Medical services in the Royal National Lifeboat Institution

The Royal National Lifeboat Institution (RNLI) was incorporated by Royal Charter in 1860, but it had been founded in 1824 by Sir William Hillary as The Royal National Institution for the Preservation of Life from Shipwreck. There had previously been a number of local groups for a similar purpose, many stimulated by events following the wreck of the Adventure of Newcastle at the mouth of the Tyne in 1789 in full view of thousands of onlookers. Thereafter a private club offered a prize of two guineas for the best design of a boat that could be used to save lives from shipwrecks in dangerous seas. There was bitter controversy between the three contestants for the prize, but it was awarded to Henry Greathead, and the boat which he designed and built was called Original. It is generally accepted that this was the first purpose-built lifeboat; it cost £76 9s. 8d. and remained in service for 40 years [1].

There are now 208 lifeboat stations round the coasts of Great Britain and Ireland, with 259 lifeboats and an additional relief fleet of 101 [2]. These boats may conveniently be divided into ‘all weather’ and ‘intermediate’ lifeboats, all over 10 metres in length, and ‘inshore’ lifeboats, all under 10 metres. The larger classes of boat have cabins with protection from the weather for casualties and for crew when not on deck. The older boats, which are in the process of being phased out, have a speed somewhat under 10 knots, whereas the newer boats, most of which are self-righting, can travel at 15 to 20 knots. The ‘under-10-metre’ boats are inflatables, though the largest, the Atlantic 21, has a rigid hull below the inflated tubes that constitute the sides of the vessel; they have speeds of up to 30 knots. The Atlantic 21 has a specially mounted inflatable bag by means of which it can be quickly righted after a capsize. Figures 1 and 2 illustrate one of the boats in each division, and it will be obvious that each must have its own special medical problems.

The pattern of RNLI rescues during 1989 indicates that some 75% of the emergencies arose during leisure activities [3] (Table 1).

Development of medical facilities

After the First World War an attempt had been made in conjunction with St John’s Ambulance Brigade to introduce a first aid scheme, but it never really got off the ground and finally lapsed in 1928. In 1951 the RNLI asked Dr Geoffrey Hale to look at its medical organisation, and in 1952 he submitted a report to the Committee of Management. He had found that there was no special equipment to care for casualties apart from a poorly equipped first-aid box on each lifeboat; knowledge of first aid among crewmen was minimal, and there were no facilities built into lifeboats to ease the medical care of casualties. For example, even though one of the classes of lifeboat at that time had a cabin, its floor, which was the only sheltered space available for artificial respiration, was awash in heavy weather to a depth of 2–3 inches. Even this was a great advance, for on another of the contemporary boats a casualty might have to be resuscitated with his feet lying over the gunwale in the bows and his body lying over two coils of rope [4]. Despite some initial resistance, Hale’s recommendations, which formed the subsequent basic structure of the medical services, were fully accepted. The more important problems, such as a properly designed lifejacket, were looked into by a number of ad hoc working parties, and Honorary Medical Advisers (HMAs) were appointed who were usually local general practitioners; where practical, one was appointed to each lifeboat station. There are at present 200 and, although these doctors are not expected to go to sea as part of their duties, they invariably do so when called upon; a few are actually crew members of lifeboats. There are also five Medical Referees (see below). A regularly issued newsletter is sent to all who are involved in RNLI medical activities.
Details of these developments have been described by Hale [5].

In 1971 a Medical and Survival Committee was formed to advise the Director and Chief Inspector on the following points:

1. all medical matters;
2. all matters of survival and protection;
3. to consider matters of policy regarding the above when required to do so by the Executive Committee.

The problems

In order to convey some idea of the sort of conditions a lifeboatman might have to work in, the following few sentences have been taken from two reports of recent rescue operations, the first by an ‘all weather’ boat and the second by a small (4.9 m) ‘inshore’ inflatable of the type shown in Fig. 2.

‘At 1620 Tenby’s 47 ft [14.3 m] Tyne-class lifeboat Sir Galahad was launched down the slipway with Coxswain Thomas in command and headed SE by E at full speed . . . The wind was now blowing WNW Force 8 to 9 with rain squalls and poor visibility. The sea was very rough with 30 ft breaking waves . . . The lifeboat was constantly hit by breaking seas, which engulfed the crew working on deck . . . As Silver Stream was lining up with New Venture (both Motor Fishing Vessels) to begin the attempt to drive clear [of the shore on to which they were being driven], a very large sea struck her broadside and she was rolled over until her keel could be seen. A large deep-freeze on the vessel’s deck was hurled 30 ft in the air by the impact of the wave. Amazingly the MFV recovered, but she was part-full of water and listing to starboard. Coxswain Thomas could see that the skipper was strapped in the wheelhouse by loose gear on the deck and that, with the vessel beam-on to the seas and powerless, the man was in grave danger. Coxswain Thomas drove the lifeboat in towards the casualty, positioning the starboard bow perfectly for a rescue attempt. With the coxswain exploiting the lifeboat’s manoeuvrability by expert use of the engines, Second Coxswain Roy Young and Crew Member Clive Thomas were able to pull the skipper clear through the MFV’s wheelhouse window and take him below on the lifeboat.’

‘The lifeboat (a 16 ft [4.9 m] long inflatable) had put to sea at 1021 . . . to locate five canoeists on a charity paddle and experienced conditions which deteriorated to storm force 10 winds with driving rain and spray which reduced visibility to almost nil at times. Helmsman Steenvoorden quickly located the casualties in appalling conditions and took them aboard the lifeboat. With eight people on board, the lifeboat was continually full of water in the confused 10 ft seas . . . The survivors having

Table 1. Launches and lives saved by the RNLI in 1989: showing the category of boat involved and the sources of emergencies

| Type of service          | All-weather lifeboats | Inshore lifeboats | Total launches | Total lives saved |
|--------------------------|-----------------------|-------------------|----------------|------------------|
|                          | Launches  | Lives saved | Launches   | Lives saved     | Launches  | Lives saved     |
| Pleasure, sail           | 405        | 268       | 817        | 298              | 1222      | 566       |
| Pleasure, power          | 353        | 93        | 571        | 291              | 924       | 324       |
| Pleasure, manual         | 60         | 14        | 217        | 133              | 277       | 147       |
| Swimmers                 | 68         | 11        | 167        | 92               | 255       | 33        |
| Cut off by tide          | 26         | 5         | 172        | 71               | 198       | 76        |
| Fishing vessels          | 579        | 221       | 203        | 35               | 782       | 256       |
| Other commercial         | 111        | 32        | 27         | 9                | 138       | 41        |
| Aircraft                 | 21         | 0         | 14         | 0                | 35        | 0         |
| Miscellaneous            | 165        | 14        | 263        | 21               | 428       | 35        |
| Unidentified             | 102        | 0         | 81         | 0                | 183       | 0         |
| **Totals**               | **1,890**  | **658**   | **2,532**  | **820**          | **4,422** | **1,478** |

Fig. 2. An ‘under-10-metre’, D-class inflatable
been transferred to a passing pilot launch . . . the inflatable then proceeded to a yacht aground at Spurn Point and towed her to safety, before returning to her station after nearly four hours at sea.'

Although the two services quoted vividly indicate what a lifeboat crew might well have to contend with, they are in fact exceptional. Most services are much less dramatic, as shown by W. J. Guild [6]. He has analysed services reported to him in 1989 where anyone who was rescued needed first aid and/or medical attention. Tables 2 and 3 summarise some of his findings, and it should be noted that the overwhelming number of these services were of short duration—80% of inshore services lasted no longer than 15 minutes and over 90% of ‘all weather’ services lasted no longer than two hours.

**What is being done**

**Medical standards for crew members**

The required medical standards for fitness and the times at which a medical examination is required are laid down on the advice of the Medical and Survival Committee. The local HMA usually carries out the required medical examination and after this examination the decision to accept or reject the individual for service with the RNLI is taken by one of the referees, so that a local HMA need not be faced with the embarrassment of making an unpopular decision in his local community. Similar arrangements apply to those who have been absent because of illness or accident. Where there is some difficulty in deciding about their true fitness, or when there are particular medical difficulties, the opinion of an outside consultant may be sought.

**Retiring ages**

In view of the physical stresses which can be encountered in the inflatable boats (eg accelerating forces of 5g or more, and the possibility of capsize at high speed), the maximum age for a crew member has been fixed at 45 years. Although on the larger boats conditions are not generally so physically arduous, a high degree of technical sophistication is required and difficult decisions—which must be the right ones—may have to be taken very rapidly. The retiring age here has been fixed at 55 years.

**Lifejackets**

In 1963 a Lifejacket Working Group was set up, which included Professor E. A. Pask, who had been involved in the design of the ‘Mae West’ during the war. A sophisticated anthropomorphic immersible dummy was designed which would simulate as closely as possible an unconscious ‘average’ man when placed in water [7]. Using this mannkin, tests of existing life-

| Table 2. Services reported to W. J. Guild in 1989 where those rescued received first aid and/or medical attention |
|---------------------------------------------------------------|
| All-weather lifeboats | Inshore lifeboats | Total |
|-----------------------|------------------|-------|
| Total services        | 157              | 116   | 273   |
| Total survivors       | 261              | 182   | 443   |

| Type of medical casualty (main disability) |
|-------------------------------------------|
| Exposure (air)                           | 60               | 49    | 109   |
| Exposure (immersion)                     | 59               | 76    | 135   |
| 'Illness'*                               | 68               | 19    | 87    |
| Injury*                                  | 60               | 38    | 98    |
| Maternity*                               | 14               | 0     | 14    |

* Some of these cases required transport from islands or from shore, eg the base of cliffs

jackets were carried out at sea during the course of designing one especially suitable for the RNLI [8]. This lifejacket has been in general use ever since. It has an inherent buoyancy of just over 20 lb (9 kg) and when fully inflated (by mouth) of 48 lb (22 kg). It will keep the wearer floating on his back with his body at an angle of about 30 degrees to the surface of the water. Such a person will tend to float facing the wind and waves; the buoyant front of the jacket has thus been designed to divert as far as possible water and spray away from the wearer’s face—an important point since a person, particularly if hypothermic, may be drowned by spray and water entering the nose and mouth. The inherent buoyancy, which inevitably and unfortunately adds bulk to the jacket, is a safety measure for anyone who might be knocked unconscious when swept overboard. Recently, the advent of ‘all weather’ boats with heated cabins and improvements in methods of rapid inflation have made it necessary to design a new lifejacket which will take these new factors into consideration.

| Table 3. Involvement of doctors, nurses, medical auxiliaries or helicopters in Guild’s sample |
|---------------------------------------------------------------|
| On lifeboat at sea | At boathouse or on shore |
|---------------------|--------------------------|
| Hon. Medical Advisers | 36                       | 16         |
| Other doctors, nurses or medical auxiliaries | 60               | 4         |
| Total services where qualified help was given | 96               | 20        |

10 casualties were transferred at sea from a lifeboat to a helicopter and 15 from own vessel or from shore after involvement of a lifeboat crew.
Protective clothing

This clearly must be waterproof and warm; the fabric must be very tough and should allow the diffusion of water vapour. It should have an attached hood which can cover a protective cap or helmet and most of the face, and it should not interfere with the flotation properties of the lifejacket. The colour should be very conspicuous. The existing bright orange gear, which has proved very satisfactory, is nevertheless being replaced by newly designed clothing made of more efficient fabric. In particular it is more resistant to corrosive chemicals which might be encountered. Its fluorescent yellow colour is more conspicuous than the previous orange. Like the previous clothing, it consists of a jacket and trousers which will cover the normal clothing, the trousers falling outside rubber boots.

Swimmers are, of course, provided with wet suits, and special clothing is also available for crews of inflatables.

Hypothermia and drowning

Hypothermia, whether from undue exposure to cold conditions when inadequately clad or from immersion in the sea, when it may be associated with drowning, is one of the most frequent hazards (Table 2) for those who have to be rescued. The sea off our coasts is always cold, rarely rising above 12°C, although on the south and west coasts it may in some places reach 15°C in the summer. Hypothermia is thus always a hazard for those who become immersed, quite apart from drowning. The pathophysiology has been summarised by Golden [9]. For those taken on to one of the larger boats, with heated cabins, blankets and available hot drinks, the problem concerns the first-aid treatment of those who are significantly hypothermic and/or drowning when they are picked up. Various methods of rapid rewarming have been looked at but none has so far been adopted. On one occasion, many years ago, the very red face and head of the present Director of the RNLI could be seen protruding from a bag constructed of channels through which water warmed by the engines was circulated! This system was rejected along with others.

Permanent oxygen-delivery apparatus was installed on one or two offshore boats in the past, but was not used and so was discarded. The matter is now being reconsidered because of the introduction of more robust portable machines which can also be used on smaller boats, and the added requirement due to the popularity of skin diving.

On inshore boats, where there is no shelter and where the speed of the boat increases the wind chill, protection, particularly from the wind and spray, is essential. For this purpose pouches or sheets of tough plastic are provided in which the rescued person can be enclosed after being wrapped in a blanket. Some boats have 'space' blankets, but it is doubtful if these have significant advantages. Fortunately most of these rescue operations are of short duration.

Getting a casualty quickly out of the water on to a lifeboat can be quite difficult, and there is some evidence that hoisting a hypothermic person out of the water can be hazardous if he is suspended vertically for a prolonged time. Thus, a swimmer may have to go overboard to place slings round the shoulders and legs of the casualty or, particularly if he is injured, to fix him into a basket stretcher (see below) so that he can be lifted on board by means of a specially designed hoist, while remaining horizontal.

Stretchers

Although many different designs have been considered and tested at sea, at present two are in general use—a modified Neil Robertson and a specially designed basket stretcher. Ships and boats tend to have narrow gangways and hatches, awkward angles, and steep stairways to negotiate, and the Neil Robertson is the best for this purpose; it also folds flat for easy stowage. Much better for a casualty, however, is the basket stretcher. It floats, so that a casualty who is still in the water can be put into it before being hoisted on to the lifeboat, using specially placed anchor points. It is big enough to hold a large man even when wearing a lifejacket, and the Royal Air Force and the Royal Navy have agreed that they will airlift a casualty in such a stretcher, thus making redundant the previous practice of transferring the person already secured in an RNLI stretcher into one lowered from a helicopter. The newer lifeboats have specially designed bunks in the aft cabin where casualties in these stretchers can be placed so that they can be attended to as conveniently as possible by a first-aider.

Encounters with unknown chemicals

Well over 1,000 dangerous chemicals which are transported in bulk were listed in 1985 [10], and the economically and socially more advanced countries have strict regulations concerning the transport of such substances in their ships. Unfortunately some countries have less-stringent rules, and some ships’ masters do not appear to adhere even to these. There are frequent press reports of chemical containers on beaches, one of them detailing 130 containers, containing 41 hazardous chemicals between them, washed up in a 12-month period [11]. It is estimated that some 9 million tons of chemicals are handled annually by our ports, and it says a good deal for the regulations that the RNLI has been involved in only two significant incidents in three years [12]. Although it is highly unlikely that any particular lifeboat will encounter an incident involving hazardous chemicals, if it did so it could be very dangerous—and difficult for the coxswain, who could not be expected to have knowledge of the hazards involved. It was thus felt necessary
to set up a special procedure to be followed if such an event should occur. Rescue operations at sea are controlled by the coastguard with whom a coxswain is in radio contact and through whom advice can be obtained. The coxswain can report such things as a hazard warning sign, or an international identification number which he may see on a container, and ask for advice. This can be obtained by the coastguard from one of the chemical information centres, or from the National Poisons Unit whose director, Dr Volans, is a member of the RNLI Medical and Survival Committee and is fully cognisant of conditions on a lifeboat.

First aid

A lifeboat crew may encounter any sort of accident, but an outstanding need is for them to be skilled in methods of life support. Hypothermia and near-drowning are the most frequent emergencies encountered, and their first-aid treatment is thus particularly important. Conventional mouth-to-mouth artificial ventilation may be very difficult in a lifeboat but, if carried out via a Brook airway with one valve to divert the patient’s expired air out of the apparatus and another to admit air when the first-aider inhales, it is much easier and more effective; in particular, it leaves the first-aider with one free hand to steady himself, and it also affords some protection against the transmission of infection.

For many years it has been the aim for at least two of the crew of the larger lifeboats to be certificated first-aiders. Recently a new RNLI course in first aid has been drawn up: ‘The contents... cover the requirements of the course in basic first aid of the National First Aid Organisations, as recognised by the Health and Safety Executive for certificate purposes. The contents are modified and augmented where necessary for the particular conditions of lifeboat work. The course is therefore intended to be a high-quality course with an attainment level above that of the national basic first aid course’. Along with the very extensive ‘course notes’, packs of teaching slides and video-tapes have been made to assist those HMAs who wish to train their crews. In addition, two mobile teaching units have been formed, each with an experienced instructor based on a large caravan fully equipped with audio-visual and first-aid apparatus and with a dummy on which trainees can practise, for example, artificial respiration. It is expected that a training course will be available to crew members at least every four years. These arrangements are proving very popular, and requests have been received from crew members’ families and from cliff rescue volunteers to attend the course—an interesting development at a time when public ignorance of first aid is being deplored.

Provision for pain relief has presented problems. Tubunic ampoules of morphine were available for use under strict Home Office regulations by first-aiders trained in their use, but their manufacture has ceased and now disposable syringes preloaded with one dose have been substituted. Entonox is being introduced for use on the larger classes of boat, the present apparatus having been found suitable.

Equipment, procedures and efficiency are formally tested each year by an exercise at sea involving several lifeboats, other vessels, a helicopter from the RN or the RAF, all co-ordinated by HM Coastguard. The theme centres on some sort of accident resulting in numbers of injured—‘wounds’ being made up very realistically. Members of the Medical and Survival Committee are present on the various boats acting as observers. Both medical activities and operational matters are tested, and at the end of the exercise a very detailed assessment is held in which all key people take part.

Conclusion

Medical work in association with the RNLI is an exciting challenge, particularly for those interested in emergency first aid. The technical development of lifeboats continues apace and the change in cargoes carried by commercial vessels, together with the emergence of new aquatic sports close to shore, means that new problems are continually emerging. The Institution strongly supports efforts to overcome such challenges and constantly gears its developments to provide maximum assistance to its crews, including those trained in first aid.

During 1989 the Institution spent £30,272,000, all derived from voluntary contributions. This was the expenditure necessary to run and keep technically up-to-date an organisation which, during the period, saved 1,478 lives and safely landed on shore 778 other people. This expenditure is equivalent to nearly £20,500 per life saved.

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