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CLINICAL

Medical practice on Tristan da Cunha – the remotest island community in the world

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ABSTRACT Midway between Africa and South America, on the edge of the 'roaring 40s' (37°S 12°W) is an archipelago of five tiny volcanic islands. Tristan, a British Overseas Territory, is the largest – seven miles across and rising 7,000 feet above sea level. There is no airport, no air access except for an occasional ship's helicopter and no sheltered anchorage. The nearest port is over 1,700 miles away – a week or more by ship and the tiny harbour requires constant repair due to the impact of the relentless South Atlantic. Ship-to-shore travel is hazardous as passengers (and medevacs) are transferred sitting in a box hoisted by crane to a raft or rigid inflatable boat. Tristan has traditionally had a resident 'ships surgeon' or 'island doctor'; although these terms may not have changed, the training and experience to fill these roles have. The island needs a general physician[1] with experience of primary care or a general practitioner with experience of secondary care. Additional training is required in surgical and gynaecological emergencies. The two authors between them had appropriate experience in general medicine, general practice, resuscitation and critical care and to be able to worry together is a better prospect than worrying alone – so a joint appointment for six months seemed sensible and was found to be effective.

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TRISTAN DA CUNHA

Two hundred years ago Britain built a garrison on this previously uninhabited island to guard against any attempt to rescue Napoleon from St Helena (1,510 miles north) where he had been exiled after the Napoleonic War and where he later died. When the garrison was abandoned, Corporal William Glass, a Scotsman, chose to remain with his African wife and subsequently produced a family of 16 children. Today the 270-strong community has only six other surnames, originating from over 20 shipwrecks, although seven other surnames were once represented and their bloodlines are still on the island.[2] In 1961 the volcano erupted and the islanders were evacuated to the UK but two years later they voted to return home (Figure 1).

Tristan's first hospital was built in 1942 as part of a Royal Navy base, which included the island's first resident doctor. With the discovery of an abundance of lobster in the surrounding waters, Tristan's fortunes changed and since 1950 the British Government has funded a resident teacher, doctor,[3] minister and administrator. Two of the archipelago islands are World Heritage sites[4] and there is a scientific monitoring complex on Tristan sending data to Vienna as part of the United Nations Nuclear Test-Ban Treaty Organisation. Currency is sterling and the lone policeman is recognisably British (in uniform and enforcement of UK law).

FIGURE 1 The single settlement of Edinburgh of the Seven Seas, showing the South Atlantic exposure of the small harbour. Photograph taken from HMS Richmond 2013.

OUR PREPARATION

Before we went to the Island, a training programme was arranged, including instruction in accident and emergency, ophthalmology, general practice and chronic disease management, orthopaedics, woman's health, laboratory analysis and blood transfusion. We observed several elective caesarian sections and received tuition in stitching and wound care, instruction in orthopaedic plastering and a demonstration of how to perform a burr hole. Colleagues, without exception, were happy to be contacted by email or telephone – a unique clinical support network which proved to be invaluable.

We also visited the Groote Schuur Hospital in Cape Town in order to strengthen formal clinical connections, as Tristan had recently established a referral contract with the Western Cape.

TRISTAN'S MEDICAL SERVICE

The hospital has three inpatient beds, a consulting room, a pharmacy, X-ray facilities (a portable Shimadzu with digital cassette reader), dental surgery and a well-equipped operating theatre. Laboratory testing includes a Reflotron Plus® for biochemistry and Hb, HbA1c meter and testing kits for troponin cTn1, *H. pylori* and chlamydia. Microbiology plating, culture and microscopy are available and the island's naturally filtered water is tested for *E. coli* every four weeks using the Paqualab® system.

There are five Tristanian nurses, a hospital manager, a dental assistant and a dental nurse. A dentist and dental technician visit the island annually, when all islanders are reviewed. A psychiatrist and an optometrist visit the island every second year and all are available to discuss problems by telephone at other times. Islanders are charged £1 for a prescription, which can include any number of medications, while non-Tristanians pay for medicine and medical care. It is a challenge to maintain an adequate, in-date pharmacy stock and to cover unexpected demands, including the possible failure of supply from any of the eight ships per year from Cape Town.

Until 2011, babies were born on Tristan but pregnant women now transfer off-island at no later than 32 weeks and deliver in Cape Town. The hazards and discomfort involved in travelling and [dis]embarkation, in addition to the disruption to family life are unpopular, but must be balanced against a potential obstetric emergency on island where there is no appropriate expertise available.

THE ISLANDERS

The islanders are exceptionally kind people, living in an extraordinary environment. Their community is small but stable and although some younger Tristanians are returning, the Island Council is aware of the need for 'new blood'. Income and cost of living are both less than in the UK but anyone who has lived on the island for two years qualifies for Islander status which entitles them to electricity, subsidised gas, local telephone rates to the UK, television, internet connection and medical care. After a five-year stay on the island a family has permission to own one cow and two sheep per person and unspecified numbers of ducks and hens, so food is fresh and plentiful and is also shared within the community.

Children play freely, there is no crime and the two police cells have never been used but it is no rural idyll as the weather, though not cold, is windy and frequently harsh. Fishing, the main source of income, is only possible on about 60 days a year although with skillful know-how, a day's catch in a two-man open boat averages 450 kg of lobster.

THE ISLAND'S DOCTORS

Over the last decade, as in many remote places, it has been difficult to recruit doctors for periods longer than a few months. Those appointed from Australia, India, South Africa and the UK have had a diversity of clinical backgrounds and issues of continuity of practice have arisen. It is intended that this will improve with the implementation of the Medical Operational Plan (developed to support doctors to work within an agreed framework, including clinical guidance; it is also used to promote consistency of practice and as a measure of the effectiveness of Tristan's Health Service) and Medical Guidance aide memoir[5] on common conditions such as asthma, diabetes and hypertension – appropriately adapted (mainly from Scottish Intercollegiate Guideline Network [SIGN]) for Tristan. The Foreign and Colonial Office requires information on the quality of medical care in all British Overseas Territories so the Tristan 10 index of medical care, approved by the Island Council, has been introduced.

Naval or cruise ships within a few days sailing of Tristan may have a doctor on board but this cannot be guaranteed. Emergency medical evacuation off-island has been provided by ships en route to Cape Town or the Falkland Islands and Tristan has provided medical care in the event of emergencies aboard passing vessels.[6]

COMMON MEDICAL CONDITIONS AND THEIR TREATMENT IN A REMOTE ENVIRONMENT

The prevalence of common diseases is similar to the UK, as reflected in the hospital admissions (Table 1) but treatment in this remote location requires different approaches.

Ectopic pregnancy and other acute intra-abdominal crises

The possibility of an ectopic pregnancy or other acute intra-abdominal crisis is a challenge. Ultrasound scanning is available but in the event of rupture and bleeding, resuscitation, intravenous (IV) ketamine, a midline incision and direct pressure over the fallopian tubes would have to be attempted. Although the blood group of all islanders is known, and there is a list of donors whose blood has been grouped and screened in Cape Town, there is no stored blood. For urgent medical advice, high quality telephone reception with the UK is

TABLE 1 Admissions to the hospital September – December 2012

Diagnosis	Age	Treatment	Outcome
Infant pyrexia	1	Antibiotics	Home
Biliary colic	75	Intravenous (IV) antibiotics, analgesia fluids	Home
Acute diverticulitis	78	Intravenous (IV) antibiotics, analgesia fluids	Home
Fracture/ manipulation ankle	33	Manipulation under anaesthesia (MUA)	Home
Chest pain (ship crew)	22	Observation, analgesia	Return ship
Miscarriage second trimester	38	Intravenous (IV) fluids, ergometrine	Home
Acute mania (bipolar disease)	84	Sedation, rehabilitation	Home
Asthma, left ventricular failure (LVF)	78	Steroids, BP control	Home
Supraventricular tachycardia (SVT)	65	Anti-arrhythmics anticoagulation	Home
Supraventricular tachycardia (SVT)	65	Anti-arrhythmics	Home
Vomiting, abnormal ++ liver function tests (LFT)	78	Intravenous fluids, intravenous dexamethasone	Home
Ovarian carcinoma stage 4	52	Abdominal paracentesis	Home
Ovarian carcinoma stage 4	52	Abdominal paracentesis	Home

reliable, and digital X-rays and clinical photographs can be emailed, but the connection cannot yet support audiovisual communication (i.e. Skype).

Appendicitis

With reference to acute appendicitis, a recent Cochrane review concluded that although appendicectomy remains the standard treatment[7] 'antibiotics might be a safe alternative in conditions where surgery is contraindicated'. A further meta-analysis[8] concluded that initial antibiotic treatment was safe. Using these data,[8] the risk of non-operative treatment of appendicitis may be extrapolated and the estimated risk of complication from such a conservative approach might be once in 20 years. According to Varadhan et al. the lifetime incidence of appendicitis is 7–8%. The predicted likelihood in a population of 276 with an average life span of 84 years is therefore once in four years.[7] The conditions in which these randomised controlled trials (RCTs) were performed were clearly very different to those on Tristan, but nonetheless they enable estimates to quantify the risk. It could also be said that in such a uniquely remote situation, Islanders' treatment expectations are different to those of people on the mainland. Further, in generalising RCT data to remote situations 'less reliability is acceptable and the pursuit of truth is a race after an illusion'.[9]

Diverticulitis and cholecystitis

Less controversially, diverticulitis and cholecystitis can also be treated with antibiotics and supportive management with subsequent referral to Cape Town or the Falkland Islands for further surgical care if indicated. The efficacy of proton pump inhibitors has reduced the need for gastroscopy and malignant bowel obstruction can be managed with antispasmodics, anti-emetics and analgesia, thus avoiding surgery in patients with advanced illness.

Hypertension

A total of 32% of the islanders are hypertensive (blood pressure [BP] ≥140/90 mm Hg). As in the UK, most patients are on combination antihypertensive treatment,[10–12] which has created a culture of polypharmacy in a small population where the incidence of stroke and myocardial infarction (MI) has been low.

Diabetes

Diabetes is found in 7% of islanders, including four who are insulin-dependent. Local HbA1c testing will reduce the need to send samples to Cape Town, but the management of insulin-dependent diabetes mellitus (IDDM) in physically active fishermen is challenging.

Asthma

A total of 18% have been diagnosed with asthma and there is a predictable increase of 'wheezy' bronchitis when passengers from yachts or cruise ships disembark. The islanders are not exposed to many infections and this clear pattern of chestiness and wheeze nearly always occurs after passengers/crew disembark onto the island bringing infection from the outside world. Between 2008 and 2010, 25% of admissions to the hospital were for acute asthma or exacerbation of chronic obstructive pulmonary disorder (COPD) but with the implementation of asthma guidelines,[13] the number of asthmatic or COPD patients on inhaled steroids (22%) or long acting bronchodilators (14%) has increased and admissions have reduced.

Gout

Unfortunately lobster and brewers yeast (found in beer) have high purine contents, and 17 (6% of the population) have gout, including some cases of severe tophaceous gout.

Public Health

Few Islanders smoke and cigarettes are costly by island standards (£5 in the island shop); most of those who do have spent time in the UK where they likely developed the habit. There is no recreational drug abuse. Alcohol – all of which is imported – is of course available, although many older islanders do not drink, or drink very little. Social issues related to alcohol excess are absent but sugar and imported sugar-containing foods combine to affect dental health and body weight.

CARE IN THE COMMUNITY

Nurses have only 'basic training' but they are caring. With the help of family and friends, they support the elderly and the sick and despite the lack of specialised mattresses, bedsores are very rare and rehabilitation is excellent (Table 1). The hospital has no cooking facilities, so food is provided by islanders, who make certain that patients have three meals a day and are never alone, day or night.

There has been considerable concern recently that medicine has lost its caring roots.[14] Survival of a remote community depends on helping each other and this is very apparent on Tristan. A pattern of care is well established, where the infirm and elderly are looked after by family, friends, nurses and the doctor.[15]

Additionally, there are only two berths reserved for medevacs on each of the supply ships, so if there are more patients than berths, the Island Council meets to discuss priorities and it is surprising how well patients can fare when an intervention is not possible. Tristanians are stoic; they seem familiar with death and there appears less need to have 'difficult' conversations about their understanding of how ill they are – essential in hospital palliative care in the UK.

The Islanders have immediate access to their doctor who in turn has rapid global access to appropriate specialist advice – a model of care, which allows a generalist with specialist support to manage circumstances they may not have dealt with before. In the words of Wilfred Trotter FRS 'The practice of medicine should allow intellectual freedom, give character as much chance as cleverness and should be subject to the tonic of difficulty and spice of danger.'[16] For a medical officer, Tristan is a liberating personal and professional experience.

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