

Development of recompression chamber facilities in Malaysia

Rozali Ahmad, Mohd Zin Bidin, Sherina Mohd Sidik, Khairuddin Husain and Sulaiman Abdullah

Key words

Hyperbaric facilities, hyperbaric oxygen therapy, decompression sickness, general interest

Abstract

(Rozali A, Mohd Zin B, Sherina MS, Khairuddin H, Sulaiman A. *Diving and Hyperbaric Medicine*. 2007; 37: 87-9.)

Development of recompression chamber facilities in Malaysia began hand-in-hand with the development of the Royal Malaysian Navy (RMN). The period from 1960 to 1990 saw the installation of several facilities to treat diving emergencies among military divers. With the establishment of the Institute of Underwater and Hyperbaric Medicine at the Armed Forces Hospital in Lumut, RMN Naval Base, this first hospital-based recompression chamber facility has introduced hyperbaric oxygen therapy (HBOT) not only to treat diving-related illnesses but also non-healing diabetic ulcers, carbon monoxide poisoning, gas gangrene, chronic osteomyelitis and crush injuries. In the early 2000s, continuing development saw a university hospital and several private health centres setting up recompression chamber facilities in their premises. The growth of recreational and commercial diving activities together with the expansion of the RMN will have a positive effect on the development of hyperbaric medicine in Malaysia. This paper discusses the development of recompression chamber facilities in Malaysia, giving a brief historical overview and some thoughts on the future direction of HBOT in Malaysia.

Historical overview

Development of recompression chamber facilities in Malaysia began in the early 1960s with the establishment of the Royal Malaysian Naval (RMN) base in Woodlands, Singapore. There was a multiplace recompression chamber facility used by the British Royal Navy before they left this country and it was used to treat diving emergencies among RMN divers. The Malaysian Armed Forces (MAF) also started to send diving and medical officers overseas to be trained in diving, diving medicine and chamber operations in Australia, New Zealand and the USA.¹

In 1978, the Institute of Underwater Medicine (IUM) was established in the Malaysian Army Special Training Forces in Sg Udang Camp, Melaka. The IUM acquired a multiplace recompression chamber from the Australian government as part of bilateral military cooperation between the two countries. It became the referral centre for the treatment of diving emergencies among the Special Forces (Commando).^{2,3}

In 1979, the RMN installed its first multiplace recompression chamber on board a hydrographic naval vessel. This was followed by the installation of another on board a class support ship. In 1982, the RMN installed several recompression chambers (multiplace and monoplace) at the naval bases in Lumut, Kuantan and Labuan. Later, in 1985, monoplace recompression chambers were installed in each of the RMN's four mine-hunter vessels. These on-board facilities were used to support military diving operations, to treat diving emergencies and to transport injured divers to the nearest hospital.¹ During the period from the 1960s to 1990 recompression therapy was limited to the treatment of diving emergencies among military divers such as

decompression illness (DCI) and barotrauma. Prior to 1996, diving emergencies among civilian divers in Malaysia were also treated at military recompression chamber facilities.⁴

Current developments

MILITARY RECOMPRESSION CHAMBER FACILITIES

The first hospital-based recompression facility was established at the Armed Forces Hospital in Lumut in 1996 (Figure 1). This facility is equipped with a three-compartment multiplace recompression chamber and is manned by two diving physicians and twenty-nine paramedics trained in underwater medicine. Although its main aim is to support military diving operations, this facility also treats diving emergencies in commercial and recreational divers.⁵ From 1996 to 2004, 173 injured divers, mainly suffering decompression illness (DCI), were treated. The majority of cases came from commercial diving activities (particularly underwater logging operations at several dams in peninsular Malaysia), followed by recreational and military diving.⁶

Realising the medical needs of the non-military diving community, in May 2000 this facility collaborated with the Divers Alert Network (DAN), to establish a 24-hour emergency hotline. Enquiries are transferred to a diving physician on call, who provides emergency advice and assistance in evacuation and subsequent recompression treatment.⁴

The facility was also upgraded to become the Institute of Underwater and Hyperbaric Medicine (IUHM) in 2002 and expanded the use of hyperbaric oxygen therapy (HBOT) to treat other clinical conditions such as non-healing diabetic

foot ulcers, carbon monoxide poisoning, gas gangrene, chronic osteomyelitis and crush injuries.⁵ Educational training programmes on dive safety and first aid have also been developed for the Malaysian diving community.⁴

Meanwhile, the RMN embarked on its expansion programme, transforming itself from a coastal brown-water navy into a blue-water navy with a fleet now ranging from corvettes to frigates and submarines. New naval bases have been built and more recompression chamber facilities made available. The diving school in Lumut has been upgraded, equipped with state-of-the-art diving equipment and commissioned as KD “Kapal DiRaja” Duyong in early 2005 (personal communication, AG Othman, August 2005). The RMN has also developed a new submarine naval base in Sepangar Bay, Sabah (East Malaysia). The first Scorpene submarine will be delivered at the beginning of 2008 and is expected to be operational in 2009. This newest naval base has medical facilities that include a recompression chamber facility for training and treatment.⁷

CIVILIAN RECOMPRESSION CHAMBERS

At present, there are no recompression chambers in any of the Malaysian Ministry of Health (MOH) hospitals. However, the Malaysian Science University Hospital (HUSM) became the first university hospital in Malaysia to install recompression chamber facilities, with a monoplace recompression chamber in 2004, and treats mainly non-healing diabetic foot ulcers, post-radiotherapy tissue injury and radiation myelitis (personal communication, NAR Nik Hisamuddin, November 2005).

A few private medical centres have also set up recompression chambers in their premises. Currently registered are four

private clinics and one private hospital. The first was set up in 2001 in Ipoh, followed by others in Kuala Lumpur.⁸ The locations of existing recompression chambers in Peninsular Malaysia, Sabah and Sarawak are shown in Figure 2.

Future directions

The growth of recreational and commercial diving activities has brought about a need to expand recompression chamber facilities in Malaysia. With the expansion of the RMN and the arrival of the first submarine in 2008, the need for more recompression chamber facilities and trained manpower will increase. The scope of treatment has also expanded from treating just dysbaric diving diseases to the clinical management of ischaemias to improve tissue oxygenation, and is expected to expand further to the next level in the form of submarine medicine.

With increased awareness of HBOT among doctors and patients, it is expected to become a popular alternative or adjunctive modality of treatment in Malaysia. However, this will depend on the availability and accessibility of recompression chamber facilities in Malaysia as well as expertise in handling them. Cost is an important issue that can determine the development of recompression chamber facilities, where a considerable sum of money is needed to develop them as well as to maintain their operations. There is a need to network among the related agencies and institutions of higher learning to develop current knowledge into a well-recognised subspecialty.

Acknowledgements

We thank Colonel (Dr) Abd Halim Mohamed of the Institute of Underwater and Hyperbaric Medicine (IUHM), Captain

Figure 1
The three-compartment multiplace recompression chamber in the Institute of Underwater and Hyperbaric Medicine (IUHM) at Armed Forces Hospital in Lumut (source: IUHM)



Figure 2
Recompression facilities (*) in Peninsular Malaysia, Sabah and Sarawak



Abd Ghani Othman of the Royal Malaysian Navy (RMN) and Dr Nik Hisamuddin Nik Abd Rahman of the Malaysian Science University Hospital (HUSM) for their assistance.

References

- 1 Rozali A, Rampal KG, Mohd Zin B, Sherina MS, Khairuddin H, Abd Halim M, Sulaiman A. Development of underwater and hyperbaric medicine in Malaysia. *Med J Malaysia*. 2006; 61: 558-61.
- 2 Mohd Zin B. The armed forces health services support system. In: Rampal KG, Noor Hassim I, editors. *Occupational safety and health in Malaysia*. Bandar Baru Bangi: NIOSH; 1996. p. 121-7.
- 3 Junaidi MT. *History of the Malaysian Medical & Dental Corp – 25th Anniversary*. Kuala Lumpur: Malaysian Medical & Dental Corps; 1992.
- 4 Abd Halim M. Underwater medicine in Malaysia. In: Malaysia’s Health 2001. *Technical report of the Director-General of Health*. Kuala Lumpur: Ministry of Health Malaysia; 2001. p. 255-63.
- 5 Angkatan Tentera Malaysia. *35 Tahun Kor Kesihatan DiRaja*. Kuala Lumpur: Perkhidmatan Kesihatan Angkatan Tentera; 2003. p. 108-9.
- 6 Rozali A, Khairuddin H, Mohd Zin B, Sherina MS, Yaakob K, Sulaiman A. Diving-related illnesses treated at the Armed Forces Hospital Lumut. *Journal of*

Occupational Safety and Health. In press, 2007.

- 7 Wikipedia, the free encyclopedia. Royal Malaysian Navy (online) <http://en.wikipedia.org/wiki/Royal_Malaysian_Navy> (last accessed 4 September 2005).
- 8 Scuba.com. Malaysian hyperbaric facilities (online): <<http://www.scuba.com/divmalay.htm>> (last accessed 24 August 2005).

Rozali Ahmad MComm.Med(Occup Health), Mohd Zin Bidin MPH, Health Services Division, Malaysian Armed Forces Sherina Mohd Sidik MMed (Fam Med), Department of Community Health, Faculty of Medicine and Health Science, Universiti Putra Malaysia (UPM) Khairuddin Husain MMed (Occup Med), Armed Forces Health Training Institute, Malaysian Armed Forces Sulaiman Abdullah MPH, Health Services Division, Malaysian Armed Forces

Address for correspondence:

*Dr Rozali Ahmad
 No 16, Jalan Budiman 4/1
 Taman Putra Budiman
 43200 Seri Kembangan
 Selangor Darul Ehsan
 Malaysia
 Phone: +60-12-296-0365
 E-mail: <rozaliahmad@yahoo.com>*