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Travel Medicine and Extreme Endurance Events

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The Jungle Marathon is an extreme adventure race which takes place every year in the Para region of Brazil. Competitors race 230km through some of Brazil's toughest jungle, carrying everything they might need to live for 7 days in a rain forest. This includes their food, clothes, a hammock, basha and mosquito net and a few personal items, such as an MP3 player and some tasty snacks to help them maintain their sanity. One could question the participants' level of sanity prior to starting the race, as this event pushes people to the limit of their physical abilities, and with a 10-20% drop-out rate, it pushes many past their coping capacity.

The race takes part in the rainforest bordering the shores of the Tapajos river, a 1400 mile tributary of the great Amazon. The Tapajos Forest is the second largest conservation area located in the region, with over 1400 families living in 29 traditional communities along its shores, surrounded by a wealth of biodiversity.

Each day the competitors start off at around 6am, just as the sun begins to take the chill out off the night air, but before the solar rays shine down with the fierce intensity all too familiar at these latitudes. Not only do the competitors have to contend with this heat, but as the hours go by the humidity becomes stifling.

The race is split into six stages, ranging from 18 to 90km in length. Each stage is then divided up with between three and nine checkpoints depending on the overall stage length. Check points are manned by a number of staff with differing roles, and often somebody from the local community. The penultimate stage, covering 90km, takes place over a 36 hour period and for some of the competitors who make it past checkpoint four before 16:45, this will involve a run through the jungle in the dark. The time limit imposed at this point prevents individuals entering an area of jungle, at dinner time for the higher than average jaguar population!

From a travel and expedition medicine standpoint this event presents a colossal challenge, arguably encompassing most aspects of our speciality. Firstly there are approximately 60 runners of varying nationalities, backgrounds and experience, all of whom require appropriate pre-trip advice and Doctor's certificates demonstrating their fitness to participate. Much of this advice is gained through peer-to-peer forums and discussion with previous competitors, some of whom were returning for the third time. As one could predict there was a considerable variation in pre-trip vaccinations and anti-malarial regimes given to competitors. This demonstrates not only individual requirements, but arguably the ongoing variations in experience and knowledge present in travel health practice. However even this pre-trip screening does not prevent the odd surprise, with some competitors arriving at the pre-race medical briefing

disclosing such information as ‘they are waiting for test results following an arthroscopy’, or ‘a course of chemotherapy recently finished’, and even ‘cardiac stenting within the past 4 months’. Following these disclosures the issues raised are considerable. For example, can one provide appropriate care for individuals following such surgery; do these individuals really know and understand the risks; is there an option to withdraw a competitor out of the race at this late stage and what if they refuse?

Medical cover was provided by a highly skilled and experienced team comprising of an Emergency Department (ED) Staff Grade (race Medical Director), two ED Registrars, an ED Charge Nurse and three fully qualified Paramedics. All but two of the medical team had provided event cover before, so knew exactly what to expect. This experience is vital, as many would-be expedition medics often find themselves in unfamiliar situations, where they are unprepared for the tasks expected of them or the conditions in which they have to live.

A list of medical equipment needed to cover such an event could be incredibly long and as with any expedition there needs to be a balance between the ideal, catering for every eventuality, against practicality, availability and cost. Other factors to be considered are the fact that some medications, such as codeine based analgesics and benzodiazepines, have controlled status in countries outside of the UK, as is the case in Brazil. The medical kit was tailored to both ‘worst case scenarios’, having oxygen, airway management apparatus, fluids and a defibrillator, but also with equipment needed for the ‘bread and butter’ work - namely foot care.

Medical cover provided during the race comprised a medic at each check point, two at the finish and one on standby with a small rescue/transfer launch. The nature and location of some stages meant that most medics were taken out to their checkpoints the night before - spending a night in the jungle soothed to sleep by the sound of howler monkeys and cicadas, to the uninitiated is a most unnerving experience! On longer stages medics leapfrogged from early checkpoints to the finish, thus enabling greater cover and in the process, creating a ‘medical rota’ - proving that one cannot escape to off-duty even in the depths of the jungle!

Competitors are on the whole highly trained and physically fit individuals capable of looking after themselves with an awareness of their limitations. However this motivation can be a double edged sword as most are willing to push themselves to the limit, ignoring pain and discomfort in the process. The pre-race confidence tangible prior to the start was soon shattered by the end of day one, as competitors soon realised running in a jungle is not like anything they had done before.

As humidity approaches 85%, sweating ceases to be effective. However, the body continues to sweat and under these conditions and activity, loses fluid at a rate measured in litres per hour. Electrolyte loss through sweat in the initial stage is commensurate to this fluid loss and will only decrease after a period of adjustment. This acclimatisation increases the reninangiotension-aldosterone system, enabling kidneys and sweat glands to retain sodium whilst maintaining significant fluid output. Acclimatisation takes between 2 to 3

weeks, occurring only with physical exertion which means that having arrived 2 days before the race, this particular group of athletes are at an increased risk of developing heat illness. In an effort to combat salt depletion, many runners were supplementing their diet with salt tablets or capsules. Although there are good arguments for their use, they are not without their side effects - the most noticeable being nausea and gastric irritation. As the race progressed some runners opted to use regular salt, added to their freeze dried expedition food.

Although heat related illnesses were the major concern of the medical team, the most common problems encountered were soft tissue injuries, wear and tear. These began to manifest themselves as the race progressed with many hours spent in the evenings draining blisters, removing toenails and debridement of wounds. Management of competitors' wounds in the jungle requires skill and determination, as dressings do not stick, become filthy within minutes of being applied and do little to prevent further contamination. The dressing saviours were a combination of 'Friar's Balsam' and zinc oxide tape. When applied to the skin and left to go tacky Friar's Balsam aids the adherence of zinc oxide tape, steri-strips and other dressings. However as one can imagine, they required regular attention.

Considering the event's nature and location, only one serious medical problem occurred - a competitor with heat stroke. After cooling and fluids he was evacuated to the regional hospital at Santarem where he underwent blood tests, a CT scan and had a period of close observation. At initial glance this evacuation sounds straight forward, however it took over five hours, at night, in rough conditions along a jungle river and involved several transfers, throughout which the patient remained unconscious.

A situation such as this raises *important issues regarding pre-trip preparation* that can be extrapolated into the wider travel health arena. For instance: do those travelling to environments such as these really understand the issues associated with medical evacuation; do they/you have an awareness of the medical facilities available to them; are they aware of the possible length of time an evacuation might take; have they compared available medical cover with previous endurance events run elsewhere and is this comparison appropriate. Although these issues are pertinent to all who travel, their importance is arguably greater to those participating in events such as this, as they are more likely to need them.

With the race complete, runners departed for their home countries and the comfort of a normal bed and some proper food. Following their return several required a course of antibiotics for infected feet, a familiar problem associated with this kind of event. A post course e-mail from the medical team to all who were involved described signs and symptoms of possible infections and reminded individuals to mention their recent travel if seeking medical follow-up.

Extreme endurance events such as the Jungle Marathon present major challenges to healthcare providers before, during and after travel. Although difficult, they highlight the need for Travel Health specialists to have a good awareness

of the issues which competitors might face and which they might not have considered. This article has hopefully highlighted some of these issues and will stimulate further reading.

Recommended Reading:

Johnson, C., Anderson, S., Dallimore, J., Winser, S., Warrell, D. (2008) *Oxford Handbook of Expedition and Wilderness Medicine.* Oxford: OUP (ISBN978-0-19-929661-3)

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