Underwater medicine: a neglected area in Accident and Emergency specialist training

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We have evaluated the available medical care to sports divers by a postal questionnaire sent to consultants and senior registrars in Accident and Emergency medicine in the UK, assessing their training in underwater medicine. Replies were received from 60 of 96 consultants (63%) and 32 of 58 (55%) senior registrars. Thirty-two per cent of consultants and 50% of senior registrars had previous personal experience in managing an underwater diving accident. Thirty per cent of consultants and only 19% of senior registrars had prior formal postgraduate training in underwater medicine. Twenty-seven per cent of consultants and 13% of senior registrars replying did not know the pattern of referral for specialist advice nor where the nearest recompression chamber was to be found. We believe that more formal postgraduate training in underwater medicine is needed by A and E medical staff. Furthermore, clear guidelines about emergency management and patterns of referral for diving accidents should be displayed prominently in all A and E departments.

Keywords: Underwater medicine, diving accidents, training in underwater medicine

There are an estimated 50 000 sports divers and 1500 commercial divers in the UK¹. The medical care of commercial divers is controlled by law and specialists in diving medicine are designated to attend to their medical needs. In contrast, the care of sports divers is not supervised and they will tend to present to the nearest Accident and Emergency (A and E) unit in the event of a diving accident. Roughly 120 sports divers required recompression therapy in 1988 and the incidence appears to be rising².

To evaluate the medical care available, we have studied by postal questionnaire the training that UK A and E consultants and senior registrars receive in underwater medicine. We have also investigated their knowledge of the location of specialist referral centres for further management of dysbaric illness.

Methods

Two-hundred-and-eighty-seven UK A and E departments were identified from the 1988 *Directory of Emergency and Special Care Units Handbook* (published by CMA Medical Data Ltd., Cambridgeshire). This

Table 1. Questionnaire

1. Give details of undergraduate teaching, postgraduate lectures, one-day seminars or courses in underwater medicine attended.
2. Do you know whom to contact when faced with a patient with a decompression accident?
3. Where is your nearest recompression chamber?
4. Give details of personal experience in managing diving accidents (other than drowning).
5. Are you a scuba diver?

excluded A and E departments in Northern Ireland and those specializing in ophthalmological, paediatric and military emergencies. Every third A and E department listed ($n = 96$) was chosen to receive a postal questionnaire (Table 1) addressed personally to the consultant whose name appeared first. In this handbook, the departments are listed alphabetically in districts within regions. In addition, the names and addresses of 58 senior registrars practising in A and E medicine were obtained from the Casualty Surgeons Association and the same questionnaire was sent to all of them.

In an effort to establish current trends in undergraduate teaching, the deans of 24 UK medical schools were asked how many hours of formal training the undergraduates received in underwater medicine.

Results

Sixty consultants responded (63%) (Table 2). A total of 18 (30%) had received formal postgraduate training in the form of a course (8), or a lecture or one-day seminar (14). Three consultants had had undergraduate training in underwater medicine. Nineteen responders (32%) had previous personal experience in managing a diving accident and 16 (27%) were unaware of the nearest decompression chamber or of the availability of specialist referral.

Thirty-two senior registrars responded (55%). Only six (19%) admitted to any formal postgraduate training; all six had attended a lecture or one-day seminar and two of these had also attended a course. Sixteen responders (50%) answered positively to personal experience in managing a diving accident. Four responders (13%) did not know the nearest recompression chamber site.

Eighteen of 24 medical schools replied (75%). Three (17%) medical schools devoted a total of 1 h to

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Table 2. Results of postal questionnaire to 96 consultants and 58 senior registrars on underwater medicine training

Training, knowledge and experience	Consultants 60 responders (63%)	Senior registrars 32 responders (55%)
Undergraduate training	3 (5)	3 (9)
Postgraduate training	18 (30) (70% in post < 10 years)	6 (19)
Lecture or seminar	14 (23)	6 (19)
Postgraduate course	8 (13) (Three while in armed forces)	2 (6) (One while in armed forces)
Referral pattern not known	16 (27)	4 (13)
Personal experience in managing a diving accident	19 (32) (Nine with no previous training)	16 (50) (Ten with no previous training)
Scuba divers	3 (5)	7 (22)

Values in parentheses are percentages

the teaching of underwater medicine to undergraduates. Fourteen (78%) had no time set aside for this purpose and one medical school refused to answer the question.

Discussion

Although constituting a relatively rare presentation to A and E departments, dysbaric illness is an important condition to diagnose since its treatment is often worthwhile and delay beyond a few hours may adversely effect the prognosis³. It usually presents as pulmonary barotrauma (pneumothorax, mediastinal emphysema or arterial air embolism) or as decompression sickness involving joints or skin (type 1), or spinal cord, cerebrum or cerebellum (type 2). In their classic forms, all are readily recognized. However, many cases present with vague symptoms such as abdominal pain, fatigue or tingling, which may herald catastrophic spinal cord damage. Recent evidence suggests that the majority of cases of decompression sickness clinically confined to the spinal cord also have cerebral perfusion defects and, therefore, must be regarded as having multisystem disease⁴. **Decompression sickness can occur despite safe diving practice and use of decompression tables, and pulmonary barotrauma can even occur in the swimming pool if divers using compressed air cylinders hold their breath on ascent¹.** Thus it is imperative that, confronted with divers who are symptomatic within 24 h of a dive, doctors should consider dysbarism and act appropriately.

The lack of teaching of underwater medicine at undergraduate level is perhaps not surprising in view of competition for space in an already packed curriculum. However, only 30% of consultants and 19% of senior registrars in the A and E departments

surveyed had any formal postgraduate training in underwater medicine. The finding, however, that 32% of consultants and 50% of senior registrars had personal experience in managing a diving accident indicates that formal training at postgraduate level should be mandatory for those embarking on a career in A and E medicine. Of great concern is the finding that roughly 25% of consultants and 13% of senior registrars were unaware of the locality of specialist referral centres, a deficiency that clearly should be rapidly rectified.

References

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Appendix 1. RECOMPRESSION CHAMBERS

Extensive facilities are available for helping with cases of dysbaric illness

Fifteen chambers under Ministry of Defence control operate in the UK. A further 14 chambers operate under civilian control. The addresses of these chambers are available from the **British Sub-Aqua Club, 16 Upper Woburn Place, London WC1 0QW, UK.**

Twenty-four hour specialist advice in managing diving accidents is available through the Royal Navy at Portsmouth (telephone 0705 822351 (for general advice) or 0705 818888 (FOR A LIFE THREATENING EMERGENCY ONLY), ext. 24875 during working hours, or ext. 22008 after hours). The Coastguard or Police can arrange for emergency transport if needed.

Appendix 2. FIRST AID TREATMENT FOR DYSBARIC ILLNESS

- 100% face mask oxygen
- Supine (head down and left lateral position if cerebral air embolism)
- Intravenous fluids (crystalloid or dextran – beware anaphylaxis)³
- Intercostal chest drain if pneumothorax
- Catheterize if serious decompression sickness
- No analgesics without expert advice (especially those containing nitrogen such as Entonox)
- Intravenous heparin and steroids are controversial – seek advice
- Urgently contact Portsmouth Royal Navy (0705 822351 or 0705 818888) for specialist advice
- Arrange transport to recompression chamber (low altitude if using helicopter).