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Elective Report – Sharm el Sheikh Hyperbaric Chamber April to May 2014

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1 Describe the pattern of decompression sickness and diving related accidents and illnesses and discuss this in the context of global health.

Data related to all diving related illnesses is difficult to obtain as it is not always collected locally at diving medicine centres or by any central agencies.

Data that is more easily accessible to analyse is annual fatality rates and the associated risk factors relating to scuba diving. Recent data from 2011 from Divers Alert Network (DAN) show that there was an annual fatality rate (AFR) of 16.4 per 100,000 insured divers per year. This figure is similar to data obtained from the British Sub-Aqua Club but may differ from the general scuba population which could be higher or lower as the number of uninsured divers is not accounted for and is a growing number.[1] Data published in the book 'Diving Medicine for divers' relating to divers from USA, UK, Canada, and Japan suggest an AFR of between 15-30 per 100,000 divers per year with a chance of fatality being approximately 2-3 per 100,000 dives.[2]

The absolute number of deaths per year of insured divers listed by DAN for the first decade of the 21st century are less than 10 in the UK, and for USA and Canada combined range between approximately 80 and 100.[1]

World Health Organisation data of annual deaths per 100,000 for 2002 for USA, UK, Canada, and Japan show an overall rate of between 711 and 1014 (Canada lowest, UK highest). Death from scuba diving within the diving population is therefore much lower than death within the general population. Deaths within the general population are broken down to between 34 and 124 from communicable, maternal, perinatal and nutritional conditions (CMPNC), the highest of these being respiratory infections at 110 in the UK, 3 fold higher than the 30 for divers quoted above. Non communicable diseases (NCD) make up between 614 and 858 (Japan the lowest and the UK again the highest). Within this category cardiovascular disease and malignant neoplasm are the highest numbers with cardiovascular disease being responsible for between 244 and 387 deaths (Japan lowest, UK highest). Malignant neoplasms were responsible for between 192 and 256 deaths (USA lowest, UK highest). Deaths from drowning for these countries per 100,000 of the general population, range from between 0.4 and 4.6 (UK lowest, Japan highest). [3] For these countries therefore the predominant causes of death are NCD primarily due to cardiovascular or malignant neoplasm. Deaths due to diving, related to the number of divers are significantly lower than any of the main causes of unavoidable deaths, and when compared to an activity such as horse-riding which has an acute harm to person rate of 1 per 350 exposures, makes diving a relatively safe option though not without risk.[4]

Globally the highest rates of death are 2764 per 100,000 for Sierra Leone with the global average per country (GAPC) being 1000. CMPNC are the greatest cause of death at 2149, these relate again to Sierra Leone, the GAPC is 395. Of the communicable diseases HIV deaths are highest at a rate of 1871 in Sierra Leone, the GAPC for HIV is 99. NCD have a highest rate of 1389 in the Ukraine and GAPC of 531. Globally therefore NCD are a greater cause of death per 100,000 than communicable. Within the NCD cardiovascular disease has the highest rate of 1032 per 100,000 again for Ukraine, and a GAPC of 277. Malignant neoplasms have a high of 314 and GAPC of 111 the high being Hungary.[3]

Globally for absolute numbers of deaths for 2002, CMPNC are responsible for 18.4million deaths and noncommunicable 33.5 million. Drownings make up a total of 382,000 deaths. Total recorded annual deaths for Canada, Japan, UK and USA for 2002 are 222k, 973k, 599k and 2.42million respectively [3]. Compared to the number of deaths due to scuba diving of less than 100 for Canada and USA combined or less than 10 in the UK, a person is much more likely to die from a non scuba diving related cause.

In summary deaths due to scuba diving within the total number of deaths, or specific sub-categories for those countries listed is insignificant, when taken in the context of the diving population they make up rates of between 0.015% and 0.03% per year, and between 2-3 per 100,000 dives, compared to sports such as horse riding, scuba diving with proper training presents much less danger to individuals but is not without risk.

2 Describe the pattern of health provision in Egypt and contrast this with the UK.

In Egypt there is no direct equivalent of the NHS with free care for all. In Egypt health care is provided by three sectors, government, the public sector (charitable organisations), and the private sector. These sectors complement each other, but the government is the principal provider of health care services in terms of capacity, expenditure and the range of different kinds of services it offers.[5] In the UK healthcare is provided primarily by the government (NHS) and to a lesser extent the private sector with very little assistance from charitable organisations.

In 2011/12 the Egyptian government spent EGP23.8 billion [5] (approximately £2.4 billion) compared to the UK that spent £105.2 billion in 2012/13.[6] The population of Egypt is approximately 90 – 95 million and the UK 63 million so the spending per person by government is approximately £25 -£27 per person in Egypt compared to £1670 in the UK. It should be remembered however that costs are significantly higher in the UK compared to Egypt due to the cost of living, wages, buildings etc. In 2011 in the UK an additional £24 billion approximately was spent on private healthcare by those wanting to avoid waiting times or obtain treatments not available on the NHS. [7]

50% of the Egyptian population are covered by basic government health insurance, 30% have private medical cover and 20% have no insurance. In the UK everyone is covered by the NHS with richer people opting for additional private medical insurance in addition to the NHS. The NHS is funded by national insurance contributions/tax from all employed people [5]. It should be noted that the UK seems to be moving towards a more privately funded model trying to follow the USA which given their expenditure is nearly double that of the UK with the temptation towards over-treatment, may be an expensive decision in the long run.[8]

One definite advantage to the Egyptian medical systems is the lack of performance targets, reporting and general financial waste on management costs, which is endemic now in the NHS. Hospitals are still primarily managed by doctors not highly paid administrators.

The Egyptian system also allows patient access to secondary care without referral by a GP, and the number of GP's generally is less compared to the UK system. In the UK even private secondary care is normally by referral from primary care first. Most medicines are also available over the counter in Egypt whereas the majority are by prescription only in the UK.

The hyperbaric chamber itself is owned by the Ministry of Tourism and run by a private company Sinai Hotels and Diving Clubs.

3 Health related objective – describe the common health problems relating to the diving community who dive in Sharm el Sheikh and their management.

During my time working at the chamber the majority of health problems have related to barotrauma to the ear due to forced equalisation or failure to equalise when diving. Primarily this has been middle ear barotraumata which is treated, depending on severity, with a combination of NSAID, antihistamine, decongestant and the use of chewing gum, with advice on how to equalise properly in the future. Other problems relating to the ear include inner ear barotrauma, rupture of the tympanic membrane, otitis media, otitis externa, fungal infection and wax clearing.

There is also a fairly regular requirement for 'fitness to dive' medicals which involves the Queens College Step Test to ascertain cardiovascular fitness, checking of resting and post exercise pulse rate and blood pressure, auscultation of the cardio respiratory system, checking of the tympanic membranes via otoscopy and checking oxygen saturations in smokers. It may also extend to spirometry, ECG or Xray when indicated.

There has also been use of the hyperbaric chamber for treatment of 3 decompression sickness cases both in recreational and technical scuba divers, and also for the treatment of a badly healing fracture to the femur. Hyperbaric oxygen has a growing number of potential uses outside of the world of decompression sickness such as treatment of non-healing diabetic wounds and even in combination with stem cell therapy.

A more expansive list of the various issues that can affect divers is included at the end of the next section 4.

The chamber also manages a number of primary care issues including paediatric and general medical problems and does charitable work for financially struggling locals and the Bedouin community.

4 Personal/professional development goals. Must also include some reflective assessment of your activities and experiences – Describe the services provided to both the amateur and professional diving community by a hyperbaric medical team and how funding is managed through private insurance and Divers Alert Network to manage the financial side of the service. Also describe what I have learned about the workings of a hyperbaric chamber service and diving medicine in general.

In contrast to the NHS services that are free at the point of treatment, charges have to be made to patients using the services of the diving chamber. There are significant overheads to be considered as hyperbaric chambers are not cheap to buy, maintain or run. There is also considerable specialist knowledge required by the physicians operating the chamber. The need to charge means there is a requirement for an accountant to manage the finances of the centre. This is not completely different from general practise in the UK where the GP is essentially operating as a sole trader/business, and has a practise manager and accountant, to manage their funding and payments from the primary healthcare trust, responsible for funding their practise. The main difference between this and the UK, is that patients at the chamber pay in cash and leave with an invoice rather than paying through a national tax. They can use the receipt to get refunds from their travel insurance company or private medical insurance company (assuming they have one). Insurance claims can also be managed directly by the centre with DAN and other insurance companies. DAN provides the majority of diving insurance packages as they are specialists in this area, and the main physician Dr Adel is the director of DAN Egypt. The centre also provides medical reports to insurance companies in order to validate claims.

There is a dual tariff system where locals who earn much less than western tourists pay a much reduced rate for consultations, which seems fair. Where overcharging and over-treatment is a concern in the UK regarding

the privatisation of the NHS, I have seen no evidence of it in this centre which is run as cost-efficiently as an NHS facility would be, though the medical director has reported of other centres who have been trying to overcharge insurance companies. This however is no different to the current situation with the NHS where fraud is reported to be in the order of millions of pounds per year and statistics are manipulated by management to avoid financial penalties.

Hyperbaric medicine is a specialist and interesting field and has scope for treatments outside of just the diving community, with research into treatments for diabetic wounds, stroke, multiple sclerosis and stem cell therapy to mention a few. Diving medicine itself covers not only the specialist field of diving related diseases as listed below, but also a wide range and large number of general medicine. It requires the specialist knowledge of the impacts on any disease process / medication caused by diving in an underwater hyperbaric environment. I had not realised quite how wide ranging this was and this experience has opened my eyes to the reality. It has also been interesting to gain more understanding of physiology which I had touched on more briefly in both my medical and diving training. It has sparked an interest for me as a possible future career option.

Diving related maladies and specialist areas of knowledge and treatment include (this is not an exhaustive list but a good indication of the breadth of the specialty):

“Dysbaric Diseases

Barotraumas – Including Pulmonary Barotrauma, Ear Barotrauma, Sinus Barotrauma, Others

Decompression Sickness, Dysbaric Osteonecrosis

Effects of Abnormal Gas Pressures

Inert gas narcosis, Hypoxia, Oxygen toxicity, Carbon dioxide toxicity, Breathing gas contamination, High pressure neurological syndrome

Aquatic Disorders

Drowning, Near drowning, Salt water aspiration syndrome

Others

Seasickness, Hyper and Hypothermia, Local infections, General infections, Trauma from marine creatures, Underwater explosions, Hearing loss, Vertigo and disorientation, Cardiac disease, Neurological disorders of diving, Psychological and neuropsychological disorders, Metabolic disorders, Drugs and diving, Long-term effects of diving, Diving accident management, Skin disorders, Dental disorders, Pulmonary oedema and dyspnoea, Trauma, Asthma, Medical standards for recreational and professional divers.” [9]

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