considered combat-related even if the crash could not be confirmed to be a result of direct enemy action, because all of the aircraft were flying combat missions over hostile territory at the time of the crashes. The aircraft crashes of a Marine CH-53 helicopter, an Army CH-47 helicopter, and an Air Force MC-130 tanker resulted in two killed in action and 32 wounded in action.

The area around Bagram Air Base in Afghanistan is one of the most heavily mined areas in the world. This air base was inhabited by the Soviets during their war in Afghanistan and then became the front line between Taliban and Northern Alliance forces after the Soviet departure. As a result of land mine density, several events occurred, involving U.S., British, Norwegian, and AMF soldiers.

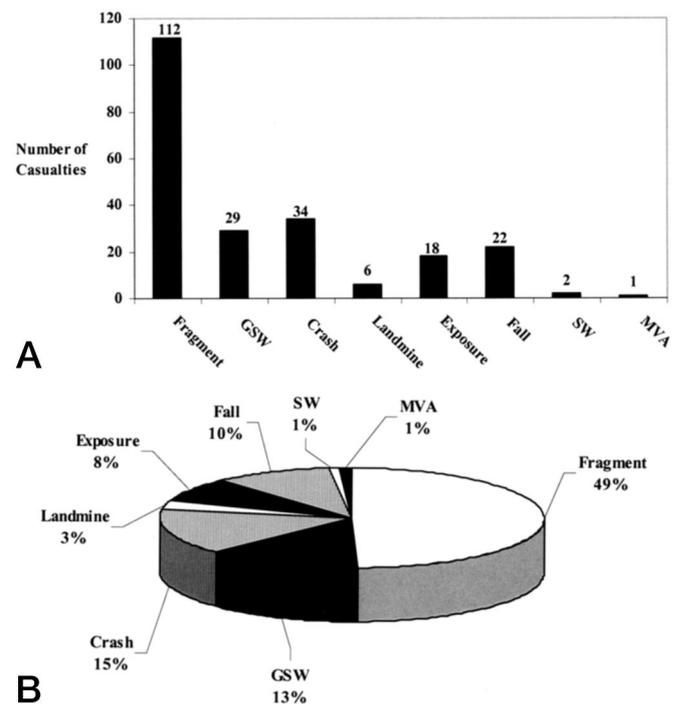


Fig. 1. (A) All 224 combat casualties treated by the 274th FST during OEF, categorized according to mechanism of injury. (B) Percentages of all 224 combat casualties treated by the 274th FST during OEF, categorized according to mechanism of injury. MVA, motor vehicle accident; SW, stab wound.

The exposure casualties were soldiers suffering from AMS. The injuries resulting from falls were primarily orthopedic injuries associated with the rough terrain in the combat area. A motor vehicle accident associated with the combat operations also occurred, and two AMF soldiers were ambushed and sustained stab wounds.

Wounding Patterns for All Combat-Related Casualties

Figure 2A demonstrates the locations of wounds sustained by the 224 combat-related casualties. Some casualties suffered wounds to more than one body part. By far the most common site of injury was an extremity, accounting for 58% of the wounds treated by the FST (Fig. 2B).

The wounding patterns are also indicated according to blunt and penetrating forces (Fig. 2A). The majority of injuries were penetrating wounds, except for the crashes and falls mentioned above; therefore, penetrating wounds were more common at all locations except for the back and were equal to blunt injuries to the pelvis.

Notable was the small number of wounds to the abdomen and chest, areas that were protected by the new body armor currently being worn by our soldiers in battle. There were only 12 chest/abdominal penetrating wounds documented in this series. Some of these occurred among soldiers who were not wearing body armor at the time of injury or individuals who would not routinely wear armor.

The distribution of wounds was not recorded for 14 individuals, including 10 of the soldiers who died of their wounds. Many of those soldiers sustained multiple wounds but the exact cause of death and distribution of wounds were not known at the time

of this analysis. When those soldiers were brought to the FST, death was confirmed but their injuries were not fully assessed or recorded.

Surgical Experience of the 274th FST

The 274th FST treated 103 surgical cases during this conflict (Table II). More than 80% of the procedures were for trauma, whereas 19% were for general surgical problems such as appendicitis and abscesses. Of the trauma-related surgical cases, 73 involved combat-related casualties, whereas the remaining 10 cases involved trauma patients from normal base operations. All of these surgical cases were classified as major or minor. Major cases were defined as those requiring general endotracheal anesthesia, whereas minor cases were performed under sedation, regional anesthesia, and/or local anesthesia. Two-thirds of the cases were major.

Figure 3A demonstrates the mechanism of injury leading to surgical procedures for the 73 combat-related casualties requiring procedures. The proportion of surgical procedures attributable to fragments closely followed the percentage of wounds attributable to this mechanism; however, the number of surgical procedures attributable to gunshot wounds (GSW) is disproportionate, because the majority of these wounds required surgical procedures. The majority of fragment wounds produced minimal tissue disruption, requiring only minor procedures of irrigation and minimal debridement, whereas the vast majority of the GSWs required more extensive debridement (excision) of devitalized tissue or correction of associated injuries (Fig. 3A). Many minor fragment wounds were simply irrigated at the bedside and the soldiers were given a single dose of intravenously administered antibiotics. These procedures are not included in this analysis. Foreign bodies were not removed unless superficial or near vital structures such as vessels, nerves, or tendons. Many of the patients with minor fragment wounds were kept in the immediate area, monitored by the FST for dressing changes, and eventually returned to full duty. No purulent wounds were encountered.

Many of the combat-wounded individuals sustained injuries to more than one body part and/or required more than one procedure to be performed at the primary surgical site. On two occasions, because of evacuation difficulties for AMF soldiers, multiple surgical procedures were performed for the same soldier. Taking these facts into account and including the non-combat-related procedures, a total of 180 procedures were performed by the 274th FST. Table III shows the number and type of procedures performed. These numbers are important for planning purposes in equipping and stocking FSTs for future low-intensity conflicts. Specifically, attention must be paid to the variety of cases treated. Figure 3B demonstrates the distribution of case by type.

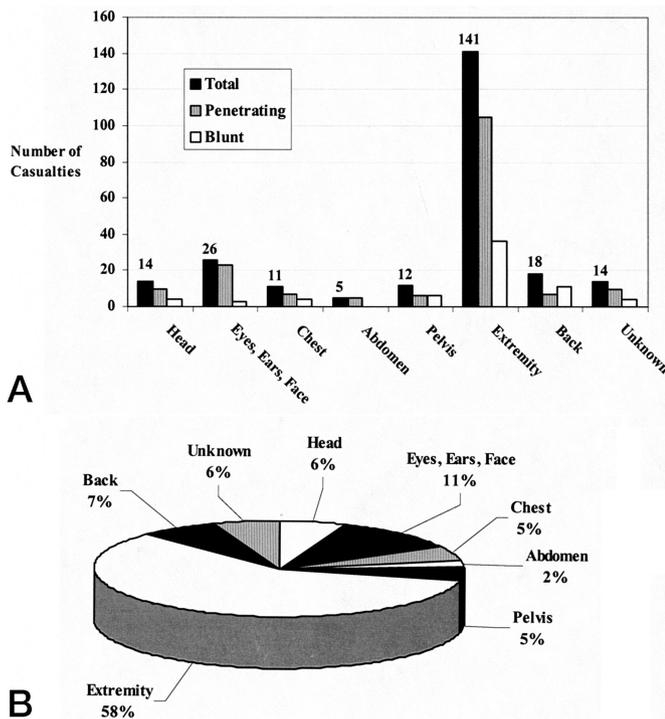


Fig. 2. (A) Wounding patterns of all combat-related casualties treated by the 274th FST during OEF. (B) Percentages of all wounds treated by the 274th FST during OEF.

TABLE II

TOTAL SURGICAL EXPERIENCE OF THE 274TH FST DURING OEF

	No.		
	Major	Minor	Total
Combat-related trauma	54	19	73
Non-combat-related trauma	5	5	10
Nontrauma	9	11	20
Total	68	35	103

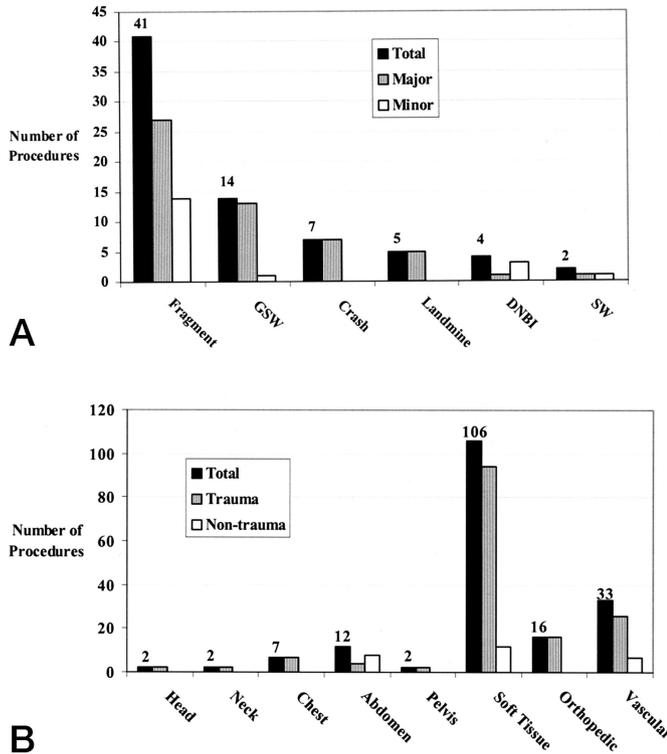


Fig. 3. (A) Surgical procedures according to mechanism of injury for 73 total combat-related casualties. (B) One hundred eighty surgical procedures performed by the 274th FST for a total of 103 patients during OEF. DNBI, disease nonbattle injury; SW, stab wound.

Not surprisingly, soft tissue irrigation and debridement procedures were the most common procedures performed, given the commonality of penetrating extremity wounds. A significant number of orthopedic procedures were performed, as were vascular procedures. Amputations were included as vascular procedures, because loss of perfusion and viability were the predominant features necessitating the majority of amputations, thus inflating this number. In addition, a detainee suffered from frostbite, with wet gangrene affecting the distal tips of seven fingers (Table III). As mentioned previously, there was a paucity of abdominal penetrating wounds, and the majority of exploratory laparotomies were performed for general surgical issues. Several exploratory laparotomies/diagnostic peritoneal lavages were avoided through the performance of focused abdominal sonography for trauma. The SonoSite compact, portable, ultrasound system was used specifically for the blunt trauma casualties involved in the aircraft crashes, three of whom had pelvic fractures and concerning abdominal examinations but were found to have negative focused abdominal sonography for trauma examinations (no free fluid in the pericardium, hepatorenal space, splenorenal space, or pelvis). All FSTs are currently being equipped with SonoSite systems (Bothell, Washington).

Focused Analyses of Mechanisms of Injury and Wounding Patterns

The data presented above included all of the casualties seen by the FST, i.e., U.S. soldiers, coalition soldiers, AMF soldiers, and detainees, and these data are important for manning, train-

TABLE III
ALL SURGICAL PROCEDURES PERFORMED BY THE 274TH FST DURING OEF

Category	Procedure	No.			
		Trauma	Nontrauma	Total	
Head	Craniotomy	2	0	2	
Neck	Exploration	2	0	2	
Chest	Total	7	0	7	
	Closed tube thoracostomy	5			
	Thoracotomy	1			
	Pericardial window	1			
Abdomen	Laparotomy	4	8	12	
Pelvis	Sheeting	2	0	2	
Soft tissue	Total	94	12	106	
	I&D, wound exploration	73			
	FB removal	11			
	Complex laceration closure	9			
	Abscess drainage		12		
	STSG	1			
	Orthopedic	Total	16	0	16
		Closed RUA	5		
		External fixator	5		
		ORIF	2		
	Arthrotomy	1			
	Arthrotomy closure	3			
Vascular	Total	26	7	33	
	Agram	3			
	Hemorrhage control	6			
	Fasciotomy	8			
	Amputation	6	7		
	Vascular repair	2			
	Thrombectomy	1			
	Total	153	27	180	

I&D, irrigation and debridement; ORIF, open reduction and internal fixation; STSG, split-thickness skin grafts; FB, foreign body; RUA, reduced under anesthesia.

ing, equipping, and stocking FSTs for future low-intensity conflicts. However, because only the most seriously injured AMF soldiers and detainees were brought to the FST, these casualties may bias the analyses for more generalized statements about mechanisms of injury and wounding patterns found during this conflict, compared with previous conflicts. These soldiers were not similarly equipped with body armor; therefore, the wounding patterns may differ. Finally, the most gravely injured detainees, and probably AMF soldiers, never made it to the FST. During the period from October 2001 to May 2002 and especially during Operation Anaconda, the 274th FST at Bagram was the only receiving facility for combat wounded in this area of operation; therefore, all U.S. and coalition casualties were included in the database.

Table IV shows the casualty totals and categories for the U.S. and coalition forces that were used as the denominators in the following analyses. Of these combat-related casualties, 73% were attributable to direct enemy action. Once again, fragments were the leading mechanism of injury but with a lower percentage than the overall, because of the number of U.S. casualties involved in aircraft crashes (Fig. 4). Although fragment wounds were three times more common than GSWs, the latter ac-

TABLE IV
SELECTED COMBAT CASUALTIES TREATED BY THE 274TH FST DURING OEF

	No.				Total
	KIA	WIA	D	NBI	
U.S.	14	108	14	17	153
Coalition	0	4	4	11	19
Total	14	112	18	28	172
% of 172	8	65	11	16	
% of 172		73		27	

KIA, killed in action; WIA, wounded in action; D, disease; NBI, nonbattle injury.

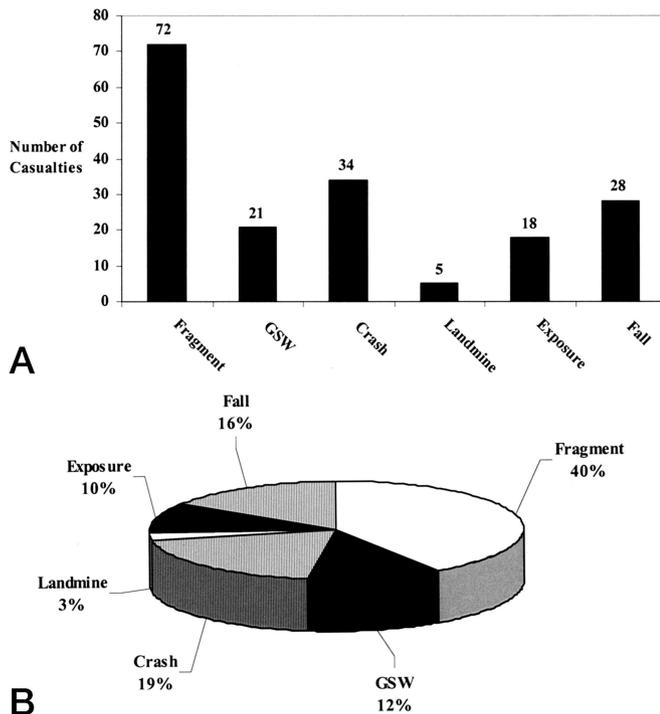


Fig. 4. (A) Total of 172 U.S. and coalition casualties treated by the 274th FST during OEF, categorized according to mechanism of injury. (B) Percentages of 172 U.S. and coalition casualties treated by the 274th FST during OEF, categorized according to mechanism of injury.

counted for the majority of the deaths (eight of 14 deaths). All deaths attributable to GSWs except one occurred during Operation Anaconda, with an additional death attributable to fragments occurring during this operation. The other GSW death occurred during an ambush earlier in the conflict. Three deaths occurred in the vicinity of Kandahar as a result of a friendly fire incident involving a Joint Direct Attack Munition bomb. Two deaths occurred as result of the Marine CH-53 helicopter crash. All 14 of these soldiers died serving their country.

The wounding pattern is demonstrated in Figure 5A. The majority (59%) of wounds occurred in an extremity (Fig. 5B). The distribution of wounds is remarkably similar to the total wound distribution (Fig. 2B). This could be because a majority (172 cases) of the total (224 cases) was accounted for by U.S. and coalition casualties; however, even a direct comparison of those soldiers with the AMF soldiers and detainees as a group dem-

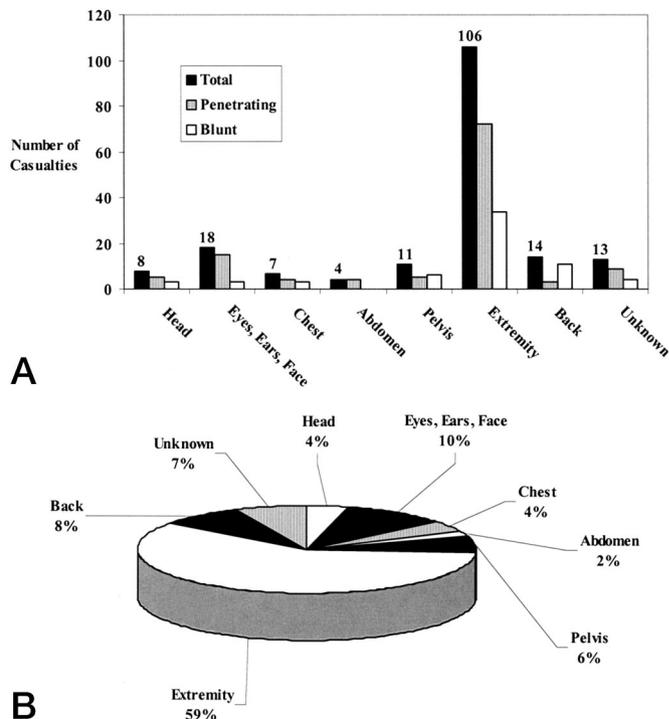


Fig. 5. (A) Wounding patterns of all 172 U.S. and coalition casualties treated by the 274th FST during OEF. (B) Percentages of U.S. and coalition casualties' wounds treated by the 274th FST during OEF.

onstrated similar distributions. Although the U.S. and coalition forces were better protected, which accounted for the preponderance of extremity wounds, the AMF soldiers and detainees who had more serious wounds probably never made it to the FST, which resulted in the presentation of casualties with survivable but serious wounds of similar distributions. The acuity of the latter group's wounds was greater and the wounds were twice as likely to require an immediate surgical procedure (52%), compared with U.S. and coalition casualties (24%).

Discussion

The 274th FST was deployed in support of OEF from October 14, 2001 to May 2002. During this period, the 274th FST was one of only two in Afghanistan and was the sole surgical facility in eastern Afghanistan. Overall, the 274th FST took care of ~90% of U.S. combat casualties during this period and treated a total of 224 combat casualties, including coalition partners, AMF soldiers, and detainees. The FST treated 103 total surgical cases, including 73 with combat wounds, with a total of 180 procedures performed. At the time, this experience with combat casualties and the surgical care of combat wounds was the largest since the Persian Gulf War.

Given the unique set of circumstances that faced the 274th FST in this conflict, namely, the lack of other U.S. medical assets in the immediate vicinity and, therefore, the prolonged evacuation times to higher levels of care, the surgical unit was asked to perform many non-doctrinal missions. Instead of performing lifesaving surgical procedures only, the 274th performed many primary procedures, as well as many definitive procedures, because of the protracted times between injury and

evacuation to higher echelons of care. The unit was also asked to hold patients for longer periods of time than is doctrinally normal. This was particularly true for the AMF casualties, because of the difficulties of follow-up care within the country and limited access to U.S. facilities. Many of the FST's accomplishments would not have been possible without the cooperation of the British 34th Field Hospital, which assisted with many of the combat wounded, especially during the aircraft crashes and Operation Anaconda. Specifically, the FST made use of the British X-ray equipment and treated some of the orthopedic cases in the field hospital before the FST was supplied with a new field digital X-ray system.

Not surprisingly, the most common mechanism of injury was fragments; this group included fragmentary wounds from multiple types of munitions. GSWs were fairly uncommon, and this trend was similar to that in the Persian Gulf War.¹⁻⁶ Given the minimal tissue disruption of many fragment wounds, these injuries were simply washed out without tissue debridement or attempts at foreign body removal, unless the proximity of the fragment posed a potential risk to vital structures. Larger wounds and contaminated wounds underwent aggressive irrigation and debridement (wound washout and excision of all devitalized and marginal tissue). Given the low intensity of this specific conflict, other mechanisms, such as aircraft crashes, made up a significant proportion of the casualties. Land mines were very common in this particular area and caused a number of casualties.

Disease or nonbattle injury casualties were also included in this analysis if they required air evacuation from the active combat area of operations. These patients were also cared for by the FST. The FST did not track the overall rate of theater evacuation for disease or nonbattle injury cases. The primary cause of combat nonbattle injuries was orthopedic, because of the rough terrain, and the specific disease entity encountered was AMS, because of the operations at 10,000 feet. Most of the combatants had been acclimated to Bagram, which is at ~5,000 feet; however, a significant number of AMS cases occurred specifically among soldiers flown from Kandahar to take part in Operation Anaconda. A great deal of discussion occurred among the medical personnel regarding prophylaxis with acetazolamide, with or without dexamethasone, before the initiation of the combat operations. The final decision was made by the individual unit chain of command, with the majority of soldiers not receiving prophylaxis because of time constraints and some concerns over dehydration during active combat.

The wounding pattern seen during this conflict was analyzed in two different ways. To make more generalized statements about the wounds seen during this conflict, for the purpose of comparison with previous wars, only U.S. and coalition partners were included in the analysis. This was done for two reasons. First, all of the soldiers were similarly equipped with body armor and Kevlar helmets. Second, all of the U.S. and coalition partner casualties in eastern Afghanistan were brought to the 274th FST. Therefore, firm statements can be made about the total number of casualties and wounding patterns among these combatants. The overall analysis of all casualties during OEF must include the casualties cared for by the 250th FST, as well as those from ongoing operations in Afghanistan who were cared for by subsequent medical units.

In the experience of the 274th FST, by far the most common site of wounding was the extremities, accounting for 59% of wounds. This was similar to the numbers reported for the Persian Gulf War.¹⁻⁶ The low mortality rate among combat casualties and, more specifically, the paucity of penetrating head, chest, and abdominal wounds demonstrate the advances in personal protective equipment and the low-intensity nature of this conflict. Even the Persian Gulf War was dramatically lower in intensity than other conflicts of the 20th century.¹ The low-intensity nature of OEF is further illustrated when the mortality rates for U.S. casualties are compared between this conflict and the Persian Gulf War, including only casualties attributable to direct enemy action. The mortality rate seen in Afghanistan at the 274th FST was 11.5% (14 of 122 cases), compared with 23% (154 of 664 cases) reported for the entire Persian Gulf War.¹

To determine the wounding pattern in the overall experience of the FST and therefore to predict future needs of this type of unit in similar conflicts, all casualties, including U.S. soldiers, coalition soldiers, AMF soldiers, and detainees, were included. As in the past and as noted in this report, it is likely that FSTs will be asked to care for all combat wounded in the future, regardless of nation of origin. The total numbers of AMF or enemy soldiers killed or wounded during this conflict is not known; therefore, the overall percentages of specific wounds or mechanisms cannot be calculated. The assumption is that only the more seriously injured AMF soldiers and detainees were brought to the FST, as evidenced by the high operative rate among these casualties, which was twice that of the U.S. and coalition forces. The wounding patterns were not significantly different but the acuity of injury was higher. The assumption is that casualties with abdominal and thoracic injuries did not survive long enough to be evacuated to the FST. Therefore, no direct comparative evidence is available to demonstrate any difference in wounding patterns produced by personal protective equipment, with the possible exception that the two cranial procedures performed by the FST were for an AMF soldier and a detainee, both of whom suffered penetrating head wounds.

The diversity of surgical procedures is listed in this report. The general distribution of cases was not significantly different from the distribution of procedures performed by surgical elements in the Persian Gulf War.¹⁻⁶ However, the acuity of cases was much less than that seen in the Vietnam War. This fact could be indirect evidence of the difference made by personal protective equipment, as well as the difference in combat intensity between these conflicts. The numbers and types of cases treated by the 274th FST during 7 months of OEF are useful for planning and training purposes. FSTs must be equipped and stocked to treat this variety of cases. Surgeons must be well versed in trauma resuscitation and the care of traumatic wounds, especially of the extremities, including sufficient but conservative debridement, wound exploration, hemorrhage control, fasciotomies (including hands and feet), placement of external fixators, vascular repairs, and all types of amputations. These procedures accounted for 85% of the procedures performed by the 274th FST.

Although the FST is not doctrinally the only surgical asset in an area of operation during a war, the series of low-intensity conflicts in the recent past has seen many uses of the FST. These diverse uses require this type of surgical unit to be flexi-

ble, well trained, and well equipped. Equipment includes new available technologies such as the compact, portable, ultrasound system for focused abdominal sonography for trauma examinations and the new portable, digital, X-ray system. The former prevented several unnecessary exploratory laparotomies and the latter is essential for adequately treating the many extremity injuries and for performing blunt trauma assessments, single-shot intravenous pyelograms for penetrating abdominal wounds, and single-shot angiograms. These two pieces of equipment dramatically expanded the capabilities of the FST.

The experience of the 274th FST during its 7 months of service in Afghanistan during OEF is representative of the wounding patterns and surgical requirements that may face other FSTs in the future, with the significant increase in U.S. involvement in peacekeeping missions around the world. This experience underscores the important advances in personal protective equipment for our soldiers. Furthermore, the information provided should be helpful for manning, training, equipping, and supplying the FST for future deployments.

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