

Combined UK/US Field Hospital Management Of A Major Incident Arising From A Chinook Helicopter Crash In Afghanistan, 28 Jan 2002

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Map: Afghanistan, 28 Jan 2002

ABSTRACT

On Monday, 28 January 2002, a US Army Chinook helicopter crashed on landing in Afghanistan. Sixteen casualties were airlifted from the scene for treatment at the US Army 274th Forward Surgical Team and the British 34 Field Hospital Troop at Bagram airfield before aeromedical evacuation out of Afghanistan. This was the largest mass casualty incident to be dealt with in a combined fashion by the British and American medical services in Afghanistan during the initial months of Operation ENDURING FREEDOM. It illustrated how multinational surgical teams can successfully manage such incidents by following common and agreed protocols. The lessons learned are relevant to any combined operations in the near future.

Introduction

A US Army CH47 (Chinook) helicopter crashed in Afghanistan on 28 January 2002. This article details the way in which this incident was managed jointly by the British and American medical services.

Setting

American troops deployed into Afghanistan in November 2001 during Operation ENDURING FREEDOM. A US Army Forward Surgical Team (the 274th FST)

was established at Bagram airfield, with three general surgeons, one orthopaedic surgeon, two nurse anaesthetists and supporting staff. It had two surgical tables and a three-bed trauma area that doubled as a post-operative temporary holding area. Any patients would be stabilised, if necessary by damage control surgery, prior to aeromedical evacuation within hours to a US Army Combat Support Hospital in Uzbekistan, and thence onwards via Turkey and Germany to the US.

British troops deployed into Afghanistan in November 2001. 34 Field Hospital deployed a 25-bed Field Hospital Troop (34 Fd Hosp Tp) with two general surgeons, two anaesthetists, and supporting staff into Bagram airfield on 23 December. The hospital was set up on 24 December about 300 metres from the US facility. The Hosp Tp had two surgical tables, a ward / ITU (with four ITU beds and four ward beds, with an extra seventeen beds held in reserve), a laboratory and an X-ray facility, and a resuscitation department with three trauma bays. There were 2 nurses and 4 combat medical technicians in the resus area, and 7 ward / ITU nurses. All the essential equipment, the initial stores and most of the staff had deployed in a single Hercules into Bagram.

Major Incident Planning

The British and American surgical teams developed a combined major incident plan within days of 34 Fd Hosp Tp's arrival. Casualties would normally arrive by helicopter and land in front of the FST, so the American FST commander (an experienced general surgeon) would carry out initial triage on the helipad. The two most critically ill patients would be directed to the FST facility. Patients with mainly orthopaedic injuries would be directed to 34 Fd Hosp Tp, largely because of the availability of X-ray facilities. All walking wounded and minor stretcher cases would be managed at the American facility. All other stretcher patients would be directed to 34 Fd Hosp Tp.

On notification of an incident involving American casualties, a Critical Care Aeromedical Team (CCAT) would be despatched in a C-130 Hercules aircraft from Uzbekistan (two hours flying time away), so that patients could be promptly

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evacuated from the FST. In the event of British casualties, aeromedical evacuation would be via Oman to the UK the day after the incident.

Scenario 28 Jan 02

At 1702hrs GMT on Monday, 28 Jan 02, a US Army CH47 (Chinook) helicopter of the 101st (Airborne) Division with 26 personnel on board crashed during a night landing at a small airfield in south-east Afghanistan. The helicopter's front right wheels caught in a ditch as it came in to land, causing the helicopter to somersault onto its right side. The soldiers inside were wearing full combat gear (including helmets) and had just unstrapped themselves prior to landing (as per usual practice, to enable them to make a rapid exit). They were, therefore, unrestrained at the moment of impact, and they were flung around the helicopter.

Nobody was killed during the impact, and all personnel on board managed to extricate themselves (where necessary aided by colleagues). Sixteen personnel were injured. One crew member (Patient 7 [Table 1]) was on the tailgate at the time, and he was swung round the outside of the helicopter on his restraint, landing heavily on his right side. Another crew member (Patient 3), seated in the aisle between the pilot and co-pilot, was catapulted through the windscreen landing heavily on his chest. One soldier's helmet was split open during the crash, but he sustained no head injury (Patient 6).

Two other Chinooks involved in the operation collected the wounded and non-injured survivors and transported them to Bagram airfield one hour's flying time away. On-board medics managed the casualties en route. The American and British medical

facilities were alerted, and the combined major incident plan was activated. The French and German International Security Assistance Force (ISAF) hospitals in Kabul were placed on standby.

Actions on arrival at Bagram airfield

The two Chinooks arrived at Bagram at 1910 hrs. The 16 casualties had been triaged en route such that they were presented to the FST commander in order of priority. Patient 1, with an open tibial fracture, was initially deemed to have the most serious injury, so he was directed to 34 Fd Hosp Tp, accompanied by the orthopaedic surgeon. Three more stretcher patients were transported directly to 34 Fd Hosp Tp. Twelve casualties (including six on stretchers) were directed to the FST.

Actions at the FST

Patients 7, 9 and 10 were assessed in the trauma area. Patients 7 & 9 each had clinical signs consistent with a dislocated right hip, Patient 7 also had a dislocated right shoulder, and Patient 10 had signs suggestive of a right hip fracture. They underwent full trauma assessment, including Focused Abdominal Sonography for Trauma (FAST) examinations, resuscitation and administration of analgesia according to Advanced Trauma Life Support (ATLS) protocols. All three were then transferred to 34 Fd Hosp Tp for radiography and further management. Two of the FST general surgeons, the two anaesthetists and other staff accompanied the patients to 34 Fd Hosp Tp to offer assistance.

An emergency room physician, a physician's assistant, and several line medics from the 10th Mountain Division managed

Case	Injuries	X-rays / Ultrasound	Operation
1	Open fracture right tibia/fibula with compartmental syndrome, laceration left leg, laceration forehead	Right leg (pre & post-op)	External fixation, four-compartment fasciotomy right calf, wound debridement
2	Fracture right ankle	CXR, right leg	
3	Probable sternal fracture	CXR, C-spine, sternum, FAST	
4	Bruising to right ankle, neck, right thumb		
5	Fractured ribs on left (10,11,12)	CXR, FAST	
6	Bruising right hip, neck, lumbar spine	CXR, pelvis, C-spine	
7	Dislocated right shoulder, dislocated right hip	CXR, pelvis, right shoulder, FAST (& post-op views of shoulder, hip)	Reduction shoulder, hip
8	Bruising left calf		
9	Pelvic fractures (pubic symphysis, right sacro-iliac joint, left inferior pubic ramus), dislocated right hip	CXR, pelvis, lumbar spine, FAST, post-op views	Reduction right hip, compression pelvis
10	Pelvic fracture (right acetabulum)	Pelvis, FAST	

Table 1. Case summaries of 34 Fd Hosp Tp patients.

the other nine casualties. The six walking wounded had soft-tissue bruises, sprains and abrasions only. Three others required X-rays for definitive assessment (for suspected rib fractures [Patient 5], cervical & thoracic tenderness [Patient 6], and severe calf tenderness [Patient 8]), so they were also transferred to 34 Fd Hosp Tp for radiography.

Actions at 34 Fd Hosp Tp

The British senior surgeon acted as clinical co-ordinator and triaged patients at the entrance to the emergency department. The first patient (Patient 1) arrived at 1925hrs accompanied by the orthopaedic surgeon who confirmed that there would be no P1 (Immediate) casualties. P2 (Urgent) casualties were therefore directed to the three Resus bays and to the ward. A P3 area had been set up in the lab (which was spacious and warm). Ten patients (six of whom had initially been managed at the FST) were received in all, and they were triaged as nine P2 and one P3. Patients were assessed and treated according to Battlefield Advanced Trauma Life Support (BATLS) protocols (these being identical to ATLS protocols).

After assessment of the first four casualties, it was evident that the most serious casualty was indeed Patient 1, with an open tibial fracture and compartmental syndrome. He was transferred to the operating theatre at 2015hrs for external fixation and four-compartment fasciotomy by the American orthopaedic surgeon, assisted by a British junior doctor and an American general surgeon (Figure1).



Fig 1: Combined UK/US surgical team.

British and American general surgeons reduced Patient 7's dislocated hip and shoulder on the second operating table. The orthopaedic surgeon then reduced Patient 9's dislocated hip and externally bound his open-book pelvic fracture (Figures 2-4). As the patient remained haemodynamically stable and post-operative X-rays showed satisfactory compression of the pelvic injury there was no need for external fixation. British and American anaesthetists worked together on Patients 7 & 9.



Fig 2: Patient 9 (X-ray: pelvic fracture & right hip dislocation).



Fig 3: Patient 9 (external compression pelvic fracture).



Fig 4: Patient 9 (X-ray: post-reduction & compression).

Radiology

Radiographic triage was necessary. There was only one radiographer (assisted with film processing by the electromedical technician), a relatively large number of patients, and an aeromedical flight was due imminently to take patients to a field hospital in Uzbekistan. There was also the need to perform post-reduction X-rays in theatre before patients could be awakened. This required a deviation from the standard protocol of the three initial trauma X-rays (chest, pelvis, cervical spine) on each patient (Table One). Cervical spine radiographs were only performed on the two patients with neck pain or with tenderness on examination, and several patients were evacuated with cervical collars in situ pending radiography elsewhere. Similarly, chest and pelvic radiographs were only performed on patients with pertinent clinical signs.

One of the general surgeons at 34 Fd Hosp Tp carried out FAST examinations. No patients had clinical evidence of abdominal pathology, nor were there any sonographic findings of free intraperitoneal or pericardial fluid.

Aeromedical evacuation

An American C-130 left Bagram with 8 casualties at 2048hrs GMT. A second C-130, with the American CCAT and 8 stretcher casualties (including the three post-operative patients), left at 2350hrs GMT, 4 hrs 40 mins after casualties arrived in Bagram. Casualties had been in 34 Fd Hosp Tp for under 4 hours.

Discussion

Deployment into Afghanistan

American FSTs are configured to provide life and limb saving surgical support to military operations, relying on the ready availability of aeromedical assets to deliver patients rapidly to definitive surgical care elsewhere. The 274th FST had initially provided the sole surgical support to British and American troops operating out of Bagram airfield. The setting up of 34 Fd Hosp Tp as a Role 3 facility greatly enhanced the medical cover in an active operational area within 24 hours of arrival.

34 Fd Hosp Tp had deployed all the essential equipment, the initial stores, and most of the staff, for a two-surgical team, 25-bed holding capability, with X-ray, lab and resus department, within a single C-130 Hercules into Bagram airfield. This has positive planning implications when air transport facilities are limited and rapid deployment is necessary. The presence of a 25-bed holding capability provided a significant safety margin, especially as environmental conditions in the coming Afghan winter could potentially shut down aeromedical evacuation flights for days.

**A Field Hospital Troop can be
deployed within a single
C-130 Hercules**

Medical unit composition

Normal British practice would have been to deploy an orthopaedic surgeon in tandem with a general surgeon, but a shortage of orthopaedic specialists in the Defence Medical Services necessitated the deployment of two general surgeons for this three-month deployment of 34 Fd Hosp Tp. The preponderance of orthopaedic injuries in this and other incidents highlighted this significant capability gap, which was fortuitously filled by the Americans. The Americans also had an Emergency Physician, who provided a very useful asset for resuscitation and stabilisation of casualties, particularly in other incidents

when the surgeons and anaesthetists were occupied in theatre, as well as providing care for medical patients. Consideration should be given by British medical planners to deploying such personnel at Hospital Troop level.

**Accident and Emergency personnel
should form part of all Field Hospital
deployments**

The other major differences between the British and American medical units were the presence of X-ray & laboratory facilities, and a much greater ward holding capability, at the British unit. The X-ray facility in particular made a fundamental difference to the management of casualties pre- and post-operatively and prior to aeromedical evacuation. Its availability was perhaps the one factor that most influenced the American readiness to transfer American casualties to the British location.

**An X-ray facility is fundamental to
operational medical support of
wounded casualties at Role 3**

The combat medical technicians at the Hospital Troop provided very useful support to the small number of doctors and nurses in the resuscitation area, both in preparing the three trauma bays and then managing patients under supervision. They assessed airways, provided oxygen, stabilised cervical spines, removed patients' clothing, established venous access, set up monitoring equipment and recorded patients' vital signs, maintained the major incident board, and they helped in a myriad of other ways as the ten patients were received.

Centralisation of casualties

Afghanistan is a large mountainous country. Surgical facilities for American, British and ISAF troops were concentrated in a few locations. It was fortuitous that two Chinook helicopters were available to promptly evacuate casualties to medical care. Road evacuation of casualties would not have been a realistic option. Even so, it was two hours after the crash before the casualties arrived at Bagram. The absence of critically injured casualties meant that all casualties could be centralised at Bagram without the need to consider diversion to the closer ISAF hospitals in Kabul.

Mechanism of injuries

The sudden cessation of forward movement, the somersaulting of the helicopter, and unrestrained occupants impacting on items of cabin equipment predisposed patients to a variety of orthopaedic injuries. Studies of other

survivable helicopter crashes have shown that casualties are at high risk of head, cervical and upper thoracic injuries (due to horizontal deceleration forces), as well as thoraco-lumbar fractures (due to vertical deceleration forces) (1,2). It was not feasible to X-ray all patients' cervical spines given the time constraints. Patients were evacuated in cervical collars unless clinicians could confidently exclude cervical injuries on clinical grounds.

The spine is particularly at risk in helicopter crashes

It was striking that four patients had right hip injuries (Patients 6,7,9,10), with two dislocations (and an open-book pelvic injury), one acetabular fracture, and one with marked soft-tissue bruising, and that there were no left hip injuries. Two of the patients had been sitting on the right side of the aircraft, facing inwards, while one was a crew member who had been swung round the side. It is not known where the fourth one was seated.

The potential for splenic injury was highest in Patient 5 (with fractured 10th – 12th left ribs). The negative ultrasound (FAST) examinations in this and other patients provided reassurance to the surgeons and the aeromedical team that none of the patients was likely to deteriorate in flight from intra-abdominal bleeding. US military surgeons have been routinely trained in FAST examinations since 1998. By contrast, British military surgeons have only recently begun to be trained in this technique (3).

Every patient with a potential abdominal injury should undergo a FAST examination to rule out intraperitoneal bleeding.

The remarkable lack of head injuries in this incident reflects the fact that everyone on board was wearing helmets. At least one patient (Patient 6) probably owes his life to his helmet, and many of the soldiers remarked how their helmets had saved them from serious harm. It has been shown that non-helmeted helicopter occupants, in at least partially survivable accidents, are at significantly higher risk of severe or fatal head injuries compared to helmeted occupants (2, 4-6).

Helmets save lives – they should be mandatory for all military personnel on helicopter flights

Though fuel was spilled, the helicopter fortunately did not catch fire, so there were

no burns casualties. Forty per cent of fatalities in survivable crashes are due to thermal injury (2). There were no intra-abdominal injuries, a result similar to that of a study of US Army helicopter crashes (2), and to that in a Czech Hip helicopter crash in Bosnia (7). It would appear that the main cause of abdominal injuries in survivable helicopter crashes is the pressure exerted by seat belt restraints – this was not a factor in this incident.

Positive publicity

There was minimal British press coverage of this incident, despite the high interest shown immediately afterwards in military circles as a result of the successful multinational management of American casualties, largely within a British field hospital. In contrast, the daily American military newspaper reported this incident reasonably accurately within 2 days of the incident (8). This highlights the need for better publicity for the operational activities of the British Defence Medical Services.

Combined training & planning

A number of factors contributed greatly to the integration of British and American teams during this major incident.

1. Daily teaching sessions (by both British and American clinicians), concentrating on trauma management along ATLS and BATLS protocols, had been initiated at 34 Fd Hosp Tp within a week of setting up the hospital, and these had been attended by doctors, nurses and medics from both units. These sessions demonstrated that there were no fundamental differences in practice between the two nations.
2. The FST and the Fd Hosp Tp had set up and exercised a combined major incident plan within days of the Hosp Tp arriving. This plan had been activated twice before this incident, including during a US Marines CH53 helicopter crash on 20 Jan 02 when the Fd Hosp Tp received three casualties. This plan functioned more smoothly with each occasion.
3. One of the British resus nurses had previously worked with the American orthopaedic surgeon at the combined British-American field hospital at Camp Bondsteel in Kosovo. This situation is likely to become more common as other clinicians and nurses rotate through this hospital.
4. One of the British anaesthetists had previously assisted at operations at the FST.
5. The American surgeons had brought patients for radiography or laboratory tests to the Fd Hosp Tp on several occasions before this incident.

The camaraderie and mutual understanding resulting from these measures helped greatly in integrating teams during

this incident. British and American surgeons, anaesthetists and nurses felt fully at ease carrying out emergency procedures and working alongside one another at the British facility.

Co-located medical units of different nationalities should actively combine training, educational meetings and major incident planning

Conclusion

The deployment of 34 Fd Hosp Tp within a single C-130 Hercules and the rapidity of its establishment as a Role 3 facility on the ground significantly enhanced the medical support to operations from Bagram. This has positive planning implications for future operations.

During three months alongside one another, 34 Fd Hosp Tp and the US Army 274th FST also dealt with other major incidents (a US Marines CH 53 helicopter crash on 20 Jan 2002, a USAF Hercules crash on 13 Feb 2002, and combat casualties during OPERATION ANACONDA in early March 2002). The Chinook crash of 28 Jan 2002 was the largest major incident during this time. British and American medical teams worked seamlessly together at 34 Fd Hosp Tp during these incidents. This ready integration was largely the result of mutual trust arising from the use of common ATLS and BATLS protocols, combined major incident planning and exercises, and an active joint educational programme instituted at the beginning of the deployment. Application of these lessons should augur well for the successful co-operation of other UK and US medical units supporting future combined operations in the fight against terrorism.

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