HELICOPTERS IN MOUNTAIN RESCUE

RAF and Air Ambulance

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The mountain arena provides for a unique set of circumstances and challenges to mountain rescuers attempting to provide medical help for, and effect the rescue of, casualties from this environment.

Accidents causing injury can occur at considerable distances from any serviceable road and therefore it can take a significant time to reach casualties and provide medical help. Helicopters can dramatically improve the outcome of patient care, by bringing rapid rescue and medical care to the mountain rescue scene, and by rapid transport to a medical facility [ICAR MEDCOM guideline number 18].

Historically, this service has been provided by the RAF Search and Rescue (SAR) helicopters for many years but, in the last five to ten years, air ambulances are becoming more involved in providing extra medical help – either working alone or in conjunction with the RAF SAR helicopters. Although both the RAF and the air ambulance services are working independently as rescue facilities in their own right, they still need to work within the existing mountain rescue framework.

Activation of a rescue helicopter for a mountain rescue incident should include due consideration of appropriate assessment of flight and safety factors, as well as medical indications and the availability of other rescuers.

There are two main groups of indicators for use of helicopters in mountain rescue, which are (a) that the patient’s condition dictates immediate medical intervention and (b) that the circumstances surrounding the location, and access to the site of the accident, would under normal conditions provide for a delay in attending the scene.

One important consideration for helicopters working in the mountainous environment would be the availability of a winch facility or an underslung static line (as is used more commonly by Alpine/European helicopters). This can significantly reduce the delay in extrication of a casualty from the scene and hence reduce the time taken to get to hospital.

Traditionally in the UK, responsibility for mountain rescue has resided with the police but, after receiving the initial emergency request from a member or members of the
public, this responsibility is generally handed over very swiftly to the relevant mountain rescue team to co-ordinate the local emergency response – although the police still retain overall responsibility.

Helicopter pilots should therefore usually communicate with the relevant team while responding to an emergency but obviously still need to be responsive to Air Traffic Control when it comes down to issues relating to air safety and coordination.

With regards air ambulances in the UK it is pertinent to take into account where they have evolved from in recent years. In 1987, the first air ambulance commenced operation in Cornwall. The following year, London HEMS began operations and was soon followed by Kent in 1989. Over the next twenty years, the air ambulance community has expanded to its current position where there are over 24 helicopter air ambulances nationwide being run by sixteen charities.

Throughout this time there has been much debate regarding the clinical procedures that benefit patients in the pre-hospital environment and the role of paramedics and doctors in pre-hospital care. Initial economic evaluations of helicopter air ambulances were also inconclusive.

With this limited recognition for the role of helicopters and medical teams in pre-hospital care, few organisations directed much thought to standards of practice, training and other issues of governance aimed specifically at helicopter air ambulances and their crews... and so was born UK HEMS, an organisation, with the sole aim of promoting best practice amongst doctor/paramedic teams on air ambulances. This was first showcased at AMBEX in 2005 and, after several modifications, UK HEMS was formed on 26 July 2007. The foundation members were: Essex & Herts Air Ambulance, Great North Air Ambulance Service, Kent Air Ambulance, London HEMS and Surrey & Sussex Air Ambulance.

Pivotal in the expansion of the helicopter charities was the commitment and funding put forward by the Automobile Association (AA) and the National Association of Air Ambulances Services (NAAAS). In England and Wales, helicopter air ambulances are provided by registered charities. Funding comes from a variety of sources from simple tin collections, lotteries and fundraising events to major corporate sponsorship. It should also be acknowledged the NHS makes a significant contribution as nearly all the paramedics working on air ambulances are provided by the NHS through local ambulance services and, in the case of London, HEMS the doctors are also funded by the NHS.

Types of aircraft

RAF Search & Rescue

Up until approximately 15-20 years ago, the main type of aircraft used by the RAF for their rescue operations was the Wessex helicopter. This was a small aircraft capable of only carrying one casualty at a time but with enough space within the cabin to allow further treatment to be given to the rescued casualty whilst en route to hospital.

However the main workhorse of the RAF for the last 15-20 years has been the Sea King helicopter. This aircraft, though now reaching the end of its useful lifespan, has served the rescue services well by providing a platform that is capable of flying at night due to the availability of night vision goggles, having winching facilities, and having more space within the cabin to allow more than one casualty to be treated and transported.

More recently, a majority of their winchmen have been trained to UK Paramedic standards. Their primary role is to respond to emergencies reported by the military (e.g. downed aircraft, military personnel needing rescuing etc) though they also extend their role to civilian search and rescue. The main bases out of which the helicopters operate include RAF Boulmer, RAF Leaconfield, RAF Valley and RAF Kinloss.

Air Ambulance

There is a variety of different aircraft used by the different Air Ambulance charities throughout the UK. For example, the Lake District is covered by the Great North Air Ambulance which at the time of writing runs two Dauphin AS365n2 helicopters, and the Northwest Air Ambulance, which runs a Eurocopter EC135 and a Bolkow BK105.

None of these aircraft have winching capabilities or have the capability to fly at night. Some have skids, which makes landing in the mountain environment much easier, though some have wheels which means the landing site needs to be more carefully selected. Some can load casualties with
the rotors running but most will need to shut the engines down prior to loading. Most, apart from the likes of the Bolkow BK105, have enough space within the aircraft to continue to treat the casualty during flight. The main advantage of some air ambulances, such as those run by the GNAAS, is that most of the time they will carry specialist trauma and anaesthetic-trained doctors which significantly improves the care provided to sick or injured casualties both at the scene and in flight. Also, due to the proximity of the air bases, flying time to most incidents is generally fairly rapid (for instance less than ten minutes to most areas of the Lakes).

The ideal scenario therefore would be that, after a mountain rescue team has been called out by the police, especially in cases of serious injury, consideration should be given to calling an air ambulance asset that has a doctor as part of its crew configuration and who can, therefore, be deployed early to initiate advanced casualty medical management (such as administering an anaesthetic in the case of serious head injury), while a military helicopter is also called to assist the eventual evacuation of the casualty, by winching if necessary.

Indications for use of helicopters in mountain rescue

According to patient’s condition (the severity of injury or illness)

A wide variety of medical conditions will benefit from helicopter evacuation. A majority of requests for air ambulances are to trauma related incidents, though a significant number are also to medically related conditions (such as heart attacks, diabetics, epileptics etc).

- An example of one such call-out, to which an air ambulance was deployed, occurred in the Lake District in 2006 near Angle Tarn in Patterdale, when a 65-year-old male suffered a cardiac arrest while out walking with his son. The son plus two passers-by commenced CPR (cardiopulmonary resuscitation) and the air ambulance – which was based just six minutes flying time away – was called and landed nearby shortly afterwards. The defibrillator was deployed from the aircraft and used to convert his VF arrest into normal sinus rhythm and a cardiac output was obtained. Following this he was flown to the nearby district general hospital in Carlisle. The casualty went on to make a full recovery thanks to prompt bystander CPR and the swift use of a defibrillator by the air ambulance.

- A majority of trauma related call-outs are to lower limb injuries such as fractured ankles but, depending on the location, there is a significant number of severe multi-trauma cases each year. One such example, where a
Helicopters in mountain rescue
RAF and Air Ambulance

Helicopters made a significant difference to the outcome, occurred again in the Lake District a few years ago where a 35-year-old male slipped on ice while ascending Sharp Edge, Blencathra, falling approximately 100 feet onto a rocky ledge and suffering a serious head injury plus fractured limbs and chest injury. He was combative and irritable due to the effects of the head injury but was held on the ledge by passing climbers.

An RAF Sea King helicopter happened to be nearby, about to commence a training exercise with the Patterdale Mountain Rescue Team. It was duly tasked to the incident, arriving on scene in less than ten minutes. The team doctor, team leader and RAF winchman were lowered to the casualty, performing immediate life-saving treatment where he lay before recovering him to the helicopter and then flying him to the nearest Trauma Hospital & Neurosurgery Centre in Newcastle. He arrived only one hour and fifteen minutes after the initial fall and began to receive expert specialist help. After a long period of in-hospital treatment and convalescence he went on to make an extremely good recovery, which was only possible because of his swift on-scene treatment and subsequent evacuation to a major specialist medical centre.

Safety

There are significant safety issues surrounding helicopters and this should be considered as one of the most important factors when tasking and using this resource. However, the bottom line here is that the pilot of the helicopter has the final say and ultimate decision-making role during mountain rescue operations. All decisions regarding safety aspects during a rescue manoeuvre should be deferred to the pilot of the aircraft. Due to the diversity of aircraft used, it is very important for mountain rescue personnel to familiarise themselves with the safety aspects of the different helicopters used in their area by use of joint training exercises etc. If this is not readily possible, then they will need to be led and guided by members of each individual aircraft during the rescue operations and follow precisely what they are being shown or told. However, as a general rule the following principles apply to all helicopters:

- In preparation for incoming helicopters landing, prepare a circular area sufficient to give ample clearance from the main rotor disc and tail rotor, including the removal of any loose debris or the tying down of items too big to move.
- Do not approach any aircraft until given the thumbs up sign by the pilot, especially if the rotors are still turning.
- It is generally best to wait for a member of the crew to depart the aircraft and approach your position.
- Never approach the aircraft tail rotor/boom at any time, especially if the rotors are still turning.
- Generally the best line of approach to a helicopter is from the side, if possible on the side where the main door is located.
- When approaching an aircraft that still has the rotors running, always wear a helmet.
- On embarking a helicopter, wait to be shown where to sit by a member of the crew and apply seatbelt (either lap belt or full four point harness), wear headphones/ear protection if shown by crew member.
- Do not unclip belt/harness and disembark helicopter until told to by crew member.
- In the unlikely event of an in-flight emergency, follow the instructions given by the crew members (eg. brace position etc).

Advantages vs disadvantages

Advantages

- Rapid deployment of medical skill and equipment to the scene of a casualty injured in the mountain environment, negating the need for lengthy approaches by walking in to the casualty site (which can take a long time in some situations). Assistance to MRT members, flying them and their kit more quickly to the scene.
- More rapid diagnosis and treatment of casualties by the deployment of trained and experienced doctors and paramedics to attend to the casualty. The use of these skills means that more lifesaving procedures and interventions
Helicopters in mountain rescue
RAF and Air Ambulance

(such as anaesthetics, chest drains, limb splintage and manipulations) can be applied to the casualty at the scene, and certainly long before they reach hospital. This could therefore potentially reduce the mortality and morbidity of individual casualties.

- Easier and quicker extrication of the casualty by means of a winch attached to the helicopter.
- The provision of a means for a fast and gentle transport of the victim to the most appropriate medical facility (particularly in the case of significant injury such as head injury/spinal injury), even if this might be some distance away from the initial accident.
- Ability to transport the casualty to a hospital which is most appropriate to serve their needs (Trauma centre, burns unit etc).

Disadvantages

- May be limited by weather or access to casualty within flying safety limitations as defined by HEMS or Civil Aviation Regulations.
- Some helicopters do not have winching or night flying capabilities.
- Depending on the type of aircraft and the space within the cabin, more medical intervention may be required before loading onto the aircraft, especially in case of smaller aircraft such as the Bolkov type.

The future

The future of helicopters in mountain rescue is being discussed in earnest at present, especially in the UK where there is no nationally funded rescue service at present, apart from the RAF and coastguard services. In terms of operational capabilities, a lot of the recent discussions are focusing on and are taking the lead from European Emergency Rescue Services (e.g. IKAR MEDCOM), where helicopters are in regular use.

Standards are being set which the emergency services in the UK will no doubt be required to follow. These regulations will dictate training and operational requirements for the future of mountain rescue helicopter services. This will include guidance regarding medical equipment used according to international standards, rescue equipment including winch and/or fixed rope capability, load and space capacity and Helicopter Emergency Medical services criteria.

Unfortunately at present there is a lack of standardised key performance indicators in the literature for pre-hospital care. The Healthcare Commission defines four for the UK ambulance services, but these are all dispatch to arrival time related (except the fourth, which is time to thrombolysis) and have little to do with clinical care.

UK HEMS is actively pursuing some clinical benchmarks and methods of reliably assuring them. The aspiration of clinical excellence in pre-hospital care has been difficult to realise for many years. An over emphasis on the ‘transport’ element of patient care, response times and simple belief that the standards of clinical care in emergency situations can be compromised simply because the situation was an emergency have hampered clinical thinking and standards. However, experience tells us that much of the work of the UK’s helicopter air ambulances is highly predictable, easy to train for and ideally suited for the same standards of governance that exist in hospital and in non-emergency situations.

The governance framework embraced by the UK HEMS at present aims to produce clinical excellence through many routes: the adoption of best practice, clinical and non-clinical audit, clinical and non-clinical risk management, development of a shared mental model through multi-professional meetings and operational guidelines, regular peer review and clear lines of medical accountability.

This framework is being developed and is entitled the HEMS Charter. The charter aims to support clinical practice in individual organisations by providing a minimum benchmark and framework for a clinical governance structure. The charter embraces clinical governance through the following headings:

1. Human Resources
2. Clinical Audit
3. Best Practice
4. Risk Management
5. Competency Based Training, Appraisal and Revalidation
6. Organisational Structure
7. Core Documents
8. Information Governance

It is hoped that in the future all air ambulances will adopt and adhere to such standards of practice in the UK.

In the Lake District, important discussions have taken place in recent years and principles established regarding the calling out of helicopters and coordination of their use in the mountain rescue environment. This, hopefully, will
establish a precedent for future plans involving helicopters in mountain rescue. However, little discussion has taken place as yet regarding clinical governance and standards of practice, though hopefully with the development of the likes of UK HEMS, such issues will be tackled in the near future.

A recent review in 2000 suggested that a way forward might be to develop a designated Mountain Rescue/Lake District Rescue helicopter. This view seemed to be developing more impetus in recent years when there has been some doubt about future arrangements with the RAF to provide rescue services as the Sea King helicopters reach the end of their working life. At one stage it was thought there would be a new arrangement with a private provider to supply a new Sikorsky type helicopter to replace the RAF’s role but, at the time of writing, this is now not thought to be going ahead.

In the Lake District, important discussions have taken place in recent years between air ambulance organisations, the RAF, the ambulance service and the police and principles established regarding the calling out of helicopters and coordination of their use in the mountain rescue environment. This hopefully will establish a precedent for future plans involving helicopters in mountain rescue.

There are also big plans being discussed regarding governance issues and standard operating procedures. This would include the laying down of agreed policies about how helicopter operations are carried out from flight plans through to medical interventions and how these interface with mountain rescue. This would also include training, hopefully together with mountain rescue teams and other services.

On a similar vein, and after recent experiences with several major incidents that have occurred in the UK (eg. Cumbrian floods November 2009, West Cumbria shootings June 2010, Grayrigg Train crash 2007), groups involved in planning for future major incidents, after recognising the import role helicopters play at such incidents, are discussing how best to include helicopters, whether air ambulance or military, in such future events.

Summary

The main aims of using a helicopter in the mountain rescue environment are:

- To provide, as fast as possible, access for a rescue team with appropriately trained medical personnel, according to local situations
- To provide necessary medical diagnosis and treatment on site,
- To provide fast and gentle transport of victims to the appropriate medical institution.

The role of the helicopter is continuing to change and evolve as developments in the various helicopter systems are developed but one thing is certain – helicopters are here to stay and are likely to form an increasing role in the rescue of casualties from the mountains.

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