Clinical

Injuries and medical issues on the Zambezi “Great River”

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Abstract

We report the injuries and medical issues incurred during a rowing expedition conducted along the Zambezi River in May 2011. All injuries and illnesses requiring medical intervention were recorded during a 30-day expedition. There were 22 rowers and 8 support staff sustaining 32 injuries, an injury incidence of 36 per 1000 days. We discuss the medical issues regarding conducting an expedition along the Zambezi and the medical preparation and education required to successfully support wilderness expeditions.

Introduction

The Zambezi River is the fourth longest river in Africa (1). During its course it flows through six countries and is 2700 km long, descending from an altitude of 1500m to the Indian Ocean. The upper part of the river is sparsely populated and in order to conduct an expedition along the Zambezi it is important to have medical support staff familiar with working in the wilderness and the diverse medical situations that can be experienced there (2).

In May 2011 an expedition was conducted to row along the Zambezi River, starting on the Zambian/Angolan border and finishing at Victoria Falls on the Zimbabwean border. The trip covered 1000km, through rapids, flood plains and waterfalls. The composition of the team was 22 rowers and 8 support staff, with an age range of 18-62 years. The level of experience in the team varied from very experienced rowers to complete novices. The expedition took place over 30 days; medical cover for the expedition involved one paramedic on the expedition, with pre-identified host nation doctor-led facilities available to review patients at certain points on the expedition. Prior to conducting the expedition a training weekend was organised which involved survival lectures, team building exercises, and climatic and region specific medical lectures. All attendees were screened with a health questionnaire, and pre-existing medical issues or medication were discussed with the medical team.

We present the injuries and medical issues that were experienced on the expedition and discuss other administrative issues, in order that medical staff planning to support expeditions in future can target their training and preparation.

Methods

All injuries sustained by the 30 personnel on the expedition were recorded, including basic epidemiological data. Simple blisters on hands were excluded from the analysis as these were considered to be minor self-treated injuries.

Discussion

It has been previously estimated that the incidence of illness and injury on wilderness courses and expeditions is in the region of between 2.26 per 1000 days and 3.8 per
1000 days, and the mortality rate can range from 0.28 to 2.0 per 100,000 days (2, 3, and 4). Our incidence of injury and illness is higher than previous studies, which may reflect other papers’ inclusion criteria. Gentile (3) only included cases which required a day off activity, evacuation or more than simple first aid; these criteria exclude some of the more minor injuries. These injuries are still important when assessing the amount of kit that will be required and other exercise considerations. Other literature identified only those injuries severe enough to require central reporting, and therefore may have missed the more minor injuries which we have included (2, 4). Another factor which may explain our high incidence rates is that most of the literature is based predominantly on hikers in a wilderness area (2); these activities may be less physically demanding and dangerous than negotiating the Zambezi.

The incidence of soft tissue injuries and other athletic type injuries in our population was lower than other studies (3,4), which may reflect that those papers concentrated on hiking and rock climbing, which has more impact related injuries than rowing. In contrast, our skin infection rate was higher than previously reported, which may reflect that these other papers are based on experiences in temperate climates rather than the tropical environment of the Zambezi, which possibly predisposes to a higher skin infection rate after minor skin trauma.

At 22% our proportion of gastrointestinal symptoms and illness is similar to the 24% reported by Leemon (4). However, on closer inspection of their results they noted that a significant improvement in the overall incidence of gastrointestinal symptoms was achieved by the implementation of simple hand hygiene activities from 0.4/1000 days to 0.2/1000 days. In a study of walkers on the Appalachian Trail (5), an incidence of 4/1000 days was noted in hikers overall, but it was noted that poor water hygiene practices increased the incidence of gastrointestinal-type illnesses. Our incidence of gastrointestinal illness was higher at 8/1000 days, which may reflect the proximity of the team to water, and the difficulties of maintaining good hygiene and preventing contamination in this environment. It may also reflect that the authors of the Appalachian Trail study relied on self reporting post-expedition, rather than actual attendance rates. In order to try to reduce the risk of gastrointestinal disease, we included basic hygiene lectures in the medical brief; despite this we still saw a high rate of gastrointestinal disease, and we would therefore encourage medical staff covering similar expeditions to factor this into their planning cycle. We would suggest that increasing the importance of basic hygiene, the provision of simple interventions like alcohol gel, isolation if possible of infected patients and meticulous water hygiene may help medical staff avoid rates as high as ours.

Two of our cases were Schistosomiasis (Bilharzia) despite all individuals being given a thorough brief on waterborne diseases and Schistosomiasis in particular. Schistosomiasis is a chronic disease that is common in this area; it can be acquired by swimming in infected water and has a number of non-specific signs and symptoms including abdominal pain, cough, diarrhoea, fever, fatigue and dermatitis.

Unfortunately during the trip all participants were in and out of the water on a regular basis. Whilst the river was generally fast flowing, so reducing the risk of contamination, two patients developed numerous skin vesicles and gastrointestinal symptoms after a few days on the Barotse flood plain; both patients were treated with Praziquantel and upon returning from the trip were diagnosed as having Bilharzia. Whilst the lectures did not prevent this illness, it certainly ensured that all participants were on the look-out for the signs and symptoms of the disease and allowed early diagnosis and treatment. We would therefore

<table>
<thead>
<tr>
<th>Medical Condition</th>
<th>Number</th>
<th>Percentage of Total</th>
<th>1000 Day Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin Infections</td>
<td>8</td>
<td>25%</td>
<td>8.8</td>
</tr>
<tr>
<td>Gastrointestinal Conditions</td>
<td>7</td>
<td>22%</td>
<td>7.8</td>
</tr>
<tr>
<td>Trauma</td>
<td>7</td>
<td>22%</td>
<td>7.8</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>5</td>
<td>16%</td>
<td>5.6</td>
</tr>
<tr>
<td>Ear Nose and Throat Infections</td>
<td>2</td>
<td>6%</td>
<td>2.2</td>
</tr>
<tr>
<td>Respiratory Infection</td>
<td>1</td>
<td>3%</td>
<td>1.1</td>
</tr>
<tr>
<td>Heat Injury</td>
<td>1</td>
<td>3%</td>
<td>1.1</td>
</tr>
<tr>
<td>Insect/Animal Bites</td>
<td>1</td>
<td>3%</td>
<td>1.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trauma</th>
<th>Number</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lacerations/Abrasions</td>
<td>3</td>
<td>Returned to Rowing</td>
</tr>
<tr>
<td>Partial Burn to Face</td>
<td>1</td>
<td>Returned to Rowing</td>
</tr>
<tr>
<td>Achilles Tendonitis</td>
<td>1</td>
<td>Returned to Rowing</td>
</tr>
<tr>
<td>Calcaneal Fracture</td>
<td>1</td>
<td>Required Surgery in UK</td>
</tr>
<tr>
<td>Ankle Sprain</td>
<td>1</td>
<td>Returned to Rowing</td>
</tr>
</tbody>
</table>

1.

### Table 1 Injury/Illness Types

### Table 2 Break-Down of Trauma and Outcome
advocate a thorough medical estimate before embarking on expeditions, and that lectures to participants be tailored to deal with prevalent diseases in the area.

At the start of the last week of the expedition, one of the media team jumped from a height of over a metre into the river to cool down. He hit the river-bed and, clinically, sustained a calcaneal fracture. At this stage the expedition was 3 days’ journey from a clinic with an x-ray, and 2 days away from an airstrip, so the decision was made to splint the limb with a Sam splint and a compression bandage. The patient was given simple analgesia and kept the foot elevated where possible. Crutches to aid his mobility were fashioned from branches. Three days post injury the patient was taken across the border to Botswana where the local doctor interpreted an x-ray as showing a soft tissue injury, although the expedition paramedic felt that it was probably a fracture. On return to the UK, a calcaneal fracture was confirmed radiologically and the patient underwent internal fixation of his calcaneum. Six months post injury the patient was walking with a limp, requiring a stick, but by 12 months the patient was able to run and ski.

Specific lectures delivered during the pre-expedition training covered other possible scenarios; we discussed the management of drowning, which although rare, is higher in those indulging in water-sports (6). We also delivered lectures on malaria and the prevention of bites and stings, although our risk analysis and literature review (7) suggested that insect bites and stings would be rare, an assessment which was shown to be correct (bites and stings constituted 3% of all injuries). However the significance of even a single bite should not be overlooked, as the management of a severe haemorrhage, early control could be obtained. It was also necessary to give advice on what to carry in personal first aid kits, where the participants were given advice similar to that provided to Royal Marines in basic training.

Whilst there are articles advising what medical equipment and medication is required on expeditions (8, 9), requirements vary depending on the type of expedition and the people involved. We addressed this by having a pre-expedition questionnaire, which allowed the medical staff to tailor their standard medical kit. Much of the knowledge about what to take and what not to take comes from prior experience, and we would advocate novices in expedition medicine either to work with experienced medical practitioners or to attend courses educating them in the pitfalls and providing them with tips prior to deploying, as remote expeditions need to be self-sufficient from the outset.

Conclusion
Covering and participating in remote wilderness expeditions is not without risk, and a variety of illness and injury can be expected. In this expedition, background research on the Zambezi, the endemic illnesses and medical facilities available, was conducted by using the Internet, contacting the British High Commission in Lusaka, and studying previous expedition reports. A medical plan was developed by researching the hospitals en-route and rescue services available. As stated by Shaw (10) this is a vital part of pre-expedition preparation and it is often a complicated evolution. In remote parts of Africa, getting information on the standard of some of the clinics, hospitals and airstrips can prove difficult, as phone numbers are often not in use and information, when available, is often out of date.

We believe that adequate preparation, along with good medical education and research prior to deployment, can mitigate the risks encountered on expeditions.

References

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