MEDICAL PRACTICE

*Expedition Medicine***South east Peru I: planning and medical care of expedition team**

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Towards the end of 1982 a team of 28 service and civilian personnel including two women travelled from Britain to the upper reaches of the Amazon river in the Andean foothills of Peru. We describe the preparation for the total health care of the team and the follow up after the expedition.

Personnel

The expedition, led by Squadron Leader Michael Cole of the RAF, was under the auspices of the Joint Services Trust. Most of the team members came from the three armed services, but a few civilians were recruited for their specialist knowledge. The age range of the team members was from the mid-twenties up to 59 years. All were physically fit, however, and undertook fairly rigorous training programmes in the months leading up to the expedition so that they were in first class condition when they left Britain at the beginning of September 1982.

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Preparation

Nine months before leaving Britain, each team member received a memo drawing attention to various medical requirements. Each person had to produce evidence of a recent full physical examination, chest x ray examination, and dental examination. Those with a negative reaction to the Heaf test were advised to have a BCG vaccination. Each member was asked to list any relevant history, allergy problems, and any current medication.

In addition to the standard typhoid, cholera, and tetanus vaccines, we advised protection against rabies, polio, yellow fever, hepatitis, and tuberculosis. The incidence of rabies in the area to which we were going was high, the usual mode of transmission being from the bite of an infected vampire bat. Consequently, everyone received two injections of inactivated rabies vaccine at a month's interval to ensure protection for up to 12 months. The area also has a high incidence of hepatitis. The gammaglobulin was given a week or so before departure, as its benefit is relatively short lived; each expedition member received a dose of 3.4 ml. Yellow fever vaccine ensures protection for 10 years. Dapsone (Maloprim) was the antimalarial preparation taken by the whole team; we suggested that for the two weeks before leaving England and for four weeks after returning to England the tablet should be taken once a week on the same day.

From then on an up to date medical record for each member was available for use throughout the expedition and afterwards if required. The medical proforma included personal details such as name, date of birth, service number, and contact address as well as details of the full physical examination, the chest x ray film and result, the blood group, and any relevant medical history, including allergies. Lastly, it included a column of the vaccination programme, together with dates when courses were started and completed.

We found a small leaflet, which, when folded once, fitted into the passport, listing 10 helpful hints for preserving health in the

tropics, a very useful acquisition. The advice was basic—for example, fluid and salt replacement after sweating profusely, or after a bout of diarrhoea and vomiting.

We met on four occasions as a team before going to Peru, and though these were ostensibly briefing sessions when the leader was able to communicate plans and strategy, we took the opportunity to prepare the team medically. At each session we vaccinated members, and on one occasion we took blood samples from each member; these samples were to provide a baseline for comparison after the expedition should it prove necessary. We tried to explain every procedure to the team, believing that we would be more likely to have their cooperation if they understood the reason for a particular action. These sessions helped us to get to know one another and to build mutual trust.

Personal medical kit

We issued a medical kit to each member of the team so that they could treat themselves in the absence of a doctor—for example, if isolated in the jungle. The various tablets, creams, etc, were labelled with their function. This kit was carried on the belt of each person each time they made a river trip.

The contents of the kit were: tube of antiseptic cream (35 g); selection of elastoplast air strips; salt tablets (100); water purification tablets (100); insect repellent gel (22 g size); ant destroyer powder; paracetamol tablets (20); senna fruit (Senokot) tablets (24); chlorpheniramine maleate (Piriton) tablets (12) for insect bites, sunburn allergic reactions; diphenoxylate hydrochloride and atropine sulphate (Lomotil) tablets (20) for diarrhoea; tetracycline tablets (16) for infections; dapsone (Maloprim)—one tablet each week protects against malaria (issued already); metronidazole (Flagyl) (15) for dysentery; chloroquine (10) for malaria; morphine (one ampoule) for pain relief in case of accident.

Base camp

We travelled from Gatwick to Lima, the capital of Peru, then over the Andes to the jungle area of Peru and set up our base camp on the banks of the Amazon's largest tributary, the river Ampurimac, opposite a shanty town called San Francisco which could be reached by a bridge. Housing in the town was substandard, after a tropical rain storm the main roads became quagmires, and despite having a hospital, albeit only 17 beds, the town did not have a single latrine. Instead, the river took away most of the waste material. Bacteriological analysis of the water indicated an extraordinarily high coliform count, plus protozoa and evidence of other contamination. As well as the dangers from infected water supplies, other dangers included snake bites, bites from vampire bats carrying rabies, scorpion stings, tarantula spider stings, and bites and stings from numerous other insects. So vigilance was called for and the responsibilities on the medical team were considerable.

WATER SUPPLIES

A clean, safe, and reliable water supply at base camp was essential. We were fortunate in procuring a portable water filtration plant supplied by Stella-Meta Filters, a division of Permutit. It consisted of a stoma filter, engine, pump, and a chlorination mixture bottle. In the chlorination system one 5 ml spoon of Ficlora Clearon chlorination powder is mixed with water in a 2 l polyethylene bottle and the solution is drawn through a flow meter at a manually adjustable rate and into the system by the pump suction. The aim is to produce a chlorine residual of one to two parts per million in the filtered water. It was the responsibility of one of the medical officers to test the water at intervals. During the whole of the expedition we had no major outbreak

of gastroenteritis, and we believe the water filter unit played a large part in keeping us free of "Amazon abdo."

Nevertheless, on our trips to clinics up and down the river, when we were away for two and three nights and unable to take base camp water with us, we filled a large container with water and treated this with enough water sterilising tablets (Steritabs, Boots) to give a residual chlorine. The simple water testing kit described in the *Army Manual of Health* is adequate for assessment of residual chlorine. It cannot be emphasised strongly enough that a safe water supply is essential for the wellbeing of any expedition team.

CAMP ACCOMMODATION

Accommodation was in three or four man army tents, with a camp bed each. A mosquito net was essential, not only to exclude the mosquitoes and the obvious danger of malaria, but also to exclude the vampire bats, which might be carrying rabies. Ordinary fruit bats would come into our tents from time to time through the evening and night, and they were frequent visitors to our overnight clinic stops.

Insect repellent cream was of questionable value in discouraging mosquitoes and other insects. A white light in the mess tent at night, run from the generator, attracted hundreds of insects, whereas a yellow painted bulb reduced their attraction considerably. Every team member was encouraged to carry a good torch at night, even walking from one tent to another, to avoid stepping on a snake or other nasty objects.

LATRINES

We dug deep trench latrines below the camp and three sufficed for the three month period. In addition, we made a separate urinal pit. It was relatively easy to wash immediately on leaving the latrines, for the washing area was near. Water for washing we took from the river, allowed it to settle, and then chlorinated it to make sure it was relatively clean; everyone knew it was not safe for drinking or cleaning teeth.

COOKING AND CATERING

The cooking and catering arrangements were overseen by two expedition members, but daily rosters meant that many team members helped in cooking and preparation of food. In addition, we hired three local young men to help with kitchen chores, food preparation, and washing up. Hence we laid down strict guidelines about washing and scrubbing hands, and in the mess tent it was always possible to wash and disinfect hands by using two different bowls.

Medical programme

Each week the medical team made one visit up river that lasted three days, and one visit down river that lasted two days. Another day we walked to a village two hours away from base camp, in the heart of the jungle. Inevitably as we visited outlying villages and clinics our standards of hygiene in food preparation were not as strict as they were in base camp, but all the time the emphasis was on using only safe water and preparing food only when it was time to eat. One of the perks of working in the village clinics was that we were often given presents of fresh fruit, such as pineapples, oranges, mangoes, bananas, and papaya.

TEAM'S HEALTH

We had two major illnesses among the team of 28. Within a week of arriving at base camp, one of the engineers developed

fever, diarrhoea, and vomiting. The possibility of typhoid fever had to be considered, but an acute appendicitis seemed more likely. Because we had not equipped ourselves to operate—a decision we took before leaving Britain—and because there were no adequate facilities locally, we asked the British Embassy in Lima by radio for a plane to evacuate the patient. The embassy staff made immediate arrangements but because of bad weather over the Andes it was two and a half days before the plane arrived. All this time we were treating the patient conservatively with intravenous fluids, intramuscular antibiotics, and analgesics. When we had decided we could no longer postpone surgery the plane arrived. Within five hours a gangrenous appendix was removed in a private clinic in Lima, and the patient made a slow but full recovery.

The second major illness occurred towards the end of the time at San Francisco before the team made the 600 mile trip down river to Pucallpa. A tall strapping marine developed fever, headache, and general myalgia, accompanied by a mild gastrointestinal upset. There were no localising signs and no palpable spleen. There was increasing weakness and anorexia and a provisional diagnosis of typhoid was made. He responded to chloramphenicol but felt very weak and lethargic for a further two weeks. Despite intensive tests on his return to Britain nothing abnormal was found.

We had no serious trauma or psychological disturbances, and despite the fact that many of us were experiencing altitudes of 4267 m (14 000 ft) as we crossed the Andes, no one suffered true altitude sickness. We did, however, notice breathlessness on exertion at this altitude, cyanosis of fingernails, and mild headache, but there were no problems with pulmonary oedema or severe headaches.

After the expedition

After the expedition each member of the team was given a questionnaire (figure), which is printed in full. There were two parts and there has been negative feedback on part 2, except for the marine who had extensive tests on returning to Britain, but with no definite diagnosis other than typhoid fever diagnosed at base camp. Blood tests and stool tests have shown nothing remarkable to date. According to service regulations chest x ray examination will be undertaken six and 12 months after the expedition.

Conclusions

The medical care of any expedition needs careful consideration and planning, particularly if the location is both tropical and isolated. We were fortunate in having nine months' preparation as the expedition had been delayed because of the Falklands campaign. It would, however, have been possible to carry out all vaccination procedures, blood tests, physical examinations, and x ray examinations in four months or less. The briefing sessions organised by the leader of the expedition were valuable for carrying out tests and vaccinations as well as for instructing the team about maintaining general health in the tropics. It is essential to document each member's medical particulars, including vaccinations.

Once at base camp the medical team have to keep a careful watch on facilities such as latrines, cooking arrangements, personnel in the kitchen, etc, but by far the most important is a careful check on the suitability of the water supply. There is no need for a daily clinic, but the doctor must be available should a team member have a problem. Competence is vital and the ability to adapt to any situation is essential, particularly with the lack of facilities, but the team is also looking for a caring, pastoral attitude from their medical advisers. Follow up after the expedition is important and we believe the questionnaire helped us to assess our work both before and during the expedition.

PART ONE

How fit were you during the expedition?.....

 Did you miss any day through illness?.....

 Which medicines from your medical kit did you use?.....

 Did you consult any of the medical team about a specific problem?.....

 Were there areas where you wished you had been given medical advice?

Tear along the dotted line

PART TWO

ONLY TO BE SUBMITTED IF YOU HAVE TO
 CONSULT A DOCTOR FOR REASONS OTHER
 THAN STOOL TESTS AND ANTIMALARIAL
 MEDICATION IN THE FIRST FOUR WEEKS
 OF RETURNING HOME

What was the problem/illness?.....

 Were you admitted to hospital?.....

 How are you now?.....

Medical questionnaire completed by members of team after expedition.

We acknowledge the help and advice given by Dr D Morley, Institute of Tropical Child Health, London; Colonel Holmes, Royal Army Medical College, London; Miss V Collett, Community Health Department, United Mission Hospital, Tansen, Nepal; and the late Dr A Reid who gave us valuable advice about the snakes of the region and the precautions we should take.

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Should a young patient who has inadvertently been taking pizotifen malate (Sanomigran) during the first four to six weeks of pregnancy continue the pregnancy? Should she be offered termination or should amniocentesis be done so that if normal she could continue the pregnancy?

There is no evidence that pizotifen malate causes fetal abnormalities. Animal testing has shown no teratogenicity. The drug was introduced in Britain in 1975, and the manufacturers have received no reports of adverse effects in pregnancy. Nevertheless, their recommendation that pizotifen "should be administered in pregnancy with due caution" may mean that few pregnant women have been exposed to the drug. The manufacturers are always interested to hear of women who have used the drug in pregnancy and to be notified about the outcome. Since normal women have more than a 2% "background" risk of fetal abnormalities, it is never possible to state categorically that any drug is completely safe in early pregnancy,¹ but there is certainly no indication for amniocentesis or termination of pregnancy in this case. Amniocentesis, which carries a risk (albeit low) of causing miscarriage, is used to detect only a few specific fetal abnormalities. If this patient is worried about having taken the drug before she realised that she was pregnant she may gain some reassurance from a real time ultrasound scan.—JAMES OWEN DRIFE, senior lecturer in obstetrics, Leicester.

¹ Beeley L. Adverse effects of drugs in the first trimester of pregnancy. *Clin Obstet Gynaecol* 1981;8:261-74.