Medical Repatriations from Operation Resolute (Bosnia)

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SUMMARY: Operation Resolute is a peace enforcement mission in Bosnia-Herzegovina, which commenced on 20 December 1995. During Weeks 1-26 of the operation a total of 405 British personnel were repatriated on medical grounds, out of a mean force size of 9,299. We analysed these repatriations by clinical category and according to final destination. In addition we carried out a focused analysis of the 87 medical repatriations which occurred during May 1996. 77.5% of all the repatriations in the first 6 months of Operation Resolute were for surgical conditions, and 22.5% were medical. Eighty two per cent of British soldiers were repatriated to UK, and 18% to Germany. The mean weekly repatriation rate during this 6-month period was 1.7 per 1,000 force strength. Orthopaedic conditions were by far the greatest single cause of repatriation. During the month of May there was a total of 87 repatriations, of which 12 were due to disease. These showed no consistent pattern. Seventy five of the May repatriations were due to injury and of these 29% were caused by sport, 5% by road traffic accidents, 4% were eye injuries and one was due to burns; other occupational injuries accounted for a further 27% of the total. Twenty out of the 87 personnel repatriated in May had pre-existing medical conditions, but only 35% of these had been reviewed by their medical officer prior to deployment. Medical officers should be more diligent in carrying out pre-deployment fitness screening. The routine medical surveillance of deployed troops should be targeted towards occupational causes of injury, since these are preventable and account for terminal manpower losses.

Introduction

Operation Resolute is Britain's contribution to the NATO-commanded peace enforcement mission in Bosnia-Herzegovina, which commenced on 20 December 1995. The multinational force was known as IFOR. The operation was planned to last for one year. Britain deployed a divisional headquarters, an armoured brigade and ground logistics elements, as well as providing air and naval support to the mission.

Militarily the operation has been a success, and has been imposed on a region which had been torn apart by 4 years of civil war. Although there were few battle casualties amongst British troops, there was a high level of routine sickness and of non-battle injury. 22 Field Hospital was deployed in support of the British force, but its role was mainly confined to carrying out life-saving surgery and acting as a secondary referral and diagnostic centre. Casualties who could not be treated or operated on in theatre, or who were likely to be occupying a hospital bed for more than 7 days, were repatriated to UK through 1 Aeromedical Evacuation Squadron (1 A Evac Sqn), based in Split.

In the first 6 months of the operation, 405 British personnel were repatriated from Operation Resolute on medical grounds. This high figure prompted us to undertake a critical analysis of the problem.

Methods

We interrogated the 1 A Evac Sqn database, which was complete from Day 1 of Operation Resolute, and which recorded the clinical grounds for the repatriation of each casualty under one of 18 broad specialty groups. In order to calculate weekly repatriation rates, we obtained precise population data from the G1 personnel branch of the British divisional headquarters in Split.

To obtain more detailed clinical and aetiological data on the casualties, we conducted a focused analysis of all British personnel evacuated by 1 A Evac Sqn during May 1996. May was chosen because it was at the mid-point of the envisaged 12-month military operation.

We analysed the data by means of the EXCEL spreadsheet facility in the Microsoft Office software package, which was on general issue during Operation Resolute (1).

Results

The size of the British force during the first 6 months of Operation Resolute fluctuated between a peak of 10,832 deployed personnel (Week 4) and a trough of 9,120 (Week 17). The mean size of the British force during Weeks 1-26 was 9,299.

Table 1 shows the breakdown of the 405 repatriated British casualties, according to the 18 clinical categories in the 1 A Evac Sqn database. By far the largest group of

Table 1
Repatriations during Weeks 1-26 of Operation
Resolute, by clinical category

Clinical category	Number (%) of repatriations
Orthopaedics	226 (55.9)
General medicine	53 (13.1)
General surgery	47 (11.7)
Psychiatry	21 (5.2)
Ophthalmology	13 (3.2)
Neurology	9 (2.2)
Urology	6 (1.5)
ENT	5 (1.2)
Burns	4 (1.0)
Dermatology	4 (1.0)
Maxillofacial	4 (1.0)
Plastics	4 (1.0)
Gynaecology	3 (0.7)
Cardiology	2 (0.5)
Dental	1 (0.2)
Renal	1 (0.2)
Rheumatology	1 (0.2)
Spinal	1 (0.2)
Total repatriations	405 (100.0)

repatriated casualties (55.9%) were orthopaedic, followed by those with general medical problems. There were 21

psychiatric repatriations and 13 ophthalmological. Four casualties were repatriated for skin conditions, and as a dental emergency. Figure 1 displays the same data in graphical form, and shows the preponderance of surgical over medical casualties in a ratio of 3.5:1.

Figure 2 shows the weekly repatriation rate per 1,000 force strength. This fluctuated considerably and with no consistent pattern, but with an overall upward trend as the operation progressed. Also charted is the weekly breakdown of whether the casualties were flown to a hospital in Germany (usually BMH Rinteln or RAFH Wegberg), or in UK (usually RH Haslar). 82% of casualties were flown to UK.

During the month of May 1996, a total of 87 British personnel were repatriated, 12 of them on account of disease. Table 2 gives a breakdown of the disease conditions, most of which were isolated and unpredictable events.

Seventy five personnel in May were repatriated as a result of injury, orthopaedic problems accounting for 87% of these. Within this category, lower limb trauma outweighed upper limb injury in a ratio of 2:1. Figure 3 gives a breakdown of the 75 injury-related repatriations according to the external cause of the injury. Two thirds of the injuries were due to avoidable occupational factors (sport, RTA, burns, eye injuries, other occupationally acquired injury). There were no repatriations on account of battle injury.

Out of the 87 casualties repatriated in May, 20 had pre-existing clinical conditions which contributed in part to

Fig 1. Surgical/medical repatriations during Weeks 1-26 of Operation Resolution

Fig 2. Repatriation rate from Operation Resolute

Table 2
Disease cases repatriated from Operation Resolute during May 1996, by diagnosis

Disease	Number of repatriations
DVT	2
Abdominal colic	1
Bell's palsy	1
Colitis	1
Infectious mononucleosis	1
Iritis	1
Myocardial infarction	1
Nodules both shins	1
Pelvic inflammatory disease	1
Pneumonia	1
Retinal oedema	1
Total disease repatriations	12

in whole to their repatriation. Only 7 out of these had been reviewed by their medical officer prior to deploying, as is shown in Figure 4.

Further analysis of the May data established that ten of the 87 personnel being repatriated had developed their disease or injury condition during social activity, and the remainder whilst on duty. Alcohol was involved in five of the 87 repatriations. All of these five fell into the social category.

Fig 3. Injury cases repatriated during May 1996 by external cause of injury

Six of the 87 casualties repatriated during May, or 6.9 percent of the total, were female. The proportion of females in the deployed British force during this period was 6.6. The difference was not significant ($p=0.93$, odds ratio 1.04, 95% CI 0.46-2.36, one degree of freedom).

Discussion

Despite the quiescent nature of the mission, the rate of medical repatriations from Operation Resolute is high. Extrapolating from the data, almost 1,000 British personnel will be evacuated on medical grounds over a 12-month period. This represents a gross wastage of operational manpower, and a major resource burden on the Defence Medical Services. There is an additional cost

Fig 4. Repatriated casualties with pre-existing conditions – May 1996

in that British aeromedical flights routinely have to travel to two separate destinations.

The lack of a sterile operating environment in Bosnia during the first phase of Operation Resolute is a deficiency which is now being addressed. Containerised operating suites are being procured for the British force, but once in place they will simply allow certain surgical operations and diagnostic procedures to be carried out further forward and at an earlier stage in the clinical history. The long-term outcome for any given surgical casualty is likely to remain the same, namely repatriation.

Although HQ ARRC surveillance during this phase of Operation Resolute showed that consultations for disease occurred three times more frequently than injury consultations, it was to be expected on the basis of past operational experience that injury would predominate as the main cause of aeromedical evacuation (2, 3). Orthopaedic conditions comprised the bulk of 1 A Evac Sqn's clinical workload, but this should not be interpreted as proof of a need for orthopaedic surgeons to be deployed in great numbers to forward locations. Most orthopaedic surgery is non-emergency and can wait for 24 hours or more until the casualty is stabilised, with the definitive surgery taking place at that stage. General surgeons, on the other hand, need to be deployed well forward during military operations, in order to carry out life-saving chest and abdominal surgery.

A high number of psychiatric casualties can be expected from a military mission, even when the level of combat is low (4, 5, 6, 7). In response to HQ ARRC epidemiological surveillance, a military psychiatrist was deployed to Bosnia during the third month of Operation Resolute. This greatly reduced the incidence of repatriations on psychiatric grounds.

The number of repatriations on ophthalmological grounds was high. This was despite the presence at 22 Field Hospital of a trainee ophthalmologist, and the existence at the Franco-German hospital in Split of a tertiary referral centre for eye disorders. The incidence of serious eye disease increased as the weather became warmer, as might have been predicted from ophthalmological experience in the Gulf (8).

This study showed that skin disease, although rarely life-threatening, can be a significant cause of repatriation in deployed troops. Dermatology was the fourth largest cause of medical, as opposed to surgical, repatriations. This bears out previous findings during Operation Resolute that the incidence of both common and exotic skin disease in the British force was high (9, 10, 11, 12).

As late as the 1960s dental emergencies were the largest single cause of helicopter ambulance journeys in deployed British troops (13). Only one casualty was repatriated on dental grounds during the six-month period of this study, and this was owing to dental trauma and not dental disease. This is evidence of the greatly improved dental health of the British population in general, the success of the Armed Forces' dental conservation programmes, and the ability of uniformed dental officers today to carry out complex treatment procedures at forward locations.

The high incidence of occupationally-caused injury is a cause for concern. Most occupational injuries are preventable, and an excess of such conditions suggests a breakdown in the management function (14, 15). The special case of sports injuries during Operation Resolute is the subject of a separate study (16). The routine medical surveillance of deployed troops should target occupational causes of injury (i.e. sports injuries, RTA, eye injuries, burns, other occupational injuries), in order that commanders can be advised of the problem at local level, and primary preventive strategies implemented.

Major non-contagious diseases such as asthma, and peptic ulceration present commonly in civilian general practice (17). These conditions however are not an important cause of terminal manpower losses during operations, and their routine surveillance at primary care level (as in "J95" is of no value.

The fact that twenty personnel out of those repatriated during May 1996 had deployed with pre-existing disease, and that only 35% of these had been reviewed prior to deployment, suggests that unit medical officers are not being as vigilant as they might be in screening personnel about to deploy overseas, or else are allowing individuals to deploy inappropriately. This finding concurs exactly with Adams' study, which showed that out of a series of Operation Resolute patients who were awaiting repatriation and who had deployed with pre-existing disease, only 34% had been medically reviewed prior to deployment (18). The remedy to this problem lies in the better training of civilian medical practitioners, and in clearer directives to uniformed medical officers in advance of major deployments.

This study demonstrates that alcohol has not been a contributory factor to occupational causes of injury during Operation Resolute, and suggests that alcohol abuse is rare. Although a "two-can rule" is in place in some British units, it has not been imposed on the entire British force. Instead the supervised, moderate consumption of alcohol is encouraged as a means of relaxation, within reasonable limits.

Finally, it is worthy of note that there was no excess of female repatriations. This is in line with Hines' findings in the Gulf that for most conditions female US personnel did not consult any more commonly than males (19, 20). The subject of gender-related morbidity differentials warrants greater study, particularly as Adams found that repatriations in females occurred at a much higher rate than in males (18).

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