

Medical Ethics in Mountain and Wilderness Medicine

S Stokes¹, S Mackenzie², C Thomas³

¹Locum SHO in Emergency Medicine, Leicester Royal Infirmary, Infirmary Square, Leicester; ²Registrar in Emergency Medicine, Royal Hospital for Sick Children, Sciennes Road, Edinburgh; ³SHO in Paediatrics, Macclesfield District General Hospital, Victoria Road, Macclesfield.

Introduction

Medical Ethics comprises four main principles which, in combination with medical law, support medical decision making and management [1]. The hospital and general practice environment in which these principles have in the most part been tried and tested, stand in contrast to the mountain environment in which wilderness doctors practice. Thus, the question arises as to whether these principles are still valid and what specific challenges mountain environments may provide to the application of these ideas. Do high altitude settings provide an exile from common ethical doctrine or should they merely be seen as a doctor's surgery with a better view? Ethical issues occur at all stages of expedition planning and execution. This article attempts to address these in the order they may arise.

The Four Principles

"First do no harm" or "*primum non nocere*", remains an important principle irrespective of the time or place [2]. In hospital medicine, harm can be done in innumerable ways by over-investigation, incorrect or excessive treatment or errors of omission. In the mountains, the advanced investigative tools that inherently have an element of risk (e.g. CT scanning, elective operative procedures) are not available and treatment options are extremely limited, which itself minimises potential harm. However, acting without sufficient knowledge of the condition or environment may nevertheless lead to harm.

Undertaking acts of "beneficence" or "doing good" in the mountains poses less of a challenge because the people requiring assistance are often in difficult circumstances and have limited alternatives for obtaining care. Minimal interventions, or simply advice, can be life-saving as long as the available resources and surrounding environment are amenable to the plan of care. In such hostile environments, a major consideration is 'failing to do good' – that is potentially, albeit unintentionally, causing harm by not acting in a necessary medical capacity when assistance is required.

Certain aspects of the third principle of "autonomy" remain steadfast despite the change in environment. That is, confidentiality, good communication, lack of deceit and informed consent are imperative. Other aspects, particularly surrounding decision making, are not so easily applied out of a controlled environment. The patients who should be making decisions about their healthcare, treatment and eventual destination (e.g. evacuation or continue journey) are biased and blinded by strong desires to achieve their initial aims (e.g. reaching the summit,

financial issues, time constraints) and by conditions that may impair their decision making ability (e.g. high altitude hypoxia). In these situations, autonomy may be influenced by mental capacity to make such choices and a formal capacity assessment may be needed before decisions are made by others (doctors, trekking leaders). An additional issue is that any decisions made might have implications for others in the mountains, which is not usually the case in regular practice –e.g. a patient with a serious condition continuing a trek may need a rescue later on endangering other trekkers and the rescuers.

The fourth principle of "justice" or the provision of equal, fair and accessible healthcare for all is extremely compromised by the remote nature of many expeditions and the extremely limited resources. Whilst in theory all patients (including trekkers as part of an expedition, locals and others not related to the expedition) would receive the same level of care, medications, treatment and effort for life-saving interventions, resources have to be rationalised and the use of limited assets would have to be justified on a need basis. The ability to provide care may have to be justified according to whom the doctor has a "duty of care". Decisions that involve the allocation of limited resources may have serious implications in the mountains, including death. However, whether acknowledged by the clients or not, understanding of the limitations of wilderness medicine forms part of the acceptance of risk when participating in an expedition. As the International Mountain and Climbing Federation (UIAA) Mountain Ethics Declaration states, "*We must be prepared for emergencies and situations which result in serious accidents and death*" [3].

The four principles are said to be "prima facie" that is – binding unless they conflict with one another. In such circumstances, which arise fairly commonly, the doctor must choose between them. The methods used to choose between them are not specified, relying on personal moral theory and an awareness of the scope of the applications of the principles [4].

The Expedition

Any doctor who has accountability for the health and welfare of clients in remote environments has a responsibility to ensure that they have adequate knowledge and training in this specialised field [5]. Currently in the UK there are no defined standards that need to be achieved prior to commencing such a post. As the field of wilderness medicine expands and doctors appreciate the real and present potential for medico-legal litigation, it may be that all doctors wishing to practice in such circumstances must first prove more formal knowledge and commitment to the speciality, for example by passing the Diploma in Mountain Medicine [6].

Prior to the departure of any expedition, candidates are usually requested to declare pre-existing medical conditions. This has many purposes including preparing the doctor for

Corresponding Author: Dr Suzy Stokes, Locum SHO in Emergency Medicine, Leicester Royal Infirmary, Infirmary Square, Leicester, LE1 5WW.
Tel: 07814263092 Email: suzystokes@doctors.org.uk

potential problems, stocking the medical kit appropriately and, on occasion, excluding those whose conditions would pose a significant risk to themselves or others on the trip. As a result of a usually unfounded fear of having travel restricted, applicants sometimes elect not to declare significant conditions. This has a number of implications for the doctor, individual and group and raises the ethical question of the responsibility participants have for themselves and others. It is also the responsibility of each individual to obtain appropriate insurance so that any necessary treatment or evacuation is expeditious and does not adversely impact on others.

Medical indemnity in the mountain environment is a controversial subject. Particularly topical is the issue of UK medical indemnity companies not providing cover for British doctors treating American citizens in case of future litigation. This can be problematic for UK doctors working for expedition companies that have international clients, some of whom may be from the USA. In many circumstances the doctor will continue on the trip without full indemnity cover and have to rely on the good will of the client should problems arise. There have been no documented cases of American patients suing British expedition doctors to date, however in the current litigious culture this situation will undoubtedly change. Working in a volunteer capacity may provide some protection from litigation, however many expedition doctors either receive direct payment, or a discount in the trekking cost.

The issue of to whom a doctor has a duty of care is also not clearly defined. When working as an expedition doctor the duty of care will include the trekking clients, but should also extend to the porters, guides and other support staff. The doctor may also feel their duty of care encompasses unwell people encountered *en route*, however some trekking companies may have an issue with the doctor utilising limited medical supplies and equipment for patients out-with their specific group. The 'good Samaritan' principle would certainly include treating such patients in remote environments where alternative medical facilities may be hours or days away, and lack of prompt treatment could be life threatening. The doctor must also acknowledge the issues surrounding commencing a treatment intended for long term benefit (e.g. anti-hypertensives to control raised blood pressure) when they will not personally be there to monitor side effect, efficacy and compliance.

Decision making in remote areas may be hampered by a lack of clearly defined guidelines specific to the expedition environment. While some topics such as high altitude sickness have comprehensive and up to date protocols, the majority of medical ailments have hospital specific guidelines which may not be practical or applicable on an expedition. For this reason, flexibility and adaption are essential and research in remote environments becomes imperative to establish an evidence base around which more specific guidelines can be formed. In addition there is a body of doctors who sub-specialise in expedition medicine who can provide personal advice or a consensus opinion that should be sought where possible, appreciating that accessibility from remote locations may be an issue.

In extreme conditions, such as high altitude, decision making can be further compromised by the effects of the environment on the doctor involved [7]. The hypoxic climate, unfamiliar surroundings and limited equipment, coupled with complex decision making, where the welfare of the entire expedition may be affected by the treatment and evacuation of one individual can

be a challenging and daunting prospect for any doctor. Indeed the doctor themselves may be suffering adversely from altitude sickness or other illness, further impairing their decision making ability. With limited local medical resources, and commonly only one medic per expedition, the question of who looks after the doctor when they become unwell is often not postulated until problems arise in the field [8]. Recognition of the limitations and complexities of expedition medicine is imperative when analysing morbidity and mortality outcomes in this extreme environment.

Equipment and medication selection for expeditions requires careful consideration. Academic but surmountable concerns include weight and cost (both of the device and customs for importation) – particularly where the expedition is self sufficient. Medications can be selected based on the client group (i.e. knowledge of past medical history) and previous trips' usage. Sufficient stock should be carried to treat the entire group if required (within reason) e.g. an outbreak of gastroenteritis, unless there is a definite possibility of mid-expedition resupply. The physician should be familiar with any medications that are carried – i.e. the dosage, frequency of administration, indications, contra-indications, side effects and occasionally antidote. Certain medications, such as opiate based analgesia, may be restricted in selected countries, where its importation may result in imprisonment.

Equipment selection will depend on the size, nature, duration and proximity of the expedition to medical assistance. A large proportion of non-sterile medical equipment can be improvised from other kit e.g. splints from walking poles or stretchers from trees. This negates the need to carry bulky specialised kit. It is sensible to carry more specific sterile supplies for IV access and fluid administration especially in countries where blood borne infections are high risk. All such implements are single use only and will require safe disposal. Even when there is no medical professional, simple alternatives such as NG tube to give rectal fluids are possible. More advanced supplies such as thoracostomy sets may be taken if the doctor is familiar with their usage.

Equipment that relies on electricity or batteries for operation will be limited in usefulness. Electricity supply is sparse and unreliable in remote environments and the operative life of batteries is severely impaired in cold weather. Repair and maintenance of devices would be difficult and the individual would have to be responsible for ensuring it was in good working order. Another relevant consideration is the implications of any result that an investigative device might give. Could the results be acted on? Will the result alter the decision making process or have any implications on the outcome? If the expedition decides to carry a defibrillator then the doctor should also consider their ability to provide ongoing life support. Even in a hospital environment, the outcome following cardiac arrest is poor. In the wilderness, where traumatic causes for cardiac arrest would be more common, successful resuscitation would be unlikely.

Remote health posts do have the advantage of storage space for larger equipment and more extensive pharmacies, however resupply of medication and electricity supply can still be an issue. Some medical posts rely on solar or wind power, which may be compromised during longer periods of bad weather, and contingency plans for operating without electricity must be in place, for example Gamow bags utilised instead of oxygen concentrators. Even in the more convenient environment of the remote medical post equipment choice must be carefully considered. A defibrillator in a medical post that has insufficient

electricity to run a ventilator, and is many hours from evacuation to the nearest definitive care centre, may only create further ethical dilemmas for the doctors involved without making any true difference to patient outcome.

Following treatment and stabilisation of the wilderness casualty, evacuation becomes the priority. Many remote areas can only be accessed by air, and helicopter rescue can be an efficient, albeit expensive, rescue. In certain areas of the world, the majority of helicopter rescues will be undertaken by commercial companies, who will only attend if payment is guaranteed and are rarely specifically adapted for medical rescue. On occasion, the individual who calls for the rescue may receive a substantial commission and the motive for requesting evacuation may therefore not be entirely altruistic. Where charity or military organisations are involved (e.g. coast guard / mountain rescue) aircraft are more likely to be appropriately outfitted and not delayed by payment authorisation. Evacuation by land may be limited by availability of personnel to carry a patient and the hostility of the environment, hindrances including weather, terrain and distance. This raises the question to what extent should the safety and wellbeing of the group be compromised to facilitate the rescue of an individual? If a decision is made to split the group, the medic will have to justify the allocation of remaining medical resources. Consequently part of the team may then be left without medical personnel to attend to their needs.

Medical ethics in mountain and wilderness medicine is a new and evolving field, which currently poses more questions than provides answers. Whilst it is not an exile from common doctrine and the four main ethical principles remain relevant, adaptations

must be made when they are applied in remote environments. As increasing numbers of people venture into such environments, inevitably the demand for doctors with knowledge and experience in mountain medicine expands at a corresponding rate. Expedition medicine is an exciting and challenging environment, which provides an unparalleled opportunity to practice medicine that relies on clinical skills and acumen. With increasing research opportunities and demand for this medical sub-speciality, further debate surrounding its diverse ethical dilemmas is both inevitable and appropriate.

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