ALFRED HYPERBARIC SERVICE
Service and Care

Radiation Tissue Injury and HBOT
This booklet has been designed by the staff of the Hyperbaric Service for patients receiving hyperbaric oxygen therapy (HBOT). It aims to provide expanded answers to the common questions that are asked by patients during their treatments.

The content of this booklet is by no means conclusive and the information given here can be elaborated on by the hyperbaric Nurse, Technician and Doctor.
# Table of Contents

- History of Hyperbaric Medicine at The Alfred ...... 1
- What is Hyperbaric Oxygen Therapy? ............... 1
- What is radiation tissue injury? .......................2
  - Indications for HBOT.................................3
  - How will HBOT help me? ............................3
- What happens during a hyperbaric treatment? .. 4
- Safety in a hyperbaric environment .................. 5
- Conclusion .................................................. 7
History of hyperbaric medicine at the Alfred

Hyperbaric medicine has been operating continuously at the Alfred since 1987.

The original chamber facilities were used to treat divers with the bends. As the number of patients being treated increased, facilities have been upgraded and our current chamber was put in place in 1999. Alfred’s Hyperbaric Service is the only public chamber in Victoria and provides the State Service 24-hour 365-day for emergencies alongside its regular inpatient and outpatient care.

What is hyperbaric oxygen therapy (HBOT)?

Hyperbaric Oxygen Therapy is the administration of 100% oxygen at a pressure greater than atmospheric pressure. As the air we breathe contains only 21% oxygen, breathing 100% oxygen at high pressure results in much more oxygen being dissolved in the body.

Hyperbaric oxygen has been used for many years to treat decompression illness ('the bends') in divers. We
are now using this treatment for other conditions such as gas gangrene, bone infections and some non-healing wounds.

**What is radiation tissue injury?**

Radiation tissue injury is a complication of radiotherapy treatment for malignancy or tumour. It occurs because radiation inevitably destroys normal cells and blood vessels, as well as tumor cells. Damage to the small arteries reduces circulation to the area, depriving it of oxygen and other necessary nutrients.

If you require surgery to a radiotherapy affected area, the wound may not heal. Hyperbaric oxygen therapy has been proven to improve prognosis and surgical outcomes.

**Indications for HBOT**

The following types of radiation tissue injury can be treated by hyperbaric:

- Soft tissue damage over treated tumour area
- Radiation cystitis
- Radiation proctitis
- Surgical wound in irradiated field
- Dental clearance/surgery for patients who have had head and neck surgery
- Irradiated tissue surgery
How will hyperbaric oxygen treatment help me?

There are several procedures that you must do before each treatment. Hyperbaric oxygen helps the body in several ways:

- **Hyperoxygenation**
  Hyperbaric oxygen increases the amount of oxygen able to be utilized by the body by super-saturating the tissue and well as haemoglobin.

- **Vasoconstriction and reducing oedema (swelling)**
  Hyperbaric oxygen has the unique property of constricting blood vessels thereby reducing oedema, whilst simultaneously increasing the oxygen supply to an area.

- **Promotes tissue growth**
  Collagen is necessary to make scar tissue and stabilises skin while growing over wounds. High oxygen levels promote the growth of collagen. Tissue such as skin, muscles and other soft tissues grow faster in an oxygen rich area.

- **Stimulates white blood cell (WBC) action**
  Some white blood cells kill bacteria by using special enzymes and toxic substances incorporating oxygen. In areas of the body where oxygen levels are low, WBC lose the oxygen dependent killing systems.
HBO restores this function, enhancing the killing of bacteria.

- **Promotes angiogenesis (blood vessel growth)**
  Hyperbaric oxygen stimulates the growth of new blood vessels into poorly perfused tissues. It also ‘supports’ at risk tissues until the new blood vessels grow.

- **Improves antibiotic action and toxic effect on micro-organisms**
  Certain antibiotics have enhanced action in an oxygen rich environment. Some bacteria are also restricted in their growth in oxygen rich tissues.

**What happens during a hyperbaric treatment?**

As the pressure in the chamber increases, you will develop a feeling of fullness in your ears. You will be taught how to 'equalise' or 'clear your ears'. This may involve swallowing, yawning, or performing a valsalva manoeuvre. You should expect a popping sensation in your ears. If the build up of pressure in your ears is becoming uncomfortable, please tell the nurse so that pressurisation can be stopped until your ears have cleared. You may not be able to equalise if you have a cold, flu or sinusitis.

You will notice that the chamber will become warmer during pressurisation. This is normal. Please let us know if you get too hot, we can give you a wet face
washer. There is a basic overhead fan in the chamber which the nurse can increase. You will also notice that the chamber will become cooler during depressurisation. This is also normal. Blankets can be provided to help keep you comfortable.

You may find that the treatments are time consuming, however, it is important that you continue the treatments on a regular basis. Interruptions will interfere with the healing process.

**Safety in a hyperbaric environment**

As the Hyperbaric Chamber is a high oxygen concentration environment there is a slight risk of fire. As a safety precaution, we will ask you to wear 100% cotton scrubs which we provide. Shoes are not allowed inside the chamber. Please leave footwear outside the
chamber so dirt and grease from the floor is not taken inside.

For safety reasons the following items are prohibited inside the chamber:

- Mobile phones
- Mp3 or CD players
- Watches
- Matches
- Cigarette lighters
- Hearing aids
- Prosthetics
- Insulin pumps
- Synthetic fibres
- Makeup/lipstick
- Hair spray/gel/other products
- Synthetic wigs/hairpieces
- Perfume/cologne

You may like to bring something to read during your treatment – but don't forget your glasses! The Hyperbaric Unit has a small library of books and magazines.

A nurse with Hyperbaric qualifications will always accompany you inside the chamber.

Outside the chamber there is another Hyperbaric qualified nurse, a Hyperbaric doctor and a Hyperbaric technician who are specially trained to operate the chamber. They observe the chamber interior constantly via a video and intercom.
Conclusion

The Hyperbaric Service is a 24 hour service, available seven days a week to treat emergency patients. Due to the irregular and unpredictable demand for hyperbaric treatment there will possibly be times when you may be kept waiting. This is unavoidable; we ask for your patience and understanding.

We have many other educational resources for you in the unit, so ask the nursing staff if you would like more information.

If you have any queries, please don't hesitate to ask.